Centers for Disease Control and Prevention
Field Epidemiology Training Program (FETP)

Non-Communicable Disease (NCD)
FIELD INVESTIGATION GUIDE
FETP Non-Communicable Disease (NCD) Field Investigation Guide

Since 1976, the U.S. Centers for Disease Control and Prevention (CDC) has worked with ministries of health (MoHs) throughout the world to establish and support ministry-based Field Epidemiology Training Programs (FETPs). Through these FETPs, health professionals are trained to be expert practitioners in applied epidemiology. Many become leaders and managers in the MoH, improving surveillance systems, strengthening capacity to address emerging health threats and endemic health concerns, and promoting a culture of data-driven decision-making. From inception, FETPs concentrated on infectious disease threats, but over the last decade many have expanded their scope of work to include non-communicable diseases (NCDs). From CDC’s Headquarters in Atlanta, CDC’s FETP-NCD Team assists national FETPs with this transition by providing technical assistance through training, minigrants, investigation tools, and direct expert consultation.

To further assist residents in developing protocols and carrying out applied field studies with direct public health consequences, CDC’s FETP-NCD Team contracted the Emory University Rollins School of Public Health’s Department of Global Health to develop an FETP Field Investigation Guide on tobacco, maternal and child health/birth defects, injury, hypertension, and cancer (cervical and colorectal). CDC experts in tobacco, reproductive health, birth defects, injury, heart disease and stroke prevention, and cancer epidemiology from CDC’s National Center for Chronic Disease Prevention and Health Promotion, CDC’s National Center on Birth Defects and Developmental Disabilities, and CDC’s National Center for Injury Prevention and Control reviewed and revised the content.

The guide includes the following by each of the five topical areas:

- Central investigation questions and ongoing field epidemiology investigation gaps (with a list of hypothesis-driven investigation questions)
- An investigation guide providing important definitions, useful formulas, commonly assessed variables, and a list of datasets
- A list of recommended exemplary investigation articles for fully CDC-supported FETP countries (see the Appendix)

The compendium focuses on supporting investigations in low- and middle-income countries (LMIC). Authors extracted information from the literature, textbooks, government-based resources (such as CDC, the National Institutes of Health, and the World Health Organization), and public health-related institutions to put together a document to guide FETP residents on developing and conducting robust investigations in their field.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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CHAPTER 1
TOBACCO

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INVESTIGATION QUESTIONS & EXAMPLE PROJECTS

Monitoring

**Question:** What is the prevalence of current tobacco use and smoking rates to identify which subgroups are in need of tailored policies and programs?

**Example project:** Use existing surveillance data, assess the prevalence of current tobacco use. Stratify groups based on sex and measure the proportion of current tobacco smokers, current daily tobacco smokers, former daily tobacco smokers (among all adults), and former daily tobacco smokers (among ever daily smokers). The study results will provide information about tobacco use and may provide data to measure the effectiveness of tobacco control efforts in your country by comparing it with baseline data (if available).

**Example project:** Use existing surveillance data sources, identify the types of tobacco used (e.g., cigarettes, bidis, chewed), across major subpopulations – classified by age, sex, income, region, and other sociodemographic characteristics. The results will highlight the form/type of tobacco use that is preferred by certain sub-populations and variations in use across sub-populations.

**Example project:** Use a survey, assess the rate of smoking among university students and determine its association with sociodemographic factors and other related predictors, including other substance use behaviors. The study will provide information on predictors associated with smoking and other health risk behaviors. The study results may inform the design of interventions and policies for tobacco and other substance use prevention programs.

**Question:** What is the country mortality attributable to smoking tobacco?

**Example project:** Conduct a population-based survey to monitor trends in tobacco use, alone or combined with tobacco-related illness. If mortality data has information regarding smoking, then using mortality data, determine smoking attributable mortality. The estimates will provide information to motivate action for stronger tobacco control policy in your country.

**Example project:** Use existing data on mortality to determine mortality attributable to smoking and ICD-9 and ICD-10 codes to identify the most relevant smoking-related pathologies for which reliable data are available. Next, calculate the relative risk and population attributable risk to establish the quantitative relationship between smoking and the selected pathologies. The estimates of the attributable smoking-related disease burden can provide value for policy formulation and decision making.

**Question:** What are the estimated rates of future susceptibility to smoking among youth?

**Example project:** Administer a school-based survey to identify the age of initiation, susceptibility factors (e.g., experimentation with tobacco products, friends smoking, parents/guardians smoking, exposure to tobacco advertising, promotion and sponsorship, smoke-free policies) that initiate tobacco use, and knowledge of the harmful effects of smoking among youth (ages 13–17). The study results will provide information on factors that may contribute to susceptibility to smoking in the future among youth. The variation in smoking rates will provide insight into the school’s smoking policy and need for intervention to raise awareness for smoking-related harm.

**Example project:** Administer a multi-site school-based survey to examine the associations between youth poly-tobacco use and substance use disorders. The study results will provide information on the variations in tobacco product use and substance use among youths who attend schools in different neighborhoods, and social and contextual factors associated with smoking and susceptibility to smoking in the future among youth.

**Example project:** Conduct a survey among students in grades 6 and 8 to assess their tobacco use behaviors, exposure to second-hand smoke (SHS), susceptibility to future smoking among never smokers.
and intention to quit among current smokers. The results will help formulate strong school policies to effectively control and prevent early smoking initiation among school children.

**Question**: What are the potential impacts of exposure to SHS among vulnerable or disadvantage populations such as blue collar workers, children, neonates, pregnant women, and illness among vulnerable populations?

**Example project**: Investigate the effects of SHS on pregnancy outcomes among non-smoking women living in impoverished neighborhoods. Compare rates of low birthweight, preterm birth, and stillbirth between exposed and non-exposed women. Survival analysis will provide information on the risk of stillbirth in SHS-exposed women living in lower socio-economic neighborhoods.

**Question**: What are the risk perceptions and attitudes towards smoke-free legislation?

**Example project**: Examine risk perception of SHS among youth and its association with the age at initiation of tobacco use. Identify factors such as demographics, social influence, media influence, and SHS exposure on risk perception towards SHS. Identify differences in the age at smoking initiation and tobacco product use.

**Example project**: Examine attitude towards smoke-free legislation (indoor smoking ban policy) and exposure among workers in indoor bars.

**Evaluation**

**Question**: What is the effectiveness of tobacco control measures in the country?

**Example project**: Measure SHS exposure in game rooms or social gathering places to determine the effective implementation of the legislative ban on smoking in public places in the country. The difference in nicotine level exposure will serve as an indicator of the effectiveness of the implementation of a legislative ban on smoking.

**Example project**: Determine whether a smoke-free policy in the workplace reduced exposure to SHS among never smokers. Compare exposure to SHS in workplace pre- and post-implementation of the smoke-free policy and compare it with another worksite where no such policy is in place (as a control site). The study results will help to check compliance with existing regulations and laws.

**Assessment**

**Question**: What are the factors associated with intention to quit among patients in public health care facilities?

**Example project**: Examine age of initiation for smoking among cancer patients and intention to quit. Identify factors/barriers that are associated with unsuccessful quitting. The results from this study will help design interventions to allocate resources and assistance for successful long-term smoking cessation.

**Example project**: Assess factors associated with intention to quit among patients visiting public health care facilities and who use tobacco in my city/state/province/country. Examine the treatment, socio-demographics, age of initiation, tobacco use, factors associated with interest in quitting, or reasons for quitting and previous quitting experience. This information will help health care providers address tobacco use in health care facilities, and help develop and deliver targeted cessation interventions to increase quit rates.

**Example project**: Use the mixed-method approach to determine factors associated with intention to quit and perceived barriers for quitting among pregnant women visiting prenatal care facilities in the country. Explore the effectiveness and acceptability of anti-smoking messages delivered by health care
providers where quitting advice and cessation counseling is part of primary counselling. This information will help health care providers address tobacco use in health care facilities and help develop and deliver more effective smoking cessation intervention.

**Question:** What is the age at initiation and intention to quit among current and former smokers?

**Example project:** Use a survey to examine the intention to quit, quit attempt, and cessation method among current and former smokers. This study will provide information about the patterns of tobacco use and preferred cessation methods among current and former smokers as an aid to smoking cessation.

**Example project:** Secondary data analysis. Examine the differences in sex and socio-economic status in the initiation of tobacco use, tobacco consumption, and exposure to SHS and quit attempts. Using GYTS data, examine the association between the initiation of tobacco use, type of tobacco used, and quit attempts. Elucidate the differences across various socio-economic status and sex regarding quit attempts. Gaining an understanding of the role of social gradient in the type of tobacco used and quit attempts will provide evidence to use in assessing tobacco control initiatives.

**Question:** What are the available resources to promote smoking cessation for people with NCDs in the country?

**Example project:** Examine initiatives to support cessation efforts among people with NCDs. Administer a survey among patients with diabetes (other smoking-related NCDs can also be used), and collect information on behaviors of tobacco use, intention to quit, quit attempts, and cessation services used to help them quit smoking. The data can be stratified by the respondents’ sex, ethnicity, culture, income, and education.

**Example project:** Examine the effectiveness of media/text messaging as marketing approaches to increase the cessation rate among vulnerable populations.

### Enforcement

**Question:** What is the effectiveness and impact of bans on tobacco advertising, promotion, and sponsorship on tobacco use cessation among adults and youth and/or initiation among youth?

**Example project:** Assess the impact on the prevalence of tobacco use among adolescents/youths in the country after comprehensive bans on tobacco advertisement, pictorial warning, and price increase. This information is important to measure the effectiveness of the tobacco control initiative on tobacco use.

**Question:** What are the community-based interventions that have the potential to impact large populations using evidence-based methods?

**Example project:** Examine changes in tobacco use among adolescents after enforcement of tobacco sales restriction to minors. Using a survey, collect information on current and past tobacco use behavior. Collect information on sources of cigarettes after enforcement of restricted sales to minors, their perception of the harmful effects of tobacco, and the intention to quit among current smokers. The study will provide information on the effectiveness of tobacco control regulations and other potential sources of cigarettes that are used by adolescents.

**Question:** What are the industry initiatives used to market tobacco products particularly to youths, adolescents, and young adults?

**Example project:** Examine compliance with the implementation and enforcement of bans, including the sale of all tobacco products to minors, within 1,000 feet of the school’s prohibited limits, and the advertisement of tobacco products. Identify socio-demographic variables associated with tobacco retailers and tobacco outlets, and assess the awareness of such retailers and sellers regarding current tobacco legislation in their country and penalty for non-compliance with such regulations. This study will
provide information on compliance with the point of sale advertisement of tobacco, prohibition of outlets selling tobacco products within or near schools, and prohibition of the sale of all tobacco products to and by minors.

**Example project:** Primary data analysis. Examine the use of flavored tobacco products (i.e., cigarette, cigar, cigarillo, dip) to recruit young and inexperienced tobacco users. Using a cross-sectional survey, examine the association between ever trying flavored tobacco products and current smoking status. The findings from this study would provide policymakers with information to regulate and prohibit sales of flavored tobacco products in order to lower youth smoking rates.

**Example project:** Primary data analysis. Characterize beliefs of harm perception about tobacco products that are labeled as “low tar,” “light,” “ultra-light,” or “mild” among young adults and how it varies by sex. Conduct a mixed-method study using surveys and focus groups on examining harm perception related to tobacco products, and explore their belief and attitude towards risk perception, other risky behavior, and the sources they use to seek information or learn about tobacco products. Stratify the findings across sex to examine the difference in the source of information and perception related to tobacco products. The study will help identify the misperceptions about the “low-tar,” “light,” “ultra-light”, or “mild” tobacco product. An effective social media messaging campaign could be designed and delivered to address some of these misperceptions using the sources cited by the youth.

**Example project:** Primary data analysis. Examine compliance with the ban on tobacco product sponsorship and promotions such as free e-cigarette/cigar or other tobacco product samples during college events.

**Example project:** Primary data analysis. Estimate the proportion of young adults exposed to cigarette advertisements and promotions who frequent bars and night clubs, and examine their likelihood for future smoking.

**Economics and Taxation**

**Question:** What is the impact of economic policies on reducing tobacco use?

**Example project:** Secondary data analysis. Responsiveness to cigarette price increase across socio-economic strata in low- and middle-income countries compared to responsiveness to cigarette price increase in high-income countries.

**Example project:** Primary data analysis/secondary data analysis. Explore socio-economic and country differences in cross-border cigarette purchasing. Education and income can be used as indicators for individuals’ socio-economic status. Using survey, collect information on whether the young adults had bought cigarettes outside their country in the last 6 months. For those who respond affirmatively, provide information on how often (example for response categories: only once, a few times, many times, and all of the time) to assess if they were purchasing frequently, occasionally, or never.

Using a multinomial logistic regression analysis with cross-border cigarette purchasing as the dependent variable (across 3 levels: non-purchasing, occasional, and frequent purchase) and independent variable including sex, age, employment status, smoking behavior (daily versus occasional smoker, heaviness of smoking, intention to quit), and smoking exclusively rolling tobacco and/or manufactured cigarettes, measure odds ratio of cross-border cigarette purchasing. The higher odds are indicative of a tax avoidance strategy.

**Example project:** Secondary data analysis. Examine the trends in cigarette price (tax price) increase and purchase behavior in geographic region of interest. Using existing data (e.g., The International Tobacco Control Policy Evaluation Project), obtain retail price data for popular brands and typical quantity of cigarettes purchased (i.e., single versus multiple packs or cartons). Assess changes in trends in brand preference and typical quantity of cigarettes purchased in relation to cigarette prices and tax rates.
INVESTIGATION METHODS

Definitions

General definitions

**Agent**: Type of tobacco product consumed

**Air monitoring**: Useful tool to measure SHS in indoor places and measure personal exposure. It is an effective method for evaluating a smoke-free policy implementation for indoor places. However, it is costly and may require repeated measurement to obtain reliable data. This method requires laboratory analysis to measure nicotine levels.

**Biomonitoring**: Approaches to measure an individual’s internal dose/exposure which can be integrated across all other approaches. It involves collecting biomarkers in saliva, urine, blood, and hair to test for SHS particles. This is a costly method and requires laboratory analysis.

**Environment**: Familial, social, cultural, economic, historical, and political factors that contribute to exposure to tobacco products

**Host**: Tobacco users

**Involuntary smoking**: Inhaling SHS that might contain carcinogens and other toxic components that are present in tobacco products.” (Ref: [www.who.int/tobacco/investigation/secondhand_smoke/en/](http://www.who.int/tobacco/investigation/secondhand_smoke/en/))

**Light and intermittent smoker**: There is no consensus definition for light and intermittent smoking. These broad terms cover different patterns of tobacco use and are usually defined through various ranges below:

- **Light smoker**: < 1 pack/day, <15 cigarettes/day, <10 cigarettes/day, or 1–39 cigarettes/week. Light smokers are further categorized as low-rate daily smokers (i.e., <5 cigarettes/day), very light smoking (i.e., <6 cigarettes/day) and “chippers” (consistently smoking ≤ 5 cigarettes/day on the days when they do smoke).
- **Intermittent smoker**: A broad term generally used to define nondaily smoking; it usually encompasses social smokers, who limit smoking to contexts such as parties, bars, or nightclubs

**Poly-tobacco use**: Current use of two or more tobacco products in the past 30 days including cigarettes; chewing tobacco, snuff, or dip; cigars, cigarillos, or little cigars; tobacco in a pipe; bidis; clove cigarettes; roll-your-own cigarettes; flavored cigarettes; clove cigars; hookah or waterpipe; flavored little cigars; snus; dissolvable tobacco products; e-cigarettes; and any other new product not listed above. (Note: 30-day use definition is mainly used to measure tobacco use among youth.)

**Single tobacco use**: Current use of only one of the products listed above

**Smoking status**: Traditionally categorized as either current smoker, former smoker, or never smoker

**Vector**: Manufacturer, distributor, or vendor of tobacco products

**U.S. definitions**

**Current smokers**: Respondents who smoked at least 100 cigarettes in their lifetimes and currently smoke every day or some days (age might be 18 and above in the United States)

**Former smokers**: Respondents who have smoked at least 100 cigarettes, but do not currently smoke
Never smokers: Respondents who report having smoked <100 cigarettes in their lifetime

**Global Adult Tobacco Survey (GATS) definitions**

Age at initiation: Age at which an individual first smoked a whole cigarette. Also defined as the age at smoking onset.

Current daily users: Adults who report using tobacco products on a daily basis.

Current use of tobacco products: Use of any number of products on at least 1 day in the past 30 days. (Note: 30-day use definition is mainly used to measure tobacco use among youth)

Current users: Adults 15 years or older who consume tobacco products daily or less than daily.

Intention to quit: Individual’s perceived likelihood or "subjective probability” that he/she will quit smoking.

Nonsmokers: Those who report no use of tobacco – includes never smokers and former smokers.

Non-use: Currently not using any tobacco products.

Number of cigarettes smoked per day (for current daily smokers): Number of cigarettes smoked in a day; may be categorized in groups of 5.

Quit attempt: Having stopped smoking for at least 1 day or longer with the intention of quitting.

Secondhand smoking: Mixture of mainstream smoke exhaled by a smoker and side-stream smoke released from a smoldering cigarette or other smoking device (e.g., cigar, pipe, bidi) and diluted with ambient air. SHS is also referred to as "environmental" tobacco smoke.

**Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Types of tobacco product(s) used</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Smoking/combustible tobacco | • Manufactured cigarettes  
• Hand-rolled cigarettes  
• Kretek cigarettes |
| Other types of smoked tobacco | • Pipes  
• Cigars/mini cigars/cigarillos  
• Waterpipes/hookah/shisha/narguileh/huble-bubble  
• Bidis |
| Smokeless tobacco | • Snuff  
• Chewing tobacco  
• Dip  
• Betel nut  
• Gutka |
| **Factors associated with exposure** | |
| Smoking status | • Current  
• Former  
• Never |
| Frequency of use | Number of cigarettes smoked per day |
| Number of products used | Total number of types of tobacco products typically consumed |
| Age at initiation of tobacco use | Age when first started consuming tobacco products (years) |
### Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Responses</th>
</tr>
</thead>
</table>
| Frequency of SHS exposure | • Daily  
• Weekly  
• Monthly  
• Less than monthly  
• Never  
• Don’t know |
| Past 30 day exposure to SHS | • Yes  
• No  
• Don’t know |
| Does someone in the household regularly smoke at home? | • Yes  
• No  
• Don’t know |
| Smoke free rules in homes | • No one is allowed to smoke anywhere inside your home  
• Smoking is allowed in some places or at sometimes inside your home  
• Smoking is permitted anywhere inside your home  
• Don’t know  
• Refused to answer  
• No response |

### Risk factors associated with the likelihood to smoke

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Responses</th>
</tr>
</thead>
</table>
| Older age  | • 18–34  
• 35–44  
• 45–64  
• > 65 |
| Being male | • Male  
• Female |
| Being white, multi-ethnic, American Indian, or Alaska native | • White  
• African American  
• Hispanic  
• American Indian or Alaska native  
• Multi-ethnic |
| Lacking college plans | • Strongly agree  
• Agree  
• Lean toward disagree  
• Disagree |
| Having parents who are not college educated | Have parents with:  
• Less than a high school diploma  
• With a high school diploma, but no college education  
• At least some college education or more |

### Risk factors that make it difficult to stop smoking

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Responses</th>
</tr>
</thead>
</table>
| Desire to quit smoking within the next 6 months | • Yes  
• No |
| How likely are you to quit in the next 30 days? | Readiness to Quit Ladder: A 10-point scale (“I have quit smoking” to “I have decided not to quit smoking for my lifetime,” and “I have no interest in quitting”) that uses the response to the item |
| Thoughts about quitting smoking | • I am planning to quit within the next month  
• I am thinking about quitting within the next 12 months |
<table>
<thead>
<tr>
<th>Variables</th>
<th>Responses</th>
</tr>
</thead>
</table>
| If you decide to quit smoking in the next 6 months, how sure are you that you would succeed? | • Not at all sure  
• Slightly sure  
• Moderately sure  
• Very sure  
• Extremely sure |

**Use of tobacco products**

| Physical effects of nicotine  
• Nicotine withdrawal | • Increased anger  
• Hostility  
• Aggression  
• Loss of social cooperation |

<table>
<thead>
<tr>
<th>Early initiation</th>
<th>Age of initiation of tobacco use</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Concerns about weight gain</th>
<th>How concerned are you about gaining weight after quitting?</th>
</tr>
</thead>
</table>

| Concerns about present and future health damage caused by smoking | • To what extent has smoking damaged your health?  
• How worried are you that smoking will damage your health in the future? |

| Perceived health benefits of quitting smoking | How much health benefit and other gains do you think you would achieve if you were to quit smoking permanently in the next 6 months? |

<table>
<thead>
<tr>
<th>Factors that need to be controlled as confounders in a multivariable analysis</th>
</tr>
</thead>
</table>

| Sex | • Female  
• Male |
|-----|---------|

| Age | • 18–34  
• 35–44  
• 45–64  
• > 65 |
|-----|---------|

| Education | • High school  
• Technical college  
• College graduate |
|-----------|------------------|

| Residence area | • Urban  
• Rural |
|----------------|-------|

**Formulas**

**General formulas**

\[ \text{Arc} = \frac{(Rc - R_\times c)}{Rc}, \text{where } R_\times c \text{ is the cancer death rate among lifelong nonsmokers, the expected death rate in the absence of smoking} \]

**Attributable risk of tobacco for cancer (or any other disease)** = Proportion of cancer deaths attributable to smoking over the overall cancer death rate

**Frequency of use** = Number of days when tobacco is used during a given time period (e.g., the previous 7 days or the previous 30 days) *(Note: Frequency of use is often dichotomized as either current daily or current nondaily use (i.e., number of daily users/number of current users). Frequency of use could also be used to calculate current frequent users (i.e., those who smoked on ≥20 of the previous 30 days).*
**Intensity of use** = Number of current users who use more than a given amount/number of current users (Note: Cut-offs should be standardized to permit comparisons. For example, for adult cigarette smokers, the use of >15 cigarettes/day could serve as a measure of heavy smoking.) (Source: [www.iarc.fr/en/publications/pdfs-online/prev/handbook12/Tobacco_vol12_3A.pdf](http://www.iarc.fr/en/publications/pdfs-online/prev/handbook12/Tobacco_vol12_3A.pdf) pg 103)

PAF = \( \frac{(p_0 + p_1 \times RR_1 + p_2 \times RR_2) - 1}{(p_0 + p_1 \times RR_1 + p_2 \times RR_2)} \); where \( p_0, p_1 \) and \( p_2 \) represent the prevalence of nonsmokers, smokers, and ex-smokers, respectively. \( RR_1 \) and \( RR_2 \) refer to the risk of dying from smoking-related pathologies for smokers and ex-smokers, respectively, compared to a baseline population of nonsmokers

**Percentage of indoor workers who were exposed to tobacco smoke at work in the past 30 days =** Number of respondents who reported being exposed to smoke in indoor areas at work during the past 30 days/total number of respondents who work outside the home, who usually work indoors, or both indoors and outdoors

**Percentage of respondents having exposure to SHS at home =** Number of respondents who report that smoking occurred inside their home/total number of respondents surveyed

**Prevalence of current tobacco users =** Number of current tobacco users/total number of respondents

**Rate of quit attempts =** Current smokers who tried to quit within the last 12 months and former smokers who quit <12 months ago. Smokers in the past 12 months includes current smokers and former smokers who quit <12 months ago.

**Smoking-associated population attributable risk (PAR) =** \( P(RR-1)/[P(\frac{RR-1}{1} +1) \) ), where \( P \) is the smoking prevalence and \( RR \) is the smoking-associated relative risk

i. Percent population attributable risk (AKA the attributable fraction):
\[ \% \text{ Pop AR} = \left( \frac{R_{\text{POP}} - R_{\text{NE}}}{R_{\text{POP}}} \right) \times 100 \text{ or } P_{\text{EXP}} (\frac{RR-1}{P_{\text{EXP}} (RR-1) +1}) \times 100 \]

ii. Smoking-attributable mortality (SAM): Mortality caused by smoking tobacco
\[ \text{SAM} = \text{OM} \times \text{PAF}, \text{ where OM is the observed mortality and PAF is the population attributable fraction} \]

PAF is calculated using the formula proposed by Levin (Source: Levin ML. The occurrence of lung cancer in man. Acta Un Intern Cancer. 1953;9:531–541), which divides the population into various categories according to tobacco use (nonsmokers, ex-smokers, and smokers)

**Formulas used to monitor SHS**

Assess the prevalence of exposure to SHS by specific age groups using an existing database or by purposive survey

Data source: The Global Youth Tobacco Survey (GYTS) has information from almost 180 countries on tobacco use among young people (13–15 years) as well as on children’s exposure to SHS in their home, frequency of exposure in the past 7 days, and parents’ smoking status.

Example: Any parental smoking = male smoking prevalence + female smoking prevalence – (male smoking prevalence × female smoking prevalence)

Demographic and health surveys contain statistics of the SHS-related conditions or diseases

In the absence of country-specific information, prior estimates for disease burden could be obtained from WHO. The estimates obtained are an approximation and may be an overestimation of the disease burden.
Estimate the disease burden among non-smokers by subtracting the disease burden due to active smoking from the total number of deaths or DALYs

For children, the health outcomes most commonly assessed are
- Low birth weight
- Sudden infant death syndrome
- Lower respiratory tract infection (< 5 years)
- Otitis media (acute and/or recurrent) (< 3 years)
- Onset of asthma (< 14 years)

For adults, the health outcomes most commonly assessed are
- Lung cancer
- Ischemic heart disease
- Onset of asthma

According to the study objective, select diseases that need to be included and which may be relevant for that particular age group. Another option is to add the individual conditions and obtain a total disease burden related to SHS.

**Formulas used to calculate disease burden**

**Among children:**

Population attributable fraction (PAF) = \( \frac{p \times (RR - 1)}{p \times (RR - 1) + 1} \)

Where \( p \) = proportion exposed to SHS in the specified age group; \( RR \) = relative risk for a given outcome in a specified population group

SHS attributable burden (AB) = PAF\(_{SHS}\) \times B

\( B \) = total burden (death, cases or DALYs)

The formula should be applied to each disease and age group separately. Add deaths and DALYs attributable to SHS.

**Among adults:**

\( B_{ns} = (B - (B \times PAF_{sm})) \times (1 - p_{sm}) \)

\( AB = PAF_{SHS} \times B_{ns} \)

Where \( B \) = the total burden in deaths, cases or DALYs; \( B_{ns} \) = the burden in nonsmokers, in deaths, cases or DALYs; \( p_{sm} \) = smoking rate; \( AB \) = burden attributable to SHS; \( PAF_{sm} \) = population attributable fraction for active smoking; \( PAF_{SHS} \) = population attributable fraction for SHS

**Data Sources**

**Global tobacco**

**Global Adult Tobacco Survey (GATS):** Household survey monitoring tobacco use among adults (15 years and older)
- [www.who.int/tobacco/surveillance/survey/gats/en/](http://www.who.int/tobacco/surveillance/survey/gats/en/)


**Global School Health Survey (GSHS):** School-based survey conducted primarily to provide data on health behaviors and protective factors among students aged 13–17 years. [www.cdc.gov/GSHS/](http://www.cdc.gov/GSHS/)

Global Tobacco Surveillance System (GTSS): Includes the collection of tobacco-specific data for both youths (13−15 years) and adults (15 years and older). [www.cdc.gov/tobacco/global/gtss/](http://www.cdc.gov/tobacco/global/gtss/)


The international tobacco control policy evaluation project: Conducts longitudinal cohort surveys in more than 20 countries and includes more than 100 tobacco control collaborators. National level information (investigators within that country and country-specific smoking data and demographics) is found at [www.itcproject.org/countries](http://www.itcproject.org/countries). Country specific survey is found at [www.itcproject.org/surveys](http://www.itcproject.org/surveys). Data request form available at [www.itcproject.org/forms](http://www.itcproject.org/forms).

The WHO Global InfoBase: Data warehouse that collects, stores, and displays information on chronic diseases and their risk factors for all WHO member states. [https://apps.who.int/infobase/Index.aspx](https://apps.who.int/infobase/Index.aspx)

WHO cancer mortality database: Contains selected cancer mortality statistics by country. [www-dep.iarc.fr/WHOdb/WHOdb.htm](http://www-dep.iarc.fr/WHOdb/WHOdb.htm)

WHO Global Health Observatory data repository: Provides access to more than 1,000 indicators on priority health topics including mortality and burden of diseases, as well as NCD indicators. [http://apps.who.int/gho/data/?theme=home](http://apps.who.int/gho/data/?theme=home)


WHO STEPwise Approach to Chronic Disease Risk Factor Surveillance (WHO STEPS): Focuses on obtaining core data on the established risk factors that determine the major disease burden. [www.who.int/chp/steps/riskfactor/en/](http://www.who.int/chp/steps/riskfactor/en/)

**U.S. - data-sets**


National Health Interview Survey (NHIS): [www.cdc.gov/nchs/nhis.htm](http://www.cdc.gov/nchs/nhis.htm)

National Survey on Drug Use and Health (NSDUH): [http://oas.samhsa.gov/nsduh.htm](http://oas.samhsa.gov/nsduh.htm)

National Survey on Drug Use and Health (NSDUH): [www.samhsa.gov/data/](http://www.samhsa.gov/data/)


Youth Risk Behavior Surveillance System (YRBSS): [www.cdc.gov/HealthyYouth/yrbs/index.htm](http://www.cdc.gov/HealthyYouth/yrbs/index.htm)

Survey question inventory

Question Inventory on Tobacco (QIT): https://chronicdata.cdc.gov/Survey-Questions-Tobacco-Use-Question-Inventory-on-Tobacco-QIT-/vdgb-f9s3?
Tobacco questions for survey: www.who.int/tobacco/publications/surveillance/en_tfi_tqs.pdf?ua=1

Tools and Analytic Methods

Fagerström Test for Nicotine Dependence (FTND)
A standard instrument to assess the intensity of physical addition to nicotine. It contains six items that evaluate the quantity of cigarette consumption, the compulsion to use, and dependence.

In scoring the FTND, yes/no items are scored from 0 to 1 and multiple-choice items are scored from 0 to 3. The items are added to yield a total score of 0 to 10. The higher the total Fagerström score, the more intense the physical dependence on nicotine.

The FTSD can be found at https://cde.drugabuse.gov/instrument/d7c0b0f5-b865-e4de-e040bb89ad43202b

Available toolkits by MPOWER categorization

(M) Monitor tobacco use and prevention policies. Surveillance and monitoring: www.who.int/tobacco/surveillance/health_outcomes/en/

(P) Protect people from tobacco smoke. Evaluation toolkit for smoke-free policies:
- www.cdc.gov/tobacco/basic_information/secondhand_smoke/evaluation_toolkit/pdfs/evaluation_toolkit.pdf

(O) Offer help to quit tobacco use. Toolkits for delivering the 5As and 5Rs brief tobacco interventions
- In primary care: www.who.int/entity/tobacco/publications/smoking_cessation/9789241506953/en/index.html
- To TB patients in primary care: www.who.int/entity/tobacco/publications/smoking_cessation/9789241506946/en/index.html


(E) Assessing compliance with Tobacco Advertising, Promotion, and Sponsorship (TAPS) Bans:
- http://globaltobaccocontrol.org/sites/default/files/TAPS_Compliance_1_0.pdf


Regional specific tools

African region: WHO Regional Office for Africa, Tobacco Control: www.afro.who.int/en/tobacco/
**Eastern Mediterranean region**: WHO Regional Office for the Eastern Mediterranean Region, Tobacco: [www.emro.who.int/health-topics/tobacco/index.html](http://www.emro.who.int/health-topics/tobacco/index.html)

**European region**: WHO Regional Office for Europe, Tobacco: [www.euro.who.int/en/healthtopics/disease-prevention/tobacco](http://www.euro.who.int/en/healthtopics/disease-prevention/tobacco)

**Region of the Americas**: WHO Pan American Health Organization: Tobacco Prevention and Control:

**South-East Asia region**: WHO Regional Office for South-East Asia, Tobacco: [www.searo.who.int/topics/tobacco/en/](http://www.searo.who.int/topics/tobacco/en/)

**Western Pacific region**: WHO Regional Office for the Western Pacific Region, Tobacco: [www.wpro.who.int/topics/tobacco/en/](http://www.wpro.who.int/topics/tobacco/en/)

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**Additional tools**

A list of useful resources (global and U.S.-based) is found below and in figure 2.

**Figure 1**: WHO regions

![WHO regions](image)

**Figure 2**: Global and U.S.-based tobacco investigation resources

- [WHO Framework Convention on Tobacco Control](http://whqlibdoc.who.int/publications/2004/9241546581_eng.pdf?ua=1)
- [The GATS Atlas](http://wpro.who.int/topics/tobacco/en/)
- [The Tobacco Atlas](http://wpro.who.int/topics/tobacco/en/)
- [American Associate for Respiratory Care, Tobacco Resources](http://www.aarc.org/resources/clinical-resources/tobacco-resources/)
- [Campaign for Tobacco Free Kids](http://www.campaignforfreedom.org)
- [Tobacconomics](http://www.tobacconomics.com)

*American Associate for Respiratory Care, tobacco resources*: [www.aarc.org/resources/clinical-resources/tobacco-resources/](http://www.aarc.org/resources/clinical-resources/tobacco-resources/)

Campaign for tobacco free kid: www.tobaccofreekids.org/ and http://tobaccocontrollaws.org/
The GATS Atlas: www.gatsatlas.org
The Tobacco Atlas: www.tobaccoatlas.org/
Tobacconomics- Economic investigation informing tobacco control policy: https://tobacconomics.org/
WHO-FCTC
  • www.who.int/tobacco/framework/WHO_FCTC_english.pdf
  • www.who.int/fctc/WHO_FCTC_summary_January2015_EN.pdf?ua=1

REFERENCES


Resources: www.who.int/quantifying_ehimpacts/publications/SHS.pdf

INVESTIGATION QUESTIONS & EXAMPLE PROJECTS

Epidemiology/Surveillance

Question: What are the determinants of maternal mortality in the country?
Example project: Secondary data analysis of existing data sources (e.g., from the Demographic and Health Survey [DHS], the World Bank, WHO). Use socio-demographic variables as independent variables to predict the dependent variable, maternal mortality.

Question: What is the magnitude of maternal deaths in the country?
Example project: Primary data collection and analysis. Carry out a reproductive age mortality survey to identify all possible deaths among women of reproductive age (e.g., between 12 and 45 years of age) using multiple sources to identify the cause of death and ways to prevent such deaths.

Example project: Secondary data analysis of census data or DHS. Identify all household members who have died within a specified time period, as well as the sex and age — in completed years — of each deceased person, the timing of adult female deaths relative to pregnancy, childbirth, and the postpartum period.

Example project: Primary data collection and analysis or secondary data analysis. Use the reproductive-age mortality survey (RAMOS) approach to study maternal deaths. Ascertain all reproductive age deaths listed in the National Death Registry and/or Death Certificates of women aged 15–49 years and corresponding clinical records based on the definitions of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).

Example project: Primary data collection and analysis or secondary data analysis. Review data collected through the Maternal Death Surveillance and Response (MDSR) surveillance system or collect primary data on the MDSR surveillance system. Use standardized surveillance evaluation criteria, such as the CDC surveillance evaluation guideline MMWR series, to evaluate the MDSR surveillance system attributes, strengths, and weaknesses, and provide recommendations to strengthen the system.

Question: What are the urban-rural differences in maternal mortality in the country?
Example project: Secondary data analysis of existing data sources (e.g., from the DHS).

Question: What are the patterns and determinants of infant mortality in the country?
Example project: Secondary data analysis of cross-sectional data (e.g., DHS data, World Fertility Survey data) to identify and rank-order the importance of the socio-economic factors affecting infant mortality.

Question: What are the urban-rural differences in infant mortality in the country?
Example project: Secondary data analysis of cross-sectional DHS data. Conduct logistic regression to determine the significant factors affecting infant mortality both in urban and rural areas.

Question: What is the access to and use of reproductive health services in the country?
Example project: Primary data collection and analysis. Conduct a qualitative study with either focus-group discussion or in-depth interviews of midwives or pregnant women. Design a structured or semi-structured interview guide to collect information about midwives’ or women’s perceptions on the access to and use of reproductive health services.

Question: What is the availability of drugs, equipment, and supplies for obstetric care in the country?
Example project: Primary data collection and analysis. Conduct a health facility assessment.

Question: What is the incidence of induced abortion due to congenital abnormalities in the country?
**Example project**: Secondary data analysis of population-based congenital anomalies surveillance. Select a region, country, and time frame. Determine the type of congenital anomaly using ICD-10.

**Question**: What are the beliefs and practices regarding delivery and postpartum maternal morbidity in the country?

**Example project**: Primary data collection and analysis. Conduct focus-group discussions to understand the experiences of delivery and postpartum illness among a group of women. The theme of the discussion could be women's beliefs about disease causation and their use of traditional health care.

**Example project**: Primary data collection and analysis. Conduct a mixed-methods study. For the quantitative part, conduct a cross-sectional survey. Sampling strategy: two-stage cluster design (first stage: households, second stage: randomly select women with an infant currently living in the same village/region). Survey can be used to collect information on reproductive history, knowledge and perception on pregnancy, delivery, and post-partum care. For the qualitative part, conduct semi-structured interviews of a small sample of purposively selected women to explore beliefs and practices related to various aspects of maternal care.

**Question**: What is the association between maternal obesity and caesarean delivery in the country?


**Question**: What are the infant and young child feeding practices in the country?

**Example project**: Secondary data analysis of existing data sets. Examples: DHS data, National Family Health Survey.

**Example project**: Primary data collection and analysis. Conduct focus group discussions of a small sample of mothers with children 0–2 years of age.

**Question**: What is the diet quality of young children in the country?

**Example project**: Secondary data analysis of existing data (e.g., DHS). Examine the association between dietary diversity and height-for-age Z-scores (HAZ) for children aged 6–23 months.

**Question**: What is the knowledge and use of folic acid for preventing birth defects amongst women in the country?

**Example project**: Primary data collection and analysis. Conduct focus group interviews among women to assess knowledge, attitudes, and practices regarding the relationship between folic acid intake and birth defects.

**Question**: What is the double burden of household malnutrition (maternal overweight and obesity and childhood undernutrition) in the country?

**Example project**: Secondary data analysis of existing data (e.g., DHS, WHO datasets).

**Question**: What are the trends in the use of maternal health services in the country?

**Example project**: Secondary data analysis of existing data. Use at least two or more waves of existing surveillance data (e.g., DHS) to monitor and measure maternal health services (e.g., antenatal care visits) over time.

**Question**: What are the perceived barriers, knowledge, and attitudes towards maternal health care services in the country?

**Example project**: Primary data collection and analysis. Conduct a community-based qualitative exploratory study of health care facilities using a Knowledge Attitudes and Practices survey (KAP) of or focus group discussions with mothers and their spouses.
Example project: Primary data collection and analysis. Conduct a cross-sectional study of women of reproductive age that were either pregnant at the time of the interview or had delivered within the last 2 years.

**Question: What is the knowledge of pregnancy-related health issues among women in the country?**

**Example project:** Primary data collection and analysis. Design and administer a short survey to determine mothers’ knowledge of pregnancy-related health issues.

**Example project:** Primary data collection and analysis. Administer a short pregnancy-related course/training session to a small sample of randomly selected pregnant women and test pre- and post-pregnancy-related literacy among them using a short survey.

**Question: What are the determinants of maternal health services use in the country?**

**Example project:** Secondary data analysis of existing data sources (e.g., DHS) using logistic regression analysis.

**Question: What is the stillbirth rate in the country?**

**Example project:** Primary data collection and analysis. Conduct an observational study using a representative sample of pregnant women.

**Question: What are the factors associated with grief after stillbirth?**

**Example project:** Primary data collection and analysis. Design and/or tailor the Perinatal Grief scale questionnaire and administer it to women to determine the factors associated with grief after stillbirth.

**Question: What is the prevalence of spina bifida by folic acid fortification status in the country?**

**Example project:** Secondary data analysis of existing data sources (e.g., national registry of neural tube defects, if any) using logistic regression analysis.

**Question: What is the prevalence of spina bifida and anencephaly in the country?**

**Example project:** Secondary data analysis of existing data sources (e.g., national registry of neural tube defects, if any).

**Risk Factors**

**Question: What are the risk factors for under-5 mortality in the country?**

**Example project:** Secondary data analysis of existing data (e.g., DHS). Identify the risk factors for under-5 mortality.

**Question: What are the risk factors affecting the use of maternal, newborn, and child health services in the country?**

**Example project:** Secondary data analysis of existing data (e.g., DHS). Identify the risk factors affecting the use of maternal, newborn, and child health services.

**Question: What are the risk factors and practices contributing to newborn sepsis in a tertiary care facility?**

**Example project:** Primary data collection and analysis. Conduct case-control study in tertiary care facility to identify cases of neonatal sepsis and risk factors associated with neonatal sepsis.

**Question: What are the factors associated with malnutrition in the country?**

**Example project:** Secondary data analysis of existing data (e.g., DHS). Determine the risk factors associated with malnutrition.

**Question: What is the prevalence of vitamin D deficiency and the associated factors among children with protein-energy malnutrition in the country?**
Example project: Secondary data analysis of existing data in the country.

Example project: Primary data collection and analysis. Use a representative sample of children with protein-energy malnutrition. Estimate serum Vitamin D₃ concentrations and determine the prevalence of vitamin D deficiency in this population.

Question: What is the prevalence and what are the risk factors of overweight and obesity among children in the country?

Example project: Secondary data analysis of existing nationally representative datasets (e.g., DHS). Determine the prevalence and identify the risk factors of overweight and obesity among children.

Question: What are the risk factors for the occurrence of congenital birth defects in the country?

Example project: Secondary data analysis of existing nationally representative datasets (e.g., Congenital Abnormality Survey, Congenital Birth defects survey WHO [Iraq]).

Program/Policy

Question: What is the impact of the engagement of men and women in a maternal health intervention in the country?

Example project: Primary data collection and analysis. Conduct a program evaluation through representative household surveys where the intervention was implemented. Interview mother-child pairs.

Question: What is the impact of a maternal and child health project in the country?

Example project: Primary data collection and analysis. Conduct in-depth qualitative interviews and focus group discussions with stakeholders, including project staff, local NGOs and community-based organizations, district health teams, community- and facility-based health workers, community members, or community leaders (as applicable). Conduct focus group discussions in an intervention area of the project among participants to discuss the effects of the project.

Question: What are the health systems factors influencing maternal health services in the country?

Example project: Secondary data analysis of existing nationally representative datasets (e.g., DHS). Determine health systems factors that may influence maternal health services.

INVESTIGATION METHODS

Definitions

Basic definitions and measures used in maternal and child health epidemiology

Birth weight: Weight of the baby (live born or stillborn) at delivery

Direct obstetric death: Death resulting from obstetric complications of the pregnancy state (i.e., pregnancy, labor, and the puerperium) from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above

Elective termination of pregnancy for fetal anomaly: Elective pregnancy termination due to detected fetal anomaly

Fertility: Ability to conceive and deliver a baby. This is the common usage in colloquial and medical English. “Fertility” is the proof of being able to conceive, rather than the potential for it.
Gravidity: Number of previous pregnancies (distinguished from parity, the number of previous births)

Indirect obstetric death: Death resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but was aggravated by the physiologic effects of pregnancy

Induced abortion: Intentional termination of a pregnancy and removal of conceptus through either medical or surgical intervention, typically in the first or second trimester of pregnancy. It is carried out for reasons ranging from unwanted pregnancy to malformations of the fetus to conditions that threaten the life of the mother.

Infant mortality rate: Number of deaths within the first year of life divided by total number of live births (expressed per 1,000). Neonatal plus post-neonatal mortality rates equals the infant mortality rate.

Infant mortality: Death of a liveborn infant within the first year of life

Infertility: Inability to achieve a clinically recognized pregnancy after attempting for more than 1 year (American College of Obstetrics and Gynecology definition) or for more than 2 years (WHO definition). Couples with low fecundability may have infertile intervals before a pregnancy. Fecundability is a couple’s probability of conception in one menstrual cycle, given regular intercourse and no method of contraception.

Lifetime risk of maternal death: Annual maternal mortality rate multiplied by the length of the reproductive period (usually 35 years). This measure reflects the cumulative risk of becoming pregnant and dying as a result of pregnancy in a woman’s lifetime.

Live birth: Baby who shows any signs of life after delivery (i.e., breathing, heartbeat, pulsation of the umbilical cord, or definite movement of voluntary muscles), regardless of whether the umbilical cord has been cut or the placenta delivered. The ICD-10 definition does not specify an attained gestational age.

Low birth weight (LBW): Birth weight of less than 2,500 g. While LBW is a convenient end point for epidemiological studies, it is subject to criticism for failing to distinguish preterm and small-term births.

Maternal mortality or maternal death: Death of a woman while pregnant or within 42 days of the termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. ICD-10 also introduced two new measures of mortality temporally associated with pregnancy:
- Late maternal death: Maternal death resulting from direct or indirect obstetric causes more than 42 days but less than 1 year after termination of pregnancy
- Pregnancy-related death: Maternal death occurring during pregnancy or within 42 days of termination of pregnancy, irrespective of cause

Maternal mortality rate: Number of maternal deaths per 1,000 women of reproductive age (usually 15–49 years). This is an indicator of the risk of maternal death among women of reproductive age and provides an indication of the burden of maternal death in the adult female population.

Maternal mortality ratio (MMR or MMRatio): Number of maternal deaths per 100,000 live births in a given time period. The MMR expresses obstetric risk or a woman’s chances of dying from a given pregnancy. This is the most commonly used indicator of maternal health.

Neonatal mortality rate: Number of deaths within the first 28 days of life, divided by the total number of live births (expressed per 1,000)

Neonatal mortality: Death of a liveborn infant within the first 28 days. Early neonatal mortality is death within 7 days.

Parity: Number of births for a given woman, counting a multiple birth pregnancy as one
**Perinatal mortality rate**: Number of deaths of fetuses weighing at least 500 g (or, when birth weight is unavailable, after 22 completed weeks of gestation or with a crown-heel length of 25 cm or more) plus the number of early neonatal deaths divided by the total number of live births (expressed per 1,000)

**Perinatal mortality**: Fetal deaths beginning at 22 completed weeks (154 days) plus deaths of live births within the first 7 days after birth. To be included in many national perinatal statistics, live births eligible to be considered as perinatal deaths must be at least 500 g, or 22 completed weeks of gestation, or 25 cm in body length. For international perinatal mortality statistics, live births must have been either 1,000 g or 28 completed weeks gestation or 35 cm in body length.

**Post-neonatal mortality rate**: Number of deaths after 28 days but within the first year of life divided by the total number of live births (expressed per 1,000)

**Post-neonatal mortality**: Death of a live birth after 28 days but within the first year of life. Neonatal plus post-neonatal mortality equals infant mortality.

**Preterm delivery**: Delivery before 37 completed weeks of gestation (less than 259 days)

**Reproductive morbidity**: Illness that includes conditions of physical ill-health related to the concepts of “successful childbearing” and of “freedom from gynecological disease and risk.” According to this definition, reproductive morbidities can be classified as follows:
- **Obstetric morbidity**: Maternal illness during pregnancy, delivery, and the postpartum period
- **Gynecological morbidity**: Illness of the female reproductive tract not associated with a particular pregnancy, such as reproductive tract infections, cervical cell changes, prolapse, and infertility

**Spontaneous abortion (miscarriage)**: Loss of a clinically recognized pregnancy, most of which occurs in the first trimester. Upper limits of gestational age for a spontaneous abortion can vary; they are often set at 20 or 28 weeks.

**Stillbirth (fetal death) mortality rate**: Number of fetal deaths divided by the total number of fetal deaths and live births (expressed per 1,000)

**Stillbirth (fetal death)**: The WHO definition of fetal death is the intrauterine death of any conceptus at any time during pregnancy. However, for practical purposes, legal definitions usually require recorded fetal deaths to exceed some gestational age (16, 20, 22, 24, or 28 weeks) or birth weight (350, 400, 500, or 1,000 g). In the United States, there are eight different definitions by combinations of gestational age and weight and at least as many in Europe.

**Sudden infant death syndrome**: Sudden and unexpected death of an infant in the first year and usually beyond the immediate perinatal period, unexplained by any known causes

**Term pregnancy**: Pregnancy with delivery from the 37th to the 42nd obstetric week (259 to 293 days)

**Very low birthweight (VLBW)**: Birth weight of less than 1,500 g; almost all VLBW babies are preterm

**Definitions of anthropometric status indicators**

The most-often used anthropometric indicators in children under 5 years of age are stunting (H/A), wasting (W/H), underweight (W/A), and mid-upper arm circumference (MUAC). The most-often used anthropometric indicator in adults is Body Mass Index (BMI).

**Body mass index (BMI)**: Measure to define overweight and thinness. BMI is defined as the weight in kilograms divided by the square of height in meters. The BMI is primarily used to identify chronic energy deficiencies (or obesity) in adults. BMI is the indicator used to assess adult nutritional status in both stable contexts and emergencies. It is of particular importance in areas where adults may be as vulnerable to malnutrition as children.
**Height-for-age (H/A):** The term “stunting” describes a condition in which children fail to gain sufficient height, given their age. Stunting is an extremely low “height-for-age” (H/A) score. Stunting is often associated with long-term factors such as chronic malnutrition, especially protein-energy malnutrition, and frequent illness. It is therefore an indicator of past growth failure and is often used for long-term planning of policies and intervention programs in non-emergency situations. Stunting is very sensitive to socio-economic inequalities.

**Mid-upper arm circumference-for-age (MUAC):** Measure of the diameter of the upper arm. It gauges both fat reserves and muscle mass. It is primarily used for children but can also be applied to pregnant women to assess nutritional status. The measurement is simple and requires minimal equipment. MUAC has therefore been proposed as an alternative index of nutritional status, in particular in situations where data on height, weight, and age are difficult to collect.

**Overweight:** Weight-for-height >+2 Z-scores of the median WHO child growth standards

**Underweight:** Weight-for-age <-2 standard deviations of the median WHO child growth standards

**Weight-for-age (W/A):** The term “underweight” describes a situation where a child weighs less than expected, given their age. Underweight is thus an extremely low weight-for-age (W/A) score. W/A reflects body mass relative to age. Unlike height, weight fluctuates over time and therefore reflects current and acute as well as chronic malnutrition. W/A is commonly used to monitor growth and to assess changes in the magnitude of malnutrition over time. The recommended reporting system of H/A, W/H, and W/A is in terms of Z-scores — a statistical measure of the distance from the median (mean) expressed as a proportion of the standard deviation. The most common cutoff point is –2 Z-score (i.e., two standard deviations below the median values of the international reference). This is the cutoff risk level used to differentiate malnourished children from those adequately nourished. Children whose H/A, W/H, and W/A scores fall below this point are considered stunted, underweight, and wasted, respectively. WHO has proposed a classification scheme for population-level malnutrition.

**Weight-for-height (W/H):** The term “wasting” refers to a situation where a child has failed to achieve sufficient weight-for-height (W/H). W/H is normally used as an indicator of current nutritional status. Wasting may be the consequence of starvation or severe disease. It can also be due to chronic conditions or a combination of both.

**Other definitions**

**Birth defects or congenital anomalies:** Structural or functional abnormalities, including metabolic disorders, that are present from birth. Congenital anomalies are a diverse group of disorders of prenatal origin that can be caused by single gene defects, chromosomal disorders, multifactorial inheritance, environmental teratogens, or micronutrient malnutrition.

**Cleft lip:** Partial or complete fissure of the upper lip; it can be either unilateral or bilateral, and can be associated with a cleft of the gum

**Cleft palate:** Fissure of the palate, which can affect the soft and hard palate or only the soft palate

**Contraceptive failure:** Unintended or unplanned pregnancy resulting from the failure of birth control method. Contraceptive failure may be a result of inconsistent use of contraceptives, failure to follow instructions for a given method of birth control, or the tearing or breaking of condoms.

**Contraceptive methods:** Methods that allow for preventing pregnancy and for planning the timing of pregnancy. Modern methods of contraception include but are not limited to oral contraceptives (such as birth control pills), contraceptive vaginal rings, condoms, intrauterine devices (also called IUDs or intrauterine contraceptive devices [IUCDs]), injectable and implantable devices, and male and female sterilization.
**Family planning:** Planning of when to have children and the use of birth control and other techniques to implement such plans.

**Lives Saved Tool:** Tool to model the impact of scaling-up health interventions in communities to reduce mortality in mothers, newborns, and children.

**Major structural anomalies:** Structural changes that have significant medical, surgical, or cosmetic consequences for the affected individual and typically require medical intervention (e.g., cleft lip, spina bifida, congenital heart defects, gastrointestinal atresias). These anomalies are the conditions that account for most of the deaths, morbidity, and disability related to congenital anomalies.

**Minor congenital anomalies:** Structural changes that pose no significant health problem in the neonatal period and tend to have limited medical or cosmetic consequences for the affected individual (e.g., protruding ears, facial asymmetry, clinodactyly [curvature of toes or fingers]).

**Neural tube defect:** Failure of the neural tube to close correctly. It is the most common type of congenital anomaly affecting the brain and the spinal cord.

**Postpartum hemorrhage (PPH):** Commonly defined as a blood loss of 500 ml or more within 24 hours after birth. PPH is the leading cause of maternal mortality in low-income countries and the primary cause of nearly one quarter of all maternal deaths globally.

**Preeclampsia:** Specific syndrome of pregnancy, defined by edema, protein in urine, and hypertension in the mother. Diagnostic criteria can vary, leading to difficulties in comparisons across populations. Condition can progress to seizures (eclampsia), a rare but potentially disastrous condition curable only by delivery of the fetus.

**Skilled birth attendant:** Accredited health professional such as a midwife, physician, or nurse who is educated and trained to be proficient in the skills needed to manage normal (uncomplicated) pregnancies, childbirth, and the immediate postnatal period, and in the identification, management, and referral of complications in women and newborns.

**Spina bifida:** Type of neural tube defect which causes congenital defect of the spine. It is usually apparent at birth. It can occur anywhere along the spine if the neural tube does not close all the way. This often results in damage to the spinal cord and nerves.

**Sustainable Development Goals (SDG):** SDGs build on the Millennium Development Goals (MDGs) and aim to go further to end all forms of poverty. There are 17 SDGs that came into effect from 1st January 2016 after being adopted by world leaders in 2016. For the next 15 years, countries will mobilize efforts to end all forms of poverty, fight inequalities, and tackle climate change, while ensuring that no one is left behind. Of the 17 SDGs, those that tie in with maternal and child health include:

- Goal 1: No poverty
- Goal 2: Zero hunger
- Goal 3: Good health and well-being
- Goal 4: Quality education
- Goal 5: Sex equality
- Goal 6: Clean water and sanitation
- Goal 8: Decent work and economic growth

**Traditional birth attendant (TBA):** WHO defines a TBA as a person who assists the mother during childbirth and who initially acquired her skills by delivering babies herself or through an apprenticeship to other TBAs (19).
### Variables

Variables of interest in the assessment of maternal morbidity and mortality

<table>
<thead>
<tr>
<th>Socio-demographic variables</th>
<th>Access to health care services</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Women’s age</td>
<td>• Range of services available</td>
</tr>
<tr>
<td>• Women’s education</td>
<td>• Quality of care</td>
</tr>
<tr>
<td>• Parity</td>
<td>• Access to information about services</td>
</tr>
<tr>
<td>• Marital status</td>
<td>• Location of services for</td>
</tr>
<tr>
<td>• Family’s education</td>
<td>– Family planning</td>
</tr>
<tr>
<td>• Family income</td>
<td>– Prenatal care</td>
</tr>
<tr>
<td></td>
<td>– Emergency obstetric care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health status variables</th>
<th>Health care behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prior history of pregnancy complications</td>
<td>• Use of family planning</td>
</tr>
<tr>
<td>• Infections and parasitic diseases (e.g., malaria, hepatitis, etc.)</td>
<td>• Use of prenatal care</td>
</tr>
<tr>
<td>• Chronic conditions (e.g., diabetes, hypertension)</td>
<td>• Use of modern care for delivery and labor</td>
</tr>
<tr>
<td>• Nutritional status (e.g., height, weight, BMI, anemia)</td>
<td>• Use of harmful traditional practices</td>
</tr>
<tr>
<td></td>
<td>• Use of illicit induced abortion</td>
</tr>
</tbody>
</table>


### Other variables

#### Information/variables from birth records/certificate

| Infant variables | • Name  
|                  | • Date/time of birth  
|                  | • Place of birth  
|                  | • Sex  
|                  | • Weight at birth  
|                  | • Plurality  
|                  | • Birth order (for multiple order births)  
|                  | • Apgar scores (1 minute, 5 minutes, 10 minutes)  
|                  | • Gestational age at birth  
|                  | • Congenital defects  
|                  | • Method of feeding at discharge  

| Maternal variables | • Name  
|                   | • Date of birth  
|                   | • Place of birth  
|                   | • Race/ethnicity of mother  
|                   | • Marital status  
|                   | • Maternal education  
|                   | • Cigarette smoking  
|                   | • Substance use (e.g., tobacco, alcohol, drugs)  
|                   | • Last menstrual period  
|                   | • Height/weight (pre-pregnancy/at delivery)  
|                   | • Monthly prenatal checkup (began/ended)  
|                   | • Number of prenatal visits  
|                   | • Past medical history  
|                   | • Past obstetric history  

Information/variables from birth records/certificate

- Parity
- Gravidity
- Birth attendant
- Providers for prenatal care
- Sources of payment for delivery
- Mode of delivery
- Birth interval (calculated)
- Pregnancy interval (calculated)
- Weight gain (calculated)

Paternal variables

- Race/ethnicity
- Date of birth
- Place of birth
- Education

Information/variables from infant death records/certificate

Variables

- Date of death
- Place of death
- Causes of death, underlying causes, and contributing factors
- Parent information
- Age at time of death
- Autopsy conducted
- Method of disposition

Formulas and Indicators

Maternal and newborn health indicators

Case fatality rate = number of women with obstetric complications who die in a particular facility in a given period of time / number of women admitted to a facility with obstetric complications while in the facility in the same time period

Cause-specific infant mortality rate = number of deaths from causes related to prematurity and LBW* among infants (born in [birth year]) x 100,000 / number of live births (in [birth year])

*LBW=low birth weight

Early neonatal mortality rate = Early neonatal deaths x 1,000 / Live births

Early neonatal mortality rate, weight-specific = Early neonatal deaths of infants weighing 1,000 g and over at birth x 1,000 / Live births weighing 1,000 g and over

Fetal death rate = Fetal deaths x 1,000 / Total births

Fetal death rate, weight-specific = Fetal deaths weighing 1,000 g and over x 1,000 / Total births weighing 1,000 g and over

Fetal death ratio = Fetal deaths x 1,000 / Live births
Infant mortality rate = \frac{Deaths \text{ under 1 year of age} \times 1,000}{Live \text{ births}}

Infant mortality rate, weight-specific = \frac{Infant \text{ deaths among live births weighing 1,000 g and over at birth} \times 1,000}{Live \text{ births weighing 1,000 g and over}}

Lifetime risk of maternal death = \frac{\# \text{ of maternal deaths in a 1 year} \times 35 \text{ years}}{Women \text{ of reproductive age}}

Maternal mortality ratio = \frac{\# \text{ of maternal deaths in a given time period} \times 100,000}{\# \text{ of live births in same time period}}

Maternal mortality rate = \frac{\# \text{ of maternal deaths in a given time period (generally 1 year)} \times 1,000 \text{ women}}{Women \text{ of reproductive age}}

Neonatal mortality rate = \frac{Neonatal死亡s \times 1,000}{Live \text{ births}}

Neonatal mortality rate, weight-specific = \frac{Neonatal deaths of infants weighing 1,000 g and over at birth \times 1,000}{Live \text{ births weighing 1,000 g and over}}

Perinatal mortality rate = \frac{(Early \text{ neonatal deaths + stillbirths}) \times 1,000}{Total \text{ births where total births =live births + stillbirths}}

Perinatal mortality ratio = \frac{Fetal \text{ deaths and early neonatal deaths} \times 1,000}{Total \text{ births where total births =live births + stillbirths}}

Proportion of deliveries attended by skilled personnel (physician, nurse, or midwife) = \frac{Deliveries \text{ by skilled personnel irrespective of outcome} \times 100}{All \text{ live births during the same time period and the same geographic area as numerator}}

**Birth defect formulas**

Birth prevalence = \frac{a}{b} \times 10,000, where

- \(a\): Number of live births and fetal deaths (stillbirths) with a specific congenital anomaly (e.g., spina bifida) counted among the source population in a given year.
- \(b\): Number of live births and fetal deaths (stillbirths) (during the same year).

Birth prevalence of congenital anomalies = \frac{\text{live birth cases} + \text{fetal death (stillbirths) cases} \times 10,000}{\text{Total live births} + \text{fetal death (stillbirths)}}

Live birth prevalence of congenital anomalies = \frac{\text{live birth cases} \times 10,000}{\text{Total live births}}

Total prevalence of congenital anomalies = \frac{\text{live birth cases} + \text{fetal death (stillbirths) cases} + \text{ETOPFA cases} \times 10,000}{\text{Total live births} + \text{total fetal deaths (stillbirths)} + \text{total ETOPFA}}

Where ETOPFA = elective termination of pregnancy for fetal anomaly

**Infant and child feeding practices formulas**

Bottle feeding = \frac{Children \text{ 0–23 months of age who were fed with a bottle during the previous day} \times 100}{\text{Children 0–23 months of age}}

Children ever breastfed = \frac{Children \text{ born in the last 24 months who were ever breastfed} \times 100}{\text{Children born in the last 24 months}}
Continued breastfeeding at 1 year =
Children 12–15 months of age who received only breast milk during the previous day
Children 12–15 months of age

Continued breastfeeding at 2 years =
Children 20–23 months of age who received breast milk during the previous day
Children 20–23 months of age

Early initiation of breastfeeding =
Children born in the last 24 months who were put to the breast within 1 hour of birth
Children born in the last 24 months

Exclusive breastfeeding under 6 months =
Infants 0–5 months of age who received only breast milk during the previous day
Infants 0–5 months of age

Exclusive breastfeeding (infants 4–5 months) =
Infants 4–5 months of age who received only breast milk during the previous day
Infants 4–5 months of age

Introduction of solid, semi-solid, or soft foods =
Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day
Infants 6–8 months of age

Minimum dietary diversity* =
Children 6–23 months of age who received foods from ≥4 food groups during the previous day
Children 6–23 months of age

*Dietary diversity is a proxy for adequate micronutrient-density of foods.

Minimum meal frequency =
Breastfed children 6–23 months of age who received solid, semi-solid, or soft foods
the minimum number of times or more during the previous day
Breastfed children 6–23 months of age

and

Non-breastfed children 6–23 months of age who received solid, semi-solid, or soft foods or
milk feeds the minimum number of times or more during the previous day
Non-breastfed children 6–23 months of age

Indicators

Emergency obstetric care indicators
The original six emergency obstetric care indicators, with modifications.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Acceptable level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Availability of emergency obstetric care: basic and comprehensive care facilities</td>
<td>There are at least 5 emergency obstetric care facilities (including at least 1 comprehensive facility) for every 500,000 population</td>
</tr>
<tr>
<td>2. Geographical distribution of emergency obstetric care facilities</td>
<td>All subnational areas have at least 5 emergency obstetric care facilities (including at least 1 comprehensive facility) for every 500,000 population</td>
</tr>
<tr>
<td>3. Proportion of all births in emergency obstetric care facilities a</td>
<td>Minimum acceptable level to be set locally</td>
</tr>
<tr>
<td>Indicator</td>
<td>Acceptable level</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4. Meeting the need for emergency obstetric care: proportion of women</td>
<td>100% of women estimated to have major direct obstetric complications are treated in emergency obstetric care facilities</td>
</tr>
<tr>
<td>with major direct obstetric complications who are treated in such</td>
<td></td>
</tr>
<tr>
<td>facilities (^a)</td>
<td></td>
</tr>
<tr>
<td>5. Caesarean sections as a proportion of all births (^a)</td>
<td>The estimated proportion of births by caesarean section in the population is not less than 5% or more than 15%</td>
</tr>
<tr>
<td>6. Direct obstetric case fatality rate (^a)</td>
<td>The case fatality rate among women with direct obstetric complications in emergency obstetric care facilities is (&lt;1%)</td>
</tr>
</tbody>
</table>

a. While these indicators focus on services provided in facilities that meet certain conditions (and therefore qualify as “emergency obstetric care facilities”), WHO recommends that these indicators be calculated again with data from all maternity facilities in the area even if they do not qualify as emergency obstetric care facilities.

b. The proportion of major direct obstetric complications throughout pregnancy, delivery, and immediately postpartum is estimated to be 15% of expected births.

**Infant and young child feeding (IYCF) indicators:** A summary list of infant and young child feeding indicators include core indicators and optional indicators.

**Core indicators**
- Early initiation of breastfeeding
- Exclusive breastfeeding under 6 months
- Continued breastfeeding at 1 year
- Introduction of solid, semi-solid, or soft foods
- Minimum dietary diversity
- Minimum meal frequency
- Minimum acceptable diet
- Consumption of iron-rich or iron-fortified foods

**Optional indicators**
- Children ever breastfed
- Continued breastfeeding at 2 years
- Age-appropriate breastfeeding
- Predominant breastfeeding under 6 months
- Duration of breastfeeding
- Bottle feeding
- Milk feeding frequency of non-breastfed children

Some DHSs include information about IYCF including the consumption of solid, semi-solid, and soft foods; question on breastfeeding; and the dietary diversity of food.
Data Sources

Major surveys

1. Birth defects surveillance systems: Monitoring of birth defects at the population level provides a means to detect changes in their frequency. Since the thalidomide event of the early 1960s, many systems have been developed throughout the world.
   - The International Clearinghouse for Birth Defects Surveillance and Research (ICBDSR) was founded in 1974. It is devoted to the prevention of birth defects. The member programs monitor the rates of birth defects and search for changes that might herald the introduction of a new teratogen into the environment. The primary purpose of the ICBDSR is to provide a forum for member programs to share information through regular quarterly and annual reports of data, at annual meetings, and through informal contacts of the staff of member programs.

2. Demographic and Health Survey (DHS): It has collected, analyzed, and disseminated accurate and representative data on population, health, HIV, and nutrition through more than 300 surveys in more than 90 countries. (Ref: http://dhsprogram.com/#sthash.NpYmMeZ4.dpuf)
   - There are two main types of DHSs:
     - **Standard DHSs** have large sample sizes (usually between 5,000 and 30,000 households) and typically are conducted about every 5 years, to allow comparisons over time.
     - **Interim DHSs** focus on the collection of information on key performance monitoring indicators but may not include data for all impact evaluation measures (such as mortality rates). These surveys are conducted between rounds of DHS surveys and have shorter questionnaires than DHS surveys. Although nationally representative, they generally have smaller samples than DHS surveys.

   **Which DHS data are related to maternal health?**
   - The DHS maternal health indicators measure maternal health care against national recommendations, such as the recommended number of antenatal care visits and the preferred timing for postnatal care. The measures of maternal health care are also compared to women’s status:
     - Antenatal care
     - Number of antenatal care visits and timing of first visit
     - Components of antenatal care
     - Iron tablets/anti-malarial drugs
     - Place of delivery
     - Assistance during delivery
     - Characteristics of delivery
     - Delivery complications
     - Problems in accessing health care

3. Demographic Surveillance Systems (DSS): DSS began in the 1960s to track longitudinal demographic changes to populations in developing countries. Unlike prospective (cohort) studies, DSSs are able to monitor entire populations and are usually larger and longer term. Field sites collect data on births, deaths (including causes), and migration, which provide an important resource to evaluate health
care interventions. They also offer a starting point for new studies. One such point is the INDEPTH Network (International Network for the Continuous Demographic Evaluation of Populations and Their Health in Developing Countries), an international network of 31 DSS field sites in 17 countries spanning Africa and Asia.

**Which DSS data are related to maternal health?**

There are four main approaches:

1. Demographic Surveillance Systems (DSS)
2. Prospective studies
3. Sample Vital Registration with Verbal Autopsy (SAVVY)
4. Sample Vital Registration Systems

(Ref: [www.maternal-mortality-measurement.org.uk/MMMResource_Tool_DemographicSurveillanceSystems.html](http://www.maternal-mortality-measurement.org.uk/MMMResource_Tool_DemographicSurveillanceSystems.html))

**4. Maternal Death Surveillance and Response (MDSR):** MDSR builds on the principles of public health surveillance. It is a continuous cycle of identification, notification, and review of maternal deaths followed by actions to improve quality of care and prevent future deaths. It consists of four steps:

- Identification and notification on an ongoing basis
- Review of maternal deaths
- Analysis and interpretation of aggregated findings from reviews
- Response and action.

MDSR facilitates gathering of information and allows for its strategic use in guiding public health actions and monitoring the impact of those actions.

Effective implementation of MDSR can directly impact the quality of care and improve maternal and perinatal health outcomes. (Ref: [www.who.int/maternal_child_adolescent/epidemiology/maternal-deathsurveillance/en/](http://www.who.int/maternal_child_adolescent/epidemiology/maternal-deathsurveillance/en/))

**Mortality surveillance**

1. **Reproductive Age Mortality Studies (RAMOS):** RAMOS use varied sources, depending on the context, to identify all deaths of women of reproductive age and ascertain which of these are pregnancy-related.

   RAMOS provide an estimate of the proportion of maternal deaths among female deaths (PMDF) but can be combined with other data to obtain the maternal mortality ratio (MMR), the maternal mortality rate (MMRate) and the lifetime risk (LTR). Identification of death varies and usually multiple sources are used to identify all deaths of reproductive aged women including:

   - Existing records (e.g., civil registration, health facility records, morgue records, burial/cemetery records, newspapers)
   - Survey/census of households with direct questions on mortality

   (Ref: [www.maternal-mortality-measurement.org.uk/Library/Tool%20Downloads/RAMOS.pdf](http://www.maternal-mortality-measurement.org.uk/Library/Tool%20Downloads/RAMOS.pdf))

2. **SAVVY:** The SAVVY method was developed by MEASURE Evaluation to collect more detailed information on deaths and mortality in developing countries by combining sample vital registration and verbal autopsy techniques. SAVVY is essentially a variation of demographic surveillance and relies upon an existing DSS to be implemented. Where DSS is established in a representative sample of areas (with annual or semi-annual update rounds), SAVVY introduces active death reporting which occurs in parallel. Deaths identified are then followed-up with verbal autopsies (Vas) by interviewers to determine cause of death. (Ref: [www.maternalmortalitymeasurement.org.uk/MMMResource_Tool_SAVVY.html](http://www.maternalmortalitymeasurement.org.uk/MMMResource_Tool_SAVVY.html))
3. Verbal autopsies (VAs): VA is an approach used to obtain cause of death by interviewing lay respondents on the signs and symptoms experienced by the deceased before death. It is used where vital registration systems are weak or the proportion of a population under medical care is low. It involves three steps:

- Data collection by interviewing bereaved relatives or others familiar with the circumstances of the death and who ideally were with the deceased during the events leading to death
- Assignment of cause of death using either individual or multiple physician reviews, expert algorithms or data driven algorithms (e.g., regression or neural networks, Bayesian approaches with probabilities of various diagnoses)
- Coding and tabulation of causes, ideally using the ICD codes (ICD-10, ICD-MM, or ICD-PM). In the context of maternal and child health, VAs aim to identify causes and contributing factors for maternal and perinatal deaths that occur in communities and identify broad sub-causes of maternal mortality.

VA is often used as part of community-based maternal death reviews and is coupled with questions to ascertain both the medical and non-medical factors that precipitated a maternal death or perinatal death via in-depth interviews using standardized questionnaires. The objective of a maternal death review is to improve the quality of safe motherhood programming to prevent future maternal and neonatal morbidity and mortality. VAs are then used to highlight non-medical factors that contribute to maternal deaths and provide descriptive information about women who die of maternal causes (e.g., age, parity).

VAs can be done on a one-off basis or routinely as part of SAVVY, DSS, or active surveillance of pregnancy-related or perinatal deaths. VA has been used to measure cause-specific mortality in populations (e.g., as part of SAVVY in India, China, and Tanzania) and to investigate cause of death in specific age, sex, or cause groups such as women of reproductive age, maternal, stillbirth, neonatal, infant, child, or injury related deaths. VAs have also been used to investigate epidemics and to assess the effectiveness of disease specific interventions.

Other surveys

The Service Provision Assessment (SPA) survey: The SPA survey is a health facility assessment that provides a comprehensive overview of a country’s health service delivery. SPA surveys fill an urgent need for monitoring health system strengthening in developing countries. They collect information on the overall availability of different facility-based health services in a country and their readiness to provide those services.

Which SPA data are related to maternal health?
SPA surveys conduct assessment of maternal health services, including availability of antenatal care and associated equipment and medicines, as well as counseling and observation of client examinations. Delivery services are also assessed, including availability of emergency transport, items for delivery services, and essential supplies for delivery. (Refs: http://dhsprogram.com/Topics/Maternal-Health.cfm#sthash.uVzAwdgf.dpuf and http://dhsprogram.com/What-We-Do/Survey Types/SPA.cfm#sthash.DW8rFKOU.dpuf)

Tools and Analytic Methods

Assessing maternal mortality and morbidity
A critical measure of progress in improving maternal health is the reduction in maternal mortality. Maternal deaths have been described as the tip of the iceberg with the true burden of maternal
morbidity not known. The causes of maternal mortality and morbidity are complex and vary in duration and severity. They can be assessed using several approaches such as community-based maternal deaths reviews (VAs), facility based maternal deaths reviews, RAMOS, and confidential enquiries into maternal deaths to ascertain maternal deaths.

a. **Sources of data to determine magnitude**: Hospital records, community identification of deaths, vital records, and formal surveillance systems

b. **Measures of maternal mortality and morbidity**: Impact indicators, outcome indicators, process indicators
   - **Impact Indicators**: Reflect changes in the primary health event of interest (i.e., morbidity and mortality) and other health outcomes
   - **Outcome Indicators**: Reflect changes in knowledge, attitudes, behaviors, or the availability of necessary services that result from program activities
   - **Process Indicators**: Specify the actions needed for program implementation in order to achieve the intended outcomes

**Assessing infant mortality and morbidity**

To assess infant mortality, the data sources most commonly used include vital records, birth surveys, interviews, reports of individual events, and record reviews. Vital records include birth certificates and death certificates; these are filed shortly after the event occurs. For infant mortality assessment, the data sources most commonly used are birth, death, and linked birth/death records. In the United States, vital events are registered in the state where the event occurs, not the state of residence, though resident-specific analysis is possible. While variation exists among states, vital record registration generally includes live births, deaths, fetal deaths, marriages, divorces and, to a lesser extent, adoptions and induced terminations of pregnancy.

- **Birth certificates** are a way to improve surveillance for perinatal events. Birth certificate information can be used, for example, to determine the extent to which women received delayed or no prenatal care. Reliability and validation studies of specific birth certificate variables have been published that provide information on the usefulness of certain measures. For example, studies have demonstrated that birth certificates are more likely to be incomplete among women of lower socio-economic status than among women of higher socio-economic status.
- **Death certificates** cannot provide accurate information on the impact of diseases with low case-fatality rates or long latency periods.
- **Linked birth-infant death records** are the first choice for every infant that dies either within a calendar year (death cohort or period file) or a specific cohort year of birth (birth cohort). While extremely valuable, cohort files may be a few years behind the current calendar year because of delays in collecting and reporting of events.

**Assessing congenital anomalies (birth defects)**

These are structural or functional abnormalities, including metabolic disorders that are present from birth. Congenital anomalies are a diverse group of disorders of prenatal origin that can be caused by single gene defects, chromosomal disorders, multifactorial inheritance, environmental teratogens, or micronutrient malnutrition

**Overview of birth defect coding**

The process of coding of birth defects starts at the field level. The field staff collect data and provide a description of birth defect cases. The data are then entered into the surveillance system and sent to the central registry, which conducts final review and analysis. This process involves a number of
professionals and requires accuracy and the use of standardized methods. The ICD-10 is the standard coding system. It is the international standard diagnostic classification system for all general epidemiological purposes, health data management purposes, and clinical use. It is developed by WHO, revised periodically, and available in 42 languages.

**Surveillance program for congenital anomalies**

Objectives of a surveillance program for congenital anomalies:

- Monitor trends in the prevalence of different types of congenital anomalies among a defined population
- Detect clusters of congenital anomalies (outbreaks)
- Refer affected infants to appropriate services in a timely manner
- Disseminate findings and interpretations to appropriate partner organizations and government agencies in a timely fashion
- Provide a basis for epidemiologic investigation (including risk factors) and prevention programs
- Allow evaluation of prevention programs

Purpose of surveillance of congenital anomalies:

- Measure the burden of congenital anomalies and identify high-risk populations
- Identify disparities in prevalence and outcomes by factors, such as race or ethnicity, maternal age, socio-economic level, or geographic region
- Assess the effects of prenatal screening and diagnosis and other changes in diagnostic technologies on birth prevalence
- Describe short-term and long-term outcomes of children with congenital anomalies, and provide information relevant to long-term management of individuals who are affected by serious congenital anomalies
- Inform public health and health care policies and programs and plan for needed services among the affected population
- Guide the planning, implementation, and evaluation of programs to help prevent congenital anomalies and minimize complications and adverse outcomes among those affected by congenital anomalies
- Assess any additional risk and the nature of adverse outcomes (including congenital anomalies) for fetuses and infants exposed to medications during pregnancy, to improve management and to inform national and global public health policies

**Types of congenital anomalies surveillance programs**

- *Population-based surveillance programs:* These capture birth outcomes with congenital anomalies that occur among a population that resides in a defined geographical area
- *Hospital- or facility-based congenital anomalies surveillance programs:* These capture birth outcomes with congenital anomalies that occur in selected facilities
- *Hybrid of the above two*

Surveillance of congenital anomalies should be ongoing and involve a systematic review of birth outcomes to determine the presence of congenital anomalies. If countries have the capacity to identify risk factors associated with congenital anomalies, such as maternal exposures (e.g., use of medications during the first trimester), a pregnancy registry or a case-control study can be implemented to allow for the collection of exposure data during pregnancy. *(Source: Birth defects surveillance: A manual for program managers. WHO, CDC, ICBDSR.)*

**Data analysis**

In birth defects surveillance, “prevalence” is used rather than “incidence rate” to measure birth defect occurrence. Determining incidence of birth defects is impractical because it requires evaluation of all the
outcomes of conception, including live births, stillbirths, terminations of pregnancy, and spontaneous abortions. Thus, for practical reasons, it is suggested to use birth prevalence that includes live births and stillbirths as the denominator. Termination of pregnancy is not included in the denominator because the total number of terminations may be very small compared to the total number of births, and its exclusion has little impact on the estimate.

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Maternal mortality measurement resource: www.maternal-mortality-measurement.org.uk/index.html


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World fertility survey: http://opr.princeton.edu/archive/wfs/
CHAPTER 3
INJURY

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INVESTIGATION QUESTIONS & EXAMPLE PROJECTS

Road Traffic Injury

Question: What are the risk factors most commonly associated with road traffic mortality in my region/country?

Example project: Secondary data analysis. Analyze existing data sources (e.g., WHO Mortality database, death certificates, police data).

Question: What is the impact of a policy or intervention to reduce road traffic injury in the country/region?

Example project: Trend analysis using government reports and statistics to report the incidence of road traffic injury before and after a given policy or intervention was implemented.

Question: What are the urban-rural differences in road traffic fatalities in my region/country?

Example project: Secondary data analysis. Using existing data on road traffic fatalities — such as death certificate, police, or insurance data — compare the fatality rate in different geographical areas of the country.

Question: What are the knowledge, attitudes, and practices (KAPs) regarding motorcycle helmet use in my region/country?

Example project: Conduct a mixed-methods study using direct observation of daytime and night-time helmet use in a specific region and roadside KAP interviews with motorcyclists.

Question: What are the reasons for lack of seat belt use among individuals admitted to a hospital for road traffic injury?

Example project: Primary data analysis. Interview individuals hospitalized for road traffic injury on whether or not seat belts were worn and if not the reasons why.

Question: What is the incidence of head injury for motorcycle users wearing helmets compared to those with no helmet use in my region/country?

Example project: Conduct a case-control survey in a hospital unit for crash injury victims to assess whether there is a difference in helmet use between those with head injury and those without.

Question: What is the pattern of injury among non-fatal road crashes in my region/country?

Example project: Conduct a cross-sectional assessment of non-fatal road crash victims in a given hospital or clinic.

Question: What are the circumstances of motorcycle crashes that lead to hospitalization in my region/country?

Example project: Primary data analysis. Collect self-reported data from patients hospitalized for injury related to motorcycle crashes and ask them about possible risk and protective factors such as use of a helmet, use of alcohol, time of day, and location of crash.

Drowning

Question: Which populations are at greatest risk from drowning?

Example project: Conduct a retrospective analysis from secondary data (e.g., mortuaries, death certificates, police data) to describe the drowning death rates by age, sex, and geographic area.
Question: What are the most common circumstances associated with drowning in my region/country?

Example project: Conduct a retrospective analysis from secondary data (e.g., police data) to describe the most common circumstances associated with drowning (e.g., where did they drown, what were they doing when they drowned, was alcohol involved, what age was the drowning victim).

Poisoning

Question: What are the most common types of substances ingested by individuals hospitalized for poisoning?

Example project: Conduct a retrospective analysis from hospital records.

Question: What are the main risk factors for unintentional childhood poisoning in my region/country?

Example project: Conduct a case-control study among children taken to an emergency department (ED) due to poisoning. Match cases and controls on age, sex, hospital, and date of attendance to the hospital. Interview the parents using questionnaires that include demographic and poisoning characteristic information.

Question: What are the characteristics of poisoned individuals and the types of agents ingested by individuals in my region/country?

Example project: If local or national poison control call centers exist, conduct a retrospective analysis of poisoning calls occurring during a given time period.

Falls

Question: What are the risk factors associated with falls among elderly people in my region/country?

Example project: Conduct surveys of older adults using the Stay Independent Questionnaire (https://www.cdc.gov/steadi/pdf/Stay_Independent_brochure-a.pdf) and ask additional questions about patient characteristics and the circumstances of falls.

Question: What are the death, disability, and household consequences of fall injuries in the country/region?

Example project: Conduct community-based household surveys to determine the burden of fall injury and ascertain deaths associated with falls, injury, post-fall required health care, and post fall related disability.

Question: What are the causes and resultant injuries associated with falls amongst children in my region/country?

Example project: Assess information on falls and resultant injuries among children using ED data and describe the distribution of falls by circumstances, type of injury, and demographic characteristics.

Burns

Question: What are the most common risk factors associated with burns in my region/country?

Example project: Conduct a retrospective study of hospital records of burns for a given time frame. Classify major risk factors according to age and sex. Types of burns to be included are flame, hot surface, electrical, chemical, cooking, household lighting, household heating (include details on fuel used, type of lamp). Include known risk factors such as height of cooking surface and use of barriers, firecrackers, oil lamps, or cook stoves.
Question: What is the incidence and what are the most common causes of burns among children in a given area?

Example project: Conduct cross-sectional household surveys to determine the incidence of burns and the most common causes.

Question: What is the primary burn prevention knowledge in my region/country?

Example project: Conduct cross-sectional surveys amongst children and adults to test knowledge of common causes, first-aid, and emergency measures regarding burn injuries.

Question: What are the socio-economic and cultural factors associated with burns in the country/region?

Example project: Conduct a prospective questionnaire-based survey of pediatric patients and their parents at a given hospital.

Violence

Question: What are the patterns and determinants of sexual violence or intimate partner violence at a counseling center?

Example project: Primary data collection using a validated survey among women in a given counseling center or clinic (not the household because victims often co-reside with perpetrators).

Question: What are cultural perceptions towards intimate partner violence in my region/country and how does this affect prevalence?

Example project: Primary data collection using a validated household survey.

Question: What are the risk factors most strongly associated with emergency department visits as a result of intimate partner violence?

Example project: Primary data collection in ED or retrospective data collection of hospital records.

Question: What are the risk factors most strongly associated with ED visits as a result of child abuse/neglect? Recommend reviewing the methodology and survey used in the Violence Against Children Surveys (https://www.cdc.gov/violenceprevention/globalviolence/index.html)

Example project: Primary data collection in ED or retrospective data collection of hospital records.

Question: What are the most common methods of homicide and suicide in my region/country?

Example project: Use of autopsy records to determine rates of homicide, suicide, and the associated methods.

Question: What are the risks and protective factors associated with intimate partner violence among teens/young adults in my region/country?

Example project: Primary data collection via questionnaire at schools or in communities.
INVESTIGATION METHODS

Definitions

Intent of injury

**Intent of injury**: Whether or not an injury was sustained by an act carried out intentionally by oneself or another with the purpose of injuring or killing

**Unintentional**: Injury or poisoning that is not inflicted by deliberate means. This includes injuries described as unintended or “accidental,” regardless of whether the injury was inflicted by oneself or by another person.

**Violence related**: Injury or poisoning resulting from a deliberate violent act inflicted on oneself or by another person with the intent to harm, injure, or kill. This category includes confirmed and suspected assaults, legal intervention (i.e., injury to a person caused by police or other law enforcement officer while in the line of duty), and confirmed or suspected self-harm.

Major types of injury

**Cut/pierce/stab**: Injury resulting from an incision, slash, perforation, or puncture by a pointed or sharp instrument, weapon, or object

**Drowning**: Process of experiencing respiratory impairment from submersion/immersion in liquid

**Falls**: Injury received when a person descends abruptly due to the force of gravity and strikes a surface at the same or lower level

**Fire/burn/smoke inhalation**: Severe exposure to flames, heat, or chemicals that leads to tissue damage in the skin or places deeper in the body

**Firearm gunshot/gunshot wound**: Penetrating force injury resulting from a bullet or other projectile fired from a weapon

**Intimate partner violence**: Serious, preventable public health problem that affects millions of people. The term “intimate partner violence” describes physical and sexual violence, stalking and psychological aggression (including coercive acts) by a current or former intimate partner.

**Poisoning**: Ingestion, inhalation, absorption through the skin, or injection of so much of a drug, toxin (biologic or non-biologic), or other chemical that it causes harmful effects

**Road traffic fatality**: Any person killed immediately or dying within 30 days as a result of a road traffic injury

**Road traffic injury**: Any injury occurring on a public road involving at least one moving vehicle, includes pedestrian injuries

**Sexual violence**: Sexual violence is defined as a sexual act committed against someone without that person’s freely given consent. Sexual violence is divided into the following types:
- Completed or attempted forced penetration of a victim
- Completed or attempted alcohol/drug-facilitated penetration of a victim
- Completed or attempted forced acts in which a victim is made to penetrate a perpetrator or someone else
Completed or attempted alcohol/drug-facilitated acts in which a victim is made to penetrate a perpetrator or someone else

Non-physically forced penetration which occurs after a person is pressured verbally or through intimidation or misuse of authority to consent or acquiesce

Unwanted sexual contact

Non-contact unwanted sexual experiences

**Violence**: Intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation. Violence can be physical or sexual in nature.

**Common terms in injury epidemiology**

- **Agent**: The force or energy
- **Environment**: The situation and the conditions where the injury occurred
- **Host**: The person injured
- **Vector**: The person or thing that applied the force, transferred the energy, or prohibited its transfer

Example from road traffic injury:

- **Host**: The person driving a motorcycle, who sustained an injury after a crash
- **Agent**: The speed of the car
- **Vector**: The motorcycle
- **Environment**: The conditions of the road (e.g., traffic lights, congestion, maintenance of road) at the time of the accident

**Variables**

**Independent variables**

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Possible responses</th>
</tr>
</thead>
</table>
| Mechanism/cause of injury | • Road traffic injury  
  • Drowning  
  • Poisoning  
  • Fall  
  • Burn  
  • Cut/stab  
  • Firearm  
  • Assault  
  • Struck by |

**Dependent variables**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Possible responses*</th>
</tr>
</thead>
</table>
| Intent of injury | • Unintentional  
  • Intentional (self-harm or suicide)  
  • Intentional (assault/homicide)  
  • Undetermined |
| Place of injury | • Home  
  • School |
<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Possible responses*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Number in years</td>
</tr>
<tr>
<td>Sex (as observed)</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>As defined by investigator</td>
</tr>
<tr>
<td>Family structure</td>
<td>Number of adults residing in household</td>
</tr>
<tr>
<td></td>
<td>Number of children residing in household</td>
</tr>
<tr>
<td></td>
<td>Marital status of adults in household</td>
</tr>
<tr>
<td></td>
<td>Maternal and paternal age</td>
</tr>
<tr>
<td>Education</td>
<td>No formal schooling</td>
</tr>
<tr>
<td></td>
<td>Less than primary school</td>
</tr>
<tr>
<td></td>
<td>Primary school completed</td>
</tr>
<tr>
<td></td>
<td>Secondary school completed</td>
</tr>
<tr>
<td></td>
<td>High school completed</td>
</tr>
<tr>
<td></td>
<td>College/university completed</td>
</tr>
<tr>
<td></td>
<td>Post graduate degree</td>
</tr>
<tr>
<td></td>
<td>Refused to answer</td>
</tr>
<tr>
<td>Marital status</td>
<td>Never married</td>
</tr>
<tr>
<td></td>
<td>Currently married</td>
</tr>
<tr>
<td></td>
<td>Separated</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
</tr>
<tr>
<td></td>
<td>Widowed</td>
</tr>
<tr>
<td></td>
<td>Cohabitating</td>
</tr>
<tr>
<td></td>
<td>Refused to answer</td>
</tr>
<tr>
<td>Work status</td>
<td>Government employee</td>
</tr>
<tr>
<td></td>
<td>Non-government employee</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
</tr>
<tr>
<td></td>
<td>Non-paid</td>
</tr>
<tr>
<td></td>
<td>Student</td>
</tr>
<tr>
<td></td>
<td>Homemaker</td>
</tr>
<tr>
<td></td>
<td>Retired</td>
</tr>
<tr>
<td></td>
<td>Unemployed (able to work)</td>
</tr>
<tr>
<td></td>
<td>Unemployed (unable to work)</td>
</tr>
<tr>
<td></td>
<td>Refused to answer</td>
</tr>
<tr>
<td>Average income</td>
<td>Per week or month or year</td>
</tr>
<tr>
<td></td>
<td>Refused to answer</td>
</tr>
<tr>
<td>Setting</td>
<td>Urban</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
</tr>
<tr>
<td>Activity (what the injured person was doing at the time of injury)</td>
<td>Work (including travel for work)</td>
</tr>
<tr>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Sports</td>
</tr>
<tr>
<td></td>
<td>Leisure</td>
</tr>
<tr>
<td></td>
<td>Other</td>
</tr>
<tr>
<td>Nature of injury</td>
<td>Fracture</td>
</tr>
<tr>
<td></td>
<td>Sprain/strain</td>
</tr>
<tr>
<td>Dependent variable</td>
<td>Possible responses*</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cut/bite</td>
<td>• Cut/bite</td>
</tr>
<tr>
<td>Bruise</td>
<td>• Bruise</td>
</tr>
<tr>
<td>Burn</td>
<td>• Burn</td>
</tr>
<tr>
<td>Traumatic brain injury</td>
<td>• Traumatic brain injury</td>
</tr>
<tr>
<td>Laceration</td>
<td>• Laceration</td>
</tr>
<tr>
<td>Puncture</td>
<td>• Puncture</td>
</tr>
<tr>
<td>Explosion</td>
<td>• Explosion</td>
</tr>
<tr>
<td>Organ system injury</td>
<td>• Organ system injury</td>
</tr>
<tr>
<td>Other</td>
<td>• Other</td>
</tr>
<tr>
<td>Body site of injury</td>
<td>• Ankle</td>
</tr>
<tr>
<td>• Knee</td>
<td>• Knee</td>
</tr>
<tr>
<td>• Head</td>
<td>• Head</td>
</tr>
<tr>
<td>– Intracranial</td>
<td>• Head</td>
</tr>
<tr>
<td>– Extracranial</td>
<td>• Head</td>
</tr>
<tr>
<td>• Face</td>
<td>• Face</td>
</tr>
<tr>
<td>• Hip/thigh/upper leg</td>
<td>• Hip/thigh/upper leg</td>
</tr>
<tr>
<td>• Shoulder</td>
<td>• Shoulder</td>
</tr>
<tr>
<td>• Hand/wrist</td>
<td>• Hand/wrist</td>
</tr>
<tr>
<td>• Trunk</td>
<td>• Trunk</td>
</tr>
<tr>
<td>• Lower leg/foot</td>
<td>• Lower leg/foot</td>
</tr>
<tr>
<td>• Arm/elbow</td>
<td>• Arm/elbow</td>
</tr>
<tr>
<td>• Neck</td>
<td>• Neck</td>
</tr>
<tr>
<td>• Other</td>
<td>• Other</td>
</tr>
<tr>
<td>Injury severity (based on the abbreviated injury scale)</td>
<td>• Minor</td>
</tr>
<tr>
<td></td>
<td>• Moderate</td>
</tr>
<tr>
<td></td>
<td>• Serious</td>
</tr>
<tr>
<td></td>
<td>• Severe</td>
</tr>
<tr>
<td></td>
<td>• Critical</td>
</tr>
<tr>
<td></td>
<td>• Unsurvivable</td>
</tr>
<tr>
<td>Admission to hospital as a result of injury</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td>ED visit as a result of injury</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td>Length of stay in hospital</td>
<td>Linear (days, weeks, months)</td>
</tr>
<tr>
<td>Alcohol use (suspicion or evidence of alcohol use before the injury event, by the injured person or others directly involved in the incident)</td>
<td>• Suspected</td>
</tr>
<tr>
<td></td>
<td>• Confirmed by self-report</td>
</tr>
<tr>
<td></td>
<td>• Confirmed by biological evidence</td>
</tr>
<tr>
<td></td>
<td>• No information available</td>
</tr>
<tr>
<td>Other substance use (suspicion or evidence of other psychoactive substance use before the injury event, by the injured person or others directly involved in the incident)</td>
<td>• Suspected</td>
</tr>
<tr>
<td></td>
<td>• Confirmed by self-report</td>
</tr>
<tr>
<td></td>
<td>• Confirmed by biological evidence</td>
</tr>
<tr>
<td></td>
<td>• No information available</td>
</tr>
<tr>
<td>Variables specific to drowning</td>
<td>• Residential pool</td>
</tr>
<tr>
<td>Location of incident</td>
<td>• Community/public pool</td>
</tr>
<tr>
<td></td>
<td>• Bathtub</td>
</tr>
<tr>
<td></td>
<td>• Bucket</td>
</tr>
<tr>
<td></td>
<td>• Lake</td>
</tr>
</tbody>
</table>

• Suspected
• Confirmed by self-report
• Confirmed by biological evidence
• No information available
<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Possible responses*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersion time</td>
<td>Time in seconds or minutes</td>
</tr>
<tr>
<td>Response to initial resuscitation</td>
<td>Alert</td>
</tr>
<tr>
<td>Temperature of liquid</td>
<td>&gt;20°C = warm water</td>
</tr>
<tr>
<td>Amount of fluid ingested</td>
<td>ml/kg</td>
</tr>
<tr>
<td>Events associated with drowning (either as a cause of or as a result of)</td>
<td>Seizures, Head or spine trauma, Cardiac arrhythmias, Hypothermia, Alcohol and drug ingestion, Syncope, Apnea, Hyperventilation, Suicide, Hypoglycemia</td>
</tr>
<tr>
<td>Clinical presentation (Assessed via medical records/autopsy records)</td>
<td>Asymptomatic, Symptomatic</td>
</tr>
<tr>
<td></td>
<td>– Altered vital signs (e.g., hypothermia, tachycardia, bradycardia)</td>
</tr>
<tr>
<td></td>
<td>– Anxious appearance</td>
</tr>
<tr>
<td></td>
<td>– Tachypnea, dyspnea, or hypoxia (if dyspnea occurs, no matter how slight, the patient is considered symptomatic)</td>
</tr>
<tr>
<td></td>
<td>– Increase in plasma acidity (may also exist in asymptomatic patients)</td>
</tr>
<tr>
<td></td>
<td>– Altered level of consciousness, neurologic deficit</td>
</tr>
<tr>
<td></td>
<td>– Cough</td>
</tr>
<tr>
<td></td>
<td>– Wheezing</td>
</tr>
<tr>
<td></td>
<td>– Hypothermia</td>
</tr>
<tr>
<td></td>
<td>– Vomiting, diarrhea, or both</td>
</tr>
<tr>
<td></td>
<td>– Cardiopulmonary arrest</td>
</tr>
<tr>
<td></td>
<td>– Apnea</td>
</tr>
<tr>
<td></td>
<td>– Immersion syndrome</td>
</tr>
<tr>
<td></td>
<td>– Obviously dead</td>
</tr>
<tr>
<td></td>
<td>– Rigor mortis</td>
</tr>
<tr>
<td></td>
<td>– Dependent lividity</td>
</tr>
<tr>
<td></td>
<td>– No apparent CNS function</td>
</tr>
<tr>
<td>Presence of fence around residential pool</td>
<td>Yes</td>
</tr>
<tr>
<td>Use of latch on gate around residential pool</td>
<td>Yes</td>
</tr>
</tbody>
</table>

• River
• Ocean
• Other body of water

• ml/kg
• Assessed from medical records

• Yes
• No
<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Possible responses*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of open drain</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td>Presence of lifeguard</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td>Variables specific to road traffic injury</td>
<td></td>
</tr>
<tr>
<td>Use of helmets</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>Use of seatbelts</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td></td>
<td>• Not present</td>
</tr>
<tr>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>Use of child safety restraints</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>Number of people in vehicle</td>
<td>Number of people</td>
</tr>
<tr>
<td>• How many people, including yourself, were in/on the vehicle at time of accident?</td>
<td></td>
</tr>
<tr>
<td>Type of road user</td>
<td>• Pedestrian</td>
</tr>
<tr>
<td></td>
<td>• Bicycle</td>
</tr>
<tr>
<td></td>
<td>• E-Bike/vehicle (Electric/battery driven Bicycle or electric vehicle)</td>
</tr>
<tr>
<td></td>
<td>• Motorized 2–3 wheeler, moto-taxi/tuk</td>
</tr>
<tr>
<td></td>
<td>• Bus</td>
</tr>
<tr>
<td></td>
<td>• Train</td>
</tr>
<tr>
<td></td>
<td>• Lorry</td>
</tr>
<tr>
<td></td>
<td>• Car</td>
</tr>
<tr>
<td></td>
<td>• Boat</td>
</tr>
<tr>
<td>Crash location</td>
<td>• Road type (e.g., highway, road, rural road)</td>
</tr>
<tr>
<td></td>
<td>• GPS location (if available)</td>
</tr>
<tr>
<td></td>
<td>• Known dangerous intersection/portion of road</td>
</tr>
<tr>
<td></td>
<td>• Mile markers on road (if available)</td>
</tr>
<tr>
<td>Variables specific to violence</td>
<td></td>
</tr>
<tr>
<td>Witnessing family violence</td>
<td>• Witnessing one family member be violent towards another</td>
</tr>
<tr>
<td></td>
<td>– Yes</td>
</tr>
<tr>
<td></td>
<td>– No</td>
</tr>
<tr>
<td></td>
<td>• Being the victim of family violence as a child</td>
</tr>
<tr>
<td></td>
<td>– Yes</td>
</tr>
<tr>
<td></td>
<td>– No</td>
</tr>
<tr>
<td>• Attitudes that are accepting of violence and sex inequality (perpetration and experience)</td>
<td>Assessed through qualitative questionnaire</td>
</tr>
<tr>
<td>• Beliefs in sexual purity and sex inequality</td>
<td></td>
</tr>
<tr>
<td>• Ideologies of male sexual entitlement</td>
<td></td>
</tr>
<tr>
<td>Past history of violence</td>
<td>• Yes</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
</tbody>
</table>

*Terminology may vary based on country or region.
Additional information can be found in WHO’s Injury Prevention Guidelines: [http://apps.who.int/iris/bitstream/10665/42451/1/9241591331.pdf](http://apps.who.int/iris/bitstream/10665/42451/1/9241591331.pdf)

**Formulas**

Disability-adjusted life years (DALYs) = Years of Life Lost + Years Living with Disability

Fatalities per 10,000 vehicles = Ratio of fatalities to motor vehicles

Fatalities per 100,000,000 vehicle kilometer traveled = Number of road fatalities to vehicle kilometers traveled

Fatalities per 100,000 population = Ratio of fatalities to population

Harm from falls from 1,000 patient days = Number of inpatient falls with injuries/number of inpatient days on the unit × 1,000

Number of fatalities = Absolute figure indicating the number of people who die as a result of a given incident

Number of injuries = Absolute figure indicating the number of injuries

Workplace injury incidence rate per 100 full-time employees per year = Total number of injuries × 200,000 /total number of hours worked by all employees, where 200,000 is equal to the number of hours accrued by 100 employees working 40 hours per week, 50 weeks per year

Years living with disability for incident cases = Incident cases × disability weight × average duration of the case until remission or death in years

Years living with disability for prevalent cases = Prevalent cases × disability weight.

The 2004 WHO disability weights are listed at [www.who.int/healthinfo/global_burden_disease/GBD2004_DisabilityWeights.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/42451/1/9241591331.pdf)

Years of life lost = For a given cause, age, and sex [number of deaths] × standard life expectancy at age of death in years

**Data Sources**

**International and national sources**

**Demographic health surveys (DHS) program:** Collects and disseminates accurate, nationally representative data on fertility, family planning, maternal and child health, sex, HIV/AIDS, malaria, and nutrition. Questionnaires pertinent to injury epidemiology include those related to alcohol consumption, causes of death, child discipline, intimate partner violence, female genital cutting, and verbal autopsy. [http://dhsprogram.com/Who-We-Are/About-Us.cfm](http://dhsprogram.com/Who-We-Are/About-Us.cfm)

The following FETP countries have DHS data available:

<table>
<thead>
<tr>
<th>AFRO</th>
<th>SEARO/WPRO</th>
<th>PAHO</th>
<th>EMRO/EURO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td>Bangladesh</td>
<td>El Salvador</td>
<td>Afghanistan</td>
</tr>
<tr>
<td>Democratic Rep. of Congo</td>
<td>India</td>
<td>Guatemala</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>Indonesia</td>
<td>Honduras</td>
<td>Morocco</td>
</tr>
<tr>
<td>Kenya</td>
<td>Vietnam</td>
<td>Nicaragua</td>
<td>Pakistan</td>
</tr>
<tr>
<td>Mozambique</td>
<td></td>
<td></td>
<td>Tajikistan</td>
</tr>
</tbody>
</table>

The following FETP countries have Demographic Surveillance System data available:

<table>
<thead>
<tr>
<th>AFRO</th>
<th>SEARO/WPRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ethiopia</td>
<td>• Bangladesh</td>
</tr>
<tr>
<td>• Kenya</td>
<td>• India</td>
</tr>
<tr>
<td>• Mozambique</td>
<td>• Indonesia</td>
</tr>
<tr>
<td>• Nigeria</td>
<td>• Vietnam</td>
</tr>
<tr>
<td>• South Africa</td>
<td></td>
</tr>
<tr>
<td>• Tanzania</td>
<td></td>
</tr>
<tr>
<td>• Uganda</td>
<td></td>
</tr>
</tbody>
</table>

International road traffic and accident database: Since 2011, provides an annual overview of road safety indicators in 38 participating countries. [http://internationaltransportforum.org/irtadpublic/index.html](http://internationaltransportforum.org/irtadpublic/index.html)

Violence Against Children Surveys (VACS): These systematically measure physical, emotional, and sexual violence against girls and boys, and identify risk and protective factors and health consequences, as well as use of services and barriers to seeking help. [https://www.cdc.gov/violenceprevention/vacs/VACS-Survey-Methods.html](https://www.cdc.gov/violenceprevention/vacs/VACS-Survey-Methods.html)

WHO global school based student health survey: Collaborative surveillance project to help countries measure and assess the behavioral risk factors and protective factors in 10 key areas (including violence and unintentional injury) among young people aged 13–17 years. [www.who.int/chp/gshs/en/](http://www.who.int/chp/gshs/en/)

WHO mortality database: Compilation of mortality data by age, sex, and cause of death, as reported annually by member states from their civil registration systems. [www.who.int/healthinfo/mortality_data/en/](http://www.who.int/healthinfo/mortality_data/en/)

Other sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Type of data</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police records</td>
<td>• Total number of crashes, injuries, and fatalities</td>
<td>• Potentially good source for fatal injuries, including road traffic injury and violence</td>
</tr>
<tr>
<td></td>
<td>• Types of road users involved</td>
<td>• Level of detail may vary</td>
</tr>
<tr>
<td></td>
<td>• Demographic descriptions of individuals involved</td>
<td>• Such records may not always be accessible</td>
</tr>
<tr>
<td></td>
<td>• Types of vehicles involved</td>
<td>• Underreporting can be common</td>
</tr>
<tr>
<td></td>
<td>• Assessment of causes</td>
<td>• Police definitions may vary from health definition of injury or severity</td>
</tr>
<tr>
<td></td>
<td>• Location and sites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alcohol use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Prosecutions</td>
<td></td>
</tr>
</tbody>
</table>
### Tools and Analytic Methods

#### Haddon’s matrix

Useful tool for analyzing an injury case. Construction of a Haddon’s matrix can also be helpful to generate investigation questions on a topic of interest or to develop ideas for potential interventions targeted at this injury topic.

<table>
<thead>
<tr>
<th>Pre-event</th>
<th>Human (or host)</th>
<th>Vector</th>
<th>Physical environment</th>
<th>Socio-economic environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is host pre-disposed or overexposed to risk?</td>
<td>Is it hazardous?</td>
<td>• Is it hazardous?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Does it have hazard-reduction features?</td>
<td>Does it encourage or discourage risk-taking and hazard?</td>
<td></td>
</tr>
<tr>
<td>Event</td>
<td>Human (or host)</td>
<td>Vector</td>
<td>Physical environment</td>
<td>Socio-economic environment</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
<td>--------</td>
<td>----------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Can host tolerate force or energy transfer?</td>
<td>Does it provide protection?</td>
<td>Does it contribute to injury during event?</td>
<td>Does it contribute to injury during event?</td>
<td></td>
</tr>
<tr>
<td>How severe is the trauma or harm?</td>
<td>Does it contribute to the trauma?</td>
<td>Does it add to the trauma after the event?</td>
<td>Does it contribute to recovery?</td>
<td></td>
</tr>
</tbody>
</table>


WHO Guidelines for Conducting Community Surveys on Injuries and Violence: [http://apps.who.int/iris/bitstream/10665/42975/1/9241546484.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/42975/1/9241546484.pdf?ua=1)


**Trauma**

**Abbreviated Injury Scale (AIS)**
Coding system created by the Association for the Advancement of Automotive Medicine to classify and describe injury severity. [www.trauma.org/archive/scores/ais.html](http://www.trauma.org/archive/scores/ais.html)

<table>
<thead>
<tr>
<th>AIS score</th>
<th>Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minor</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>Serious</td>
</tr>
<tr>
<td>4</td>
<td>Severe</td>
</tr>
<tr>
<td>5</td>
<td>Critical</td>
</tr>
<tr>
<td>6</td>
<td>Unsurvivable</td>
</tr>
</tbody>
</table>

**Falls Risk Assessment Tool**
Form derived from longitudinal studies of factors in order to assess the risk of falls in older people. See the Stay Independent Questionnaire ([https://www.cdc.gov/steadi/pdf/Stay_Independent_brochure-a.pdf](https://www.cdc.gov/steadi/pdf/Stay_Independent_brochure-a.pdf))

**Glasgow coma scale**
Useful measurement of a patient’s level of consciousness (i.e., how awake the patient is). [www.firstaidforfree.com/glasgow-coma-scale-gcs-first-aiders/](http://www.firstaidforfree.com/glasgow-coma-scale-gcs-first-aiders/)

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneously</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>To speech</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>To pain</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Oriented to time, place, and person</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Confused</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Inappropriate words</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Incomprehensible sounds</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Obey commands</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Moves to localized pain</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Flexion withdrawal from pain</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Abnormal flexion (decorticate)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td>Response</td>
<td>Score</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Abnormal extension (decerebrate)</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>No response</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Best response</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Comatose client</td>
<td></td>
<td>8 or less</td>
</tr>
<tr>
<td>Totally unresponsive</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Glasgow outcome scale (GOS)
Global scale for functional outcome that rates patient status into one of five categories (dead, vegetative state, severe disability, moderate disability, or good recovery). The extended GOS provides more detailed categorization (eight categories) by subdividing the categories of severe disability, moderate disability, and good recovery into a lower and upper category. [www.tbi-impact.org/cde/mod_templates/12_F_01_GOSE.pdf](http://www.tbi-impact.org/cde/mod_templates/12_F_01_GOSE.pdf)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Death</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>Vegetative state</td>
<td>VS</td>
</tr>
<tr>
<td>3</td>
<td>Lower severe disability</td>
<td>SD-</td>
</tr>
<tr>
<td>4</td>
<td>Upper severe disability</td>
<td>SD+</td>
</tr>
<tr>
<td>5</td>
<td>Lower moderate disability</td>
<td>MD-</td>
</tr>
<tr>
<td>6</td>
<td>Upper moderate disability</td>
<td>MD+</td>
</tr>
<tr>
<td>7</td>
<td>Lower good recovery</td>
<td>GR-</td>
</tr>
<tr>
<td>8</td>
<td>Upper good recovery</td>
<td>GR+</td>
</tr>
</tbody>
</table>

Injury mortality diagnosis matrix (ICD-10)

Injury Severity Scale (ISS)
Anatomical scoring system that provides an overall score for patients with multiple injuries. Each injury is assigned an AIS score allocated to one of six body regions (head, face, chest, abdomen, extremities [including pelvis], and external). Only the highest AIS score in each body region is used. The three most severely injured body regions have their score squared and added together to produce the ISS score. An example of ISS scoring is shown below (based on [www.trauma.org/archive/scores/iss.html](http://www.trauma.org/archive/scores/iss.html))

<table>
<thead>
<tr>
<th>Region</th>
<th>Injury description</th>
<th>AIS</th>
<th>Square top three</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head and neck</td>
<td>Cerebral contusion</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Face</td>
<td>No injury</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chest</td>
<td>Flail chest</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Abdomen</td>
<td>• Minor contusion of liver</td>
<td>• 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Complex rupture spleen</td>
<td>• 5</td>
<td>25</td>
</tr>
<tr>
<td>Extremity</td>
<td>Fractured femur</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>External</td>
<td>No injury</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Injury severity score</strong></td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

Screening and assessment instruments for trauma
For a selected sample of available tools to screen and assess traumatic events and trauma-related symptoms, go to [www.ncbi.nlm.nih.gov/books/NBK207193/](http://www.ncbi.nlm.nih.gov/books/NBK207193/)
WHO violence against women instrument

Consists of two sets of questions designed to capture information critical to assess the prevalence, frequency, and severity of different forms of violence against women, perpetrated both by intimate partners and others. The first set of questions focuses on violence by intimate partners only and should be used in its entirety to measure violence by intimate partners. The second set addresses violence by others and can be added onto the first set if violence against women is explored in a broader context. www.path.org/publications/files/GBV_rvaw_appx.pdf

Injury and violence in children

The U.S. Center for Disease Control and Prevention's Youth Risk Behavior Survey captures the health of children in the United States. However, it can be taken and adapted to other country settings. ftp://ftp.cdc.gov/pub/data/yrbs/2015/2015_hs_questionnaire.pdf

WHO global status reports

WHO global status report on road safety

WHO global status report on violence prevention
Reflects data from 133 countries. Data include national efforts to address interpersonal violence, namely child maltreatment, youth violence, intimate partner and sexual violence, and elder abuse. www.who.int/violence_injury_prevention/violence/status_report/2014/en/

WHO multi-country study on women’s health and intimate partner violence against women
Analyses data from 10 countries and addresses the prevalence of violence against women in countries where few data were previously available. It also uncovers the forms and patterns of this violence across different countries and cultures, documenting the consequences of violence for women’s health. www.who.int/gender/violence/who_multicountry_study/summary_report/summary_report_English2.pdf

REFERENCES


CHAPTER 4

HYPERTENSION

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INVESTIGATION QUESTIONS & EXAMPLE PROJECTS

Surveillance

Question: What is the burden of hypertension (HTN) (geographic region/country)?
Example project: Obtain data from existing surveillance system, census, or from health care providers or facilities. Obtain data about total population size from appropriate database.

Question: What is the demographic and geographic distribution of HTN in (country)?
Example project: Obtain data from existing surveillance system, census, or from health service providers. Include demographic variables such as sex, ethnicity, age, income, education, and geographic variables such as urban versus rural.

Question: Which sub-population in (country) is most at risk for developing HTN?
Example project: Obtain data from existing surveillance system, census, or from health care providers. Include variables such as sex, ethnicity, age, income, education.

Question: What are the primary risk factors for HTN in (specific sub-population/geographic region) in (country)?
Example project: Analyze STEPS data on behavior but look at specific sub-groups.

Epidemiology

Question: What exposures/risk factors are associated with the change in the rate/prevalence/incidence of HTN in (country) over the past (number of) years?
Example project: Select known risk factors for HTN (e.g., diet, exercise, salt consumption, alcohol use, type of occupation) from population surveys about health behavior (i.e., WHO STEPS) and examine the correlation with increase/decrease in prevalence of HTN.

Question: How much of the population of (country) know what HTN is and the behaviors that contribute to it? Which specific subgroup is most in need of an educational intervention?
Example project: Use an HTN knowledge, attitudes and behavior (KAB) questionnaire with a representative sample of the population. Can focus on a specific region, urban versus rural.

Question: What are the health system factors that increase the risk for HTN in (country)?
Example project: Assess health system factors in specific country such as HTN screening/management programs, availability of antihypertensive medications, models of care used for HTN management, which might affect the known risk factors for HTN (e.g., diet, alcohol, physical activity environment).

Question: What is the association between (exposure/risk factor) and HTN?
Example project: The World Hypertension League has called for quality investigation on the effects of salt intake in particular on health; therefore, an example investigation question may be “What is the association between high salt intake and HTN?” However, any relevant risk factor can be used.

Question: What proportion of physicians (or other health care providers) in (country) are educated about what HTN is and the behaviors/factors that contribute to HTN?
Example project: Conduct a knowledge survey among physicians or other health care providers about the standard protocol for HTN screening and management. Can also focus on community health workers, small local clinics, etc.
Question: What are the primary treatments recommended/prescribed by physicians (or other health care providers) in (country)?

Example project: Conduct a survey among physicians about the most commonly prescribed medications as well as non-pharmacological recommendations.

Question: When provided recommended treatment for HTN, what proportion of the population uses available health services?

Example project: Select a cohort of people who have been diagnosed with HTN in a particular area or at a particular clinic and have been recommended to seek treatment. Check back with them at various times to see if they have sought treatment.

Question: What kinds of support or training do health care providers in (country) need to better help their patients manage their HTN, and where do they normally obtain this training?

Example project: Conduct a survey/qualitative interview with health care providers on the barriers they face in providing care to HTN patients.

Question: What are the reasons for poor hypertensive medication adherence in (country)?

Example project: Conclude qualitative interviews with hypertensive patients who are on medication.

Question: To what extent is self-monitoring of blood pressure (BP) being used by patients and how can it be further supported?

Example project: Conduct a survey of hypertensive patients and frequency of measurement of BP.

Program/Policy Evaluation

Question: What is the influence of the WHO package of essential non-communicable disease interventions for primary health care in low-resource settings protocol in the management/prevention of HTN?

Example project: Find a health facility that will adopt the WHO-recommended protocol, establish baseline, and measure control of HTN after a certain time interval. Establish whether there is support for treatment of identified patients at this clinic.

INVESTIGATION METHODS

Definitions

**Alpha blockers**: Classes of medication that reduce resistance in the arteries by relaxing their walls (AHA)

**Alpha-2 receptor agonists**: Classes of medication that reduce BP by decreasing the effect of the sympathetic portion of the involuntary nervous system*

**Ambulatory BP**: Portable cuff and monitor that a patient wears throughout the day for 24 hours and which provides valuable information on how antihypertensive medications may be working

**Aneroid sphygmomanometer**: Commonly used device consisting of the same cuff and with a stethoscope, but where the measurement of pressure is seen with a dial. This method is less accurate than the mercury sphygmomanometer method.

**Angiotensin converting enzyme (ACE) inhibitors**: Classes of medication that help relax blood vessels, reducing BP*
Angiotensin II receptor blockers (ARBs): Classes of medication that prevent angiotensin from constricting the blood vessels*

Auscultation: Act of listening, through a stethoscope or another instrument, to sounds within the body as a method of diagnosis

Automatic/digital sphygmomanometer: Types of devices that use electronic calculations and automatic inflation to measure BP, the level of which appears on a digital screen. These are simple to use with little training and work even in noisy environments.

Beta blockers: Classes of medication that reduce the heart rate and the force of the blood by blocking the effects of adrenaline/epinephrine*

Blood pressure (BP): Force of an individual’s blood against the walls of his/her arteries

Calcium channel blockers (CCB): Classes of medication that work to relax and widen the walls of blood vessels, reducing BP*

Central agonists: Classes of medication that reduce BP by reducing the blood vessels’ ability to contract*

Combined Alpha and Beta blockers: Classes of medication used in an IV drip when a patient is in hypertensive crisis*

Diastolic blood pressure (DBP): Force of an individual’s blood against his/her artery walls when the heart rests between beats

Hypertension (HTN, also called high blood pressure): Force of an individual’s blood against the walls of his/her arteries is higher than it should be. An individual is diagnosed with HTN when his/her SBP is ≥140 mmHg and when his/her DBP is ≥90 mmHg.

Korotkoff sounds: Sounds that clinicians listen for when measuring BP with a stethoscope. The BP level at the first sound is the SBP, while the BP level at the fifth sound is the DBP.

Mercury sphygmomanometer: Considered the gold standard for measuring BP. It consists of an inflatable cuff that collapses and then releases the artery, and the height of a column of mercury is observed to see the BP. These do not need to be calibrated. This method is often avoided now because of possible environmental contamination of mercury.

mmHg: Stands for “millimeters of mercury” and is the unit of measurement for BP

Normotension: A normal BP indicated by an SBP level < 120 mmHg and a DBP < 80 mmHg

<table>
<thead>
<tr>
<th>Blood Pressure Category</th>
<th>Systolic mm Hg (upper #)</th>
<th>Diastolic mm Hg (lower #)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120 – 139</td>
<td>or</td>
</tr>
<tr>
<td>High Blood Pressure (Hypertension) Stage 1</td>
<td>140 – 159</td>
<td>or</td>
</tr>
<tr>
<td>High Blood Pressure (Hypertension) Stage 2</td>
<td>160 or &gt;</td>
<td>or</td>
</tr>
<tr>
<td>Hypertensive Crisis (Emergency care needed)</td>
<td>&gt; 180</td>
<td>or</td>
</tr>
</tbody>
</table>

Peripheral adrenergic inhibitors: Classes of medication that block the neurotransmitters that tell smooth muscles to contract. These are rarely used.*

Pre-eclampsia: Complication of pregnancy in which a woman has HTN and rapid weight gain

Pre-hypertension: BP level does not yet meet the threshold for an HTN diagnosis, but is elevated to between 120 mmHG and 139 mmHG for SBP and between 80 mmHG and 89 mmHG for BBP
Pulmonary hypertension: HTN that occurs in the arteries of the lungs. It is a different measurement from systemic HTN and is only defined here to reduce confusion. Pulmonary HTN is not the focus of this compendium.

Systolic blood pressure (SBP): Force of and individual’s blood against his/her artery walls when the heart beats

Thiazide diuretics: Classes of medication that make the kidneys pass out more fluid, creating less fluid in the blood and lowering BP*

Vasodilators: Classes of medication that cause blood vessel walls to relax*

*Source: American Heart Association (AHA)

Variables

Independent variables

Demographic variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Possible responses</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>• How old are you?</td>
<td>Number in years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WHO STEPS instrument (see Measurement Tools section)</td>
</tr>
<tr>
<td>Sex (as observed)</td>
<td>• Male</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Female</td>
<td></td>
</tr>
<tr>
<td>In total, how many</td>
<td>Number in years</td>
<td></td>
</tr>
<tr>
<td>years have you spent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at school and in full-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>time study (excluding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>preschool)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>• No formal schooling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Less than primary school</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Primary school completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Secondary school completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High school completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• College/university completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Post graduate degree</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refused to answer</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>• Never married</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Currently married</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Separated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Divorced</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Widowed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cohabitating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refused to answer</td>
<td></td>
</tr>
<tr>
<td>Work status</td>
<td>• Government employee</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Non-government employee</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Self-employed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Non-paid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Student</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Homemaker</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Retired</td>
<td></td>
</tr>
</tbody>
</table>
### Anthropometric variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Measurement tools/protocols</th>
</tr>
</thead>
</table>
| Abdominal obesity      | • *Centrally obese*: a waist circumference of $\geq 94$ cm for men and $\geq 80$ cm for women  
  • Waist-to-hip ratio (W/H) $>0.8$ for women and $1.0$ for men | **Tape measure**  
  • *Waist circumference*: Measured to the nearest 0.1 centimeter. Measurement should be taken in a private area. The midpoint between the inferior margin of the last rib and the crest of the ilium are marked using a tape measure. With the assistance of the participant, the tape measure is wrapped around the waist directly over the skin or light clothing. Just before the measurement is taken, the participant is asked to stand with their feet together, place their arms at the side of their body with the palms of their hands facing inwards, and breathe out gently.  
  • *Hip circumference*: Measured to the nearest 0.1 centimeter. Measurement should be taken in a private area. The measurement is taken at the maximum circumference over the buttocks, after requesting the participant to relax the arms at the sides. |
| Body Mass Index        | • *Obese*: $\geq 30$ kg/m$^2$  
  • *Overweight*: 25–30 kg/m$^2$  
  • *Normal*: 18.5–25 kg/m$^2$ | **Stadiometer and scale**  
  Calculated as weight (in kgs)/ squared height$^2$ (in meters$^2$) and further divided into the categories defined by WHO |
<p>| Total cholesterol      | • <em>Desirable</em>: $&lt;200$ mg/dL                                                          |                                          |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Measurement tools/protocols</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HDL cholesterol</strong></td>
<td>• Low: &lt;40 mg/dL • High: ≥60 mg/dL</td>
<td>Medical record abstraction Classified based on the Adult Treatment Panel III (Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (ATP III))</td>
</tr>
<tr>
<td><strong>LDL cholesterol</strong></td>
<td>• Optimal: &lt;100 mg/dL • Near optimal/above optimal: 100–129 mg/dL • Borderline high: 130–159 mg/dL • High: 160–189 mg/dL • Very high: ≥190 mg/dL</td>
<td>ASCVD Risk calculated using this calculator: <a href="http://www.cvriskcalculator.com/">www.cvriskcalculator.com/</a></td>
</tr>
<tr>
<td>Eligibility for primary CVD prevention (according to the American College of Cardiology/(AHA) Task Force on Practice Guidelines)</td>
<td>• Moderate or intensive statin therapy if atherosclerotic cardiovascular disease is ≥7.5% • Moderate intensity statin therapy if ASCVD risk is between 5% and 7.5%</td>
<td>Medical record abstraction</td>
</tr>
<tr>
<td><strong>Hemoglobin</strong></td>
<td>Hemoglobin is a protein that allows red blood cells to carry oxygen to all parts of the body</td>
<td>Medical record abstraction</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>Measured to the nearest 0.1 cm</td>
<td>Stadiometer Participant wears light clothing and no footwear. Participant is requested to have feet together, heels against the backboard, knees straight, and look straight ahead.</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Measured to the nearest 0.1 kg</td>
<td>Digital scale Participant is wearing light clothing and no footwear</td>
</tr>
<tr>
<td><strong>Blood glucose</strong></td>
<td>Fasting: • Normal: &lt;100 mg/dL • Prediabetes: 100 mg/dL to 125 mg/dL • Diabetes: ≥126 mg/dL Oral Glucose Tolerance Test: • Normal: &lt;140 mg/dL • Prediabetes: 140 mg/dL to 199 mg/dL • Diabetes: ≥200 mg/dL (American Diabetes Association [ADA])</td>
<td>Medical record abstraction</td>
</tr>
<tr>
<td><strong>10-year CVD risk (WHO charts)</strong></td>
<td></td>
<td>WHO Risk Prediction Charts (see the Measurement Tools section)</td>
</tr>
</tbody>
</table>
### Comorbid conditions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Case definition</th>
<th>Measurement tool</th>
</tr>
</thead>
</table>
| Diabetes mellitus      | • The presence of a non-fasting blood glucose of ≥11.1 mmol/L, or a fasting blood glucose of ≥7.0 mmol/L  
  • The current criteria for the diagnosis of type 2 diabetes from the ADA are a fasting plasma glucose of ≥126 mg/dL and/or 2-hour plasma glucose (after a standard 75 mg glucose load) ≥200 mg/dL  
  Fasting:  
  • Normal: <100 mg/dL  
  • Prediabetes: 100 mg/dL to 125 mg/dL  
  • Diabetes: ≥126 mg/dL  
  Oral Glucose Tolerance Test:  
  • Normal: <140 mg/dL  
  • Prediabetes: 140 mg/dL to 199 mg/dL  
  • Diabetes: ≥200 mg/dL  
  (ADA)                                                                                                                                                                                                                                                                       | • Self-reports of a diagnosis of diabetes and history of taking anti-diabetes medication  
  • Medical record abstraction                                                                                          |
| Renal (kidney) failure | Diagnosed by:  
  • Presence of albumin in the urine  
  • Urine albumin-to-creatinine ratio >30 mg/g  
  Estimated glomerular filtration rate (eGFR)  
  • Normal range: ≥60  
  • May indicate kidney damage: <60  
  • May indicate kidney failure: ≤15  
  (NIDDK)                                                                                                                     | Medical record abstraction                                                                 |
| Depression             | Score range total scores:  
  • Minimal: 0–13  
  • Mild: 14–19  
  • Moderate: 20–28  
  • Severe: 29–63  
  Harcourt Assessment, Inc. administers the rights for the Beck scales; it can be purchased for $75 (includes manual and 25 record forms). Added forms are $40 for 25 or $145 for 100. Contact Aaron T. Beck. Dept. of Psychiatry, U. of Pennsylvania School of Medicine. Tel: 215-898-4102. E-mail: becka@landru.cpr.upenn.edu  
  • The Beck Depression Inventory Second Edition (BDI-II) is a 21-item self-report instrument. Each corresponds to a symptom of depression and is summed to give a single score for the BDI-II. (Info from: Medical U. of South Carolina)  
  • The Zung Self-Rating Depression Scale is a 20-item self-report  
  • WHO: Most people with depression score between 50 and 69, while a score of ≥70 indicates severe depression.                                                                                                   |                                                                                                      |
<p>| Thrombosis             | Blood clot                                                                                                                                                                                                                                                                                                                                     |                                                                                                      |
| Stroke                 | Happens when a blood vessel that feeds the brain gets blocked, usually from a blood clot. When the blood supply to a                                                                                                      |                                                                                                      |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Case definition</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>part of the brain is shut off, brain cells die. The result can be the inability to carry out some of the previous functions as before like walking or talking (AHA)</td>
<td></td>
</tr>
</tbody>
</table>

### Behavioral variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alcohol consumption</strong></td>
<td>• Daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 6 days/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 3–4 days/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1–2 days/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1–3 days/month</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• &lt; once a month</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Another option:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Current alcohol users: Those having consumed any amount of alcohol in the 30 days preceding the survey</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Heavy users: An equivalent of &gt;6 standard drinks of alcohol in one sitting; and/or consuming an equivalent of &gt;6 standard drinks of alcohol on average/occasion among men, or an equivalent of &gt;4 standard drinks of alcohol on average/occasion among women</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Medium users: An equivalent of 4–6 standard drinks of alcohol on average/occasion among men, or 2–4 standard drinks of alcohol on average/occasion among women</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Low users: An equivalent of &lt;4 standard drinks of alcohol on average/occasion among men, or &lt;2 standard drinks of alcohol on average/occasion among women</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The WHO STEPS Instrument (survey)* provides further detail with regard to each behavior (see the Measurement Tools section).</td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td>• Do you currently smoke any tobacco products, such as cigarettes, cigars or pipes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No</td>
<td></td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td>• Adequate: &gt;150 minutes moderate intensity activity or &gt;75 minutes vigorous intensity activity/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Active: Regular exercise ≥ 2 hours/week</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Physical Activity Questionnaire (IPAQ) (see the Measurement Tools section). Any sport, exercise, or activity that required energy expenditure associated with aerobic work was considered as physical activity.</td>
</tr>
</tbody>
</table>
### FETP Non-Communicable Disease (NCD) Field Investigation Guide: Hypertension

#### Variable | Operational definition | Measurement tool
---|---|---
Fruit and vegetable intake | Adequate: 5 servings of fruit or vegetables/day, using a serving size of 80 g and the daily minimum of 400 g | There are a multitude of options when assessing food intake (see the Measurement Tools section and WHO STEPS).
Salt intake | Salt intake measured by having each participant demonstrate by removing from a container (using hands, measuring cups, or spoons) the amount of salt they typically used at breakfast, lunch, and dinner. A total volume of added salt intake per day is calculated from these values. To determine daily salt added to food in grams, a conversion tool is used to convert the volume measurement to grams. | Assessed in WHO STEPS
Time since BP was last measured | Score for:  
- High adherence: 0  
- Medium adherence: 1–2  
- Low adherence: 3–8 | Morisky Medication Adherence Scale – 8. Permission for use is required. A Licensure agreement is available from Donald E. Morisky, Prof., Dept. of Community Health Sciences, UCLA School of Public Health, 650 Charles E. Young Dr. South, Los Angeles, CA 90095-1772, e-mail: d morisky@ucla.edu (see the Measurement Tools section)
Self-Measured Blood Pressure Monitoring (SMBP) (AKA home BP monitoring) | The regular measurement of BP by the patient outside the clinical setting, either at home or elsewhere (Million Hearts) | Although more investigation is needed to determine the optimal timing and frequency of measurements, experts, including the (AHA), European Hypertension Society (EHS), and British Hypertension Society (BHS), recommend that patients using SMBP take two or three successive readings (at 1-minute intervals) at least twice a day, once in the morning and once in the evening. (Million Hearts)

### Health care variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacological treatment for HTN</td>
<td>Yes</td>
<td>WHO STEPS</td>
</tr>
<tr>
<td>Variable</td>
<td>Operational definition</td>
<td>Measurement tool</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>• Are you currently on HTN medication?</td>
<td>• No</td>
<td></td>
</tr>
<tr>
<td>• During the past 2 weeks, have you been treated for raised BP with drugs (medication) prescribed by a physician or other health worker?</td>
<td>Ask participants if they were advised to • Change diet (special prescribed diet) • Exercise (start or do more exercise) • Lose weight (advice or treatment to lose weight) • Quit smoking (advice or treatment to stop smoking) attributed to HTN, by indication of a health professional</td>
<td></td>
</tr>
<tr>
<td>Non-pharmacological treatment for HTN</td>
<td>Use of health care for HTN • Have you ever had your BP measured by a physician or other health worker? • Yes • No</td>
<td>WHO STEPS</td>
</tr>
<tr>
<td>Use of informal health care provider</td>
<td>• Have you ever seen a traditional healer for raised BP or HTN? • Are you currently taking any herbal or traditional remedy for your raised BP? Ask for any appointment with a traditional healer in the previous 12 months and use of any herbal or traditional remedy attributed to high BP</td>
<td>WHO STEPS</td>
</tr>
<tr>
<td>Controlled HTN</td>
<td>Individual level: controlled HTN is defined as SBP &lt; 140 mm Hg and DBP &lt; 90 mmHg among persons with HTN. (CDC) • For population prevalence of HTN control (see the Formulas section)</td>
<td></td>
</tr>
</tbody>
</table>

**Other variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time since HTN diagnosis</td>
<td>• &lt;6 months • 6 months–2 years • 2.1–5 years • 5.1–15 years • &gt;15 years</td>
<td></td>
</tr>
<tr>
<td>Awareness of HTN</td>
<td>Hypertensive subjects are considered to be aware of HTN when having been told by a health professional, in the previous 12 months, that they had HTN or high BP or when reporting a pharmacological or non-pharmacological treatment for HTN</td>
<td>WHO STEPS</td>
</tr>
<tr>
<td>Average out of pocket costs of hypertensive drugs/month</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Hypertension

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of antihypertensive medication treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pills taken daily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Psychological distress | After taking a sum of the score for each question, likely to:  
• Be well: <20  
• Have mild mental disorder: 20–24  
• Have moderate mental disorder: 25–29  
• Have severe mental disorder: >30 | Kessler Psychological Distress Scale (see the Measurement Tools section) |
| Quality of life | The WHOQOL-BREF questionnaire developed by WHO, a short form of WHOQOL-100, is a cross-cultural instrument. It can capture broadly and totally all aspects of QOL including physical health, psychological, social relationship, and environment. It has 26 items. Order on the WHO website or EuroQol-5. (See the Measurement Tools section) | |
| HTN knowledge | HTN Knowledge Survey | |
| **HTN treatment** | • In the past 2 weeks, have you taken any drugs (medication) for raised BP prescribed by a physician or other health worker?  
• Yes  
• No | WHO STEPS |

### Dependent variables (outcomes)

#### General HTN outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Case definition</th>
<th>Measurement tool</th>
</tr>
</thead>
</table>
| HTN stage | • Stage 1: SBP of at least 140mmHg and/or a DBP of at least 90mmHg  
• Stage 2: SBP of at least 160mmHg and a DBP of at least 100mmHg | Manual sphygmomanometer or automated measurement device (ensure devices were calibrated and certified, if possible) |
| Dyslipidemia | Elevated LDL:  
• Borderline high: 130–159  
• High: 160–189  
• Very high: ≥ 190 OR  
• Low HDL: <40 mg/dL | Medical records |
<table>
<thead>
<tr>
<th>Variable</th>
<th>Case definition</th>
<th>Measurement tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic syndrome</td>
<td><strong>Clinical Identification of the Metabolic Syndrome – Any 3 of the Following:</strong></td>
<td>Medical record or self-report (Adult Treatment Panel III recommendations)</td>
</tr>
<tr>
<td></td>
<td>- <strong>Risk Factor</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Abdominal obesity*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Men: &gt;102 cm (&gt;40 in)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Women: &gt;88 cm (&gt;35 in)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Triglycerides ≥150 mg/dL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- HDL cholesterol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Men: &lt;40 mg/dL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Women: &lt;50 mg/dL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Blood pressure ≥130/85 mmHg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fasting glucose ≥110 mg/dL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Overweight and obesity are associated with insulin resistance and the metabolic syndrome. However, the presence of abdominal obesity is more highly correlated with the metabolic risk factors than an elevated body mass index (BMI). Therefore, the simple measure of waist circumference is recommended to identify the body weight component of the metabolic syndrome.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>† Some male patients can develop multiple metabolic risk factors when the waist circumference is only marginally increased, e.g., 94-102 cm (37-39 in). Such patients may have a strong genetic contribution to insulin resistance. They should benefit from changes in life habits, similarly to men with categorical increases in waist circumference.</td>
<td></td>
</tr>
<tr>
<td>Stroke (cerebrovascular accident)</td>
<td>Occurs when blood flow to an area of brain is cut off. When this happens, brain cells are deprived of oxygen and begin to die. When brain cells die during a stroke, abilities controlled by that area of the brain such as memory and muscle control are lost. <a href="http://www.stroke.org/">www.stroke.org/</a></td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Angina</td>
<td>Chest pain</td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Heart attack</td>
<td>A heart attack happens when the flow of oxygen-rich blood to a section of heart muscle suddenly becomes blocked and the heart can’t get oxygen. If blood flow isn’t restored quickly, the section of heart muscle begins to die. <a href="http://www.nhlbi.nih.gov/health/healthtopics/topics/heartattack">www.nhlbi.nih.gov/health/healthtopics/topics/heartattack</a></td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>A condition in which a waxy substance called plaque builds up inside the coronary (heart) arteries. <a href="http://www.nhlbi.nih.gov/health/healthtopics/topics/cad">www.nhlbi.nih.gov/health/healthtopics/topics/cad</a></td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>Includes heart valve problems, stroke, arrhythmia, and heart attack (AHA)</td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>When the heart does not circulate blood normally, the kidneys receive less blood and filter less fluid out of the circulation into the urine. The extra fluid in the circulation builds up in the lungs, the liver, around the eyes, and sometimes in the legs. This is called fluid congestion; physicians call this congestive heart failure. (AHA)</td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td>Buildup of plaque in the arteries</td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>* Indicated by kidney damage (a ratio of &gt;30 mg of albumin to 1g of creatinine on spot urine testing), or</td>
<td>Medical record or self-report</td>
</tr>
<tr>
<td>Variable</td>
<td>Case definition</td>
<td>Measurement tool</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Erectile dysfunction</td>
<td>Medical record or self-report</td>
<td></td>
</tr>
<tr>
<td>Memory loss</td>
<td>Medical record or self-report</td>
<td></td>
</tr>
<tr>
<td>Level of disability</td>
<td>Barthel Index. The Maryland State Medical Society holds the copyright. It may be used freely for noncommercial purposes with this citation: Mahoney FL, Barthel D. “Functional evaluation: the Barthel Index.” <em>Maryland State Med Journal</em> 1965;14:56-61. Used with permission. Permission is required to modify the Barthel Index or to use it for commercial purposes.</td>
<td></td>
</tr>
<tr>
<td>HTN control</td>
<td>BP &lt;140 mmHg/90 mmHg in someone who has been diagnosed with HTN</td>
<td></td>
</tr>
</tbody>
</table>

**Formulas**

**Age standardized prevalence of hypertension** = Observed prevalence of HTN for each age stratum multiplied by the WHO World Standard’s weights for each stratum, then summed together

**Body Mass Index (BMI)** = Weight in kg/(height in meters)$^2$. [www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/](http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/)

**Mean Arterial Pressure (MAP)** = Diastolic blood pressure + (systolic blood pressure – diastolic blood pressure)/3. [www.usc.edu/dept/biomed/bme403/Section_3/mean_arterial_pressure.html](http://www.usc.edu/dept/biomed/bme403/Section_3/mean_arterial_pressure.html)

**Population prevalence of controlled hypertension** = Patients with last BP measurement of SBP <140 mmHg and the DBP <90 mm Hg/All patients 18 to 85 years of age with a diagnosis of HTN during the measurement year. (National Committee for Quality Assurance: [www.hrsa.gov/quality/toolbox/measures/hypertension/](http://www.hrsa.gov/quality/toolbox/measures/hypertension/))

**Data Sources**


United States government open data: [www.data.gov/](http://www.data.gov/)

USAID demographic health surveys (DHS): Nationally representative population-based surveys with large sample sizes (usually between 5,000 and 30,000 households). In all households, women age 15–49 are eligible to participate; in many surveys men age 15–54(59) from a sub-sample are also eligible to participate. Register for dataset access at [www.dhsprogram.com/data/Using-DataSets-for-Analysis.cfm](http://www.dhsprogram.com/data/Using-DataSets-for-Analysis.cfm)
In addition to data from available datasets, you may need to gather information from local hospitals or health centers, specifically information on the current protocols used by health care providers (in different settings) for the diagnosis and management of HTN (e.g., admission registration logbooks, delivery registration books, patient charts).


**WHO Global Infobase**: Contains data on chronic diseases and their risk factors (HTN being a risk factor for many chronic diseases) for all WHO member states. There is also an NCD profile for each country. [https://apps.who.int/infobase/](https://apps.who.int/infobase/)


### Tools and Analytic Methods

**Behavioral Risk Factor Surveillance System (BRFSS)**
This interview assesses risk behaviors. Below is an example of the questions that were used in the United States in 2014 ([www.cdc.gov/brfss/questionnaires/pdf-ques/2014_brfss.pdf](http://www.cdc.gov/brfss/questionnaires/pdf-ques/2014_brfss.pdf))

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible response</th>
</tr>
</thead>
<tbody>
<tr>
<td>If someone’s BP is 120/80, it is</td>
<td>High, low, normal, don’t know</td>
</tr>
<tr>
<td>If someone’s BP is 160/100, it is</td>
<td>High, low, normal, don’t know</td>
</tr>
<tr>
<td>High BP can cause strokes</td>
<td>Yes, no, don’t know</td>
</tr>
<tr>
<td>High BP can cause heart attacks</td>
<td>Yes, no, don’t know</td>
</tr>
<tr>
<td>High BP can cause kidney problems</td>
<td>Yes, no, don’t know</td>
</tr>
<tr>
<td>High BP can cause eye problems</td>
<td>Yes, no, don’t know</td>
</tr>
<tr>
<td>Once someone has high BP, it usually lasts for</td>
<td>A few years, 5–10 years, the rest of their life, don’t know</td>
</tr>
<tr>
<td>Losing weight usually makes BP</td>
<td>Go up, go down, stay the same</td>
</tr>
<tr>
<td>Eating less salt usually makes BP</td>
<td>Go up, go down, stay the same</td>
</tr>
<tr>
<td>People with high BP should take their medicine</td>
<td>Every day, at least a few times a week, only when they feel sick</td>
</tr>
</tbody>
</table>

**Beliefs about medicines questionnaire**
This instrument can be used to assess beliefs about medications. It assesses patients’ beliefs about the necessity of prescribed medication for controlling their illness and their concerns about the potential adverse consequences of taking it. Examples of items from the necessity scale include: “My health, at present, depends on my medicines” and “My medicines protect me from becoming worse.” Examples of items from the concerns scale include: “I sometimes worry about the long term effects of my medications” and “I sometimes worry about becoming too dependent on my medications.”


**Blood pressure measurement conditions**
Measurement should be taken in a quiet environment at room temperature. Make sure that the individual is seated, has been resting for a few minutes, is not crossing his/her legs, and is not engaging in conversation. Smoking, caffeine consumption, and alcohol consumption should be avoided before the
measurement is taken.

**Blood pressure measurement methods**

<table>
<thead>
<tr>
<th>Materials</th>
<th>Auscultation method</th>
<th>Automatic method</th>
</tr>
</thead>
</table>
| • Mercury or aneroid sphygmomanometer*  
• Stethoscope |  | Automatic sphygmomanometer (must have been calibrated using the auscultation method)* |

**Steps**

1. Upper arm and arm cuff maintained at heart level with arm supported; cuff located directly above crease of elbow
2. Arm cuff rapidly inflated
3. Arm cuff deflated at rate of 2–3 mmHg/beat or second
4. BP at 1st Korotkoff sound is SBP
5. BP at 5th Korotkoff sound is DBP
6. Measurement performed at least two times, 1–2 minutes apart
7. The average of the two measurements that are most similar, or with < 5mmHg of difference between them is taken

*The cuff of the sphygmomanometer used should be 13 cm wide and 22–24 cm long, which meets the Japanese Industrial Standard.

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**Important reminders**

- For the initial visit, measurements from both arms should be taken
- The cuff should not be placed over thick shirts or jackets, nor should the upper arm be compressed by rolling a sleeve up
• For the elderly or people with diabetes, BP should also be measured after 1 and 3 minutes of standing
• Pulse should also be measured and recorded
• Those who are trained in the auscultation method should use that method instead of the automatic sphygmomanometer (Japanese Society of Hypertension)

The AHA and WHO also have BP measurements protocols published.

**CDC hypertension toolkit**
A toolkit to improve care for hypertensive patients through the use of standardized HTN treatment protocols. Designed to support health care providers in their implementation of the Global Standardized Hypertension Treatment Project framework. [www.cdc.gov/globalhealth/healthprotection/ncd/hypertension-toolkit.html](http://www.cdc.gov/globalhealth/healthprotection/ncd/hypertension-toolkit.html)

**Compendium of assessment tools created in California**
For example, it contains the Fruit and Vegetable Module of the BRFSS. [https://food-hub.org/files/resources/Network-Compendium.pdf](https://food-hub.org/files/resources/Network-Compendium.pdf)


**Food frequency questionnaires**
This type of survey gives the investigator an idea of a participant’s diet. One can be purchased from NutritionQuest at [www.nutritionquest.com/](http://www.nutritionquest.com/)

**Global Physical Activity Questionnaire (GPAQ)**
Created by WHO. [www.who.int/chp/steps/resources/GPAQ_Analysis_Guide.pdf](http://www.who.int/chp/steps/resources/GPAQ_Analysis_Guide.pdf)

**HTN treatment**
WHO Package of Essential Non-communicable disease interventions for primary health care in low-resource settings

TREATMENT RECOMMENDATIONS:
• Under age 55: Low thiazide diuretic and/or ACE inhibitor
• Over age 55: CCB and/or low dose thiazide diuretic
• For those who are intolerant to ACE inhibitor or for women of child-bearing age, use beta blocker
• Test creatinine and potassium levels before prescription of an angiotensin converting enzyme inhibitor

Can be used, for example, if comparing the treatment protocols used in a local hospital to the WHO recommendations. [www.who.int/nmh/publications/essential_ncd_interventions_lr_settings.pdf](http://www.who.int/nmh/publications/essential_ncd_interventions_lr_settings.pdf)

**International Physical Activity Questionnaire (IPAQ)**
[https://sites.google.com/site/theipaq/](https://sites.google.com/site/theipaq/)

**Kessler Psychological Distress Scale (K10)**
Measures distress based on responses to questions about anxiety and depressive symptoms. It has 10 items. [www.nevdrop.org.au/files/programsupport/mentalhealth/K10_English%5B1%5D.pdf](http://www.nevdrop.org.au/files/programsupport/mentalhealth/K10_English%5B1%5D.pdf)

**Morisky medication adherence scale**
Can be used to assess adherence to medication. The License Application for use of the instrument is located at [http://dmorisky.bol.ucla.edu/MMAS_scale_files/mmas10cl_DEM%281%29.pdf](http://dmorisky.bol.ucla.edu/MMAS_scale_files/mmas10cl_DEM%281%29.pdf)

**National Health and Nutrition Examination Survey (NHANES)**
Used to assess health and nutritional status in the United States. It has variables related to HTN. [www.cdc.gov/nchs/nhanes/search/default.aspx](http://www.cdc.gov/nchs/nhanes/search/default.aspx)
Quality of life surveys
- EuroQol-5: www.euroqol.org/
- WHO QoL: www.who.int/mental_health/publications/whoql/en/


Service Provision Assessment (SPA)
This survey is a health facility assessment that provides a comprehensive overview of a country’s health service delivery. It collects information on the overall availability of different facility-based health services in a country and their readiness to provide those services. http://dhsprogram.com/What-We-Do/Survey-Types/SPA.cfm#sthash.DW8rFKOU.dpuf

Indicators related to HTN include:
- Presence/inventory of essential medicines to treat HTN
- Health worker competence in diagnosing HTN

WHO/International Society for Hypertension risk prediction charts
Provides the 10-year risk of a fatal or nonfatal cardiovascular event when taking into account age, sex, cholesterol, BP, diabetes mellitus, and smoking status are divided by epidemiological sub-regions. http://ish-world.com/downloads/activities/colour_charts_24_Aug_07.pdf

WHO model list of essential medicines
Lists the safest, most cost-effective, and efficacious medications for priority conditions, and the extent to which they should be available in a hospital. www.who.int/selection_medicines/committees/expert/20/EML_2015_FINAL_amended_AUG2015.pdf?ua=1

WHO STEPwise approach
Provides an instrument with standardized questions and protocols for risk factor surveillance. There are three different levels, which are the questionnaire, physical measurements, and biochemical measurements. All three levels can be used for HTN surveillance. Some examples of the questions contained in this instrument are “Have you ever had your BP measured by a physician or other health worker?” and “Have you ever been told by a physician or other health worker that you have raised BP or HTN?” www.who.int/chp/steps/instrument/en/

WHO’s Study on Global Ageing and Adult Health (SAGE)
An example of a HTN-related question on this survey is “Have you ever been diagnosed with high BP (HTN)?” www.who.int/healthinfo/sage/en/
CHAPTER 5
COLORECTAL CANCER

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INVESTIGATION QUESTIONS & EXAMPLE PROJECTS

Epidemiology

Question: What are potential contributors to the trends in incidence rates of colorectal cancer (CRC) in the country?
Example project: Does incidence vary by certain factors, such as region or socio-economic status? Are there patterns in the changes in incidence rates?

Question: If a population-based registry is available, what is the burden of CRC on the country?
Example project: Assess incidence and mortality rates (if available) and associated financial costs (e.g., costs due to years of productivity lost, costs due to treatment).

Question: Does the burden of disease differ by certain factors (e.g., sex)?

Question: Several risk factors of CRC are similar to those of other cancers and diseases. Are there efforts to provide education for CRC along with other cancers/diseases? Are those at risk for other cancers/diseases also at risk for CRC?
Example project: What are the most prevalent cancers in the country? Are there similar patterns in the incidence of these cancers?

Data Sources

Question: Is a cancer registry available for the country?
Example project: If yes, what type(s)? If no, what are the reasons?

Question: If yes, assess its validity, accuracy, and completeness.
Example project: Compare CanReg5 indicators with those from small data abstraction studies.

Example project: Analyze cancer cases missed by hospital registries when compared with other additional sources (e.g., death records, path reports over a period of time).

Question: If a cancer registry is available, how can data quality be improved?
Example project: Examine the implementation and use of CanReg5 to improve data quality. Assess accuracy of registry data before CanReg5 use, implement CanReg5, and then re-evaluate the quality of the data.

Risk Factors

Question: Common risk factors for CRC include dietary and lifestyle factors and family history. How can knowledge of these risk factors be assessed? Are there existing efforts to increase knowledge?
Example project: It may be necessary to first assess the basic knowledge of CRC in the population as well as typical dietary and lifestyle patterns.

Question: Are there methods to identify first-degree relatives of those with CRC?
Example project: First-degree relatives are at higher risk, but is this fact known among the population and providers?

Question: Are there specific foods or dietary patterns in the country that may be contributing to an increased risk for CRC?
Example project: Examine the impact of aflatoxins or preserved/smoked foods on CRC rates.

Question: Are risk factors for CRC perceived differently by sex in the country? If so, why and what are the differences?

Example project: Men and women in different cultures may have differing perceptions of gastrointestinal cancers, such as CRC. In particular, there may be differing perceptions of the cause of CRC.

Question: Are there different levels of risk for CRC in the country according to region or socioeconomic status? If so, what are the major differences in risk?

Example project: Examine CRC rates by region and SES.

Treatment

Question: What are the available treatment options (e.g., resection, chemotherapy)?

Example project: How do these options compare in terms of cost, accessibility, treatment time, recovery time, and physical and mental stress?

Question: What are the barriers to treatment in the country?

Example project: Examine the availability of medical facilities, and trained personnel. Examine the financial, political, cultural, and psychological barriers.

Question: What is the willingness to pay and receive treatment? Is there a need for government assistance?

Example project: Are there perceptions (or misconceptions) of the treatment methods?

Question: Is CRC treated by traditional medicinal practices? If so, what are the outcomes of these patients compared to those treated by other methods? Are these traditional treatments adequate?

Example project: Consider traditional healers, alternative medicines, rituals, etc. and how these practices were developed.

Question: Are patients with initial CRC symptoms followed up for further examination? If not, what are the reasons?

Example project: Are the symptoms of CRC known? How are these identified?

Prevention/Early Detection

Question: The most common risk factors of CRC are well established. How aware is the population of both the risk factors and common symptoms of CRC?

Example project: Does knowledge of CRC risk factors and symptoms affect treatment/prevention?

Example project: What are the attitudes towards CRC compared to other cancers?

Question: Do screening recommendations exist in the country, and if not, are there efforts to create them?

Example project: Are CRC recommendations combined with other cancers in public educational materials? If cancer prevention messages are provided at schools or workplaces, is CRC included?

Question: If screening recommendations exist, what is the adherence to these guidelines by providers? If they are not being followed, what are the reasons?

Example project: Does adherence by providers vary by region or other factors?
Question: What method(s) (if any) of screening (e.g., colonoscopy, flexible sigmoidoscopy, FOBT, FIT) are currently used in the country? If none, what are the reasons and/or barriers?

Example project: Are there potential alternatives better suited for the country? (e.g., Multi-Target Stool DNA Test (MT-sDNA) suggested in China)

Question: What is the procedure for polyps detected at screening? What are the attitudes toward this potentially invasive procedure as a preventive measure for CRC?

Example project: Is the concept and process of a colonoscopy adequately understood by both the health care provider and patient?

Question: What are the main barriers to effective prevention and control of CRC in the country?

Example project: Assess available resources (e.g., human and financial resources, adequate facilities/equipment/trained personnel).

Question: Are there interventions targeting diet, physical activity, and/or lifestyle modifications?

Example project: If yes, are they compatible with the country’s cultural practices, foods, religion, etc.?

Example project: How can awareness be improved while maintaining traditional lifestyle practices?

Question: Does health education in the country exist? How does it incorporate topics on CRC prevention/screening or suggestions to influence changes in diet and lifestyle patterns?

Example project: Suggestions for China: Due to strong governmental control, there are ideas that the government should provide teaching materials for disease prevention to be taught in primary, middle, and high schools. The government may also require television and radio stations to include at least 5 to 10 minutes of health education messages in their programs per day.

INVESTIGATION METHODS

Definitions

Cancer mortality: Number of deaths from a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. The inability to control the spread of these cells often leads to cancer mortality. Breast cancer, lung cancer, and CRC are the most common types of cancers for women and prostate cancer, lung cancer, and CRC are the most common types for men.

Cancer registries: Valuable resources that can be used to
- Describe the occurrence and burden of cancers (e.g., trends in cancer incidence and mortality)
- Set priorities for comprehensive plans and programs for cancer control
- Assess the impact of cancer control programs and interventions
- Assess treatment
- Study the causes of cancer
(Source: CDC—From Data to Action: Cancer Prevention and Controls in LMICs. Principles of Cancer Registries.)

Colonoscopy: Test that detects polyps and cancer in the colon and rectum and can detect polyps and cancer in the entire colon and rectum. It is especially beneficial in detecting and removing pre-cancerous adenomas. The test is conducted via a flexible, lighted tube with a small video camera at the end that is inserted through the rectum and images are displayed on a monitor. Small polyps may be removed or a biopsy may be collected if larger polyps or a tumor is discovered.*

Colorectal cancer staging system: Used to describe the severity of the cancer based on the size and extent of the primary tumor and whether or not metastasis is present. Staging allows medical
professionals to exchange information using this common terminology and is useful in estimating prognosis and planning appropriate treatment for patients.

Staging is most often determined by the following factors:
- Site of the primary tumor and cell type
- Tumor size and/or extent
- Lymph node involvement
- Number of tumors
- Tumor grade

**Computed tomography (CT) colonography (virtual colonoscopy):** CT scan of the colon and rectum. This test may be a useful alternative for those who cannot or do not want invasive procedures, such as a colonoscopy. However, a colonoscopy is needed to inspect suspicious areas. This test may be conducted with or without contrast solution. A small, flexible tube is inserted through the rectum and used to pump air in the colon and rectum before entering the CT scanner.*

**Current screening guidelines:**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>American Cancer Society/U.S. Multi-Society Task Force on Colorectal Cancer/American College of Radiology</th>
<th>U.S. Preventive Services Task Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age to begin and end screening in average-risk adults</td>
<td>Begin at age 50, and end screening when curative therapy would not be offered due to life-limiting co-morbidity</td>
<td>Begin screening at age 50. Routine screening between ages 76–85 not recommended. Screening after age 85 not recommended.</td>
</tr>
<tr>
<td>Screening in high-risk adults</td>
<td>Detailed recommendations based on personal risk and family history</td>
<td>No specific recommendations for age to begin testing or type of testing</td>
</tr>
</tbody>
</table>
| Prioritization of tests                              | Tests grouped into two groups:  
**Group 1:** Those that are primarily effective at detecting cancer  
**Group 2:** Those that are effective at detecting cancer and adenomatous polyps  
Group 2 is preferred due to the greater potential for prevention. | No specific prioritization of tests, though recommendations acknowledge that direct visualization techniques offer substantial benefit over fecal tests |
| Stool Testing, Guaiac based FOBT (gFOBT)            | Annual screening with high sensitivity guaiac based tests                                       | Annual screening with high sensitivity guaiac based tests |
| Stool Testing, Immunochemical- based FOBT (FIT)      | Annual screening                                                                               | Annual screening                   |
| Stool Testing, Stool DNA (sDNA)                      | Screening every 3 years                                                                       | Insufficient evidence to recommend for or against sDNA |
| Flexible sigmoidoscopy                               | • Screening every 5 years  
• Screening every 5 years, along with annual gFOBT or FIT is also an option | Screening every 5 years, with gFOBT every 3 years |
<p>| Colonoscopy                                          | Screening every 10 years                                                                       | Screening every 10 years            |</p>
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>American Cancer Society/U.S. Multi-Society Task Force on Colorectal Cancer/American College of Radiology</th>
<th>U.S. Preventive Services Task Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT colonography</td>
<td>Screening every 5 years</td>
<td>Insufficient evidence to recommend for or against it</td>
</tr>
<tr>
<td>Double Contrast Barium Enema (DCBE)</td>
<td>Screening every 5 years</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>


**Double-contrast barium enema:** X-ray used to detect abnormalities in the colon and rectum and can be used to screen for abnormalities in the colon and rectum. However, a colonoscopy is needed to explore suspicious areas. The test is conducted via a small flexible tube that is inserted through rectum to pump barium sulfate in the colon and rectum. Air is then pumped into the colon and rectum, and X-ray images are taken of the lining of the colon and rectum.*

**Dysplasia:** Area in a polyp or lining of the colon or rectum with proliferation of cells that are abnormal but not like true cancer cells; also a pre-cancerous condition

**Flexible sigmoidoscopy:** Test that detects polyps and cancer in the sigmoid colon and rectum and can detect polyps and cancer within the sigmoid colon and rectum. If an adenoma or cancer is found, a colonoscopy is needed to view the entire colon. The test is conducted via a flexible, lighted tube with a small video camera at the end that is inserted through the rectum and images are displayed on a monitor. Small polyps may also be removed during the procedure.*

**Hospital-based cancer registries:** Information from patients in specific hospitals. This provides information needed for hospital administration and cancer care.

**Metastasis:** Spread of cancer to other parts of the body, where they begin to grow and form new tumors. Occurs when the cancer cells enter the bloodstream or lymph vessels.

**Mortality rate:** The numerator of the mortality rate is the number of deaths and the denominator is the size of the population. The population used depends on the rate to be calculated. For cancer sites that occur in only one sex, the sex-specific population (e.g., females for cervical cancer) is used.

**Pathology-based cancer registries:** Information from laboratories on histologically-diagnosed cancers

**Polyp:** Tissue growth from the inner lining of the colon or rectum. There are 2 main types of polyps:
- **Adenomatous polyp (adenoma):** More likely to develop into cancer
- **Hyperplastic polyp:** More common but generally not pre-cancerous

**Population-based cancer registries:** Data on new cancer cases in a well-defined population. Considered the gold standard, these registries can be used to assess the impact of cancer in the population and to develop, monitor, and assess cancer control programs.

**Screening tests:** High-Sensitivity Fecal Occult Blood Tests (FOBTs) detect occult (hidden) blood in stool, and may detect CRC since blood vessels in larger polyps or cancers are usually fragile and can be easily damaged by passage of feces*

**Stool DNA (sDNA) test:** Test that detects abnormal DNA from cancer or polyp cells, and may detect DNA mutations in certain genes from CRC or polyp cells that are found in the stool. The test is conducted by obtaining a small amount of stool for a test kit sent by mail, which is then returned by mail for testing.*

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**TNM system:** One of the most common staging systems. It is based on the size and/or extent of the primary tumor (T), lymph node (N) involvement, and the presence of metastasis (M). The three tables below classify the various types of tumors, nodes, and metastasis.

<table>
<thead>
<tr>
<th><strong>Tumor (T):</strong> Describes extent cancer has spread through the layers forming the wall of the colon &amp; rectum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tx</strong></td>
</tr>
<tr>
<td><strong>Tis</strong></td>
</tr>
<tr>
<td><strong>T1</strong></td>
</tr>
<tr>
<td><strong>T2</strong></td>
</tr>
<tr>
<td><strong>T3</strong></td>
</tr>
<tr>
<td><strong>T4a</strong></td>
</tr>
<tr>
<td><strong>T4b</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Nodes (N):</strong> Degree of spread of cancer to nearly lymph nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nx</strong></td>
</tr>
<tr>
<td><strong>N0</strong></td>
</tr>
<tr>
<td><strong>N1</strong></td>
</tr>
<tr>
<td><strong>N1a</strong></td>
</tr>
<tr>
<td><strong>N1b</strong></td>
</tr>
<tr>
<td><strong>N1c</strong></td>
</tr>
<tr>
<td><strong>N2</strong></td>
</tr>
<tr>
<td><strong>N2a</strong></td>
</tr>
<tr>
<td><strong>N2b</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Metastasis (M):</strong> Indicates whether or not cancer has metastasized to distant organs or lymph nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M0</strong></td>
</tr>
<tr>
<td><strong>M1a</strong></td>
</tr>
<tr>
<td><strong>M1b</strong></td>
</tr>
</tbody>
</table>


**Variables**

**Risk factors**

<table>
<thead>
<tr>
<th>Socio-demographic</th>
<th>• Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Sex</td>
</tr>
<tr>
<td></td>
<td>• Education</td>
</tr>
<tr>
<td></td>
<td>• Income</td>
</tr>
<tr>
<td></td>
<td>• Marital status</td>
</tr>
<tr>
<td></td>
<td>• Geographic region</td>
</tr>
</tbody>
</table>
| Dietary | • Red/processed meats  
|         | • Dietary fiber  
|         | • Calcium, vitamin D, milk products |
| Lifestyle | • Smoking  
|          | • Alcohol  
|          | • Dietary patterns (i.e., diet low in fruits and vegetables)  
|          | • Physical activity  
|          | • Environmental factors, exposure to carcinogens  
|          | • Weight, body mass index (BMI) |
| Medical history | • Family history of CRC  
|                | • History of cancer and other chronic conditions  
|                | • Previous medications  
|                | • Genetic conditions  
|                | • Nutritional status  
|                | • Infectious diseases (e.g., HIV/AIDS)  
|                | • Pregnancy history  
|                | • Immunosuppression  
|                | • Multiple full term pregnancies |
| Access to health care services | • Range of services available (including screening and treatment services)  
|                                | • Accessibility of services (location)  
|                                | • Quality of care  
|                                | • Access to emergency care  
|                                | • Prenatal care (for women) |

**Formulas**

**Crude mortality rate** = Total number of deaths per year per 1,000 people

**Incidence rate** = (# of new cases of disease/population at risk) in a period of time

**Mortality rate** = Number of deaths in a population per unit of time. Commonly expressed in units of deaths per 1,000 individuals per year.

**Proportional Incidence Ratio (PIR)** = \((R/E) \times 100\)

The PIR is the method of choice to compare data sets where a standard set of age-specific proportions is available for each cancer type. The PIR is the ratio of the cases observed to those expected and is usually expressed as a percentage.

\[ R = \text{observed cases at the site of interest} \]
\[ E = \text{expected cases at the site of interest} \]

**Survival curve** = Summary display of the pattern of survival rates over time. Most often, survival curves are shown as “staircase” curves, showing the fraction of patients living for a certain amount of time after treatment.

**Survival rate** = Percentage of people who are still alive for a certain period of time after being diagnosed with or starting treatment for a disease, such as cancer. Often stated as a 5-year survival rate, which represents the percentage of people who are alive 5 years after their diagnosis or the start of treatment.
Data Sources

Cancer registries

The main data source will be cancer registries, which is discussed in detail in the Definitions section. The Global Initiative for Cancer Registry Development (GICR) has established six hubs around the world to provide support in the development of cancer registries. Additional information and resources are available at http://gicr.iarc.fr/.

When beginning epidemiologic investigation in cancer, the availability of cancer registries may dictate the direction and feasibility of investigation projects. Figure 1 below provides basic ideas of the types of projects that may be feasible according to the resources available in a country.

Key cancer registry agencies and organizations

- International Association of Cancer Registries (www.iacr.com/fr/)
- International Agency for Investigation on Cancer (www.iarc.fr/)
- Union for International Cancer Control (www.uicc.org)
- North American Association of Central Cancer Registries (www.naaccr.org)
- U.S. National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) program (www.seer.cancer.gov)

Tools

CanReg5 is a tool used to input, store, check, and analyze cancer registry data. CanReg5 can also be used to facilitate the set-up of a new or modification of an existing database. Available in English, French, Russian, Chinese, Spanish, Turkish, and Portuguese. www.iacr.com.fr/index.php?option=com_content&view=article&id=9:canreg5&catid=68&Itemid=445

Figure 1: Flowchart: Assessment of Cancer Registry

```
Is a cancer registry available?  
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
| Type of cancer registry?  
| Hospital-based | Population-based |
| Pathology-based | |  
| Provides accurate classification of registered tumors | Can be used for:  
| Data from contributing hospitals may be used to:  
| Review clinical performance | Public health surveillance  
| Assess data reporting methods | Assessment of cancer burden  
| Coding accuracy | Setting priorities  
| Follow-up procedures | Cancer control program planning and evaluation |
| | Surveys | Interviews, Focus Groups | Food Frequency Questionnaire |
| Determine method of data collection |
```
Surveys and questionnaires

When cancer registries are unavailable, new data may be collected from the population of interest, though this process requires much time and effort. Additionally, even if data from cancer registries is available, supplementary data may be needed. Data may be conducted through in-person interviews or surveys, which participants may be given to complete privately. Surveys can be used to collect a wide variety of data, such as medical history, health behaviors and perceptions, socio-economic status, and dietary and lifestyle patterns. Examples of surveys and questionnaires are listed below.

**Demographic and Health Surveys (DHS):** Nationally-representative household surveys that can be used to collect information on various indicators. Although cancer-specific surveys have not been developed, other surveys may be used to collect other relevant information that may aid in assessing risk factors for cancer, such as nutrition. There are two main types of DHS surveys:
- **Standard surveys** have large sample sizes and are usually conducted every 5 years
- **Interim surveys** collect information on key performance indicators but may not necessarily include data for all impact evaluation measures. These are typically shorter than standard surveys and have smaller samples. [www.dhsprogram.com/What-We-Do/Survey-Types/DHS.cfm](http://www.dhsprogram.com/What-We-Do/Survey-Types/DHS.cfm)

**Food Frequency Questionnaire (FFQ):** Dietary assessment tool that can be used in large epidemiologic studies of diet and cancer. It consists of a checklist of foods and beverages with a frequency response section for each item over a specified period of time. When using an FFQ, it must be specific to and validated for the specific country. For example, it would be inappropriate to use an FFQ developed for North America in China, as it would not contain the foods commonly consumed in the Chinese population. Example of NHANES FFQ: [http://epi.grants.cancer.gov/diet/usualintakes/ffq.html?&url=/diet/usualintakes/ffq.html](http://epi.grants.cancer.gov/diet/usualintakes/ffq.html?&url=/diet/usualintakes/ffq.html)

**Service Provision Assessment:** Used to assess the health facilities and health service delivery system in a country. Although these surveys have not been specifically developed for cancer, they may still provide information useful in assessing cancer screening and treatment services, and other health resources. [www.dhsprogram.com/What-We-Do/Survey-Types/SPA.cfm](http://www.dhsprogram.com/What-We-Do/Survey-Types/SPA.cfm)

**Other resources**


**Cancer Atlas (American Cancer Society):** Provides a reliable source with information on the burden of cancer around the world, associated risk factors, methods of prevention, and measures of cancer control. [http://canceratlas.cancer.org/](http://canceratlas.cancer.org/)

**Cancer Mortality Database (WHO):** Provides data on cancer deaths by population, type of cancer, and the year. (Specific formulas that can be used in analyzing data are listed in the Formulas section.) [www-dep.iarc.fr/WHOdb/WHOdb.htm](http://www-dep.iarc.fr/WHOdb/WHOdb.htm)

**CANCER Mondial (International Agency for Investigation on Cancer):** Provides data on incidence, mortality, and prevalence for 28 types of cancer worldwide. There are nine databases available on this website. [www-dep.iarc.fr/](http://www-dep.iarc.fr/)


**World Cancer Investigation Fund International:** [www.wcrf.org/](http://www.wcrf.org/)
Tools and Analytic Methods

Note: Specific formulas that can be used in analyzing data are listed in the Formulas section.

Epidemiologic data on cancer is valuable and informative in various ways. These epidemiological studies can assess:

- Burden of disease
- Cancer risk
- Screening guidelines and procedures
- Accuracy of reporting to cancer registries
- Adequacy of follow-up procedures

However, it is important to properly analyze the data that have been collected from cancer registries or other sources.

Evaluating cancer registry data

It is important to understand how cancer registry data was collected in order to use cancer registries for cancer control planning and other investigation studies (explained in detail in the Definitions section). Follow-up data usually only includes death and sometimes the specific cause of death. Thus, strategies to improve follow-up data may include contacting physicians, hospitals, and patients or establishing electronic linkage to death records.

In addition, registries should be evaluated to assess if the data sources and data collection methods are providing the expected data. These quality control measures may include the assessment of missing, ineligible, or duplicate cases and the accuracy of coded items. Some software programs, such as CanReg5 from IARC (www.iacr.com.fr/canreg5.htm), can run routine data quality checks.

Cancer registry data can be used to:

- Assess primary and secondary prevention programs
- Inform health care planning
- Inform patient care
- Institute public health action

In epidemiologic studies, it is important to first define what is meant by a “case,” though this may be complex. Cancer registry data are useful in determining cases, but there are still several considerations, such as:

- Should cases only include those that were pathologically confirmed?
- Should cases include those with well-established precursors of cancer (e.g., adenomatous polyps as a precursor to colon cancer)?
- For cancers of paired organs (e.g., breast, kidney), should a case reflect the number of organs affected?
- For those with recurrences, should each occurrence count as a case or just the initial diagnosis?

Online free-access tools for global cancer analyses include the following:

- Epi Info: www.cdc.gov/epiinfo/index.html
- GLOBOCAN online analysis: http://globocan.iarc.fr/Pages/online.aspx
- Joinpoint Analysis Software from the NCI Surveillance Investigation Program: http://surveillance.cancer.gov/joinpoint/
- NCI DCEG tools and resources: http://dceg.cancer.gov/tools
- R statistical software: https://www.r-project.org/
• **U.S. National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) program:**
  [www.seer.cancer.gov](http://www.seer.cancer.gov) (for United States only)

**Surveillance**

The purpose of cancer surveillance is to measure incidence, survival, and mortality for cancer patients and to assess genetic, environment, and lifestyle and behavioral risk factors for cancer. In addition, surveillance includes the assessment of screening practices and quality of care.

Population-based cancer registries are the only type of cancer registries that can be used for cancer surveillance and planning. These registries collect data from a defined population to provide an unbiased profile of the cancer burden and any changes over time. This surveillance data may provide insight to questions, such as:

- What are the emerging issues of a specific cancer?
- What are the trends in incidence, survival, and mortality of cancer?
- How is the burden of cancer changing in one region of a country compared to another?
- What sub-populations are most affected by a specific cancer?
- How are risk factors for various cancers changing?
- What types of cancer control strategies are needed?
- Where are economic, material, and human resources most needed?

**Process of surveillance**

- **Collection:** Collect data from population-based cancer registries

- **Analysis:** Surveillance data can first be analyzed in terms of time, place, and person. Analysis by time may include comparison of the number of cases reported during a specific time period to the number of cases from a previous time period. If there is a notable increase in incidence upon data analysis by time, the data can then be analyzed by place to determine where the cases may be occurring. Even if time analysis does not reveal any significant findings, place analysis may still be useful in identifying local outbreaks or patterns. Analysis of surveillance data by characteristics (e.g., age, sex, race, risk factors) of the cases may also be helpful.

  The Surveillance Investigation Program (SRP) at the National Cancer Institute Division of Cancer Control and Population Sciences has developed tools (shown in Figure 2) for the analysis of and reporting of cancer statistics. [http://surveillance.cancer.gov/tools/methods.html](http://surveillance.cancer.gov/tools/methods.html)

- **Interpretation:** If the data show a pattern different than what was expected, further investigation may be needed. Changes in population size, reporting methods, and diagnosis procedures are examples of factors that should be taken into consideration before determining a change in cancer patterns to be true.

- **Dissemination:** Dissemination of surveillance data that targets both residents and medical professionals in the population of interest is essential. The purpose of a surveillance report is to both inform and motivate. This report may contain all the findings from the analysis of the data as well as graphs and figures. Recommendations for screening and other preventive strategies may also be included in surveillance reports.
Other considerations

Confounding
One important consideration in epidemiologic studies is confounding, which occurs when a second exposure is associated with both the original exposure of interest and the outcome. Thus, a confounder will affect the estimated association between the original exposure and the outcome. For example, an association between a work place and the risk of lung cancer may be confounded by tobacco smoking. In this case, smoking may be associated with the workers (e.g., many workers may smoke), and smoking is also directly associated with lung cancer.

There are several methods of handling confounders in data analysis:

- **Stratification**: A method of analyzing the association of the exposure and outcome separately for each category of the confounding variable. For example, if sex is a confounder, the association is estimated separately for men and for women.

- **Statistical modeling**: Statistical methods, such as regression modeling, can also be used to control for confounders. This method is particularly useful when adjustment for several confounders are needed simultaneously.
### ADDITIONAL RESOURCES

**Table 1. Summary of cervical, breast and prostate cancer studies.**

<table>
<thead>
<tr>
<th>Author, Study Design, N Participants</th>
<th>Purpose(s)</th>
<th>Data Collection &amp; Analysis</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harries et al., 2009 (27). Qualitative study. Healthcare providers, policy makers &amp; influential community members. 43 female community members. Biyau et al., 2010 (28). Descriptive cross-sectional. 375 female university students.</td>
<td>To explore key challenges and opinions towards human papilloma virus (HPV), vaccination introduction in South Africa. To assess awareness of cervical cancer and risk factors among female university students and to determine perceived readiness to accept HPV vaccine.</td>
<td>50 In-depth interviews (IDI) and 6 focus group discussions (FGD). Purposive &amp; snowballing sampling. Content data analysis. Multistage sampling. Self-administered closed-ended survey.</td>
<td>Poor community knowledge of cervical cancer, and HPV. Policy leaders concerned with the overburdened healthcare system, limited capacity to offer cervical screening services. Lack of cervical cancer and HPV awareness. Medical students were better informed. Age, medical education, HPV awareness, and cervical cancer were positively related to willingness to accept HPV vaccination.</td>
</tr>
<tr>
<td>Maree &amp; Wright, 2010 (29). 565 women.</td>
<td>To explore what women living in Ga-Rankuwa in Tshwane, South Africa know and understand about cancer and their health seeking behaviour should they suspect that they have cancer.</td>
<td>An exploratory, contextual, quantitative door-to-door survey. Overt’s self-care deficit nursing theory guided the study.</td>
<td>Low cancer knowledge despite cancer education interventions. Participants could share cancer suspicions with their families but could not adopt health seeking practices because of guilt and need for their husband’s approval.</td>
</tr>
<tr>
<td>Maree &amp; Wright, 2011 (30). Exploratory pilot study survey. 105 women, different literacy levels from different cultural groups.</td>
<td>To explore if cervical cancer information presented in a non-stigmatizing manner would promote cervical screening in women in Tshwane, South Africa</td>
<td>Quantitative door-to-door self-reporting survey.</td>
<td>Presenting cervical cancer information in a non-stigmatizing manner based on the theme of self-protection promotes cervical screening.</td>
</tr>
<tr>
<td>Rones et al., 2012 (32). 169 parents, female pupils, teachers, health workers &amp; religious leaders.</td>
<td>To learn what people knew about cervical cancer and HPV vaccination, vaccination acceptability &amp; perceptions on vaccine delivery &amp; consent.</td>
<td>Purposive sampling for key informants. 31 IDI, and 12 FGD. Deductive analysis guided by study themes. IDI (10) and FGD (6) with 10 women per group. Phenomenology descriptive inquiry. Content analysis of data.</td>
<td>Low cancer knowledge levels especially cervical cancer. Most participants supported HPV vaccination after HPV vaccination education, preferring more girls be vaccinated before sexual debut. Equated cervical cancer to death, perceived it as a stigmatizing disease. No differences of cervical cancer conceptualization according to HPV serostatus.</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alam &amp; Abd-elzein, 2012 (34). Cross sectional study. 600 females visiting primary healthcare clinics.</td>
<td>Exploring the level of knowledge of Egyptian females on breast cancer and its risk factors.</td>
<td>Structured questionnaire assessing demographic, breast cancer awareness, incidence and risk factors. Descriptive statistics using chi-square test.</td>
<td>Low breast cancer knowledge. 38.3% of participants believed breast cancer is incurable, 29% had a family history of breast cancer with 36.2% admitting being at higher risk. Reproductive factors later age at menarche, higher parity and breastfeeding for more than 12 months played a significant protective role in etiology of breast cancer. Besides doctors, participants had poor knowledge of breast cancer risk factors, but were positive towards treatment 95% practiced Breast self-exam (BSE); few had clinical breast exam, were aware of mammograms &amp; believed in traditional therapy &amp; prayers.</td>
</tr>
<tr>
<td>Huo et al., 2008 (6)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Case control. 1388 women: 819 breast cancer cases, 569 controls.</td>
<td>To examine the relationship between reproductive factors and breast cancer risk among Nigerian women.</td>
<td>Semi structured questionnaires. Data analysis methods: t-test, chi-square test, Wilcoxon rank sum test, logistic regression, and Kaplan-meier survival analysis.</td>
<td>Women didn’t go for medical check-ups; they sought treatment when the disease was advanced because of lack of finances, time, education and absence of pain. Participants were aware of breast cancer, its symptoms and treatment.</td>
</tr>
<tr>
<td>Uddin et al., 2012 (37). Qualitative study. 48 Egyptian urban and rural women.</td>
<td>To investigate knowledge and attitudes of women towards breast cancer diagnosis, treatment and screening.</td>
<td>6 FGDs, 6-10 participants in each FGD using a structured interview guide.</td>
<td></td>
</tr>
<tr>
<td>Prostate Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jalal et al., 2008 (11). Cross sectional study. 113 men with no history of prostate cancer or prostate disease.</td>
<td>To examine PSA screening awareness and the distribution of PSA values in Senegalese men and to explore the role of PSA testing in early detection of prostate cancer in these men.</td>
<td>Questionnaire, Digital rectal exam (DRE), and PSA testing. Random sampling.</td>
<td>Low level of awareness of PSA screening, and few participants had undergone PSA testing. Higher levels of PSA were associated with advancing age, non-smoking status and abnormal DRE.</td>
</tr>
</tbody>
</table>
**CRC screening programs worldwide** (Schreuders et al., 2015):

<table>
<thead>
<tr>
<th>Country</th>
<th>ASRI</th>
<th>ASRm</th>
<th>Region(s)</th>
<th>Programme type</th>
<th>Status of organised programme</th>
<th>Type of test</th>
<th>Definition positive test</th>
<th>Starting year</th>
<th>Age range (years)</th>
<th>Screening interval (months)</th>
</tr>
</thead>
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<td>European region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
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<td>26</td>
<td>9.9</td>
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<td>Opportunistic</td>
<td>gFOBT</td>
<td></td>
<td>1980</td>
<td>40+</td>
<td>12</td>
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<td>Belgium</td>
<td>36.7</td>
<td>11.8</td>
<td>Flanders</td>
<td>Organised</td>
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<td>FIT</td>
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<td>2013</td>
<td>56-74</td>
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<tr>
<td></td>
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<td>Wallonia and Brussels</td>
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<td>FIT</td>
<td></td>
<td>2014</td>
<td>50-74</td>
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<td>Estonia</td>
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<td>All</td>
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<td>gFOBT</td>
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<td>2009</td>
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<td>2012</td>
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<tr>
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<td>OC/FS/FIT</td>
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| Region of the Americas   |      |      |                            |                |                              |              |                          |               |                   |                             |
| Argentina                | 23.8 | 13   | Urban areas                | Organised      | Pilot                       | FIT/OC       |                          | 50-74         | 12               |                             |
| Bahamas                  | 20.3 | 10.8 | All                        | Opportunistic  | gFOBT/RT/OC                 |              |                          | 2013          | 50-74             |                             |
| Barbados                 | 28.4 | 14.1 | All                        | Opportunistic  | gFOBT/RT/OC                 |              |                          | 2009          | 60-74             |                             |
| Brazil                   | 15.8 | 8    | Regions/Sao Paulo          | Organised      | Pilot                       | FIT          |                          | 2010          | 60-74             |                             |

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*Weak positives (one to four of six slides positive) are retested with FIT.
Weak positives (one to four of six slides positive) are retested with FIT.

ASRI, age-standardised incidence rates; ASRm, age-standardised mortality rates; DRE, digital rectal exam; FIT, faecal immunochromatography test for haemoglobin; FS, flexible sigmoidoscopy; gFOBT, guaiac faecal occult blood test; OC, (optical) colonoscopy.
REFERENCES


CHAPTER 6

CERVICAL CANCER

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INVESTIGATION QUESTIONS & EXAMPLE PROJECTS

Epidemiology

Question: What are the differences between cervical cancer (CC) prevalence in rural versus urban areas?
Example project: Cross sectional surveys and secondary data analysis of existing sources such as the Demographic and Health Survey (DHS).

Question: What CC surveillance data sources exist?
Example project: Compare data from cancer registry and screening registry for a subset of the population to assess the gaps in screening and cancer (e.g., Zambia and Thailand).

Question: What is the magnitude of CC deaths in a specific country or region of a country?
Example project: Reproductive age mortality survey to identify possible deaths of women of reproductive age using multiple sources, including charts, to identify causes of death.

Risk Factors

Question: What is the prevalence of condom use among individuals in a specific area? How does this compare to the prevalence throughout the country and other low- or middle-income countries?
Example project: Conduct a cross-sectional study (through a survey or short questionnaire) to look at prevalence of condom use in specific villages and smaller areas. Compare data for overall country and other countries using DHS (World Contraceptive Use) data.

Question: What are the attitudes, beliefs, and practices among men and women on safe sex practices?
Example project: Conduct qualitative interviews and/or surveys with men and women regarding their attitudes, beliefs, and practices on safe sex practice, and analyze the gaps in education, as well as differences between men and women. Safe sex practices to be assessed in the data collection include using contraceptives and knowledge regarding proper use.

Question: What are the risk factors that affect use of CC screening and/or prevention resources in the country?
Example project: Use existing data to identify risk factors affecting use of CC screening services.

Question: What are the associations between CC risk factors and prevalence?
Example project: Use existing data (retrospective patient charts) to identify how risk factors (e.g., contraception use, smoking) are associated with the prevalence of CC.

Prevention

Question: Which screening method is more cost-effective: visual inspection with acetic acid (VIA) or human papillomavirus (HPV) DNA testing?
Example project: Conduct a cost-effective analysis (simple) to see which screening method is better for the country to use due to its cost effectiveness. Note: This can also be done with other prevention methods including cryotherapy and Pap smears.

Question: What are the resources available in the country to create a program to train community health workers in HPV testing, VIA, and Pap smears?
Example project: Conduct a community needs assessment in various settings within the country to assess the resources available (and what is needed) for community health worker training, which will help increase prevention for CC. Community needs assessment methods include secondary data analysis (if available) and qualitative interviews to understand resources and infrastructure in the country.

Question: What are the vaccination attitudes and beliefs among men in developing countries and what are their effects on their spouse and/or daughters getting vaccinated or screened for CC?

Example project: Investigate vaccination attitudes and beliefs using qualitative interviews and focus groups. Use surveys (and patient charts if available) to check if spouse and daughters received screening or the vaccine (particularly in countries and cultures where the male is the decision maker of the family).

Question: What are the gaps in education regarding HPV vaccine and CC prevention in parents and adolescents?

Example project: Assess the gaps in education using qualitative in-depth interviews and surveys asking participants to state their knowledge on the vaccine and its preventive measures.

Question: What are the common knowledge, attitudes, beliefs, and practice of health care providers regarding CC screening and HPV vaccination?

Example project: Conduct in-depth key informant interviews (or focus groups if feasible) with various health care providers (e.g., physicians, traditional healers) to assess their current knowledge, attitudes, beliefs, and practices.

Question: What are the trends in HPV vaccine acceptance focusing on religious beliefs, race/ethnic groups, sex (in cases where husband/father may be the decision maker), and marital status?

Example project: Conduct surveys addressing demographic factors and follow up with in-depth qualitative interviews (if possible) that cover factors measuring vaccine acceptance and efficacy.

Question: What is the validity of self-reported data versus medical records regarding CC screening?

Example project: Assess the validity of self-report versus medical records by conducting a cross-sectional survey asking women if they have been screened for CC (yes/no) and check their medical records to assess validity.

Question: What are the gaps in education regarding HPV vaccine and CC prevention in parents and adolescents?

Example project: Qualitative interviews and surveys asking participants (both parents/caregivers and adolescents) to state and discuss their previous knowledge, opinions, sources of info, etc. on the vaccine and its preventive measures. Can also do a cross-sectional survey to pinpoint specific gaps in a population.

Question: How do pre- and post-tests after implementation of a communications campaign impact CC knowledge?

Example project: Conduct a communications campaign (e.g., web, newspaper, social media) and do a pre-test and post-test to evaluate the change in CC knowledge (including treatment and prevention).

Example project: Conduct a theory based intervention using theories (e.g., stages of change, elaboration likelihood model, health belief model) to see how knowledge and attitudes (or other desired measures) have changed in the pre-test and post-test.

Question: What are the trends between cultural norms and willingness to receive Pap smears? (Focusing on the literature that exemplifies that some cultures may be apprehensive to receive vaginal examinations. This could also help identify which prevention/treatment options work best for
certain cultures and populations)

**Example project:** Use in-depth qualitative interviews to identify and investigate influential factors in decision making in terms of receiving Pap smears.

**Question:** What are the perceptions and practices of providers in the country regarding recommending CC screening and vaccination (if available)?

**Example project:** Conduct key informant interviews and/or surveys with health care providers asking questions about what their perceptions of CC severity and susceptibility is, as well as current practices and recommendations to their patients to obtain screening services, as well as prevention.

**Question:** What are the HPV vaccine-related barriers in clinics and other medical care locations (if any)? How do they differ by sex?

**Example project:** Conduct in-depth face-to-face interviews with medical professionals exploring barriers (other than financial) in terms of vaccine acceptance. *Note:* This is similar to the previous educational and cultural barriers projects but will explore other barriers that may be present.

### Treatment

**Question:** What are the common knowledge, attitudes, beliefs, and practices of health care providers regarding CC treatment?

**Example project:** Conduct in-depth key informant interviews (or focus groups if feasible) with various health care providers (e.g., physicians, traditional healers) to assess their current knowledge, attitudes, beliefs, and practices.

**Question:** What are the barriers and facilitators to effective treatment access?

**Example project:** Conduct in-depth key informant interviews with patients and/or surveys, both with questions focusing on barriers and facilitators for patients.

### Program/Policy

**Question:** What is the overall impact of the vaccination program in the country (for countries with a vaccination program in place like South Africa, Tanzania, but that still have low vaccination rates and high CC rates)?

**Example project:** Conduct a program evaluation of the vaccine program. Use secondary data, surveys, and qualitative interviews/focus groups with women and providers.

**Question:** What are the health systems factors that influence screening and vaccination rates?

**Example project:** Conduct a needs assessment of resources and health system factors that could potentially influence screening and vaccination. Use surveys and interviews, as well as surveillance data.
INVESTIGATION METHODS

Definitions and General Terms

*Cervical cancer definitions*

**Cancer mortality rates**: The numerator of the mortality rate is the number of deaths and the denominator is the size of the population. The population used depends on the rate to be calculated. For cancer sites that occur in only one sex, the sex-specific population (e.g., females for CC) is used. Mortality rate = (cancer deaths/population) × 100,000.

**Cancer mortality**: Number of deaths from a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. The inability to control the spread of these cells often leads to cancer mortality. Breast, lung, and colorectal cancers are the most common types of cancers for women and prostate, lung, and colorectal cancers are the most common types for men.

**Cancer registries**: Valuable resources that can be used to
1. Describe the occurrence and burden of cancers (e.g., trends in cancer incidence and mortality)
2. Set priorities for comprehensive plans and programs for cancer control
3. Assess the impact of cancer control programs and interventions
4. Assess treatment
5. Study the causes of cancer
(Source: CDC- From Data to Action: Cancer Prevention and Controls in LMICs. Principles of Cancer Registries)

There are several types of cancer registries.

- **Population-based**: Collect data on new cancer cases in a well-defined population. Considered the “gold standard,” they can be used to assess the impact of cancer in the population and to develop, monitor, and assess cancer control programs. (Example: Mumbai Cancer Registry, est. 1963)

- **Hospital-based**: Collect information from patients in specific hospitals. This provides information needed for hospital administration and cancer care. Pros: Includes demographic, treatment, and outcome data, which are useful when reviewing clinical performance; are often the most feasible in many countries. Con: Not representative of the population. (Example: Srinagarind Hospital, Khon Kaen University Cancer Registry, Thailand, est. 1987)

- **Pathology-based**: Collect information from laboratories on histologically-diagnosed cancers. Pro: High diagnostic quality data since tumors have been identified using histopathology. Cons: Not representative of the population, so incidence rates cannot be calculated accurately; groups with less access to health care are captured, and brain, lung, and liver cancers, which are less likely to be biopsied, are underrepresented. (Example: South Africa National Cancer Registry, NCR, est 1986)

**Cervical biopsy**: Technique used to diagnose cervical pre-cancers and cancers. They can sometimes remove all abnormal tissue.

**Cervical cells**: Two main types of cells covering the cervix are squamous cells (on the exocervix) and glandular cells (on the endocervix). The cells meet at the transformation zone.

**Colposcope**: Magnifying instrument with various lenses and bright light. It is used to conduct a colposcopy.

**Colposcopic biopsy**: Cervix is examined with a colposcope to find the abnormal areas. Using a biopsy forceps, a small (about 1/8-inch) section of the abnormal area on the surface of the cervix is removed.
Colposcopy: Test conducted if certain symptoms are present (or if abnormal Pap smear). A speculum is placed in the vagina and a colposcope is used to see the cervix. Sometimes a weak solution of acetic acid and/or iodine solution is added to the cervix to make abnormal areas easy to see.

Cone biopsy: Procedure where the physician removes a cone-shaped piece of tissue from the cervix. The tissue removed in the cone includes the transformation zone. If a high amount of tissue is removed using this procedure, it may lead to a high risk of a woman giving birth prematurely.

Endocervical curettage: Endocervix is scraped by inserting a narrow instrument (a curette) into the endocervical canal (part of cervix closest to uterus). The tissue removed is sent to a laboratory for examination.

Endocervix: Part of the cervix closest to the body of the uterus

Exocervix: Part next to the vagina

HPV vaccine: This vaccine protects against most of the cancers caused by HPV and is recommended for boys and girls at age 11 or 12. The vaccination is given in a series of three shots over several months. Girls need the vaccine to protect against cancers of the cervix, anus, vulva, vagina, and mouth/throat area. Boys need the vaccine to protect against cancers of the anus, penis, and mouth/throat area.

Human papillomavirus: Most commonly transmitted virus in the United States with one in four currently infected. The virus is spread through skin-to-skin contact and the virus can even be passed when the infected individual has no symptoms. While HPVs consist of more than 200 related viruses, about a dozen of them (specifically HPV types 16 and 18) cause cancer.

Metastasis: Cancer cells often travel to other parts of the body, where they begin to grow and form new tumors that replace normal tissue. This occurs when the cancer cells get into the bloodstream or lymph vessels of the body.

Pap smear or test: Procedure used to collect cells from the cervix so that they can be looked at under a microscope to find cancer and pre-cancer. These cells can also be used for HPV testing. A Pap test can be done during a pelvic exam, but not all pelvic exams include a Pap test.

Transformation zone: Border between the endocervix and exocervix, where cervical pre-cancers and cancers are more likely to start

Visual inspection with acetic acid: Technique was first described by Schiller in 1933, who applied an iodine solution to the cervix to detect neoplastic lesions. In the 1990s, visual inspection of the cervix with Lugol iodine (VILI) or with dilute (3% or 5%) acetic acid (VIA) became more extensively used in screening initiatives, mainly in resource-poor settings (e.g., Bangladesh).

Types of cervical cancer

Adenocarcinoma: Adenomatous cells are gland cells that produce mucus. The cervix has these gland cells scattered along the inside of the passageway that runs from the cervix to the womb. Adenocarcinoma is a cancer of these gland cells. It is less common than squamous cell cancer, but has become more common in recent years. More than 1 in 10 CCs are adenocarcinoma.

Squamous cervical cancer: Squamous cells are the flat, skin-like cells that cover the outer surface of the cervix. Around 7 to 8 out of 10 CCs are squamous cell cancer.
Tumor classification

**Benign tumor:** Mass of cells that lacks the ability to invade neighboring tissue or metastasize. If a tumor is benign it is not cancerous.

**Malignant tumor:** Cancerous tumors made of cells that grow out of control. Often times these cells spread to a different part of the body and metastasize. In CC, it is when dysplastic cells become cancerous, the first detectable stage is *carcinoma in situ* (CIS). This usually takes months or even years.

Other definitions

**Survival curve:** Summary display of the pattern of survival rates over time. The basic concept is simple. For example, for a certain category of patient, one might ask “what proportion is likely to be alive at the end of a specified interval, such as 5 years?” The greater the proportion surviving, the lower the risk for this category of patients.

**Survival rate:** Statistical index that summarizes the probable frequency of specific outcomes for a group of patients at a particular point in time.

Cancer stages

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<th>Definition</th>
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<td>0 (carcinoma in situ)</td>
<td>The cancer cells are only in the cells on the surface of the cervix (the layer of cells lining the cervix), without growing into (invading) deeper tissues of the cervix</td>
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<tr>
<td>I</td>
<td>The cancer has invaded the cervix, but it is not growing outside the uterus. It has not spread to nearby lymph nodes (N0) or distant sites (M0)</td>
</tr>
<tr>
<td>IA</td>
<td>This is the earliest form of stage I. There is a very small amount of cancer, which can be seen only under a microscope</td>
</tr>
<tr>
<td>IB</td>
<td>The cancer can be seen and measures ( \leq 4 ) cm; or the cancer can only be seen under a microscope and measures ( &gt;5 ) mm deep and 7 mm wide</td>
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<tr>
<td>II</td>
<td>The cancer has grown beyond the cervix and uterus, but has not spread to the walls of the pelvis or the lower part of the vagina</td>
</tr>
<tr>
<td>IIA</td>
<td>The cancer has not spread into the tissues next to the cervix (the parametria) but it may have grown into the upper part of the vagina</td>
</tr>
<tr>
<td>IIB</td>
<td>The cancer has spread into the tissues next to the cervix</td>
</tr>
<tr>
<td>III</td>
<td>The cancer has spread to the lower part of the vagina or the walls of the pelvis and may be blocking the ureters (tubes that carry urine from the kidneys to the bladder); it has not spread to nearby lymph nodes or distant sites</td>
</tr>
<tr>
<td>IIIA</td>
<td>The cancer has spread to the lower third of the vagina, but not to the walls of the pelvis</td>
</tr>
<tr>
<td>IIIB</td>
<td>The cancer has grown into the walls of the pelvis and/or has blocked both ureters, but has not spread to the lymph nodes or distant sites; or it has spread to the lymph nodes in the pelvis, but not too distant sites</td>
</tr>
<tr>
<td>IV</td>
<td>This is the most advanced stage of CC. It has spread to nearby organs or other parts of the body.</td>
</tr>
<tr>
<td>IVA</td>
<td>The cancer has spread to the bladder or rectum, but not to the lymph nodes or distant sites</td>
</tr>
<tr>
<td>IVB</td>
<td>The cancer has spread to organs beyond the pelvis, such as the lungs or liver</td>
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### Variables

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<th>Possible responses/assessment methods</th>
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<td>Cost effectiveness of treatment mechanisms</td>
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<td>Knowledge of CC</td>
<td>Surveys, questionnaires</td>
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<tr>
<td>Attitudes/beliefs/perceptions of CC/prevention/treatment options</td>
<td>Qualitative studies (e.g., key informant interviews, focus groups with patients and health care providers)</td>
</tr>
<tr>
<td>Acceptability</td>
<td>Qualitative interviews and focus groups, surveys/questionnaires</td>
</tr>
</tbody>
</table>

**Medical history**

| History of cancer and other chronic conditions                                  | List all history of cancer and other chronic diseases (e.g., hypertension, diabetes). Can be asked in survey form or qualitative interview. |
| Genetic conditions                                                              | List any preexisting genetic conditions; if any, survey or qualitative             |
| Infectious diseases (e.g., HIV/AIDS, chlamydia)                                 | List any infectious diseases; if any, survey or qualitative                         |
| Pregnancy history                                                              | • Never been pregnant  
|                                                                              | • 1 child  
|                                                                              | • 2 children  
|                                                                              | • >2 children  
|                                                                              | • Not carried to full term                                                        |
| Multiple full-term pregnancies                                                  | List number of full-term pregnancies                                              |

**Lifestyle factors**

| Smoking                                                                        | • Yes  
|                                                                              | • No  
|                                                                              | • Current  
|                                                                              | • Former  
|                                                                              | • Never  |
| Alcohol (≥1 drinks/day)                                                        | • Yes  
|                                                                              | • No  |
| Dietary patterns (i.e., diet low in fruits and vegetables)                     | List typical foods in a day or ask participants to fill out a FFQ                 |
| Physical activity                                                              | • Inactive  
|                                                                              | • Moderately active  
|                                                                              | • Active  
|                                                                              | • Very active  |
| Exposure to carcinogens                                                        | List potential carcinogens and ask patients to check off if they had been exposed |
| Weight                                                                         | Numerical value                                                                     |

**Sexual history**

| How many sexual partners have you had?                                         | • In past week  
|                                                                              | • In past month  
|                                                                              | • In past 6 months  
|                                                                              | • In past year  |

**Contraceptive use**

| Condoms                                                                       |
Independent variables | Possible responses/assessment methods
--- | ---
• Which of the following contraceptive methods do you use regularly? | • Oral contraceptive pills
• Injectable contraception
• Calendar

Socio-demographic

<table>
<thead>
<tr>
<th>Age</th>
<th>Number in years</th>
</tr>
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</table>
| Education | • No formal schooling
• < primary school
• Primary school completed
• Secondary school completed
• High school completed
• College/university completed
• Post-graduate degree
• Refused to answer |
| Income | • Per week
• Per month
• Per year
• Refused to answer |
| Marital status | • Never married
• Currently married
• Separated
• Divorced
• Widowed
• Cohabiting |

Access to health care services

| Range of services available (including screening and treatment services) | Use qualitative interviews to assess access to health care services |
| Accessibility of services (location) | |
| Quality of care | |
| Access to emergency care | |
| Prenatal care (for women) | |

Formulas

**Crude (all ages rate per 100000)**  
\[ C = R/N \times 100\,000 \]  
(R= number of cases, N= total number of person-years per observation)

**Incidence rate**  
Number of new cases of disease/population at risk (in a period of time)

**Mortality rate**  
\[ \text{Mortality rate} = \left( \frac{\text{Cancer deaths}}{\text{population}} \right) \times 100,000 \]

**Proportional Incidence Rate (PIR)**  
\[ \text{Proportional Incidence Rate (PIR)} = \left( \frac{RIE}{E} \right) \times 100 \]  
The PIR is the method of choice for comparing data sets where a standard set of age-specific proportions is available for each cancer type.

R = observed cases at the site of interest
E = expected cases at the site of interest
Data Sources

Cancer registries

The main data source will be cancer registries, which is discussed in detail in the Definitions section. The Global Initiative for Cancer Registry Development (GICR) has established six hubs around the world to provide support in the development of cancer registries. Additional information and resources are available at http://gicr.iarc.fr/.

When beginning epidemiologic investigation in cancer, the availability of cancer registries may dictate the direction and feasibility of investigation projects. Figure 1 below provides basic ideas of the types of projects that may be feasible according to the resources available in a country.

Key cancer registry agencies and organizations

- International Association of Cancer Registries (www.iacr.com/fr/)
- International Agency for Investigation on Cancer (www.iarc.fr/)
- Union for International Cancer Control (www.uicc.org)
- North American Association of Central Cancer Registries (www.naaccr.org)
- U.S. National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) program (www.seer.cancer.gov)

Tools

CanReg5 is a tool used to input, store, check, and analyze cancer registry data. CanReg5 can also be used to facilitate the set-up of a new or modification of an existing database. Available in English, French, Russian, Chinese, Spanish, Turkish, and Portuguese. www.iacr.com.fr/index.php?option=com_content&view=article&id=9:canreg5&catid=68&Itemid=445

Figure 1: Flowchart: Assessment of Cancer Registry
Surveys and questionnaires

When cancer registries are unavailable, new data may be collected from the population of interest, though this process requires much time and effort. Additionally, even if data from cancer registries is available, supplementary data may be needed. Data may be conducted through in-person interviews or surveys, which participants may be given to complete privately. Surveys can be used to collect a wide variety of data, such as medical history, health behaviors and perceptions, socio-economic status, and dietary and lifestyle patterns. Examples of surveys and questionnaires are listed below.

Demographic and Health Surveys (DHS): Nationally-representative household surveys that can be used to collect information on various indicators. Although cancer-specific surveys have not been developed, other surveys may be used to collect other relevant information that may aid in assessing risk factors for cancer, such as nutrition. There are two main types of DHS surveys:
- **Standard surveys** have large sample sizes and are usually conducted every 5 years
- **Interim surveys** collect information on key performance indicators but may not necessarily include data for all impact evaluation measures. These are typically shorter than standard surveys and have smaller samples. [www.dhsprogram.com/What-We-Do/Survey-Types/DHS.cfm](http://www.dhsprogram.com/What-We-Do/Survey-Types/DHS.cfm)

Food Frequency Questionnaire (FFQ): Dietary assessment tool that can be used in large epidemiologic studies of diet and cancer. It consists of a checklist of foods and beverages with a frequency response section for each item over a specified period of time. When using an FFQ, it must be specific to and validated for the specific country. For example, it would be inappropriate to use an FFQ developed for North America in China, as it would not contain the foods commonly consumed in the Chinese population. Example of NHANES FFQ: [http://epi.grants.cancer.gov/diet/usualintakes/ffq.html?&url=/diet/usualintakes/ffq.html](http://epi.grants.cancer.gov/diet/usualintakes/ffq.html?&url=/diet/usualintakes/ffq.html)

Service Provision Assessment: Used to assess the health facilities and health service delivery system in a country. Although these surveys have not been specifically developed for cancer, they may still provide information useful in assessing cancer screening and treatment services, and other health resources. [www.dhsprogram.com/What-We-Do/Survey-Types/SPA.cfm](http://www.dhsprogram.com/What-We-Do/Survey-Types/SPA.cfm)

Other resources


Cancer Mortality Database (WHO): Provides data on cancer deaths by population, type of cancer, and the year. (Specific formulas that can be used in analyzing data are listed in the Formulas section.) [www-dep.iarc.fr/WHOdb/WHOdb.htm](http://www-dep.iarc.fr/WHOdb/WHOdb.htm)

CANCER Mondial (International Agency for Investigation on Cancer): Provides data on incidence, mortality, and prevalence for 28 types of cancer worldwide. There are nine databases available on this website. [www-dep.iarc.fr/](http://www-dep.iarc.fr/)


World Cancer Investigation Fund International: [www.wcrf.org/](http://www.wcrf.org/)
Tools and Analytic Methods

Note: Specific formulas that can be used in analyzing data are listed in the Formulas section.

Epidemiologic data on cancer is valuable and informative in various ways. These epidemiological studies can assess:

- Burden of disease
- Cancer risk
- Screening guidelines and procedures
- Accuracy of reporting to cancer registries
- Adequacy of follow-up procedures

However, it is important to properly analyze the data that have been collected from cancer registries or other sources.

Evaluating cancer registry data

It is important to understand how cancer registry data was collected in order to use cancer registries for cancer control planning and other investigation studies (explained in detail in the Definitions section). Follow-up data usually only includes death and sometimes the specific cause of death. Thus, strategies to improve follow-up data may include contacting physicians, hospitals, and patients or establishing electronic linkage to death records.

In addition, registries should be evaluated to assess if the data sources and data collection methods are providing the expected data. These quality control measures may include the assessment of missing, ineligible, or duplicate cases and the accuracy of coded items. Some software programs, such as CanReg5 from IARC (www.iarc.com.fr/canreg5.htm), can run routine data quality checks.

Cancer registry data can be used to:

- Assess primary and secondary prevention programs
- Inform health care planning
- Inform patient care
- Institute public health action

In epidemiologic studies, it is important to first define what is meant by a “case,” though this may be complex. Cancer registry data are useful in determining cases, but there are still several considerations, such as:

- Should cases only include those that were pathologically confirmed?
- Should cases include those with well-established precursors of cancer (e.g., adenomatous polyps as a precursor to colon cancer)?
- For cancers of paired organs (e.g., breast, kidney), should a case reflect the number of organs affected?
- For those with recurrences, should each occurrence count as a case or just the initial diagnosis?

Online free-access tools for global cancer analyses include the following:

- Epi Info: www.cdc.gov/epiinfo/index.html
- GLOBOCAN online analysis: http://globocan.iarc.fr/Pages/online.aspx
- Joinpoint Analysis Software from the NCI Surveillance Investigation Program: http://surveillance.cancer.gov/joinpoint/
- NCI DCEG tools and resources: http://dceg.cancer.gov/tools
- R statistical software: https://www.r-project.org/
Surveillance

The purpose of cancer surveillance is to measure incidence, survival, and mortality for cancer patients and to assess genetic, environment, and lifestyle and behavioral risk factors for cancer. In addition, surveillance includes the assessment of screening practices and quality of care.

Population-based cancer registries are the only type of cancer registries that can be used for cancer surveillance and planning. These registries collect data from a defined population to provide an unbiased profile of the cancer burden and any changes over time. This surveillance data may provide insight to questions, such as:

- What are the emerging issues of a specific cancer?
- What are the trends in incidence, survival, and mortality of cancer?
- How is the burden of cancer changing in one region of a country compared to another?
- What sub-populations are most affected by a specific cancer?
- How are risk factors for various cancers changing?
- What types of cancer control strategies are needed?
- Where are economic, material, and human resources most needed?

Process of surveillance

- Collection: Collect data from population-based cancer registries
- Analysis: Surveillance data can first be analyzed in terms of time, place, and person. Analysis by time may include comparison of the number of cases reported during a specific time period to the number of cases from a previous time period. If there is a notable increase in incidence upon data analysis by time, the data can then be analyzed by place to determine where the cases may be occurring. Even if time analysis does not reveal any significant findings, place analysis may still be useful in identifying local outbreaks or patterns. Analysis of surveillance data by characteristics (e.g., age, sex, race, risk factors) of the cases may also be helpful.
  The Surveillance Investigation Program (SRP) at the National Cancer Institute Division of Cancer Control and Population Sciences has developed tools (shown in Figure 2) for the analysis of and reporting of cancer statistics. [http://surveillance.cancer.gov/tools/methods.html](http://surveillance.cancer.gov/tools/methods.html)
- Interpretation: If the data show a pattern different than what was expected, further investigation may be needed. Changes in population size, reporting methods, and diagnosis procedures are examples of factors that should be taken into consideration before determining a change in cancer patterns to be true.
- Dissemination: Dissemination of surveillance data that targets both residents and medical professionals in the population of interest is essential. The purpose of a surveillance report is to both inform and motivate. This report may contain all the findings from the analysis of the data as well as graphs and figures. Recommendations for screening and other preventive strategies may also be included in surveillance reports.
**Other considerations**

**Confounding**

One important consideration in epidemiologic studies is confounding, which occurs when a second exposure is associated with both the original exposure of interest and the outcome. Thus, a confounder will affect the estimated association between the original exposure and the outcome. For example, an association between a work place and the risk of lung cancer may be confounded by tobacco smoking. In this case, smoking may be associated with the workers (e.g., many workers may smoke), and smoking is also directly associated with lung cancer.

There are several methods of handling confounders in data analysis:

- **Stratification**: A method of analyzing the association of the exposure and outcome separately for each category of the confounding variable. For example, if sex is a confounder, the association is estimated separately for men and for women.
- **Statistical modeling**: Statistical methods, such as regression modeling, can also be used to control for confounders. This method is particularly useful when adjustment for several confounders are needed simultaneously.
APPENDIX

COUNTRY-SPECIFIC INFORMATION
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AFRO Region

Cameroon


**Introduction:** Our objective was to determine factors associated with smoking among university students in Cameroon. **Methods:** A cross-sectional survey was carried out using an anonymous self-administered questionnaire among a convenience sample of 3000 students from three universities (the Université des Montagnes, and the Universities of Douala and Yaounde 1) in Cameroon; 190 students (5.9%) did not consent to the survey. Socio-demographic characteristics and smoking trends were recorded. Logistic regression was used to identify risk factors for smoking. **Results:** Of the students selected, 1862 (62%) were male. The mean age was 23.3 years. We found that 30.1% of students had tried smoking and that 5.6% (n = 168) reported regular smoking. Smoking prevalence among male and female students was respectively 9.5% and 1%. The mean age of smokers was 24.1 years. Only 12.5% of regular smokers were nicotine-dependent. Factors motivating smoking were pleasure, imitation, snobbery and curiosity. In the multivariate analysis, smoking was statistically associated with age, male sex, exposure to friends who smoke and living with smokers. **Conclusion:** Although the prevalence of smoking found in our study was low, effective tobacco control programmes targeting factors such as age, male sex and peer influence should be implemented in universities. Future studies are needed to evaluate the impact of these interventions.

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**Introduction:** The aim of this study was to determine the prevalence of tobacco use, beliefs and risk awareness and psychosocial correlates of tobacco use among university students in 24 low, middle and emerging economy countries. **Methods:** Using anonymous questionnaires, data were collected from 16953 undergraduate university students (mean age 20.9, SD=2.9) from 25 universities in 24 countries across Asia, Africa and the Americas. **Results:** Results indicate that overall 13.3% of the university students were current tobacco users, 22.4% for men and 6.6% for women, ranging from 3.8% in Singapore to 32.5% in Cameroon. The risk awareness of the smoking lung cancer link was 83.6%, while the risk awareness of the smoking heart disease link was 46.5%. **Conclusion:** Multivariate logistic regression found that older age, male gender, having a wealthy family background, living in a low income country, residing off campus on their own, poor beliefs in the importance not to smoke, awareness of the smoking heart disease link, hit by a
sexual partner, depressive symptoms, and substance use (binge drinking and illicit drug use) were associated with current tobacco use.

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**Smokeless tobacco use, tooth loss and oral health issues among adults in Cameroon.** Agbor MA, Azodo CC, Tefouet TS. *Afr Health Sci.* 2013 Sep;13(3):785-90.

**Introduction:** Tobacco use in smokeless and smoked forms is preventable cause of mortality and morbidity worldwide. Objective: To determine the prevalence of smokeless tobacco use and the association with tooth loss and oral health problems among adults in Cameroon. **Methods:** Adults dwelling in the Fokoue area of West Region of Cameroon were studied. **Results:** Out of the 226 participants studied, 119 of them reported smokeless tobacco use giving a prevalence of 52.7% with majority-74 (62.2%) chewing it. Three-quarters (77.3%) of the respondents use it more than thrice-daily and more than half of them respondents have been using it for 6-10 years. The smokeless tobacco users were more of those aged 50-59 years, females, farmers, those with less than post-primary education, non-alcohol consumers and those that have not received previous dental care than smokeless tobacco users. However, it was only age (p=0.006) and educational attainment (p=0.009) that were significantly associated with smokeless tobacco use. Smokeless tobacco user were more likely to have poor oral hygiene, dental caries, gingival recession, leukoplasia, erythroplasia, abnormal growth, tooth wear lesion, experienced tooth loss and edentulousness than non-smokeless tobacco users. However, the significantly associated lesions with smokeless tobacco use were tooth loss (p=0.008), edentulousness (p=0.016), gingival recession (p=0.006) and leukoplasia (p=0.001). **Conclusion:** The prevalence of smokeless tobacco use was high among adults in Cameroon and it was associated with more likelihood of oral health problems. There is therefore a need for health education on the health consequences of the smokeless tobacco use with demonstrations by the dentist.

**Corresponding author:** Dr. Clement C Azodo, Department of Periodontics, Prof Ejide Dental Complex, University of Benin Teaching Hospital P.M.B. 1111 Ugbowo, Benin City, Edo State, Nigeria. Phone: 08034051699. E-mail: clementazodo@yahoo.com

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**Data sources**

**Country-specific needs/attention**
Partner with Health promotion watch (NGO based in Cameroon) to identify approaches to prevent tobacco use: [https://www.unodc.org/ngo/showSingleDetailed.do?req_org_uid=16387](https://www.unodc.org/ngo/showSingleDetailed.do?req_org_uid=16387)

**Country-specific information**
WHO Report on the Global Tobacco Epidemic, 2015- Country Profile-Cameroon: [www.who.int/tobacco/surveillance/policy/country_profile/cmr.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile/cmr.pdf?ua=1)

**Public health campaigns/programs**
The organisation Health Promotion Watch distributes pamphlets on the dangers of smoking to young people during February’s 2013 youth festival in Cameroon:
- [https://www.flickr.com/photos/54886491@N08/8528974787](https://www.flickr.com/photos/54886491@N08/8528974787)
- [www.tobacco.org/tagged/cameroon](http://www.tobacco.org/tagged/cameroon)
Democratic Republic of Congo


**Introduction:** Tobacco use is a leading cause of global morbidity and mortality. Much of the epidemiologic research on tobacco focuses on smoking, especially cigarette smoking, but little attention on smokeless tobacco (SLT). **Methods:** Using data from the Republic of Congo Global Youth Tobacco Survey (GYTS) of 2006, we estimated the prevalence of SLT use among in-school adolescents. We also assessed the association between SLT use and cigarette smoking as well as the traditional factors which are associated with cigarette smoking among adolescents (e.g. age, sex, parental or peer smoking). Unadjusted odds ratios (OR) and adjusted odds ratios (AOR) together with their 95% confidence intervals (CI) were used to measure magnitudes of associations. **Results:** Of the 3,034 respondents, 18.0% (18.0% males and 18.1% females) reported having used smokeless tobacco (chewing tobacco, sniff or dip) in the last 30 days. In multivariate analysis, no significant associations were observed between age and sex on one hand and current smokeless tobacco use on the other. Cigarette smokers were more than six times likely to report current use of smokeless tobacco (AOR = 6.65; 95% CI [4.84, 9.14]). Having parents or friends smokers was positively associated with using smokeless tobacco (AOR = 1.98; 95% CI [1.51, 2.59] for parents who smoked cigarettes, AOR = 1.82; 95% CI [1.41, 2.69] for some friends who smoked cigarettes, and AOR = 2.02; 95% CI [1.49, 2.47] for most or all friends who smoked cigarettes). Respondents who reported have seen tobacco advertisement on TV, billboards and in newspapers/magazines were 1.95 times more likely to report current use of smokeless tobacco (AOR = 1.95; 95% CI [1.34, 3.08]). Perception that smoking was harmful to health was negatively associated with current use of smokeless tobacco (AOR = 0.60; 95% CI [0.46, 0.78]). **Conclusion:** Prevention programs aimed to reduce teen [cigarette] smoking must also be designed to reduce other forms of tobacco use. The teenagers environment at home, at school and at leisure must also be factored in order to prevent their uptake or maintenance of tobacco use.

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**Introduction:** Our objective was to assess associations between nose-throat (NT) diseases and passive smoking prevalence among school children. **Methods:** A cross-sectional survey was carried out on a randomized multistage sample of 381 school children (50.9% males, aged 9.8 ± 3.5 years) from Kinshasa town. Parents and children were asked to fill in a questionnaire detailing their smoking habits. The NT symptoms and diseases were assessed by the survey NT specialist. **Results:** The prevalence of passive smoking was 38.6% (n = 147). Residence in peripheral areas, catholic school system, elementary level, exposure of family to passive smoking, history of NT
surgery, medicines and menthol inhaling, headache, nasal pain, dysphagia, odynophagia, dysosmia, dysphonia, pharyngeal irritation, dry throat, snore, and chronic pharyngitis were more reported by passive smokers. After adjusting for confounding factors, passive smoking (OR = 16.7 95%CI 3.3-83.3), catholic system (OR = 2 95%CI 1.2-3.2), and elementary degree (OR = 1.4 95%, CI 1.1-2.1) were identified as independent determinants of chronic pharyngitis. **Conclusion:** Parents should not smoke in the same room used by their children.

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<tr>
<td><strong>Country-specific needs/attention</strong></td>
<td>No known or recent data, or data that are not both recent and representative tobacco prevalence</td>
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</table>
| **Country-specific information** | • WHO Report on the Global Tobacco Epidemic, 2015- Country Profile-Democratic Republic of Congo: [www.who.int/tobacco/surveillance/policy/country_profile/cod.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile/cod.pdf?ua=1)  

**Ethiopia**


**Introduction:** The World Health Organization (WHO) attributes more than 4 million deaths a year to tobacco, and it is expected that this figure will rise to 10 million deaths a year by 2020. Moreover, it is now a growing public health problem in the developing world. Objective: To assess the prevalence of cigarette use and its determinant factors among high school students in eastern Ethiopia. **Methods:** A cross-sectional study was conducted using structured self-administered questionnaires among 1,721 school adolescents in Harar town, eastern Ethiopia. Univariate and multivariate logistic regression analyses were performed to examine associations. **Results:** The analysis revealed that prevalence of ever cigarette smoking was 12.2% (95% CI 10.8% - 13.9%). Reasons mentioned for smoking cigarettes were for enjoyment (113, 52.8%), for trial (92, 42.9%), and for other reasons (9, 4.3%). The main predictors of cigarette smoking were sex (OR 4.32; 95% CI 2.59-7.22), age (OR 1.20; 95% CI 1.05-1.38) and having friends who smoke (OR 8.14; 95% CI 5.19-12.70). Living with people who smoke cigarettes was not significantly associated with smoking among adolescents (OR 1.25; 95% CI 0.81-1.92). **Conclusion:** This study concluded that high proportion of school adolescents in Harar town smoked cigarettes. Sex, age and peer influence were identified as important determinants of smoking. There is a need for early cost-effective interventions and education campaigns that target secondary school students.

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Appendix – Country-specific Information: Tobacco


Introduction: Cessation of smoking reduces morbidity and mortality related to tobacco smoking. It is essential to explore the intention of individuals to quit smoking to design effective interventions. The objective of this study was to assess cigarette smokers’ intention to quit smoking in Dire Dawa town using the Trans theoretical model. Methods: From February 15 to 19, 2009, we conducted a community based cross-sectional study among 384 current cigarette smokers in Dire Dawa town east Ethiopia. Data was collected by trained personnel using a pretested structured questionnaire. The data was analyzed using SPSS version 16.0. Results: Two hundred and nineteen (57%) smokers in the study area had the intention to quit cigarette smoking within the next six months and all the process of change had an increasing trend across the stages. Based on the Fragestrom test of nicotine dependence of cigarette, 35 (9.1%), 69 (18%) and 48(12.5%) were very high, high and medium dependent on nicotine respectively. For the majority 247(64.3%) of the respondents, the mean score of cons of smoking outweighs the pros score (negative decisional balance). Only 66(17.2%) had high self-efficacy not to smoke in places and situations that can aggravate smoking. Conclusion: Majority of the smokers had the intention to quit smoking. All the process of change had an increasing trend across the stages. Those who had no intention to quit smoking had high level of dependence on nicotine and low self-efficacy. The pros of smoking were decreasing while the cons were increasing across the stages. Stage based interventions should be done to move the smokers from their current stage to an advanced stages of quitting cigarette smoking.

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Introduction: Tobacco is one of the leading preventable causes of non-communicable diseases. Previous studies gave due emphasis only for cigarette smoking with little attention given for other types of tobacco use. This study describes the prevalence of all common forms of tobacco use and identify associated factors among adults in Ethiopia. Methods: The study used data from the 2011 Ethiopian demographic and health survey. An index was constructed from yes or no responses for common types of tobacco use. Bivariate and multivariate logistic regression statistical models were employed to determine associated factors with tobacco using adjusted odds ratios (AOR) and their 95 % confidence intervals (CI). Results: The overall prevalence of tobacco use was 4.1 % [95 % CI: (3.93–4.37)]. The highest prevalence 16.9 % [95 % CI: (11.02–23.76)] in Gambella and the lowest 0.8 % [95 % CI: (0.48–1.29)] in Tigray regions were reported. The odds of tobacco use in the age group 20–24 and 45–49 years were [AOR = 2.3; 95 % CI: (1.60–3.21)] and [AOR = 9.1; 95 % CI: (6.06–13.54)] more likely to use tobacco, respectively, as compared to the age group 15–19 years. Traditional religion [AOR = 5.5; 95 % CI: (3.96–7.55)], Catholics [AOR = 3.40; 95 % CI: (2.03–5.69)] and Islamic followers [AOR = 2.8; 95 % CI: (2.31–3.32)] had higher odds of using tobacco as compared to Orthodox religion followers. Adults in the poorest wealth quintile were [AOR = 1.4; 95 % CI: (1.05–1.79)] more likely to use tobacco as compared to the richest wealth quintile. The odds of tobacco use among males were higher as compared to females [AOR = 13.08; 95 % CI: (10.24–16.72)]. Formerly married adults were [AOR = 1.71; 95 % CI: (1.20–2.34)] more likely to
use tobacco as compared to never married. Adults who were professionally working [AOR = 0.49; 95 % CI: (0.29–0.85)] had less likely to use tobacco as compared to non-working adults. However, adults who were working in sales, skilled and unskilled occupations had [AOR = 1.6; 95 % CI: (1.18–2.24)], [AOR = 1.7, 95 % CI: (1.21–2.50)] and [AOR = 3.8 95 % CI: (2.27–6.23)] more likely to use tobacco, respectively, as compared to non-working adults. Individuals who had experience of child death were [AOR = 1.4; 95 % CI: (1.17–1.63)] more likely to use tobacco as compared to their counterparts. **Conclusion:** The overall prevalence of tobacco use seems low in Ethiopia. However, a significant regional variation of tobacco use was observed. A tailored public health interventions targeting regions with high prevalence of tobacco use is recommended.

**Corresponding author:** Yihunie Lakew, Ethiopian Public Health Association, Addis Ababa, Ethiopia. E-mail: yihunierh@yahoo.com

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**Data sources**

<table>
<thead>
<tr>
<th>Country-specific needs/attention</th>
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<tr>
<td><strong>Public health campaign/programs</strong></td>
<td>Ethiopia Cancer Society (MWECS) runs an anti-tobacco campaign “Mathiwos Wondu”: <a href="http://www.uicc.org/advocacy/success-stories">www.uicc.org/advocacy/success-stories</a></td>
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**Kenya**


**Introduction:** This review examines the existing tobacco control research done in the country. It further identifies key gaps present in research and gives recommendations on priority research areas required to implement effective tobacco control programmes. **Methods:** Published literature, technical reports and reports by the Ministry of Health were reviewed. It included studies that measure tobacco use and its effects, monitor progress of tobacco control, or articles that are discussing tobacco control policy. The review was conducted in January 2013 and included 18 papers. **Results:** There are six studies that assessed the prevalence of current tobacco consumption which yielded prevalence’s of between 3.8%-19%. Only one study tried to determine an association between Tobacco use and Health. Studies that monitored progress of legislation indicated that the country lacked coordinated efforts for tobacco control, enforcement was weak and monitoring of the existing tobacco legislation was poor. **Conclusion:** This review has demonstrated that Kenya has made efforts to generate knowledge on tobacco control through research. However there is lack of research that demonstrates the effects of tobacco consumption on health and studies that detail the impact of the various tobacco control interventions.

Introduction: Our objective was to estimate the prevalence and pattern of substance use among patients attending primary health centres in urban and rural areas of Kenya. Methods: A descriptive cross-sectional prevalence survey. Setting: Urban health centres of Jericho and Kenyatta University (KU) and rural health centres in Muranga district. Subjects: One hundred and fifty adult patients (seventy eight males and seventy two females) were included in the study. Intervention: Semi-structured questionnaires and the DSM IV diagnostic criteria were used to record the socio-demographic data and to determine substance dependence or abuse. Results: The substances commonly used in descending order of frequency were alcohol, tobacco, khat and cannabis. Only alcohol and tobacco were extensively used. Lifetime prevalence rates of alcohol use for the two urban health centres were 54% and 62% compared to 54% for the rural health centres. For tobacco the lifetime prevalence rates were 30% for Jericho, 28% for KU and 38% for Muranga. The differences between the rural and urban samples were not statistically significant. More males than females had used alcohol (average lifetime use 80.8% for males compared to 30.6% for females: p<0.05) and tobacco (average lifetime use 56.4% for males compared to 5.6% for females p<0.05). Conclusion: The rates of substance abuse were generally low with the exception of alcohol and tobacco. Socio-cultural factors might be responsible for the differences noted. It is suggested that preventive measures and education should be emphasized at the primary care level.


Introduction: The purpose of this study was to present preliminary data on sources of and exposure to pro- and anti-tobacco messages. Methods: A questionnaire was administered to 1130 Kenyan primary schoolchildren. Results: Forty-seven percent had received risk information from broadcast media and 88% was exposed to tobacco advertisements. Nonsmokers held more favorable attitudes toward control policies and were less frequently exposed to pro-and anti-tobacco messages. Conclusion: Adolescents receive risk information mainly from the broadcast media. Advertising is an important risk factor of smoking status in this developing country.

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To evaluate barriers in coordinated efforts for tobacco control and enforcement and monitoring of the existing tobacco legislation at country level

**Country-specific information**


**Public health campaign/programs**

- Kenya Communications Campaign: [http://worldlungfoundation.org/ht/d/sp/i/35115/pid/35115](http://worldlungfoundation.org/ht/d/sp/i/35115/pid/35115)

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**Mozambique**


**Introduction:** Monitoring tobacco consumption patterns is essential to define and evaluate strategies to control the tobacco epidemic. We aimed to quantify the use of smoked (manufactured/hand-rolled cigarettes) and smokeless (snuff/chew) tobacco, according to sociodemographic characteristics, in adult Mozambicans. **Methods:** A national representative sample (n = 3,323) of subjects aged 25-64 years was evaluated in 2005 following the World Health Organization Stepwise Approach to Chronic Disease Risk Factor Surveillance (STEPS), which included the assessment of tobacco consumption with the quantification of each type of tobacco used daily. We computed prevalences, and age- and education-adjusted prevalence ratios (PRs), with 95% CIs. **Results:** Daily smoking was reported by 9.1% (95% CI = 5.0-13.1) of women (manufactured, 3.4%; hand-rolled, 5.6%) and 33.6% (95% CI = 29.3-38.0) of men (manufactured, 18.7%; hand-rolled, 14.8%). Daily manufactured cigarette smoking was significantly more frequent in men (urban: PR = 14.62, 95% CI = 7.59-28.55; rural: PR = 4.32, 95% CI = 2.42-7.71). Daily hand-rolled cigarette smoking was three- to fourfold more frequent among men and nearly 80% less frequent in urban areas, regardless of sex. The prevalence of daily smokeless tobacco use was 7.4% (95% CI = 4.6-10.2) in women (chew, 6.4%; sniff, 1.0%) and 3.4% (95% CI = 1.7-5.2) in men (chew, 1.6%; sniff, 1.8%). Daily smokeless tobacco consumption was significantly less frequent in urban areas only among men (PR = 0.05, 95% CI = 0.01-0.33). **Conclusion:** Despite the relatively low levels of manufactured cigarette smoking, traditional forms of tobacco consumption are frequent, especially among women and in rural settings, showing the need for control measures to target specifically different patterns of consumption.

**Corresponding author:** Nuno Lunet, Ph.D., Departamento de Epidemiologia Clínica, Medicina Preditiva e Saúde Pública, Faculdade de Medicina da Universidade do Porto, Al. Prof. Hernâni Monteiro, 4200-319 Porto, Portugal. Telephone: +351-225513652.

**Manufactured and hand-rolled cigarettes and smokeless tobacco consumption in Mozambique: regional differences at early stages of the tobacco epidemic.** Araújo C, Silva-Matos C, Damasceno


**Appendix – Country-specific Information: Tobacco**


**Introduction:** To describe the use of different types of tobacco (manufactured and hand-rolled cigarettes, and smokeless tobacco) in the adult Mozambican population, across regions.

**Methods:** A representative sample of 12,902 Mozambicans aged 25-64 years was evaluated in a national household survey conducted in 2003 using a structured questionnaire. The patterns of tobacco consumption were described to highlight the sex-specific differences by age and between urban and rural settings, and between the north, where most of the country’s tobacco production is concentrated, and the south of the country, where the wealthiest provinces, closer to the city capital, are located. **Results:** The prevalence of current tobacco consumption was 39.9% in men and 18.0% in women. Women consumed predominantly smokeless tobacco (prevalence: 10.1%), especially in the north. Hand-rolled and manufactured cigarettes were the most frequently consumed among men (prevalences: 18.7% and 17.2%, respectively). Additionally, hand-rolled cigarette consumption predominantly occurred in the northern provinces and rural settings, whereas manufactured cigarette consumption predominated in the south and urban areas. **Conclusion:** The overall tobacco consumption was higher than expected for an African country with scarce economic resources, mostly due to traditional forms of consumption. The gender and regional specific patterns of consumption identified in Mozambique may contribute to the development of culturally adapted and locally grounded actions for tobacco control, and stress the need of locale-specific surveillance data and public health action in this field.

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**Changing patterns of tobacco consumption in Mozambique: evidence from a migrant study.**


**Introduction:** Maputo, the Mozambique capital, contrasts with the rest of the country with regard to its sociodemographic characteristics and patterns of tobacco exposure. We conducted a migrant study to compare the prevalence of manufactured-cigarette smoking and traditional forms of tobacco use among dwellers in the capital who were also born in Maputo City (MC/MC) with those born in southern (SP/MC) and northern (NP/MC) provinces, and additionally with inhabitants in the latter regions. **Methods:** In 2003, a representative sample of 12,902 Mozambicans aged 25-64 years was evaluated. We computed age- and education-adjusted prevalence ratios (PR) with 95%-confidence intervals (95%CI) using Poisson regression. **Results:** The prevalence of any type of tobacco consumption among Maputo City inhabitants born in other provinces contrasted with the pattern observed in locally born inhabitants (SP/MC vs. MC/MC: men, PR, 0.61; 95%CI, 0.44-0.85; women, PR, 0.38, 95%CI, 0.18-0.79; NP/MC vs. MC/MC: men, PR, 0.66; 95%CI, 0.34-1.29; women, PR, 4.56, 95%CI, 1.78-11.69); the prevalence among city inhabitants born in other provinces resembled the pattern seen in inhabitants of their provinces of origin. Traditional forms of tobacco consumption among men were rare in Maputo City, which is in stark contrast to the situation in other provinces. **Conclusion:** Cultural background, affordability, and availability of different types of tobacco in urban Mozambique need to be considered when developing strategies to control the tobacco epidemic.
**Corresponding author:** Nuno Lunet, Department of Hygiene and Epidemiology, University of Porto Medical School, Porto, Portugal. E-mail: nlunet@med.up.pt

### Data sources

### Country-specific needs/attention
- Design community level programs/intervention to assist with smoking cessation
- Engage community workers to provide counselling to those who wish to give up, and to treat nicotine addiction

### Country-specific information

### Public health campaign/programs
- Making a better life for children in tobacco growing communities. Mozambique- React programme: [www.eclt.org/project countries/mozambique/](http://www.eclt.org/project countries/mozambique/)

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**Namibia**

**Tobacco control in Namibia: the importance of government capacity, media coverage and industry interference.** Tam J, van Walbeek C. *Tob Control,* 2014, Nov;23(6):518-23. PMID: 23788605

**Introduction:** Namibia is typical of low-income and middle-income countries with growing tobacco use, but with limited capacity to impose comprehensive tobacco control legislation. Despite initiating dialogue on national tobacco control policy in 1991, the country took nearly 20 years to pass the Tobacco Products Control Act. Objective: To use Namibia as a case study to illustrate challenges faced by low-income countries working to forward tobacco control legislation. **Methods:** Face-to-face and telephonic interviews were conducted with 13 bureaucrats and advocates currently or previously engaged in tobacco-related work in Namibia. Tobacco-related news articles from national newspapers were examined. **Results:** The constitutional obligation of the government to promote public health laid the foundation for Namibia's tobacco control policy. Staff capacity constraints greatly delayed the passing of tobacco control legislation. It is unclear what influence the tobacco industry's involvement as a stakeholder had on policy; however, in at least one instance, the tobacco industry actively misled government. Namibia's ratification of the Framework Convention on Tobacco Control was instrumental in passing legislation that meets most provisions of the international treaty. The media have generally played a supportive role in pushing the government to pass tobacco control legislation. **Conclusion:** The fact that Namibia was able to pass fairly comprehensive tobacco control legislation with such meagre resources is commendable. The government must now implement
the regulations that make the legislation effective. Tobacco control progress in low-income and middle-income nations can be encouraged through use of the media and improved staff and legal capacity within health ministries.

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**Introduction:** This report examines the prevalence and common correlates of early smoking initiation among male and female school children across seven African countries. **Methods:** The total sample included 17,725 school children aged 13 to 15 years from nationally representative samples in seven African countries. Univariate and multivariate analyses were conducted to assess the relationship between early smoking initiation, health compromising behaviours, mental distress, protective factors and socio-economic status variables. **Results:** Overall 15.5% had experienced smoking initiation before age 14, with the percentages 20.1% among boys and 10.9% among girls. In multivariable analysis, early smoking initiation was among boys associated with ever drunk from alcohol use (OR = 4.73, p = 0.001), ever used drugs (OR = 2.36, p = 0.04) and ever had sex (OR = 1.63, p = 0.04). Among girls, it was associated with higher education (OR = 5.77, p = 0.001), ever drunk from alcohol use (OR = 4.76, p = 0.002), parental or guardian tobacco use (OR = 2.83, p = 0.001) and suicide ideation (OR = 2.05, p = 0.02). **Conclusion:** The study found a high prevalence of early smoking initiation among 13-15 year-olds in seven African countries. Various risk factors have been identified in boys and girls who initiate smoking before age 14, forming a distinct risk group in this setting. Specific interventions are needed for boys and girls in the preteen years, before smoking initiation.

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**Data sources**


**Country-specific needs/attention**

- Environmental scan of bars and restaurants to evaluate implementation of indoor smoking bans
- Examine if sale of single or ‘loose’ cigarettes promote cigarettes in Namibian youths
- Examine barriers to implementation of smoke free regulations in Universities
- Community level intervention to support smoking cessation
- Methods to estimate prevalence of current smokeless tobacco use

**Country-specific information**

Current national smoke free regulations cover government facilities

WHO Report on the Global Tobacco Epidemic, 2015- Country Profile-Namibia: [www.who.int/tobacco/surveillance/policy/country_profile/nam.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile/nam.pdf?ua=1)
**Public health campaign/programs**


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**Nigeria**

**Tobacco related knowledge and support for smoke-free policies among community pharmacists in Lagos state.** Poluyi EO, Odukoya OO, Aina B, Faseru B. Nigeria. *Pharm Pract (Granada)*. 2015, Jan-Mar;13(1):486. PMCID: PMC4384264

**Introduction:** There are no safe levels of exposure to second hand smoke and smoke-free policies are effective in reducing the burden of tobacco-related diseases and death. Pharmacists, as a unique group of health professionals, might be able to play a role in the promotion of smoke-free policies. **Objective:** To determine the tobacco-related knowledge of community pharmacists and assess their support for smoke-free policies in Lagos state, Nigeria. **Methods:** A cross-sectional descriptive study design using both quantitative and qualitative methods was employed. Two hundred and twelve randomly selected community pharmacists were surveyed using a pre-tested self-administered questionnaire. In addition, one focus group discussion was conducted with ten members of the Lagos state branch of the Association of Community Pharmacists of Nigeria. **Results:** The quantitative survey revealed that the majority (72.1%) of the respondents were aged between 20 and 40 years, predominantly male (60.8%), Yoruba (50.2%) or Igbo (40.3%) ethnicity and had been practicing pharmacy for ten years or less (72.2%). A majority (90.1%) of respondents were aware that tobacco is harmful to health. Slightly less (75.8%) were aware that second hand smoke is harmful to health. Among the listed diseases, pharmacists responded that lung (84.4%) and esophageal (68.9%) cancers were the most common diseases associated with tobacco use. Less than half of those surveyed associated tobacco use with heart disease (46.9%), chronic obstructive pulmonary disease (27.8%), bladder cancer (47.2%), peripheral vascular disease (35.8%) and sudden death (31.1%). Only 51.9% had heard of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC). A little over half of the respondents (53.8%) were aware of any law in Nigeria controlling tobacco use. The majority of respondents supported a ban on smoking in homes (83.5%), in public places (79.2%), and in restaurants, nightclubs and bars (73.6%). For every additional client attended to daily, knowledge scores increased by 0.022 points. Current smokers were 1.3 times less likely to support smoke-free policies compared with non-smokers. The findings emanating from the focus group discussion reinforced the fact that the pharmacists were in support of smoke-free policies particularly in homes and public places. It also demonstrated that most of them were aware of the health risks associated with tobacco use and second hand smoke however some misconceptions seemed to exist. **Conclusion:** The pharmacists surveyed expressed support of smoke-free policies and most of them were aware of the health risks associated with tobacco use. However, awareness of WHO FCTC and country-level tobacco legislation was low. Current smokers were less likely to support smoke-free policies. Community pharmacists should therefore be considered worth engaging for the promotion of smoke-free policies. Efforts should also be made to educate pharmacists about country level smoke-free laws.

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Cigarette smoking and perception of its advertisement among antenatal clinic attendees in referral health facilities in Enugu, Nigeria. Obiora CC, Dim CC1, Uzochukwu BS, Ezugwu FO. Niger J Clin Pract. 2015, Jan-Feb;18(1):80-5. PMID: 25511349

Introduction: The most predominant form of tobacco use is cigarette smoking, and it poses serious threats to maternal and child health. The magnitude of cigarette smoking in pregnancy in our environment is not well-known. The study aimed to determine the prevalence of cigarette smoking among pregnant women in Enugu, Nigeria as well as their exposures and perceptions of cigarette smoking advertisement. Methods: Questionnaires were administered to a cross-section of pregnant women randomly selected from three hospitals in Enugu, South-East Nigeria, from May 2, 2012 to June 12, 2012. Analysis was both descriptive and inferential at 95% confidence levels. Results: The prevalence of tobacco smoking in pregnancy was 4.5% (9/200). Over 90% of respondents admitted that cigarette smoking could harm both mother and unborn baby. In all, 79.5% (159/200) of respondents had seen or heard of advertisement for cigarette smoking as against 82.5% (165/200) that had seen or heard of antismoking advertisement (P = 0.444, odds ratio = 1.2 [95% confidence intervals: 0.74, 2.00]). Conclusion: The prevalence of cigarette smoking in pregnancy in Enugu, Nigeria was low, and there was high exposure to both pro-and anti-smoking advertisement. The awareness of harmful health effect of smoking was high but, that of the specific diseases associated with smoking in pregnancy was limited. Hence, antenatal classes and antismoking advertisement should be scaled-up to include maternal and peri-natal diseases/conditions associated with cigarette smoking.

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Abstract Major strides towards national tobacco control have been made since Nigeria became signatory to the WHO Framework Convention on Tobacco Control (FCTC) in June 2004. The Nigerian senate passed a bill on March 15, 2011 which is expected to be signed into law shortly, to regulate and control production, manufacture, sale, advertising, promotion and sponsorship of tobacco or tobacco products. This paper highlights how the proposed tobacco control law provides a unique opportunity to domesticate the WHO FCTC, expand on smokeless tobacco regulation and develop a science base to improve tobacco control measures in Nigeria.

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Introduction: It is projected that low and middle-income countries will bear a major burden of tobacco related morbidity and mortality, yet, only limited information is available on the determinants of smoking initiation among youth in Africa. This study aimed to assess the determinants of smoking initiation and susceptibility to future smoking among a population of high school students in Lagos, Nigeria. Methods: Baseline data from an intervention study
designed to assess the effect of an anti-smoking awareness program on the knowledge, attitudes and practices of adolescents was analyzed. The survey was carried out in six randomly selected public and private secondary schools in local government areas in Lagos state, Nigeria. A total of 973 students completed self-administered questionnaires on smoking initiation, health related knowledge and attitudes towards smoking, susceptibility to future smoking and other factors associated with smoking. **Results:** Of the respondents, 9.7% had initiated smoking tobacco products with the predominant form being cigarettes (7.3%). Males (OR: 2.77, 95%CI: 1.65-4.66) and those with more pro-smoking attitudes (OR: 1.44, 95%CI: 1.34-1.54) were more likely to have initiated smoking. Those with parents and friends who are smokers were 3.47 (95%CI: 1.50-8.05) and 2.26 (95%CI: 1.27-4.01) times more likely to have initiated smoking. Non-smoking students, in privately owned schools (OR: 5.08), with friends who smoke (5.09), with lower knowledge (OR: 0.87) and more pro-smoking attitudes (OR 1.13) were more susceptible to future smoking. In addition, respondents who had been sent to purchase cigarettes by an older adult (OR: 3.68) were also more susceptible to future smoking. **Conclusion:** Being male and having parents who smoke are predictors of smoking initiation among these students. Consistent with findings in other countries, peers not only influence smoking initiation but also influence smoking susceptibility among youth in this African setting. Prevention programs designed to reduce tobacco use among in-school youth should take these factors into consideration. In line with the recommendations of article 16 of the WHO FCTC, efforts to enforce the ban on the sales of cigarettes to minors should be also emphasized.

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**Data sources**

**Country-specific needs/attention**
- Effective implementation of WHO-FCTC Framework including implementation of 100% smoke-free laws, increased tobacco taxes, bans on tobacco advertising, promotion and sponsorship and effective warning labels on tobacco products
- Intervention to raise awareness about second hand smoking and harms of tobacco use
- Evaluate compliance with restrictions in public smoking and advertisement ban
- Longitudinal studies to measure the effectiveness of restrictions in public smoking in reducing secondhand smoke
- Longitudinal measurement of secondhand smoke exposure using P.M 2.5 levels in public areas such as hospitals, schools and hospitality centers such as bars and clubs in order to assess the impact of the laws in reducing secondhand smoke

**Country-specific info**
  - [www.who.int/tobacco/surveillance/policy/country_profile/nga.pdf](http://www.who.int/tobacco/surveillance/policy/country_profile/nga.pdf)
  - [www.no-smoke.org/goingsmokefree.php?id=783](http://www.no-smoke.org/goingsmokefree.php?id=783)
  - [www.tobacco.org/tagged/nigeria](http://www.tobacco.org/tagged/nigeria)
South Africa

**Predictors of tobacco smoking abstinence among tuberculosis patients in South Africa.**

**Abstract:** This study examines predictors of smoking cessation in tuberculosis patients with high HIV co-infection rates in a South African primary care setting. Current smokers were randomly allocated to brief motivational interviewing (n = 205) or receipt of a brief message (n = 204). Multi-level logistic regression was performed to identify predictors of sustained 3- and 6-month abstinence and 7-day point prevalence abstinence (PPA) at 1 month, with the facility as a random effect. The intervention was ineffective among smokers with high nicotine-dependence at 1 month, but was effective for all smokers over longer periods. Higher baseline self-efficacy predicted the 1-month 7-day PPA, but not sustained abstinence. HIV-positive participants' odds of sustained abstinence were about three times higher than those of their HIV-negative counterparts. Results support a more intensive motivational intervention and/or coping skills training to increase self-efficacy and abstinence rates. Tobacco cessation services can be introduced in tuberculosis services where high HIV co-infection rates occur.

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**Tobacco advertising, promotion, and sponsorship (TAPS) exposure, anti-TAPS policies, and students' smoking behavior in Botswana and South Africa.** English LM, Hsia J, Malarcher A. *Prev Med.* 2016 Jan 26. PMID:26824891

**Introduction:** We examined the change over time in tobacco advertising, promotion and sponsorship exposure and the concurrent changes in cigarette smoking behavior among students age 13 to 15 years in two African countries with different anti-tobacco advertising, promotion and sponsorship policies. In South Africa, anti-tobacco advertising, promotion and sponsorship policies became more comprehensive over time and were more strictly enforced, whereas the partial anti-tobacco advertising, promotion and sponsorship policies adopted in Botswana were weakly enforced. **Methods:** We analyzed two rounds of Global Youth Tobacco Survey data from South Africa (1999, n=2342; 2011, n=3713) and in Botswana (2001, n=1073; 2008, n=1605). We assessed several indicators of tobacco advertising, promotion and sponsorship exposure along with prevalence of current cigarette smoking and smoking susceptibility for each data round. Logistic regression was used to examine changes over time in tobacco advertising, promotion and sponsorship exposure and smoking behavior in both countries. **Results:** Between 1999 and 2011, South African students' exposure to tobacco advertising and sponsorship decreased significantly by 16% (p value, <0.0001) and 14% (p value, <0.0001), respectively. Exposure to tobacco promotion was lower and did not decrease significantly. Botswanan students' tobacco advertising, promotion and sponsorship exposure did not change significantly between 2001 and 2008. South African students' prevalence of cigarette smoking decreased over time (OR, 0.68) as did susceptibility to smoking (OR, 0.75), but declines did not remain significant after adjusting for
parents' and friends' smoking. In Botswana, students' prevalence of cigarette smoking increased significantly over time (OR, 1.84), as did susceptibility to smoking (OR, 2.71). **Conclusion:** Enforcement of strong anti-tobacco advertising, promotion and sponsorship policies is a vital component of effective tobacco control programs in Africa. Such regulations, if effectively implemented, can reduce tobacco advertising, promotion and sponsorship exposure among adolescents and may influence cigarette smoking behavior.

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**Introduction:** Tobacco use and its concomitant, nicotine dependence, are increasing in African countries and other parts of the developing world. However, little research has assessed nicotine dependence in South Africa or other parts of the African continent. Previous research has found that adolescent problem behaviors, including tobacco use, tend to cluster. This study examined the relationship between nicotine dependence and adolescent problem behaviors in an ethnically diverse sample of urban South African adolescents. **Methods:** A community sample (N = 731) consisting of "Black," "White," "Coloured," and "Indian" youths aged 12-17 years was drawn from the Johannesburg metropolitan area. Structured interviews were administered by trained interviewers. Nicotine dependence was assessed by the Fagerström Test of Nicotine Dependence. **Results:** Logistic regression analyses showed that higher levels of nicotine dependence significantly predicted elevated levels of violent behavior, deviant behavior, marijuana and other illegal drug use, binge drinking, early sexual intercourse, multiple sexual partners, and inconsistent condom use, despite control on the adolescents' demographic characteristics, peer smoking, conflict with parents, peer deviance, and the availability of legal and illegal substances. These relationships were robust across ethnicity and gender. **Conclusion:** The findings indicate the need for policy makers and prevention and intervention programs in South Africa to consider adolescent nicotine dependence in conjunction with comorbid problem behaviors, including other substance use, sexual risk behaviors, and deviant behaviors.

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**Introduction:** Smoking rates are projected to increase substantially in developing countries such as South Africa. **Purpose:** The aim of this study was to test the efficacy of two contrasting approaches to school-based smoking prevention in South African youth compared to the standard health education program. One experimental program was based on a skills training/peer resistance model and the other on a harm minimization model. **Methods:** Thirty-six public schools from two South African provinces, KwaZulu-Natal and the Western Cape, were stratified by
socioeconomic status and randomized to one of three groups. Group 1 (comparison) schools (n = 12) received usual tobacco use education. Group 2 schools (n = 12) received a harm minimization curriculum in grades 8 and 9. Group 3 schools (n = 12) received a life skills training curriculum in grades 8 and 9. The primary outcome was past month use of cigarettes based on a self-reported questionnaire. **Results:** Five thousand two hundred sixty-six students completed the baseline survey. Of these, 4,684 (89%) completed at least one follow-up assessment. The net change in 30-day smoking from baseline to 2-year follow-up in the control group was 6% compared to 3% in both harm minimization (HM) and life skills training (LST) schools. These differences were not statistically significant. Intervention response was significantly moderated by both gender and race. The HM intervention was more effective for males, whereas the life skills intervention was more effective for females. For black African students, the strongest effect was evident for the HM intervention, whereas the strongest intervention effect for "colored" students was evident for the LST group. **Conclusion:** The two experimental curricula both produced similar overall reductions in smoking prevalence that were not significantly different from each other or the control group. However, the impact differed by gender and race, suggesting a need to tailor tobacco and drug use prevention programs. More intensive intervention, in the classroom and beyond, may be needed to further impact smoking behavior.

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**Data sources**

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<th>Global Youth Tobacco Survey (2002)</th>
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**Experts**

| Yussuf Saloojee, Executive Director, National Council Against Smoking National Council Against Smoking. P O Box 1242, Houghton, 2041, South Africa. Tel +27 11 725 1514. E-mail: ysaloojee@iafrica.com |

**Country-specific needs/attention**

| The increase in smokeless tobacco use is not restricted to the youth. A rising prevalence is noticeable among South African women, rural residents, the elderly, the poor, and the less educated, as they are unaware of the health hazards of these products. |

**Country-specific information**

| WHO Report on the Global Tobacco Epidemic, 2015- Country Profile: www.who.int/tobacco/surveillance/policy/country_profile/zaf.pdf?ua=1 |

**Public health campaign/programs**

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**Tanzania**


**Abstract:** According to data from the Global Youth Tobacco Survey, 37.6% of South African adolescents reported ever smoking in 2002, and over half of the smokers reporting having parents who smoke. Kaduri et al present a study that aims to provide representative data about smoking among adolescents in Dar es Salaam, Tanzania. Results of this study could be useful in designing and targeting specific interventions and developing proactive youth anti-smoking tobacco control policies in Tanzania and other developing countries in Africa.

**Abstract:** World Health Organization (2004) documented that substance use or abuse and mental disorders are important causes of disease burden accounting for 8.8% and 16.6% of the total burden of disease in low income and lower middle-income countries, respectively. Alcohol use/abuse disorders alone contribute to 0.6%-2.6% of the total burden of disease in these countries. This cross-sectional descriptive study recruited 184 psychiatric patients seen at Bugando Medical centre and assessed them for substance involvement using the WHO Alcohol, Smoking and Substance Involvement Screening Test. The most frequently used substances among respondents were alcohol (59.3%), tobacco (38.6%), and cannabis (29.3%), while heroin and cocaine were least used (2.1% and 1.6%, respectively). Statistical significant difference existed between substance use and participants: level of education, formal employment, marital status, gender, family history of mental illness, and family history of substance use. About a third attributed their involvement into substance exclusively to peer pressure, 8.7 to both peer pressure and curiosity while 7.1% exclusively to curiosity. This result represents one of the most important risks to mental health, and is a leading factor that causes high rates of admission or reason to be seen by a psychiatrist, this cannot be ignored when managing psychiatric disorders and therefore calls for routing screening for substance involvement among clients seeking psychiatric treatment. It also calls for appropriate standard operation policy procedures that can be operationalized as a matter of clinical practice by mental health workers in their routine medical practice.

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**Abstract:** Evidence suggests substance abuse in Tanzania is a growing public health problem. A random sample of 899 adults aged 15-59 in two urban sites of differing levels of poverty surveyed alcohol, tobacco and illicit substance use. Rates of substance use were 17.2%. 8.7% and 0.8% for alcohol, tobacco and cannabis, respectively. Living in the less affluent area was associated with higher lifetime rates of tobacco and alcohol use. Substance use is less prevalent in Tanzania than in richer countries, but lifetime consumption is higher in poorer areas. The association of substance use with a range of socio-economic factors warrants further research.

**Corresponding author:** Rachel Jenkins, Director, WHO Collaborating Centre (Mental Health), Institute of Psychiatry, Kings College London, UK. E-mail: r.jenkins@iop.kcl.ac.uk

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<th>Data sources</th>
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<td>Experts</td>
<td>Lutgard Kokulindap Kagaruki, Tanzania Tobacco Control Forum, Plot 677 Sinza A, Sam Nujoma/Igesa Rd. Opp Kobil Petrol St, P. O. Box 33105, Dar es Salaam, Tanzania. E-mail: <a href="mailto:info@ttcf.or.tz">info@ttcf.or.tz</a></td>
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### Country-specific needs/attention

- Effective implementation of strategies to reduce tobacco use, including declaring all public places smoke free, increasing tobacco tax, intensifying health warnings against tobacco use.
- Introducing cessation support programs and sustained public education campaigns.

### Country-specific information

- WHO Report on the Global Tobacco Epidemic, 2015- Country Profile:
  - [www.who.int/tobacco/surveillance/policy/country_profile/tza.pdf?ua=1](www.who.int/tobacco/surveillance/policy/country_profile/tza.pdf?ua=1)

### Public health campaign/programs


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### Uganda

#### Rapid assessment of the demand and supply of tobacco dependence pharmacotherapy in Uganda.


**Abstract:** Tobacco dependence pharmacotherapy (TDP) plays a major role in smoking cessation. We conducted a rapid assessment of current smoking, availability of TDP and the willingness to quit and to pay for TDP among 56 patients with tobacco-attributable diseases and 38 pharmacies in Uganda. Of the 56 patients, 63% were current smokers, 77.4% wanted to quit and 37% were willing to pay. Drugs were largely unavailable: nicotine replacement products were available in only seven pharmacies (18%) and bupropion in three (8%); these cost respectively US$15.7 and US$17.1 for a 1-month supply. Improving supplies and lowering prices could facilitate access to TDP in Uganda.

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#### Cigarette smoking prevalence among school-going adolescents in two African capital cities: Kampala Uganda and Lilongwe Malawi.


**Introduction:** Non communicable diseases are a growing public health concern. Globally tobacco-related deaths surpass malaria deaths and yet developing countries’ data are lacking. Objectives: To compare prevalence of tobacco use and exposure to tobacco and tobacco-related issues among adolescents in Kampala, Uganda and Lilongwe, Malawi. **Methods:** Cross sectional data from the Global Youth Tobacco Survey (GYTS) w used. Data were collected in 2001 in Lilongwe and in 2002 in Uganda using a standardized questionnaire tool. The study was aimed to enrolled schoolchildren aged 13-17 years. **Results:** The prevalence of tobacco smoking in Kampala and Lilongwe among adolescents was 5.6% and 6.2% (p >0.05) respectively. However, adolescents in Lilongwe were statistically significantly more likely to have ever smoked, use other tobacco products and perceived themselves as likely to initiate smoking in the coming year. Exposure to tobacco-related advertisements through billboards, newspapers and magazines was high in both settings. **Conclusion:** Adolescents are increasingly being exposed to tobacco and tobacco-related...
advertisements in Lilongwe, Malawi and Kampala, Uganda. There is need to enhance tobacco prevention efforts in developing nations.

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**Introduction:** In sub-Saharan Africa, little is known about the damage to respiratory health caused by biomass smoke and tobacco smoke. We assessed the prevalence of chronic obstructive pulmonary disease (COPD) and related risk factors in a rural region of Uganda. **Methods:** We did this prospective observational cross-sectional study in rural Masindi, Uganda. We randomly selected people above the age of 30 years from 30 villages. Trained local health-care workers asked validated questionnaires and administered spirometry to participants. We defined COPD as FEV1: FVC less than the lower limit of normal. We calculated prevalence of COPD and tested its association with risk factors. **Results:** Between April 13, and Aug 14, 2012, we invited 620 people to participate, of whom 588 provided acceptable spirometry and were analysed. Mean age was 45 years (SD 13·7); 297 (51%) were women. 546 (93%) were exposed to biomass smoke. The prevalence of COPD was 16-2% (15-4% in men, 16-8% in women). Prevalence was highest in people aged 30-39 years (17 [38%] of 45 men, 20 [40%] of 50 women). 20 (44%) of 45 men with COPD were current smokers (mean age 40 years, SD 7-5), 11 (24%) were former smokers (mean age 49 years, SD 11-0); four [8%] of 50 women were current smokers (mean age 52 years, SD 18-1), nine (18%) were former smokers (mean age 64 years, SD 16-2). Mean Clinical COPD Questionnaire score was 0·81 (SD 0-78), mean Medical Research Council dyspnea score was 1·33 (SD 0-65); 28 (30%) of 95 patients had had one or more exacerbations past 12 months. COPD was associated with wheeze (odds ratio 2·17, 95% CI 1·09-4·34; p=0·028) and being a former smoker (1·96, 1·07-3·59; p=0·029). **Conclusion:** In this rural district of Uganda, COPD starts early in life. Major risk factors were biomass smoke for both sexes and tobacco smoke for men. In addition to high smoking prevalence in men, biomass smoke could be a major health threat to men and women in rural areas of Uganda.

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**Data sources**
- Global Health Professions Student Survey (2005)

**Country-specific needs/attention**
The Control of Smoking in Public Places Regulations- The smoke free regulations do not conform to the standards of the Article 8 Guidelines. The smoke free law is not comprehensive, as it allows for DSRs and has ventilation provisions. The law is not well enforced. Funds, public awareness campaigns and research is needed for implementing smoke free policies.
Zambia


**Introduction:** Our objective was to evaluate the content of school textbooks as a tool to prevent tobacco use in developing countries. **Methods:** Content analysis was used to evaluate if the textbooks incorporated the following five core components recommended by the WHO: (1) consequences of tobacco use; (2) social norms; (3) reasons to use tobacco; (4) social influences and (5) resistance and life skills. Setting: Nine developing countries: Bangladesh, Cambodia, Laos, Nepal, Sri Lanka, Benin, Ghana, Niger and Zambia. Of 474 textbooks for primary and junior secondary schools in nine developing countries, 41 were selected which contained descriptions about tobacco use prevention. **Results:** Of the 41 textbooks, the consequences of tobacco use component was covered in 30 textbooks (73.2%) and the social norms component was covered in 19 (46.3%). The other three components were described in less than 20% of the textbooks. **Conclusion:** A rather limited number of school textbooks in developing countries contained descriptions of prevention of tobacco use, but they did not fully cover the core components for tobacco use prevention. The chance of tobacco prevention education should be seized by improving the content of school textbooks.

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**Introduction:** Tobacco use is the leading cause of noncommunicable disease morbidity and mortality. Most smokers initiate the smoking habit as adolescents or young adults. **Methods:** Survey data from the 2007 Lusaka (Zambia) Global Youth Tobacco Survey were used to estimate the prevalence of current cigarette smoking and assess whether exposure to pro-tobacco media and perception of the potential harm of secondhand smoke are associated with adolescents’ smoking. Logistic regression analysis was used to estimate the associations. **Results:** Altogether, 2378 students, of whom 56.8% were females, participated in the study. Overall, 10.5% of the students (9.3% among males and 12.1% among females) smoked cigarettes in the 30 days prior to the survey. Students who favored banning smoking in public places were 33% (OR = 0.67; 95% CI [0.47, 0.96]) less likely to smoke cigarettes compared to those who were not in favor of the ban.
Appendix – Country-specific information: Tobacco

Seeing actors smoking in TV shows, videos or movies was positively associated with smoking (OR = 1.90; 95% CI [1.26, 2.88]). However, possessing an item with a cigarette brand logo on it, seeing advertisements of cigarettes on billboards and being ever offered a free cigarette by a cigarette sales representative were negatively associated with smoking (OR=0.39, 95% CI [0.26, 0.58]; OR=0.63, 95% CI [0.43, 0.92]; and OR=0.43, 95% CI [0.29, 0.65], respectively). Conclusion: Findings from this study indicate that TV advertisement-promotion-sponsorship was positively associated with smoking, while it was the opposite with other forms of advertisement; there is a need for further studies.

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Introduction: Our objective was to study pregnant women’s knowledge, attitudes and behaviors towards tobacco use and secondhand smoke (SHS) exposure, and exposure to advertising for and against tobacco products in Zambia and the Democratic Republic of the Congo (DRC). Design: Prospective cross-sectional survey between November 2004 and September 2005. Setting: Antenatal care clinics in Lusaka, Zambia, and Kinshasa, DRC. Population: Pregnant women in Zambia (909) and the DRC (847). Methods: Research staff administered a structured questionnaire to pregnant women attending antenatal care clinics. Main Outcome Measures: Pregnant women’s use of tobacco, exposure to SHS, knowledge of the harms of tobacco and exposure to advertising for and against tobacco products. Results: Only about 10% of pregnant women reported ever having tried cigarettes (6.6% Zambia; 14.1% DRC). However, in the DRC, 41.8% of pregnant women had tried other forms of tobacco, primarily snuff. About 10% of pregnant women and young children were frequently or always exposed to SHS. Pregnant women’s knowledge of the hazards of smoking and SHS exposure was extremely limited. About 13% of pregnant women had seen or heard advertising for tobacco products in the last 30 days. Conclusion: Tobacco use and SHS exposure pose serious threats to the health of women, infants and children. In many African countries, maternal and infant health outcomes are often poor and will likely worsen if maternal tobacco use increases. Our findings suggest that a ‘window of opportunity’ exists to prevent increased tobacco use and SHS exposure of pregnant women in Zambia and the DRC.

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Data sources
- Global Health Professions Student Survey (2009)

Experts
- Dr Nivo Ramanandraibe, Technical Officer, Tobacco Control, WHO Regional Office for Africa, Tel: + (47 241) 39 371, E-mail: ramanandraiben@who.int
### Appendix – Country-specific Information: Tobacco

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| More girls smoke in Zambia than on average in middle-income countries, understanding factors that influence such disparity in tobacco use. | - WHO Report on the Global Tobacco Epidemic, 2015- Country Profile: [www.who.int/tobacco/surveillance/policy/country_profile/zmb.pdf?ua=1](www.who.int/tobacco/surveillance/policy/country_profile/zmb.pdf?ua=1)  
- Tobacco-Free Association of Zambia (TOFAZA)                                                                 |

### SEARO/WPRO Region

### Bangladesh


**Introduction:** Our objective was to examine the perceived effectiveness of text and pictorial smokeless tobacco health warnings in India and Bangladesh, including different types of message content. **Methods:** An experimental study was conducted in Navi Mumbai, India (n=1002), and Dhaka, Bangladesh (n=1081). Face-to-face interviews were conducted on tablets with adult (≥19 years) smokeless tobacco users and youth (16-18 years) users and non-users. Respondents viewed warnings depicting five health effects, within one of the four randomly assigned warning label conditions (or message themes): (1) text-only, (2) symbolic pictorial, (3) graphic pictorial or (4) personal testimonial pictorial messages. **Results:** Text-only warnings were perceived as less effective than all of the pictorial styles (p<0.001 for all). Graphic warnings were given higher effectiveness ratings than symbolic or testimonial warnings (p<0.001). No differences were observed in levels of agreement with negative attitudes and beliefs across message themes, after respondents had viewed warnings. **Conclusion:** Pictorial warnings are more effective than text-only messages. Pictorial warnings depicting graphic health effects may have the greatest impact, consistent with research from high-income countries on cigarette warnings.

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Abstract: The MPOWER policy package enables countries to implement effective, evidence-based strategies to address the threat posed to their population by tobacco. All countries have challenges to overcome when implementing tobacco control policy. Some are generic such as tobacco industry efforts to undermine and circumvent legislation; others are specific to national or local context. Various factors influence how successfully challenges are addressed, including the legal-political framework for enforcement, public and administrative attitudes towards the law, and whether policy implementation measures are undertaken. This paper examines District Tobacco Control Taskforces, a flexible policy mechanism developed in Bangladesh to support the implementation of the Smoking and Tobacco Products Usage (Control) Act 2005 and its 2013 Amendment. At the time of this study published research and/or data was not available and understanding about these structures, their role, contribution, limitations and potential, was limited. We consider Taskforce characteristics and suggest that the "package" comprises a distinctive tobacco control implementation model. Qualitative data is presented from interviews with key informants in ten districts with activated taskforces (n = 70) to provide insight from the perspectives of taskforce members and non-members. In all ten districts taskforces were seen as a crucial tool for tobacco control implementation. Where taskforces were perceived to be functioning well, current positive impacts were perceived, including reduced smoking in public places and tobacco advertising, and increased public awareness and political profile. In districts with less well established taskforces, interviewees believed in their taskforce's 'potential' to deliver similar benefits once their functioning was improved. Recommendations to improve functioning and enhance impact were made. The distinctive taskforce concept and lessons from their development may provide other countries with a flexible local implementation model for tobacco control.

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Introduction: Dual use of tobacco (using smoking and smokeless forms) in Bangladesh is uncommon in women but common in men. Dual users are at additional risk of cancers and heart diseases compared with a single form of tobacco use. Knowledge about their socioeconomic background is necessary for planning appropriate interventions. We report here socioeconomic background of the dual users of tobacco from a nationally representative survey. Methods: The study adopted a probability proportionate to size sampling technic of divisional population stratified into urban and rural areas to recruit men aged 25 years or older from their households. A total of 4312 men were recruited. Variables included questions on 20 household assets, tobacco use and other behavioral risk factors, and measurement of body weight and height. Results: The average age of dual users was 46.7 years old compared to 43.4 and 52.3 years for smokers and smokeless tobacco users. Prevalence of "smoking only," "smokeless only" and "dual use" of tobacco was 40.6%, 15.2%, and 14.2%, respectively. Among all tobacco users, dual users constituted 20%. These dual users had lower educational achievement, rural residence, lower intake of fruit, and higher intake of alcohol. They were more undernourished as indicated by a
thin body mass index compared to nonusers and smokers. Dual users were of socioeconomically deprived as measured by wealth quartiles constructed out of household assets. **Conclusion:** Dual use of tobacco is common in Bangladesh, and it is intimately linked with socioeconomic deprivation. Poverty reduction strategy and campaigns should address tobacco control not only tobacco in general, but its dual use in particular.

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**Introduction:** The population of Bangladesh is highly susceptible to secondhand smoke (SHS) exposure due to high smoking rates and low awareness about the harmful effects of SHS. This study aims to determine the prevalence of SHS exposure and highlight the essential determinants in developing successful strategies to prevent adverse health effects in Bangladesh. **Methods:** The analysis is based on the Bangladesh Demographic Health Survey 2011, in which 17,749 women in the reproductive age group (12-49 years) were included. The information regarding SHS exposure at home was derived from the question: "How often does anyone smoke inside your house?" The variable was recoded into 3 groups: daily exposure, low exposure (exposed weekly, monthly, or less than monthly), and no SHS exposure. We performed descriptive and bivariable analyses and multinomial logistic regression. **Results:** A total of 46.7% of the women reported high exposure to SHS at home. According to the multinomial logistic regression model, relatively lower education and lower wealth index were significantly associated with daily SHS exposure at home. The exposure differed significantly between the divisions of Bangladesh. Having children at home (vs. not) and being Islamic (compared to other religious affiliations) were protective factors. **Conclusion:** The study indicates that women from socioeconomically disadvantaged households are more likely to experience daily exposure to SHS at home. Therefore, especially these groups have to be targeted to reduce tobacco consumption. In addition to aspects of legislation, future strategies need to focus educational aspects to improve the population's health status in Bangladesh.

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**Data sources**
- GAS (2009)

**Experts**
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- Abu S Abdullah, School of Public Health, Guangxi Medical University, China. E-mail: asm.abdullah@graduate.hku.hk
- Dhirendra N Sinha. Regional Adviser, Surveillance, (Tobacco Control), Tobacco Free Initiative Unit, Regional Office for South-East Asia, WHO, New Delhi. E-mail: sinhad@who.int
Country-specific needs/attention

More people use smokeless tobacco in Bangladesh than on average in low-income countries. Smoking Prohibition Act 26 was approved in March 2005 and took effect in 2006. It includes a ban on smoking in public places, but does not cover many places – schools, hospitals, governmental and non-governmental institutions, public transport with one carriage (and waiting areas), shopping malls, covered sports areas. Smoking areas are allowed.

Needs:
- Projects to promote the enforcement and amendment of national tobacco control legislation in order to achieve full compliance with the FCTC
- Projects to strengthen Bangladeshi tobacco control through Government-NGO cooperation for improved FCTC implementation

Country-specific information


Public health campaign/programs

- Bangladesh "Death Clock" Anti-Smoking Campaign: [https://www.youtube.com/watch?v=QPRw5isK7ok](https://www.youtube.com/watch?v=QPRw5isK7ok)
- Anti-smoking campaign: [www.connectbangladesh.org/new/content/view/288/189/](http://www.connectbangladesh.org/new/content/view/288/189/)
- Bangladesh Anti Tobacco Alliance
- The first national tobacco control mass media campaign was launched in Bangladesh on World No Tobacco Day - May 31, 2011: [http://worldlungfoundation.org/ht/d/sp/i/17834/pid/17834%20](http://worldlungfoundation.org/ht/d/sp/i/17834/pid/17834%20)

China


**Abstract:** The non-communicable disease burden in China is enormous, with tobacco use a leading risk factor for the major non-communicable diseases. The prevalence of tobacco use in men is one of the highest in the world, with more than 300 million smokers and 740 million non-smokers exposed to second-hand smoke. In the past decade public awareness of the health hazards of tobacco use and exposure to second-hand smoke has grown, social customs and habits have changed, aggressive tactics used by the tobacco industry have been revealed, and serious tobacco control policies have been actively promoted. In 2014, national legislators in China began actively considering national bans on smoking in public and work places and tobacco advertising. However, tobacco control in China has remained particularly difficult because of interference by the tobacco industry. Changes to the interministerial coordinating mechanism for implementation of the WHO Framework Convention on Tobacco Control are now crucial. Progress towards a tobacco-free world will be dependent on more rapid action in China.

Introduction: This study was to identify factors limiting the implementation of smoking policies in county-level hospitals. Methods: We conducted qualitative interviews (17 focus groups discussions and 6 one-to-one in depth interviews) involving 103 health professionals from three target county-level hospitals. A combination of purposive and convenience sampling was used to recruit subjects and gain a broad range of perspectives on issues emerging from ongoing data-analysis until data saturation occurred. The transcripts were analyzed for themes and key points. Results: The main themes that emerged suggested that both smokers and non-smokers viewed smoking very negatively. However, it was clear that, underlying this acceptance of the health risks of smoking, there was a wide range of beliefs. Most of the health professionals pointed out that, as smoking was legal, addictive, and influenced by social norms, currently it was almost unrealistic to expect all smokers to give up smoking or not to smoke in the hospitals. Furthermore, they were concerned about the potentially detrimental effects of providing counseling advice to all smokers on the interpersonal relationship among colleagues or between doctors and patients. In addition, low level of employee participation influenced the sustainable implementation of smoking policies. Conclusion: Simply being aware of the health risks about smoking did not necessarily result in successful implementation of the smoking policies. Application of comprehensive intervention strategies such as implementing smoking policies in public places at the county level, creating supportive environments, promoting community participation, and conducting health education, may be more effective.


Introduction: Exposure to environmental tobacco smoke (ETS) is a widespread source of nicotine exposure, and an estimated 540 million Chinese are exposed to ETS in mainland China. We aimed to investigate associations of ETS exposure and metabolic syndrome (MetS) as well as its individual components independent of active smoking status in Chinese adults. Methods: A cross-sectional data of 304 randomly selected Chinese households with fourth (elementary school) and seventh (middle school) graders in Qingdao city was used. Assessments of fat mass, metabolic biomarkers, personal history of illness, and health behaviors were conducted. Results: Proportions of current smokers were 3% in women and 60.5% in men, and more men reported exposure to ETS 5-7 days per week than women (60.8% vs. 48.1%). Exposure to ETS was significantly associated with enhanced risks of MetS (odds ratio [OR] = 2.8, p = .01), hypertriglyceridemia (OR = 2.1, p = .02), and central obesity (OR = 2.7, p < .001) and reduced levels of high-density lipoprotein cholesterol (OR = 1.9, p = .02) and elevated mean levels of fasting insulin (p < .01). These observed associations were independent of active smoking status.
and were successfully replicated in female never-smokers. **Conclusion:** Results of our study support the hypothesis that ETS exposure is independently associated with MetS and its individual components. Further large-scale studies with longitudinal design and objective assessment of ETS exposure are needed to elucidate the underlying mechanisms and the causal effects of passive smoking on MetS. Findings of this work emphasize the importance of developing community intervention to reduce smoking, ETS, and promote healthy lifestyle.

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**Tobacco use among HIV-infected individuals in a rural community in Yunnan Province, China.**

**Introduction:** Our objective was to examine the prevalence and correlates of smoking versus tobacco chewing, and potential gender differences in tobacco use among HIV-infected individuals in a rural community in Yunnan Province, China. **Methods:** A cross-sectional design using face-to-face interviews. **Results:** Among the participants, 301 (66.2%) were male; 79 (17.4%) were ethnic Han, 310 (68.1%) were Jingpo minority, 62 (13.6%) were Dai minority; 17.8% had no formal education and 55.6% had only primary school education; 15.4% were never married; 40% reported drinking in the past 30 days; 55.4% had ever used drugs; and 67% were currently receiving antiretroviral therapy (ART). The mean age of the study participants was 38.1 years (SD=8.8). About 62% were current cigarette smokers. Current cigarette smoking was positively associated with being male (OR=142.43, 95% CI: 35.61-569.72) and current drinking (OR=7.64, 95% CI: 2.68-21.81), as well as having ever used drugs (OR=4.03, 95% CI: 1.31-12.35). Among current smokers, 67.6% were heavy smokers (smoked at least 20 cigarettes per day). Those who were older than 46 years of age (OR=9.68, 95% CI: 1.41-66.59) and current drinkers (OR=2.75, 95% CI: 1.56-4.83) were more likely to be heavy smokers. Approximately 9% were currently used chewing tobacco. Those who were female (OR=41.29, 95% CI: 8.53-199.93) and current drinkers (OR=3.22, 95% CI: 1.02-10.16) were more likely to use chewing tobacco. All who used chewing tobacco were ethnic minorities. **Conclusion:** Cigarette smoking and use of chewing tobacco were highly prevalent among HIV-infected individuals in rural Yunnan, underscoring the urgent need for tobacco prevention and intervention programs tailored for this population.

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**Data sources**
- The International Tobacco Control Policy Evaluation Project: [www.itcproject.org/countries/china](http://www.itcproject.org/countries/china)
- Data can be requested using forms: [www.itcproject.org/forms](http://www.itcproject.org/forms) and [http://data.worldbank.org/country/china](http://data.worldbank.org/country/china)

**Experts**
- Teh-wei Hu; Geoff Fong; Yuan Jiang

**Country-specific needs/attention**
Implement effective strategies to create smoke-free hospitals in China

**Country-specific information**
Appendix – Country-specific Information: Tobacco


• Another step change for tobacco control in China?

Public health campaign/ programs

The World Lung Foundation (WLF) advocated for the enforcement of stronger tobacco control laws in more than 43 cities in China: [www.worldlungfoundation.org/ht/d/sp/i/7217/pid/7217](http://www.worldlungfoundation.org/ht/d/sp/i/7217/pid/7217)

India


**Introduction:** The Global Adult Tobacco Survey (GATS) was carried out for systematically monitoring tobacco use and for tracking key tobacco control indicators. **Methods:** A total of 70,802 households, including 42,647 in rural areas and 28,155 in urban areas, were covered with a three stage sampling design. Data were collected on sociodemographic characteristics, knowledge, attitude and practices of tobacco consumption. **Results:** GATS-India highlighted that total tobacco use among its residents is overall 34.6%, varying for males (47.9%) and females (20.7%). The rural areas of the country exhibit comparatively higher prevalence rates (38.4%) in comparison to urban areas (25.3%). Overall, Khaini, a smokeless tobacco product (12.0%), is the most popular form of tobacco use among males and females, followed by bidi smoking (9.0%). **Conclusion:** Results of GATS data can be used as baseline for evaluation of new tobacco control approaches in India integrating culturally acceptable and cost effective measures.

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**Introduction:** Our objective was to examine the perceived effectiveness of text and pictorial smokeless tobacco health warnings in India and Bangladesh, including different types of message content. **Methods:** An experimental study was conducted in Navi Mumbai, India (n=1002), and Dhaka, Bangladesh (n=1081). Face-to-face interviews were conducted on tablets with adult (≥19 years) smokeless tobacco users and youth (16-18 years) users and non-users. Respondents viewed warnings depicting five health effects, within one of the four randomly assigned warning label conditions (or message themes): (1) text-only, (2) symbolic pictorial, (3) graphic pictorial or (4) personal testimonial pictorial messages. **Results:** Text-only warnings were perceived as less effective than all of the pictorial styles (p<0.001 for all). Graphic warnings were given higher effectiveness ratings than symbolic or testimonial warnings (p<0.001). No differences were observed in levels of agreement with negative attitudes and beliefs across message themes, after respondents had viewed warnings. **Conclusion:** Pictorial warnings are more effective than text-only messages. Pictorial warnings depicting graphic health effects may have the greatest impact, consistent with research from high-income countries on cigarette warnings.

Introduction: The nationwide effects of smoking on mortality in India have not been assessed reliably. Methods: In a nationally representative sample of 1.1 million homes, we compared the prevalence of smoking among 33,000 deceased women and 41,000 deceased men (case subjects) with the prevalence of smoking among 35,000 living women and 43,000 living men (unmatched control subjects). Mortality risk ratios comparing smokers with nonsmokers were adjusted for age, educational level, and use of alcohol. Results: About 5% of female control subjects and 37% of male control subjects between the ages of 30 and 69 years were smokers. In this age group, smoking was associated with an increased risk of death from any medical cause among both women (risk ratio, 2.0; 99% confidence interval [CI], 1.8 to 2.3) and men (risk ratio, 1.7; 99% CI, 1.6 to 1.8). Daily smoking of even a small amount of tobacco was associated with increased mortality. Excess deaths among smokers, as compared with nonsmokers, were chiefly from tuberculosis among both women (risk ratio, 3.0; 99% CI, 2.4 to 3.9) and men (risk ratio, 2.3; 99% CI, 2.1 to 2.6) and from respiratory, vascular, or neoplastic disease. Smoking was associated with a reduction in median survival of 8 years for women (99% CI, 5 to 11) and 6 years for men (99% CI, 5 to 7). If these associations are mainly causal, smoking in persons between the ages of 30 and 69 years is responsible for about 1 in 20 deaths of women and 1 in 5 deaths of men. In 2010, smoking will cause about 930,000 adult deaths in India; of the dead, about 70% (90,000 women and 580,000 men) will be between the ages of 30 and 69 years. Because of population growth, the absolute number of deaths in this age group is rising by about 3% per year. Conclusion: Smoking causes a large and growing number of premature deaths in India.

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Introduction: Our objective was to examine the relationship between tobacco advertisements, counter-advertisements, and smoking status among Indian youth. Methods: Global Youth Tobacco Survey (GYTS) data was used; the data encompassed a representative two-stage probability sample of 60,001 students aged 13-15 years in 24 states in India. These students were interviewed with an anonymous, self-administered questionnaire. Binary logistic regression analyses were performed with smoking status as the dependent variable, and exposure to cigarette advertisements or counter-advertisements as independent variables. Results: Students watching anti-smoking media messages were less likely to be current smokers, which was true for both boys [OR = 0.89, 95% CI (0.81-0.98)] and girls [OR = 0.79, 95% CI (0.69-.90)]. This relationship was stronger among past smokers for boys [OR = 0.56, 95%CI (0.52-0.60)] and girls [OR = 0.49, 95% CI (0.45-0.53)]. On the other hand, students who were exposed to cigarette brand names during sports events and other televised programs, newspapers or magazines, and being offered...
free cigarette or cigarette-branded merchandise promotions were significantly more likely to be smokers, with effects ranging from moderate (OR=1.19) to very strong (OR=3.83). Conclusion: This is the first attempt from India to investigate the relationship between smoking and advertising. When the data were collected, cigarette advertising was legal and highly correlated with smoking behavior. Today, indirect surrogate advertising still exists; future research should examine its effect, as it is likely to have the same impact as direct advertising on smoking behavior. Finally, counter-advertising has a protective effect on youth and may function as a cessation aid.

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**Linking Global Youth Tobacco Survey 2003 and 2006 data to tobacco control policy in India.**


**Introduction:** India made 2 important policy statements regarding tobacco control in the past decade. First, the India Tobacco Control Act (ITCA) was signed into law in 2003 with the goal to reduce tobacco consumption and protect citizens from exposure to secondhand smoke (SHS). Second, in 2005, India ratified the World Health Organization Framework Convention on Tobacco Control (WHO FCTC). During this same period, India conducted the Global Youth Tobacco Survey (GYTS) in 2003 and 2006 in an effort to track tobacco use among adolescents. **Methods:** The GYTS is a school-based survey of students aged 13-15 years. Representative national estimates for India in 2003 and 2006 were used in this study. **Results:** In 2006, 3.8% of students currently smoked cigarettes and 11.9% currently used other tobacco products. These rates were not significantly different than those observed in 2003. Over the same period, exposure to SHS at home and in public places significantly decreased, whereas exposure to pro-tobacco ads on billboards and the ability to purchase cigarettes in a store did not change significantly. **Conclusion:** The ITCA and the WHO FCTC have had mixed impacts on the tobacco control effort for adolescents in India. The positive impacts have been the reduction in exposure to SHS, both at home and in public places. The negative impacts are seen with the lack of change in pro-tobacco advertising and ability to purchase cigarettes in stores. The Government of India needs to consider new and stronger provisions of the ITCA and include strong enforcement measures.

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**Data sources**

- [http://apps.who.int/gho/data/node.country.country-IND?lang=en](http://apps.who.int/gho/data/node.country.country-IND?lang=en)
- GATS (2009)
- Information: [www.itcproject.org/surveys](http://www.itcproject.org/surveys)

**Experts**

Shrinath Reddy; Prabhakaran Dorairaj; Prakash Gupta ; Prabhat Jha

**Country-specific needs/attention**

- Identify cost effective and affordable strategies for quitting tobacco that could be made available across the whole community for example advice from health care professionals delivered in a variety of settings, including use of pharmacotherapy such as cytotisie at an operable cost
- Identify extent to which smoking in public places bans is enforced in rural areas. (ref# Sarkar BK, Reddy KS. *Priorities for tobacco control research in India. Addiction.* 2012;107(12):2066-8.)

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Country-specific Information

- India releases its Global Adult Tobacco Survey data: factsheet: www.who.int/tobacco/surveillance/en_tfi_india_gats_fact_sheet.pdf?ua=1
- www.itcproject.org/countries/india

Public health campaign/programs

- World Lung Foundation- India Health Communications Campaign: http://worldlungfoundation.org/ht/d/sp/i/11219/pid/11219
- www.worldlungfoundation.org/ht/display/ReleaseDetails/i/35773/pid/6858
- VHAI’s Resource Centre for Tobacco Free India: http://rctfi.org/goi_initiatives.htm
- http://rctfi.org/AdvocacyandCampaign.htm

Indonesia


Introduction: Community pharmacists play an important role in tobacco control and adequate training on smoking cessation is essential. Methods: A quasi-experimental pre-test/post-test design was used. A one-day workshop on smoking cessation organized by Indonesian Pharmacists Association as part of PCE program was offered to 133 community pharmacists. The workshop consisted of a 3-hour lecture and a 3-hour role-play session. Pre-training and post-training surveys assessed the impact of training on parameters including knowledge, perceived role and self-efficacy with respect to smoking cessation counseling practices. Intention and ability to perform counseling using the 5A framework was assessed after training only. Results: After PCE, knowledge score significantly increased from 24.9±2.58 to 35.7±3.54 (p<0.001). Perceived role and self-efficacy in smoking cessation counseling also significantly increased from 25.8±2.73 to 28.7±2.24, and 27.6±4.44 to 32.6±3.63, respectively (p<0.001). After the workshop, most participants were willing to ask, advise, and assess patients who ready to quit, but were still less likely to assist in quitting plans and arranging follow up counseling. More than 75% pharmacists were able to perform cessation counseling and 65% of them can completely perform a 5A brief intervention. Conclusion: PCE can enhance pharmacists' knowledge, perceived role, self-efficacy in cessation counseling practices, and create willingness and ability to perform cessation counseling. Future training is recommended to improve skills in assisting quitting plans and arranging follow up.

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**Introduction:** District policies were recently put into place in Indonesia prohibiting smoking in public spaces. This study sought to (1) assess participants' general knowledge of secondhand smoke (SHS) dangers; (2) assess participants' awareness of and specific knowledge of smoke-free (SF) policies; and (3) assess the extent to which such policies are socially enforced and gather examples of successful social enforcement. **Methods:** Qualitative in-depth interviews and focus group discussions were conducted in Bogor and Palembang cities with both community members and key informants such as government officials, non-government agency staff, religious leaders and health workers. **Results:** Participants in both Palembang and Bogor find SF policy important. Although there was awareness of SHS dangers and SF policies, accurate knowledge of the dangers and an in-depth understanding of the policies varied. There was a high level of support for the SF policies in both cities among both smokers and non-smokers. Many participants did have experience asking a smoker not to smoke in an area where it was restricted, even if their comfort in doing so varied. There was, however, a higher level of comfort in telling smokers to stop or to move away from pregnant women and children. Hesitation to socially enforce the policies was especially present when asking men of status and/or community leaders to stop smoking, but overall participants felt they could comfortably ask someone to obey the law. **Conclusion:** Palembang and Bogor may be evolving towards creating social norms in support of prohibiting smoking in public spaces. If provided with more support from government and law officials, such as government officials themselves promoting the policies and demonstrating compliance, and renewed efforts to promote and enforce policies in general were made, Indonesians in these cities may feel more confident protecting non-smokers from SHS.

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**Introduction:** The present qualitative study assessed the need, acceptability and appropriateness for implementing effective and culturally appropriate smoking prevention programs for adolescents in schools in of staff in the education department, junior high school teachers and individuals who had taught junior Indonesia. **Methods:** Snowball sampling was used to recruit participants. The study sample comprised a mixture high school students in Aceh Province, Indonesia. Data were collected through one hour in-depth face to face or telephone interviews and analyzed using a descriptive content analysis procedure. **Results:** School teachers and policy makers in education firmly supported the implementation of a school-based smoking prevention program in Aceh. An appropriate intervention for smoking prevention program in schools in Aceh should involve both health and Islamic based approaches, and be provided by teachers and external providers. Potential barriers to the program included smoker teachers and parents, time constraints of students and/or teachers, lack of teachers' ability, increase in students' load, the availability of tobacco advertising and sales, and lack of tobacco regulation and support from community and related departments. To increase program effectiveness, involvement of and coordination with other relevant parties are needed. **Conclusion:** The important stakeholders in Indonesian childhood education agreed that school-based smoking prevention program would be appropriate for junior high school students. An appropriate intervention for smoking prevention
program for adolescents in schools in Indonesia should be appropriate to participants' background and involve all relevant parties.

**Corresponding author:** Teuku Tahlil, Discipline of Public Health, School of Medicine, Flinders University, Australia. E-mail: teuku.tahlil@flinders.edu.au

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<td><strong>Introduction:</strong> School-based smoking prevention programs have been shown to increase knowledge of the negative effects of smoking and prevent tobacco smoking. The majority of evidence on effectiveness comes from Western countries. This study investigated the impact of school-based smoking prevention programs on adolescents' smoking knowledge, attitude, intentions and behaviors (KAIB) in Aceh, Indonesia. <strong>Methods:</strong> We conducted a 2x2 factorial randomized controlled trial among 7th and 8th grade students aged 11 to 14 years. Eight schools were randomly assigned to a control group or one of three school-based programs: health-based, Islamic-based, or a combined program. Students in the intervention groups received eight classroom sessions on smoking prevention education over two months. The KAIB impact of the program was measured by questionnaires administered one week before and one week after the intervention. <strong>Results:</strong> A total of 477 students participated (58% female, 51% eighth graders). Following the intervention, there was a significant main effect of the Health based intervention for health knowledge scores ($\beta = 3.9 \pm 0.6$, $p &lt; 0.001$). There were significant main effects of the Islamic-based intervention in both health knowledge ($\beta = 3.8 \pm 0.6$, $p &lt; 0.001$) and Islamic knowledge ($\beta = 3.5 \pm 0.5$, $p &lt; 0.001$); an improvement in smoking attitude ($\beta = -7.1 \pm 1.5$, $p &lt; 0.001$). The effects of Health and Islam were less than additive for the health and Islamic factors for health knowledge ($\beta = -3.5 \pm 0.9$, $p &lt; 0.01$ for interaction) and Islamic knowledge ($\beta = -2.0 \pm 0.8$, $p = 0.02$ for interaction). There were no significant effects on the odds of intention to smoke or smoking behaviors. <strong>Conclusion:</strong> Both Health and Islamic school-based smoking prevention programs provided positive effects on health and Islamic related knowledge respectively among adolescents in Indonesia. Tailoring program interventions with participants' religion background information may provide additional benefits to health only focused interventions.</td>
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<tr>
<td><strong>Corresponding author:</strong> Discipline of Public Health, School of Medicine, Flinders University, Adelaide, SA 5001, Australia. E-mail: <a href="mailto:teuku.tahlil@flinders.edu.au">teuku.tahlil@flinders.edu.au</a></td>
</tr>
</tbody>
</table>

| Data sources | • GYTS (2004)  
• GATS (2011) |
| Experts | • Dhirendra N Sinha. Regional Adviser, Surveillance, (Tobacco Control), Tobacco Free Initiative Unit, Regional Office for South-East Asia, World Health Organization, New Delhi. E-mail: sinhad@who.int  
• Krishna Palipudi, Global Tobacco Control Branch, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia, US. E-mail: gou8@cdc.gov, vyp7@cdc.gov |
| Public health campaign/ programs | Anti-tobacco campaign, launched in Jakarta, features Panjaitan - a victim of tobacco - to show how lives are ruined by smoking: |
Appendix – Country-specific Information: Tobacco


| Country-specific information | - Need laws approved by Parliament not just presidential decree  
- Ratification of FCTC  
- Enforcement issues of existing tobacco laws |

**Vietnam**


**Abstract:** In Vietnam, a pilot 'smoke-free hospital' model was implemented in nine hospitals in 2009-2010 to supply lessons learned that would facilitate a replication of this model elsewhere. This study aimed to assess smoking patterns among health professionals and to detect levels of second-hand smoke (SHS) exposure within hospital premises before and after the 'smoke-free hospital' model implementation. A pre- and post-intervention cross-sectional study was conducted in nine purposively selected hospitals. Air nicotine levels were measured using passive nicotine monitors; smoking evidence was collected through on-site observations; and smoking patterns were assessed through interviews with health workers. Despite the 'smoke-free hospital' intervention, smoking continued among health-care workers who were former smokers. Specifically, self-reported smoking prevalence significantly decreased post-intervention, but the number of daily cigarettes smoked at workplaces among male health workers remained unchanged. Post-intervention, smoking was more likely to take place outside buildings and cafeterias. However, air nicotine levels in the doctors' lounges and in emergency departments did not change post-intervention. Air nicotine levels at other sites decreased minimally. Tailored tobacco cessation programmes, targeting current smokers and mechanisms to enforce non-smoking, should be established to meet requirements of Vietnam's comprehensive National Tobacco Control Law effective in May 2013.

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**Barriers and facilitators to expanding the role of community health workers to include smoking cessation services in Vietnam: a qualitative analysis.** Shelley D, Nguyen L, Pham H, VanDevanter N, Nguyen N. *BMC Health Serv Res*. 2014 Nov 26; 14:606. PMCID: PMC4247125.

**Introduction:** Despite high smoking rates, cessation services are largely unavailable in Vietnam. This study explored attitudes and beliefs of community health workers (CHWs) towards expanding their role to include delivering tobacco use treatment (TUT), and potential barriers and facilitators associated with implementing a strategy in which health centers would refer patients to CHWs for cessation services. **Methods:** We conducted four focus groups with 29 CHWs recruited from four district community health centers (CHCs) in Hanoi, Vietnam. **Results:** Participants supported expanding their role saying that it fit well with their current responsibilities. They further endorsed the feasibility of serving as a referral resource for providers in local CHCs expressing the belief that CHWs were "more suitable than their clinical colleagues" to offer cessation assistance. The most frequently cited barrier to routinely offering...
cessation services was that despite enacting a National Tobacco Control Action plan, cessation is not one of the national prevention priorities. As a result, CHWs have not been "assigned" to help smokers quit by the Ministry of Health. Additional barriers included lack of training and time constraints. **Conclusion:** Focus groups suggest that implementing a systems-level intervention that allows providers to refer smokers to CHWs is a promising model for extending the treatment of tobacco use beyond primary care settings and increasing access to smoking cessation services in Vietnam. There is a need to test the cost-effectiveness of this and other strategies for implementing TUT guidelines to support and inform national tobacco control policies in Vietnam and other low- and middle-income countries.

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**Abstract:** The benefits of preventing smoking onset are well known, and even just delaying smoking onset conveys benefits. Tobacco control policies are of critical importance to low-income countries with high smoking rates such as Vietnam where smoking prevalence is greater than 55 % in young men between the ages of 25 and 45. Using a survey of teens and young adults, I conducted duration analyses to explore the impact of tobacco price on smoking onset. The results suggest that tobacco prices in Vietnam have a statistically significant and fairly substantial effect on the onset of smoking. Increases in average tobacco prices, measured by an index of tobacco prices and by the prices of two popular brands, are found to delay smoking onset. Of particular interest is the finding that Vietnamese youth are more sensitive to changes in prices of a popular international brand that has had favorable tax treatment since the late 1990s.

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**Introduction:** Building on its National Tobacco Control Policy initiated in 2000, Vietnam is currently considering introducing a comprehensive law to strengthen the implementation of tobacco control policy. This study analyses the positions of key stakeholders in the development of tobacco control legislation in the context of a largely state-owned industry, and discusses their implications for the policy process. **Methods:** Several qualitative methods were employed for the study including: literature review and documentary analysis; key informant interview; focus groups discussion; and key stakeholders survey. **Results:** The Ministry of Health, Ministry of Trade and Industry, and Ministry of Finance are key players in the tobacco control policy and legislation, representing competing bureaucratic interests over health, macro-economy and revenue. High-ranking officials, including the Communist Party and National Assembly members, take a rather relaxed position reflecting the low political stakes placed on tobacco issues. The state-owned tobacco industry is regarded as an important contributor to the government revenue and gross
domestic product, and the relative weight on health and socioeconomic issues placed by stakeholders determine their positions on tobacco control. Overall, short-term economic interests have more immediate influence in setting policy directions, with the consequences of health gains perceived as relegated to a distant future. This was reflected in the position of tobacco control advocates, including MOH, that presented with reluctance in insisting on some tobacco control strategies revealing a mixture attitude of concessions to the socioeconomic uncertainties and a sense of bargaining to win the strategies that are more likely to be accepted. **Conclusion:** The state-ownership of tobacco industry poses a major paradox within the government that benefits from manufacturing of tobacco products and is also responsible for controlling tobacco consumption. The perceptions of negative implications on government revenue and the macro-economy, coupled with the reluctance to challenge these issues from health perspective too directly, means that tobacco control has yet to secure itself a place on the priority policy agenda. The overall policy environment will shift in favor of tobacco control only if the economic framing can be challenged.

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|--------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Country-specific needs/ attention | • The rate of people obeying regulations on smoking bans in public areas was low  
• Identify strategies to prevent sale of cigarettes among children and youth |

**EMRO/EURO Region**

**Afghanistan**

**The burden of cigarette smoking among males in Kabul, Afghanistan.** Mohmand, KA; Sharifi, K; Bahram, A. *AFJPH.* Vol. 02 Issue 01 January 2014 21-25.

**Introduction:** Despite clear scientific evidence of the public health harm attributable to tobacco use, very little research has been conducted on the nature and magnitude of cigarette smoking in Afghanistan. Objective: The objective of this study was to assess the prevalence of cigarette smoking in the male population in Kabul, Afghanistan. **Methods:** Using probability proportionate to size (PPS) cluster sampling, a cross-sectional study was conducted in Kabul, Afghanistan in September and October of 2010. In total, 554 randomly selected men aged 15 years and older were interviewed. **Results:** The study findings indicated that 35.2% (95%CI, 31.2-39.2) of men aged 15 years and older were current smokers. Inclusive of all respondents, 85.4% (35.2% active smokers and 50.2% passive smokers) reported exposure to cigarette smoke. Respondents were more likely to smoke when they grew up in a family where family members smoked (adjusted OR,
2.2; 95% CI, 1.5–3.4) or reported having friends who smoked (adjusted OR, 7.08; 95% CI, 3.5–14.2). Among non-smoking respondents, 78.3% reported that they were exposed to secondhand smoke (35.6% at home, 56% on public transportation). **Conclusion:** Smoking prevention programs in Afghanistan should target early adolescence and consider the role of family and friends influences on smoking behaviors. Government should take measures to decrease smoking by increasing the price of cigarettes through increasing excise tax. Given the high prevalence of exposure to secondhand smoke, developing and enforcing policies to ban cigarette smoking at work and in public places are also a priority.

**Corresponding author:** Khalil Ahmad Mohmand; social and health development program (SHDP), Kabul, Afghanistan. E-mail: shdpkbal@gmail.com. Note: This is a local journal; to access: [http://anpha.af/wp-content/uploads/2014/07/afjph_2014_volume_2_issue_1.pdf](http://anpha.af/wp-content/uploads/2014/07/afjph_2014_volume_2_issue_1.pdf)


**Introduction:** Military service and combat exposure are risk factors for smoking. Although evidence suggests that veterans are interested in tobacco use cessation, little is known about their reasons for quitting, treatment preferences, and perceived barriers to effective tobacco use cessation treatment. Our study objective was to elicit perspectives of Iraq- and Afghanistan-era veterans who had not yet quit smoking post deployment to inform the development of smoking cessation services for this veteran cohort. **Methods:** We conducted 3 focus groups among 20 participants in October 2006 at the Durham Veterans Affairs Medical Center to explore issues on tobacco use and smoking cessation for Iraq- and Afghanistan-era veterans who continued to smoke post deployment. We used qualitative content analysis to identify major themes and organize data. **Results:** Veterans expressed the belief that smoking was a normalized part of military life and described multiple perceived benefits of smoking. Although veterans expressed a high level of interest in quitting, they listed several behavioral, situational, and environmental triggers that derailed smoking cessation. They expressed interest in such cessation treatment features as flexible scheduling, free nicotine replacement therapy, peer support, and family inclusion in treatment. **Conclusion:** Our results indicate that the newest cohort of veterans perceives smoking as endemic in military service. However, they want to quit smoking and identified several personal and environmental obstacles that make smoking cessation difficult. Our findings may inform programmatic efforts to increase successful quit attempts in this unique veteran population.

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<table>
<thead>
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<th>Data sources</th>
<th>Extrapolated data for smoking prevalence: <a href="http://www.cureresearch.com/smoking/stats-country.htm">www.cureresearch.com/smoking/stats-country.htm</a></th>
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<tbody>
<tr>
<td>Public health campaign/programs</td>
<td>Public awareness campaign on harms of second hand smoke starts in Kabul- In Kabul on the 15th of December 2013. The Afghanistan National Public Health Association (ANPHA) and the Organization of Afghan Alumni (OAA), in cooperation with the Afghan Ministry of Public Health (MoPH), created a 4-week campaign to raise awareness about the</td>
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**Country-specific needs/attention**
The country does not have well-defined regulation; the only ban levied is on advertisement. There is no age restriction for purchasing, or where to smoke. There is no real country level data to measure the prevalence (among adults) and mortality rate attributable to smoking in Afghanistan.

**Country-specific information**

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### Georgia


**Introduction:** This study aims to provide data on a public level of support for restricting smoking in public places and banning tobacco advertisements. **Methods:** A nationally representative multistage sampling design, with sampling strata defined by region (sampling quotas proportional to size) and substrata defined by urban/rural and mountainous/lowland settlement, within which census enumeration districts were randomly sampled, within which households were randomly sampled, within which a randomly selected respondent was interviewed. Setting: The country of Georgia, population 4.7 million, located in the Caucasus region of Eurasia. Participants: One household member aged between 13 and 70 was selected as interviewee. In households with more than one age-eligible person, selection was carried out at random. Of 1588 persons selected, 14 refused to participate and interviews were conducted with 915 women and 659 men. Outcome measures: Respondents were interviewed about their level of agreement with eight possible smoking restrictions/bans, used to calculate a single dichotomous (agree/do not agree) opinion indicator. The level of agreement with restrictions was analysed in bivariate and multivariate analyses by age, gender, education, income and tobacco use status. **Results:** Overall, 84.9% of respondents indicated support for smoking restrictions and tobacco advertisement bans. In all demographic segments, including tobacco users, the majority of respondents indicated agreement with restrictions, ranging from a low of 51% in the 13-25 age group to a high of 98% in the 56-70 age group. Logistic regression with all demographic variables entered showed that agreement with restrictions was higher with age, and was significantly higher among never smokers as compared to daily smokers. **Conclusion:** Georgian public opinion is normatively supportive of more stringent tobacco-control measures in the form of smoking restrictions and tobacco advertisement bans.

**Corresponding author:** Dr George D Bakhturidze. E-mail: iayd@yahoo.com

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**Country-specific information**
WHO Report on the Global Tobacco Epidemic, 2015- Country Profile-Georgia: [www.who.int/tobacco/surveillance/policy/country_profile/geo.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile/geo.pdf?ua=1)

**Public health campaign/programs**

**Introduction:** Tobacco use is considered one of the largest public health threats facing the world. The estimated number of current smokers in the world exceeds 1.3 billion, which means that one third of the world's population above 15 years are smokers. Smoking prevalence is increasing in the developing world but monitoring of this trend is poor in these countries. Studies on smoking in Iraq are scarce, with the current smoking prevalence rate reported to be 15-25% for males and 1-10% for females in surveys conducted in the past ten years. Objectives: This study aimed to find the prevalence of smoking among Karbala University students in Iraq and determine its associations with participants' demographic and other related predictors, including other substance use behaviors, to help inform and develop future prevention and control programs.

**Methods:** A categorical random sample included 2298 students at Karbala University in Iraq who answered a self-completed questionnaire. The questionnaire was based on the Drug Abuse Program questionnaire and was piloted before implementation. Descriptive and analytic statistical tools (SPSS-20) were used to assess significant associations at P < 0.001 to compensate for multiple comparisons. **Results:** The prevalence of current smoking among Karbala University students was 10.5%, shisha smoking 4.4% and previous smoking (having ceased smoking for more than 30 days) 1.0%. Approximately half of the smokers surveyed (45.7%) started smoking before the age of 18. Smoking was positively related to male gender, increasing age, being unmarried, college, drinking alcohol, having a positive attitude toward smoking and higher fathers' educational level. **Conclusion:** Lifetime smoking prevalence was found to be approximately two out of ten students. Significant positive association was found between smoking and other substance use behaviours. Additionally it was associated with positive attitudes toward substance use. Significant predictors were determined. Further studies are needed to explore the prevalence of smoking among Iraqi youths to find trends and help to guide the implementation scientifically based control and prevention programs.

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**Abstract:** In 2008, Iraq's parliament ratified the World Health Organization Framework Convention on Tobacco Control (WHO FCTC), which obligates participants to establish tobacco use monitoring, surveillance, and evaluation systems. Lack of data on adolescent tobacco use in Iraq led the Ministry of Health (MOH) to conduct the Global Youth Tobacco Survey (GYTS) in Baghdad in 2008. GYTS is a school-based survey of students aged 13–15 years that is self-administered in classes in selected schools. As in most Middle East countries, tobacco use in Iraq takes the form of cigarettes and shisha. Based on GYTS results, 7.4% of students aged 13–15...
years reported having ever smoked cigarettes, 12.9% had ever smoked shisha, 3.2% currently smoked cigarettes, and 6.3% currently smoked shisha. Among never smokers aged 13--15 years, 13.0% reported they were likely to initiate cigarette smoking in the next year. Future declines in adolescent tobacco use in Iraq (and Baghdad) could be enhanced by expanding existing tobacco control programs to include prevention and cessation of the use of cigarettes and shisha, implementing measures that discourage adolescents who have never smoked from initiating tobacco use, expanding legislation to ban exposure to secondhand smoke in all indoor workplaces, and enacting legislation banning pro-tobacco advertising and sponsorship.


Abstract: Tobacco use is one of the major preventable causes of premature death and disease in the world. The Global Youth Tobacco Survey (GYTS), part of the Global Tobacco Surveillance System initiated by the World Health Organization (WHO), CDC, and the Canadian Public Health Association, was developed to monitor tobacco use, attitudes about tobacco, and exposure to secondhand smoke among youths and has been conducted in 140 countries. This report presents findings from the GYTS conducted in the Kurdistan region of Iraq (i.e., Irbil, as-Sulaymaniyyah, and Dahuk governorates) in 2005, which revealed that one in 10 students currently smoked cigarettes or used other tobacco products. Boys (21%) were statistically significantly more likely than girls (2.1%) to smoke cigarettes, but no significant difference was observed between boys and girls in their use of other tobacco products. Public health authorities in the Kurdistan Region of Iraq can use the baseline information from the GYTS to design and implement tobacco-control programs to reduce youth smoking.

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<th>Data sources</th>
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<td>• <a href="http://www.who.int/tobacco/surveillance/policy/country_profile/irq.pdf?ua=1">www.who.int/tobacco/surveillance/policy/country_profile/irq.pdf?ua=1</a>:</td>
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<td>• <a href="http://www.who.int/tobacco/media/en/Iraq.pdf">www.who.int/tobacco/media/en/Iraq.pdf</a></td>
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Kazakhstan


Introduction: Our aim was to analyse compliance of cigarette packets with the Framework Convention on Tobacco Control (FCTC) and national legislation and the policy actions that are required in eight former Soviet Union countries. Methods: We obtained cigarette packets of each of the 10 most smoked cigarette brands in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Russia and Ukraine. The packets were then analysed using a standardized data collection instrument. The analysis included the placing, size and content of health warning labels and deceptive labels (e.g., 'Lights'). Findings were assessed for compliance with the FCTC and national legislation. Results: Health warnings were on all packets from all countries and met the FCTC minimum recommendations on size and position except Azerbaijan and Georgia. All countries used a variety of warnings except Azerbaijan. No country had pictorial health warnings,
Appendix – Country-specific Information: Tobacco

despite them being mandatory in Georgia and Moldova. All of the countries had deceptive labels despite being banned in all countries except Russia and Azerbaijan where still no such legislation exists. Conclusion: Despite progress in the use of health warning messages, gaps still remain-particularly with the use of deceptive labels. Stronger surveillance and enforcement mechanisms are required to improve compliance with the FCTC and national legislation.

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Introduction: Our aim was to describe levels of knowledge on the harmful effects of tobacco and public support for tobacco control measures in nine countries of the former Soviet Union and to examine the characteristics associated with this knowledge and support. Methods: Standardized, cross-sectional nationally representative surveys conducted in 2010/2011 with 18 000 men and women aged 18 years and older in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine. Respondents were asked a range of questions on their knowledge of the health effects of tobacco and their support for a variety of tobacco control measures. Descriptive analysis was conducted on levels of knowledge and support, along with multivariate logistic regression analysis of characteristics associated with overall knowledge and support scores. Results: Large gaps exist in public understanding of the negative health effects of tobacco use, particularly in Azerbaijan, Kazakhstan, Kyrgyzstan and Moldova. There are also extremely high levels of misunderstanding about the potential effects of ‘light’ cigarettes. However, there is popular support for tobacco control measures. Over three quarters of the respondents felt that their governments could be more effective in pursuing tobacco control. Higher levels of education, social capital (membership of an organisation) and being a former or never-smoker were associated with higher knowledge on the health effects of tobacco and/or being more supportive of tobacco control measures. Conclusion: Increasing public awareness of tobacco’s health effects is essential for informed decision-making by individuals and for further increasing public support for tobacco control measures.

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Introduction: Our aim was to provide accurate and timely data on the determinants of smoking in countries of the former Soviet Union in order to facilitate the development of effective tobacco control policies in the region. Such data are urgently needed given the absence of accurate comparative data in the region and the recent changes experienced. Methods: Cross-sectional surveys using standardized methods and representative samples of the adult population in eight former Soviet Union countries conducted as part of the EU-Copernicus Project Living Conditions,
Appendix – Country-specific Information: Tobacco

Lifestyle, and Health study. Setting: Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine. Participants: A total of 18 428 adults aged 18 plus; response rates 71-88%. Measurements: The association of smoking with demographic and socio-economic factors was investigated using multiple logistic regression analyses, stratifying by gender. **Results:** Age was a strong determinant of smoking in both genders, with elderly individuals being less likely to smoke. Men who were more socially disadvantaged (less educated, poorer economic situation and/or less social support) were more likely to smoke. In women, living in larger urban areas was the strongest predictor of smoking. Divorced, separated or widowed women were also more likely to smoke than married women. Muslim respondents smoked less frequently compared with other respondents. **Conclusion:** Smoking is a major public health issue in the FSU particularly affecting socially vulnerable men and young women living in urbanized areas. These high-risk groups should be targeted in future smoking prevention and cessation strategies in the region.

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**Data sources**

**Country-specific information**

**Public health campaign/programs**
- [http://worldlungfoundation.org/ht/d/sp/i/20940/pid/20940](http://worldlungfoundation.org/ht/d/sp/i/20940/pid/20940)
- In Kazakhstan, Smoking's Not Just For Men Anymore: [www.rferl.org/content/kazakhstan-tobacco-women-smoking/24901025.html](http://www.rferl.org/content/kazakhstan-tobacco-women-smoking/24901025.html)

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**Morocco**

**Knowledge and attitude about antismoking legislation in Morocco according to smoking status.**

**Abstract:** Despite tobacco control legislation enacted in Morocco in 1996, the Moroccan population appears to have little interest in or awareness of tobacco control measures. This household survey aimed to assess knowledge and attitudes about tobacco legislation among Moroccans, according to their smoking status. A cross-sectional study was conducted on a random sample of 9195 Moroccans. Only 33.3% knew about the antismoking legislation: 38.7% of smokers versus 32.3% of non-smokers. Among the 3050 people who knew about the law, 60.1% knew about the ban on smoking in public areas and 22.4% knew there was an obligatory health warning on tobacco packaging. The attitude questions showed that 27.2% agreed that the price of tobacco products should increase sharply and 45.0% that antismoking legislation should prohibit tobacco sales to children. These data demonstrate low levels of information among Moroccans concerning current tobacco control legislation.

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Introduction: Motivations for cessation of smoking should be studied to determine which factors have an impact. Educational messages can then be developed to help smokers become more successful in adopting healthy behavior. The objective of our work was to determine the factors influencing the quality of motivation for smoking cessation among patients attending a lung disease clinic. Methods: Between March and June 2008, patients attending the outpatient clinical of the Moulay Youssef Hospital Department of Pneumology in Rabat were studied. Data on the smoking status and motivation to stop smoking (Richmond's test) were collected using a standardized questionnaire. A logistic regression model was developed to analyze the quality of their motivation to quit smoking. Results: The median age for smoking the first cigarette was low (<20 years); pharmacological dependence on nicotine was low (Fagerström score<8 in 71.8%). More than a third of patients (36.6%) had already intended to cease smoking. According to the Richmond test, only 46.0% were well motivated (score>or=8). At multivariate analysis, factors predictive of a good motivation to quit smoking were a previous attempt to stop smoking (OR=5.4 [2.5-11.7]), severe disease (OR=3.7 [1.6-8.2]). Beginning the tobacco addiction before the age of 18 years was predictive of poor motivation (OR=2.7 [1.4-5.3]). Conclusion: Our investigation provides evidence in favor of searching for different factors which might affect motivation to stop smoking among patients seeking care in a lung disease clinic. Lung specialists, who manage the large majority of these patients should be particularly active in this area.

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Introduction: We conducted a hospital-based case-control study that included 118 incident lung cancer cases and 235 age-, sex- and residence-matched controls. Methods: We analyzed the data using matched univariate and matched and unmatched multivariate logistic regression analyses. Results: Active tobacco smoking and history of chronic bronchitis were the strongest risk factors for lung cancer in the matched logistic regression model. Multivariate odds ratio (OR) and 95% confidence intervals varied from 1.79 (0.47-6.79) for former light smokers to 26.07 (6.58-103.27) for current heavy tobacco smokers at the time of disease occurrence. Combined use of hashish/kiff and snuff had an OR of 6.67 (1.65-26.90), whereas the OR for hashish/kiff (without snuff) was 1.93 (0.57-6.58). History of chronic bronchitis had an OR of 4.16 (1.76-9.85). Other slightly increased risks of lung cancer were found for exposure to passive smoking (1.36; 0.71-2.62), occupational exposures (1.75; 0.84-3.63), use of candles for lighting (1.44; 0.42-5.01), and poor ventilation of the kitchen (1.22; 0.57-2.58). Conclusion: This study confirms known risk factors for lung cancer and uncovers potential new etiologic ones such as the role of hashish/kiff.

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Introduction: Tobacco control measurements' had little impact on smoking prevalence in Morocco. The aim of this study is to provide first data on smoking attributable mortality in Morocco. Methods: The Smoking-Attributable Mortality, Morbidity and Economic Costs (SAMMEC) software was used to estimate the smoking attributable mortality (SAM) in Casablanca region in 2012. Smoking prevalence and mortality data of people aged 35 years or older were obtained from the national survey on tobacco "Marta" and from Health Ministry Mortality System, respectively. Results: Of the 5261 deaths of persons aged 35 years and older, 508 (9.7%) were attributable to cigarette smoking. This total represents 16.2% of all male deaths (n =448) and 2.0% (n =80) of all female deaths in this region. The leading four causes of smoking attributable deaths were lung cancer (177), chronic airways obstruction (76), ischemic heart disease (39), and cerebrovascular disease (31). Conclusion: Tobacco use caused one out of six deaths in Casablanca in 2012. Four leading causes (lung cancer, ischemic heart disease, cerebrovascular disease and chronic airways obstruction,) accounted for 51.6% of SAM. Effective and comprehensive actions must be taken in order to slow this epidemic in Morocco.

Corresponding author: Nabil Tachfouti, Laboratory of Epidemiology, Clinical Research and Community Health, Faculty of Medicine, Fez. E-mail: tachfoutinabil@yahoo.fr

<table>
<thead>
<tr>
<th>Country-specific needs/attention</th>
<th>There are smoke free provisions in health care and educational facilities, government facilities, indoor workplaces, but not restaurants and bars. Enforcement is weak.</th>
</tr>
</thead>
</table>
| Country-specific information     | • WHO Report on the Global Tobacco Epidemic, 2015- Country Profile-Morocco: [www.who.int/tobacco/surveillance/policy/country_profile_mar.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile_mar.pdf?ua=1)  
• Tobacco control law: [www.tobaccocontrollaws.org/legislation/country/morocco/summary](http://www.tobaccocontrollaws.org/legislation/country/morocco/summary) |
| Public health campaign/programs | Ran a national anti-tobacco campaign in 2011 and 2012 |

Pakistan


Introduction: Our objective was to assess Pakistani dentists' ability, willingness and perceived barriers to carry out tobacco cessation activities for their patients in the dental office. The study is limited to the smoking form of tobacco use. Methods: Using a structured questionnaire for a cross sectional study, 239 full time or part time practicing licensed dentists based in Islamabad and Rawalpindi were recruited by two sampling techniques; convenience and cluster sampling. Participation rate was 66.2%. Results: Based on the characteristics, the study population is assumed representative of the average Pakistani dentist. Prevalence of smoking amongst dentists was 20.3%. Only one-third rated their knowledge and ability regarding tobacco cessation messages as good/excellent. The majority of the dentists considered tobacco cessation activity as peripheral to their profession. The main barrier to performing tobacco cessation interventions was cited as gender. Conclusion: Dentists exhibit a superficial approach to delivery of smoking
cessation care. It is recommended that dentists be trained in delivering effective tobacco dependence intervention, using the WHO/FDI advocacy guide for oral health professionals, modified to incorporate gender oriented culturally sensitive doctor-patient interaction. Tobacco cessation clinics should also be set up in private and public sectors to augment the dentists' participation.

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**Can a community-based 'smoke-free homes' intervention persuade families to apply smoking restrictions at homes?** Alwan N, Siddiqi K, Thomson H, Lane J, Cameron I. *J Public Health (Oxf).* 2011 Mar;33(1):48-54. PMID:20930040

**Introduction:** Children are commonly exposed to second-hand smoke (SHS). The aim of this study is to evaluate the feasibility, acceptability and outcome of Smoke-Free Homes (SFH), a community-based intervention; and assess potential evaluation methods. **Methods:** SFH, designed to encourage families to implement smoking restrictions at home, was delivered over a period of 6 months through schools, healthcare settings and community events in Beeston, South Leeds, UK. It was evaluated using baseline and post-implementation surveys, focus group discussions and promise forms follow-up. **Results:** We surveyed 318 households before, and 217 households after, the intervention. The proportion of all surveyed households reporting being completely smoke free significantly increased from 35% [95% confidence interval (CI) 30, 40] at baseline to 68% (95% CI: 61, 74) 6 months post-implementation (P < 0.0001). Ninety per cent of people, followed-up by telephone 3 months after signing SFH promise form, said they were still keeping their promise. Focus group discussions with children and parents conveyed acceptability of the intervention, in particular, the schools element, where children are encouraged to discuss the concept of SFH with the adults in their households. **Conclusion:** Our study shows that SFH can be implemented effectively and has the potential to improve children's health through preventing exposure to SHS in the home.

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**Introduction:** An important way of reducing tobacco use is to train the health professional (HP) students to assist in tobacco cessation by educating patients and public. In order to shape their thoughts for the desired role, it is vital to understand their existing perceptions regarding HP's role in tobacco control. Thus, the aim of our study was to find out the perceptions of Pakistani HP students regarding their future role in tobacco control, and examine factors associated with negative perceptions. **Methods:** Secondary data analysis of the Global Health Professional Students Survey, Pakistan, 2011 was performed. Study population included 3445 health professional students in third year of graduate level programs. The dependent variable (perceptions of HP students), was developed using four questions from the survey. Students who
did not regard HP's role in tobacco control were labeled as having negative perceptions. Logistic regression analyses were conducted to analyze association between HP students' perceptions and various socio-demographic, attitudinal and knowledge related factors; and were reported as adjusted odds ratios with 95% confidence interval. **Results:** We found that 44.8% (n = 1542) of students do not regard HPs as role model for their patients and public, and perceive that HPs do not play an important part in patient’s quitting tobacco use. These negative perceptions were associated with male sex (OR = 1.25, 95% CI 1.02 - 1.53, p value 0.028), and poor knowledge about tobacco cessation techniques (OR = 1.32, 95% CI 1.12 - 1.55, p value < 0.001). Negative perceptions were also associated with their attitudes towards ban on: tobacco advertisements (OR = 1.67, 95% CI 1.13 - 2.48, p value 0.010); and tobacco use at public places (OR = 1.60, 95% CI 1.26 - 2.03, p value < 0.001). **Conclusion:** The role of HPs for tobacco control is fairly under-perceived by HP students, and the undesired negative perceptions are associated with male sex, poor knowledge about tobacco use cessation techniques and negative attitudes towards legislative control. A comprehensive approach, focusing on these aspects should be adopted to train HPs, in order to utilize them as an effective manpower for tobacco control.

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**Introduction:** Our objective was to explore the gender dimensions on influences of tobacco uptake on medical students using both qualitative and quantitative methods. **Methods:** A phased mixed-method study design was used with in-depth interviews followed by a survey questionnaire in a 'smoke-free' medical college campus in a private university of Karachi. Eight in-depth interviews were conducted to under-pin themes that were further used for developing the questionnaire. Tabulation and analysis of the quantitative data was done using SPSS software version 12. All the ethical issues for the research were taken into consideration. **Results:** One hundred and sixty-five (72 male, 93 female) students participated in the study. Mean age was 21.57 +/- 1.66 years. The survey results reported perceived reasons for male smoking as stress relief (74%), image (62%), companionship (54%), leisurely independence (46%) and male power and masculinity (44%). Among reasons for women for not smoking by the majority was that it was frowned upon (87%) while the reasons for smoking clustered around concepts of images (65%), western culture (66%), stress relief (51%) and advertising (36%). A large proportion (55%) of students felt bad and bothered by male and female smoking. **Conclusion:** Despite being medical students, the anti-tobacco future role models, traditional concepts of gender were frequently involved that explains smoking and non-smoking gendered behaviours.

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**Data sources**


**Country-specific needs/attention**

Monitoring the implementation of the tobacco control framework and identify barriers for its implementation including, development and
adoption of legislative measures for a comprehensive ban on tobacco promotion and advertisements, pictorial health warnings, raise in tobacco taxes and controlling smuggling of tobacco products

|----------------------------|---------------------------------------------------------------------------------------------------------------|

Public health campaign/ programs


Tajikistan


**Introduction:** Our objective was to describe the prevalence of current cigarette smoking and other tobacco use among 13-15year olds across 44 countries and 110 sites participating in the Global School-based Health Survey (GSHS), and compare these results with previous findings from the Global Youth Tobacco Survey. **Methods:** The GSHS is conducted in countries using standardized sampling and survey methodology procedures. Smoking and other tobacco use prevalence was compiled from fact sheets available on the GSHS web site from the available 110 sites where the survey has been conducted and resulting data processed. Tobacco use prevalence rates are weighted to adjust for the probabilities of nonresponse and varying probabilities of selection. Boy to girl ratios were calculated to examine gender differences in tobacco use prevalence. **Results:** Current smoking rates ranged widely from a low of approximately 1 in 100 students in Tajikistan and India to a high of more than 1 in 4 students in certain sites in Chile and Colombia, and more than 1 in 5 in other sites in Chile, Ecuador, Argentina, and Colombia. Other tobacco use prevalence ranged from a low of 1.0% in Hangzhou, China to a high of 43.7% in Northwest Namibia. **Conclusion:** This is the first multi-country, cross-national study of tobacco use involving GSHS data. Results provide an opportunity to examine youth tobacco use in several countries and compare results with the Global Youth Tobacco Survey (GYTS) which is a more extensive global surveillance of youth tobacco use.

**Corresponding author:** Randy M. Page, Department of Health Science, Brigham Young University, Provo, UT 84602, USA. E-mail: randy_page@byu.edu

<table>
<thead>
<tr>
<th>Data sources</th>
<th>Global health observatory data: <a href="http://www.who.int/gho/countries/tjk/en/">www.who.int/gho/countries/tjk/en/</a></th>
</tr>
</thead>
</table>
| Country-specific needs/ attention | • **Note:** The 2012 Tajikistan Demographic and Health Survey does not report smoking or tobacco use prevalence for adults  
• Examine feasibility for conducting GATS survey  
• Environmental scan of percent of Pack Covered with smoking related harm warning  
• Needs:  
  - Establish and sufficiently fund a national tobacco control program  
  - Develop strategies and programs to provide representative and transparent surveillance of rates of tobacco use and SHS exposure in adults and youths; health outcomes associated with tobacco should be assessed  
  - Investigate the extent of or impact of illicit or unregulated tobacco commerce |
- Enforce SHS laws and provide public health and educational campaigns about SHS
- Increase the access to smoking cessation programs in all appropriate health care facilities or institutions
- Increase access to treatment for tobacco dependence and tobacco-related health outcomes
- Provide means of economic or other social development aid to rural populations who are or previously were dependent on tobacco production

|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|

| Public health campaign/program | None recently but ran a national anti-tobacco campaign during 2011 and 2012 (Ref Tobacco atlas) |

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**PAHO Region**

**Belize**

**A cross-country comparison of the prevalence of exposure to tobacco advertisements among adolescents aged 13-15 years in 20 low and middle income countries.** Agaku IT, Adisa AO, Akinyamou AO, Agboola SO. *Tob Induc Dis.* 2013 May 23;11(1):11. PMCID: PMC3665668

**Introduction:** This study assessed the prevalence and influence of exposure to pro-tobacco advertisements among adolescents in 20 low and middle income countries (LMICs). **Methods:** The 2007-2008 Global Youth Tobacco Survey was analyzed for students aged 13-15 years in 20 LMICs. Overall and sex-specific prevalence of exposure to tobacco advertisements in several media, as well as the prevalence of smoking susceptibility (i.e., the lack of a firm commitment among never smokers not to smoke in the future or if offered a cigarette by a friend) were assessed. The variability of the point estimates was assessed using 95% confidence intervals (CI). Logistic regression was used to assess the effect of exposure to multiple (i.e., ≥2) pro-tobacco advertisements on current smoking, adjusting for age and sex (P < 0.05). Data were weighted and analyzed with Stata version 11. **Results:** Overall country-specific prevalence for different advertisement sources ranged as follows: movies/videos (78.4% in Lesotho to 97.8% in Belize); television programs (48.7% in Togo to 91.7% in the Philippines); newspapers/magazines (29.5% in Togo to 89.7% in the Philippines); and outdoor community events (30.6% in Rwanda to 79.4% in the Philippines). The overall proportion of never smokers who were susceptible to cigarette smoking ranged from 3.7% in Sri Lanka to 70.1% in Kyrgyzstan. Exposure to ≥2 sources of pro-tobacco advertisements was associated with significantly increased odds of cigarette smoking among adolescents in several countries including South Africa (adjusted odds ratio, aOR = 4.11; 95% CI:2.26-7.47), Togo (aOR = 3.77; 95% CI:1.27-11.21), the Former Yugoslav Republic of Macedonia (aOR = 1.42; 95% CI:1.01-1.99), Republic of Moldova (aOR = 1.53; 95% CI:1.11-2.12), Belize (aOR = 13.95; 95% CI:1.91-102.02), Panama (aOR = 5.14; 95% CI: 2.37-11.14) and Mongolia (aOR = 1.52; 95% CI:1.19-1.94). **Conclusion:** Prevalence of exposure to various pro-tobacco advertisements was high among adolescents in the LMICs surveyed. Enhanced and sustained
national efforts are needed to reduce exposure to all forms of tobacco advertising and promotional activities.

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### Data sources

- GHPSS (2009) nursing and pharmacy data available

### Country-specific needs/attention

The prevalence of smokeless tobacco use in Belize is not estimated, future surveillance efforts must measure smokeless tobacco use prevalence in the population to help inform future tobacco control efforts. Only some indoor workplaces are covered by national smoke free regulations. Some of the regulations are unwritten (MPOWER, WHO, 2008; INGCAT).

### Country-specific information

- WHO Report on the Global Tobacco Epidemic, 2015- Country Profile-Belize: [www.who.int/tobacco/surveillance/policy/country_profile/blz.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile/blz.pdf?ua=1)
- [www.who.int/tobacco/media/en/Belize.pdf](http://www.who.int/tobacco/media/en/Belize.pdf)

### Public health campaign/programs


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### Costa Rica


**Abstract:** The aim of this quantitative, descriptive, transversal study was to characterize drug use among students in the second year of the Nursing Degree course. The sample of 119 students answered a questionnaire divided into: general information, sociodemographic, economic, personal, familiar, sociocultural and drug usage. The study showed that students possess factors that protect them from drug usage and the acquisition of drug habits; but that they also have risk factors which must be taken into consideration in prevention programs, such as unhealthy life styles or drug abusage in people close to them (family, friends or classmates). We found that the profile of drugs used, containing both legal and illegal drugs, was similar to those in the national and international context. It is important to emphasize that even though the consumption of alcohol and tobacco occupy the highest places, in the student environment as well as nationally, these are not considered as problematic as the illegal drugs.

**Corresponding author:** Virima Leiva Diaz, Psychologist and Nurse, Master of Psychology, Associate Professor, School of Nursing, University of Costa Rica, Costa Rica. E-mail [Professorviriaml@yahoo.es](mailto:Professorviriaml@yahoo.es)

Introduction: Our objective was to examine the prevalence of asthma and the relation between tobacco use and asthma among university students in Costa Rica. Methods: Cross-sectional study of 1279 adolescents and young adults enrolled in careers in the health sciences in public and private universities in Costa Rica. Results: Of the 1279 study participants, 105 (8.2%) had current asthma, and 136 (10.6%) reported wheezing in the previous 12 months (current wheezing). Among individuals with either current wheezing or current asthma, none was using anti-inflammatory medications for asthma (e.g., inhaled corticosteroids). Approximately one third of the study participants reported any cigarette smoking. Young adults who had current wheezing were 5.8 times more likely to smoke at least 10 cigarettes per day than those who had no current wheezing [95% confidence interval (CI) for odds ratio (OR) = 3.3-10.2, p < 0.001]. Similar results were observed when an alternative definition of asthma (current asthma) was used in the analysis (OR for smoking at least 10 cigarettes per day = 4.4, 95% CI = 2.3-8.5, p < 0.001). Conclusion: Adequate public health measures are needed to prevent tobacco use in Costa Rican adolescents and to promote smoking cessation among young adults. Young adults with asthma living in Latin American countries with high asthma prevalence, such as Costa Rica, should be better educated with regard to asthma and the risks of tobacco use.

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Introduction: Our objective was to analyze the passage of Costa Rica's 2012 tobacco control law. Methods: Review of legislation, newspaper articles, and key informant interviews. Results: Tobacco control advocates, in close collaboration with international health groups, recruited national, regional and international experts to testify in the Legislative Assembly, implemented grassroots advocacy campaigns, and generated media coverage to enact strong legislation in March 2012 consistent with the World Health Organization Framework Convention on Tobacco Control, despite tobacco industry lobbying efforts that for decades blocked effective tobacco control legislation. Conclusion: Costa Rica’s experience illustrates how with resources, good strategic planning, aggressive tactics and perseverance tobacco control advocates can overcome tobacco industry opposition in the Legislative Assembly and Executive Branch. This determined approach has positioned Costa Rica to become a regional leader in tobacco control.

Corresponding author: Stanton A. Glantz, PhD. Center for Tobacco Control Research and Education. Room 366 Library, 530 Parnassus. San Francisco, CA 94143-13990. E-mail: ude.fscu.enicidem@zt nalg

Data sources

• Global School Personnel Survey (2008)
• Global Health Professions Student Survey (2006: Medical and nursing)

Country-specific needs/attention
Smoke free initiatives: Weak legislation. Only public transport is smoke free. Smoking restrictions in educational facilities, some indoor workplaces and public places such as cinemas, theatres, museums, hospitals, covered sports centers, all places intended primarily for the recreation of minors, and closed areas for collective use. Smoking areas are allowed. (INGCAT) (see www.geosalud.com/leyes/leyfumado.htm). Well enforced.

Country-specific information
WHO Report on the Global Tobacco Epidemic, 2015- Country Profile: www.who.int/tobacco/surveillance/policy/country_profile/cri.pdf?ua=1

Public health campaign/programs
Ran a national anti-tobacco campaign during 2011 and 2012: www.tobaccofreekids.org/press_releases/post/2012_03_23_costarica:

El Salvador


Introduction: Our objective was to estimate smoking prevalence by gender, describe patterns of cigarette use, and identify predictors of current smoking in reproductive-age adults in four Latin American countries. Methods: Self-reported smoking was examined using data from Reproductive Health Surveys of women aged 15-49 years in Ecuador (2004), El Salvador (2002-2003), Guatemala (2002), and Honduras (2001), and of men aged 15-59 years in El Salvador, Guatemala, and Honduras for the same years. Current smoking was assessed by demographic characteristics, and independent associations were examined using logistic regression. Data were weighted to be nationally representative of households with reproductive-age women and men.

Results: Current smoking prevalence ranged from 2.6% (Guatemala) to 13.1% (Ecuador) for women and from 23.1% (Guatemala) to 34.9% (El Salvador) for men. In Ecuador, 67.6% of female smokers were non-daily users; in other countries, daily use was more prevalent than non-daily use for both men and women. In daily users, the median number of cigarettes smoked per day ranged from 1.9 (Ecuador, Honduras) to 2.3 (Guatemala) for women and from 2.1 (Guatemala) to 3.6 (Honduras) for men. In bivariate analysis, smoking prevalence in all countries was highest in women who lived in urban areas, were previously married, and/or had high socioeconomic status. Risk factors for smoking varied by country and gender. Conclusion: National tobacco control programs in these countries should aggressively target high-risk populations (reproductive-age men) and maintain low prevalence in low-risk populations (reproductive-age women). More research is needed to understand addiction patterns in non-daily smokers.

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Country-specific needs/attention
Smoke free initiatives: Very little legislation, and not well enforced

Country-specific information
• www.who.int/tobacco/surveillance/policy/country_profile/slv.pdf?ua=1
• Tobacco atlas: www.tobaccoatlas.org/country-data/el-salvador/
Guatemala


**Abstract:** Adolescence is an important stage of life when health behaviors and attitudes are established. The purpose of this research was to assess health risk behaviors among Guatemalan students in both an urban and rural school. Items were adapted from the Global School-based Student Health Survey and were used to measure and compare the prevalence of risk behaviors between these two demographically and culturally distant school-based samples. In general, the prevalence of adolescent health risk behaviors in both schools was lower than other Latin American countries. Many health risk behaviors were associated with location (urban vs. rural settings) and/or gender. Tobacco use, alcohol use, and sexual activity were higher among urban students. Boys were more likely than girls to use alcohol, use tobacco, and be sexually active. In addition, the prevalence of mental health problems was higher among girls and rural students. These findings imply that measures should be taken to design effective and appropriate health strategies for adolescents attending these schools. Health promotion programs in schools and communities should assist the youth in developing positive health behaviors and cultivating healthy lifestyles in an effort to reduce risk behaviors among adolescent populations. Further research is needed to extend our understanding of risk factors of health behavior in these adolescent populations and to identify effective preventative approaches and strategies that specifically cater to the location and culture of the students.

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**Introduction:** Guatemala, a party to the Framework Convention on Tobacco Control (FCTC), is obliged to promote the wider availability of smoking cessation treatment and to restrict tobacco advertising. Pharmacies are fundamental in providing smoking cessation medications but also might increase the availability of cigarettes. **Purpose:** To assess availability of cessation medications and cigarettes and their corresponding advertising in Guatemala pharmacies. **Methods:** In Guatemala City a representative sample was selected from a list of registered pharmacies classified by type (non-profit, chain, independent). In addition, all pharmacies in the neighboring town of Antigua were included for comparison. Trained surveyors used a checklist to characterize each pharmacy with respect to availability and advertising of cessation medications and cigarettes. **Results:** A total of 505 pharmacies were evaluated. Cessation medications were available in 115 (22.8%), while cigarettes were available in 29 (5.7%) pharmacies. When available, medications were advertised in 1.7% (2) and cigarettes in 72.4% (21) of pharmacies. Chain pharmacies were significantly more likely to sell cessation medications and cigarettes, and to advertise cigarettes than were non-profit and independent pharmacies. **Conclusion:** Most pharmacies in Guatemala do not stock cessation medications or cigarettes. Cigarette advertising was more prevalent than advertising for cessation medications. FCTC provisions have not been implemented in Guatemala pharmacies.

**Author information:** Dr Joaquin Barnoya, Cardiovascular Unit of Guatemala, 5a avenida 6-22 zona 1 1 Guatemala, Guatemala City, Guatemala 01011. E-mail: jbarnoya@post.harvard.edu
Patterns and predictors of current cigarette smoking in women and men of reproductive age—Ecuador, El Salvador, Guatemala, and Honduras. Tong VT, Turcios-Ruiz RM, Dietz PM, England LJ. 

Introduction: Our objective was to estimate smoking prevalence by gender, describe patterns of cigarette use, and identify predictors of current smoking in reproductive-age adults in four Latin American countries. Methods: Self-reported smoking was examined using data from Reproductive Health Surveys of women aged 15-49 years in Ecuador (2004), El Salvador (2002-2003), Guatemala (2002), and Honduras (2001), and of men aged 15-59 years in El Salvador, Guatemala, and Honduras for the same years. Current smoking was assessed by demographic characteristics, and independent associations were examined using logistic regression. Data were weighted to be nationally representative of households with reproductive-age women and men. Results: Current smoking prevalence ranged from 2.6% (Guatemala) to 13.1% (Ecuador) for women and from 23.1% (Guatemala) to 34.9% (El Salvador) for men. In Ecuador, 67.6% of female smokers were non-daily users; in other countries, daily use was more prevalent than non-daily use for both men and women. In daily users, the median number of cigarettes smoked per day ranged from 1.9 (Ecuador, Honduras) to 2.3 (Guatemala) for women and from 2.1 (Guatemala) to 3.6 (Honduras) for men. In bivariate analysis, smoking prevalence in all countries was highest in women who lived in urban areas, were previously married, and/or had high socioeconomic status. Risk factors for smoking varied by country and gender. Conclusion: National tobacco control programs in these countries should aggressively target high-risk populations (reproductive-age men) and maintain low prevalence in low-risk populations (reproductive-age women). More research is needed to understand addiction patterns in non-daily smokers.

Corresponding author: Van T. Tong, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. E-mail: vtong@cdc.gov


Introduction: Our objective was to survey Honduran pre-adolescent knowledge, perceptions and experience regarding smoking. Methods: A 12-item survey was administered in the classroom to fifth and sixth grade students. The main outcome measures were a description of demographic factors, personal smoking experience, knowledge of health risks, attitudes about tobacco use and perceived sources of information. Results: A total of 225 students were surveyed. The majority were aware that smoking is bad for health, and most reported never having smoked. Most viewed smoking as ugly. Friends and family were selected as the major source of information. Conclusion: School children in this area of Honduras are aware of the health risks of smoking and view smoking as unattractive.

Corresponding author: Santa Cruz Medical Clinic, Santa Cruz, California, USA.
Appendix – Country-specific information: Tobacco

<table>
<thead>
<tr>
<th>Experts</th>
<th>Odessa Henriquez, Honduran Alliance for Tobacco Control. Colegio de Médicos, phone 232-6763/231-0518. E-mail: <a href="mailto:cmhhon@yahoo.com">cmhhon@yahoo.com</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public health campaign/programs</td>
<td>Ran a national anti-tobacco campaign during 2011 and 2012</td>
</tr>
</tbody>
</table>

Nicaragua


Introduction: Our objective was to describe the prevalence of noncommunicable disease (NCD) risk factors (overweight/obesity, tobacco smoking, and alcohol consumption) and identify correlations between these and sociodemographic characteristics in western and central Nicaragua. Methods: This was a cross-sectional study of 1,355 participants from six communities in Nicaragua conducted in September 2007-July 2009. Demographic and NCD risk-related health behavior information was collected from each individual, and their body mass index (BMI), blood pressure, diabetes status, and renal function were assessed. Data were analyzed using descriptive statistics, bivariate analyses, and (non-stratified and stratified) logistic regression models. Results: Of the 1,355 study participants, 22.0% were obese and 55.1% were overweight/obese. Female sex, higher income, and increasing age were significantly associated with obesity. Among men, lifelong urban living correlated with obesity (Odds Ratio [OR] = 4.39, 1.18-16.31). Of the total participants, 31.3% reported ever smoking tobacco and 47.7% reported ever drinking alcohol. Both tobacco smoking and alcohol consumption were strikingly more common among men (OR = 13.0, 8.8-19.3 and 15.6, 10.7-22.6, respectively) and lifelong urban residents (OR = 2.42, 1.31-4.47 and 4.10, 2.33-7.21, respectively). Conclusion: There was a high prevalence of obesity/overweight across all income levels. Women were much more likely to be obese, but men had higher rates of tobacco and alcohol use. The rising prevalence of NCD risk factors among even the poorest subjects suggests that an epidemiologic transition is underway in western and central Nicaragua whereby NCD prevalence is shifting to all segments of society. Raising awareness that health clinics can be used for chronic conditions needs to be priority. PMCID: PMC4387569.

Panama


Abstract: Tobacco use is the single most preventable cause of death in the world today, and the majority of smokers begin using tobacco products before age 18 years. However, before the late 1990s, few countries had reliable data on youth tobacco use. In 1999, the World Health Organization (WHO), CDC, and the Canadian Public Health Association developed the Global Youth Tobacco Survey (GYTS) to help countries monitor youth tobacco use. At the same time, WHO initiated the Framework Convention on Tobacco Control (WHO FCTC), the first international
public health treaty on tobacco control. Panama ratified WHO FCTC in 2004 and enacted two key anti-tobacco regulations in 2005 and 2008. To evaluate progress toward attaining tobacco control goals in Panama, Panama’s Ministry of Health, CDC, and WHO compared results from GYTS surveys conducted in Panama in 2002 and 2008. This report summarizes the results of that comparison, which revealed substantial decreases from 2002 to 2008 in youth current cigarette smoking (13.2% versus 4.3%), current use of tobacco products other than cigarettes (9.8% versus 5.8%), and likely initiation of smoking by never smokers (13.8% versus 10.0%). In addition, factors influencing tobacco use showed substantial decreases, including 1) exposure to secondhand smoke (SHS) at home and in public places, 2) best friends smoking, 3) pro tobacco advertising in newspapers and magazines, and 4) having an object with a tobacco company logo on it. These results suggest that comprehensive regulations in Panama helped reduce tobacco use among adolescents and further gains are possible.

| Data sources | • GATS (2013)  
• GYTS (2002) |
| Experts | Reina Roa, Coalition Against Tobacco Panama (COPACET) |
| Country-specific needs/attention | • Monitoring the implementation of smoke free laws  
• Impact of SF policies on youth and other population groups  
• Changes in consumption of tobacco or non-smoked tobacco products |
| Country-specific information | WHO Report on the Global Tobacco Epidemic, 2015- Country Profile:  
• [www.who.int/tobacco/surveillance/policy/country_profile/pan.pdf?ua=1](http://www.who.int/tobacco/surveillance/policy/country_profile/pan.pdf?ua=1)  
MATERNAL AND CHILD HEALTH

AFRO Region

Nigeria


Introduction: Utilization of maternal health services is associated with improved maternal and neonatal health outcomes. Considering global and national interests in the Millennium Development Goal and Nigeria’s high level of maternal mortality, understanding the factors affecting maternal health use is crucial. Studies on the use of maternal care services have largely overlooked community and other contextual factors. This study examined the determinants of maternal services utilization in Nigeria, with a focus on individual, household, community and state-level factors. Methods: Data from the 2005 National HIV/AIDS and Reproductive Health Survey - an interviewer-administered nationally representative survey - were analyzed to identify individual, household and community factors that were significantly associated with utilization of maternal care services among 2148 women who had a baby during the five years preceding the survey. In view of the nested nature of the data, we used multilevel analytic methods and assessed state-level random effects. Results: Approximately three-fifths (60.3%) of the mothers used antenatal services at least once during their most recent pregnancy, while 43.5% had skilled attendants at delivery and 41.2% received postnatal care. There are commonalities and differences in the predictors of the three indicators of maternal health service utilization. Education is the only individual-level variable that is consistently a significant predictor of service utilization, while socio-economic level is a consistent significant predictor at the household level. At the community level, urban residence and community media saturation are consistently strong predictors. In contrast, some factors are significant in predicting one or more of the indicators of use but not for all. These inconsistent predictors include some individual level variables (the woman’s age at the birth of the last child, ethnicity, the notion of ideal family size, and approval of family planning), a community-level variable (prevalence of the small family norm in the community), and a state-level variable (ratio of PHC to the population). Conclusion: Factors influencing maternal health services utilization operate at various levels - individual, household, community and state. Depending on the indicator of maternal health services, the relevant determinants vary. Effective interventions to promote maternal health service utilization should target the underlying individual, household, community and policy-level factors. The interventions should reflect the relative roles of the various underlying factors.

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Introduction: Efficacious strategies to improve maternal nutrition and subsequent maternal, neonatal, and child health exist, but their utilization and application at scale is limited. Objective. This study explored the gaps, barriers, and opportunities for maternal nutrition policy and programming in Nigeria, a country with a disproportionate share of the global burden of maternal and child mortality. Methods: Research was conducted in three phases in four Local Government Authorities in Taraba State. Phase 1 consisted of a desk review of policies, programs, and socio-demographic and health indicators pertinent to maternal nutrition. In-depth interviews were conducted with key informants in state and local ministries of health as well as international nongovernmental organizations and community- and faith-based organizations. Phase 2 utilized in-depth interviews and focus group discussions with community leaders, health promoters, and mothers. Phase 3 consisted of key informant interviews with federal policy and program leaders in government ministries and nongovernmental organizations. Results: Nutrition, especially maternal nutrition, is not prioritized and is poorly funded in both the governmental and the nongovernmental systems. Perceived weak advocacy for nutrition and its role in economic development and the lack of coordination among governmental and nongovernmental actors were said to contribute to low prioritization. Dependence on health facilities as the primary platform for delivering maternal nutrition is problematic, given severe resource constraints and perceived community barriers, including cost, distance, and poor quality of care. Conclusion: Advocacy for maternal nutrition that improves understanding of its consequences for health and economic development could hasten prioritization, coordination, and investment in maternal nutrition at the national, state, and local levels. Innovative, multisectoral strategies that move beyond facility-based platforms are needed to reduce the burden of maternal undernutrition in Northeast Nigeria.

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Introduction: Reducing preventable medical causes of neonatal death for faster progress toward the MGD4 will require Cameroon to adequately address the social factors contributing to these deaths. The objective of this paper is to explore the social, behavioral and health systems determinants of newborn death in Doume, Nguelemendouka and Abong–Mbang health districts, in Eastern Region of Cameroon, from 2007–2010. Methods: Data come from the 2012 Verbal/Social Autopsy (VASA) study, which aimed to determine the biological causes and social, behavioral and health systems determinants of under-five deaths in Doume, Nguelemendouka and Abong–Mbang health districts in Eastern Region of Cameroon. The analysis of the data was guided by the review of the coverage of key interventions along the continuum of normal maternal and newborn care and by the description of breakdowns in the care provided for severe neonatal illnesses within the Pathway to Survival conceptual framework. Results: One hundred sixty-four newborn deaths were confirmed from the VASA survey. The majority of the deceased newborns were living in households with poor socio-economic conditions. Most (60–80%)
neonates were born to mothers who had one or more pregnancy or labor and delivery complications. Only 23% of the deceased newborns benefited from hygienic cord care after birth. Half received appropriate thermal care and only 6% were breastfed within one hour after birth. Sixty percent of the deaths occurred during the first day of life. Fifty-five percent of the babies were born at home. More than half of the deaths (57%) occurred at home. Of the 64 neonates born at a health facility, about 63% died in the health facility without leaving. Care seeking was delayed for several neonates who became sick after the first week of life and whose illnesses were less serious at the onset until they became more severely ill. Cost, including for transport, health care and other expenses, emerged as main barriers to formal care-seeking both for the mothers and their newborns. **Conclusion:** This study presents an opportunity to strengthen maternal and newborn health by increasing the coverage of essential and low cost interventions that could have saved the lives of many newborns in eastern Cameroon.

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### Data sources

- Nigeria Demographic and Health Survey (NDHS)
- National HIV/AIDS and Reproductive Health Survey
- Nigeria Food Consumption and Nutrition Survey

### Experts

Fatusi, A

### Country-specific needs/attention

- High maternal mortality rate
- Newborn mortality

### Country-specific information


### Public health campaign/programs

- Nigeria-Gates Institute for Population and Reproductive Health
- USAID’s Maternal and Child Health Integrated Program in Nigeria

### Kenya

**Individual and contextual determinants of adequate maternal health care services in Kenya.**


**Abstract:** This study aimed to examine individual and community level factors associated with adequate use of maternal antenatal health services in Kenya. Individual and community level factors associated with adequate use of maternal health care (MHC) services were obtained from the 2008-09 Kenya Demographic and Health Survey data set. Multilevel partial-proportional odds logit models were fitted using STATA 13.0 to quantify the relations of the selected covariates to adequate MHC use, defined as a three-category ordinal variable. The sample consisted of 3,621 women who had at least one live birth in the five-year period preceding this survey. Only 18 percent of the women had adequate use of MHC services. Greater educational attainment by the woman or her partner, higher socioeconomic status, access to medical insurance coverage, and greater media exposure were the individual-level factors associated with adequate use of MHC services. Greater community ethnic diversity, higher community-level socioeconomic status, and
greater community-level health facility deliveries were the contextual-level factors associated with adequate use of MHC. To improve the use of MHC services in Kenya, the government needs to design and implement programs that target underlying individual and community level factors, providing focused and sustained health education to promote the use of antenatal, delivery, and postnatal care.

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**Introduction:** Our objective was to identify factors associated with repeat pregnancy subsequent to an index pregnancy among women living with HIV (WLWH) in western Kenya who were enrolled in a 24-month phase-II clinical trial of triple-ART prophylaxis for prevention of mother-to-child transmission, and to contextualize social and cultural influences on WLWH’s reproductive decision making. **Methods** A mixed-methods approach was used to examine repeat pregnancy within a 24 month period after birth. Counselor-administered questionnaires were collected from 500 WLWH. Forty women (22 with a repeat pregnancy; 18 with no repeat pregnancy) were purposively selected for a qualitative interview (QI). Simple and multiple logistic regression analyses were performed for quantitative data. Thematic coding and saliency analysis were undertaken for qualitative data. **Results** Eighty-eight (17.6%) women had a repeat pregnancy. Median maternal age was 23 years (range 15-43 years) and median gestational age at enrollment was 34 weeks. In multiple logistic regression analyses, living in the same compound with a husband (adjusted odds ratio (AOR): 2.33; 95% confidence interval (CI): 1.14, 4.75) was associated with increased odds of repeat pregnancy (p <= 0.05). Being in the 30-43 age group (AOR: 0.25; 95% CI: 0.07, 0.87), having talked to a partner about family planning (FP) use (AOR: 0.53; 95% CI: 0.29, 0.98), and prior usage of FP (AOR: 0.45; 95% CI: 0.25, 0.82) were associated with a decrease in odds of repeat pregnancy. QI findings centered on concerns about modern contraception methods (side effects and views that they ‘ruined the womb’) and a desire to have the right number of children. Religious leaders, family, and the broader community were viewed as reinforcing cultural expectations for married women to have children. Repeat pregnancy was commonly attributed to contraception failure or to lack of knowledge about post-delivery fertility. **Conclusion** In addition to cultural context, reproductive health programs for WLWH may need to address issues related to living circumstances and the possibility that reproductive-decision making may extend beyond the woman and her partner.

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Introduction: Complete and timely health information is essential to inform public health decision-making for maternal and child health, but is often lacking in resource-constrained settings. Electronic medical record (EMR) systems are increasingly being adopted to support the delivery of health care, and are particularly amenable to maternal and child health services. An EMR system could enable the mother and child to be tracked and monitored throughout maternity shared care, improve quality and completeness of data collected and enhance sharing of health information between outpatient clinic and the hospital, and between clinical and public health services to inform decision-making. Methods: This study implemented a novel cloud-based electronic medical record system in a maternal and child health outpatient setting in Western Kenya between April and June 2013 and evaluated its impact on improving completeness of data collected by clinical and public health services. The impact of the system was assessed using a two-sample test of proportions pre-and post-implementation of EMR-based data verification. Results: Significant improvements in completeness of the antenatal record were recorded through implementation of EMR-based data verification. A difference of 42.9% in missing data (including screening for hypertension, tuberculosis, malaria, HIV status or ART status of HIV positive women) was recorded pre-and post-implementation. Despite significant impact of EMR-based data verification on data completeness, overall screening rates in antenatal care were low. Conclusion: This study has shown that EMR-based data verification can improve the completeness of data collected in the patient record for maternal and child health. A number of issues, including data management and patient confidentiality, must be considered but significant improvements in data quality are recorded through implementation of this EMR model. 

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Barriers and facilitators to antenatal and delivery care in western Kenya: a qualitative study.

Introduction: In western Kenya, maternal mortality is a major public health problem estimated at 730/100,000 live births, higher than the Kenyan national average of 488/100,000 women. Many women do not attend antenatal care (ANC) in the first trimester, half do not receive 4 ANC visits. A high proportion use traditional birth attendants (TBA) for delivery and 1 in five deliver unassisted. The present study was carried out to ascertain why women do not fully utilize health facility ANC and delivery services. Methods: A qualitative study using 8 focus group discussions each consisting of 8-10 women, aged 15-49 years. Thematic analysis identified the main barriers and facilitators to health facility based ANC and delivery. Results: Attending health facility for ANC was viewed positively. Three elements of care were important; testing for disease including HIV, checking the position of the fetus, and receiving injections and/or medications. Receiving a bed net and obtaining a registration card were also valuable. Four barriers to attending a health facility for ANC were evident; attitudes of clinic staff, long clinic waiting times, HIV testing and cost, although not all women felt the cost was prohibitive being worth it for the health of the child. Most women preferred to deliver in a health facility due to better management of complications. However cost was a barrier, and a reason to visit a TBA because of flexible payment. Other barriers were unpredictable labor and transport, staff attitudes and husbands’ preference. Conclusion: Our findings suggest that women in western Kenya are amenable to ANC and would be willing and even prefer to deliver in a healthcare facility, if it were affordable and accessible to them. However for this to happen there needs to be investment in health promotion, and transport, as well as reducing or removing all fees associated with antenatal and
delivery care. Yet creating demand for service will need to go alongside investment in antenatal services at organizational, staffing and facility level in order to meet both current and future increase in demand.

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**Abstract:** Agricultural strategies such as dairy intensification have potential to improve human nutrition through increased household food security. Increasing dairy productivity could also adversely affect infant and young child feeding (IYCF) practices because of increased maternal stress, demands on maternal time, and beliefs about the timing and appropriate types of complementary foods. Yet, few studies have looked rigorously at how interventions can affect young children (0-60 months). The study explores, within the context of rural dairy farming in Kenya, the relationship between level of household dairy production and selected IYCF practices using a mixed-methods approach. Six focus group discussions with women involved in dairy farming investigated their attitudes towards breastfeeding, introduction of complementary foods and child diets. Ninety-two households involved in three levels of dairy production with at least one child 0-60 months participated in a household survey. Quantitative results indicated that women from higher dairy producing households were more likely to introduce cow’s milk to infants before they reached 6 months than women from households not producing any dairy. Themes from the focus group discussions demonstrated that women were familiar with exclusive breastfeeding recommendations, but indicated a preference for mixed feeding of infants. Evidence from this study can inform nutrition education programmes targeted to farmers participating in dairy interventions in rural, low-income settings to minimize potential harm to the nutritional status of children.

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**Introduction:** Volunteer community health workers (CHWs) form an important element of many health systems, and in Kenya these volunteers are the foundation for promoting behavior change through health education, earlier case identification, and timely referral to trained health care providers. This study examines the effectiveness of a community health worker project conducted in rural Kenya that sought to promote improved knowledge of maternal newborn health and to increase deliveries under skilled attendance. **Methods:** The study utilized a quasi-experimental nonequivalent design that examined relevant demographic items and knowledge about maternal and newborn health combined with a comprehensive retrospective birth history of women’s children using oral interviews of women who were exposed to health messages delivered by CHWs and those who were not exposed. The project trained CHWs in three geographically
Appendix – Country-specific Information: Maternal and Child Health

distinct areas. **Results:** Mean knowledge scores were higher in those women who reported being exposed to the health messages from CHWs, Eburru 32.3 versus 29.2, Kinale 21.8 vs 20.7, Nyakio 26.6 vs 23.8. The number of women delivering under skilled attendance was higher for those mothers who reported exposure to one or more health messages, compared to those who did not. The percentage of facility deliveries for women exposed to health messages by CHWs versus non-exposed was: Eburru 46% versus 19%; Kinale 94% versus 73%; and Nyakio 80% versus 78%. **Conclusion:** The delivery of health messages by CHWs increased knowledge of maternal and newborn care among women in the local community and encouraged deliveries under skilled attendance.

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• Nairobi Urban Health and Demographic Surveillance System (NUHDSS)  
• KEMRI/CDC Demographic Surveillance System  
• Kenya- Chogoria Family Planning/Maternal and Child Health Survey |
| Experts | Mageto, L. E |
| Country-specific needs/attention | High maternal mortality rate |
| Public health campaign/programs | • [www.who.int/pmnch/about/en/](http://www.who.int/pmnch/about/en/)  
• The Partnership for Maternal, Newborn and Child Health (PMNCH)  
• [www.beyonddzero.or.ke/](http://www.beyonddzero.or.ke/)  
• [www.popcouncil.org/research/kenya](http://www.popcouncil.org/research/kenya) |

**Namibia**


**Introduction:** Inequities in the utilization of maternal health services impede progress towards the MDG 5 target of reducing the maternal mortality ratio by three quarters, between 1990 and 2015. In Namibia, despite increasing investments in the health sector, the maternal mortality ratio has increased from 271 per 100,000 live births in the period 1991-2000 to 449 per 100,000 live births in 1998-2007. Monitoring equity in the use of maternal health services is important to
target scarce resources to those with more need and expedite the progress towards the MDG 5 target. The objective of this study is to measure socio-economic inequalities in access to maternal health services and propose recommendations relevant for policy and planning. **Methods:** Data from the Namibia Demographic and Health Survey 2006-07 are analyzed for inequities in the utilization of maternal health. In measuring the inequities, rate-ratios, concentration curves and concentration indices are used. **Results:** Regions with relatively high human development index have the highest rates of delivery by skilled health service providers. The rate of caesarean section in women with post-secondary education is about seven times that of women with no education. Women in urban areas are delivered by skilled providers 30% more than their rural counterparts. The rich use the public health facilities 30% more than the poor for child delivery. **Conclusion:** Most of the indicators such as delivery by trained health providers, delivery by caesarean section and postnatal care show inequities favoring the most educated, urban areas, regions with high human development indices and the wealthy. In the presence of inequities, it is difficult to achieve a significant reduction in the maternal mortality ratio needed to realize the MDG 5 targets so long as a large segment of society has inadequate access to essential maternal health services and other basic social services. Addressing inequities in access to maternal health services should not only be seen as a health systems issue. The social determinants of health have to be tackled through multi-sectoral approaches in line with the principles of Primary Health Care and the recommendations of the Commission on Social Determinants of Health.

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**Introduction:** Improving maternal health is one of the eight Millennium Development Goals (MDGs) aimed at improving maternal healthcare and reducing maternal mortality. The utilization of maternal health services is influenced by several factors that need to be better understood. The objective of this study was to estimate the role of socio-economic position as a determinant of the utilization of maternal health care in Namibia. **Methods:** Data were collected from the Namibia Demographic and Health Survey in 2006-2007, based on survey responses from 9,804 female respondents aged 15-49 years. Multivariate logistic regression analysis was performed accounting for socio-economic factors associated with the use of maternal health care services. **Results:** The results from both bivariate and multivariate analyses confirmed the importance of education, wealth index, place of residence and marital status in explaining the utilization of maternal health care services. Wealth index was the only consistently significant predictor of all indicators of maternal health services; with other factors being significantly associated with one or more of the indicators. Women’s age and occupation showed inconclusive results in relation to access to maternal health care services. **Conclusion:** Several socio-economic factors significantly influence the three indicators of maternal health services utilization. Effective interventions need to take these factors into consideration and to explore means that increase maternal health service utilization especially among lowly educated and poor women in rural areas.

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**Introduction:** Tanzania is on track to meet Millennium Development Goal (MDG) 4 for child survival, but is making insufficient progress for newborn survival and maternal health (MDG 5) and family planning. To understand this mixed progress and to identify priorities for the post-2015 era, Tanzania was selected as a Countdown to 2015 case study. **Methods** We analysed progress made in Tanzania between 1990 and 2014 in maternal, newborn, and child mortality, and unmet need for family planning, in which we used a health systems evaluation framework to assess coverage and equity of interventions along the continuum of care, health systems, policies and investments, while also considering contextual change (e.g., economic and educational). We had five objectives, which assessed each level of the health systems evaluation framework. We used the Lives Saved Tool (LiST) and did multiple linear regression analyses to explain the reduction in child mortality in Tanzania. We analysed the reasons for the slower changes in maternal and newborn survival and family planning, to inform priorities to end preventable maternal, newborn, and child deaths by 2030. **Results:** In the past two decades, Tanzania's population has doubled in size, necessitating a doubling of health and social services to maintain coverage. Total health-care financing also doubled, with donor funding for child health and HIV/AIDS more than tripling. Trends along the continuum of care varied, with preventive child health services reaching high coverage (≥ 85%) and equity (socioeconomic status difference 13-14%), but lower coverage and wider inequities for child curative services (71% coverage, socioeconomic status difference 36%), facility delivery (52% coverage, socioeconomic status difference 56%), and family planning (46% coverage, socioeconomic status difference 22%). The LiST analysis suggested that around 39% of child mortality reduction was linked to increases in coverage of interventions, especially of immunization and insecticide-treated bed nets. Economic growth was also associated with reductions in child mortality. Child health programmes focused on selected high-impact interventions at lower levels of the health system (e.g., the community and dispensary levels). Despite its high priority, implementation of maternal health care has been intermittent. Newborn survival has gained attention only since 2005, but high-impact interventions are already being implemented. Family planning had consistent policies but only recent reinvestment in implementation. **Conclusion:** Mixed progress in reproductive, maternal, newborn, and child health in Tanzania indicates a complex interplay of political prioritization, health financing, and consistent implementation. Post-2015 priorities for Tanzania should focus...
on the unmet need for family planning, especially in the Western and Lake regions; addressing gaps for coverage and quality of care at birth, especially in rural areas; and continuation of progress for child health.

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**Abstract:** In an effort to reduce maternal mortality, developing countries have been investing in village-level primary care facilities to bring skilled delivery services closer to women. We explored the extent to which women in rural western Tanzania bypass their nearest primary care facilities to deliver at more distant health facilities, using a population-representative survey of households (N=1204). Using a standardized instrument, we asked women who had a delivery within 5 years about the place of their most recent delivery. Information on all functioning health facilities in the area were obtained from the district health office. Women who delivered in a health facility that was not the nearest available facility were considered bypassers. Forty-four per cent (186/423) of women who delivered in a health facility bypassed their nearest facility. In adjusted analysis, women who bypassed were more likely than women who did not bypass to be 35 or older (OR 2.5, P<0.01), to have one or no living children (OR 2.2, P<0.03), to have stayed in a maternity waiting home prior to delivery (OR 4.3, P<0.01), to choose a facility on the basis of quality or experience (OR 2.1, P<0.01), to have a high level of trust in health workers at the delivery facility (OR 2.7, P<0.01), and to perceive the nearest facility to be of low quality (OR 3.1, P<0.01). Bypassing for facility delivery is frequent among women in rural Tanzania. In addition to obstetric risk factors, a major reason for this appears to be a concern about the quality of care at government dispensaries and health centres. Investing in improved quality of care in primary care facilities may reduce bypassing and improve the efficiency and effectiveness of the health system in providing coverage for facility delivery in rural Africa.

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**Introduction:** Globally, health facility delivery is encouraged as a single most important strategy in preventing maternal and neonatal morbidity and mortality. However, access to facility-based delivery care remains low in many less developed countries. This study assesses facilitators and barriers to institutional delivery in three districts of Tanzania. **Methods:** Data come from a cross-sectional survey of random households on health behaviours and service utilization patterns among women and children aged less than 5 years. The survey was conducted in 2011 in Rufiji, Kilombero, and Ulanga districts of Tanzania, using a closed-ended questionnaire. This analysis focuses on 915 women of reproductive age who had given birth in the two years prior to the
survey. Chi-square test was used to test for associations in the bivariate analysis and multivariate logistic regression was used to examine factors that influence institutional delivery. **Results:** Overall, 74.5% of the 915 women delivered at health facilities in the two years prior to the survey. Multivariate analysis showed that the better the quality of antenatal care (ANC) the higher the odds of institutional delivery. Similarly, better socioeconomic status was associated with an increase in the odds of institutional delivery. Women of Sukuma ethnic background were less likely to deliver at health facilities than others. Presence of couple discussion on family planning matters was associated with higher odds of institutional delivery. **Conclusion:** Institutional delivery in Rufiji, Kilombero, and Ulanga district of Tanzania is relatively high and significantly dependent on the quality of ANC, better socioeconomic status as well as between-partner communication about family planning. Therefore, improving the quality of ANC, socioeconomic empowerment as well as promoting and supporting inter-spousal discussion on family planning matters is likely to enhance institutional delivery. Programs should also target women from the Sukuma ethnic group towards universal access to institutional delivery care in the study area.

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**Data sources**

- Tanzania Demographic and Health Survey.
- Rufiji Health and Demographic Surveillance System (RHDSS) in Tanzania

**Experts**

Armstrong, C. E

**Country-specific needs/attention**

High maternal mortality rate

**Country-specific information**

- The National Bureau of Statistics (NBS) is the National Statistical Office of Tanzania. [www.nbs.go.tz/nbs/](http://www.nbs.go.tz/nbs/)

**Public health campaign/programs**

Tanzania PMNCH: established by the Government of Tanzania and partners from the NGO, research, health professional and UN communities, in an effort to accelerate the national drive for improved maternal, newborn and child health. [www.who.int/pmnch/countries/tanzania/en/index1.html](http://www.who.int/pmnch/countries/tanzania/en/index1.html)
[www.who.int/pmnch/about/en/](http://www.who.int/pmnch/about/en/)

**Mozambique**

**Effects of health-system strengthening on under-5, infant, and neonatal mortality: 11-year provincial-level time-series analyses in Mozambique.** Fernandes, Q. F., Wagenaar, B. H., Anselmi,
Introduction: Knowledge of the relation between health-system factors and child mortality could help to inform health policy in low-income and middle-income countries. We aimed to quantify modifiable health-system factors and their relation with provincial-level heterogeneity in under-5, infant, and neonatal mortality over time in Mozambique. Methods: Using Demographic and Health Survey (2003 and 2011) and Multiple Indicator Cluster Survey (2008) data, we generated provincial-level time-series of child mortality in under-5 (ages 0-4 years), infant (younger than 1 year), and neonatal (younger than 1 month) age groups for 2000-10. We built negative binomial mixed models to examine health-system factors associated with changes in child mortality.

Results: Under-5 mortality rate was heterogeneous across provinces, with yearly decreases ranging from 11.1% (Nampula) to 1.9% (Maputo Province). Heterogeneity was greater for neonatal mortality rate, with only seven of 11 provinces showing significant yearly decreases, ranging from 13.6% (Nampula) to 4.2% (Zambezia). Health workforce density (adjusted rate ratio 0.94, 95% CI 0.90-0.98) and maternal and child health nurse density (0.96, 0.92-0.99) were both associated with reduced under-5 mortality rate, as were institutional birth coverage (0.94, 0.90-0.98) and government financing per head (0.80, 0.65-0.98). Higher population per health facility was associated with increased under-5 mortality rate (1.14, 1.02-1.28). Neonatal mortality rate was most strongly associated with institutional birth attendance, maternal and child nurse density, and overall health workforce density. Infant mortality rate was most strongly associated with institutional birth attendance and population per health facility. Conclusion: The large decreases in child mortality seen in Mozambique between 2000 and 2010 could have been partly caused by improvements in the public-sector health workforce, institutional birth coverage, and government health financing. Increased attention should be paid to service availability, because population per health facility is increasing across Mozambique and is associated with increased under-5 mortality. Investments in health information systems and new methods to track potentially increasing subnational health disparities are urgently needed.

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Introduction: Low Birth Weight (LBW) is prevalent in low-income countries. Even though the economic evaluation of interventions to reduce this burden is essential to guide health policies, data on costs associated with LBW are scarce. This study aims to estimate the costs to the health system and to the household and the Disability Adjusted Life Years (DALYs) arising from infant deaths associated with LBW in Southern Mozambique. Methods: Costs incurred by the households were collected through exit surveys. Health system costs were gathered from data obtained onsite and from published information. DALYs due to death of LBW babies were based on local estimates of prevalence of LBW (12%), very low birth weight (VLBW) (1%) and of case fatality rates compared to non-LBW weight babies [for LBW (12%) and VLBW (80%)]. Costs associated with LBW excess morbidity were calculated on the incremental number of hospital admissions in LBW babies compared to non-LBW-weight babies. Results: Direct and indirect household costs for routine health care were 24.12 US$ (CI 95% 21.51; 26.26). An increase in birth weight of 100 grams would lead to a 53% decrease in these costs. Direct and indirect household
costs for hospital admissions were 8.50 US$ (CI 95% 6.33; 10.72). Of the 3,322 live births that occurred in one year in the study area, health system costs associated to LBW (routine health care and excess morbidity) and DALYs were 169,957.61 US$ (CI 95% 144,900.00; 195,500.00) and 2,746.06, respectively. Conclusion: This first cost evaluation of LBW in a low-income country shows that reducing the prevalence of LBW would translate into important cost savings to the health system and the household. These results are of relevance for similar settings and should serve to promote interventions aimed at improving maternal care.

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Abstract: Despite high infant and maternal mortality rates, many Mozambican women with access to prenatal services delay prenatal clinic consultations, limiting opportunity for prevention and treatment of preventable pregnancy complications. Ethnographic research, interviews with health providers and longitudinal pregnancy case studies with 83 women were conducted in Central Mozambique to examine pregnant women's underutilization of clinic-based prenatal services. The study found that pregnancy beliefs and prenatal practices reflect women's attempts to influence reproduction under conditions of vulnerability at multiple levels. Women reported high maternal reproductive morbidity, frequent pregnancy wastage, and immense pressure to bear children throughout their reproductive years. Reproductive vulnerability is intensified by poverty and an intense burden placed on poor, peri-urban women farmers for family subsistence and continuous fertility in a period of economic austerity, land shortages, and increasing social conflict and inequality. In this environment of economic insecurity exacerbated by congested living conditions, women report competing for scarce resources, including male support and income. This vulnerability heightens women's perceptions that they and their unborn infants will be targets of witchcraft or sorcery by jealous neighbors and kin. They respond by hiding pregnancy and delaying prenatal care. Within the context of women's perceived reproductive risks, delayed prenatal care can be seen as a strategy to protect pregnancy from purposeful human and spirit harm. Women mobilized limited resources to acquire prenatal care outside the formal clinic setting. It is concluded that provision of clinical prenatal services is insufficient to reduce reproductive risks for the most socially and economically marginal since it is their vulnerability that prevents women from using available services. Confidential maternity services and social safety nets for greater economic security are recommended.

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Abstract: This study investigates the relation between socio-economic parental position (education and occupation) and child death in Mozambique using data from the Mozambican
Demographic and Health Survey carried out between March and July 1997. The analysis included 9142 children born within 10 years before the survey. In spite of the Western system of classification used in the study, the results partly showed a parental socio-economic gradient of infant and child mortality in Mozambique. Father's education seemed to reflect the family's social standing in the Mozambique context, showing a strong statistical association with post neonatal and child mortality. However, maternal education as a measure of socio-economic position was not statistically significantly associated with child mortality. This finding may partly be explained by the extreme hardships experienced by the country (civil war and natural disasters) and the implementation of the Economic Structural Adjustment Programme that have also affected the health of women and their children during the years covered by this study. Other measures of socio-economic position applicable to the rural African setting should be investigated.

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| Data sources | Mozambican Demographic and Health Survey (2003 and 2011)  
|             | Multiple Indicator Cluster Survey (2008) |
| Experts     | Sherr, K. |
| Country-specific needs/attention | High maternal mortality rate  
|             | Infant mortality |
| Public health campaign/programs | USAID’s Maternal and Child Health Integrated Program in Mozambique |

**Cameroon**


**Abstract:** This study seeks to explore and explain the socio-cultural factors responsible for the incidence of infant malnutrition in Cameroon with particular emphasis on northern Cameroon where it is most accentuated. It combines quantitative data drawn from the 1991, 1998, 2004 and 2011 Cameroon Demographic and Health Surveys, as well as a literature review of publications by the WHO and UNICEF. This is further complemented with qualitative data from various regions of Cameroon, partly from a national ethnographic study on the ethno-medical causes of infertility in Cameroon conducted between 1999 and 2000. Whereas socio-cultural factors related to child feeding and maternal health (breast-feeding, food taboos and representations of the colostrum as dangerous for infants) are widespread throughout Cameroon, poverty-related factors (lack of education for mothers, natural disaster, unprecedented influx of refugees, inaccessibility and inequity in the distribution of health care services) are pervasive in northern Cameroon. This conjunction of factors accounts for the higher incidence of infant malnutrition and mortality in northern Cameroon. The study suggests the need for women’s empowerment and for health care personnel in transcultural situations to understand local cultural beliefs, practices and sentiments before initiating change efforts in infant feeding practices and maternal health. Biomedical services should be tailored to the social and cultural needs of the target population - particularly women - since beliefs and practices underpin therapeutic recourse. Whereas infant diarrhea might be believed to be the result of sexual contact, in reality, it is caused by unhygienic

Abstract: This study was conducted to clarify nutritional status and associated factors in 5-24 month old children in the district of Batouri, Republic of Cameroon. Mothers were interviewed using a semi structured questionnaire, and the child's weight, length, head circumference, and mid-upper arm circumference was collected. The data were compared with child growth standards proposed by the World Health Organization using Z-scores; (2)-test, Fisher's exact test, and Wilcoxon rank sum test were used to determine variables associated with malnutrition. A total of 100 mother-child pairs participated in this study; valid data from 100 pairs were subjected to analysis. The percentages of children with malnutrition indicators were wasting (6%), stunting (31%), underweight (14%), and low mid-upper arm circumference (16%). Five factors were found to be statistically significant in their association with the children's malnutrition: mother's age, child's age, mother's educational level, mothers who had family planning information, and the source of tap water. A high percentage of stunting was positively associated with a high percentage of chronic malnutrition. We speculate that insufficient nutrition was more likely to begin after weaning.

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Introduction: The pattern of obesity in relation to socioeconomic status is of public health concern. This study investigates whether the association between height and obesity in children is affected by their socioeconomic background. It also explores the relationship between high birth weight and obesity. Methods: School children, (N = 557; 5 to 12 years old) were recruited from randomly selected primary schools in a cross-sectional study including 173 rural and 384 urban children in the North West Region of Cameroon. Socioeconomic status (SES) and birth weight were obtained using a self-administered questionnaire. Anthropometric measures included height, weight, BMI, waist circumference and percentage body fat. These measures were transformed into age and sex-standardized variables. Then participants were divided according to quartiles of height SDS. Results: The highest frequencies of overweight/obesity (18.8%), abdominal overweight/obesity (10.9%) and high body fat/obesity (12.3%) were observed among the tallest children from a high socioeconomic background. Univariate analyses indicate that children of high SES (39.9%), fourth height quartile (33.1%) and of high birth weight (54.8%) were significantly (p<0.001) more likely to be overweight/obese. Multivariate analyses showed high SES (OR 8.3, 95% CI 3.9 - 15.4), fourth height quartile (OR 9.1, 95% CI 3.4 - 16.7) and high birth weight

**Introduction:** Childhood obesity is one of the most serious public health challenges of the 21st century. The prevalence of overweight and obesity among children (<5 years) in Cameroon, based on weight-for-height index, has doubled between 1991 and 2006. This study aimed to determine the prevalence and risk factors of overweight and obesity among children aged 6 months to 5 years in Cameroon in 2011. **Methods:** Four thousand five hundred and eighteen children (2205 boys and 2313 girls) aged between 6 to 59 months were sampled in the 2011 Demographic Health Survey (DHS) database. Body Mass Index (BMI) z-scores based on WHO 2006 reference population was chosen to estimate overweight (BMI z-score > 2) and obesity (BMI for age > 3). Regression analyses were performed to investigate risk factors of overweight/obesity. **Results:** The prevalence of overweight and obesity was 8% (1.7% for obesity alone). Boys were more affected by overweight than girls with a prevalence of 9.7% and 6.4% respectively. The highest prevalence of overweight was observed in the grassfield area (including people living in West and North-West regions) (15.3%). Factors that were independently associated with overweight and obesity included: having overweight mother (adjusted odds ratio (aOR) = 1.51; 95% CI 1.15 to 1.97) and obese mother (aOR = 2.19; 95% CI = 155 to 3.07), compared to having normal weight mother; high birth weight (aOR = 1.69; 95% CI 1.24 to 2.28) compared to normal birth weight; male gender (aOR = 1.56; 95% CI 1.24 to 1.95); low birth rank (aOR = 1.35; 95% CI 1.06 to 1.72); being aged between 13-24 months (aOR = 1.81; 95% CI = 1.21 to 2.66) and 25-36 months (aOR = 2.79; 95% CI 1.93 to 4.13) compared to being aged 45 to 49 months; living in the grassfield area (aOR = 2.65; 95% CI = 1.87 to 3.79) compared to living in Forest area. Muslim appeared as a protective factor (aOR = 0.67; 95% CI 0.46 to 0.95). compared to Christian religion. **Conclusion:** This study underlines a high prevalence of early childhood overweight with significant disparities between ecological areas of Cameroon. Risk factors of overweight included high maternal BMI, high birth weight, male gender, low birth rank, aged between 13-36 months, and living in the Grassfield area while being Muslim appeared as a protective factor. Preventive strategies should be strengthened especially in Grassfield areas and should focus on sensitization campaigns to reduce overweight and obesity in mothers and on reinforcement of measures such as surveillance of weight gain during antenatal consultation and clinical follow-up of children with high birth weight. Meanwhile, further studies including nutritional characteristics are of great interest to understand the association with religion, child age and ecological area in this age group, and will help in refining preventive strategies against childhood overweight and obesity in Cameroon.

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Appendix — Country-specific Information: Maternal and Child Health

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Democratic Republic of Congo (DRC)


**Introduction**: The use of maternal health services, known as an indirect indicator of perinatal death, is still unknown in Lubumbashi. The present study was therefore undertaken in order to determine the factors that influence the use of mother and child healthcare services in Lubumbashi, Democratic Republic of the Congo. **Methods**: This was transversal study of women residing in Lubumbashi who had delivered between January and December 2009. In total, 1762 women were sampled from households using indicator cluster surveys in all health zones. Antenatal consultations (ANC), delivery assisted by qualified healthcare personnel (and delivery in a healthcare facility) as well as postnatal consultations (PNC) were dependent variables of study. The factors determining non-use of maternal healthcare services were researched via logistic regression with a 5% materiality threshold. **Results**: The use of maternal healthcare services was variable; 92.6% of women had attended ANC at least once, 93.8% of women had delivered at a healthcare facility, 97.2% had delivered in the presence of qualified healthcare personnel, while the rate of caesarean section was 4.5%. Only 34.6% postnatal women had attended PNC by 42 days after delivery. During these ANC visits, only 60.6% received at least one dose of vaccine, while 38.1% received Mebendazole, 35.6% iron, 32.7% at least one dose of Sulfadoxine Pyrimethamine, 29.2% folic acid, 15.5% screening for HIV and 12.8% an insecticide treated net. In comparison to women that had had two or three deliveries before, primiparous and grand multiparous women were twice as likely not to use ANC during their pregnancy. Women who had unplanned pregnancies were also more likely not to use ANC or PNC than those who had planned pregnancies alone or with their partner. The women who had not used ANC were also more likely not to use PNC. The women who had had a trouble-free delivery were more likely not to use PNC than those who had complications when delivering. **Conclusion**: In Lubumbashi, a significant proportion of women continue not to make use of healthcare services during pregnancy, as well as during and after childbirth. Women giving birth for the first time, those who have already given birth many times, and women with an unwanted pregnancy, made less use of ANC. Moreover, women who had not gone for ANC rarely came back for postnatal consultations, even if they had given birth at a healthcare facility. Similarly, those who gave birth without complications, less frequently made use of postnatal consultations. As with ANCs, women with unwanted pregnancies rarely went for postnatal visits. In addition to measures aimed at reinforcing women’s autonomy, efforts are also needed to reinforce and improve the information given to women of childbearing age, as well as communication between the healthcare system and the...
community, and participation from the community, since this will contribute to raising awareness of safe motherhood and the use of such services, including family planning.

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**Introduction:** To describe malaria knowledge, attitudes toward malaria and bed net use, levels of ownership and use of bed nets, and factors associated with ownership and use among pregnant women attending their first antenatal care (ANC) visit in Kinshasa, DRC. **Methods:** Women attending their first ANC visit at one maternity in Kinshasa were recruited to take part in a study where they were given free insecticide treated bed nets (ITNs) and then followed up at delivery and 6 months post-delivery to assess ITN use. This study describes the baseline levels of bed net ownership and use, attitudes towards net use and factors associated with net use **Results:** Among 351 women interviewed at baseline, 115 (33%) already owned a bed net and 86 (25%) reported to have slept under the net the previous night. Cost was reported as the reason for not owning a net by 48% of the 236 women who did not own one. In multivariable analyses, women who had secondary school or higher education were 3.4 times more likely to own a net (95% CI 1.6-7.3) and 2.8 times more likely to have used a net (95% CI 1.3-6.0) compared to women with less education. **Conclusion:** Distribution of ITNs in antenatal clinics in this setting is needed and feasible. The potential for ITN use by this target population is high.

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**Abstract:** To determine if a post-partum depression syndrome exists among mothers in Kinshasa, Democratic Republic of Congo, by adapting and validating standard screening instruments. Using qualitative interviewing techniques, we interviewed a convenience sample of 80 women living in a large peri-urban community to better understand local conceptions of mental illness. We used this information to adapt two standard depression screeners, the Edinburgh Post-partum Depression Scale and the Hopkins Symptom Checklist. In a subsequent quantitative study, we identified another 133 women with and without the local depression syndrome and used this information to validate the adapted screening instruments. Based on the qualitative data, we found a local syndrome that closely approximates the Western model of major depressive disorder. The women we interviewed, representative of the local populace, considered this an important syndrome among new mothers because it negatively affects women and their young children. Women (n = 41) identified as suffering from this syndrome had statistically significantly higher depression severity scores on both adapted screeners than women identified as not having this syndrome (n = 20; P < 0.0001). When it is unclear or unknown if Western models of
psychopathology are appropriate for use in the local context, these models must be validated to ensure cross-cultural applicability. Using a mixed-methods approach we found a local syndrome similar to depression and validated instruments to screen for this disorder. As the importance of compromised mental health in developing world populations becomes recognized, the methods described in this report will be useful more widely.

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Data sources
DRC Demographic and Health Survey

Experts
Donnen, P.

Country-specific needs/attention
Maternal and infant mortality

Ethiopia


Introduction: Antenatal Care (ANC), use of skilled delivery attendants and postnatal care (PNC) services are key maternal health services that can significantly reduce maternal mortality. Understanding the factors that affect service utilization helps to design appropriate strategies and policies towards improvement of service utilization and thereby reduce maternal mortality. The objective of this study was to identify factors that affect utilization of maternal health services in Ethiopia. Methods: Data were drawn from the 2011 Ethiopia Demographic and Health Survey. The dependent variables were use of ANC, skilled delivery attendants and PNC services. The independent variables were categorized as socio-cultural, perceived needs and accessibility related factors. Data analysis was done using SPSS for windows version 20.0. Bivariate and multivariate logistic regression models were used in the analysis. Results: Thirty four percent of women had ANC visits, 11.7% used skilled delivery attendants and 9.7% of women had a postnatal health checkup. Education of women, place of residence, ethnicity, parity, women's autonomy and household wealth had a significant association with the use of maternal health services. Women who completed higher education were more likely to use ANC (AOR = 3.8, 95% CI = 1.8-7.8), skilled delivery attendants (AOR = 3.4, 95% CI = 1.9-6.2) and PNC (AOR = 3.2, 95% CI = 2.0-5.2). Women from urban areas use ANC (AOR = 2.3, 95% CI = 1.9-2.9), skilled delivery attendants (AOR = 4.9, 95% CI = 3.8-6.3) and PNC services (AOR = 2.6, 95% CI = 2.0-3.4) more than women from rural areas. Women who have had ANC visits during the index pregnancy were more likely to subsequently use skilled delivery attendants (AOR = 1.3, 95% CI = 1.1-1.7) and PNC (AOR = 3.4, 95% CI = 2.8-4.1). Utilization of ANC, delivery and PNC services is more among more autonomous women than those whose spending is controlled by other people. Conclusion: Maternal health service utilization in Ethiopia is very low. Socio-demographic and accessibility related factors are major determinants of service utilization. There is a high inequality in service utilization among women with differences in education, household wealth, autonomy and residence. ANC is an important entry point for subsequent use of delivery and PNC services. Strategies that aim improving maternal health service utilization should target improvement of education, economic status and empowerment of women.

**Introduction:** Ethiopia has one of the highest maternal mortality in the world. Institutional delivery is the key intervention in reducing maternal mortality and complications. However, the uptake of the service has remained low and the factors which contribute to this low uptake appear to vary widely. Our study aims to determine the magnitude and identify factors affecting delivery at health institution in two districts in Ethiopia. **Methods:** A community based cross sectional household survey was conducted from January to February 2012 in 12 randomly selected villages of Wukro and Butajera districts in the northern and south central parts of Ethiopia, respectively. Data were collected using a pretested questionnaire from 4949 women who delivered in the two years preceding the survey. **Results:** One in four women delivered the index child at a health facility. Among women who delivered at health facility, 16.1% deliveries were in government hospitals and 7.8% were in health centers. The factors that significantly affected institutional delivery in this study were district in which the women lived (AOR: 2.21, 95% CI: 1.28, 3.82), women age at interview (AOR: 1.96, 95% CI: 1.05, 3.62), women's education (AOR: 3.53, 95% CI: 1.22, 10.20), wealth status (AOR: 16.82, 95% CI: 7.96, 35.54), women's occupation (AOR: 1.50, 95% CI: 1.01, 2.24), antenatal care (4+) use (AOR: 1.77, 95% CI: 1.42, 2.20), and number of pregnancies (AOR: 0.25, 95% CI: 0.18,0.35). We found that women who were autonomous in decision making about place of delivery were less likely to deliver in health facility (AOR: 0.38, 95% CI: 0.23,0.63). **Conclusion:** Institutional delivery is still low in the Ethiopia. The most important factors that determine use of institutional delivery appear to be women education and household economic status. Women’s autonomy in decision making on place of delivery did not improve health facility delivery in our study population. Actions targeting the disadvantaged, improving quality of services and service availability in the area are likely to significantly increase institutional delivery.

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died from maternal causes face nutrition deficits, and are less likely to access needed health care than children with living mothers. Older children drop out of school to care for younger siblings and contribute to household and farm labor which may be beyond their capacity and age, and often choose migration in search of better opportunities. Family fragmentation is common following maternal death, leading to tenuous relationships within a household with the births and prioritization of additional children further stretching limited financial resources. Currently, there is no formal standardized support system for families caring for vulnerable children in Ethiopia.

**Conclusion:** Impacts of maternal mortality on children are far-reaching and have the potential to last into adulthood. Coordinated, multi-sectorial efforts towards mitigating the impacts on children and families following a maternal death are lacking. In order to prevent impacts on children and families, efforts targeting maternal mortality must address inequalities in access to care at the community, facility, and policy levels.

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**South Africa**


**Introduction:** Preventing unintended pregnancy among HIV-positive women constitutes a critical and cost-effective approach to primary prevention of mother-to-child transmission of HIV and is a global public health priority for addressing the desperate state of maternal and child health in HIV hyper-endemic settings. We sought to investigate whether the prevalence of contraceptive use and method preferences varied by HIV status and receipt of highly active antiretroviral therapy (HAART) among women in Soweto, South Africa. **Methods:** We used survey data from 563 sexually active, non-pregnant women (18-44 years) recruited from the Perinatal HIV Research Unit in Soweto (May-December, 2007); 171 women were HIV-positive and receiving HAART (median duration of use = 31 months; IQR = 28, 33), 178 were HIV-positive and HAART-naive, and 214 were HIV-negative. Medical record review was conducted to confirm HIV status and clinical variables. Logistic regression models estimated adjusted associations between HIV status, receipt of HAART, and contraceptive use. **Results:** Overall, 78% of women reported using contraception, with significant variation by HIV status: 86% of HAART users, 82% of HAART-naive women, and 69% of HIV-negative women (p<0.0001). In adjusted models, compared with HIV-negative women, women receiving HAART were significantly more likely to use contraception while HAART-naive women were non-significantly more likely (AOR: 2.40; 95% CI: 1.25, 4.62 and AOR: 1.59; 95% CI: 0.88, 2.85; respectively). Among HIV-positive women, HAART users were non-significantly more likely to use contraception compared with HAART-naive women (AOR: 1.55;
Conclusion: Among HIV-positive women receiving HAART, the observed higher prevalence of contraceptive use overall and condoms in particular promises to yield fewer unintended pregnancies and reduced risks of vertical and sexual HIV transmission. These findings highlight the potential of integrated HIV and reproductive health services to positively impact maternal, partner, and child health.

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Introduction: Our objective was to understand the barriers delaying early prenatal care for women in South Africa. Methods: A mixed-methods study was conducted at a center in Pretoria. Results: Following interviews with 21 women at a prenatal clinic in Pretoria, a quantitative survey was completed by 204 postpartum women. During interviews, women described presenting late owing to contemplating induced abortion, fear of HIV testing, and fear of jealousy and bewitching. The survey results demonstrated that a majority of women (133 [65.2%]) reported knowledge of recommendations to present before 12weeks; however, the average gestational age at initial presentation was 19.1+/−7.7weeks. Women were more likely to present earlier if the pregnancy was planned (P=0.013) and were less likely to if they had at any point contemplated induced abortion (P=0.021). Fears of bewitching and harmful psychological stress owing to a positive HIV test result prevailed in both the interviews and the surveys. Conclusion: Significant efforts should be devoted to improving access to contraception and prepregnancy counseling in order to improve early prenatal care attendance. Similarly, addressing cultural concerns and fears regarding pregnancy is imperative in promoting early attendance.

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**Data sources**

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<th>South African Demographic Health Survey</th>
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**Experts**

| Gray, G |

**Country-specific needs/attention**

- Maternal and child mortality
- Need to increase life expectancy

**Public health campaign/programs**

- USAID’s Maternal and Child Health Integrated Program in South Africa
Uganda


**Introduction:** Uganda’s poor maternal health indicators have resulted from weak maternal health services delivery, including access to quality family planning, skilled birth attendance, emergency obstetric care, and postnatal care for mothers and newborns. This paper investigated the predictors of maternal health services (MHS) utilization characterized as: desirable, moderate and undesirable. **Methods:** We used a sample of 1728 women of reproductive ages (15-49), who delivered a child a year prior to the 2011 UDHS survey. A multinomial logistic regression model was used to analyze the relative contribution of the various predictors of ideal maternal health services package utilization. Andersen’s Behavioral Model of Health Services Utilization guided the selection of covariates in the regression model. **Results:** Women with secondary and higher education were more likely to utilize the desirable maternal health care package (RRR = 4.5; 95% CI = 1.5-14.0), compared to those who had none (reference = undesirable MHS package). Women who lived in regions outside Kampala, Uganda’s capital, were less likely to utilize the desirable package of maternal health services (Eastern - RRR = 0.2, CI = 0.1-0.5; Western - RRR = 0.3, CI = 0.1-0.8; Central - RRR = 0.3, CI = 0.1-0.8; Northern - RRR = 0.4, CI = 0.2-1.0). Women from the richest households were more likely to utilize the desirable maternal health services package (RRR = 1.9; 95% CI = 1.0-3.7). Residence in rural areas, being Moslem and being married reduced a woman’s chances of utilizing moderate maternal health care services. **Conclusion:** Utilization of maternal health services varied greatly by demographic and socio-economic characteristics. Women with a secondary and higher education, and those of higher income levels, were more likely to utilize the ideal maternal health services package. Therefore, there is need to formulate policies and design maternal health services programs that target the socially marginalized women.

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**Abstract:** To assess different methods for determining cause of death from verbal autopsy (VA) questionnaire data, the intra-rater reliability of Physician-Certified Verbal Autopsy (PCVA) and the accuracy of PCVA, expert-derived (non-hierarchical) and data-driven (hierarchal) algorithms were assessed for determining common causes of death in Ugandan children. A verbal autopsy validation study was conducted from 2008-2009 in three different sites in Uganda. The dataset included 104 neonatal deaths (0-27 days) and 615 childhood deaths (1-59 months) with the cause(s) of death classified by PCVA and physician review of hospital medical records (the 'reference standard'). Of the original 719 questionnaires, 141 (20%) were selected for a second review by the same physicians; the repeat cause(s) of death were compared to the original, and agreement assessed using the Kappa statistic. Physician reviewers' refined non-hierarchical algorithms for common causes of death from existing expert algorithms, from which, hierarchal algorithms were developed. The accuracy of PCVA, non-hierarchical, and hierarchical algorithms...
for determining cause(s) of death from all 719 VA questionnaires was determined using the reference standard. Overall, intra-rater repeatability was high (83% agreement, Kappa 0.79 [95% CI 0.76-0.82]). PCVA performed well, with high specificity for determining cause of neonatal (>67%), and childhood (>83%) deaths, resulting in fairly accurate cause-specific mortality fraction (CSMF) estimates. For most causes of death in children, non-hierarchical algorithms had higher sensitivity, but correspondingly lower specificity, than PCVA and hierarchical algorithms, resulting in inaccurate CSMF estimates. Hierarchical algorithms were specific for most causes of death, and CSMF estimates were comparable to the reference standard and PCVA. Inter-rater reliability of PCVA was high, and overall PCVA performed well. Hierarchical algorithms performed better than non-hierarchical algorithms due to higher specificity and more accurate CSMF estimates. Use of PCVA to determine cause of death from VA questionnaire data is reasonable while automated data-driven algorithms are improved.

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**Introduction:** Understanding maternal factors that influence child feeding is necessary to inform intervention planning in settings in which mothers experience substantial social vulnerabilities. The purpose of this study was to assess maternal sociodemographic factors that may constrain women’s caring capabilities and subsequent child nutrition in Uganda. **Methods:** We analyzed data from the 2006 and 2011 Uganda Demographic and Health Surveys to model the associations between maternal sociodemographic factors, child feeding practices, and anthropometry with multivariate logistic regression models. **Results:** The proportion of children fed according to recommended guidelines declined in Uganda from 2006 to 2011. Mothers who lacked literacy skills were less likely to achieve recommended complementary feeding indicators; however, literacy was not associated with breastfeeding practices. Mothers in the upper 60% wealth percentile were more likely to meet minimum meal frequency, diversity, and adequacy indicators. Mothers who gave birth at health facilities (2006 OR: 0.49; 95% CI: 0.26, 0.91; P < 0.05) and who were in the upper 60% wealth percentile (2011 OR: 0.43; 95% CI: 0.21, 0.69) were less likely to exclusively breastfeed until 6 mo. There were no significant associations between age at first pregnancy, maternal education, and infant and young child feeding practices. Women with a formal education had children with lower stunting and underweight probabilities in both time periods (OR range: 0.43-0.74). Women who delivered in childbirth facilities were less likely to have a child with low weight-for-age, length-for-age, or weight-for-length z scores (OR range: 0.59-0.82). Marital status, the age at first child birth, not accepting domestic violence, freedom to travel away from home, and involvement in household and reproductive decisions were not associated with child anthropometry in either time period. **Conclusion:** Mothers with low literacy skills, who deliver their children at home, and who lack formal education are particularly at risk of poor child feeding and represent a group that may benefit from enhanced interventions that address their particular vulnerabilities. Factors that contribute to improved maternal feeding capabilities but may impair breastfeeding practices need to be better understood.
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Introduction: Vitamin D deficiency is a world-wide epidemic with recent estimates indicating that greater than 50% of the global population is at risk. In Uganda, 80% of healthy community children in a survey were found to be vitamin D insufficient. Protein-energy malnutrition is likely to be associated with vitamin D intake deficiency. The aim of this study was to determine the prevalence of vitamin D deficiency and the associated factors among children admitted with protein-energy malnutrition to the pediatrics wards of Mulago hospital in Kampala, Uganda.

Methods: Consecutive sampling was done with 158 children, aged 6-24 months, enrolled in a cross sectional study. One hundred and seventeen malnourished and 41 non malnourished children were enrolled from the Acute Care unit, pediatrics in-patient wards, outpatient and immunization clinics, following informed consent obtained from the children's parents/guardians. Children with protein energy malnutrition were categorized based on anthropometric measurements of weight-for-height and weight for length compared with the recommended WHO reference Z-score. Serum 25-hydroxyvitamin D, calcium and phosphate were assayed.

Results: One hundred seventeen malnourished and 41 non malnourished children were enrolled. The majority of study participants were male, 91 (57.6%). The mean serum vitamin D levels among the malnourished was 32.5 mmol/L (+/-12.0 SD) and 32.2 mmol/L (10.9 SD) among the malnourished, p = 0.868. Fifteen (36.6%) of the non-malnourished children and 51 (43.6%) of the malnourished had suboptimal levels, p = 0.689. Malnourished children admitted with meningitis and cerebral palsy had lower serum vitamin D levels than those with other infections. Conclusion: There was no statistically significant difference in vitamin D values between the malnourished and non-malnourished children. Clinicians should actively screen for children for serum vitamin D levels regardless of nutritional status.

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Data sources
Uganda Demographic Health Survey (UDHS)

Experts
Kiconco, A

Country-specific needs/attention
High maternal mortality rate

Country-specific information
Uganda Bureau of Statistics (UBOS)

Zambia

Introduction: Globally, approximately 3 million babies die annually within their first month. Access to adequate care at birth is needed to reduce newborn as well as maternal deaths. We explore the influence of distance to delivery care and of level of care on early neonatal mortality in rural Zambia and Malawi, the influence of distance (and level of care) on facility delivery, and the influence of facility delivery on early neonatal mortality. Methods: National Health Facility Censuses were used to classify the level of obstetric care for 1131 Zambian and 446 Malawian delivery facilities. Straight-line distances to facilities were calculated for 3771 newborns in the 2007 Zambia DHS and 8842 newborns in the 2004 Malawi DHS. Results: There was no association between distance to care and early neonatal mortality in Malawi (OR 0.97, 95% CI 0.58-1.60), while in Zambia, further distance (per 10 km) was associated with lower mortality (OR 0.55, 95% CI 0.35-0.87). The level of care provided in the closest facility showed no association with early neonatal mortality in either Malawi (OR 1.02, 95% CI 0.90-1.16) or Zambia (OR 1.02, 95% CI 0.82-1.26). In both countries, distance to care was strongly associated with facility use for delivery (Malawi: OR 0.35 per 10km, 95% CI 0.26-0.46). All results are adjusted for available confounders. Early neonatal mortality did not differ by frequency of facility delivery in the community. Conclusion: While better geographic access and higher level of care were associated with more frequent facility delivery, there was no association with lower early neonatal mortality. This could be due to low quality of care for newborns at health facilities, but differential underreporting of early neonatal deaths in the DHS is an alternative explanation. Improved data sources are needed to monitor progress in the provision of obstetric and newborn care and its impact on mortality.

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Introduction: The use of census data to measure maternal mortality is a recent phenomenon, implemented in settings with non-functional vital registration systems and driven by needs for trend data. The 2010 round of population and housing censuses recorded a significant increase in the number of countries collecting maternal mortality data. The objective of this study was to estimate rural-urban differentials in pregnancy-related mortality in Zambia using census data. Methods: We used data from the Zambia 2000 and 2010 censuses. Both censuses recorded the female population by age, the number of children ever born, and live births 12 months prior to the census. The 2010 census further recorded, by age, household, and pregnancy-related deaths 12 months prior to the census. We evaluated and adjusted recorded live births using the cohort Parity Fertility ratio method, and household deaths using deaths distribution methods (General Growth Balance and Synthetic Extinct Generation). Adult female mortality and pregnancy-related mortality for rural and urban areas were estimated for the period October 2009 to October 2010. Results: Data evaluation showed errors in recorded population age, age-at-death, live births, and deaths, and appropriate adjustments were made. Adjusted adult female mortality was high; an adolescent aged 15 years had a one-in-three chance of dying before her 50th birthday in rural areas and one-in-four chance in urban areas. Pregnancy-related deaths comprised 15.3 % of all deaths among reproductive-age women overall; 17.9 % in rural areas and 9.8 % in urban areas. The pregnancy-related mortality ratio for the period was 789 deaths/100,000 live births overall: 960/100,000 live births in rural areas and 470/100,000 live births in urban areas. Conclusion: Census-based estimates show very high adult female mortality and particularly high pregnancy-
related mortality in both rural and urban areas of Zambia 12 months prior to the 2010 census. Future censuses should pay greater attention to strategies for improving data quality.

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**Introduction:** Since 2000, the world has been coalesced around efforts to reduce maternal mortality. However, few studies have estimated the significance of eliminating maternal deaths on female life expectancy. We estimated, based on census data, the potential gains in female life expectancy assuming complete elimination of pregnancy-related mortality in Zambia. **Methods:** We used data on all-cause and pregnancy-related deaths of females aged 15-49 reported in the Zambia 2010 census, and evaluated, adjusted and smoothed them using existing and verified techniques. We used associated single decrement life tables, assuming complete elimination of pregnancy-related deaths to estimate the potential gains in female life expectancy at birth, at age 15, and over the ages 15-49. We compared these gains with the gains from eliminating deaths from accidents, injury, violence and suicide. **Results:** Complete elimination of pregnancy-related deaths would extend life expectancy at birth among Zambian women by 1.35 years and life expectancy at age 15 by 1.65 years. In rural areas, this would be 1.69 years and 2.19 years, respectively, and in urban areas, 0.78 years and 0.85 years. An additional 0.72 years would be spent in the reproductive age group 15-49; 1.00 years in rural areas and 0.35 years in urban areas. Eliminating deaths from accidents, injury, suicide and violence among women aged 15-49 would cumulatively contribute 0.55 years to female life expectancy at birth. **Conclusion:** Eliminating pregnancy-related mortality would extend female life expectancy in Zambia substantially, with more gains among adolescents and females in rural areas. The application of life table techniques to census data proved very valuable, although rigorous evaluation and adjustment of reported deaths and age was necessary to attain plausible estimates. The collection of detailed high quality cause-specific mortality data in future censuses is indispensable.

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**Data sources**
- National Health Facility Censuses
- Zambia Demographic Health Survey

**Experts**
Richard Banda

**Country-specific needs/attention**
- Neonatal and infant mortality
- High maternal mortality rate

**Public health campaign/programs**
- Maternal and Child Health Integrated Program (MCHIP)
- Zambia Ministry of Community Development, Mother and Child Health (MCDMCH)
- Zambia Center for Applied Health Research and Development (ZCAHRD) (Boston University)

**Introduction:** Most maternal deaths in developing countries can be prevented. China is among the 13 countries with the most maternal deaths; however, there has been a marked decrease in the maternal mortality ratio (MMR) over the last 3 decades. China’s reduction in the MMR has contributed significantly to the global decline of the MMR. This study examined the geographic and rural-urban differences, time trends and related factors in preventable maternal deaths in China during 1996-2005, with the aim of providing reliable evidence for effective interventions.

**Methods:** Data were retrieved from the population-based maternal mortality surveillance system in China. Each death was reviewed by three committees to determine whether it was avoidable. The preventable maternal mortality ratio (PMMR), the ratios of PMMR (risk ratio, RR) and 95% confidence intervals (CI) were used to analyze regional disparities (coastal, inland and remote regions) and rural-urban variations. Time trends in the MMR, along with underlying causes and associated factors of death, were also analysed. **Results:** Overall, 86.1% of maternal mortality was preventable. The RR of preventable maternal mortality adjusted by region was 2.79 (95% CI 2.42-3.21) and 2.38 (95% CI: 2.01-2.81) in rural areas compared to urban areas during the 1996-2000 and 2001-2005 periods, respectively. Meanwhile, the RR was the highest in remote areas, which was 4.80(95% CI: 4.10-5.61) and 4.74(95% CI: 3.86-5.83) times as much as that of coastal areas. Obstetric hemorrhage accounted for over 50% of preventable deaths during the 2001-2005 period. Insufficient information about pregnancy among women in remote areas and out-of-date knowledge and skills of health professionals and substandard obstetric services in coastal regions were the factors frequently associated with MMR. **Conclusion:** Preventable maternal mortality and the distribution of its associated factors in China revealed obvious regional differences. The PMMR was higher in underdeveloped regions. In future interventions in remote and inland areas, more emphasis should be placed on improving women’s ability to utilize healthcare services, enhancing the service capability of health institutions, and increasing the accessibility of obstetric services. These approaches will effectively lower PMMR in those regions and narrow the gap among the different regions.

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**Introduction:** Cesarean delivery has increased significantly during the last decades. This study aimed to investigate the association between planned mode of delivery and method of feeding. **Methods:** A cohort was created retrospectively using data from a population-based maternal and child health surveillance system, which covers 27 study sites in China from 1993 to 2006. The
cohort consisted of 431,704 women for analysis, including 22,462 women with planned cesarean delivery on maternal request (CDMR) and 409,242 women with planned vaginal delivery (VD). Logistic regression models were used to examine the association between mode of delivery and method of feeding adjusting for selected covariates. **Results:** In this cohort, 398,176 (92.2%) women exclusively breastfed their baby, 28,798 (6.7%) women chose mixed feeding, and 4,730 (1.1%) women chose formula feeding before hospital discharge. Women who planned CDMR were less likely to exclusively breastfeed and more likely to formula feed their babies than those who planned VD. After adjusting for covariates, the odds ratios were 0.85 (95% CI: 0.81-0.89) for exclusive breastfeeding and 1.61 (95% CI: 1.45-1.79) for formula feeding. Associations between planned mode of delivery and method of feeding in the south, north, rural and urban areas yielded similar results. **Conclusion:** This study demonstrated that planned CDMR was associated with a lower rate of exclusive breastfeeding and a higher rate of formula feeding in a low-risk Chinese population.

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**Introduction:** To quantify the association between maternal obesity and caesarean delivery, particularly caesarean delivery on maternal request (CDMR), a fast-growing component of caesarean delivery in many nations. **Methods:** We followed 1019576 nulliparous women registered in the Perinatal Healthcare Surveillance System during 1993-2010. Maternal body mass index (BMI, kg/m²), before pregnancy or during early pregnancy, was classified as underweight (<18.5), normal (18.5 to <23; reference), overweight (23 to <27.5), or obese (27.5), consistent with World Health Organization guidelines for Asian people. The association between maternal obesity and overall caesarean and its subtypes was modelled using log-binomial regression. **Results:** During the 18-year period, 404971 (39.7%) caesareans and 93927 (9.2%) CDMRs were identified. Maternal obesity was positively associated with overall caesarean and CDMR. Adjusted risk ratios for overall caesarean in the four ascending BMI categories were 0.96 [95% confidence interval (CI) 0.94, 0.97], 1.00 (Reference), 1.16 [95% CI 1.14, 1.18], 1.39 [95% CI 1.43, 1.54], and for CDMR were 0.95 [95% CI 0.94, 0.96], 1.00 (Reference), 1.20 [95% CI 1.18, 1.22], 1.48 [95% CI 1.43, 1.54]. Positive associations were consistently found in women residing in southern and northern provinces and in subgroups stratified by year of delivery, urban or rural residence, maternal age, education, level of delivering hospital, and birthweight. **Conclusion:** In a large Chinese cohort study, maternal obesity was associated with an increased risk of caesarean delivery and its subtypes, including CDMR. Given the rising global prevalence of obesity, and in view of the growth of CDMR, it seems likely that caesarean births will increase, unless there are changes in obstetrical practice.

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Appendix – Country-specific Information: Maternal and Child Health


**Introduction:** Our objective was to evaluate the role of hospitalized delivery in reducing maternal deaths from obstetric hemorrhage in urban and rural areas of China. Design. Longitudinal, retrospective study and review of maternal deaths based on data from the Maternal and Child Health Surveillance System (MCHSS). Setting. The surveillance areas of Maternal and Child Health in China from 1996 to 2006. A total of 6,259,336 live births and 1,418 maternal deaths from hemorrhage. **Methods:** Data on maternal deaths were retrieved from the MCHSS. The leading factors contributing to these deaths were reviewed by three committees. Main outcome measures: Maternal mortality ratio (MMR), relative risk (RR), leading factors contributing to deaths. **Results:** The MMR due to hemorrhage significantly decreased with increasing hospitalized delivery rates in rural areas, but it did not decrease in urban areas. The RR of maternal deaths from hemorrhage in women with non-hospitalized delivery in comparison to hospitalized delivery were 2.52 (95% confidence interval (CI): 1.71 similar to 3.70) in urban areas, and 5.52 (95% CI: 4.79 similar to 6.36) in rural areas. The level of knowledge and skills of medical professionals was the leading factor contributing to 79.6% (urban) and 81.0% (rural) of the deaths during hospitalized delivery. **Conclusion:** The quality of obstetric care in hospitals has become one of the most important factors influencing the risk of maternal deaths from hemorrhage in China. The knowledge and skills of medical professionals need to be improved, especially in primary hospitals.

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| Data sources          | • China Health and Nutrition Survey (CHNS)  
|                       | • Provincial maternal mortality surveillance systems (PMMSS)  
|                       | • Maternal and Child Health Surveillance System (MCHSS) |

| Experts          | Wang H |

| Country-specific needs/attention | Maternal mortality |

**Indonesia**


**Introduction:** Considerable improvements in life expectancy and other human development indicators in Indonesia are thought to mask considerable disparities between populations in the country. We examine the existence and extent of these disparities by measuring trends and inequalities in the under-five mortality rate and neonatal mortality rate across wealth, education and geography. **Methods:** Using data from seven waves of the Indonesian Demographic and Health Surveys, direct estimates of under-five and neonatal mortality rates were generated for 1980-2011. Absolute and relative inequalities were measured by rate differences and ratios, and where possible, slope and relative indices of inequality. Disparities were assessed by levels of rural/urban location, island groups, maternal education and household wealth. **Results:** Declines
in national rates of under-five and neonatal mortality have accorded with reductions of absolute inequalities in dusters stratified by wealth, maternal education and rural/urban location. Across these groups, relative inequalities have generally stabilized, with possible increases with respect to mortality across wealth subpopulations. Both relative and absolute inequalities in rates of under-five and neonatal mortality stratified by island divisions have widened. **Conclusion:** Indonesia has made considerable gains in reducing under-five and neonatal mortality at a national level, with the largest reductions happening before the Asian financial crisis (1997-98) and decentralization (2000). Hasty implementation of decentralization reforms may have contributed to a slowdown in mortality rate reduction thereafter. Widening inequities between the most developed provinces of Java-Bali and those of other island groupings should be of particular concern for a country embarking on an ambitious plan for universal health coverage by 2019. A focus on addressing the key supply side barriers to accessing health care and on the social determinants of health in remote and disadvantaged regions will be essential for this plan to be realized.

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**Introduction:** Our objective was to explore the factors that encompass maternal self-efficacy in providing food for the home. **Methods:** In-depth interviews were conducted with 19 mothers of nutritionally at risk children in an urban area of East Jakarta, Indonesia. This study was based on Social Cognitive Theory, Family Stress Models, and Ecological Frameworks. Data collection was coded and analyzed using the Grounded Theory Method. **Results:** Most mothers felt secure in providing food for their families knowing that their relatives and neighbors would support them if they lacked the money to buy food; however, most of them did not supply appropriate meals in terms of nutrient content, variety, and timing. **Conclusion:** Maternal self-efficacy was mainly characterized by practical issues concerning the preparation of food at home and a lack of knowledge of health and nutrition. Family-based interventions are needed to enhance competence in providing nutritious food from available resources.

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**Abstract:** A considerable body of evidence has now demonstrated positive correlations between grandparental presence and child health outcomes. It is typically assumed that such correlations exist because grandparental investment in their grandchildren improves child health and wellbeing. However, less is known about how grandparents allocate help to adult children and grandchildren, particularly in lower income contexts. Here we use detailed quantitative data from the longitudinal Indonesia Family Life Survey (data collected in 1993, 1997, 2000, 2007; n = 16,250) to examine grandparental help in a society transitioning both demographically and
We test the hypothesis that grandparents direct help preferentially towards those adult children and grandchildren most in need of help. This hypothesis was supported for help provided by married grandparents and single grandmothers, who tended to: provide more help to their adult children when this generation had young children themselves, provide financial help if their adult children were poorer, and provide more household help if their adult daughters worked outside the home. One unexpected result was that help from maternal and paternal grandparents is positively correlated; if one set of grandparents is helping the other set is more likely to help, counter to our predictions. These results provide support for the hypothesis that grandparents preferentially invest in some descendants over others, where married grandparents and single grandmothers tend to invest in those adult children and grandchildren with the most need. Investigating the effect of grandparents on child health outcomes may therefore be confounded by grandparent's preferential investment in needier descendants.

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Abstract: This article examines the impact of the World Bank's Safe Motherhood Project (SMP) on health outcomes for Indonesia's poor. Provincial data from 1990 to 2005 was analyzed combining a difference-in-differences approach in multivariate regression analysis with matching of intervention (SMP) and control group provinces and adjusting for possible confounders. Our results indicated that, after taking into account the impact of two other concurrent development projects, SMP was statistically significantly associated with a net beneficial change in under-five mortality, but not with infant mortality, total fertility rate, teenage pregnancy, unmet contraceptive need or percentage of deliveries overseen by trained health personnel. Unemployment and the pupil teacher ratio were statistically significantly associated with infant mortality and percentage deliveries overseen by trained personnel, while pupil teacher ratio and female education level were statistically significantly associated with under-five mortality. Clinically relevant changes (52-68% increase in the percentage of deliveries overseen by trained personnel, 25-33% decrease in infant mortality rate, and 8-14% decrease in under-five mortality rate) were found in both the intervention (SMP) and control groups.

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Data sources
- Indonesia Demographic Health Survey
- National Social Economic Survey (SUSENAS)
- Indonesia Family Life Survey

Experts
Jimenez-Soto E

Public health campaign/programs
World Bank's Safe Motherhood Project (SMP)
Vietnam


Introduction: Good infant growth is important for future health. Assessing growth is common in pediatric care all over the world, both at the population and individual level. There are few studies of birth weight and growth studies comparing urban and rural communities in Vietnam. The first aim is to describe and compare the birth weight distributions and physical growth (weight and length) of children during their first year in one rural and one urban area of Hanoi Vietnam. The second aim is to study associations between the anthropometric outcomes and indicators of the economic and educational situations. Methods: Totally 1,466 children, born from 1st March, 2009 to June 2010, were followed monthly from birth to 12 months of age in two Health and Demographic Surveillance Sites; one rural and one urban. In all, 14,199 measurements each of weight and length were made. Birth weight was recorded separately. Information about demographic conditions, education, occupation and economic conditions of persons and households was obtained from household surveys. Fractional Polynomial models and standard statistical methods were used for description and analysis. Results: Urban infants have higher birth weight and gain weight faster than rural infants. The mean birth weight for urban boys and girls were 3,298 grams and 3,203 grams as compared to 3,105 grams and 3,057 grams for rural children. At 90 days, the urban boys were estimated to be 4.1% heavier than rural boys. This difference increased to 7.2% at 360 days. The corresponding difference for girls was 3.4% and 10.5%. The differences for length were comparatively smaller. Both birth weight and growth were statistically significantly and positively associated with economic conditions and mother education. Conclusion: Birth weight was lower and the growth, weight and length, considerably slower in the rural area, for boys as well as for girls. The results support the hypothesis that the rather drastic differences in maternal education and economic conditions lead to poor nutrition for mothers and children in turn causing inferior birth weight and growth.

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Introduction: Our objective was to investigate the initiation of breast-feeding and exclusive breast-feeding within the first week after delivery for women in rural Vietnam. Methods: An interviewer-administered survey was conducted on a sample of rural women who gave birth during August-October 2002. Setting: Quang Xuong District, Thanh Hoa Province of Vietnam. Subjects: Four hundred and sixty-three women participated in the study, of whom 181 delivered at the district hospital (39.1%), 229 at a commune health centre (49.5%) and 53 at home attended by a traditional birth attendant (11.4%). Results: Although the initiation and exclusive breast-feeding rates were relatively high at 98.3% and 83.6% respectively, the premature introduction of complementary food was a great concern. Logistic regression analysis showed that, together with sociocultural determinants such as feeding preferences of the husband and maternal grandmother, feeding practices of friends, factors relating to delivery methods, delivery locations and health problems could influence the initiation rate and breastfeeding patterns. Conclusion:
To promote breast-feeding practices of rural mothers, health education on breast-feeding should take into account local socio-cultural features in addition to improving the counselling skills of health workers.

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**Introduction:** Vietnam has achieved considerable success in economic development, poverty reduction, and health over a relatively short period of time. However, there is concern that inequalities in health outcomes and intervention coverage are widening. This study explores if inequalities in reproductive, maternal, newborn and child health and nutrition changed over time in Vietnam in 1997-2006, and if inequalities were different depending on the type of stratifying variable used to measure inequalities and on the type of outcome studied. **Methods:** Using data from four nationally representative household surveys conducted in 1997-2006, we study inequalities in reproductive, maternal, newborn and child health and nutrition outcomes and intervention coverage by computing concentration indices by living standards, maternal education, ethnicity, region, urban/rural residence, and sex of child. **Results:** Inequalities in maternal, newborn and child health persisted in 1997-2006. Inequalities were largest by living standards, but not trivial by the other stratifying variables. Inequalities in health outcomes generally increased over time, while inequalities in intervention coverage generally declined. The most equitably distributed interventions were family planning, exclusive breastfeeding, and immunizations. The most inequitably distributed interventions were those requiring multiple service contacts, such as four or more antenatal care visits, and those requiring significant support from the health system, such as skilled birth attendance. **Conclusion:** Three main policy implications emerge. First, persistent inequalities suggest the need to address financial and other access barriers, for example by subsidizing health care for the poor and ethnic minorities and by support from other sectors, for example in strengthening transportation networks. This should be complemented by careful monitoring and evaluation of current program design and implementation to ensure effective and efficient use of resources. Second, greater inequalities for interventions that require multiple service contacts imply that inequalities could be reduced by strengthening information and service provision by community and village health workers to promote and sustain timely care-seeking. Finally, larger inequalities for interventions that require a fully functioning health system suggest that investments in health facilities and human resources, particularly in areas that are disproportionately inhabited by the poor and ethnic minorities, may contribute to reducing inequalities.

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**Data sources**

- Vietnam Demographic Health Survey
- Vietnam Nutrition Survey of Mothers and Children
- Vietnam General Nutrition Survey (GNS)
- Vietnam National Anemia Survey
Appendix – Country-specific Information: Maternal and Child Health

- Vietnam National Protein Energy Malnutrition Survey

**Experts**

Nguyen PH

**Country-specific needs/attention**

- Child undernutrition
- Micronutrient deficiencies
- Maternal and infant mortality

**Country-specific information**

National Nutrition of Nutrition (Vietnam)

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**Bangladesh**


**Introduction:** The aim of this study was to identify factors associated with mortality in children under 5 years of age using a nationally representative sample of singleton births for the period of 2004-2011. **Methods:** Pooled 2004, 2007 and 2011 cross-sectional data sets of the Bangladesh Demographic and Health Surveys were analysed. The surveys used a stratified two-stage cluster sample of 16,722 singleton live-born infants of the most recent birth of a mother within a 3-year period. Outcome measures were neonatal mortality (0-30 days), post neonatal mortality (1-11 months), infant mortality (0-11 months), child mortality (1-4 years) and under-5 mortality (0-4 years). **Results:** Survival information for 16,722 singleton live-born infants and 522 deaths of children <5 years of age included: 310 neonatal deaths, 154 post neonatal deaths, 464 infant deaths, 58 child deaths and 522 under-5 deaths. Multiple variable analysis showed that, over a 7-year period, mortality reduced significantly by 48% for post neonatal deaths, 33% for infant deaths and 29% for under-5 deaths, but there was no significant reduction in neonatal deaths (adjusted OR (AOR) = 0.79, 95% CI 0.59 to 1.06) or child deaths (AOR = 1.00, 95% CI 0.51 to 1.94). The odds of neonatal, post neonatal, infant, child and under-5 deaths decreased significantly among mothers who used contraceptive and mothers who had other children aged 3 years or older. The risk of neonatal, post neonatal, infant, child and under-5 deaths was significantly higher in mothers who reported a previous death of a sibling. **Conclusion:** Our study suggests that family planning is needed to further reduce the overall rate of under-5 deaths in Bangladesh. To reduce childhood mortality, public health interventions that focus on child spacing and contraceptive use by mothers may be most effective.

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**Abstract:** This paper examines the association of social networks with the experience of neonatal death and the type of assistance that a woman obtains at childbirth in rural Bangladesh. Data were collected by interviewing 694 women from seven villages using a structured questionnaire. From the use of both social network analysis and statistical methods, we find that the experience
of neonatal death and the type of assistance that a woman gets at childbirth are associated with the characteristics of their social networks along with a set of socioeconomic factors that are usually considered to be important. The higher the degree of centrality of a woman in her social network, the less likely it is that she will experience neonatal death, and the experience of neonatal death is significantly associated with the type of assistance she obtained at giving birth. Using a multivariate multinomial logistic regression model to explore the likelihood of using different types of birth assistance, we find that the higher the degree centrality of a woman, the less likely she will be attended by professional assistance. Further investigations reveal that the dominant norm in villages is to use traditional birth attendants and the perception about professional birth assistance is that it is 'not needed'. Moreover, the respondents' network members were also interviewed, and from the sociograms we find that there was an inward connectivity between the same types of assistance users. These findings have implications for norm change interventions among the village women using a network approach and in particular using opinion leaders.

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**Abstract:** New medical inventions for saving young lives are not enough if these do not reach the children and the mother. The present paper provides new evidence that institutional delivery can significantly lower child mortality risks, because it ensures effective and timely access to modern diagnostics and medical treatments to save lives. We exploit the exogenous variation in community's access to local health facilities (both traditional and modern) before and after the completion of the 'Women's Health Project' in 2005 (that enhanced emergency obstetric care in women friendly environment) to identify the causal effect of hospital delivery on various mortality rates among children. Our best estimates come from the parents fixed effects models that help limiting any parents-level omitted variable estimation bias. Using 2007 Bangladesh Demographic Health Survey data from about 6000 children born during 2002-2007, we show that, ceteris paribus, access to family welfare clinic particularly boosted hospital delivery likelihood, which in turn lowered neo-natal, early and infant mortality rates. The beneficial effect was particularly pronounced among adolescent mothers after the completion of Women's Health Project in 2005; infant mortality for this cohort was more than halved when delivery took place in a health facility.

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**Introduction:** A community based approach before, during and after child birth has been proven effective address the burden of maternal, neonatal and child morbidity and mortality in the low and middle income countries. We aimed to examine the overall change in maternal and newborn health outcomes due the "Improved Maternal Newborn and Child Survival" (IMNCS) project,
which was implemented by BRAC in rural communities of Bangladesh. **Methods:** The intervention was implemented in four districts for duration of 5-years, while two districts served as comparison areas. The intervention was delivered by community health workers who were trained on essential maternal, neonatal and child health care services. A baseline survey was conducted in 2008 among 7,200 women with pregnancy outcome in last year or having a currently alive child of 12-59 months. A follow-up survey was administered in 2012-13 among 4,800 women of similar characteristics in the same villages. **Results:** We observed significant improvements in maternal and essential newborn care in intervention areas over time, especially in health care seeking behaviors. The proportion of births taking place at home declined in the intervention districts from 84.3% at baseline to 71.2% at end line (P<0.001). Proportion of deliveries with skilled attendant was higher in intervention districts (28%) compared to comparison districts (27.4%). The number of deliveries was almost doubled at public sector facility comparing with baseline (P<0.001). Significant improvement was also observed in healthy cord care practice, delayed bathing of the new-born and reduction of infant mortality in intervention districts compared to that of comparison districts. **Conclusion:** This study demonstrates that community-based efforts offer encouraging evidence and value for combining maternal, neonatal and child health care package. This approach might be considered at larger scale in similar settings with limited resources.

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**Data sources**

- Bangladesh Demographic Health Survey

**Experts**

- Dibley, M. J

**Country-specific needs/attention**

- Maternal mortality

**Country-specific information**

- Government of India. Sample registration system of India. Office of Registrar General of India. Ministry of Home Affairs

**Public health campaign/programs**

- International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)
- Improved Maternal Newborn and Child Survival" (IMNCS) project, implemented by Bangladesh Rehabilitation Assistance Committee (BRAC) in rural communities of Bangladesh
- USAID’s Maternal and Child Health Integrated Program in Bangladesh

**India**


**Introduction:** Low use of maternal healthcare services is one of the reasons why maternal mortality is still considerably high among adolescent mothers in India. To increase the utilization of these services, it is necessary to identify factors that affect service utilization. To our knowledge, no national level study in India has yet examined the issue in the context urban adolescent mothers. The present study is an attempt to fill this gap. **Methods:** Using information from the third wave of District Level Household Survey (2007-08), we have examined factors associated with the utilization of maternal healthcare services among urban Indian married
adolescent women (aged 13-19 years) who have given live/still births during last three years preceding the survey. The three outcome variables included in the analyses are ‘full antenatal care (ANC)’, ‘safe delivery’ and ‘postnatal care within 42 days of delivery’. We have used Chi-square test to determine the difference in proportion and the binary logistic regression to understand the net effect of predictor variables on the utilization of maternity care. **Results:** About 22.9% of mothers have received full ANC, 65.1% of mothers have had at least one postnatal check-up within 42 days of pregnancy. The proportion of mother having a safe delivery, i.e., assisted by skilled personnel, is about 70.5%. Findings indicate that there is considerable amount of variation in use of maternity care by educational attainment, household wealth, religion, parity and region of residence. Receiving full antenatal care is significantly associated with mother’s education, religion, caste, household wealth, parity, exposure to healthcare messages and region of residence. Mother's education, full antenatal care, parity, household wealth, religion and region of residence are also statistically significant in case of safe delivery. The use of postnatal care is associated with household wealth, woman's education, full antenatal care, safe delivery care and region of residence. **Conclusion:** Several socioeconomic and demographic factors affect the utilization of maternal healthcare services among urban adolescent women in India. Promoting the use of family planning, female education and higher age at marriage, targeting vulnerable groups such as poor, illiterate, high parity women, involving media and grass root level workers and collaboration between community leaders and health care system could be some important policy level interventions to address the unmet need of maternity services among urban adolescents.

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**Effectiveness of a multiple-strategy community intervention to reduce maternal and child health inequalities in Haryana, North India: a mixed-methods study protocol.** Gupta M, Angeli F, van Schayck OCP, Bosma H. *Glob Health Action.* 2015;8:10. PMID: 25676665

**Introduction:** A multiple-strategy community intervention, known as National Rural Health Mission (NRHM), launched in India to improve the availability of and access to better-quality healthcare, especially for rural, poor mothers and children. The final goal of the intervention is to reduce maternal and child health inequalities across geographical areas, socioeconomic status groups, and sex of the child. Extensive, in-depth research is necessary to assess the effectiveness of NRHM, on multiple outcome dimensions. This paper presents the design of a new study, able to overcome the shortcomings of previous research. **Objective:** To propose a comprehensive, methodologically sound protocol to assess the extent of implementation and the effectiveness of NRHM measures to improve maternal and child health outcomes and reduce maternal and child health inequalities. **Methods:** A mixed-methods approach (quantitative and qualitative) is proposed for this study in Haryana, a state in North India. NRHM's health sector plans included health system strengthening, specific maternal and child healthcare strategies, and communitization. Mission documents and reports on progress, financial monitoring, and common and joint review will be reviewed in-depth to assess the extent of the implementation of plans. Data on maternal and child health indicators will be obtained from demographic health surveys held before, during, and after the implementation of the first phase of the NRHM (2005-2012) and compared over time. Differences in maternal and child health indicators will be used to measure maternal and child health inequalities; these will be compared pre- and post-NRHM. Focus group discussions (FGDs) with service providers and in-depth interviews with program
managers, community representatives, and mothers will be conducted until data saturation is achieved, in two districts of Haryana. Using NVivo software, an inductive qualitative content analysis will be performed to search for the broader themes across the interviews and FGDs. Ethical approval was obtained from the Ethics Committee of the Post Graduate Institute of Medical Education and Research.

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**Introduction:** As part of efforts to reduce maternal deaths in Karnataka state, India, there has been a concerted effort to increase institutional deliveries. However, little is known about the quality of care in these healthcare facilities. We investigated the availability and distribution of emergency obstetric care (EmOC) services in eight northern districts of Karnataka state in south India. **Methods:** We undertook a cross-sectional study of 444 government and 422 private health facilities, functional 24-hours-a-day 7-days-a-week. EmOC availability and distribution were evaluated for 8 districts and 42 taluks (sub-districts) during the year 2010, based on a combination of self-reporting, record review and direct observation. **Results:** Overall, the availability of EmOC services at the sub-state level [EmOC = 5.9/500,000; comprehensive EmOC (CEmOC) = 4.5/500,000 and basic EmOC (BEmOC) = 1.4/500,000] was seen to meet the benchmark. These services however were largely located in the private sector (90% of CEmOC and 70% of BEmOC facilities). Thirty six percent of private facilities and six percent of government facilities were EmOC centres. Although half of eight districts had a sufficient number of EmOC facilities and all eight districts had a sufficient number of CEmOC facilities, only two-fifths of the 42 taluks had a sufficient number of EmOC facilities. With the private facilities being largely located in select towns only, the ‘non-headquarter’ taluks and ‘backward’ taluks suffered from a marked lack of coverage of these services. Spatial mapping further helped identify the clustering of a large number of contiguous taluks without adequate government EmOC facilities in northeastern Karnataka. **Conclusion:** In conclusion, disaggregating information on emergency obstetric care service availability at district and sub district levels is critical for health policy and planning in the Indian setting. Reducing maternal deaths will require greater attention by the government in addressing inequities in the distribution of emergency obstetric care services.

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**Abstract:** Nearly 40% of the world's stunted children live in India and the prevalence of undernutrition has been persistently high in recent decades. Given numerous available interventions for reducing undernutrition in children, it is not clear of the relative importance of each within a multifactorial framework. We assess the simultaneous contribution of 15 known risk factors for child chronic undernutrition in India. Data are from the 3rd Indian National Family
Appendix – Country-specific Information: Maternal and Child Health

Health Survey (NFHS-3), a nationally representative cross-sectional survey undertaken in 2005-2006. The study population consisted of children aged 6-59 months [n = 26,842 (stunting/low height-for-age), n = 27,483 (underweight/low weight-for-age)]. Risk factors examined for their association with undernutrition were: vitamin A supplementation, vaccination, use of iodized salt, household air quality, improved sanitary facilities, safe disposal of stools, improved drinking water, prevalence of infectious disease, initiation of breastfeeding, dietary diversity, age at marriage, maternal BMI, height, education, and household wealth. Age/sex-adjusted and multivariable adjusted effect sizes (odds ratios) were calculated for risk factors along with Population Attributable Risks (PAR) and Fractions (PAF) using logistic regression. In the mutually adjusted models, the five most important predictors of childhood stunting/underweight were short maternal stature, mother having no education, households in lowest wealth quintile, poor dietary diversity, and maternal underweight. These five factors had a combined PAR of 67.2% (95% CI: 63.3-70.7) and 69.7% (95% CI: 66.3-72.8) for stunting and underweight, respectively. The remaining factors were associated with a combined PAR of 11.7% (95% CI: 6.0-17.4) and 15.1% (95% CI: 8.9-21.3) for stunting and underweight, respectively. Implementing strategies focused on broader progress on social circumstances and infrastructural domains as well as investments in nutrition specific programs to promote dietary adequacy and diversity are required to ensure a long term trajectory of optimal child growth and development in India.

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Introduction: Caste is one of the traditional measures of social segregation in India and differs from other indicators as it is both, endogamous and hereditary. Evidence suggests that belonging to lower castes exposes one to social inequalities and affects health adversely. We examined the association of caste with childhood anemia in India and explored the effect modifying role of adult education and household wealth. Methods: A cross-sectional analysis of National Family Health Survey (NFHS) data of 43,484 children aged 6-59 months was performed. Poisson regression analysis was conducted to study the association between caste and childhood anemia accounting for various maternal, child, and household related variables. Caste was categorized as "other caste" (least disadvantageous), "other backward caste", "scheduled tribe" and "scheduled caste" (most disadvantageous). Anemia was defined as mild (hemoglobin level 7-11 g/dL), moderate (hemoglobin level 5-7 g/dL) and severe (hemoglobin level <5 g/dL). Results: We found that children in scheduled caste had higher risk of having anemia [mild anemia: RR = 1.10, 95% CI = 1.05-1.15; moderate anemia: RR = 1.19, 95% CI = 1.14-1.24; severe anemia: RR = 1.87, 95% CI = 1.51-2.31] after accounting for child, maternal and household covariates including adult education and household wealth. The interaction of caste with adult education and household wealth was not statistically significant for any level of anemia. Sensitivity analyses for children born to mothers of age >/= 18 years at first child birth and body mass index (BMI) >/= 18.5 kg/m(2), resulted in similar findings. Conclusion: Caste is an independent determinant of childhood anemia in India. The level of adult education and household wealth did not modify the association between caste and childhood anemia. The findings may be used for countering childhood anemia and it may be beneficial to target future public health actions towards disadvantageous castes in India.
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**Introduction:** India accounts for 24% to all under-five mortality in the world. Residence in rural area, poverty and low levels of mother’s education are known confounders of under-five mortality. Since two-thirds of India’s population lives in rural areas, mothers employed in agriculture present a particularly vulnerable population in the Indian context and it is imperative that concerns of this sizeable population are addressed in order to achieve MDG4 targets of reducing U5MR to fewer than 41 per 1,000 by 2015. This study was conducted to examine factors associated with under-five mortality among mothers employed in agriculture. **Methods:** Data was retrieved from National Family Household Survey-3 in India (2008). The study population is comprised of a national representative sample of single children aged 0 to 59 months and born to mothers aged 15 to 49 years employed in agriculture from all 29 states of India. Univariate and Multivariate Cox PH regression analysis was used to analyses the Hazard Rates of mortality. The predictive power of child mortality among mothers employed in agriculture was assessed by calculating the area under the receiver operating characteristic (ROC) curve. **Results:** An increase in mothers’ ages corresponds with a decrease in child mortality. Breastfeeding reduces child mortality by 70% (HR 0.30, 0.25-0.35, p = 0.001). Standard of Living reduces child mortality by 32% with high standard of living (HR 0.68, 0.52-0.89, 0.001) in comparison to low standard of living. Prenatal care (HR 0.40, 0.34-0.48, p = 0.001) and breastfeeding health nutrition education (HR 0.45, 0.31-0.66, p = 0.001) are associated significant factors for child mortality. Birth Order five is a risk factor for mortality (HR 1.49, 1.05-2.10, p = 0.04) in comparison to Birth Order one among women engaged in agriculture while the household size (6-10 members and ≥ 11 members) is significant in reducing child mortality in comparison to ≤5 members in the house. Under-five mortality among mothers employed in agriculture in India discriminated well between death and survival (Area Under ROC was 0.75, 95% CI [0.73-0.77]) indicating that the model is good for appropriate prediction of child mortality. **Conclusion:** In a nationally representative sample of households in India, mother’s age, breastfeeding, standard of living, prenatal care and breastfeeding health nutrition education are associated with reduction in child mortality.

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**Abstract:** Evidence from developing countries demonstrates a mixed relationship of overweight/obesity with socioeconomic status (SES) and place of residence. Theory of nutrition transition suggests that over the course of development, overweight first emerges among rich
and urban people before spreading among rural and poor people. India is currently experiencing a rapid rise in the proportion of overweight and obese population especially among adult women. Under the backdrop of huge socio-economic heterogeneity across the states of India, the inter-state scenario of overweight and obesity differs considerably. Hence, this paper investigates the evolution over time of overweight and obesity among ever-married Indian women (15-49 years) from selected 'underweight states' (Bihar, Orissa and Madhya Pradesh, where underweight proportion is predominant) and 'overweight states' (Kerala, Delhi and Punjab, where overweight is the prime concern), in relation to a few selected socio-economic and demographic indicators. This study analysed National Family Health Surveys- NFHS-2 (1998-99) and NFHS-3 (2005-06) following Asian population specific BMI cut-offs for overweight and obesity. The results confirm that within India itself the relationship of overweight and obesity with place of residence and SES cannot be generalized. Results from 'overweight states' show that the overweight problem has started expanding from urban and well-off women to the poor and rural people, while the rural-urban and rich-poor difference has disappeared. On the other hand in 'underweight states' overweight and obesity have remained socially segregated and increasing strongly among urban and richer section of the population. The rate of rise of overweight and obesity has been higher in rural areas of 'OW states' and in urban areas of 'UW states'. Indian policymakers thus need to design state-specific approaches to arrest the rapid growth of overweight and its penetration especially towards under-privileged section of the society.

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| Data sources | • India Demographic Health Survey  
• District Level Household Survey  
• National Family Health Survey (NFHS)  
• National Nutrition Monitoring Bureau (NNMB)  
• Birth Defect Registry of India |
| Experts | Subramanian, S. V |
| Country-specific needs/attention | • Neonatal and child mortality  
• Maternal mortality  
• Child undernutrition  
• Micronutrient malnutrition |
| Country-specific information | Government of India. Sample registration system of India. Office of Registrar General of India. Ministry of Home Affairs |
| Public health campaign/programs | • National Rural Health Mission (NRHM)  
• Family Planning, Child Survival and Safe Motherhood and Reproductive and Child Health  
• India flour fortification network (IFFN)  
• iodine deficiency disorder control program  
• Foetal Care Research Foundation. Birth defect registry of India |
PAHO Region

Nicaragua


Introduction: Our objective was to evaluate the associations of women's autonomy and social support with infant and young child feeding practices (including consumption of highly processed snacks and sugar-sweetened beverages) and nutritional status in rural Nicaragua. Methods: Cross-sectional study. Feeding practices and children's nutritional status were evaluated according to the WHO guidelines complemented with information on highly processed snacks and sugar-sweetened beverages. Women's autonomy was assessed by a seventeen-item questionnaire covering dimensions of financial independence, household-, child-, reproductive and health-related decision making and freedom of movement. Women's social support was determined using the Duke-UNC Functional Social Support Questionnaire. The scores attained were categorized into tertiles. Setting: Los Cuatro Santos area, rural Nicaragua. Subjects: A total of 1371 children 0-35 months of age. Results: Children of women with the lowest autonomy were more likely to be exclusively breast-fed and continue to be breast-fed, while children of women with middle level of autonomy had better complementary feeding practices. Children of women with the lowest social support were more likely to consume highly processed snacks and/or sugar-sweetened beverages but also be taller. Conclusion: While lower levels of autonomy and social support were independently associated with some favorable feeding and nutrition outcomes, this may not indicate a causal relationship but rather that these factors reflect other matters of importance for child care.

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Abstract: Relationships among women's employment, child care strategies, and nutritional status of children 12-18 months of age were examined in 80 Nicaraguan households sampled by randomized block design in 10 low income urban communities. Multiple regression analyses showed that children of employed mothers (56%) fared better in weight/height than those whose mothers were not employed, with and without controlling for socioeconomic status; and maternal education, paternal financial support, child care adequacy, and sex and age of the child. Children with inadequate alternate child care (care by a preteen or care at the work place) had lower height for age, even controlling for the same variables and for maternal employment. Differences in 10 caregiving behaviors between families as a function of work status of the mother and adequacy of child care were examined. In families with working mothers, caregivers were less likely to be observed washing their hands, suggesting that the positive associations of
work for earnings might be due to income rather than improved care. Inadequate care was associated with less food variety, less use of health care, and marginally less handwashing. Inadequate child care, which tends to be associated with informal work, nuclear families and poverty, should be a concern for child welfare.

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**Introduction:** Socio-economic resources may be associated with infant feeding in complex patterns in societies undergoing a nutrition transition. This study evaluates associations of housing quality, food security and maternal education to the World Health Organization (WHO) feeding recommendations and to consumption of highly processed snacks (HP snacks) and sugar-sweetened beverages (SSBs) in rural Nicaragua. **Methods:** Data were collected from May to November 2009, with mothers of 0- to 35-month-olds being asked about young child feeding using a food frequency questionnaire. A validated questionnaire was used to assess household food insecurity and data were collected on maternal education and housing quality. Pearson’s chi-squared test was used to compare proportions and determine associations between the resources and young child feeding. The three socio-economic resources and other confounders were introduced to multivariate logistic regression analyses to assess the independent contribution of the resources to the feeding practices and consumption of HP snacks and SSBs. **Results:** Mothers with the lowest education level were more likely to be exclusively breastfeeding (EBF) their infants (OR not EBF: 0.19; 95% CI: 0.07, 0.51), whilst mothers of 6- to 35-month-olds in the lowest education category had more inadequate dietary diversity (DD) (OR for not meet DD: 2.04; 95% CI: 1.36, 3.08), were less likely to consume HP snacks (OR for HP snacks: 0.47; 95% CI: 0.32, 0.68) and SSBs (OR for SSBs: 0.68; 95% CI: 0.46, 0.98), compared to mothers with the highest level of education. Similarly, children residing in households with the highest food insecurity were also more prone to have inadequate dietary diversity (OR for not meet DD: 1.47; 95% CI: 1.05, 2.05). The odds for double burden of suboptimal feeding (concurrent inadequate diet and consumption of HP snacks/SSBs) were significantly lower in children of least educated mothers (OR: 0.64; 95% CI: 0.44, 0.92). **Conclusion:** Higher level of education was associated with both more and less adherence to the WHO recommended feeding practices as well as with more consumption of HP snacks and SSBs. Regardless of educational strata, the children in the community were exposed to suboptimal feeding practices conducive to both under- as well as over nutrition.

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**Data sources**
- Nicaragua Demographic Health Survey
- Nicaragua Reproductive Health Survey
- Nicaragua-Boaco Family Planning/Maternal and Child Health Survey

**Experts**
- Ekstrom EC
El Salvador


**Introduction:** Our objective was to provide a baseline perspective on the prevalence of Salvadoran men's attendance at prenatal care, delivery, and postpartum well-baby care and on sociodemographic factors associated with their attendance, with the goal of informing efforts to help men play more positive roles in maternal-child health. **Methods.** The data came from the 2003 Salvadoran National Male Health Survey. The data focused on fathers (n = 418) and their most recent live-born child in the preceding five years. Factors associated with the fathers' participation in prenatal care visits, attendance at delivery, and participation in postnatal well-baby visits were explored using logistic and multinomial regression models. **Results.** Ninety percent of the recent Salvadoran fathers who were surveyed participated in a prenatal care visit, attended the delivery, or participated in a postpartum well-baby care visit; 34% participated in all three of the activities. Attendance at delivery was most common, reported by 81% of fathers; the most common reason that subjects cited for not attending was that they had had to work. **Conclusion.** A large majority of the Salvadoran fathers participated in at least one prenatal care visit, delivery, or a postpartum well-baby care visit. While attendance alone does not necessarily indicate that men are supporting their partners, the results suggest that norms are in place for men to play positive roles in maternal-child health matters. Furthermore, the participation of fathers in these maternal and child health care activities may provide new opportunities to educate and further support men in both their own health and their family's health.

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**Abstract:** It is well understood that undernutrition underpins much of child morbidity and mortality in less developed countries, but the causes of undernutrition are complex and interrelated, requiring a multipronged approach for intervention. This paper uses a subsample of 3853 children under age 5 from the most recent family health survey in El Salvador to examine the relationship between birth spacing and childhood undernutrition (stunting and underweight). While recent research and guidance suggest that birth spacing of three to five years contributes to lower levels of infant and childhood mortality, little attention has been given to the possibility that short birth intervals have longer-term effects on childhood nutrition status. The analysis controls for clustering effects arising from siblings being included in the subsample, as well as variables that are associated with household resources, household structure, reproductive history and outcomes, and household social environment. The results of the multiple regression analyses find that in comparison to intervals of 36-59 months, birth intervals of less than 24 months and intervals of 24-35 months significantly increase the odds of stunting (<24 months Odds Ratio (OR)
Appendix – Country-specific Information: Maternal and Child Health

= 1.52; 95% confidence interval (CI): 1.21-1.92; 25-36 months OR = 1.30; 95% CI: 1.05-1.64). Other factors related to stunting and underweight include standard of living index quintile, child’s age, mother’s education, low birthweight, use of prenatal care, and region of the country where the child lives. Policy and program implications include more effective use of health services and outreach programs to counsel mothers on family planning, breastfeeding, and well child care.

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Data sources
- El Salvador National Family Health Survey
- El Salvador Demographic Health Survey
- El Salvador Reproductive Health Survey
- El Salvador Family planning/Maternal and Child Health Survey
- El Salvador Contraceptive Prevalence Survey (1978)
- Salvadoran National Male Health Survey

Experts
- Speizer I

Country-specific needs/attention
- Maternal mortality
- Child undernutrition (stunting and underweight)

Panama


Abstract: The prevalence of vitamin A deficiency in a nationally representative sample of children 12-59 months old in Panama was assessed using serum retinol levels and dietary indicators. The median serum retinol level found was 1.27 +/- 0.42 mmol/L (38 micrograms/dL); 6.0% of the study sample providing adequate blood specimens had levels below 0.7 mmol/L (20 micrograms/dL), indicating deficient vitamin A intake. The Panama City Metropolitan Area and the country’s western region had the highest prevalences of low serum retinol levels (below 0.7 mmol/L in 9% and 6% of the study children, respectively), as compared to overall prevalences of 5% in the two other regions studied. Low serum retinol levels were significantly more prevalent among Indians in the study group (primarily Guaymí Indians) than among non-Indians (13% versus 5%). Dietary information provided by the study children’s mothers showed that high risk of inadequate dietary vitamin A intake closely paralleled low serum retinol levels; specifically, the highest prevalence of dietary inadequacy was found in the western region, especially among the Indians. The Panamanian Government is currently increasing distribution of high-dose vitamin A capsules to Indian preschoolers in Chiriquí and Bocas del Toro Provinces.

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**Introduction:** Our objective was to determine whether national distribution of a neonatal provider education program (the S.T.A.B.L.E. Program) positively impacts the health of ill newborns that require transport in Panama. **Methods:** The investigation used a prospective, pre-and post-intervention study design with a double pretest. The 10 birthing centers in Panama that routinely transport the greatest number of newborns received the education program intervention. Primary outcomes were body temperature and serum glucose level on arrival at the referral facility. Length of stay and mortality were evaluated as secondary outcomes. Variation in outcome indicators was compared for 7 months before and after the intervention. Data from all live newborns transported from outlying birthing center study sites during the study dates were included in the investigation. **Results:** A total of 136 and 146 newborns were transported during the observation and post intervention periods, respectively. Significantly more patients in the post intervention group had temperatures within the normal range (56% in post intervention group vs 34% in observation group; P<0.01). No statistical difference was observed in serum glucose levels, length of stay or mortality. **Conclusion:** Distribution of a neonatal provider educational program was associated with improved thermal management of transported newborns in Panama. Further study will help to confirm this association and determine the extent to which these findings are generalizable to other resource-constrained settings.

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**Data sources**

<table>
<thead>
<tr>
<th>Experts</th>
<th>Panama Family Planning/Maternal and Child Health Survey</th>
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**Belize**


**Abstract:** Data from the 1991 Belize Family Health Survey show differentials in the use of maternal and child health services between ethnic groups (Creole, Mestizo, Maya/Ketchi and Garifuna). Multivariate analysis is used to explore whether such differentials can truly be attributed to ethnicity or to other characteristics that distinguish the ethnic groups. Health services considered are: family planning, place of delivery (hospital/other), postpartum and newborn check-ups after a birth, and immunizations for children. The language usually spoken in the household is found to be important for interpreting ethnic differentials. Mayan-speaking Maya/Ketchis are significantly less likely to use family planning services or to give birth in a hospital. Spanish-speakers (Mestizos and Maya/Ketchis) are less likely to use newborn and postpartum check-ups, after controlling for other characteristics. There are no ethnic differentials for immunizations. Programmatic implications of these results are discussed.

**Corresponding author:** Paul W Stupp, Behavioral Epidemiology and Demographic Research Branch, Division of Reproductive Health, Centers for Disease Control, Atlanta, GA

Abstract: Suggestions that carotenoid-containing foods are beneficial in maintaining health have led to several studies of circulating carotenoid concentrations of adults. Because few data are available for children, we report serum carotenoid concentrations of 493 children in Belize. Carotenoid concentrations were determined as part of a survey of vitamin A status of children, most between 65 and 89 months of age. Reproducibility was tested by collecting a second blood sample 2 weeks after the first collection from a subset of children (n = 23) who consumed their habitual diet with no treatment during the interim. Predominant serum carotenoids were lutein/zeaxanthin and beta-carotene; which accounted for 26% and 24% of median total carotenoids, respectively. The three provitamin A carotenoids, alpha- and beta-carotene and beta-cryptoxanthin, constituted 51% of median total carotenoid concentrations. Partial correlations of each carotenoid with lasting retinol concentration indicated that beta-carotene had the highest correlation. Concordance correlation coefficients (r(c)) for lasting carotenoid concentrations determined 2 weeks apart were greater than or equal to 0.89 for lycopene, beta-cryptoxanthin, and alpha- and beta-carotene. The r(c) for lutein/zeaxanthin and total carotenoids was lower, 0.59 and 0.68 respectively, because of higher lutein/zeaxanthin concentrations at the second sampling than at the first. The reproducibility of the concentrations suggests both that individuals have characteristic profiles and that serum carotenoid concentrations can be measured randomly over greater than or equal to 2 weeks without significant bias.

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Data sources
- Belize Reproductive Health Survey
- Belize Family Health Survey

Experts
Paul W Stupp

Country-specific needs/attention
Maternal mortality

Public health campaign/programs
Belize health information system (BHIS)

Costa Rica


Abstract: This study uses a natural experiment approach to evaluate the effect of health insurance on infant and child mortality. In the 1970s Costa Rica adopted national health insurance, which expanded children's insurance coverage from 42 percent in 1973 to 73 percent by 1984. Aggregate infant and child mortality rates dropped rapidly during this period, but this trend had begun prior to the insurance expansion, and may be related to other changes during this period. We use county-level vital statistics and census data to isolate the causal insurance effect on mortality using county fixed effects models. We find that insurance increases are strongly related to mortality decreases at the county level before controlling for other time-varying factors. However, after controlling for changes in other correlated maternal, household,
and community characteristics, fixed effects models indicate that the insurance expansion could have explained only a small portion of the mortality change. These results question the proposition that health insurance can lead to large improvements in infant and child mortality, and that expanding insurance to the poor can substantially narrow socioeconomic differentials in mortality.

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**Introduction:** Our objective was to evaluate the impact of the fortification of food with folic acid on prevalence trends for neural tube defects (NTD) and the infant mortality rate (IMR) associated with this disorder in Costa Rica. **Methods.** The surveillance data from the Congenital Disease Registry Center and the Central American Population Center were analyzed. The neural tube defects considered were anencephaly, spina bifida, and encephalocele. The trends from 1987-2009, as well as the differences in prevalence and mortality rates prior to and up to 12 years after food fortification with folic acid, were examined (95% confidence interval [CI]). The contribution of fortification to the decrease in the overall IMR was determined. **Results.** During 1987-1997, prior to the period of food fortification with folic acid, NTD prevalence was 12/10 000 births (95% CI: 11.1-12.8), whereas in 2009 prevalence was 5.1/10 000 births (3.3-6.5). The IMR associated with NTD was 0.64/1 000 births (46-0.82) in 1997 and 0.19/1 000 births (0.09-9.3) in 2009. There were significant decreases in the IMR associated with NTD and the prevalence of NTD: 71%, and 58%, respectively (P < 0.05). The overall IMR decreased from 14.2/1 000 births in 1997 to 8.84/1 000 births in 2009 (P < 0.05). The decrease in the IMR associated with NTD contributed to an 8.8% decrease in the overall IMR from 1997 to 2009. **Conclusion.** Food fortification with folic acid caused a decrease in NTD at birth and the IMR associated with this malformation during the 1997-2009 period. It also led to a decrease in the overall IMR. There is a temporal relationship between the introduction of fortification policies and the decrease in prevalence and mortality associated with NTD. This intervention should be promoted in Latin American and Caribbean countries where it has not yet been implemented.

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**Introduction:** Our objective was to identify trends for different types of birth defects and their impact on infant (IMR) and neonatal (NMR) mortality rates in Costa Rica from 1981 to 2010. **Methods.** Infant, neonatal, and post neonatal mortality trends were analyzed, using data from the Central American Population Center, which uses the International Classification of Diseases,
versions 9 and 10, to classify causes of death. For each group of birth defects, a Poisson log-linear regression model was constructed. IMR and NMR, relative risk, and 95% confidence intervals (95% CI) were calculated for the three decades (1981-1990, 1991-2000, and 2001-2010). Estimates were compared using Wald chi square. Results. Comparison of the 1980s and the 2000s found a significant decrease in NMR and IMR from birth defects in these decades, from 2.37 (95% CI: 2.26-2.48) to 2.13 (2.03-2.23) and from 4.13 (3.99-4.27) to 3.18 (3.05-3.31), respectively. Reduction in IMR was significant for birth defect groups for nervous, digestive, and circulatory systems. There was also a significant drop in NMR for nervous and digestive system groups. All other groups experienced a significant increase or no change. Conclusion. IMR and NMR from birth defects have decreased, although these rates have increased proportionately due to a greater decline in other causes. This reduction is much smaller for neonatal mortality. Primary prevention and neonatal care of birth defects should be strengthened.

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Introduction: There is evidence that health care during pregnancy is a crucial component in ensuring a safe delivery. Because the infant mortality rate in Costa Rica is almost half the rate of Panama, the researchers tested the hypothesis that women in Costa Rica are more knowledgeable about prenatal health care than women in neighboring Panama. Methods: A multiple-choice survey was used to evaluate women’s knowledge of prenatal care using WHO recommendations as the nominal standard. Oral surveys were administered to 320 women in Costa Rican and Panamanian health care clinics. The surveys consisted of multiple-choice questions designed to assess four specific domains of knowledge in prenatal care: nutrition, danger signs, threats from illness, and acceptable activities during pregnancy. Survey answers were scored, and significant factors in assessing women's knowledge of prenatal care were determined using analysis of variance and general linear models. Results: Costa Rican women scored higher than Panamanian women in most domains of knowledge in prenatal health care. Only country of origin and educational level were significant factors in determining knowledge of prenatal care. However, country of origin was a stronger predictor of knowledge of prenatal care than was having completed high school. Conclusion: These data suggest that Costa Rican women are more knowledgeable about necessary prenatal care than Panamanian women, and that this difference is probably related to direct education about and promotion of prenatal care in Costa Rica. This suggests all influence of cultural health care awareness that extends beyond the previously established negative correlation between maternal educational level and infant mortality.

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Data sources

- Costa Rica Reproductive Health Survey
- Costa Rica Family planning/Maternal and Child Health Survey

Experts

Barboza-Arguello MD
### Appendix — Country-specific Information: Maternal and Child Health

| Country-specific needs/attention | • Infant mortality  
|• Neural tube defects  
|Public health campaign/programs | • Congenital Disease Registry Center and the Central American Population Center  
|• Central American Population Center  
|• National Neonatal and High Risk Screening Program |

### Guatemala

**TulaSalud: An m-health system for maternal and infant mortality reduction in Guatemala.**

**Abstract:** The Guatemalan NGO (Non-Governmental Organization) TulaSalud has implemented an m-health project in the Department of Alta Verapaz. This Department has 1.2 million inhabitants (78% living in rural areas and 89% from indigenous communities) and in 2012, had a maternal mortality rate of 273 for every 100,000 live births. This m-health initiative is based on the provision of a cell phone to community facilitators (CFs). The CFs are volunteers in rural communities who perform health prevention, promotion and care. Thanks to the cell phone, the CFs have become tele-CFs who able to carry out consultations when they have questions; send full epidemiological and clinical information related to the cases they attend to; receive continuous training; and perform activities for the prevention and promotion of community health through distance learning sessions in the Q’eqchi and/or Poqomchi’ languages. In this study, rural populations served by tele-CFs were selected as the intervention group while the control group was composed of the rural population served by CFs without Information and Communication Technology (ICT) tools. As well as the achievement of important process results (116,275 medical consultations, monitoring of 6,783 pregnant women, and coordination of 2,014 emergency transfers), the project has demonstrated a statistically significant decrease in maternal mortality ($p<0.05$) and in child mortality ($p = 0.054$) in the intervention group compared with rates in the control group. As a result of the telemedicine initiative, the intervention areas, which were selected for their high maternal and infant mortality rates, currently show maternal and child mortality indicators that are not only lower than the indicators in the control area, but also lower than the provincial average (which includes urban areas).

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**Introduction:** Our objective was to obtain background information about maternal health and health-seeking behaviors among indigenous mothers living in rural Mam-Mayan communities of Quetzaltenango, Guatemala. **Methods:** A cross-sectional analysis of 100 pregnant and breastfeeding women in four communities was performed to determine prevalence and determinants of service utilization. **Results:** Extreme poverty, poor education, and poor access to basic resources were prevalent. Out of 100 women 14-41 years old, 33% did not use the formal health care sector for antenatal care; the majority consulted a traditional birth attendant. Only
13% delivered in a hospital. Lower socioeconomic status, lack of fluency in Spanish, and no ownership of a motorized vehicle were associated with the highest likelihood of poor utilization of services. **Conclusion:** A variety of factors affect utilization of maternal health services by indigenous women in rural Quetzaltenango. These include socioeconomic disparities, ethnic and linguistic differences, and poor access to basic resources. The current reproductive needs of women should be addressed to improve their health and increase their chance of having healthy children.

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**Socioeconomic disparities and the familial coexistence of child stunting and maternal overweight in Guatemala.** Lee J, Houser RF, Must A, de Fulladolsa PP, Bermudez OI. *Econ Hum Biol.* 2012;10(3):232-41. PMID: 21889428

**Abstract:** The double burden of malnutrition, defined here as households with a stunted child and an overweight mother (SCOM), is a growing problem in Guatemala. We explored the magnitude of SCOM and the identification of socio-economic factors associated with this malnutrition duality. From the 2000 Living Standards Measurement Study from Guatemala, we obtained a sample of 2492 households with pairs of children 6-60 months and their mothers (18-49 years) and estimated the prevalence of SCOM. Economic characteristics of this sample were assessed with the Concentration Index (CI). Results revealed higher prevalence of child stunting, but a lower prevalence of maternal overweight among the poor compared to the rich households. Economic inequality in child stunting was greater than economic inequality in maternal overweight (CI = -0.22 vs. +0.14). SCOM pairs were more prevalent among the poor and middle SES groups as compared to the rich households. A multivariate logistic regression model showed that SCOM was more likely to occur in households from the middle consumption quintile than in those from the first quintile (odds ratio = 1.7). The findings reported here add new insights into the complex phenomenon observed in households with both extremes of the malnutrition continuum, and support the need for the identification of economic, social and biological interventions aimed at, on the one hand, the prevention of this duality of the malnutrition in those households where it is still non-existent, and on the other hand, to deter or correct the economic, social and biological environments where those mother-child dyads are already affected by such phenomena.

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**Data sources**
- Guatemala Demographic Health Survey
- Guatemala Reproductive Health Survey
- Guatemala Family Planning/Maternal and Child Health Survey
- Guatemala Contraceptive Prevalence Survey 1978-1979

**Experts**
- Odilia I. Bermudez

**Country-specific needs/attention**
- Maternal mortality
Honduras


**Abstract:** We used data from the 1996 Honduras National Micronutrient Survey to investigate the co-occurrence of vitamin A deficiency (VAD), anemia and stunting in a representative sample of Honduran children 1-5 y old. Observed frequencies of co-occurrence were compared with frequencies expected by chance in children 12-35.9 month old (n = 633) and 36-59.9 month old (n = 610) for the three possible two-way combinations of the problems and the three-way combination. Observed frequencies were greater than expected frequencies for all eight comparisons, and all comparisons except for that of stunting and anemia in younger children were significant. The observed frequency of the three-way co-occurrence was 8.4% compared with an expected co-occurrence of 8.1% in younger children (P < 0.05) and 4.8% compared with 4.2%, respectively, in older children (P < 0.001). Although there was statistical evidence for co-occurrence, differences between expected and observed prevalences were small for most comparisons. Our findings suggest that having one or two problems does not appreciably increase the probability of having another. The efficiency of nutrition interventions aimed at these conditions would not be improved by targeting children with any one of the conditions; rather, the three conditions should be treated as virtually independent when designing programs. Replication of this study in other settings is warranted.

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**Introduction:** Maternal depression is a substantial problem that has negative consequences on the health of both mother and child Little research has been done on the prevalence of maternal depression in the developing world This study aims to estimate the prevalence of current depression among mothers in Honduras and identify demographic predictors of depression in this sample

**Methods:** A modified Spanish version of the PHQ-9 and a demographic questionnaire were administered by trained Interviewers to 415 rural and urban women aged 15-66 who had children between 1 and 10 years old

**Results:** Prevalence of current major depressive syndrome was 17.6% Mild depressive symptoms were detected in 52% of the sample The estimated prevalence of current major depressive syndrome in the urban sample (19%) was not significantly greater than in the rural sample (16% P = 0.49) None of the demographic variables measured, including age, number of children, or marital status predicted major depression in this sample

**Conclusion:** Maternal depression occurred at a high rate in this sample of Honduran women The estimated prevalence rates in this study are similar to rates of maternal depression in studies of mothers in other Latin American countries, as well as in samples of mothers on Medicaid in the United States Further study is needed to confirm and extend these findings, and to identify predictors of maternal depression in this population.

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Introduction: Our aim was to characterize determinants of folic acid (FA) use among women of reproductive age and patient education practices of health care professionals in one region of Honduras. Methods: 508 female outpatients and 128 health workers were interviewed in six primary care clinics in Honduras. Results were analyzed using univariate and multivariate regression models. Results: The survey showed that 45% patients were familiar with FA. Of that number, 30% knew appropriate timing of consumption and 25% reported proper pre-natal supplementation. Increasing education was strongly correlated with knowledge of folic acid function (OR=252.52, P<0.0001) and actual use (OR=12.65, P<0.000). Age is associated with knowledge of proper timing of FA usage (OR=3.94, P<0.01). Most women learned about FA from medical professionals, but only half of providers educate their female patients about FA. Conclusion: Healthcare providers should remember to discuss the role of folic acid with their patients, particularly those of low education and at the extremes of reproductive age. While long-term efforts to develop fortification programs continue, interim Honduran health campaigns to increase proper consumption of folic acid should target these particularly vulnerable populations.

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Abstract: Traditional birth attendants (TBAs) have limited ability to reduce maternal mortality, but may be able to have a significant impact on neonatal survival. This qualitative study explores TBAs' (possessive) experience with neonatal care in a rural Honduran community. In 6 semi structured focus groups, TBAs described services they routinely provide to newborns. Using Atlas.ti, Version 6.0. (ATLAS.ti Scientific Software Development GmbH, University of Berlin), transcripts were coded by bilingual researchers and analyzed by thematic content. TBAs demonstrated limited knowledge of newborn physiology, yet were aware of many internationally recommended practices. Despite attempts to follow recommendations, all TBAs expressed difficulty due to resource constraints. TBAs were strong advocates of immediate breast-feeding and skin-to-skin care, but they did not demonstrate knowledge regarding delayed bathing and thermal care. Most TBAs stated that a sick neonate could be identified immediately at birth; thus, infections or other illnesses developed in later days may be missed. TBAs did not believe they could have averted neonatal complications or deaths that had occurred under their care. For most healthy newborns, TBAs are the primary providers until the 2-month vaccine visit at the healthcare clinic. Improved TBA training focused on infection symptomatology, physiology, and thermoregulation for newborns may increase opportunities for improved health and timely referrals to healthcare facilities.

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**Data sources**
- Honduras Demographic Health Survey
- Honduras Reproductive Health Survey
- Honduras Family planning/Maternal and Child Survey
- Honduras Epidemiology and Family Health Survey
- Honduras National Micronutrient Survey

**Experts**
Lawson Wulsin

**Country-specific needs/attention**
- Hunger
- Micronutrient deficiencies (e.g.: iron-deficiency anemia)

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### EMRO/EURO Region

**Kazakhstan**


**Abstract:** Kazakhstan is undergoing a rapid modernization process, which carries the risk of an epidemic of obesity and cardiovascular disease. We enrolled a sample of about 50 children for every combination of gender, environment (urban vs. rural), ethnic group (Kazakh vs. Russian), and age group from 7 to 18 years, for a total of 4,808 children. Anthropometry and blood pressure were measured on all children while fasting blood cholesterol and glucose were measured only in 2,616 children aged ≥12 years. The prevalence of overweight and risk of overweight ranged from 2.8 (rural male Kazakhs) to 9.1% (urban male Russians). The prevalence of prehypertension and hypertension ranged from 8.3 (urban females) to 15.9% (rural females); that of hypercholesterolemia from 11.5 (male rural Russians) to 26.5% (female rural Kazakhs); and the overall prevalence of impaired fasting glucose was 0.1%. We conclude that overweight and cardiovascular risk factors are less prevalent in children living in Kazakhstan than in those living in Western countries. However, these figures are not negligible and suggest that preventive measures are needed to contain the epidemic of overweight and cardiovascular disease that will most likely accompany the modernization of Kazakhstan in the next years.

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**Introduction:** Data on puberty development are available for several countries but not for Central Asia. Aim: Using data collected during the Kazakhstan Health and Nutrition Survey (KHA-ES), we evaluated the relationship between the living environment (rural vs. urban), ethnicity (Russians vs. Kazakhs) and pubertal status in children living in Kazakhstan. **Methods:** Genital (G1-G5), breast (B1-B5) and pubic hair (PH1-PH5) development were evaluated in a sample of 2389 boys and
2416 girls using Tanner's criteria. Age at menarche was evaluated using the 'status quo' and 'recall' methods. **Results:** Rural children were older than urban children at stages \( \geq \) G2 for males and \( \geq \) B2 for females, and this difference was more evident for Russian males. Differences levelled out at later stages of development in Kazakh males and in the pooled girls. The living environment was slightly but significantly associated with median age at menarche (12.89 years for urban Kazakhs to 13.43 years for rural Kazakhs). Male and female Kazakhs were older than Russians at stages 4 and 5, especially in the urban area. **Conclusion:** A relationship between pubertal status and the living environment was present in a rapidly modernizing country such as Kazakhstan.

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**Abstract:** This study investigates anaemia related to the sufficiency of dietary iron intake of school-aged children in the Kzyl-Orda region of Kazakhstan. We conducted a cross-sectional study of 97 school-aged children living in Kzyl-Orda. Blood samples were collected for measuring hemoglobin. Dietary intake data were obtained from 24-h dietary recalls. Iron bioavailability was estimated with algorithms adjusting for absorption enhancers (meat, fish and poultry, and vitamin C) and inhibitors (tea and phytates) consumed in the same meal. The median total iron intakes were adequate compared with the median basal iron requirement; however, the median bioavailable iron intakes were well below the median absorbed iron requirement. Available iron was 6.9-7.2% of the total iron intake after adjusting for the absorption enhancers, and was reduced by 3.1-4.4% after adjusting for both enhancers and inhibitors. After adjustment for energy intake, higher iron intake was significantly associated with a decreased prevalence of anaemia (odds ratio, 0.39; 95% confidence interval, 0.16-0.93; \( P = 0.034 \)). Some evidence suggested an association between bioavailable iron intake after adjustment of absorption enhancers and inhibitors (odds ratio, 0.43; 95% confidence interval, 0.18-1.01; \( P = 0.053 \)). In conclusion, low bioavailability of dietary iron seems related to anaemia in the region. Although iron fortification or supplementation programmes can be useful for promoting the anaemia prevention control programme, further efforts for nutritional education suited for family level dietary practice are necessary.

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**Abstract:** This study was aimed to investigate the impact of maternal obesity on mothers and their neonatal health. Our study population consisted of 157 women with completed singleton pregnancies, which included both obese (Body mass index, BMI > or \( \geq \)30) and non-obese women (BMI < 30). Data were collected from case histories, and ante- and postnatal records at the
Appendix – Country-specific Information: Maternal and Child Health

tertiary hospital in Astana, Kazakhstan between January and February of 2008. Associations between pregnancy and delivery-related complications, outcomes, and maternal obesity were estimated as odds ratios (ORs) and 95% confidence intervals (CIs) using a logistic regression model. Women aged 30 years or more were at higher risk of obesity (OR = 3.1, 95% CI = 0.8-11.6) than women less than 30 years old. Multiparous women were also at higher risk of obesity (OR = 4.1, 95% CI = 0.9-19.6) than primiparous ones. Obese women were also more likely to have longer hospital stays of more than 10 days (OR=2.2, 95% CI = 0.8-6.2), and were more prone to eclampsia/preeclampsia (OR = 24.7, 95% CI = 2.2-44.8), cesarean sections (OR = 2.1, 95% CI-0.7-6.2), and abnormal labor (OR = 8.1, 95% CI = 1.0-63.8) compared to non-obese women. Neonatal complications such as pneumonia (OR = 3.4, 95% CI = 0.6-20.2) and fetal macrosomia (OR = 2.2, 95% CI = 0.6-8.0) were also more common among babies born to obese mothers. Congenital baby birth defects were strongly associated with maternal obesity (P = 0.016). We concluded that maternal obesity is associated with increased risks of both maternal and neonatal complications, and that such risks increase with advanced age and parity of the mother. Hence, medical practices must take these complications into account by ensuring an adaptable and early management in order to improve mothers and their neonatal health.

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Data sources
- Kazakhstan Demographic Health Survey
- Kazakhstan Health and Nutrition Survey (KHA-ES)

Experts
Fiorenzo Facchini

Tajikistan


Introduction: There has been no evaluation of the association between contraceptive use and maternal and child health (MCH) in Tajikistan, though the government has made concerted efforts to improve accessibility to family planning methods. The aim of this study is to understand the relationship between current contraceptive utilization and specific MCH outcomes in Tajikistan. Methods: Using data from the 2012 Tajikistan Demographic and Health Survey (DHS), a total weighted sample of 6,716 women aged 15 to 49 years who had at least one child at the time of interview was analyzed. Logistic regression analyses were performed to assess the relationship between current contraceptive utilization and birth spacing, birth limiting, and infant mortality. Results: Modern contraceptive use was low among women studied (27.1%). Modern contraceptive users were more likely to present with a longer birth interval (aOR = 2.4, 95% CI = 2.0-2.8) than traditional- or non- users. Women who used modern contraceptives were half as likely to limit births to 3 or fewer children compared to traditional- or non-users (aOR = 0.5, 95% CI = 0.4-0.6). Among women whose most recent live birth resulted in death, modern contraceptive use was not associated with lower levels of infant mortality. Conclusion: Efforts made by the Tajik government to increase utilization of family planning have had mixed effects on overall uptake and the MCH outcomes analyzed in this study. These findings can help to inform the government's policy on family planning. Implications: Contraceptive utilization has not yet
translated into beneficial MCH outcomes. Policy makers in Tajikistan might consider placing more emphasis on family planning education, while maximizing accessibility of contraceptive methods.

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**Abstract:** This study examines women's declining use of maternal healthcare services in post-socialist Tajikistan. Using data from the 2003 and 2007 Tajikistan Living Standards Surveys (TLSS), the findings support previous evidence that a woman's use of prenatal and delivery care depends on her education, household income, and proximity to services. However, previous models have not specified who makes the decision to use maternal healthcare services. This study finds that in Tajikistan a woman shares decision making with her spouse and the eldest woman in the household. There is limited evidence that traditional proxies for bargaining power, such as relative earnings level, affect outcomes. The authors conclude that where women's exit options are limited, surveys evaluating the value of women's assets and their services in the home, as well as questions about decision making, will allow more refined measures of women's bargaining power.

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**Inequality and changes in women's use of maternal health-care services in Tajikistan.** Falkingham J. *Stud Fam Plann.* 2003;34(1):32-43. PMID: 12772444

**Abstract:** Using recently available survey data for Tajikistan, this study explores changes in the pattern of maternal health care during the last decade and the extent to which inequalities in access to that care have emerged. In particular, the links between poverty and women's educational status and the use of maternal health-care services are investigated. The survey findings demonstrate a significant decline in the use of maternal health-care services in Tajikistan since the country gained independence from the Soviet Union in 1991. They show changes in the location of delivery and the person providing assistance, with a clear shift away from giving birth in a medical facility toward giving birth at home. More than two-fifths of all women who gave birth in the year prior to the survey delivered their baby at home. Women from the poorest quintile are three times more likely than women from the richest quintile to undergo a home delivery without a trained assistant.

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**Data sources**
- Tajikistan Demographic Health Survey
- Tajikistan Living Standards Surveys (TLSS)
Iraq


**Introduction:** Limited information is available in Iraq regarding the causes of under-five mortality. The vital registration system is deficient in its coverage, particularly from rural areas where access to health services is limited and most deaths occur at home, i.e. outside the health system, and hence the cause of death goes unreported. Knowledge of patterns and trends in causes of under-five mortality is essential for decision-makers in assessing programmatic needs, prioritizing interventions, and monitoring progress. The aim of this study was to identify causes of under-five children deaths using a simplified verbal autopsy questionnaire. The objective was to define the leading symptoms and cause of death among Iraqi children from all regions of Iraq during 1994-1999. **Methods:** To determine the cause structure of child deaths, a simplified verbal autopsy questionnaire was used in interviews conducted in the Iraqi Child & Maternal Mortality Survey (ICMMS) 1999 national sample. All the mothers/caregivers of the deceased children were asked open-ended questions about the symptoms within the two weeks preceding death; they could mention more than one symptom. **Results:** The leading cause of death among under-five children was found to be childhood illnesses in 81.2%, followed by sudden death in 8.9% and accidents in 3.3%. Among under-five children dying of illnesses, cough and difficulty in breathing were the main symptoms preceding death in 34.0%, followed by diarrhea in 24.4%. Among neonates the leading cause was cough/and or difficulty in breathing in 42.3%, followed by sudden death in 11.9%, congenital abnormalities in 10.3% and prematurity in 10.2%. Diarrhea was the leading cause of death among infants in 49.8%, followed by cough and/or difficulty in breathing in 26.6%. Among children 12-59 months diarrhea was the leading cause of death in 43.4%, followed by accidents, injuries, and poisoning in 19.3%, then cough/difficulty in breathing in 14.8%.

**Conclusion:** In Iraq Under-five child mortality is one of the highest in the Middle East region; deaths during the neonatal period accounted for more than half of under-five children deaths highlighting an urgent need to introduce health interventions to improve essential neonatal care. Priority needs to be given to the prevention, early and effective treatment of neonatal conditions, diarrheal diseases, acute respiratory infections, and accidents. This study points to the need for further standardized assessments of under-5 mortality in Iraq.

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**Introduction:** In 1999 UNICEF, in cooperation government of Iraq and the local authorities in "autonomous" (northern Kurdish) region, conducted similar surveys to provide regionally representative and reliable estimates of child mortality (the subject of this paper) and maternal mortality. **Methods:** In a cross-sectional household survey in the south/centre of Iraq in February and March, 1999, 23 105 ever-married women aged 15-49 years living in sampled households were interviewed by trained interviewers with a structured questionnaire that was developed
using the Demographic and Health Surveys questionnaire and following a pre-test. In a similar survey in the autonomous region in April and May 14 035 ever-married women age 15-49 were interviewed. Results: In the south/center, infant and under-5 mortality increased during the 10 years before the survey, which roughly corresponds to the period following the Gulf conflict and the start of the United Nations sanctions. Infant mortality rose from 47 per 1000 live births during 1984-89 to 108 per 1000 in 1994-99, and under-5 mortality rose from 56 to 131 per 1000 live births. In the autonomous region during the same period, infant mortality declined from 64 to 59 per 1000 and under-5 mortality fell from 80 to 72 per 1000. Childhood mortality was higher among children born in rural areas, children born to women with no education, and in boys, and these differentials were broadly similar in the two regions. Interpretation Childhood mortality clearly increased after the Gulf conflict and under UN sanctions in the south/center of Iraq, but in the autonomous region since the start of the Oil-for-Food Programme childhood mortality has begun to decline. Conclusion: Better food and resource allocation to the autonomous region contributed to the continued gains in lower mortality, whereas the situation in the south/center deteriorated despite the high level of literacy in that region.

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Abstract: The community-based Iraq Infant and Child Mortality and Nutrition Survey was designed to estimate mortality and nutritional status of Iraqi infants and children under five years of age after the Gulf conflict of 1991. This article presents results from a nationwide nutritional survey conducted between August 25 and September 5, 1991. A random multistage cluster sample was selected, including a subsample of 2676 children in the anthropometric analysis. The percentage below -2 standard deviations was 21.8% for height-for-age, 11.9% for weight-for-age, and 3.4% for weight-for-height. It is possible that the observed prevalence of wasting was an underestimate, resulting from a survivor bias. This observation suggests that cross-sectional nutritional surveys may not be the most appropriate method for assessing the effect of the Gulf conflict on the nutritional status of children in Iraq. Longitudinal information on child mortality and nutritional status would be more useful in predicting the likelihood of famine.

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Introduction: Traditional birth attendants (TBAs) are likely to deliver lower quality maternity care compared to professional health workers. It is important to characterize women who are assisted by TBAs in order to design interventions specific to such groups. We thus conducted a study to assess if socio-economic status and demographic factors are associated with having childbirth supervised by traditional birth attendants in Iraq. Methods: Iraqi Multiple Indicator Cluster Survey (MICS) data for 2000 were used. We estimated frequencies and proportions of having been delivered by a traditional birth attendant and other social characteristics. Logistic regression
Appendix

Country-specific Information: Maternal and Child Health

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Analysis was used to assess the association between having been delivered by a TBA and wealth, area of residence (urban versus rural), parity, maternal education and age. **Results:** Altogether 22,980 women participated in the survey, and of these women, 2873 had delivery information and whether they were assisted by traditional birth attendants (TBAs) or not during delivery. About 1 in 5 women (26.9%) had been assisted by TBAs. Compared to women of age 35 years or more, women of age 25-34 years were 22% (AOR = 1.22, 95% CI [1.08, 1.39]) more likely to be assisted by TBAs during delivery. Women who had no formal education were 42% (AOR = 1.42, 95% CI [1.22, 1.65]) more likely to be delivered by TBAs compared to those who had attained secondary or higher level of education. Women in the poorest wealth quintile were 2.52 (AOR = 2.52, 95% CI [2.14, 2.98]) more likely to be delivered by TBAs compared to those in the richest quintile. Compared to women who had 7 or more children, those who had 1 or 2 were 28% (AOR = 0.72, 95% CI [0.59, 0.87]) less likely to be delivered by TBAs. **Conclusion:** Findings from this study indicate that having delivery supervised by traditional birth attendants was associated with young maternal age, low education, and being poor. Meanwhile women having 1 or 2 children were less likely to be delivered by TBAs. These factors should be considered in the design of interventions to reduce the rate of deliveries assisted by TBAs in favor of professional midwives, and consequently reduce maternal and neonatal mortality rates and other adverse events.

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**Data sources**

- Iraqi Child and Maternal Mortality Survey (ICMMS)
- Iraqi Multiple Indicator Cluster Survey (MICS)

**Experts**

Mary C. Smith

**Country-specific information**

- Maternal mortality
- High fertility rate with week reproductive health/family planning services

**Georgia**

**Contraception matters: two approaches to analyzing evidence of the abortion decline in Georgia.** Serbanescu F, Stupp P, Westoff C. *Int Perspect Sex Reprod Health.* 2010;36(2):99-110. PMID: 20663746

Introduction: The abortion rate in the republic of Georgia is the highest documented in the world. Analyses using reliable data are needed to inform programs for preventing unintended pregnancy and abortion. **Methods:** Data from two large national household surveys conducted in 1999 and 2005 were used to assess the relationship between contraceptive use and abortion. Two analytic approaches were used. First, abortion rates were estimated for three subgroups: users of modern contraceptives, users of traditional contraceptives and nonusers of contraceptives. A decomposition method was then used to estimate the proportions of change in abortion rates that were due to changes in contraceptive use and to changes in use- and nonuse-specific abortion rates. Second, a methodology developed by Westoff was used to examine abortion rates among contraceptive users and among nonusers with differing risks of unintended pregnancy. **Results:** According to data from the 60 months before each survey, contraceptive prevalence among married women increased by 23% (from 39% to 48%) and the marital abortion rate
declined by 15% (from 203 to 172 abortions per 1,000 woman-years) between 1999 and 2005. Both approaches showed that nonuse of any method was the principal determinant of the high unintended pregnancy rate and that the increase in use of modern contraceptives was a significant contributor to the recent drop in abortion (explaining 54% of the decline, according to the decomposition analysis). **Conclusion:** Efforts to increase availability and use of modern family planning methods in Georgia should lead to a direct and measurable decline in the abortion rate.

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**Twinning project: Israel and Georgia - the birth of a diabetes-in-pregnancy centre in Georgia.**

**Introduction:** Our objective was to determine the effectiveness of a joint Israeli-Georgian twinning project aimed at introducing modern methods of perinatal care to Georgian women with pregestational diabetes mellitus. **Methods:** A Diabetes-in-Pregnancy Centre was established in Georgia (in the former USSR). Thirty-two women with Type 1 diabetes mellitus participated in the first stage of the study (January 1997-June 1998). All were maintained under strict metabolic surveillance starting at least three months prior to conception and were given organized instruction in methods of self-monitoring of glucose levels, insulin dose adjustment, dietary management and close fetal surveillance throughout pregnancy. A second stage of the project was started in January 1998 and aimed at the diagnosis of gestational diabetes mellitus (GDM). **Results:** Of the 32 women, 20 had had a total of 44 prior pregnancies without proper perinatal care (1990-96); only five (11.3%) ended in the birth of a healthy infant. On entry to the study, all 32 patients had unsatisfactory metabolic indices. HbA(1c) levels decreased significantly from the preconception period (P<0.001) and were maintained at the lower level throughout pregnancy; insulin doses decreased significantly until the third trimester (P<0.01) and then increased (P<0.001). Since January 1997, 21 women have become pregnant. Eighteen have given birth, 12 (67%) by Caesarean section and six (33%) by vaginal delivery. Gestational age at birth was 36-39 weeks, and birth weight ranged from 2300 to 4100 g. The only neonatal complications were mild respiratory distress syndrome and hypoglycemia. There were no significant maternal complications in the 236 women screened, eight were diagnosed as having GDM and 12 impaired glucose tolerance. They were actively managed to a successful outcome. **Conclusion:** The establishment of the Diabetes-in-Pregnancy Centre in the Republic of Georgia has significantly reduced the prior high pre-programme perinatal morbidity and mortality as well as the incidence of maternal complications in pre-GDM as well as in GDM.

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**Abstract:** Congenital malformations (CM) are considered as 10 leading causes for global burdens of the disease. The study aimed to assess the knowledge on CM among pregnant residents of
Tbilisi. Investigation was carried out on the base of "D. Gagua Clinic", LLC, Tbilisi. 470 women, visiting the clinic for antenatal monitoring, were involved in the study to provide an appropriate assessment of pregnant. Assessment of basic knowledge of the women was conducted according to the specially developed questionnaire and completed by the respondents at their visiting to the doctors. The level of knowledge on prevention of CM among the pregnant residents of Tbilisi is low while relationship to CM in the first place is associated with this group of population. The knowledge on CM is comparatively higher in women older than 30 and among the pregnant with higher education. Certain differences in the level of knowledge on CM was found among temporary unemployed women (housewives) and employed respondents. The differences in knowledge on CM among women with first and second delivery were not revealed. On the background of the obtained results it should be concluded that the level of knowledge on CM among reproductive age women residents of Tbilisi is not satisfactory. There is direct evidence of low preventive activity and bareness of measures regarding to family planning as well.

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**Morocco**


**Abstract:** Morocco has reported important achievements in coverage for mother and child healthcare services. Nevertheless, client-use and quality of antenatal care (ANC) services need to be improved. The aim was to identify factors related to the use of ANC services through a cross-sectional survey among women attending an urban maternity hospital in Fes. We describe quality of ANC services assessed in six health centres through pre-established national checklists. Of 240 women interviewed in postnatal wards, 23% had not undertaken any ANC consultation during their last pregnancy. The main characteristics of women not using ANC services were being multiparous (OR: 2.7; CI: 1.5-4.8) and having no formal schooling (OR: 3.7; CI: 2.2-6.4). These women stated three main reasons: (1) did not find it necessary (46.9%); (2) health centre too far away (14%); (3) dissatisfied about the quality of care (12%). Evaluation of the quality of care showed a shortage of personnel and basic supplies and malfunctions were identified at various levels. In the region of Fes, there is a need to strengthen ANC and overall maternal health activities through community mobilization and information and education. We recommend that the WHO ANC protocol (less ANC visits with emphasis on quality) be pilot tested in Morocco.

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Abstract: There are a number of reasons for anticipating that contact by women in developing country settings with modern maternal-child health (MCH) services will lead to increased use of family planning services. Indeed, the expectation of such a relationship underlies the integrated service delivery strategy that has been adopted on a more or less global basis. However, the available empirical evidence in support of this proposition is inconclusive. This study re-examines this issue in Morocco, Household survey data and data on the supply environment for health and family planning services gathered in 1992 are analysed in the study. A full-information maximum likelihood estimator is used to control for the possible endogeneity of health care and contraceptive choices. The findings indicate a substantial and apparently causal relationship between the intensity of MCH service use and subsequent contraceptive use. Policy simulations indicate that sizeable increases in contraceptive prevalence might be realized by increasing the coverage and intensity of use of MCH services.

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Introduction: In 2009, the Ministry of Health of Morocco launched a national confidential enquiry around maternal deaths based on the newly implemented routine maternal death surveillance system (MDSS). The objective of this paper is to show the importance of substandard care among the factors associated with maternal deaths. Methods: The Moroccan National Expert Committee (NEC) organized an audit of maternal deaths identified by the MDSS to determine the medical cause, the preventability of the deaths and the type of substandard care involved. Results: Three hundred and three cases of maternal deaths were analysed for the year 2009. Direct causes accounted for 80.8%. 75.9% were considered avoidable by the NEC. The three main factors were insufficient follow-up of care in 45.6% of cases, inadequate treatment in 43.9% and delay in seeking care in 41.3%. The auditors found that 54.3% of all maternal deaths could have been avoided if appropriate action had been taken at the health facilities. Conclusion: The audit of maternal deaths in Morocco enabled a better understanding of the circumstances contributing to maternal deaths and pinpointed that more than half of maternal deaths were associated with substandard care in hospitals.

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Data sources
- National maternal mortality monitoring system in Morocco

Experts
- David Hotchkiss
Appendix – Country-specific Information: Maternal and Child Health

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**Pakistan**


**Abstract:** We aimed to discern paternal factors associated with neonatal deaths and births with low weight, independent of maternal and other socio-demographic factors. We analyzed the nationally representative sample of 5,724 ever-married women of reproductive age (15-49 years) who delivered their last child during the past 5 years preceding the Pakistan Demographic and Health Survey 2006-2007. We assessed adverse birth outcomes using two variables i.e. neonatal deaths (< 28 days) and small size births (as a proxy for birth weight). Associations between paternal factors and adverse birth outcomes were assessed by calculating unadjusted and adjusted odds ratios using logistic regression models after controlling for maternal and socio-demographic factors. The analysis was performed by using the statistical package for social sciences (SPSS) version 17. About 4.5 % mothers reported neonatal deaths and 34 % had small size births (SSB). We found that fathers involved in manual occupation were more likely to have neonatal deaths than fathers involved in managerial/professional jobs (adjusted odds ratio (aOR): 1.64; 95 % Confidence Interval (CI) 1.01, 3.55). Similarly, fathers who belonged to poorer wealth index had higher risk of SSB (aOR: 1.62; 95 % CI 1.18, 2.22). Additionally, consanguinity was a major risk factor which was associated with neonatal deaths (aOR: 1.73; 95 % CI 1.09, 2.74) and SSB (aOR: 1.25; 95 % CI 1.03, 1.55). Fathers' occupation including unemployment and consanguinity were associated with increased risk of adverse birth outcomes. Further studies are warranted to discern other paternal risk factors related to adverse birth outcomes.

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**Abstract:** Child marriage (before 18 years) is prevalent in Pakistan, which disproportionately affects young girls in rural, low income and low education households. Our study aims to determine the association between early marriage and high fertility and poor fertility health indicators among young women in Pakistan beyond those attributed to social vulnerabilities. Nationally representative data from Pakistan Demographic and Health Survey, 2006-2007, a cross-sectional observational survey, were limited to ever-married women aged 20-24 years (n = 1,560; 15% of 10,023) to identify differences in poor fertility outcomes [high fertility (three or more childbirths); rapid repeat childbirth (<24 months between births); unwanted pregnancy (any ever); pregnancy termination (any stillbirth, miscarriage or abortion ever)] by early (<18) versus adult (>/>=18) age at marriage. Associations between child marriage and fertility outcomes were assessed by calculating adjusted odds ratios (AORs) using logistic regression models after...
controlling for demographics, social equity indicators (education, wealth index, rural residence), contraception use, marriage duration and culture-specific factors (husband’s desire for more children, son preference). Overall, 50% of ever-married women aged 20-24 years in Pakistan were married before the age of 18 years. Girl child marriage was significantly (p < 0.001) associated with low social equity indicators (poverty, rural residence, and no formal education). Adjusted logistic regression models showed that girl child marriage was significantly associated with high fertility (AOR 6.62; 95% CI 3.53-12.43), rapid repeat childbirth (AOR 2.88; 95% CI 1.83-4.54), unwanted pregnancy (AOR 2.90; 95% CI 1.75-4.79), and pregnancy termination (AOR 1.75; 95% CI 1.10-2.78). Girl child marriage affects half of all ever-married women aged 20-24 years in Pakistan, and increases their risk for high fertility and poor fertility health indicators, highlighting the need of increasing the age of marriage among women in Pakistan. Efforts to eliminate girl child marriage by strict law enforcement, promoting civil, sexual and reproductive health rights for women can help eliminate girl child marriage in Pakistan.

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Introduction: Our objective was to determine the relationship between child marriage (before age 18 years) and morbidity and mortality of children under 5 years of age in Pakistan beyond those attributed to social vulnerabilities. Methods: Nationally-representative cross-sectional observational survey data from Pakistan Demographic and Health Survey, 2006-2007 was limited to children from the past 5 years, reported by ever-married women aged 15-24 years (n = 2630 births of n = 2138 mothers) to identify differences in infectious diseases in past 2 weeks (diarrhea, acute respiratory infection [ARI], ARI with fever), under 5 years of age and infant mortality, and low birth weight by early (<18) vs adult (>/= 18) age at marriage. Associations between child marriage and mortality and morbidity of children under 5 years of age were assessed by calculating adjusted OR using logistic regression models after controlling for maternal and child demographics. Results: Majority (74.5%) of births were from mothers aged <18 years. Marriage before age 18 years increased the likelihood of recent diarrhea among children born to young mothers (adjusted OR = 1.59; 95% CI: 1.18-2.14). Even though maternal child marriage was associated with infant mortality and mortality of children under 5 years of age in unadjusted models, association was lost in the adjusted models. We did not find a relation between girl-child marriage and low birth weight infants, and ARI. Conclusion: Girl-child marriage increases the likelihood of recent diarrhea among children born to young mothers. Further qualitative and prospective quantitative studies are needed to understand the factors that may drive child morbidity and mortality among those married as children vs adults in Pakistan.

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Abstract: We aimed to discern paternal factors associated with neonatal deaths and births with low weight, independent of maternal and other socio-demographic factors. We analyzed the nationally representative sample of 5,724 ever-married women of reproductive age (15-49 years) who delivered their last child during the past 5 years preceding the Pakistan Demographic and Health Survey 2006-2007. We assessed adverse birth outcomes using two variables i.e. neonatal deaths (<28 days) and small size births (as a proxy for birth weight). Associations between paternal factors and adverse birth outcomes were assessed by calculating unadjusted and adjusted odds ratios using logistic regression models after controlling for maternal and socio-demographic factors. The analysis was performed by using the statistical package for social sciences (SPSS) version 17. About 4.5 % mothers reported neonatal deaths and 34 % had small size births (SSB). We found that fathers involved in manual occupation were more likely to have neonatal deaths than fathers involved in managerial/professional jobs (adjusted odds ratio (aOR): 1.64; 95 % Confidence Interval (CI) 1.01, 3.55). Similarly, fathers who belonged to poorer wealth index had higher risk of SSB (aOR: 1.62; 95 % CI 1.18, 2.22). Additionally, consanguinity was a major risk factor which was associated with neonatal deaths (aOR: 1.73; 95 % CI 1.09, 2.74) and SSB (aOR: 1.25; 95 % CI 1.03, 1.55). Fathers' occupation including unemployment and consanguinity were associated with increased risk of adverse birth outcomes. Further studies are warranted to discern other paternal risk factors related to adverse birth outcomes.

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Data sources
- Pakistan National Nutrition Survey
- Karachi Health and Demographic Surveillance System (HDSS)
- Global Network’s Maternal Newborn Health Registry (MNHR)

Experts
- Rubeena Zakar

Country-specific information
- Maternal mortality, child mortality, neonatal mortality

Public health campaign/programs
- USAID’s Maternal and Child Health Integrated Program in Pakistan

Afghanistan

Abstract: Home delivery in unhygienic environments is common among Afghan women; only one third of births are delivered at health facilities. Institutional delivery is central to reducing maternal mortality. The factors associated with place of delivery among women in Afghanistan were examined using the Afghanistan Mortality Survey 2010 (AMS 2010), which was open to researchers. The AMS 2010 data were collected through an interviewer-led questionnaire from 18,250 women. Odds ratio (OR) and 95% confidence interval (CI) of non-institutional delivery were estimated by logistic regression analysis. When age at survey, education, parity, residency, antenatal care frequency, remoteness, wealth and regions were adjusted, the OR of non-institutional delivery was 8.37 (95% CI, 7.47-9.39) for no antenatal care relative to four or more antenatal care visits, 4.07 (95% CI, 3.45-4.80) for poorest household relative to women from richest household, 2.02 (95% CI, 1.43-2.84) for no education relative to higher education, 1.78 (95% CI, 1.52-2.09) for six or more deliveries relative to one delivery, and 1.50 (95% CI, 1.36-1.67) for rural relative to urban residency. Since antenatal care was strongly associated with non-institutional delivery after adjustment of the other factors, antenatal care service may promote institutional deliveries, which can reduce maternal mortality ratio in Afghanistan.

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Introduction: Complications of abortion are one of the leading causes of maternal mortality worldwide, along with hemorrhage, sepsis, and hypertensive diseases of pregnancy. In Afghanistan little data exist on the capacity of the health system to provide post-abortion care (PAC). This paper presents findings from a national emergency obstetric and neonatal care needs assessment related to PAC, with the aim of providing insight into the current situation and recommendations for improvement of PAC services. Methods: A national Emergency Obstetric and Neonatal Care Needs Assessment was conducted from December 2009 through February 2010 at 78 of the 127 facilities designated to provide emergency obstetric and neonatal care services in Afghanistan. Research tools were adapted from the Averting Maternal Death and Disability Program Needs Assessment Toolkit and national midwifery education assessment tools. Descriptive statistics were used to summarize facility characteristics, and linear regression models were used to assess the factors associated with providers' PAC knowledge and skills. Results: The average number of women receiving PAC in the past year in each facility was 244, with no significant difference across facility types. All facilities had at least one staff member who provided PAC services. Overall, 70% of providers reported having been trained in PAC and 68% felt confident in their ability to perform these services. On average, providers were able to identify 66% of the most common complications of unsafe or incomplete abortion and 57% of the steps to take in examining and managing women with these complications. Providers correctly demonstrated an average of 31% of the tasks required for PAC during a simulated procedure. Training was significantly associated with PAC knowledge and skills in multivariate regression models, but other provider and facility characteristics were not. Conclusion: While designated emergency obstetric facilities in Afghanistan generally have most supplies and equipment for PAC, the capacity of healthcare providers to deliver PAC is limited. Therefore, we strongly
recommend training all skilled birth attendants in PAC services. In addition, a PAC training package should be integrated into pre-service medical education.

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**Abstract:** Maternal death rates in Afghanistan were among the highest in the world during the reign of the Taliban. Although these figures have improved, current rates are still alarming. The aim of this pilot study was to develop a needs assessment of the major health issues related to the high maternal mortality rates in Afghanistan. In-depth interviews were conducted with managerial midwives, clinical midwives, and mothers. Results of the interviews indicate that the improvement in the maternal mortality rate may be attributed to the increase in the involvement of midwives in the birthing process. However, barriers to decreasing maternal mortality still exist. These include transportation, access to care, and sociocultural factors such as the influence of the husband and mother-in-law in preventing access to midwives. Therefore, any programs to decrease maternal mortality need to address infrastructure issues (making health care more accessible) and sociocultural factors (including husbands and mother-in-laws in maternal health education). However, it should be noted that these findings are based on a small pilot study to help develop a larger scale need assessment.

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**Data sources**
- Afghanistan Demographic and Health Survey

**Experts**
- Nasrat Ansari

**Country-specific information**
- Maternal mortality and morbidity
- Infant mortality

**Public health campaign/programs**
- Afghanistan National Public Health Institute
INJURY

AFRO Region

Nigeria


Abstract: There is relatively little information regarding the pattern of homicides in developing countries such as Nigeria. This study is aimed at determining the pattern and demographic factors associated with homicide cases seen in a Nigerian Teaching Hospital. It is a descriptive autopsy study of homicide cases seen at the University College Hospital (UCH), Ibadan over a 10-year period from January 1997 to December 2006. All the coroner’s autopsies for the period, of homicides or suspected homicides, were reviewed with emphasis on the following: gender, age, occupation, circumstances surrounding event, likely motive, type of weapon used, site(s) of injury and mechanism of death. Homicides accounted for 153 (3.1%) of the 4928 coroner’s cases at the UCH within the study period. One hundred and thirty-seven of the 152 cases were men, and the overall age range was 4–83 years. The mechanism of death was hemorrhagic shock in 91 cases (59.9%); severe raised intracranial pressure in 58 cases (38.2%); septicemic shock in two cases (1.3%); and asphyxia in one case (0.7%). Gunshot injuries accounted for 64.5% of the fatalities, sharp objects 21.1% and blunt force 14.5%. Most were victims of armed robbery attacks. The head, abdomen, chest and lower limbs were single sites of injuries in descending order of frequency and most of the cases sustained multiple injuries involving two or more of these sites. Gunshot deaths were the commonest form of homicides in the period under review. Young males and victims of armed robbery attacks were most susceptible.

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Introduction: Although head injury (HI) is a major public health problem in Nigeria and other low and middle income countries of the world, there is a paucity of data from these societies. This is largely due to under-reporting. We carried out a prospective study of the clinic-epidemiological profiles and outcomes following the first hospitalization of a cohort of head-injured patients in Ikeja, Nigeria, a metropolitan African city. Methods: In an 8-month period from May until December 2005, data from all HI cases seen in our neurosurgical unit were prospectively recorded for subsequent analysis. These include demographics, mechanism of injury, pre-neurosurgical care received, severity of injury using the Glasgow Coma Scale, presence of hemodynamic instability, pupillary anomalies and associated systemic injuries, cranial computed tomography (CT) findings and the number of surgical interventions, as well as outcomes after the first hospital admission using the Glasgow Outcome Scale. Determinants of outcome were explored using the $\chi^2$ test and the level of
significance was put at \( p = 0.05 \). **Results:** There were 143 cases of HI, which is about one fifth of our total workload, including 122 males and 21 females aged 0.5–85 years (mean age 29.15). The majority (88%) were either school children or low income earners. Road accidents accounted for 75% of the cases; three quarter of the cases had some initial care in other health facilities before the arrival in our unit, at an average of 33 h. Mild, moderate and severe HI accounted for 60, 18 and 22%, respectively. About a quarter of the patients sustained other systemic injuries. Cranial CT scanning was obtainable in 40 patients (28%); 9 of these revealed surgical mass lesions, of whom 5 had life-saving operations. Many well-known determinants of a poor outcome of HI were prevalent in this study group and found to have a significantly adverse effect on patient outcome. **Conclusion:** HI is a major public health problem in Nigeria, taking up at least one fifth of the neurosurgical workload. The prehospital emergency medical service is poorly organized. Determinants of a poor outcome of HI are highly prevalent, including poor accessibility to cranial CT scanning, absence or inadequacy of logistics for neurocritical care and an inadequate number of neurosurgeons.

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**Introduction:** Road traffic accidents, injuries and deaths remain important public health problems in both developed and developing countries. These problems have since escalated with the introduction of the new phenomenon of commercial motorcycle transportation such as is found in the urbanizing slum of Nnewi, Anambra state of Nigeria. **Methods:** Using a semi-structured, interviewer-administered questionnaire, relevant data on socio-demographic and motorcycle characteristics were collected from a sample of 291 commercial motorcyclists selected by systematic sampling technique. Data on RTA, RTI and death were also collected from them over a period of three months. **Results:** The result showed that young commercial motorcyclists (<30 years of age), experienced higher fatal injury rate than older ones (≥30 years of age), \( p < 0.01 \). Motorcyclists with some formal education experienced RTA and RTI incidence rates that were significantly lower than those of motorcyclists with no formal education, \( p < 0.01 \). In the same vein, medical condition and social vices such as alcohol intake among the motorcyclists were found to be obvious predictors of RTA, RTI and death. Furthermore, motorcyclists who used >100 cc engine capacity motorcycles had significantly higher RTA incidence rate (478.8/100 MCY), RTI rate (223.2/100 MCY) and FIR (410/100 MCY) than users of <100 cc engine motorcycles who recorded RTA incidence of 258.9/100 MCY, RTI rate of 49/100 MCY and zero fatal injury respectively \( p < 0.01, p < 0.001, p < 0.001 \) respectively. **Conclusion:** A careful consideration of all these predictors individually and collectively, will enable stakeholders in transport industry plan effective RTA, RTI and death control measures. Rather than an outright ban of motorcycle transportation, evening classes can be organized for the motorcyclists at subsidized rates to improve their literacy levels to run side by side with road safety informational lessons delivered at their places of work.

**Introduction:** Motorcyclists are at high risk of road traffic accidents and the attendant injuries, but few community-based studies have investigated the problem in Nigeria. Therefore, this study was conducted to determine the incidence of accidents and patterns of non-fatal injury among commercial motorcyclists in a rural community in Oyo State, Nigeria. **Methods:** A total sample of all the commercial motorcyclists registered in the motor parks of Igbo-Ora, Oyo State was surveyed. An interviewer administered questionnaire was used to collect information on the respondents' sociodemographic characteristics, occurrence of accidents in the year preceding the study, type of injury sustained, motorcycle riding experience, substance use and other characteristics. **Results:** Two hundred and ninety nine motorcyclists were interviewed, 136 (45.3%) had been involved in a road traffic accident; of these 85 (62.5%) were involved in a single accident, while 51 (37.5%) were involved in 2 or more accidents. Motorcycle accident risk factors included age of the motorcyclist, between 20-29 and 30-39 years, OR 10.1 and OR 9.6 respectively, alcohol use, OR 1.18, and visual impairment, OR 1.62. The collisions occurred mainly with cars (28.7%) and other motorcyclists (27.9%). The commonest types of injuries sustained were abrasions and cuts (67.6%) and fractures of the upper and lower limbs (16.2%). **Conclusion:** Road traffic accidents occur frequently among commercial motorcyclists in this community. Introduction of road safety education targeted at discouraging alcohol use among these motorcyclists while riding and ensuring periodic visual acuity assessment is recommended.

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**Introduction:** Despite the high incidence of infectious diseases in developing countries, injuries still contribute significantly to the health burden. There are few reports of rural, community-based injury surveys in Nigeria. This study describes the incidence and pattern of injuries among the residents of a rural area in South-Western Nigeria. **Methods:** It was a community based cross-sectional study. Two of six census areas were randomly selected and all households in the two areas visited. Information on the sociodemographic characteristics, individual injury events and outcomes was obtained with a questionnaire. Data were analyzed using SPSS version 11. **Results:** Information was obtained on the 1,766 persons in 395 households. Fifty-nine injuries were recorded by 54 people, giving an injury incidence of 100 per 1,000 per year (95% CI = 91.4–106.9). Injury incidence among <30 years was 81.6 per 1,000 per year (95% CI = 62.3–83.1); and 126 per 1,000 per year (95% CI = 98.2–137.4) for those ≥ 30 years (p = 0.013). Injury incidence for females was 46 per 1,000 per year; and 159 per 1,000 per year (p = 0.000) for males. A significantly higher proportion of males (5%) sustained injury compared to females (2%) (p = 0.043). Falls and traffic injuries, 15 (25%) each, were the leading causes of injury; followed by cuts/stabs 12 (21%), and blunt injuries, 9 (15%). Traffic injuries were the leading cause of injuries in all age groups except among the 5–14 years where falls were the leading cause of injury. In thirty-four (58%) of those injuries, treatment was at a hospital/health centre; while in two (3%), treatment was by untrained traditional practitioners. Thirty-nine (66%) of the injuries were fully recovered from, and 19 (32%) resulted in disability. There were 2 fatalities in the 5-year period, one (2%) within the study period. **Conclusion:** Injuries were common in Igbo-Ora, though resultant disability and fatality were low. Males and those aged ≥ 30
years had significantly higher proportions of the injured. Falls and traffic injuries were the most commonly reported injuries. Appropriate interventions to reduce the occurrences of injuries should be instituted by the local authorities. There is also need to educate the community members on how to prevent injuries.

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Kenya


Introduction: Trauma in Africa is an increasingly significant problem. The aims of this study were to document the epidemiology and clinical management of trauma in a rural Kenyan hospital and from this to highlight important areas for the medical training of doctors managing trauma in similar situations. Methods: Prospective audit of 202 consecutive trauma patients admitted to Kijabe Hospital. Results: The mean patient age was 31, 77% were males. The median Injury Severity Score (ISS) was nine. The median distance to hospital was 60 km, with a 9 h delay in presentation. Injury mechanisms included road traffic accidents 52%, fall 22%, assaults 13% and burns 6%. The main injuries were limb fractures, soft tissue injuries, head injury and haemo/pneumothorax. Common interventions included fracture management, wound debridement, chest drain insertion, blood transfusion and skin grafting. The overall mortality rate was 3.5%. Conclusion: With appropriate resources and training, good trauma outcomes are possible. The importance of access to hospital care and orthopedic training are highlighted.

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Introduction: There is increasing importance of trauma not only as a major cause of surgical admissions, but also a significant cause of morbidity, mortality and disability. Objective: To document injury-related visits and hospitalization in a provincial hospital, western Kenya. Methods: On-site review of records of all patients who visited emergency department (ED) from January 2002 through December 2003, and admissions of year 2003. Results: A total of 15365 patients visited the ED, of which 41% (6319/15395) were injury cases. The leading causes of injury were assault (42%), road traffic crashes (RTC) (28%), unspecified soft tissue injury (STI) (11%). Cut-wounds, dog bites, falls, burns and poisoning were infrequently reported (each <10%). The age group 15-44 years formed the largest proportion (75%). A total of 3253 patients were admitted in 2003, of which 1010 (31%) were due to injuries. RTC were leading cause of hospitalization (49%) followed by assault (16%). Men were more likely to be hospitalized due to assault (OR=2.22; CI = 1.45 - 3.41) and not burns or poisoning (p<0.01). There were 64 (6.3%) injury-related deaths, mainly resulting from RTC (41.9%), burns (19.4%) and assault (16.1%). Conclusion: This study provides considerable

**Introduction**: Road traffic injuries continue to exert a huge burden on the health care system in Kenya. Few studies on the severity of road traffic injuries have been conducted in Kenya. We carried out a cross-sectional study to determine factors associated with severity of road traffic injuries in a public hospital in Thika district, Kenya. **Methods**: Road crash victims attending the Thika district hospital, a 265-bed public hospital, emergency room were recruited consecutively between 10th August 2009 and 15th November 2009. Epidemiologic and clinical information was collected from medical charts and through interview with the victims or surrogates using a semi-structured questionnaire. Injuries were graded as severe or non-severe based on the Injury Severity Score (ISS). Independent factors associated with injury severity were assessed using multivariate logistic regression. **Results**: The mean age of participants was 32.4 years, three quarters were between 20-49 years-old and 73% (219) were male. Nineteen percent (56/300) of the victims had severe injury. Five percent (15) had head injury while 38% (115) had fractures. Vulnerable road users (pedestrians and two-wheel users) comprised 33% (99/300) of the victims. Vulnerable road users (OR=2.0, 95%CI=1.0-3.9), road crashes in rainy weather (OR=2.9, 95%CI=1.3-6.5) and night time crashes (OR=2.0, 95%CI=1.1-3.9) were independent risk factors for sustaining severe injury. **Conclusion**: Severe injury was associated with vulnerable road users, rainy weather and night time crashes. Interventions and measures such as use of reflective jackets and helmets by two wheel users and enhanced road visibility could help reduce the severity of road traffic injuries.

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**Introduction**: The rise in the use of motorcycles in Kenya in the last 10 years has been associated with increased injury rates. Between 2004 and 2009, motorcycle injuries increased at a rate of 29% and, in some hospitals, motorcycle users have become the predominant road user category injured. Although most road traffic injuries occur in Nairobi, there has been no previous account of motorcycle injury and associated outcomes at its main hospital. **Objective**: To describe the injury patterns and outcomes following motorcycle trauma at the Kenyatta National Hospital. **Methods**: All motorcycle trauma admissions during one calendar year were analyzed. The data captured included demographics, injury patterns and outcomes, lengths of hospital stay, hospitalization cost, and early hospital mortality. Factors associated with outcomes were analyzed by univariate and multivariate means. The probability of survival was estimated using the Trauma and Injury Severity Score (TRISS) methodology for each patient. **Results**: Two hundred and five patients were reviewed. Motorcycle trauma admissions formed 22.3% of all road traffic injury admissions. Male riders predominated. The average age and modal age group was 30.78 and 21–30 years, respectively. Half
of riders and 20% of passengers used protective helmets. Injuries were mostly to the extremities (60.7%) and head/neck (32.07%), and the average Injury Severity Score (ISS) was 7.57 ± 4.0 (median 9.0). At 2 weeks, 9.0% of patients had died. The estimated probability of survival ranged from 0.86 to 0.97. Surgical interventions were needed for 51.7% of patients. The mean length of stay in the hospital was 24.3 days, while the cost of treatment was 31,783 Kenya Shillings (Kshs). Injury severity (P < 0.001), admission to the intensive care unit (ICU) (P < 0.001), non-surgical treatment (P = 0.003), blood transfusion (P = 0.029), head injury (P < 0.001), and low Glasgow Coma Scale (GCS) score at admission were significantly associated with mortality. **Conclusion:** Injuries to the lower limbs and the head predominated in motorcycle trauma. The high mortality rate, need for surgery in the majority of patients, and prolonged admission days call for motorcycle control and expedited care. Significant head injury mortality calls for efforts to embrace helmet laws for riders and passengers.

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**Introduction:** Our objective was to define the scope of injury due to interpersonal violence in a medium-sized town in Western Kenya. **Methods:** Prospective, cross-sectional data collection and analysis. Setting/subjects: Data were prospectively collected on all injured patients (n = 562) presenting to a health center in Western Kenya, 2002–2004. Age, gender, type, and severity of injury, relationship to assailant, disposition, and clinician’s suspicion of alcohol use were recorded. Main outcome measures: Number of injuries due to interpersonal violence; correlation of gender, alcohol use, relationship to assailant, and type of injury. **Results:** Interpersonal violence caused 43% of all injuries. Men and women were equally likely to suffer violent injuries (42% vs 45%); however, women were more likely to suffer injury from domestic violence (4.7% vs 7.0%) and sexual assault (0% vs 3.5%). Men and women were equally likely to know their assailant. Women were more likely to be injured by a spouse/partner (19% vs 1.3%), whereas men were more likely to be injured by an acquaintance (29% vs 16%). Alcohol use was more often suspected for victims of violent, as opposed to unintentional, injury (45% vs 16%). Men with violent injuries were more likely than women to be suspected of having used alcohol (51% vs 35%). **Conclusion:** Interpersonal violence is a leading cause of injury in Western Kenya. Although men and women are equally likely to be assaulted, women are more likely to be injured by a spouse, and men by an acquaintance. Alcohol use is common among those who suffer violent injuries in this population.

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**Introduction:** Road traffic injuries (RTIs) contribute to a significant proportion of the burden of disease in Kenya. They also have a significant impact on the social and economic well-being of individuals, their families, and society. However, though estimates quantifying the burden of RTIs in
Kenya do exist, most of these studies date back to the early 2000s—more than one decade ago. This article aims to present the current status of road safety in Kenya. Using data from the police and vital registration systems in Kenya, we present the current epidemiology of RTIs in the nation. We also sought to assess the status of 3 well-known risk factors for RTIs—speeding and the use of helmets and reflective clothing. **Methods:** Data for this study were collected in 2 steps. The first step involved the collection of secondary data from the Kenya traffic police as well as the National Vital Registration System to assess the current trends of RTIs in Kenya. Following this, observational studies were conducted in the Thika and Naivasha districts in Kenya to assess the current status of speeding among all vehicles and the use of helmets and reflective clothing among motorcyclists. **Results:** The overall RTI rate in Kenya was 59.96 per 100,000 population in 2009, with vehicle passengers being the most affected. Notably, injuries to motorcyclists increased at an annual rate of approximately 29 percent (95% confidence interval [CI]: 27–32; P < .001). The mean age of death due to road traffic crashes was 35 years. Fatalities due to RTIs increased at an annual rate of 7 percent (95% CI: 6–8; P < .001) for the period 2004 to 2009. Observational studies revealed that 69.45 percent of vehicles in Thika and 34.32 percent of vehicles in Naivasha were speeding. Helmets were used by less than one third of motorcycle drivers in both study districts, with prevalence rates ranging between 3 and 4 percent among passengers. **Conclusion:** This study highlights the significant burden of RTIs in Kenya. A renewed focus on addressing this burden is necessary. Focusing on increasing helmet and reflective clothing use and enforcement of speed limits has the potential to prevent a large number of road traffic crashes, injuries, and fatalities. However, it is difficult to demonstrate the magnitude of the injury problem to policymakers with minimal or inaccurate data, and this study illustrates the need for national continuous, systematic, and sustainable data collection efforts, echoing similar calls for action throughout the injury literature.

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### Namibia


**Abstract:** The aims of this study were to identify the demographic characteristics of injury victims and the types of injury cases seen and admitted for treatment in Khorixas District Hospital, Namibia. A descriptive retrospective survey of all injuries attended to and admitted in the hospital from January 2001 to December 2004 was done using document review of patients’ medical records. A total of 331 injury cases (6.8% of all admissions) were admitted. The age group 20-29 years was the most commonly affected, with 18% injured. Injury was common among the males (76%). The unemployed constituted 36% of all the injuries, followed by children/infants (19%). Over two-thirds (68%) of the injuries were unintentional. Cuts and stabs were the most common (24%) type of injury among the injury cases admitted. Motor vehicle accidents accounted for 21% of all injuries admitted. Over a third (36%) of all the injuries were alcohol related. Farmers (11%) constitute the most affected group among the employed. Type of injury and occupation were significantly
associated ($\chi^2$) = 107.879, p < 0.001). Mass propagation of anti-violence education is needed to reduce the high rate of intentional injuries among the injuries such as cuts/stabs, assaults, human bite and gunshot injuries.

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**Introduction:** Interpersonal physical violence is an important global public health concern that has received limited attention in the developing world. There is in particular a paucity of data regarding physical violence and its socio-demographic correlates among in-school adolescents in Namibia.

**Methods:** We analysed cross-sectional data from the Namibia Global School-Based Health Survey (GSHS) conducted in 2004. We aimed to estimate the prevalence and socio-demographic correlates of physical fighting within the last 12 months. We obtained frequencies of socio-demographic attributes. We also assessed the association between self-reported history of having engaging in a physical fight and a selected list of independent variables using logistic regression analysis.

**Results:** Of the 6283 respondents, 50.6% (55.2% males and 46.2% females) reported having been in a physical fight in the past 12 months. Males were more likely to have been in a physical fight than females (OR = 1.71, 95% CI (1.44, 2.05)). Smoking, drinking alcohol, using drugs and bullying victimization were positively associated with fighting (OR = 1.91, 95% CI (1.49, 2.45); OR = 1.48, 95% CI (1.21, 1.81); OR = 1.55, 95% CI (1.22, 1.81); and OR = 3.12, 95% CI (2.62, 3.72), respectively). Parental supervision was negatively associated with physical fighting (OR = 0.82, 95% CI (0.69, 0.98)). Both male and female substance users (cigarette smoking, alcohol and drug use) were more likely to engage in physical fighting than non-substance users (OR = 3.53, 95% CI (2.60, 4.81) for males and OR = 11.01, 95% CI (7.25, 16.73) for females). Parental supervision was negatively associated with physical fighting (OR = 0.85, 95% CI (0.72, 0.99)).

**Conclusion:** Prevalence of physical fighting within the last 12 months was comparable to estimates obtained in European countries. We also found clustering of problem behaviours or experiences among adolescents who reported having engaged in physical violence in the past 12 months. There is a need to bring adolescent violent behavior to the fore of the public health agenda in Namibia.

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**Tanzania**


**Introduction:** Road traffic crash is of growing public health importance worldwide contributing significantly to the global disease burden. There is paucity of published data on road traffic crashes in our local environment. This study was carried out to describe the injury characteristics and outcome of road traffic crash victims in our local setting and provide baseline data for establishment of prevention strategies as well as treatment protocols.

**Methods:** This was a prospective hospital based study of road traffic crash victims carried out at Bugando Medical Centre
in Northwestern Tanzania between March 2010 and February 2011. After informed consent to participate in the study, all patients were consecutively enrolled into the study. Data were collected using a pre-tested questionnaire and analyzed using SPSS computer software version 15.0. **Results:** A total of 1678 road traffic crash victims were studied. Their male to female ratio was of 2.1:1. The patients ages ranged from 3 to 78 years with the mean and median of 29.45 (± 24.22) and 26.12 years respectively. The modal age group was 21-30 years, accounting for 52.1% patients. Students (58.8%) and businessmen (35.9%) were the majority of road traffic crash victims. Motorcycle (58.8%) was responsible for the majority of road traffic crashes. Musculoskeletal (60.5%) and the head (52.1%) were the most common body region injured. Open wounds (65.9%) and fractures (26.3%) were the most common type of injuries sustained. The majority of patients (80.3%) were treated surgically. Wound debridement was the most common procedure performed in 81.2% of the patients. The complication rate was 23.7%. The overall average length of hospital stay (LOS) was 23.5 ± 12.3 days. Mortality rate was 17.5%. According to multivariate logistic regression analysis, patients who had severe trauma (Kampala Trauma Score II ≤ 6) and those with long bone fractures stayed longer in the hospital and this was significant (P < 0.001) whereas the age of the patient, severe trauma (Kampala Trauma Score II ≤ 6), admission Systolic Blood Pressure < 90 mmHg and severe head injury (Glasgow Coma Score = 3-8) significantly influenced mortality (P < 0.001).

**Conclusion:** Road traffic crashes constitute a major public health problem in our setting and contribute significantly to unacceptably high morbidity and mortality. Urgent preventive measures targeting at reducing the occurrence of road traffic crashes is necessary to reduce the morbidity and mortality resulting from these injuries. Early recognition and prompt treatment of road traffic injuries is essential for optimal patient outcome.

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**Abstract:** Motorcycle injuries constitute a major but neglected emerging public health problem in developing countries and are a common cause of road traffic injuries. The aim of this study was to establish the prevalence, injury pattern and treatment outcome of motorcycle injuries in our setting. This was a descriptive cross-sectional study of motorcycle injury patients presenting to the A & E department of Bugando Medical centre between March 2009 and February 2010. After informed consent to participate in the study, all patients were consecutively enrolled in the study. Data was collected using a pre-tested, coded questionnaire and analyzed using SPSS computer software version 11.5. A total of 384 motorcycle injury patients were studied constituting 37.2% of all road traffic injuries. 267 patients (69.5%) were males and 117 (30.5%) were females (Male: Female ratio = 2.3:1). The patients’ ages ranged from 4 to 87 years with a mean of 25.7 years and a peak incidence of 21-30 years. The majority of patients were self-employed and students accounting for 68.8% and 42.2% respectively. Motorcyclists accounted for the majority of motorcycle injury patients (212, 55.2%), followed by passengers (130, 33.9%) and pedestrians (42, 10.9%). Helmet use was recorded in 87 patients (22.7%). Most patients (352; 91.7%) sustained blunt injuries. Musculoskeletal (extremities) and head injuries were the most common body region injured affecting 234 (60.9%) and 212 (55.2%) patients respectively. The majority of patients (244; 63.5%) were treated surgically. Wound debridement was the most common procedure performed in 212 (86.9%) patients. The overall length of hospital stay ranged from 1 day to 120 days (mean 19.23 days). The LOS for non-survivors ranged from 1 day to 25 days (mean 5.6 days). Patients with...
major trauma (ISS > 16), severe head injury (GCS 3-8) and those with long bone fractures stayed longer in the hospital and this was significant (p-value < 0.001). Mortality rate was 16.7% (64 deaths). Age of the patient, non-helmeted patients, major trauma (ISS > 16), admission SBP < 90mmHg, severe head injury (GCS < 9), need for ICU admission and need for ventilatory support significantly influenced mortality (p-value < 0.001). Motorcycle injuries constitute a major but neglected emerging public health problem in Mwanza city and continue to be one of the most common cause or agent of road traffic injuries. The morbidity and mortality can be mitigated by encouraging use of protective gear like helmets and encouraging enforcement of traffic laws.

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**Introduction:** Our objective was to determine the causes, magnitude and management of burns in children under five years of age who were admitted in the district hospitals of Dar es Salaam City, Tanzania. **Methods:** In this study, a total of 204 under-fives were enrolled. Questionnaires were used to elicit if the parent/caretaker had the knowledge of the cause of the burns, what was done immediately after burn injury, first aid given immediately after burn, source of the knowledge of first aid and when the child was taken to the hospital. Also the questionnaire was cited with data on the management of burns in the hospitals through observation and checking the treatment files. **Results:** Forty nine percent were males while 50.5% were females. Most of the children (54.9%) were aged between 1-2 years. 78.4% had scalds while 21.6% had flame burns. No children were found to have burns caused by chemicals or electricity. Most of the burns (97.5%) occurred accidentally, although some (2.5%) were intentional. 68.6% of these burn injuries occurred in the kitchen. Immediately after burn 87.3% of the children had first aid applied on their wounds while 12.7% didn't apply anything. Of the agents used, honey was the most used (32.8%) followed by cold water (16.7%). The source of knowledge on these agents was from relatives and friends (72.5%), schools (7%), media (6%) and medical personnel (14%). The study further revealed that analgesics, intravenous fluids, antiseptics and antibiotics were the drugs used for treatment of burns in the hospital and that there was no specialized unit for burns in the hospitals. **Conclusion:** Causes of childhood burns are largely preventable requiring active social/medical education and public enlighten campaigns on the various methods of prevention. The government to see to it that hospitals have specialized units for managing burn cases and also the socio-economic status of its people be improved.

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**Abstract:** The objective of this study was to identify the incidence of burn injuries among children in a sub-Saharan urban area and describe contributing factors in the home environment. A cross-sectional household survey was conducted in Dar es Salaam, Tanzania between 8 and 22 July 2009. Demographic characteristics of participants were reported using descriptive statistics. Bivariate analyses using Pearson's chi-square tests for categorical variables were used to explore possible
associations. Burns represented 16.3% of reported injuries. The one-month incidence was calculated to be 1.73%. The most common contributor to burn injury was open flame 36.9%, followed by hot liquids 33.8%. Most burns occurred in urban areas with 88% occurring in the home. A significant association with burn injury was found in the 0–4 age category. There exists a continued need for research examining the mechanisms of safety provision in the home in low resource settings, especially concerning burn injury.

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**Introduction:** Injuries rank high among the leading causes of death and disability annually, injuring over 50 million and killing over 5 million people globally. Approximately 90% of these deaths occur in developing countries. Objectives: To estimate and identify the risk factors for injury mortality in the Rufiji Health and Demographic Surveillance System (RHDSS) in Tanzania. **Methods:** Secondary data from the RHDSS covering the period 2002 and 2007 was examined. Verbal autopsy data was used to determine the causes of death based on the 10th revision of the International Classification of Diseases (ICD-10). Trend and Poisson regression tests were used to investigate the associations between risk factors and injury mortality. **Results:** The overall crude injury death rate was 33.4/100 000 population. Injuries accounted for 4% of total deaths. Men were three times more likely to die from injuries compared with women (adjusted IRR (incidence risk ratios)=3.04, p=0.001, 95% CI (2.22 to 4.17)). The elderly (defined as 65+) were 2.8 times more likely to die from injuries compared with children under 15 years of age (adjusted IRR=2.83, p=0.048, 95% CI (1.01 to 7.93)). The highest frequency of deaths resulted from road traffic crashes. **Conclusion:** Injury is becoming an important cause of mortality in the Rufiji district. Injury mortality varied by age and gender in this area. Most injuries are preventable, policy makers need to institute measures to address the issue.

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**Country-specific information**

Uganda


**Introduction:** Our objective was to describe injuries and their emergency care at five city hospitals. Data were collected between January and December 1998 from casualty departments of the five largest hospitals of Kampala city, Uganda, with bed capacity ranging from 60 to 1200. **Methods:** Registry forms were completed on trauma patients. All patients with injuries were eligible. Outcome at two weeks was determined for admitted patients. **Results:** Of the 4359 injury patients, 73% were males. Their mean age was 24.2 years, range 0.1–89, and a 5–95 centile of 5–50 years. Patients with injuries were 7% of all patients seen. Traffic crashes caused 50% of injuries, and were the leading cause for patients ≥10 years. Fifty eight per cent of injuries occurred on the road, 29% at home, and 4% in a public building. Falls, assaults, and burns were the main causes in homes. Fourteen per cent
Appendix – Country-specific Information: Injury

of injuries were intentional. Injuries were severe in 24% as determined with the Kampala trauma score. One third of patients were admitted; two thirds arrived at the hospital within 30 minutes of injury, and 92% were attended within 20 minutes of arrival. Conclusion: Injuries in Kampala are an important public health problem, predominantly in young adult males, mostly due to traffic. The majority of injuries are unintentional. Hospital response is rapid, but the majority of injuries are minor. Without pre-hospital care, it is likely that patients with serious injuries die before they access care. Preventive measures and a pre-hospital emergency service are urgently needed.

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Abstract: Acid burns from assault represent a substantial and neglected proportion of burn injuries in the developing world. A retrospective chart review was conducted to assess the frequency of acid burns in relation to total burns requiring admission in Kampala, Uganda. Seventeen percent of the adult burns admitted at New Mulago hospital over an 18-month period resulted from acid assault. Patients had a mean age of 33.1 years, with a male to female ratio of 1.1:1. The average extent of injury was 14.1% total body surface area (TBSA), commonly involving the face (86.7%), head and neck (66.7%), upper limbs (60.0%) and chest (53.3%). Thirty-three percent of patients suffered partial or complete blindness. Mean length of stay in hospital was 49.5 days and all patients survived. Patterns of assault followed two common trends: attacks during robberies (46.7%), and attacks associated with domestic disputes (33.3%). The Ugandan pattern is contrasted with patterns reported from Bangladesh, Cambodia and Jamaica with a view to understanding the social context underlying such assaults. Prevention of these hideous injuries will require further understanding of their underlying social and cultural determinants. Serious questions remain whether public education programs will reduce the incidence of acid assault or increase it by giving potential assailants an idea they did not have before.

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Introduction: Traffic injuries are an important problem in low income countries. In Uganda road traffic is the largest single cause of injury in Kampala; pedestrians, and children are most affected. Pedestrian injury affects school children in Uganda. Objective: To determine the overall risk of pedestrian traffic injury among school children in Kawempe, Uganda. Methods: A cohort was assembled at 35 primary schools and followed for 3 terms. Ten of the schools had participated in previous injury programs, others were systematically selected. Injuries were recorded by teachers using a questionnaire. Data collected included ID, school, age, grade, gender, incident date, vehicle type, and injury outcome. Demographic characteristics are described and cumulative incidences calculated. Results: The cohort included 8,165 children (49% male) from 35 primary schools. The mean age was 9 years (Sd=2.78). Of the 35 schools, 92% were day; the others mixed day and boarding. 53 children (27 girls) were involved in a traffic incident. 25% of the injuries reported were serious and warranted care in a health facility. No deaths occurred. Forty % of incidents involved commercial motorcycles, 41% bicycles, 9% cars, 8% taxis, and 2% trucks. The cumulative incidence
was 0.168% each term. Over the 3 terms of the year the cumulative incidence was 0.5 + 0.02. There were no gender differences in the cumulative incidence. **Conclusion:** Each school year about ½ % of Kawempe school children are involved in a traffic incident. Interventions are necessary to reduce the unacceptably high incidents of pedestrian traffic. Interventions to alleviate this situation including safer routes, teaching skills of road crossing to children as well as better regulation and road safety education to two wheelers could reduce the unacceptably high incidents of pedestrian traffic injury.

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### Country-specific information

| Country-specific information | Health and Demographic Surveillance Systems through the in-depth Data Repository: [www.indepth-ishare.org/index.php/home](http://www.indepth-ishare.org/index.php/home) |

### Zambia


**Introduction:** The metal mining industry employs ~15% of formally employed workers in Zambia, but there is little information about the magnitude of occupational injuries among the miners. **Aim:** To determine the frequency rates of occupational injuries and fatalities among copper miners in Zambia. **Methods:** A retrospective study of occupational injuries and fatalities at one of the largest copper mining companies in Zambia was undertaken for the period January 2005 to May 2007. Information on injuries and fatalities was obtained from the electronic accident survey database of the company. Analysis was restricted to fatalities and those injuries that had prompted medical attention and at least 1 day of absence from work. Annual injury and fatality frequency rates (injuries per 1000 employee years and fatalities per 100 000 employee years, respectively) were calculated. **Results:** In the selected period, 165 injuries and 20 fatalities were recorded. The underground department had the highest frequency rates of fatalities (111/100 000 employee years) and injuries (5.5/1000 employee years). The most common cause of fatal injuries was fall of rock in the underground mines. The most frequent mechanism of injury was handling of tools and materials, and the most commonly injured body parts were the hands and fingers. **Conclusion:** The fatality rate is high compared to reported values from the metalliferous mining industry in developed countries, strongly suggesting that measures should be taken to reduce risks, particularly at underground sites.

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**Abstract:** The aim of this study is to assess primary burn prevention knowledge in a rural Zambian population that is disproportionately burdened by burn injuries. A 10-question survey was completed by youths, and a 15-question survey was completed by adults. The survey was available in both English and Nyanja. The surveys were designed to test their knowledge in common causes, first aid, and emergency measures regarding burn injuries. Logistic regression analysis was used to
explore relationships between burn knowledge, age, school, and socioeconomic variables. A burn prevention coloring book, based on previous local epidemiological data, was also distributed to 800 school age youths. Five hundred fifty youths and 39 adults completed the survey. The most significant results show knowledge deficits in common causes of burns, first aid treatment of a burn injury, and what to do in the event of clothing catching fire. Younger children were more likely to do worse than older children. The adults performed better than the youths, but still lack fundamental burn prevention and treatment knowledge. Primary burn prevention data from the youths and adults surveyed demonstrate a clear need for burn prevention and treatment education in this population. In a country where effective and sustainable burn care is lacking, burn prevention may be a better investment to reduce burn injury than large investments in healthcare resources.

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**Abstract:** Injuries are a growing cause of morbidity and mortality in the world. Data from Southern Africa are limited, possibly because of limited research prioritization of the issue and pre-occupation with communicable diseases. We conducted the current study to estimate the prevalence of, and assess factors associated with, self-inflicted serious injuries among in-school adolescents in Zambia.

We used data collected from the 2004 Zambia Global School-Based Health Survey to estimate prevalence of self-inflicted serious injury within the past 12 months. Logistic regression analysis was conducted to assess the association between selected predictor variables and reported history of having seriously injured oneself. Out of 2,136 adolescents who participated in the Zambia 2004 Global School-based Student Health Survey, 927 (43.4%) reported seriously injuring themselves. Of these who reported injuries, 110 (11.9%) reported seriously injuring themselves on purpose. The following variables were associated with history of self-inflicted injury: worry; sadness; suicidal behavior; history of ever having been drunk and marijuana use. Reported history of injury and self-inflicted injury among in-school adolescents in Zambia are common. History of self-inflicted injury was associated with other lifestyle and psychological concerns among the study participants.

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**Introduction:** Lusaka, the Capital City of Zambia, runs a Death Registry Office, which captures all deaths in a catchment area of nearly 2 000 000 people before disposal of the body by burial or cremation. Objectives: To audit burns-related mortality between November 2007 and June 2009 at the Lusaka Death Registry. **Methods:** This was a retrospective study employing all records including Certificates of Deaths, Burial Permits and Postmortem findings. The data was then compared with originating Health centre and Police death Records. **Results:** A total of 614 injury-related deaths were recorded with 104 or 16.9% due to burns. The majority 78(75%) involved children under 6 years of age, 27(15%) aged 7–35 years while the rest 10(4%) were over 36 years old. 58(55.8%) were males and 46(44.2%) were female. Dry and wet heat, open fires, hot water, porridge, combustible agents such as petroleum products were the causative agents. **Conclusion:** Burns mortality, a largely preventable cause of death in Lusaka, mainly affects children under 6 years of age. Clinician’s early and prudent use of antibiotics, bactericidal creams, skin grafting, adequate
dehydration and good nutrition can help prevent burns mortality. Studying and taking measures to reduce contact with causative agents will help reduce burns mortality and injury-related mortality overall. Death Registries can be used to not only to show burns mortality trends and causative agents but monitor effectiveness of treatment regimens.

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**Mozambique**


**Abstract:** Records of all registered deaths due to injuries maintained by the Legal Medicine Department in Maputo City for the period 1 January to 31 December 2000 were reviewed. Among the 1135 registered deaths, road traffic injuries accounted for the most common underlying cause of death (43.7%), followed by firearm discharge (8.7%) and burns (7.8%). For all deaths, skull fracture (21.9%), organ system injury (17.2%) and brain tissue injury (9.3%) were the most important intermediate causes of death and among the immediate causes of death acute anaemia (21.9%) was the most common followed by asphyxia (14.4%) and traumatic shock (12.0%). Overall, most cases were seen in the age group 20 – 29 years (27.0%) and comprising mainly males (male/female ratio 3.1). The most commonly reported cause for the victims to sustain injuries leading to death were accidents (59.4%), followed by homicides (19.8%), unknown causes (16.1%) and suicides (4.2%). Prevention of road traffic injuries and improved emergency care and health facility-based treatment is needed to reduce injury-related mortality.

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Appendix – Country-specific Information: Injury


**Introduction:** In Mozambique, the magnitude of trauma and violence has increased in recent years with traffic crashes as the leading cause of traumatic death. Objective: To describe the epidemiological profile of trauma patients hospitalized in the Maputo Central Hospital (HCM), Mozambique. **Methods:** Descriptive cross-sectional study of injured patients admitted to HCM in a 35-day period of study. **Results:** Injury was frequent in males (65%) 15–34 years old. Traffic accidents were the main cause of injury (39%) with pedestrians most affected, followed by falls (23%) and burns (20%). Majority of falls (64%) occurred over 45 years. Majority of burn victims were under 5 years caused by hot liquid. More than half patients arrived in the hospital in a private car and only 26% received first-aid in lower health facilities, prior to arrival at the hospital. The traffic injured patients required an average 5 days of hospitalization, while burned required an average of 10 days. **Conclusion:** Injured patients are primarily men aged 15–34. Road traffic injuries, falls and burns dominate the admitted injuries. Road traffic injured patients were primarily pedestrians. Burns have the highest average length of stay affecting mainly patients under five years of age. **Significance:** To contribute for national health system strengthening plan and monitoring.

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**Introduction:** Pediatric burn injuries are one of the leading causes of preventable morbidity and mortality in Sub-Saharan Africa. Research on the complex system of social, economic and cultural factors contributing to burn injuries in this setting is much needed. **Methods:** We conducted a prospective questionnaire-based analysis of pediatric burn patients presenting to the Hospital Central de Maputo. A total of 39 patients were included in the study. Interviews were conducted with the children’s caretakers by two trained medical students at the Eduardo Mondlane Medical School in Maputo with the aid of local nursing staff. **Results:** Most burns occurred from scald wounds (26/39) particularly from bathwater, followed by fire burns (11/39). Burns occurred more frequently in the afternoon (16/39) and evening (16/39). Over one quarter of burns (9/33) occurred in the absence of a caretaker. One-third (12/36) of participants attempted to treat the burn at home prior to bringing the child into the hospital, and roughly two-thirds (24/37) reported using traditional remedies for burn care. The average household had just 2 rooms for an average of 5 family members. Most burns were second degree (25/37). **Conclusion:** Prevention efforts in this setting are much needed and can be implemented taking complex cultural and social factors into account. Education regarding regulation of water temperature for baths is important, given the prevalence of scald burns. Moreover, the introduction of low-cost, safer cooking technology can help mitigate inhalation injury and reduce fire burns. Additionally, burn care systems must be integrated with local traditional medical interventions to respect local cultural medicinal practices.

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Appendix – Country-specific Information: Injury

Cameroon


**Introduction:** Injuries are quickly becoming a leading cause of death globally, disproportionately affecting sub-Saharan Africa, where reports on the epidemiology of injuries are extremely limited. Reports on the patterns and frequency of injuries are available from Cameroon are also scarce. This study explores the patterns of trauma seen at the emergency ward of the busiest trauma center in Cameroon’s capital city. **Methods:** Administrative records from January 1, 2007, through December 31, 2007, were retrospectively reviewed; information on age, gender, mechanism of injury, and outcome was abstracted for all trauma patients presenting to the emergency ward. Univariate analysis was performed to assess patterns of injuries in terms of mechanism, date, age, and gender. Bivariate analysis was used to explore potential relationships between demographic variables and mechanism of injury. **Results:** A total of 6,234 injured people were seen at the Central Hospital of Yaoundé’s emergency ward during the year 2007. Males comprised 71% of those injured, and the mean age of injured patients was 29 years (SD = 14.9). Nearly 60% of the injuries were due to road traffic accidents, 46% of which involved a pedestrian. Intentional injuries were the second most common mechanism of injury (22.5%), 55% of which involved unarmed assault. Patients injured in falls were more likely to be admitted to the hospital (p < 0.001), whereas patients suffering intentional injuries and bites were less likely to be hospitalized (p < 0.001). Males were significantly more likely to be admitted than females (p < 0.001). **Conclusion:** Patterns in terms of age, gender, and mechanism of injury are similar to reports from other countries from the same geographic region, but the magnitude of cases reported is high for a single institution in an African city the size of Yaoundé. As the burden of disease is predicted to increase dramatically in sub-Saharan Africa, immediate efforts in prevention and treatment in Cameroon are strongly warranted.

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**Hospital-based injury data from level III institution in Cameroon: retrospective analysis of the present registration system.** Mefire, Alain Chichom, Georges Alain Etoundi Mballa, Marcel Azabji Kenfack, Catherine Juillard, and Kent Stevens. *Injury* 44, no. 1 (2013): 139-143.

**Introduction:** Data on the epidemiology of trauma in Cameroon are scarce. Presently, hospital records are still used as a primary source of injury data. It has been shown that trauma registries could play a key role in providing basic data on trauma. Our goal is to review the present emergency ward records for completeness of data and provide an overview of injuries in the city of Limbe and the surrounding area in the Southwest Region of Cameroon prior to the institution of a formal registration system. **Methods:** A retrospective review of Emergency Ward logs in Limbe Hospital was conducted over one year. Records for all patients over 15 years of age were reviewed for 14 data points considered to be essential to a basic trauma registry. Completeness of records was assessed and a descriptive analysis of patterns and trends of trauma was performed. **Results:** Injury-related conditions represent 27% of all registered admissions in the casualty department. Information on age, sex and mechanism of injury was lacking in 22% of cases. Information on vital signs was present in 2% (respiratory rate) to 12% (blood pressure on admission) of records. Patient disposition (admission, transfer, discharge, or death) was available 42% of the time, whilst location
of injury was found in 84% of records. Road traffic injury was the most frequently recorded mechanism (36%), with the type of vehicle specified in 54% and the type of collision in only 22% of cases. Intentional injuries were the second most frequent mechanism at 23%

**Conclusion**: The frequency of trauma found in this context argues for further prevention and treatment efforts. The institution of a formal registration system will improve the completeness of data and lead to increased ability to evaluate the severity and subsequent public health implications of injury in this region.

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**Introduction**: Injury rates in sub-Saharan Africa are among the highest in the world, but prospective, registry-based reports from Cameroon are limited. We aimed to create a prospective trauma registry to expand the data elements collected on injury at a busy tertiary center in Yaoundé Cameroon. **Methods**: Details of the injury context, presentation, care, cost, and disposition from the emergency department (ED) were gathered over a 6-month period, by trained research assistants using a structured questionnaire. Bivariate and multivariate models were built to explore variable relationships and outcomes. **Results**: There were 2,855 injured patients in 6 months, comprising almost half of all ED visits. Mean age was 30 years; 73 % were male. Injury mechanism was road traffic injury in 59 %, fall in 7 %, penetrating trauma in 6 %, and animal bites in 4 %. Of these, 1,974 (69 %) were discharged home, 517 (18 %) taken to the operating room, and 14 (1 %) to the intensive care unit. The body areas most severely injured were pelvis and extremity in 43 %, head in 30 %, chest in 4 %, and abdomen in 3 %. The estimated injury severity score (eISS) was <9 in 60 %, 9–24 in 35 %, and >25 in 2 %. Mortality was 0.7 %. In the multivariate analysis, independent predictors of mortality were eISS ≥9 and Glasgow Coma Score ≤12. Road traffic injury was an independent predictor for the need to have surgery. Trauma registry results were presented to the Ministry of Health in Cameroon, prompting the formation of a National Injury Committee. **Conclusion**: Injuries comprise a significant proportion of ED visits and utilization of surgical services in Yaoundé. A prospective approach allows for more extensive information. Thorough data from a prospective trauma registry can be used successfully to advocate for policy towards prevention and treatment of injuries.

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**Introduction**: Road traffic injuries (RTIs) are a major cause of death and disability worldwide. In Cameroon, like the rest of sub-Saharan Africa, more data on RTI patterns and outcomes are needed
Appendix

Country-specific Information: Injury

Methods: A prospective injury surveillance study was conducted in the emergency room of the Central Hospital of Yaoundé from April 15 to October 15, 2009. RTI patterns and relationships among demographic variables, road collision characteristics, injury severity, and outcomes were identified. Results: A total of 1686 RTI victims were enrolled. The mean age was 31 years, and 73% were male. Eighty-eight percent of road collisions occurred on paved roads. The most common user categories were ‘pedestrian’ (34%) and ‘motorcyclist’ (29%). Pedestrians were more likely to be female (p < 0.001), while motorcyclists were more likely to be male (p < 0.001). Injuries most commonly involved the pelvis and extremities (43%). Motorcyclists were more likely than other road users to have serious injuries (RR = 1.45; 95% CI: 1.25, 1.68). RTI victims of lower economic status were more likely to die than those of higher economic status.

Conclusion: Vulnerable road users represent the majority of RTI victims in this surveillance study. The burden of RTI on hospitals in Cameroon is high and likely to increase. Data on RTI victims who present to trauma centres in low- and middle-income countries are essential to improving treatment and prevention.

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Democratic Republic of Congo


Introduction: We sought to provide data-based estimates of sexual violence in the Democratic Republic of Congo (DRC) and describe risk factors for such violence. Methods: We used nationally representative household survey data from 3436 women selected to answer the domestic violence module who took part in the 2007 DRC Demographic and Health Survey along with population estimates to estimate levels of sexual violence. We used multivariate logistic regression to analyze correlates of sexual violence. Results: Approximately 1.69 to 1.80 million women reported having been raped in their lifetime (with 407 397–433 785 women reporting having been raped in the preceding 12 months), and approximately 3.07 to 3.37 million women reported experiencing intimate partner sexual violence. Reports of sexual violence were largely independent of individual-level background factors. However, compared with women in Kinshasa, women in Nord-Kivu were significantly more likely to report all types of sexual violence. Conclusion: Not only is sexual violence more generalized than previously thought, but our findings suggest that future policies and programs should focus on abuse within families and eliminate the acceptance of and impunity surrounding sexual violence nationwide while also maintaining and enhancing efforts to stop militias from perpetrating rape.

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Appendix – Country-specific Information: Injury

**Introduction:** Despite the signing of international peace agreements, a deadly war continues in the Democratic Republic of Congo (DRC) and sexual violence is a prominent modus operandi of many military groups operating in the region. **Methods:** Retrospective cohort study of women who presented to Panzi Hospital in 2006 requesting post-sexual violence care. Data was extracted and analyzed to describe the patterns of sexual violence. **Results:** A total of 1,021 medical records were reviewed. A majority of attacks occurred in individual homes (56.5%), with the fields (18.4%) and the forest (14.3%) also being frequent locations of attack. In total, 58.9% of all attacks occurred at night. Of the four primary types of sexual violence, gang rape predominated (59.3%) and rape Not Otherwise Specified (NOS) was also common (21.5%). Sexual slavery was described by 4.9% of the survivors and a combination of gang rape and sexual slavery was described by 11.7%. The mean number of assailants per attack was 2.5 with a range of one to > 15. There were several demographic predictors for sexual slavery. Controlling for age, education level and occupation, a marital status of "single" increased the risk of sexual slavery (OR = 2.97, 95% CI = 1.12-7.85). Similarly, after controlling for other variables, age was a significant predictor of sexual slavery with older women being at a slightly reduced risk (OR = 0.96, 95% CI = 0.92-0.99). Women who experienced sexual slavery were 37 times more likely to have a resultant pregnancy in comparison to those who reported other types of sexual violence (OR = 37.50, 95% CI =14.57-99.33).

**Conclusion:** Among sexual violence survivors presenting to Panzi Hospital in 2006, the majority of attacks occurred in women’s own homes, often at night. This represents a pattern of violence that differs from other conflict settings and has important implications regarding protection strategies. Sexual violence in South Kivu was also marked with a predominance of gang rape, thus increasing the risk of serious injury as well as the likelihood of an individual woman contracting a sexually transmitted infection (STI). Sexual slavery was noted to be more common among young, single women and was found to have a high rate of resultant pregnancy.

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**Introduction:** The province of North Kivu in the Democratic Republic of Congo has been afflicted by conflict for over a decade. After months of relative calm, offences restarted in September 2008. We did an epidemiological study to document the impact of violence on the civilian population and orient pre-existing humanitarian aid. **Methods:** In May 2009, we conducted three cross-sectional surveys among 200,000 resident and displaced people in North Kivu (Kabizo, Masisi, Kitchanga). The recall period covered an eight-month period from the beginning of the most recent offensive to the survey date. Heads of households provided information on displacement, death, violence, theft, and access to fields and health care. **Results:** Crude mortality rates (per 10,000 per day) were below emergency thresholds: Kabizo 0.2 (95% CI: 0.1-0.4), Masisi 0.5 (0.4-0.6), Kitchanga 0.7 (0.6-0.9). Violence was the reported cause in 39.7% (27/68) and 35.8% (33/92) of deaths in Masisi and Kitchanga, respectively. In Masisi 99.1% (897/905) and Kitchanga 50.4% (509/1020) of households reported at least one member subjected to violence. Displacement was reported by 39.0% of households (419/1075) in Kitchanga and 99.8% (903/905) in Masisi. Theft affected 87.7% (451/514) of households in Masisi and 57.4% (585/1019) in Kitchanga. Access to health care was good: 93.5% (359/384) of the sick in Kabizo, 81.7% (515/630) in Masisi, and 89.8% (651/725) in Kitchanga received care, of whom 83.0% (298/359), 87.5% (451/515), and 88.9% (579/651), respectively, did
Conclusion: Our results show the impact of the ongoing war on these civilian populations: one third of deaths were violent in two sites, individuals are frequently subjected to violence, and displacements and theft are common. While humanitarian aid may have had a positive impact on disease mortality and access to care, the population remains exposed to extremely high levels of violence.

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### Data sources

<table>
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<th>Data sources</th>
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<tr>
<td>Demographic and Health Surveys in the Democratic Republic of Congo: The demographic and health survey in the Democratic Republic of Congo is designed to provide data for monitoring the population and health situation in DRC, and provides reliable data on sexual activity which may be helpful in assessing sexual and intimate partner violence.</td>
<td><a href="http://dhsprogram.com/data/dataset/Congo-Democratic-Republic_Standard-DHS_2013.cfm?flag=0">http://dhsprogram.com/data/dataset/Congo-Democratic-Republic_Standard-DHS_2013.cfm?flag=0</a></td>
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### Ethiopia


Introduction: Occupational injuries pose major public health and socioeconomic developmental problems. However, efforts towards investigation of determinants among factory workers are very minimal in developing countries. Thus, this study aimed at to identify determinants of occupational injury among textile factory workers in Amahara regional state in Ethiopia. **Methods:** A case control study was done among 456 textile factory workers (152 cases and 304 controls). Self-reported data from workers and document review from factories clinics were used to ascertain occupational injury status within one-year period. Data was collected using pretested and structured questionnaire by trained data collectors. Odds ratio with 95% confidence interval was used to assess level significance. **Results:** Young age (<30 years) (AOR 1.90, 95% CI (1.22, 2.94)), male gender (AOR 2.54, 95% CI (1.58, 4.07)), health and safety training (AOR 1.85, 95% CI (1.17, 2.91)), sleeping disturbance (AOR 1.99, 95% CI (1.30, 3.04)), and job stress (AOR 2.25, 95% CI (1.15, 4.41)) were significant predictors of occupation injury. **Conclusion:** Lack of training, sleeping disturbance, and job stress increased the risk of occupational injury. So, providing basic health and safety training with special emphasis on younger and male workers, reducing stressors, and providing sleep health education were recommended.

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Introduction: Epidemiological study on burn injuries and exploration of the risk factors in different settings is important for effective intervention. Very little is known about burn injuries in Ethiopia. Objectives: The aims of this study were to assess the annual incidence of burn injuries and to describe the local knowledge about burns in Mekele town in Tigray, Ethiopia. **Methods:** We did a cross sectional survey of burn injuries on 7309 individuals in 1390 households. **Results:** The annual incidence in burns was 1.2%. Burn had the highest incidence among children less than 5 years old.
Appendix – Country-specific Information: Injury

(4.8%). Scald (59%) was the leading cause of burn followed by flame (34%). Most burns occurred at home (81%). Eighty nine point four percent of the burns healed with minor or no sequelae, 9.4% developed sequelae and the mortality was 1%. Crowding and employment were significant risk factors for burn injury. Domestic burn injuries were common among women of reproductive age and work related burns were more common among men. Many people (36%) used harmful substances with deleterious consequences as first aid measure for burn. Conclusion: This is the first study from northern Ethiopia and underlines that burn represents a major public health problem. However as we have used a long recall period people may have forgotten minor injuries and we may have underestimated the true incidence. Many people either do not know or have harmful misconceptions about first aid measures for burn injuries. Thus we recommend health education about burn prevention and first aid measures be given to the public.

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Introduction: Road traffic injuries are the eighth leading cause of death globally, and the leading cause of death for young people. More than a million people die each year on the world’s roads, and the risk of dying as a result of a road traffic injury is highest in Africa. Methods: A prospective hospital based study was undertaken to assess injury characteristics and outcome of road traffic accident among victims at Adult Emergency Department of Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. A structured pre-tested questionnaire was used to gather the required data. The collected data were analyzed using SPSS version 20.0. Hierarchical multiple regression analysis was used to identify predictors of fatalities among the road traffic crash victims. Results: A total of 230 road traffic accident victims were studied. The majority of the study subjects were men 165 (71.7 %) and the male/female ratio was 2.6:1. The victims’ ages ranged from 14 to 80 years with the mean and standard deviations of 32.15 and ± 14.38 years respectively. Daily laborers (95 (41.3 %)) and students (28 (12.2 %)) were the majority of road traffic accident victims. Head (50.4 %) and musculoskeletal (extremities) (47.0 %) were the most common body region injured. Fractures (78.0 %) and open wounds (56.5 %) were the most common type of injuries sustained. The overall length of hospital stay (LOS) ranged from 1 day to 61 days with mean (± standard deviation) of 7.12 ± 10.5 days and the mortality rate was 7.4 %. Hierarchical multiple regression analysis showed that age of the victims (ß = 0.16, p < 0.05), systolic blood pressure on admission (ß = −0.35, p < 0.001) and Glasgow coma scale (ß = −0.44, p < 0.001) were statistically significant predictors of fatalities among the victims. Conclusion: This study showed diverse injury characteristics and high morbidity and mortality among the victims attending Adult Emergency Department of Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. The findings reflect that road traffic accident is a major public health problem. Urgent road traffic accident preventive measures and prompt treatment of the victims are warranted in order to reduce morbidity and mortality among the victims.

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Characteristics of police-reported road traffic crashes in Ethiopia over a six year period. Tulu, Getu Segni, Simon Washington, and Mark J. King. In Proceedings of the 2013 Australasian Road Safety

Abstract: Ethiopia has one of Africa’s fastest growing non-oil producing economies and an increasing level of motorization (AfDB, OECD, UNDP, & UNECA, 2012). This rapidly increasing mobility has created some unique road safety concerns; however there is scant published information and related commentary (United Nations Economic Commission for Africa, 2009). The objective of this paper is to quantify police-reported traffic crashes in Ethiopia and characterize the existing state of road safety. Six years (July 2005 - June 2011) of police-reported crash data were analysed, consisting of 12,140 fatal and 29,454 injury crashes on the country’s road network. The 12,140 fatal crashes involved 1,070 drivers, 5,702 passengers, and 7,770 pedestrians, totaling 14,542 fatalities, an average of 1.2 road user fatalities per crash. An important and glaring trend that emerges is that more than half of the fatalities in Ethiopia involve pedestrians. The majority of the crashes occur during daytime hours, involve males, and involve persons in the 18-50 age group—Ethiopia’s active workforce. Crashes frequently occur in mid blocks or roadways. The predominant collision between motor vehicles and pedestrians was a rollover on a road tangent section. Failing to observe the priority of pedestrians and speeding were the major causes of crashes attributed by police. Trucks and minibus taxis were involved in the majority of crashes, while automobiles (small vehicles) were less involved in crashes relative to other vehicle types, partially because small vehicles tend to be driven fewer kilometers per annum. These data illustrate and justify a high priority to identify and implement effective programs, policies, and countermeasures focused on reducing pedestrian crashes.

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South Africa


Introduction: Injury patterns and interpretation of injuries in homicidal deaths are important components of medicolegal autopsies. The objective of this article is to describe the incidence of female homicides and their related injury patterns with reference to autopsy practices in South Africa. Methods: A national retrospective mortuary-based study of homicides in women of 14 years and older in 1999 was conducted. Data were gathered from medical legal laboratory records, autopsy reports, and police interviews from a stratified multistage sample of 25 mortuaries. Results: The most common cause of homicide was a gunshot wound injury, with a firearm mortality rate of 7.5/100,000 women, 14 years and older, in 1999, followed by sharp force injury (6.8/100,000) and blunt force injury (6.1/100,000). Gunshot victims were more likely to be African, and those killed by sharp force injury were more likely colored. Significantly, blunt force injury deaths occurred predominantly in intimate partner homicides. A full autopsy was performed only in 70% of cases. An assessment of postmortem reports revealed poor descriptions of the anatomic location of injuries and the specifications of wound dimensions. Conclusion: South Africa has a high female homicide rate that exceeds reported rates with the cause of homicide varying by social group. Assessment of injury description suggests weaknesses in the documentation of injuries at autopsy. This weakens the forensic investigation and undermines the strength of evidence presented in court. Further measures are needed to strengthen forensic pathology services in South Africa.
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**Introduction:** Trauma is one of the leading causes of death in the Mthatha area, which is one of the least developed regions of South Africa. Road traffic accidents (RTAs) contribute substantially to the number of such deaths. Objective: To estimate the number of fatal RTAs in the Mthatha area, and analyses age and sex of the deceased. **Methods:** A review of autopsies performed in the Mthatha General Hospital mortuary was conducted. Data were analysed using the GENSTAT 9 package with a Poisson regression model. **Results:** There were 2,736 deaths from RTAs over the 12-year period 1993 - 2004 in the Mthatha area. These casualties constituted an average annual rate of 57 deaths per 100 000 population. The highest (69.4/100 000) was in 1998, and the lowest (40.2/100 000) in 2001. Males outnumbered females by 2.6:1 (95% confidence interval (CI) 2.13 - 3.22), and the rate showed a decline of 0.97/100 000/year (95% CI 0.95 - 0.99) for the 1998 - 2001 period. The rate of decline was the same for males and females. The highest annual rate was 14.2 per 100 000 population in the age group 21 - 30 years, and the lowest, of 2.6 per 100 000 population, in the group above 70 years of age. The death rates were related to sex (p<0.001) and calendar year (p<0.049). There was no significant connection between year and sex, implying that the effect of year (time) was the same for men and women. These results are statistically significant despite the very high variability in the data ($S^2=5.53$). **Conclusion:** RTA-related deaths in the Mthatha area are 3 times higher than the global average.

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**Introduction:** Pediatric injuries are associated with significant morbidity and mortality, especially in low- and middle-income countries. Despite the magnitude of this burden, there is lack of data to characterize the etiology and risk factors associated with childhood injuries, especially in low- and middle-income countries. The aim of this article is to describe the demographics, mechanisms, and severity of injuries during a 10-year time period using hospital-based data in Cape Town, South Africa. **Methods:** Data from Childsafe South Africa’s registry were used to study injured children younger than 13 years who presented with either intentional or unintentional injuries to the Trauma Unit of the Red Cross War Memorial Children’s Hospital’s (RCH) Causality Department between 1996 and 2007. Univariate and bivariate analyses were performed for demographic characteristics and injury mechanisms. Poisson regression analysis was used to analyze the age-adjusted annual incidence of injury presenting to RCH. **Results:** Between 1997 and 2006, 62,782 children with a total of 68,883 injuries presented to RCH. The mean age was 5.4 years (standard deviation ± 3.5 years) and 61.7% were male. Mechanism of injury included falls (39.8%), road traffic...
injuries (15.7%), burns (8.8%), and assault (7.4%). The majority of injuries occurred in and around the home. Abbreviated injury severity scoring showed 60.2% of injuries were minor, 36.6% were moderate, and 3.2% were severe. Sixty-six deaths occurred in the trauma casualty department. Thirty-one percent of patients were admitted to the hospital; children who suffered burn and head injuries were more likely to require admission. **Conclusion**: Age, gender, mechanism, and severity of injury in pediatric populations have not been described elsewhere in South African national or sub-Saharan regional data. This retrospective, observational study uses Level II evidence to suggest the need for targeted interventions to address risk factors for pediatric injuries, emphasizing the importance of pediatric surveillance systems as a tool to study injuries in developing countries.

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**Introduction**: Our objective was to describe age- and sex-specific rates of child homicide in South Africa. **Methods**: A cross-sectional mortuary-based study was conducted in a national sample of 38 medicolegal laboratories operating in 2009. These were sampled in inverse proportion to the number that were operational in each of three strata defined by autopsy volume: < 500, 500–1499 or > 1499 annual autopsies. Child homicide data were collected from mortuary files, autopsy reports and police interviews. Cause of death, evidence of abuse and neglect or of sexual assault, perpetrator characteristics and circumstances surrounding the death were investigated. **Results**: An estimated 1018 (95% confidence interval, CI: 843–1187) child homicides occurred in 2009, for a rate of 5.5 (95% CI: 4.6–6.4) homicides per 100 000 children younger than 18 years. The homicide rate was much higher in boys (6.9 per 100 000; 95% CI: 5.6–8.3) than in girls (3.9 per 100 000; 95% CI: 3.2–4.7). Child abuse and neglect had preceded nearly half (44.5%) of all homicides, but three times more often among girls than among boys. In children aged 15 to 17 years, the homicide rate among boys (21.7 per 100 000; 95% CI: 14.2–29.2) was nearly five times higher than the homicide rate among girls (4.6 per 100 000; 95% CI: 2.4–6.8). **Conclusion**: South Africa's child homicide rate is more than twice the global estimate. Since a background of child abuse and neglect is common, improvement of parenting skills should be part of primary prevention efforts.

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**Country-specific information**

| National Injury Mortality Surveillance System (NIMSS): The National Injury Mortality Surveillance System (or NIMSS) is currently the most detailed source of information on fatal injuries in South Africa. Data request forms and more information can be found at: [www.mrc.ac.za/crime/nimss.htm](http://www.mrc.ac.za/crime/nimss.htm) |  |
Appendix – Country-specific Information: Injury

SEARO/WPRO Region

China


Abstract: Injuries are a growing public health concern in China, accounting for more than 30% of all Person Years of Life Lost (PYLL) due to premature mortality. This study analyzes the trend and disease burden of injury deaths in Chinese population from 2004 to 2010, using data from the National Disease Surveillance Points (DSPs) system, as injury deaths are classified based on the International Classification of Disease-10th Revision (ICD-10). We observed that injury death accounted for nearly 10% of all deaths in China throughout the period 2004–2010, and the injury mortality rates were higher in males than those in females, and higher in rural areas than in urban areas. Traffic crashes (33.79–38.47% of all injury deaths) and suicides (16.20–22.01%) were the two leading causes of injury deaths. Alarmingly, suicide surpassed traffic crashes as the leading cause of injury mortality in rural females, yet adults aged 65 and older suffered the greatest number of fatal falls (20,701 deaths, 2004–2010). The burden of injury among men (72.11%) was about three times more than that of women's (28.89%). This study provides indispensable evidence that China Authority needs to improve the surveillance and deterrence of three major types of injuries: Traffic-related injury deaths should be targeted for injury prevention activities in all population, people aged 65+ should be encouraged to take individual fall precautions, and prevention of suicidal behavior in rural females should be another key priority for the government of China.

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Introduction: This study is to report characteristics of people killed in road traffic crashes and to describe major patterns of traffic crashes in China. Methods: Descriptive and inferential statistical analyses were conducted. Road traffic death national data, population denominator data and motor vehicles data of 2009 were obtained from the Bureau of Traffic Management at Ministry of Public Security and National Bureau of Statistics. The association between the fatalities from road traffic crashes and selected demographic factors, the time distribution, crash patterns, crash causes, and road user category were assessed in χ2 analyses. Results: Road traffic crashes in China disproportionately affected the following populations: males, persons 21–65 years of age and adults aged more than 65 years, persons living in rural areas, pedestrians, passengers, motorcyclists and bicyclists. Approximately 50% of fatalities of road traffic crash occurred in Eastern regions. The number of road traffic deaths was higher in daytime than in nighttime. Road traffic deaths in frontal crashes, side-to-side crash and crashes with an object or a person were more common than in rear-end crashes. In about 92% of road traffic deaths, auto drivers were believed to be responsible for the fatal crash. Major cause crash causing factors were speeding, careless driving, driving without a license, driving in the wrong lane, and driving after drinking alcohol. Conclusion: Road traffic deaths accounted for about 70,000 premature deaths in China, which should be taken into account.

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Introduction: Our objective was to track changes of the burden and trends of childhood injury mortality among children aged 0–14 years in China from 2004 to 2011. Methods: National representative data from the Chinese Disease Surveillance Points system and Chinese Maternal and Child Mortality Surveillance system from 2004 to 2011 were used. Rates and 95% CIs of age-standardized mortality, as well as the proportions of injury death, were estimated. Setting: Urban and rural China. Participants: Children aged 0–14 years from 2004 to 2011. Results: The proportion of injury among all deaths in children increased from 18.69% in 2004 to 21.26% in 2011. A ‘V’ shape change was found in the age-standardized injury mortality rate during the study period among the children aged 0–14 years, with the age-standardized injury mortality rate decreasing from 29.71 per 100 000 per year in 2004 to 24.12 in 2007, and then increasing to 28.12 in 2011. A similar change was observed in the rural area. But the age-standardized mortality rate decreased consistently in the urban area. The rate was higher among boys than among girls. Drowning, road traffic accidents and falls were consistently the top three causes of death among children. Conclusion: Childhood injury is an increasingly serious public health problem in China. The increasing trend of childhood injury mortality is driven by the rural areas rather than urban areas. More effective strategies and measures for injury prevention and control are needed for rural areas, boys, drowning, road traffic accidents and falls.

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Introduction: To evaluate the effect of an intervention on fall induced injuries of elderly people in a safe-community in Shanghai and to discuss an intervention model that is proper for the community to generalize. Methods: Five neighborhood areas in a Safe Community were purposively selected. All individuals aged 60 years or over in five neighborhoods were prospective participants. From randomly selected prospective households with elders, 2,889 (pre intervention) and 3,021 (post intervention) elderly people were included in the study. Knowledge, Attitude and Practice Model (KAP) questionnaires were used at the pre- and post-intervention phase for fall-induced injury prevention in the community. Descriptive statistics and chi-square tests were used. Results: After the intervention, knowledge about the prevention of fall-induced injuries increased, as did attitudes, beliefs and good behaviors for fall prevention. Behavior modification was most notable with many behavior items changing significantly (p value<0.0001). Conclusion: The integrated program for reducing fall-related injuries in the community was effective in improving fall prevention among the elderly, but the intervention still needs further improvement.

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Introduction: We aimed to investigate the patterns and risk factors of nonfatal injuries among rural mountain-area children in southwest China. Methods: A stratified sampling method was used to recruit rural children aged 8 to 17 years (mainly 9–14 years) from 7 schools. Self-reported injuries during the past 12 months and relevant concerns were collected from June to December 2012 by using a structured questionnaire in a class interview. Results: The mean age of the 2,854 children was 12.2±1.5 years. The probability of annual injury was 16.7% (95% confidence interval [95% CI] 15.3–18.1%), with slightly higher injury risk for boys than girls (17.7% vs. 16.0%; \( P > 0.05 \)). The top 3 causes of injuries were falls (37.3%), animal-related incidents (20.6%), and burns (14.9%). The main injury risk factors included being involved in a violent episode (odds ratio [OR] 1.34, 95% CI 1.08–1.66, \( P = 0.007 \)), maltreatment by parents or guardians (1.42, 1.17–1.72, \( P < 0.001 \)), and being from a single-child family (1.30, 1.10–1.66, \( P = 0.039 \)). Older age was a protective factor (0.81, 0.76–0.87, \( P < 0.001 \)). Conclusion: The incidence of nonfatal injury among rural children was high, and falls were the leading cause. Younger children and boys from poor-care and poor-living environments were at increased risk of injury, which requires urgent attention. Injury prevention programs targeting these issues are needed in this mountain area and similar rural regions of China.

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Introduction: Spinal cord injuries are highly disabling and deadly injuries. Currently, few studies focus on non-traumatic spinal cord injuries, and there is little information regarding the risk factors for complete injuries. This study aims to describe the demographics and the injury characteristics for both traumatic and non-traumatic spinal cord injuries and to explore the risk factors for complete spinal cord injuries. Methods: A retrospective study was performed by reviewing the medical records of 3,832 patients with spinal cord injuries who were first admitted to the sampled hospitals in Guangdong, China. The demographics and injury characteristics of the patients were described and compared between the different groups using the chi-square test. Logistic regression was conducted to analyze the risk factors for complete spinal cord injuries. Results: The proportion of patients increased from 7.0% to 14.0% from 2003 to 2011. The male-to-female ratio was 3.0:1. The major cause of spinal cord injuries was traffic accidents (21.7%). Many of the injured were workers (36.2%), peasants (22.8%), and unemployed people (13.9%); these occupations accounted for 72.9% of the total sample. A multivariate logistic regression model revealed that the OR (95% CI) for male gender compared to female gender was 1.25 (1.07–1.89), the OR (95%CI) for having a spinal fracture was 1.56 (1.35–2.60), the OR (95%CI) for having a thoracic injury was 1.23 (1.10–2.00), and the OR (95%CI) for having complications was 2.47 (1.96–3.13). Conclusion: The proportion of males was higher than the proportion of females. Workers, peasants and the unemployed comprised the high-risk occupational categories. Male gender, having a spinal fracture, having a thoracic injury, and having complications were the major risk factors for a complete injury. We recommend that preventive measures should focus on high-risk populations, such as young males.

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**Introduction:** This study aimed to examine the association between negative life events (NLEs) and attempted suicide in rural China. **Methods:** Six rural counties were selected from disease surveillance points in Shandong province, China. A total of 409 suicide attempters in rural areas between October 1, 2009, and March 31, 2011, and an equal number of matched controls were interviewed. We compared negative life events experienced within 1 month, 1–3 months, 3–6 months, and 6–12 months prior to attempted suicide for cases and prior to interview for controls. We used multivariate logistic regression to examine the association between NLEs and attempted suicide. **Results:** Suicide attempters experienced more NLEs within the last year prior to suicide attempt than controls prior to interview (83.1% vs. 33.5%). There was a significant dose-response relationship between NLEs experienced within the last year and increased risk of attempted suicide. Timing of NLEs analysis showed that NLEs experienced in the last month and 6–12 months prior to suicide attempt were significantly associated with elevated risk of attempted suicide, even after adjusting for mental disorders and demographic factors. Of NLEs, quarrelling with spouse, quarrelling with other family members, conflicting with friends or neighbors, family financial difficulty, and serious illness were independently related to attempted suicide. **Conclusion:** NLEs are significantly associated with increased risk for attempted suicide in rural China. Stress management and intervention may be important to prevent suicidal behavior in rural China.

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**Introduction:** China has not adopted national policies for child safety restraints in cars, although children are increasingly traveling in cars. Objective: To describe child restraint use, and parents’ knowledge of and attitude toward child restraint in Shantou, China. **Methods:** An observational study and driver survey on child restraint use was conducted in the Southeast China city of Shantou in 2012. Observational sites included 22 middle schools, 31 primary schools, 24 kindergartens, and 4 hospitals. Drivers were asked about their knowledge of and attitude toward the use of child restraints. In September 2012, multivariate regression was used to evaluate the factors associated with increased child restraint use. **Results:** Of 3333 children observed in vehicles, only 22 (0.6%) children were secured in child safety seats or booster seats and 292 (8.7%) children were wearing seatbelts. More than half (n=508, 56.1%) of the infants or toddlers were riding on the laps of adults. Of 1069 drivers who responded to the survey, more than 62% thought it was necessary to use child restraint while traveling in a car. The drivers’ higher education status (OR=1.56, 95% CI=1.07, 2.27) and seatbelt use (OR=4.00, 95% CI=2.56, 6.25) were associated with increased child restraint use. Parents (OR=0.55, 95% CI=0.34, 0.88) and male drivers (OR=0.61, 95% CI=0.46, 0.81) had reduced odds of children properly rear-seated. **Conclusion:** Child restraint use is very low in China, although the majority of drivers had positive attitudes about child restraint. These findings indicate that child restraint policies and educational approaches are urgently needed in China.

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Appendix – Country-specific Information: Injury

- WHO Global Health Observatory Data Repository – China statistics summary
- Statistical Yearbook on Road Traffic Accidents in P.R.C 2010
- World Bank-funded Urban Transportation Programs in China
- WHO’s Bloomberg Initiative for Global Road Safety, 2015-2019

Bangladesh


**Introduction:** Our objective was to assess the burden of road traffic injury (RTI) in primary and secondary level hospitals in Bangladesh, and its economic impact on affected families. **Methods:** The study was carried out in February and March 2001. To estimate the burden of RTI patients and the length of stay in hospital, the discharge records of primary and secondary level hospitals were used as data sources. Records from 16 district hospitals and 45 Upazila health complexes (sub district level hospitals), selected at random, were included in this study. A direct interview method was adopted to estimate the patient costs of RTI; this involved interviewing patients or their attendants. In this study, patient costs included money spent by the patient for medicine, transport, food and lodging (including attendants). **Results:** Approximately 33% of the beds in primary and secondary level hospitals in Bangladesh were occupied by injury-related patients, and more than 19% of the injury patients had been injured in a road traffic accident. People aged 18-45 years were the major victims of RTI, and constituted 70% of the total RTI-related admissions in primary and secondary level hospitals. More than two-thirds of RTI patients were male. The average duration of hospital stay was 5.7 days, and the average patient cost for each RTI patient was US$86 (5834 BDT). **Conclusion:** RTI is a major cause of hospital admission in Bangladesh, and represents an economic and social burden for the family and the nation. A national strategy and road safety program need to be developed to reduce the hospital burden and minimize the economic and social impact.

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**Introduction:** Burn is one of the major causes of childhood illnesses in Bangladesh and is the third leading cause of illness of 1- to 4-year-old children. Rural children are more at risk compared to urban-dwelling children. Objective: The study was designed to identify the risk factors of childhood burn in rural Bangladesh. **Methods:** This nested case-control study was conducted in rural Bangladesh. The study population was children of less than 10 years old in three sub-districts of Bangladesh. **Results:** Children of families who did not have a household with a separate kitchen, a common occurrence in rural areas, were at significantly higher risk of burn (OR 1.65; 95% CI 1.22-2.24). A kitchen without a door was also found to create a more hazardous environment compared to a kitchen with a door. The traditional kerosene lamp (kupi bati) was found to be one of the major determinants of childhood burn in rural Bangladesh (OR 3.16; 95% CI 1.58-6.35). No use or restricted use of kupi bati significantly reduces the risk of childhood burn. Children of nuclear families were at significantly higher risk of burn compared to combined families. **Conclusion:** Cooking in an open place and use of the traditional kerosene lamp are the major determinants of
Appendix – Country-specific Information: Injury

childhood burn in rural Bangladesh. A combined family environment reduces the risk of childhood burn. Childhood burn can be reduced by prohibiting use of kupi bati and limiting children’s access to the cooking area. Promoting combined family could be an initiative of childhood burn prevention program.

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**Abstract:** Electrical injury is a major cause of burn injury and significant cause of mortality, morbidity and disability. To explore the proportional incidence of thermal and electrical burn injuries in Bangladesh, a population-based cross sectional survey was conducted between January and December 2003. Nationally representative data was collected from 171,366 rural and urban households, comprising of a total population of 819,429. The study was designed to describe the proportional incidence of thermal, electrical and chemical cause of burn in Bangladesh. Electrical injury constituted about one third of the total burn injuries. Among the total 1,999 injuries about 31% were due to electrical injuries, about 26% were due to flame, about 25% were due to hot liquid, over 16% by hot object, about 2% by chemical and less than 1% were due to explosives. The incidence of death rate was 3.97 per 100,000 populations per year. Thermal burn was found as the major cause of death due to burn injuries and constituted 58% of the total deaths due to burn. Electrical injuries caused 42% of the deaths. It was estimated that more than 5,600 people die due to burn and electrical injuries every year in Bangladesh considering the incidence rate of 3.97 per 100,000 populations per year in the 150 million population. Electrical injury including lightning constitute about one third of the burn related mortality, morbidity and disabilities. Rural people and children are the more vulnerable group. Electrical injury needs to be included as a special component in a burn prevention strategy, particularly in rural Bangladesh.

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**Introduction:** This study was conducted to gain an in-depth understanding of people’s perceptions of childhood burns and their prevention in rural areas of Bangladesh. **Methods:** Five focus group discussions were conducted in this study. Eight to twelve members were present in each group. Groups were composed of mothers of children under 5 years of age, adolescent male and female students in Grades IX and X, fathers and local leaders such as school teachers and religious leaders. The study was conducted in a rural community of Bangladesh in 2003. **Results:** Focus group participants were aware of the devastating consequences of childhood burn injuries. They reported that younger boys and older girls are at higher risk of burn injuries. They identified home as the most common place for childhood burn injuries, and stated that occurrence was more common in winter. They held the household members or caregivers responsible because of their lack of supervision and carelessness. The focus group participants suggested that people should supervise their children more carefully, and should take initiatives to modify their homes and premises as necessary so that children would not have access to fires and heat sources. Regarding first aid, the focus group participants reported prevailing harmful practices which are likely to make injuries
worse. **Conclusion:** A safety education programme could be an effective intervention to improve knowledge and practices of rural people in Bangladesh with regard to prevention of burns injuries in children.

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India


**Introduction:** Violence against women is a global phenomenon that cuts across all social and economic classes. This study was designed to measure the prevalence and correlates of domestic violence (DV) among women seeking services at a voluntary counseling and testing (VCT) center in Bangalore, India. Settings and designs: A cross-sectional survey was conducted among women visiting a human immunodeficiency virus (HIV) VCT center in Bangalore, between September and November 2005. **Methods:** An interviewer-administered questionnaire was used to collect information about violence and other variables. Univariable associations with DV were made using Pearson Chi-squared test for categorical variables and Student t-test or the Mann-Whitney test for continuous variables. **Results:** Forty-two percent of respondents reported DV, including physical abuse (29%), psychological abuse (69%) and sexual abuse (1%). Among the women who reported violence of any kind, 67% also reported that they were HIV seropositive. The most common reasons reported for DV included financial problems (38%), husband's alcohol use (29%) and woman's HIV status (18%). Older women (P < 0.001) and those with low income levels were the most likely to have experienced DV (P = 0.02). Other factors included husband's education, HIV seropositivity and alcohol or tobacco use (P < 0.001). **Conclusion:** This study found DV levels comparable to other studies from around the world. The findings highlight the need for additional training among health care providers in VCT centers in screening for DV, detection of signs of physical abuse and provisions and referrals for women suffering from domestic partner violence.

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**Abstract:** A retrospective study was carried out based on 110 pediatric burns (0–14 years) seen at the Burn unit, Choithram Hospital & Research Centre, Indore over a period of 7 years (1993–1999). Epidemiological data included age, sex, seasonal variation, place of burn and the cause and mode of burn. Hospitalized pediatric burns constituted 13.5% of total burn accidents. These children were categorized into three groups, the infants and toddlers (0–2 years), early childhood (>2–6 years) and late childhood (>6–14 years). In the first two groups scalding was the predominant cause of injury while in late childhood there were many more flame and electric burns. Males were mainly affected. Most of the burns (53.6%) occurred in the winter season between October and February. Ninety-five percent of accidents occurred at home. The overall mortality rate was 21.8%. An intense campaign to make people aware of the risk factors and their avoidance is required to reduce the number of burn accidents in children.

**Abstract:** Drowning is a major global public health problem which is amenable to prevention. According to the Global Burden of Diseases 2000 data, the number of deaths caused due to drowning is 449,000 people worldwide (7.4 per 100,000 population). The aim of this study is to derive a profile of drowning victims, to identify the successful drowning preventive measures that may be adopted or enhanced in Mangalore, a coastal Taluk of South India. Retrospective study of deaths caused due to drowning in an 11 years period between 1994 and 2005 was done by reviewing the medical records, the findings of which have been described later. Epidemiologic profiles of populations at risk and the contributing factors are highlighted while public safety measures are recommended.

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**Introduction:** Our objectives were to: 1. To assess the prevalence of road traffic cases coming to hospital. 2. To know the various epidemiological factors related to road traffic accident cases.

**Results:** There were 83% male and 17% female accident victims. Laborers were the highest (29.9%) among the victims. The highest number of accidents took place in the month of January (12.9%) and on Sundays (17.1%). The occupants of the various vehicles constituted the large (45%) group of the victims. Among the motorized vehicles, two wheeler drivers were more (31.1%) involved in


**Introduction:** Our objective was to study the pattern of injuries among non-fatal cases of road traffic accidents. **Methods:** Cross-sectional study. Setting: Nagpur, a city in central India. Participants: 423 non-fatal cases of road traffic accidents reporting for treatment to Indira Gandhi Medical College, Nagpur during 1999-2000. **Results:** Out of total 423 subjects, 363 (85.8%) were male while only 60 (14.2%) were female subjects. Majority of the victims (75%) were in the age group 18-37 years. Sideways collision was the most common type of accident seen in 269 (63.59%) cases. Two wheelers and LMV were the common vehicle being involved in accidents (69.97%) and these accidents were almost equally distributed in both half of the day. Fracture of the bones was the common injury afflicted to the victims followed by multiple injuries like blunt injury, abrasions and lacerations. Lower extremity was involved in 192 (45.39%) cases while multiple sites were affected in 114 (26.95%) cases. **Conclusion:** In the present study, the fractures were the commonest injury among the victims of non-fatal road traffic accidents.

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accidents. Out of 254 drivers 14.9% were found to have consumed alcohol. **Conclusion:** Being knocked down was the common mode of accidents.

**Exploring the relationship between development and road traffic injuries: a case study from India.**

**Introduction:** Road traffic injuries (RTI) are a major cause of mortality and disability in the world. Only after significant losses have communities in developed nations taken necessary steps to prevent crashes and their consequences. Increase in road safety is related to increasing socio-economic development. We aim to study the trends in injury and death rates in a developing country, India, define sub-national variations, and analyses these trends in relation to economic and population growth. **Methods:** Public sector data from India were used to develop a standardized database on traffic injuries and indicator of economic development. The data were analysed using linear regression models to test the a priori hypothesis of a positive relationship between net domestic product (NDP), and injury and death rates from road crashes across states. **Results:** The absolute burden of RTI in India has been consistently rising over the past three decades. The reported rates are lower than those estimated by global health agencies and may reflect under-reporting. Population-based rates provide a better assessment of the public health burden of RTI than vehicle-based rates. There is an inverted U-shaped relationship between NDP and injury and death rates. Even with the limited data, Kuznets phenomenon is evident for within-country level comparisons. **Conclusion:** India and other developing countries could learn from the experience of highly motorized nations to avoid the expected rise in RTI and deaths with economic development, by currently investing in road safety and prevention measures.

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**An epidemiological study of poisoning cases reported to the national poisons information centre, All India Institute of Medical Sciences, New Delhi.** Srivastava, Amita, Sharda Shah Peshin, Thomas Kaleekal, and Suresh Kumar Gupta. *Human & experimental toxicology* 24, no. 6 (2005): 279-285.

**Abstract:** A retrospective analysis of poisoning calls received by the National Poisons Information Centre showed a total of 2719 calls over a period of three years (April 1999-March 2002). The queries were made on poisoning management (92%) and information (8%) about various products and functioning of the centre. The data were analysed with respect to age, sex, mode and type of poisoning. The agents belonged to various groups: household products, agricultural pesticides, industrial chemicals, drugs, plants, animal bites and stings, miscellaneous and unknown groups respectively. The age ranged from less than 1 to 70 years, with the highest incidence in the range of 14-40 years, with males (57%) outnumbering females (43%). The most common mode of poisoning was suicidal (53%), followed by accidental (47%). The route of exposure was mainly oral (88%). Dermal (5%), inhalation and ocular exposure contributed 7% to the total. The highest incidence of poisoning was due to household agents (44.1%) followed by drugs (18.8%), agricultural pesticides (12.8%), industrial chemicals (8.9%), animals bites and stings (4.7%), plants (1.7%), unknown (2.9%) and miscellaneous groups (5.6%). Household products mainly comprised of pyrethroids, rodenticides, carbamates, phenyl, detergents, corrosives etc. Drugs implicated included benzodiazepines, anticonvulsants, analgesics, antihistamines, tricyclic antidepressants, thyroid hormones and oral contraceptives. Among the agricultural pesticides, aluminum phosphide was the
most commonly consumed followed by organochlorines, organophosphates, ethylene dibromide, herbicides and fungicides. Copper sulphate and nitrobenzene were common among industrial chemicals. The bites and stings group comprised of snake bites, scorpion, wasp and bee stings. Poisoning due to plants was low, but datura was the most commonly ingested. An alarming feature of the study was the high incidence of poisoning in children (36.5%). The age ranged from less than 1 to 18 years and the most vulnerable age group included children from less than 1 year to 6 years. Accidental mode was the most common (79.7%). Intentional attempts were also noticed (20.2%) in the age group above 12 years. The present data may not give an exact picture of the incidence of poisoning in India, but represents a trend in our country. The Poisons Information Centre plays a vital role in providing timely management guidelines including the supply of necessary antidotes from the recently established National Antidote Bank, thereby helping to save precious lives.

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Data sources

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<th>Country-specific information</th>
<th>Health and Demographic Surveillance Systems through the in-depth Data Repository</th>
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Introduction: Although considerable research has documented the widespread prevalence of spousal violence in India, little is known about specific risk or protective factors. This study examines the relationships between factors that are often considered to be social and economic resources for women and recent occurrence of domestic violence. Methods: Data were collected from 744 young married women in slum areas of Bangalore, India. Unadjusted and adjusted multivariable logistic regression models were used to determine factors associated with having been hit, kicked or beaten by one's husband in the past 6 months. Results: Over half (56%) of the study participants reported having ever experienced physical domestic violence; about a quarter (27%) reported violence in the past 6 months. In a full multivariable model, women in ‘love’ marriages (OR = 1.7, 95% CI 1.1–2.5) and those whose families were asked for additional dowry after marriage (OR = 2.3, 95% CI 1.5–3.4) were more likely to report domestic violence. Women who participated in social groups (OR = 1.6, 95% CI 1.0–2.4) and vocational training (OR = 3.1, 95% CI 1.7–5.8) were also at higher risk. Conclusion: Efforts to help women empower themselves through vocational training, employment opportunities and social groups need to consider the potential unintended consequences for these women, such as an increased risk of domestic violence. The study findings suggest that the effectiveness of anti-dowry laws may be limited without additional strategies that mobilize women, families and communities to challenge the widespread acceptance of dowry and to promote gender equity. Longitudinal studies are needed to elucidate the complex causal relationships between ‘love’ marriages and domestic violence.

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Indonesia


**Abstract:** This paper examines motorcycle helmet use and injuries in a developing country with a helmet law. Data were collected by systematic street observations and interviews with motorcyclists and supplemented with motorcycle injury data from a 1 month study of all patients coming to emergency departments in Yogyakarta, Indonesia. Observations show that 89% of motorcycle drivers (N = 9242) wore helmets; only 20% of the passengers (N = 3541) did. However, only 55% of the drivers wore helmets correctly (e.g. with chin strap buckled). Differences in time and place were noted in interviews when motorcyclists reported wearing helmets least at night and when no police were around; various reasons for not wearing helmets included physical discomfort and absence of police surveillance. Data from emergency departments found that motorcycles were involved in 64% of all traffic accident injuries, comprising 33% of total trauma patients presenting to emergency departments. Injury Severity Scores were calculated for the 26% of motorcycle injuries which were admitted to the hospital, with 60% having scores of 1–8, 27% 9–15, and 9% > 15. We conclude that although motorcycle drivers appear to comply with the motorcycle helmet law, it is a “token compliance.” Less than 50% of riders were maximally protected by helmets and very little safety consciousness was found among drivers. Suggestions for improving helmet use that take cultural definitions of wearing helmets into account are presented for future research.

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**Abstract:** This article contributes to cross-cultural understandings of gender-based violence by examining women’s definitions and experiences of domestic violence in Eastern Indonesia. The research was part of a larger study of human rights in maternal and neonatal health and involved a survey that integrated common anthropological practices in its development and delivery. This survey measured the prevalence of emotional and physical abuse, violence during pregnancy, unwanted sex and fear of violence among a sub-sample of 504 married Muslim women. Standard human rights definitions of violence were adapted to create locally appropriate definitions of economic violence, husband infidelity and unwanted sex within marriage. Survey responses indicated that the majority of women believed verbal abuse, threats of harm, economic violence, physical violence, control of women’s mobility and a husband’s public infidelity to constitute domestic violence. Our exploration of how Indonesian women understand domestic violence reinforces the salience of cultural specificity for different women’s definitions of violence, as well as the applicability of internationally recognized definitions of gender-based violence.

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Vietnam


**Introduction:** Based on previous data, road traffic injury (RTI) was a leading cause of non-fatal injury in all-age groups in Vietnam, and among the top causes of injury in children and adolescents. Specific analysis on RTIs in young people, however, has yet to be fully investigated. Using the results of two surveys in 2004 and 2009, the present study aims to describe the current situation of non-fatal, unintentional RTIs among Vietnamese youths. In addition, it explores RTI-related risk and protective factors. **Methods:** This study utilized the nationally representative Survey Assessment of Vietnamese Youth 2009 (SAVY2) of 10,044 youths aged 14 to 25 from all 63 provinces in Vietnam. The indicators were compared with data from SAVY1 in 2004 of 7,584 youths. Bivariate and multivariable statistical techniques were applied. **Results:** Overall, 75% of youths used a motorcycle in SAVY2 compared with 54.2% in SAVY1. Of the SAVY2 sample, the proportion that had experienced an RTI was 10.6% vs. 14.1% in SAVY1. While the proportion of RTIs for both sexes decreased, the decline was greater for males (11.9% vs. 17.8% in SAVY1) than in females (9.2% vs. 10.4%). The proportion of rural youths aged 22–25 who experienced an RTI increased slightly in the 5 years between the two study intervals. The percentage of youths reporting frequent helmet use increased significantly from 26.2% in SAVY1 to 73.6% in SAVY2. Factors related to the likelihood of ever having experienced an RTI included: older age, male, ever being drunk, and ever riding motorcycles after drinking. **Conclusion:** While improvements in RTIs appear to have occurred between 2004 and 2009, more attention should be paid, particularly, in maintenance and supervision of law enforcement to helmet use and drunk driving.

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**Introduction:** This population-based study investigated the different forms, magnitude and risk factors of men's violence against women in intimate relationships in a rural part of northern Vietnam and whether a difference in risk factors were at hand for the different forms of violence. Vietnam has undergone a rapid transition in the last 20 years, moving towards a more equal situation for men and women however, Confucian doctrine is still strong and little is known about men's violence against women within the Vietnamese family. **Methods:** This is a cross-sectional population-based study that used a questionnaire developed by the World Health Organisation for investigating women's health and violence against women in different settings. Face-to-face structured interviewing was performed and 883 married women, aged 17 to 60 participated. Bi- and multivariate analyses was used for risk factor assessment. **Results:** The lifetime prevalence of physical violence was 30.9 percent and past year prevalence was 8.3 per cent, while the corresponding figures for physical and sexual violence combined was 32.7 and 9.2 percent. The lifetime prevalence was highest for psychological abuse (27.9 percent) as a single entity. In most cases the violence was of a severe nature and exercised as repeated acts over time. Woman's low educational level, husband’s low education, low household income and the husband having more
than one wife/partner were risk factors for lifetime and past year physical/sexual violence. The pattern of factors associated with psychological abuse alone was however different. Husband’s low professional status and women’s intermediate level of education appeared as risk factors.

**Conclusion:** Men’s violence against women in intimate relationships is commonly occurring in rural Vietnam. There is an obvious need of preventive and treatment activities. Our findings point at that pure psychological abuse is different from physical/sexual violence in terms of differing characteristics of the perpetrators and it might be that also different strategies are needed to reduce and prevent this violence.

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**Introduction:** Although unintentional injuries are recognized as a major public health problem globally, little is known about their patterns and rates at the community level in most low-income countries. Rapid social development, leading to increased traffic and industrialization, may be changing patterns of injury. Injuries within the home environment have not so far been recognized to the same extent as traffic and work-related injuries in Vietnam, largely because they have not been effectively counted. This study took place in northern Vietnam, in the context of a longitudinal community surveillance site called FilaBavi, as a pilot project aiming to determine the community incidence of unintentional injury and to explore appropriate methods for community-based injury surveillance. **Methods:** An initial study population of 23,807 was identified and asked about their experience of injury in the preceding three months. **Results:** Overall 450 new injuries were detected over 5,952 person-years, a rate of 76 per 1,000 person-years. Males were injured at 1.6 times the rate of females, and home and road traffic accidents were most common. Most injuries occurred during unpaid household tasks. Cutting and crushing injuries occurred most frequently. Of 221 deaths from all causes in the FilaBavi population during 1999 among 43,444 person-years, 25 were attributed to unintentional injuries and two to suicide. Unintentional injury was the third leading cause of death in this community, with a case-fatality rate of 0.8%. **Conclusion:** The findings suggest that greater attention needs to be directed toward the prevention of injuries occurring in the home in rural Vietnam. On the basis of this pilot study, a one-year study using the same approach is under way to characterize the patterns of unintentional injury in more detail, including any seasonal variation.

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**Data sources**

| Country-specific information |

| Health and Demographic Surveillance Systems through the in-depth Data Repository |
Guatemala


Abstract: Guatemala’s 36-year civil war officially ended in December 1996 after some 200,000 deaths and one million refugees. Despite the ceasefire, Guatemala continues to be a violent country with one of the highest homicide rates in the world. We investigated potential associations between violence, mental health, and substance abuse in post-conflict Guatemala using a community based survey of 86 respondents living in urban and rural Guatemala. Overall, 17.4% of our respondents had at least one, direct violent experience during the civil war. In the post-conflict period, 90.7% of respondents reported being afraid that they might be hurt by violence, 40.7% screened positive for depression, 50.0% screened positive for PTSD, and 23.3% screened positive for alcohol dependence. Potential associations between prior violent experiences during the war and indicators of PTSD and aspects of alcohol dependence were found in regression-adjusted models (p < 0.05). Certain associations between prior civil war experiences, aspects of PTSD and alcohol dependence in this cohort are remarkable, raising concerns for the health and safety of the largely indigenous populations we studied. Higher than expected rates of depression, PTSD, and substance abuse in our cohort may be related to the ongoing violence, injury and fear that have persisted since the end of the civil war. These, in turn, have implications for the growing medical and surgical resources needed to address the continuing traumatic and post-traumatic complications in the post-conflict era. Limitations of the current study are discussed. These findings are useful in beginning to understand the downstream effects of the Guatemalan civil war, although a much larger, randomly sampled survey is now needed.

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Nicaragua


Introduction: Our objective was to identify and describe the work related injuries in both the formal and informal work sectors captured in an emergency department based injury surveillance system in Managua, Nicaragua. Setting: Urban emergency department in Managua, Nicaragua serving 200–300 patients per day. Methods: Secondary analysis from the surveillance system data. All cases indicating an injury while working and seen for treatment at the emergency department between 1 August 2001 and 31 July 2002 were included. There was no exclusion based on place of occurrence (home, work, and school), age, or gender. Results: There were 3801 work related injuries identified which accounted for 18.6% of the total 20 425 injures captured by the surveillance system. Twenty seven work related fatalities were recorded, compared with the 1998 International Labor Organization statistic of 25 occupational fatalities for all of Nicaragua. Injuries occurring outside of a formal work location accounted for more than 60% of the work related injuries. Almost half of these occurred at home, while 19% occurred on the street. The leading mechanisms for work related
injuries were falls (30%), blunt objects (28%), and stabs/cuts (23%). Falls were by far the most severe mechanism in the study, causing 37% of the work related deaths and more than half of the fractures. **Conclusion:** Occupational injuries are grossly underreported in Nicaragua. This study demonstrated that an emergency department can be a data source for work related injuries in developing countries because it captures both the formal and informal workforce injuries. Fall prevention initiatives could significantly reduce the magnitude and severity of occupational injuries in Managua, Nicaragua.

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**Introduction:** This study measured the prevalence, frequency, and severity of physical wife abuse and its risk factors in León, Nicaragua. **Methods:** A cross-sectional survey was conducted with a representative sample of 488 women 15 to 49 years of age. **Results:** The lifetime prevalence of spousal violence was 52% among ever-married women (n = 360). Spousal violence was significantly positively associated with poverty, parity, urban residence, and history of violence in the husband’s family. No significant associations were found between spousal violence and women's age, education, marital dependency, or occupation. **Conclusion:** Wife abuse constitutes a major public health problem in Nicaragua, requiring urgent measures for prevention and treatment for victims.

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**Introduction:** This study aims to estimate the prevalence and characteristics of partner abuse during pregnancy as well as to investigate associated social factors in León, Nicaragua. **Methods:** Cross-sectional community-based study. Setting: All pregnant women from 50 randomly selected geographical clusters out of 208 in the municipality of León, Nicaragua. Sample: A total of 478 pregnant women were included; only one woman refused to participate. The domestic violence questionnaire from the WHO-coordinated Multi-Country Study on Women's Health and Life Events was used with each participant being interviewed twice during pregnancy. Main outcome measures: Prevalence and characteristics of partner violence during pregnancy. **Results:** The prevalence of emotional, physical and sexual abuse during pregnancy was 32.4%, 13.4% and 6.7%, respectively. Seventeen percent reported experience of all three forms of violence. Two-thirds of the victims reported repeated abuse. Half of the abused women had experienced punches and kicks directed towards the abdomen and 93% had been injured. Most women had not sought health care in relation to the abuse, but those who did were usually hospitalized. Factors such as women's age below 20 years, poor access to social resources and high levels of emotional distress were independently associated with violence during pregnancy. **Conclusion:** Violence against pregnant women in Nicaragua is common and often repeated. Although these women have poor access to social resources and high levels of emotional distress, they are rarely assisted by the health services. Innovative strategies are needed to provide support and counselling.
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El Salvador


Introduction: Adolescence is an important stage of life for establishing healthy behaviors, attitudes, and lifestyles that contribute to current and future health. Health risk behavior is one indicator of health of young people that may serve both as a measure of health over time as well as a target for health policies and programs. This study examined the prevalence and distribution of youth health risk behaviors from five risk behavior domains—aggression, victimization, depression and suicidal ideation, substance use, and sexual behaviors—among public secondary school students in central El Salvador. Methods: We employed a multi-stage sampling design in which school districts, schools, and classrooms were randomly selected. Data were collected using a self-administered questionnaire based on the US Center for Disease Control and Prevention's Youth Risk Behavior Survey. Sixteen schools and 982 students aged 12–20 years participated in the study. Results: Health risk behaviors with highest prevalence rates included: engagement in physical fight (32.1%); threatened/injured with a weapon (19.9%); feelings of sadness/hopelessness (32.2%); current cigarette use (13.6%); and no condom use at last sexual intercourse (69.1%). Urban and male students reported statistically significant higher prevalence of most youth risk behaviors; female students reported statistically significant higher prevalence of feelings of sadness/hopelessness (35.6%), suicidal ideation (17.9%) and, among the sexually experienced, forced sexual intercourse (20.6%). Conclusion: A high percentage of Salvadoran adolescents in this sample engaged in health risk behaviors, warranting enhanced adolescent health promotion strategies. Future health promotion efforts should target: the young age of sexual intercourse as well as low condom use among students, the higher prevalence of risk behaviors among urban students, and the important gender differences in risk behaviors, including the higher prevalence of reported feelings of sadness, suicidal ideation and forced sexual intercourse among females and higher sexual intercourse and substance use among males. Relevance of findings within the Salvadoran and the cross-national context and implications for health promotion efforts are discussed.

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Data sources

| National Death Files Institute of Legal Medicine El Salvador |

Honduras


Introduction: Honduras has the second highest incidence of violence in the Americas. The aim of this study is to explore the number and mechanism of fatal injuries, non-fatal injuries and the sequelae of these injuries due to violence. This is compared with unintentional injuries, in the capital of Honduras for 2001, with a view to better-targeted prevention. Methods: Data for non-fatal injuries was retrospectively obtained from medical records of all admissions from the public
Emergency Department in Tegucigalpa for 2001. Data on fatal injuries were obtained from the national forensic department. All injuries were reviewed for intention, mechanism and age group. **Results:** There were 1631 (rate 138/100,000) fatal injuries recorded for 2001 in Tegucigalpa. Of these, 1149 (70.4%) were due to violence, compared to 355 (21.8%) due to unintentional injuries and 127 (7.8%) of unknown intent. Homicides accounted for 1044 (64%), suicides 105 (6.4%) and unintentional deaths 355 (22%). Firearms were the leading cause of death in the homicide group (84.3%). In addition 1592 (rate 235/100,000) non-fatal injuries were documented for people 15 years and above, with 1228 (77.1%) caused by violence, of which 640 (52.1%) were caused by firearms. The age group 15–24 years had the highest rates of fatal and non-fatal injuries due to violence. Twenty percent had permanent sequelae as a result of their injuries. Firearm injuries had the highest proportion of sequelae (28.8%). **Conclusion:** Violence in Tegucigalpa is a major cause of injury resulting in substantial morbidity, mortality and disability, particularly in young individuals. Firearm injuries have the highest proportion of sequelae (28.8%).

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**Introduction:** We sought to evaluate the methods and accuracy of mortality data collection and summarize the injury mortality rate in one sector of the State of Olancho, Honduras, with the intent to establish a baseline of injury mortality that will identify potential areas of intervention and serve as a comparison after subsequent interventions. **Methods:** Mortality data were collected from a rural, regional, health center database containing age, sex, and cause of death for one geographic sector in the State of Olancho, Honduras. Causes of death were classified as medical or intentional versus nonintentional injury. **Results:** Accurate mortality data were difficult to obtain for several reasons: (1) deaths are often recorded by untrained health care workers, (2) causes of death are not coded in a standard manner, and (3) infant mortality is underreported. We found 132 recorded noninfant deaths. A disproportionate number of these resulted from injury, especially from intentional injury, particularly among male subjects aged 12 to 49 years. Eighty-two percent of male subjects aged 12 to 49 years who died did so from injuries, and 52% died from intentional injuries. Overall, 48% of all male deaths were injury related. The estimated male mortality rate (age 12 to 49 years) from injuries was 4.5 times that of the United States. **Conclusion:** Injury, particularly intentional injury, is an important cause of mortality in rural Honduras, particularly among male subjects aged 12 to 49 years. This suggests a fertile opportunity for intervention. More reliable data collection will be necessary to accurately target which specific causes of injury death are most amenable to interventions and to monitor the effect of injury control programs.

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Introduction: Our objective was to establish the prevalence of exposure to physical and sexual violence, mental health symptoms, and medical treatment-seeking behavior among three street-based subpopulation groups in Tegucigalpa, Honduras, and to assess the association between sociodemographic group, mental health indicators, and exposure to violence. Methods: An anonymous, cross-sectional survey among randomly selected street-based adolescents, adults, and commercial sex workers (CSWs) was undertaken at the end of 2010 in Tegucigalpa. Médecins Sans Frontières (MSF) mapped places where the study population gathers. Stratified probability samples were drawn for all groups, using two-stage random sampling. Trained MSF staff administered on-site standardized face-to-face questionnaires. Results: Self-reported exposure to severe physical violence in the previous year was 20.9% among street-based adolescents, 28.8% among adults, and 30.6% among CSWs. For the physical violence event self-defined as most severe, 50.0% of the adolescents, 81.4% of the adults, and 70.6% of the CSWs sought medical treatment. Their exposure to severe sexual violence was 8.6%, 28.8%, and 59.2%, respectively. After exposure to the self-defined most severe sexual violence event, 14.3% of adolescents, 31.9% of adults, and 29.1% of CSWs sought treatment. Common mental health and substance abuse symptoms were highly prevalent and strongly associated with exposure to physical (odds ratio 4.5, P < 0.0001) and sexual (odds ratio 3.7, P = 0.0001) violence. Conclusion: Exposure to physical and sexual violence reached extreme levels among street-based subpopulations. Treatment-seeking behavior, particularly after severe sexual violence, was limited. The association of mental health and substance abuse symptoms with exposure to violence could lead to further victimization. Medical and psychological treatments targeting these groups are needed and could help decrease their vulnerability.

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Panama


Introduction: Fatalities from motor vehicle collisions are one of the leading causes of death among children in developed countries. Previous publications have shown that the rate is approximately four times higher in Latin American countries. We aimed to determine the prevalence and characteristics of child victims of motor vehicle collisions in Panama and to compare it with data from a more developed country. In this study, Spain was the country chosen for such comparison. Methods: A descriptive and retrospective study on the prevalence and characteristics of child victims from motor vehicle collisions that occurred from 2005 to 2012 in Panama was performed. To carry out this study, the records pertaining to victims of motor vehicle collisions in Panama were obtained from the National Institute of Statistics and Census and the Spanish data was obtained from the Road Accident Report. The variables analyzed were: age, sex, number of victims, number of injuries, number of fatalities, and type of motor vehicle collisions. Results: The child mortality rate in Panama by motor vehicle collisions during the evaluated time period ranged from 2.11 to 3.63, while mortality rates in Spain ranged from 0.6 to 1.9, making rates in Panama 3 to 4 times higher than the rates observed in Spain. Children under 5 years old were the group with the highest number of fatalities in Panama. Conclusion: In Panama, a lack of specific legislation on the use of child restraints (car seats) as well as a lack of information and awareness campaigns could be responsible for the high toll of child victims associated with motor vehicle collisions.
### Data sources


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**Intimate partner violence and alcohol use among the Ngöbe and Buglé indigenous population of Panama, Central America.** Cadena, Sandra J. *Revista Colombiana de Enfermería* 7, no. 7 (2012): 54-67.

**Abstract:** Indigenous communities of the Ngöbe and Buglé peoples in the Chiriquí province of Panamá, Central America, identified a growing problem with alcohol use and intimate partner violence (IPV). The researchers were invited to determine the extent of the problem. A descriptive correlational study adapting an interview style survey from the 2005 World Health Organization’s Multi-country study on women’s health and domestic violence against women: Summary report of initial results on prevalence, health outcomes and women’s responses was conducted to provide initial data that identified the extent, qualities and risk factors of IPV (1). Results illustrated a correlation between alcohol and intimate partner violence among the population; significant correlations between alcohol abuse, IPV, education level, number of pregnancies, and number of living children were identified. Increasing the awareness of this issue can affect future development of community-based interventions for this unique population.

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**Belize**


**Introduction:** Our objective was to estimate the economic cost of road traffic injuries in Belize in 2007. **Methods:** A cross-sectional study was conducted using secondary cost data, assuming the health system and social perspectives. Epidemiologic information was obtained from the mortality database, the national hospital discharge database, and administrative records from police and the Ministry of Health. A health provider survey was carried out in order to estimate the post discharge ambulatory utilization figures. Direct cost was estimated with the World Health Organization WHO-CHOICE (CHOosing Interventions that are Cost Effective) database. Prehospital costs were obtained from the Belize emergency response team. After estimating years of potential life lost using the Belize life expectancy for 2008 and methodology proposed by the Pan American Health Organization, the indirect cost associated with premature death was estimated with the human capital approach. Total estimation of road traffic injuries' economic costs used a decision tree model approach. Multiway sensitivity analysis was used to incorporate uncertainty in the estimations. **Results:** Sixty-one people died due to road traffic injuries during 2007, 338 were hospitalized, and 565 people were estimated to be slightly injured. A total of 2 501 years of potential life were lost in Belize due to premature death, with a total economic cost of US$11-062-544. This figure represents 0.9% of the Belize gross domestic product. Direct cost was estimated at US$163-503, of which 2.4% was spent on fatalities, 46.7% on the severely injured, and 50.9% on the slightly injured. **Conclusion:** The economic cost estimations make clear the need to prevent road traffic injuries with a strategic and multisectoral approach that focuses on addressing the main problems identified.

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Costa Rica


**Introduction:** Our aim was to explore the relation between occupational and organizational factors and work related injuries (WRI) among public hospital employees in Costa Rica. **Methods:** A cross-sectional survey was conducted among a stratified random sample of 1000 employees from 10 of the 29 public hospitals in Costa Rica. A previously validated, self-administered questionnaire which included occupational and organizational factors and sociodemographic variables was used. From the final eligible sample (n=859), a total of 842 (response rate 98%) questionnaires were returned; 475 workers were analysed after excluding not-at-risk workers and incomplete questionnaires. WRI were computed for the past six months. **Results:** Workers exposed to chemicals (RR = 1.36) and physical hazards (RR = 1.26) had higher WRI rate ratios than non-exposed workers. Employees reporting job tasks that interfered with safety practices (RR = 1.46), and a lack of safety training (RR = 1.41) had higher WRI rate ratios than their counterparts. Low levels of safety climate (RR = 1.51) and safety practices (RR = 1.27) were individually associated with an increased risk of WRI. Also, when evaluated jointly, low levels of both safety climate and safety practices showed the highest association with WRI (RR = 1.92). **Conclusion:** When evaluated independently, most of the occupational exposures and organizational factors investigated were significantly correlated with an increased injury risk. As expected, some of these associations disappeared when evaluated jointly. Exposure to chemical and physical hazards, lack of safety training, and low levels of safety climate and safety practices remained significant risk factors for WRI. These results will be important to consider in developing future prevention interventions in this setting.

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EMRO/EURO Region

Kazakhstan


**Abstract:** Traffic fatalities in Kazakhstan increased from 15 to more than 30 per 100 000 between 2001 and 2006. Mortality remains high compared with developed nations. Safety-restraint laws have been enacted, but little data exist regarding usage of seatbelts, particularly among children and passengers. This cross-sectional study surveyed medical university students about attitudes and behaviours regarding seatbelt and child safety-restraint usage. Seatbelts are widely used in the front seat (81%) but not in the back seat (79% ‘never’ or ‘rarely’ use a seatbelt in the back seat). Fewer than half reported ‘always’ or ‘almost always’ providing restraint for children under 7 years...
and 24% reported children secure the seatbelts themselves. Safety in the back seat merits attention. Adults generally do not buckle in the back seat despite a law requiring seatbelt use. Promotion of child safety restraints should be prioritized in prevention education for physicians and the community.

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**Introduction:** Kazakhstan, a developing middle-income country, has the highest road traffic collision (RTC) mortality in the European Region. The aims of this study were to determine main characteristics of road traffic fatalities in Semey region, Kazakhstan and to compare findings with National data and middle-income European countries. **Methods:** This descriptive surveillance study assesses RTC mortality rates and epidemiology in the Semey Region of East Kazakhstan Oblast. Data of all 318 road traffic fatalities form the Semey Regional Center for Forensic Medicine were analyzed for the 5-year period of January 1, 2006 through December 31, 2010. **Results:** Over the study period, the average road traffic mortality in the Semey Region was 12.1 per 100,000 population with downward trend by 35.1% (p=0.002). The victims mean age was 37.1 (SD=17) years. Males predominated at 74.5%. Vehicle fatality was the most common mode of fatality at 61.3%. The majority of collisions, 53.1%, occurred on highways. Most victims, 67.3%, have died at the scene of collision; in 67.3% of fatalities, autopsies identified multiple injuries as cause of death. The high number of fatal collisions took place in “no snow” season (P<0.001), with an overall 5-years downward dynamic. **Conclusion:** High proportion of males, pedestrians and car occupants among road traffic fatalities; high proportion of death on scene in case of highway collisions are specifics for Semey region, Kazakhstan. These findings can be used to formulate preventive strategies to reduce fatalities and to improve the medical care system for road traffic fatalities.

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**Georgia**


**Introduction:** Little research on Intimate Partner Violence (IPV) and social perceptions toward this behavior has been disseminated from Eastern Europe. This study explores the prevalence and risk factors of IPV and the justification of this behavior among women in the Republic of Georgia. It seeks to better understand how IPV and IPV justification relate and how social justification of IPV differs across socio-economic measures among this population of women. **Methods:** This study utilizes a national sample of ever-married women from the Republic of Georgia (N = 4,302). We describe the factors that predict IPV justification among these women and the relationship between of the acceptability of IPV and victimization overall and across socio-demographic factors. **Results:** While the overall lifetime prevalence of IPV in this sample was relatively low (4%), these women were two to four times more likely to justify IPV, Just under one-quarter of the sample
agreed that IPV was justified in at least one scenario, namely when the wife was unfaithful, compared with women who had no experience being abused by a partner. Georgian women who were poor, from a rural community, had lower education, were not working and who experienced child abuse or IPV among their parents were more likely to justify this behavior. **Conclusion:** These findings begin to fill a gap in our understanding of IPV experienced by women in Eastern Europe. In addition, these findings emphasize the need for researchers, practitioners and policy makers to contextualize IPV in terms of the justification of this behavior among the population being considered as this can play an important role in perpetration, victimization and response.

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**Iraq**

**Fall injuries in Baghdad from 2003 to 2014: results of a randomized household cluster survey.**


**Introduction:** Falls incur nearly 35 million disability-adjusted life-years annually; 75% of which occur in low- and middle-income countries. The epidemiology of civilian injuries during conflict is relatively unknown, yet important for planning prevention initiatives, health policy and humanitarian assistance. This study aimed to determine the death and disability and household consequences of fall injuries in post-invasion Baghdad. **Methods:** A two-stage, cluster randomized, community-based household survey was performed in May of 2014 to determine the civilian burden of injury from 2003 to 2014 in Baghdad. In addition to questions about household member death, households were interviewed regarding injury specifics, healthcare required, disability, relatedness to conflict and resultant financial hardship. **Results:** Nine hundred households totaling 5148 individuals were interviewed. There were 138 fall injuries (25% of all injuries reported); fall was the most common mechanism of civilian injury in Baghdad. The rate of serious fall injuries increased from 78 to 466 per 100,000 persons in 2003 and 2013, respectively. Fall was the most common mechanism among the injured elderly (i.e. ≥65 years; 15/24 elderly unintentional injuries; 63%). However, 46 fall injuries were children aged <15 years (49% of unintentional injuries) and 77 were respondents aged 15–64 years (36%). Respondents who spent significant time within the home (i.e. unemployed, retired, homemaker) had three times greater odds of having suffered a fall injury than student referents (aOR 3.34; 95%CI 1.30–8.60). Almost 80% of fall injured were left with life-limiting disability. Affected households often borrowed substantial sums of money (34 households; 30% of affected households) and/or suffered food insecurity after a family member’s fall (52; 46%). **Conclusion:** Falls were the most common cause of civilian injury in Baghdad. In part due to the effect of prolonged insecurity on a fragile health system, many injuries resulted in life-limiting disabilities. In turn, households shouldered much of the burden after fall injury due to loss of income and/or medical expenditure, often resulting in food insecurity. Given ongoing conflict, civilian injury control initiatives, trauma care strengthening efforts and support for households of the injured is urgently needed.

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**Introduction:** Our objective was to characterize the epidemiology of burn injury in pediatric patients and identify factors associated with mortality based on burn severity. **Methods:** Retrospective cohort study. Setting: U.S. military combat support hospitals and forward surgical hospitals in Iraq and Afghanistan. Patients: Iraqi and Afghan children less than 18 years old admitted with isolated burn injury. Interventions: None. Measurements and Main Results: Burn severity was classified as mild, moderate, and severe based on external Abbreviated Injury Scale score. Patient characteristics and outcomes were described according to burn severity. A multivariate logistic regression was performed on univariate associations with mortality. Of 4,743 pediatric patients, 549 (11.6%) had isolated burn injury. **Results:** Overall mortality was 13%, median external Abbreviated Injury Scale was 3 (interquartile range, 2–4), and 67% were male. Variables included in the logistic regression were external Abbreviated Injury Scale score, abnormal heart rate for age, hypotension, mechanical ventilation, transfusion, Glasgow Coma Scale, international normalized ratio, base deficit, hematocrit, and platelet count. Factors independently associated with mortality were international normalized ratio (odds ratio, 2.6; 95% CI, 1.2–5.8; *p* = 0.021) and external Abbreviated Injury Scale (odds ratio, 2.5; 95% CI, 1.3–4.7; *p* = 0.004). Mortality increased with burn severity: mild 1.7%, moderate 7.2%, and severe 47% (*p* < 0.001). **Conclusion:** This is the first in-depth study of pediatric burn injuries in combat. Children with severe burns (total body surface area > 39% or > 29% if < 5 year) had a high mortality and required significant resources in a setting that is not primarily resourced for long-term care of severe pediatric burn injury. Extraordinary measures are therefore used for the long-term care of these burned children within the war zones of Iraq and Afghanistan.

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**Introduction:** While it is globally observed that young children are at a higher risk of burn injuries, little is known about childhood burns in Iraqi Kurdistan. This study was undertaken to describe the epidemiology of burns amongst pre-school children in this region. **Methods:** A prospective study was undertaken from November 2007 to November 2008 involving all children aged 0–5 years attending the burns centre in Sulaimaniyah province for a new burn injury whether treated as an outpatient or admitted to hospital. **Results:** 1,122 children attended the burns center of whom 944 (84%) were interviewed (male 53%, female 47%). Mean age was 1.9 years with children aged 1 year comprising 32% and those aged 2 years comprising 21% of the sample. The incidence of burns was 1044/100,000 person-years (1030 in females and 1057 in males). Mechanisms of injury included scalds (80%), contact burns (12%) flames (6%) and other mechanisms (2%). Almost 97% of burns occurred at home including 43% in the kitchen. Winter was the commonest season (36%) followed by autumn (24%). There were 3 peak times of injury during the day corresponding to meal times. The majority of burns were caused by hot water (44%) and tea (20%) and the most common equipment/products responsible were tea utensils (41%). There were 237 admissions with an admission rate of 95 per 100,000 person-years. Scald injuries accounted for most admissions (84%). Median total body surface area affected by the burn or scald (TBSA) was 11% and median hospital stay was 7 days. In-hospital mortality was 8%. Mortality rate was 4% when TBSA was ≤25%, and 100% when TBSA was over 50%. **Conclusion:** Burn incidence is high in young
children especially those aged 1–2 years. Preventive interventions targeted at families with young children & focusing on home safety measures could be effective in reducing childhood burns.

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**Abstract:** Mortality rates are important outcome parameters after burn, and can serve as objective end points for quality control. Causes of death after severe burn have changed over time. In a prospective study, eight hundred and eighty-four burn patients were admitted to the Burns and Plastic surgery Hospital in Sulaimani–Kurdistan region of Iraq in 2009. Age, gender, nationality, cause of burn, extent of injury, cause of death and mortality rate were tabulated and analyzed, 338 (38.2%) were male and 546 (61.8%) were female. The highest number of cases occurred in January, with the highest short period incidence occurring in April. Out of 884 cases, 260 persons died. Burn injuries were more frequent and larger with higher mortality in females than in males. Flame was the major cause of burns. Self-inflicted burns were noted mainly in young women. A large number of burns which affect children and females, occur in the domestic setting and could have been prevented. Therefore, it is necessary to implement programs for health education relating to prevention of burn injuries focusing on the domestic setting.

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**Morocco**


**Abstract:** Injuries are the leading cause of mortality among 10-19 years old children and adolescents globally. This study reports on correlates of injuries using multivariate analysis and compares trends in injury from 2006 to 2010 in Morocco. For the prevalence of all cause injury, there was a statistically significant decrease between year 2006 and 2010, cumulatively, as well as for each sex. Within same years, boys reported having sustained more injuries than girls, and this difference was found to be statistically significant. Within same years, boys reported having sustained more fall injuries than girls; however this was statistically significant for year 2006 only. All cause injuries were also found to be statistically significantly more common in boys compared to girls in the year 2010, in the multiple logistic regression model. To further mitigate the burden of injury malady in Morocco among adolescents; all stakeholders i.e. health policymakers, pediatricians, psychiatrists, general practitioners, teachers, and parents need to choreograph their moves in concert.

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**Data sources**

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<th>Data sources</th>
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**Epidemiology and treatment of pediatric burns in a large children’s hospital in Morocco: Analysis of 394 cases:** Épidémiologie et traitement des brûlures pédiatriques dans un grand hôpital pour
Appendix – Country-specific Information: Injury


Introduction: Injury from burns represents 2% of emergency admissions in university hospitals in Morocco. Burn injuries can lead to substantial morbidity in the pediatric population including an impact on later life. Methods: A retrospective study of 394 pediatric burn patients was performed. Subjects were identified by review of the emergency center logs and data were extracted from patient records. Data included demographic information, mechanism of burn, treatment prior to arrival at the hospital, hospital management and follow up condition. Results: The majority (65.7%, n = 259) of patients were between 1 and 4 years old with an average age of 4.26 years and male predominance (male:female = 2:1). Scalding was the main mechanism of injury (83.5%, N = 329). The trunk and upper limbs were the most commonly affected areas of the body (59% and 50%, respectively) with the face affected in 9.6% of cases. The total body surface area burned ranged from 1% to 10% in 86% of patients. Seventy-five patients (19%) required hospitalization, 57 patients (14%) required skin grafting and 27 (6.9%) had major sequelae. Conclusion: This large case series highlights the current epidemiology, management and outcome of pediatric burn victims in Morocco. Current burn management in low resources settings can be challenging and several additional measures should be taken to reduce morbidity among pediatric burn victims.

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Introduction: This study, characterizing the incidence of hip fracture in the province of Rabat, showed that age- and sex-specific rates remained stable between 2006 and 2009. The demographic projections estimated for Morocco indicate that between 2010 and 2030, the expected annual number of hip fractures would increase about twofold. Introduction: No data on hip fracture incidence trends exist from Africa. The aim of the study was to determine time trends in hip fracture rates for the province of Rabat and to forecast the number of hip fractures expected in Morocco up to 2030. Methods: All hip fracture cases registered during the years 2006–2009 were collected at all the public hospitals and private clinics with a trauma unit and/or a permanent orthopedic surgeon across the province. Results: Over the 4-year period, 723 (54.3 %) hip fractures were recorded in women and 607 (45.6 %) in men. The age- and gender-specific incidence of hip fracture rose steeply with advancing age. Hip fractures occurred later in women 75.0 (10.7) years than in men 73.3 (11.0) years (p = 0.014), and its incidence was higher in women than in men [85.9 (95 % CI 79.7–92.2) per 100,000 person-years vs. 72.7 (95 % CI 66.9–78.5)]. The incidence remained globally stable over the period study, and the linear regression analysis showed no significant statistical difference. For the year 2010, there were 4,327 hip fractures estimated in Morocco (53.3 % in women). Assuming no change in the age- and sex-specific incidence of hip fracture from 2010 to 2030, the number of hip fractures in men is expected to increase progressively from 2,019 to 3,961 and from 2,308 to 4,259 in women. Conclusion: The age-specific incidence of hip fracture between the years 2006 and 2009 remained stable in Morocco, and the number of expected hip fractures would double between 2010 and 2030.

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Pakistan


Introduction: Globally, more than 875 000 children under the age of 18 die due to injury every year. The rate of child injury death is 3.4 times higher in low-income and middle-income countries than in high-income countries. Objectives: To study injury mortality burden among children under the age of 5 in Pakistan. Methods: Demographic and Health Survey in Pakistan was conducted from September 2006 until February 2007. It included 95 000 households, out of which 3232 households had death of a child under the age of 5 from January 2005 onwards. The Child Verbal Autopsy Questionnaire (CVAQ) was administered to these households with a response rate of 96%.

Results: For age group 0–5 years, injury was the sixth leading cause of death and was responsible for 2.5% of all deaths (n=73). For age group 1–5 years, injury was found to be the third leading cause of death (11%) after diarrhea (18%) and pneumonia (17%). The overall under-fives mortality rate due to injury was estimated at 39.5 per 100 000 per year in Pakistan. Drowning (22%), road traffic injuries (12%), burns (11%) and falls (10%) were the most common types of injury. The mortality rate was twice as high in rural areas (32 per 100 000; 95% CI 18 to 45), compared to the urban areas (15 per 100 000; 95% CI 0.3 to 29). Conclusion: Injury is the third leading cause of deaths among children 1–5 in Pakistan. The burden is twice as high in rural areas.

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Introduction: School-based injuries account for one in five unintentional childhood injuries. Little is known about the epidemiology of school-based injuries in low-income settings. The objective of our study was to compare emergency department (ED) outcomes of the school-based injuries with respect to age, sex, and injury mechanisms in a Pakistani urban setting. Methods: A pilot injury surveillance study was conducted at the EDs of three major tertiary-care hospitals of Rawalpindi city from July 2007 to June 2008 and included children of less than 15 years injured at school. The World Health Organization’s questionnaire for injury surveillance was used. Results: There were 923 school injury cases. Mean age of children involved was 8.3 years (SD ± 3.3) with male female ratio 2.9:1. Most injuries occurred while playing 85.6% (n = 789); of which the most common mechanism was falls (n = 797, 86.4%). Nineteen of twenty cases were directly discharged home from the ED (N = 861). Compared to ED discharged cases, injury characteristics overrepresented in hospital admitted cases (n = 46) were age 10–14 years (65.2% vs. 40.9%, p = 0.005), male (88.6% vs. 25.9%), involved in educational activities (39.1% vs. 5.3%), injured from fire/heat (37.8% vs. 0.6%), had burns (39.5% vs. 0.9%) and head injuries (27.9% vs. 6.4%). Conclusion: Falls while playing are the commonest injury mechanism in school-based injuries reported in our ED sample. School officials need to prevent these injuries. Studying injury hazards present in school environment in Pakistan might facilitate developing specific prevention strategies.

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Introduction: Burns are leading cause of fatal injuries and major cause of morbidity and mortality in developing countries. The major obstacle in controlling severity is factors related to burn. This study determines frequency of burns and the factors related to it in Karachi, Pakistan. Methods: A cross-sectional study was conducted and 384 hospitalized adult patients with burns were consecutively interviewed during August 2013 to February 2014. Information was collected on socio-demographic profile, intent of burn, severity of burn, health hazards, physical and psychological characteristics. TBSA burn of >15% was considered as higher severity of burn. Results: Higher severity of burns was found in 76.3% patients. Multivariate analysis showed that higher severity of burns were significantly associated with age less than 25 years (OR 2.7, 95% CI 1.5–4.9), never had been to school (OR 3.1, 95% CI 1.7–5.9) and intentional burn (OR 20.6, 95% CI 5.0–84.9). Conclusion: Majority of patients had higher severity of burn. The intent of injury was intentional, age less than 25 years and no schooling were found significantly associated with higher severity of burns.

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Abstract: Road traffic injuries are on the rise in developing countries with a disproportionately high number of crashes involving commercial vehicles. Baseline information on risk factors is necessary to develop targeted prevention programmes. A survey of commercial drivers was conducted at the largest bus and truck station in Rawalpindi, Pakistan. Structured interviews elicited information from 857 drivers on their socio-demographics, high-risk driving behaviours, fatigue, use of drugs while driving, vehicle maintenance and health conditions, as well as crash involvement. A binary logistic regression analysis was used to investigate the factors associated with crash involvement in the last five years. Overall, 92 (11.2%) drivers reported having had a road crash in the last 5 years. Factors independently associated with the occurrence of crashes were alcohol use (OR 2.2, 95% CI 1.1–4.4), poor vehicle maintenance (OR 3.4, 95% CI 1.7–7.01) and lack of seat belt use (OR 2.7, 95% CI 1.3–5.6). The high prevalence of high-risk attributes in the study population indicates a great need for targeted risk prevention.

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Afghanistan


Introduction: International humanitarian law requires emergency medical support for both military personnel and civilians, including children. Here we present a detailed review of pediatric admissions with the pattern of injury and the resources they consume. Methods: All pediatric admissions to the hospital at Camp Bastion between 1 January and 29 April 2011 were analysed prospectively. Data collected included time and date of admission, patient age and weight,
mechanism of injury, extent of wounding, treatment, length of hospital stay and discharge destination. **Results:** Eighty-five children (65 boys and 17 girls, median age: 8 years, median weight: 20kg) were admitted. In 63% of cases the indication for admission was battle related trauma and in 31% non-battle trauma. Of the blast injuries, 51% were due to improvised explosive devices. Non-battle emergencies were mainly due to domestic burns (46%) and road traffic accidents (29%). The most affected anatomical area was the extremities (44% of injuries). Over 30% of patients had critical injuries. Operative intervention was required in 74% of cases. The median time to theatre for all patients was 52 minutes; 3 patients with critical injuries went straight to theatre in a median of 7 minutes. A blood transfusion was required in 27 patients; 6 patients needed a massive transfusion. Computed tomography was performed on 62% of all trauma admissions and 40% of patients went to the intensive care unit. The mean length of stay was 2 days (range: 1–26 days) and there were 7 deaths. **Conclusion:** Pediatric admissions make up a small but significant part of admissions to the hospital at Camp Bastion. The proportion of serious injuries is very high in comparison with admissions to a UK pediatric emergency department. The concentration of major injuries means that lessons learnt in terms of teamwork, the speed of transfer to theatre and massive transfusion protocols could be applied to UK pediatric practice.

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**Introduction:** Trauma is a leading cause of death in children. Life support courses have been developed to reduce the mortality and morbidity of children suffering trauma; differences in anatomy and physiology may produce different injury patterns to adults when children are exposed to trauma, challenging the care providers. **Methods:** A retrospective analysis of all pediatric patients transported by the helicopter-borne MERT between 01 May 2006 and 31 December 2007 in Helmand Province, Afghanistan. **Results:** 78 children were brought in over the study period by the MERT team representing 7.3% of MERT casualties and 2.2% of the total seen in the Emergency Department. Breakdown by demographics, triage category, mechanism of injury, and treatment is given. **Conclusion** A significant number of pediatric patients are treated by the deployed pre-hospital team. All military pre-hospital care providers should gain training and experience in the care of the seriously injured child prior to deployment.

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**Introduction:** Throughout history, children have been victims of armed conflict, including the blast injury complex, however, the pattern of injury, physiologic impact, and treatment needs of children with this injury are not well documented. **Methods:** The Joint Theatre Trauma Registry provides data on all civilians admitted to US military treatment facilities from 2002 to 2010 with injuries from an explosive device. The data were stratified by age and analyzed for differences in
anatomic injury patterns, Injury Severity Score (ISS), Revised Trauma Score (RTS), mortality, intensive care unit days, and length of hospitalization. Multivariate logistic regression was done to determine independent predictors of mortality. All operative procedures with a specified site were tabulated and categorized by body region and age. **Results:** A total of 4,983 civilian patients were admitted, 25% of whom were younger than 15 years. Pediatric patients aged 8 to 14 years had a higher ISS and hospital stay than other age groups, and children younger than 15 years had a longer intensive care unit stay. Injuries in children were more likely to occur in the head and neck and less likely in the bony pelvis and extremities. Children had a lower RTS than the other age groups. Mortality correlated highly with burns, head injury, transfusion, and RTS. Adolescent patients had a lower mortality rate than the other age groups. Improvised explosive devices were the most common cause of injury in all age groups. **Conclusion:** Children experiencing blast injury complex have an anatomic pattern that is unique and an RTS that reflects more severe physiologic derangement. Injuries requiring transfusion or involving the head and neck and burns were predictive of mortality, and this persisted across all age groups. The mortality rate of children with blast injury is significant (7%), and treatment is resource intensive, requiring many surgical subspecialties.

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AFRO Region

Nigeria


**Introduction:** Hypertension is a leading risk factor for death in sub-Saharan Africa. Quality treatment is often not available nor affordable. We assessed the effect of a voluntary health insurance program, including quality improvement of healthcare facilities, on blood pressure (BP) in hypertensive adults in rural Nigeria. **Methods:** We compared changes in outcomes from baseline (2009) to midline (2011) and endline (2013) between non-pregnant hypertensive adults in the insurance program area (PA) and a control area (CA), through household surveys. The primary outcome was the difference between the PA and CA in change in BP, using difference-in-differences analysis. **Results:** Of 1500 eligible households, 1450 (96.7%) participated, including 559 (20.8%) hypertensive individuals, of which 332 (59.4%) had follow-up data. Insurance coverage increased from 0% at baseline to 41.8% at endline in the PA and remained under 1% in the CA. The PA showed a 4.97mm Hg (95% CI: -0.76 to +10.71mm Hg) greater decrease in systolic BP and a 1.81mm Hg (-1.06 to +4.68mm Hg) greater decrease in diastolic BP from baseline to endline compared to the CA. Respondents with stage 2 hypertension showed an 11.43mm Hg (95% CI: 1.62 to 21.23mm Hg) greater reduction in systolic BP and 3.15mm Hg (-1.22 to +7.53mm Hg) greater reduction in diastolic BP in the PA compared to the CA. Attrition did not affect the results. **Conclusion:** Access to improved quality healthcare through an insurance program in rural Nigeria was associated with a significant longer-term reduction in systolic BP in subjects with moderate or severe hypertension.

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**Introduction:** Hypertension (HTN) control is a major public health and clinical challenge. A number of guidelines exist globally to assist in tackling this challenge. The aim of this study was to determine conformity of the HTN detection and evaluation practices of a sample of Lagos-based general practitioners (GPs) to international guidelines. **Methods:** Self-administered structured questionnaires were used to collect data from a cohort of GPs attending continuing medical education programs in Lagos. **Results:** Out of the 460 GPs that were approached, 435 agreed to participate in the study, with questionnaires from 403 GPs analyzed. The average age and number of years post-registration of the GPs were 40.0 ± 11.3 years and 14.3 ± 11.1 years, respectively. Two thirds (n = 269) were in private practice. Their daily average total and HTN patients' loads were 17.4 ± 14.3 and 4.4 ± 3.5, respectively. Awareness of HTN guidelines was 46.7% (n = 188),
while 18.1% (n = 73) was able to name one or more HTN guidelines. The approaches of these GPs to the detection and evaluation of HTN and their relationships to the GPs’ experience were heterogeneous. **Conclusion:** The approach of the GPs to detection and evaluation of HTN though heterogeneous is unsatisfactory and may partly contribute to poor HTN control in Nigeria. Strengthening the capacity of GPs in this regard through continuous medical education may greatly improve HTN control.

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**Introduction:** Evidence of positive association between traffic-related air pollution and elevated blood pressure has been published widely. However, the risk of hypertension and prolonged exposure to crude oil pollution and gas flares remains unexplored. **Methods:** We recruited 2,028 residents (aged 18-80) in a cross-sectional survey of both oil/gas polluted and nonpolluted communities in the Niger Delta region of Nigeria. Prevalence and risk of hypertension, anthropometric indices, lifestyle and sociodemographic factors, and cardiovascular comorbidities were examined and compared between the 2 groups. Hypertension was defined as blood pressure ≥140/90mm Hg or on antihypertensive medication. Both univariate and multivariate logistic regression models were used to examine factors associated with hypertension. Model fits statistics were used to assess the parsimonious model and predictive power. **Results:** More than one-third of participants were hypertensive (37.4%). Half of the participants were from oil-polluted areas (51%). Only 15% of participants reported family history of hypertension. In the adjusted model, participants living in oil-polluted areas were almost 5 times as likely to have developed hypertension (adjusted odds ratio (aOR) = 4.85, 95% confidence interval (CI): 1.84-12.82) compared to participants in unpolluted areas. Age modifies the association between pollution status and risk of hypertension. For every 10 years increase in the age of the participants, the odds of developing hypertension increased by 108% (aOR = 2.08, 95% CI: 1.77-2.43). **Conclusion:** The results suggested that exposure to oil/gas pollution may be associated with an increased risk of hypertension. Our findings need to be further investigated in longitudinal studies.

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**Data sources**

**Experts**
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- Nigerian Heart Foundation Chairman, Board of Trustees Emeritus Professor Akinkugbe; Executive Director, Dr. Kingsley Akinroye
- Nigerian Cardiac Society
### Appendix – Country-specific Information: Hypertension

| Country-specific needs/attention | • Cost as a barrier to routine blood pressure checks  
| | - lack of knowledge of hypertension and its health consequences  
| | - lack of health insurance coverage  
| | - lack of routine blood pressure checks make the available statistics on blood pressure unreliable, need better surveillance that it not dependent on health care facilities  
| | - increased salt and fat intake from the consumption of processed foods  
| | - increased tobacco use  
| | - sedentary lifestyles  
| | - trans fat consumption  
| | - especially so in urban areas - stress levels and loss of family cohesion  
| | • Interest in food labeling initiatives |

| Public health campaigns/programs | • National policy on noncommunicable diseases  
| | • Lagos: diagnosis in public health facilities, awareness campaigns in newspapers |

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### Kenya


**Introduction:** Cardiovascular disease (CVD) is a rising health burden among the world’s poor with hypertension as the main risk factor. In sub-Saharan Africa, hypertension is increasingly affecting the urban population of which a substantial part lives in slums. This study aims to give insight into the profile of patients with hypertension living in slums of Nairobi, Kenya. **Methods:** Sociodemographic and anthropometric data as well as clinical measurements including BP from 440 adults with hypertension aged 35 years and above living in Korogocho, a slum on the eastern side of Nairobi, Kenya, will be collected at baseline and at the first clinic visit. **Conclusion:** The study population showed high prevalence of overweight and abdominal obesity as well as behavioral risk factors such as smoking, alcohol and a low vegetable and fruit intake. Furthermore, the majority of hypertensive patients do not take anti-hypertensive medication and the ones who do show little adherence.

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Introduction: Mobile health (mHealth) applications have recently proliferated, especially in low- and middle-income countries, complementing task-redistribution strategies with clinical decision support. Relatively few studies address usability and feasibility issues that may impact success or failure of implementation, and few have been conducted for non-communicable diseases such as hypertension. Objective: To conduct iterative usability and feasibility testing of a tablet-based Decision Support and Integrated Record-keeping (DESIRE) tool, a technology intended to assist rural clinicians taking care of hypertension patients at the community level in a resource-limited setting in western Kenya. Methods: Usability testing consisted of "think aloud" exercises and "mock patient encounters" with five nurses, as well as one focus group discussion. Feasibility testing consisted of semi-structured interviews of five nurses and two members of the implementation team, and one focus group discussion with nurses. Content analysis was performed using both deductive codes and significant inductive codes. Critical incidents were identified and ranked according to severity. A cause-of-error analysis was used to develop corresponding design change suggestions. Results: Fifty-seven critical incidents were identified in usability testing, 21 of which were unique. The cause-of-error analysis yielded 23 design change suggestions. Feasibility themes included barriers to implementation along both human and technical axes, facilitators to implementation, provider issues, patient issues and feature requests. Conclusion: This participatory, iterative human-centered design process revealed previously unaddressed usability and feasibility issues affecting the implementation of the DESIRE tool in western Kenya. In addition to well-known technical issues, we highlight the importance of human factors that can impact implementation of mHealth interventions.

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Abstract: Given shortages of health care providers and a rise in the number of people living with both communicable and non-communicable diseases, Community Health Workers (CHWs) are increasingly incorporated into health care programs. We sought to explore community perceptions of CHWs including perceptions of their roles in chronic disease management as part of the Academic Model Providing Access to Healthcare Program (AMPATH) in western Kenya. In depth interviews and focus group discussions were conducted between July 2012 and August 2013. Study participants were purposively sampled from three AMPATH sites: Chulaimbo, Teso and Turbo, and included patients within the AMPATH program receiving HIV, tuberculosis (TB), and hypertension (HTN) care, as well as caregivers of children with HIV, community leaders, and health care workers. Participants were asked to describe their perceptions of AMPATH CHWs, including identifying the various roles they play in engagement in care for chronic diseases including HIV, TB and HTN. Data was coded and various themes were identified. We organized the concepts and themes generated using the Andersen-Newman Framework of Health Services Utilization and considering CHWs as a potential enabling resource. A total of 207 participants including 110 individuals living with HIV (n = 50), TB (n = 39), or HTN (n = 21); 24 caregivers; 10 community leaders; and 34 healthcare providers participated. Participants identified several roles for CHWs including promoting primary care, encouraging testing, providing education and facilitating engagement in care. While various facilitating aspects of CHWs were uncovered, several barriers of CHW care were raised, including issues with training and confidentiality. Suggested resources to help CHWs improve their services were also described. Our findings
suggest that CHWs can act as catalysts and role models by empowering members of their communities with increased knowledge and support.

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### Data sources

- Kenya Open Data Portal: [https://opendata.go.ke/browse](https://opendata.go.ke/browse)
- Quandl: [https://www.quandl.com/](https://www.quandl.com/)
- The Humanitarian Data Exchange: [https://data.hdx.rwlabs.org/](https://data.hdx.rwlabs.org/)

### Experts

- Dorcus Kiptui, an officer from the Health Ministry’s department of Non-Communicable Disease.
- Dr Joseph Kibachio, Head of Division of Non Communicable Diseases. Ministry of Health
- Dr. Fred Bukachi, a Cardiologist Consultant and School of Medicine Lecturer at University of Nairobi

### Country-specific needs/attention

Lack of awareness of hypertensive status

### Public health campaigns/programs

- Healthy Heart Africa, launched by AstraZeneca, a pharmaceutical company, to raise awareness about hypertension
- Karl Friberg, Vice President, Healthy Heart Africa
- AMREF Health Africa Kenya
- Population Services International Kenya Dr. Meshack Ndirangu, Amref Health Africa Country Director, said: “Amref Health Africa in Kenya is committed to prioritizing NCDs, especially hypertension, as they are part of the unmet medical need amongst Kenyans.

## Namibia


**Introduction:** Cardiovascular disease (CVD) is the leading cause of adult mortality in low-income countries but data on the prevalence of cardiovascular risk factors such as hypertension are scarce, especially in sub-Saharan Africa (SSA). This study aims to assess the prevalence of hypertension and determinants of blood pressure in four SSA populations in rural Nigeria and Kenya, and urban Namibia and Tanzania. **Methods:** We performed four cross-sectional household surveys in Kwara State, Nigeria; Nandi district, Kenya; Dar es Salaam, Tanzania and Greater Windhoek, Namibia, between 2009-2011. Representative population-based samples were drawn
Appendix – Country-specific Information: Hypertension

in Nigeria and Namibia. The Kenya and Tanzania study populations consisted of specific target groups. **Results:** Within a final sample size of 5,500 households, 9,857 non-pregnant adults were eligible for analysis on hypertension. Of those, 7,568 respondents ≥ 18 years were included. The primary outcome measure was the prevalence of hypertension in each of the populations under study. The age-standardized prevalence of hypertension was 19.3% (95%CI:17.3-21.3) in rural Nigeria, 21.4% (19.8-23.0) in rural Kenya, 23.7% (21.3-26.2) in urban Tanzania, and 38.0% (35.9-40.1) in urban Namibia. In individuals with hypertension, the proportion of grade 2 (≥ 160/100 mmHg) or grade 3 hypertension (≥ 180/110 mmHg) ranged from 29.2% (Namibia) to 43.3% (Nigeria). Control of hypertension ranged from 2.6% in Kenya to 17.8% in Namibia. Obesity prevalence (BMI ≥ 30) ranged from 6.1% (Nigeria) to 17.4% (Tanzania) and together with age and gender, BMI independently predicted blood pressure level in all study populations. Diabetes prevalence ranged from 2.1% (Namibia) to 3.7% (Tanzania). **Conclusion:** Hypertension was the most frequently observed risk factor for CVD in both urban and rural communities in SSA and will contribute to the growing burden of CVD in SSA. Low levels of control of hypertension are alarming. Strengthening of health care systems in SSA to contain the emerging epidemic of CVD is urgently needed.

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**Introduction:** The burden of non-communicable diseases (NCDs) is growing in sub-Saharan Africa combined with an already high prevalence of infectious disease, like HIV. Engaging the formal employment sector may present a viable strategy for addressing both HIV and NCDs in people of working age. This study assesses the presence of three of the most significant threats to health in Namibia among employees in the formal sector: elevated blood pressure, elevated blood glucose, and HIV and assesses the knowledge and self-perceived risk of employees for these conditions.

**Methods:** A health and wellness screening survey of employees working in 13 industries in the formal sector of Namibia was conducted including 11,192 participants in the Bophelo! Project in Namibia, from January 2009 to October 2010. The survey combined a medical screening for HIV, blood glucose and blood pressure with an employee-completed survey on knowledge and risk behaviors for those conditions. We estimated the prevalence of the three conditions and compared to self-reported employee knowledge and risk behaviors and possible determinants.

**Results:** 25.8% of participants had elevated blood pressure, 8.3% of participants had an elevated random blood glucose measurement, and 8.9% of participants tested positive for HIV. Most participants were not smokers (80%), reported not drinking alcohol regularly (81.2%), and had regular condom use (66%). Most participants could not correctly identify risk factors for hypertension (57.2%), diabetes (57.3%), or high-risk behaviors for HIV infection (59.5%). In multivariate analysis, having insurance (OR: 1.15, 95%CI: 1.03 - 1.28) and a managerial position (OR: 1.29, 95%CI: 1.13 - 1.47) were associated with better odds of knowledge of diabetes.

**Conclusion:** The prevalence of elevated blood pressure, elevated blood glucose, and HIV among employees of the Namibian formal sector is high, while risk awareness is low. Attention must be paid to improving the knowledge of health-related risk factors as well as providing care to those with chronic conditions in the formal sector through programs such as workplace wellness.
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<td><strong>Country-specific needs/attention</strong></td>
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### Tanzania


**Abstract:** There are limited, reliable data on the prevalence of hypertension in East African populations. The aim of this study was to document the prevalence of hypertension in the rural Hai district of Tanzania. All consenting individuals aged 70 years and over who were living in 12 randomly-selected villages in the district underwent three consecutive sitting blood pressure (BP) measurements. An average of the last two measurements was taken. Prior diagnosis of, and treatment for, hypertension was recorded. Of the 2223 subjects, 1553 (69.9%, 95% CI 68.0-71.8) had hypertension (BP ≥140/90). Of those with hypertension 733 (47.2%) had isolated systolic hypertension. Only 586 (37.7%) hypertensives had been previously diagnosed, 94 (6.1%) were currently treated and 14 (0.9%) were adequately controlled. This is the first large-scale prevalence study of hypertension in the elderly in sub-Saharan Africa (SSA). Our results approximate to a 'rule of sixths'; 2/6 of hypertensives were previously detected, 1/6 of those previously detected were on treatment and 1/6 of those on treatment were adequately controlled. Hypertension is a large problem in the elderly population in SSA, and there are a growing number of elderly who are at risk of hypertensive sequelae owing to lack of detection and treatment.

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**Abstract:** Regular blood pressure (BP) monitoring is a cost-effective means of early identification and management of hypertensive disease in pregnancy. In much of rural sub-Saharan Africa, the ability to take and act on accurate BP measurements is lacking as a result of poorly functioning or absent equipment and/or inadequate staff education. This study describes the feasibility of using validated automated BP devices suitable for low-resource settings (LRS) in primary health-care facilities in rural Tanzania. Following a primary survey, 19 BP devices were distributed to 11 clinics and re-assessed at one, three, six, 12 and 36 months. Devices were used frequently with high levels of user satisfaction and good durability. We conclude that the use of automated BP devices
in LRS is feasible and sustainable. An assessment of their ability to reduce maternal and perinatal morbidity and mortality is vital.

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**Introduction:** Drug therapy in high-risk individuals has been advocated as an important strategy to reduce cardiovascular disease in low income countries. We determined, in a low-income urban population, the proportion of persons who utilized health services after having been diagnosed as hypertensive and advised to seek health care for further hypertension management. **Methods:** A population-based survey of 9254 persons aged 25-64 years was conducted in Dar es Salaam. Among the 540 persons with high blood pressure (defined here as BP > or = 160/95 mmHg) at the initial contact, 253 (47%) had high BP on a 4th visit 45 days later. Among them, 208 were untreated and advised to attend health care in a health center of their choice for further management of their hypertension. One year later, 161 were seen again and asked about their use of health services during the interval. **Results:** Among the 161 hypertensive persons advised to seek health care, 34% reported to have attended a formal health care provider during the 12-month interval (63% public facility; 30% private; 7% both). Antihypertensive treatment was taken by 34% at some point of time (suggesting poor uptake of health services) and 3% at the end of the 12-month follow-up (suggesting poor long-term compliance). Health services utilization tended to be associated with older age, previous history of high BP, being overweight and non-smoking, but not with education or wealth. Lack of symptoms and cost of treatment were the reasons reported most often for not attending health care. **Conclusion:** Low utilization of health services after hypertension screening suggests a small impact of a patient-centered screen-and-treat strategy in this low-income population. These findings emphasize the need to identify and address barriers to health care utilization for non-communicable diseases in this setting and, indirectly, the importance of public health measures for primary prevention of these diseases.

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**Data sources**


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**Uganda**


**Introduction:** The successful scale-up of antiretroviral therapy (ART) in sub-Saharan Africa has led to increasing life expectancy, and thus increased risk of hypertension. We aimed to describe the
Appendix – Country-specific Information: Hypertension

incidence and predictors of hypertension in HIV patients receiving ART at a publicly funded clinic in rural Uganda. **Methods:** We abstracted data from medical records of adult patients who initiated ART at an HIV clinic in south-western Uganda during 2010-2012. We defined hypertension as at least two consecutive clinical visits, with a SBP at least 140 mmHg and/or SBP of at least 90 mmHg, or prescription for an antihypertensive medication. We calculated the incidence of hypertension and fit multivariable Cox proportional-hazards models to identify predictors of hypertension. **Results:** A total of 3389 patients initiated ART without a prior diagnosis of hypertension during the observation period. Over 3990 person-years of follow-up, 445 patients developed hypertension, for a crude incidence of 111.5/1000 (95% confidence interval 101.9-121.7) person-years. Rates were highest among men aged at least 40 years (158.8 per/1000 person-years) and lowest in women aged 30-39 years (80/1000 person-years). Lower CD4 cell count at ART initiation, as well as traditional risk factors including male sex, increasing age, and obesity, were independently associated with hypertension. **Conclusion:** We observed a high incidence of hypertension in HIV-infected persons on ART in rural Uganda, and increased risk with lower nadir CD4 cell counts. Our findings call for increased attention to screening of and treatment for hypertension, along with continued prioritization of early ART initiation.

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**Introduction:** Hypertension is an important contributor to global burden of disease and mortality, and is a growing public health problem in sub-Saharan Africa. However, most sub-Saharan African countries lack detailed nationwide data on hypertension and other non-communicable diseases (NCD) risk factors that would provide benchmark information for design of appropriate interventions. We analyzed blood pressure data from Uganda’s nationwide NCD risk factor survey conducted in 2014, to describe the prevalence and distribution of hypertension in the Ugandan population, and to identify the associated factors. **Methods:** The NCD risk factor survey drew a countrywide sample stratified by the four regions of the country, and with separate estimates for rural and urban areas. The World Health Organization’s STEPs tool was used to collect data on demographic and behavioral characteristics, and physical and biochemical measurements. Prevalence rate ratios (PRR) using modified Poison regression modelling was used to identify factors associated with hypertension. **Results:** Of the 3906 participants, 1033 were classified as hypertensive, giving an overall prevalence of 26.4%. Prevalence was highest in the central region at 28.5%, followed by the eastern region at 26.4%, western region at 26.3%, and northern region at 23.3%. Prevalence in urban areas was 28.9%, and 25.8% in rural areas. The differences between regions, and between rural-urban areas were not statistically significant. Only 7.7% of participants with hypertension were aware of their high blood pressure. The prevalence of pre-hypertension was also high at 36.9%. The only modifiable factor found to be associated with hypertension was higher body mass index (BMI). Compared to participants with BMI less than 25 kg/m², prevalence was significantly higher among participants with BMI between 25 to 29.9 kg/m² with an adjusted PRR = 1.46 [95% CI = 1.25-1.71], and even higher among obese participants (BMI ≥ 30 kg/m²) with an adjusted PRR = 1.60 [95% CI = 1.29-1.99]. The unmodifiable factor found to be associated with hypertension was older age with an adjusted PRR of 1.02 [95% CI = 1.02-1.03] per yearly increase in age. **Conclusion:** The prevalence of hypertension
in Uganda is high, with no significant differences in distribution by geographical location. Only 7.7% of persons with hypertension were aware of their hypertension, indicating a high burden of undiagnosed and un-controlled high blood pressure. Thus a big percentage of persons with hypertension are at high risk of hypertension-related cardiovascular NCDs.

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**Introduction:** High blood pressure is the principal risk factor for stroke, heart failure and kidney failure in the young population in Africa. Control of hypertension is associated with a larger reduction in morbidity and mortality in younger populations compared with the elderly; however, blood pressure control efforts in the young are hampered by scarcity of data on prevalence and factors influencing awareness, treatment and control of hypertension. We aimed to describe the prevalence of prehypertension and hypertension among young adults in a peri-urban district of Uganda and the factors associated with occurrence of hypertension in this population. **Methods:** This cross-sectional study was conducted between August, 2012 and May 2013 in Wakiso district, a suburban district that that encircles Kampala, Uganda's capital city. We collected data on socio-demographic characteristics and hypertension status using a modified STEPs questionnaire from 3685 subjects aged 18-40 years selected by multistage cluster sampling. Blood pressure and anthropometric measurements were performed using standardized protocols. Fasting blood sugar and HIV status were determined using a venous blood sample. Association between hypertension status and various biosocial factors was assessed using logistic regression. **Results:** The overall prevalence of hypertension was 15 % (95 % CI 14.2 - 19.6) and 40 % were pre-hypertensive. Among the 553 hypertensive participants, 76 (13.7 %) were aware of their diagnosis and all these participants had initiated therapy with target blood pressure control attained in 20 % of treated subjects. Hypertension was significantly associated with the older age-group, male sex and obesity. There was a significantly lower prevalence of hypertension among participants with HIV OR 0.6 (95 % CI 0.4-0.8, P = 0.007). **Conclusion:** There is a high prevalence of high blood pressure in this young periurban population of Uganda with sub-optimal diagnosis and control. There is previously undocumented high rate of treatment, a unique finding that may be exploited to drive efforts to control hypertension. Specific programs for early diagnosis and treatment of hypertension among the young should be developed to improve control of hypertension. The relationship between HIV infection and blood pressure requires further clarification by longitudinal studies.

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**Data sources**
World Health Organization African Health Observatory:

**Public health campaigns/ programs**
One Million Community Health Workers Campaign: [http://1millionhealthworkers.org/](http://1millionhealthworkers.org/)

**Introduction:** Hypertension constitutes a growing burden of illness in developing countries like Zambia. Adequately screening and treating hypertension could greatly reduce the complications of stroke and coronary disease. Our objective was to determine the prevalence of hypertension and identify current treatment practices among adult patients presenting for routine care to rural health facilities in the Better Health Outcomes through Mentoring and Assessments (BHOMA) project. **Methods:** We conducted a retrospective analysis of routinely collected clinical data from 46 rural government clinics in Zambia. Our analysis cohort comprised patients ≥25 years with recorded blood pressure measurements, who sought care at primary health centers. Consistent with prior research, in our primary analysis, we only included data from first visits. Hypertension was defined as a systolic blood pressure ≥140 mmHg, or diastolic blood pressure ≥90 mmHg, or reported use of antihypertensive medication. A sensitivity analysis was performed using median blood pressure for individuals with multiple visits. **Results:** From January 2011 to December 2014, 116,130 first visits by adult patients met eligibility criteria. The crude prevalence of hypertension by onsite measurement or reported use of antihypertensive medication was 23.1 % [95 % CI: 22.8-23.3] (23.6 % in females, 22.3 % in males). The age standardized prevalence of hypertension across participating sites was 28.0 % [95 % CI: 27.7-28.3] (29.7 % in females, 25.8 % in males). Sensitivity analysis revealed a similar prevalence using data from all visits. Only 5.6 % of patients had a diagnosis of hypertension documented in their medical record. Among patients with hypertension, only 18.0 % had any antihypertensive drug prescribed, with nifedipine (8.9 %), furosemide (8.3 %), and propranolol (2.4 %) as the most common. **Conclusion:** Age standardized prevalence of hypertension in rural primary health clinics in Zambia was high compared to other studies in rural Africa; however, we diagnosed hypertension with only one measurement and this may have biased our findings. **Conclusion:** Future efforts to improve hypertension control should focus on population preventive care and primary healthcare provider education on individual management.

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**Abstract:** Hypertension is an important public health issue in Zambia. Despite the need for early detection, treatment, and ongoing monitoring, there is little documented research on hypertension in Zambia. The study aims were to: 1) better understand risk factors for hypertension in urban and rural communities in Mongu and Limulunga Districts, Western Province; 2) identify current health practices for hypertension and prevention in these communities; and 3) explore intersections between culture and hypertension perceptions and practices for study participants. A mixed methods approach was used; 203 adults completed surveys including demographics, anthropometric measures, blood pressure (BP), physical activity, diet, and salt intake at five health check stations. Two focus groups were conducted with rural and urban community members to better understand their perspectives on hypertension. The prevalence of hypertension was 32.8% for survey participants. A further 24.6% had pre-
hypertension. The mean total weight of salt added to food was nearly double the WHO recommendation with women adding significantly more salt to food than men. Significant differences in waist circumference were observed between men and women with men at low risk and women at substantially high risk. In focus groups, participants cited westernized diets, lack of physical activity, stress, psychological factors, and urbanization as causative factors for hypertension. Participants lacked understanding of BP medications, healthy lifestyles, adherence to treatment, and ongoing monitoring. Focus group participants mentioned challenges in obtaining treatment for hypertension and desired to be active contributors in creating solutions. They recommended that government prioritize hypertension initiatives that increase access to health education to reduce risk, enhance early detection, and support lifestyle changes and medication adherence. Our findings suggest that policy-makers need to engage communities more effectively to develop successful public health strategies to prevent, detect, and manage hypertension in Western Province, Zambia, particularly in rural areas.

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Introduction: Hypertension a major risk factor for cardiovascular disease and is the most widely recognized modifiable risk factor for this disease. There is little information on the prevalence and risk factors for hypertension in Zambia, and in particular in rural areas of the country. In order to contribute to the existing global literature on hypertension, particularly in rural Zambia, this study was conducted to determine the prevalence of hypertension and its correlates in two rural districts of Zambia, namely Kaoma and Kasama. Methods: A cross-sectional study using a modified World Health Organization (WHO) global non communicable diseases (NCD) surveillance initiative NCD-STEPwise approach was used. Proportions were compared using the Yates' corrected $\chi^2$ test, and a result yielding a $p$-value of less than 5% was considered significant. Bivariate and multivariate logistic regression analyses were conducted. Factors that were significantly associated with the outcome in bivariate analyses were considered in a multivariate logistic regression analysis using a backward variable selection method. Adjusted odds ratios (AOR) and their 95% confidence intervals (CI) were reported. Results: In total, 895 participants from Kaoma and 1198 participants from Kasama took part in the surveys. Overall, 25.8% participants (27.5% male, 24.6% female; $p=0.373$) in Kaoma and 30.3% (31.3% male, 29.5% female; $p=0.531$) in Kasama were hypertensive. In Kaoma, age and BMI were independently associated with hypertension. Compared with participants aged 45 years or older, participants aged 25-34 years were 60% (AOR=0.40, 95% CI [0.21, 0.56]) less likely to be hypertensive. Participants with BMI <18.5 and 18.5-24.9 were 54% (AOR=0.46, 95% CI [0.30, 0.69]) and 31% (AOR=0.69, 95% CI [0.49, 0.98]) less likely to be hypertensive compared with participants with BMI ≥30. In Kasama, age, smoking and heart rate were significantly associated with hypertension in multivariate analysis. Participants 25-34 years were 49% (AOR=0.51, 95% CI [0.41, 0.65]) less likely to be hypertensive compared with participants 45 years or older. Compared with participants who were non-smokers, smokers were 21% (AOR=1.21, 95% CI [1.02, 1.45]) more likely to be hypertensive. Participants who had heart rate >90 beats/min were 59% (AOR=1.59, 95% CI [1.17, 2.16]) more likely to be hypertensive compared with participants who had heart rate 60-90 beats/min. Conclusion: The findings reveal that hypertension is prevalent among rural residents in Kaoma and Kasama, Zambia. The disease is highly associated with age, BMI, smoking

Introduction: Hypertension is a leading cause for ill-health, premature mortality and disability. The objective of the study was to determine the prevalence and associated factors for hypertension in Lusaka, Zambia. Methods: A cross sectional study was conducted. Odds ratios and their 95% confidence intervals were calculated to assess relationships between hypertension and explanatory variables. Results: A total of 1928 individuals participated in the survey, of which 33.0% were males. About a third of the respondents had attained secondary level education (35.8%), and 20.6% of males and 48.6% of females were overweight or obese. The prevalence for hypertension was 34.8% (38.0% of males and 33.3% of females). In multivariate analysis, factors independently associated with hypertension were: age, sex, body mass index, alcohol consumption, sedentary lifestyle, and fasting blood glucose level. Conclusion: Health education and structural interventions to promote healthier lifestyles should be encouraged taking into account the observed associations of the modifiable risk factors.


Introduction: Our aim was to estimate the proportion of Mozambicans eligible for pharmacological treatment for hypertension, according to single risk factor and total cardiovascular risk approaches. Methods: A representative sample of Mozambicans aged 40-64 years (n=1116) was evaluated according to the WHO STEPwise Approach to Chronic Disease Risk Factor Surveillance (STEPS). We measured blood pressure (BP) and 12-h fasting blood glucose levels and collected data on sociodemographic characteristics, smoking, and use of antidiabetic and antihypertensive drugs. We estimated the 10-year risk of a fatal or nonfatal major cardiovascular event (WHO/International Society of Hypertension risk prediction charts), and computed the proportion of untreated participants eligible for pharmacological treatment for hypertension, according to BP values alone and accounting also for the total cardiovascular risk (WHO guidelines for assessment and management of cardiovascular diseases). Results: Among the Mozambicans aged 40-64 years and not taking antihypertensive drugs, less than 4% were classified as having cardiovascular risk at least 20% whereas the prevalence of SBP/DBP at least 140/90 mmHg was nearly 40%. A total of 19.8% of 40-64-year-olds would be eligible for pharmacological treatment of hypertension according to the WHO guidelines, all of whom had SBP/DBP at least 160/100 mmHg. Conclusion: Among the Mozambicans aged 40-64 years not taking antihypertensive drugs and having SBP/DBP at least 140/90 mmHg, only half were eligible...
for pharmacological treatment according to the WHO guidelines. Taking the latter into account, when defining strategies to control hypertension at a population level, may allow a more efficient use of the scarce resources available in developing settings.

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**Low prevalence of hypertension with pharmacological treatments and associated factors.**

**Introduction:** Our objective was to assess the determinants of the lack of pharmacological treatment for hypertension. **Methods:** In 2005, 3,323 Mozambicans aged 25-64 years old were evaluated. Blood pressure, weight, height and smoking status were assessed following the Stepwise Approach to Chronic Disease Risk Factor Surveillance. Hypertensives (systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg and/or antihypertensive drug therapy) were evaluated for awareness of their condition, pharmacological and non-pharmacological management, as well as use of herbal or traditional remedies. Prevalence ratios (PR) were calculated, adjusted for sociodemographic characteristics, cardiovascular risk factors and non-pharmacological treatment. **Results:** Most of the hypertensive subjects (92.3%), and nearly half of those aware of their condition were not treated pharmacologically. Among the aware, the prevalence of untreated hypertension was higher in men (PR = 1.61; 95% confidence interval (95%CI 1.10;2.36)) and was lower in subjects under non-pharmacological treatment (PR = 0.58; 95%CI 0.42;0.79); there was no significant association with traditional treatments (PR = 0.75; 95%CI 0.44;1.26). **Conclusion:** The lack of pharmacological treatment for hypertension was more frequent in men, and was not influenced by the presence of other cardiovascular risk factors; it could not be explained by the use of alternative treatments as herbal/traditional medicines or non-pharmacological management. It is important to understand the reasons behind the lack of management of diagnosed hypertension and to implement appropriate corrective actions to reduce the gap in the access to healthcare between developed and developing countries.

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**Hypertension prevalence, awareness, treatment, and control in mozambique: urban/rural gap during epidemiological transition.**

**Abstract:** The prediction of cardiovascular risk profile trends in low-income countries and timely action to modulate their transitions are among the greatest global health challenges. In 2005 we evaluated a nationally representative sample of the Mozambican population (n=3323; 25 to 64 years old) following the Stepwise Approach to Chronic Disease Risk Factor Surveillance. Prevalence of hypertension (systolic blood pressure > or =140 mm Hg and/or diastolic blood pressure > or =90 mm Hg and/or antihypertensive drug therapy), awareness (having been informed of the hypertensive status by a health professional in the previous year), treatment among the aware (use of antihypertensive medication in the previous fortnight), and control among those treated (blood pressure <140/90 mm Hg) were 33.1% (women: 31.2%; men: 35.7%),
14.8% (women: 18.4%; men: 10.6%), 51.9% (women: 61.1%; men: 33.3%), and 39.9% (women: 42.9%; men: 28.7%), respectively. Urban/rural comparisons are presented as age- and education-adjusted odds ratios (ORs) and 95% CIs. Among women, hypertension (OR: 2.0; 95% CI: 1.2 to 3.0) and awareness (OR: 4.3; 95% CI: 1.9 to 9.5) were more frequent in urban areas. No urban/rural differences were observed in men (hypertension: OR: 1.3, 95% CI: 0.9 to 2.0; awareness: OR: 1.5, 95% CI: 0.5 to 4.7). Treatment prevalence was not significantly different across urban/rural settings (women: OR: 1.4, 95% CI: 0.5 to 4.4; men: OR: 0.3, 95% CI: 0.1 to 1.4). Control was less frequent in urban women (OR: 0.2; 95% CI: 0.0 to 1.0) and more frequent in urban men (OR: 78.1, 95% CI: 2.2 to 2716.6). Our results illustrate the changing paradigms of "diseases of affluence" and the dynamic character of epidemiological transition. The urban/rural differences across sexes support a trend toward smaller differences, emphasizing the need for strategies to improve prevention, correct diagnosis, and access to effective treatment.


Abstract: A total of 1275 consecutive cases of pregnancy-associated hypertension were registered in the Maputo Central Hospital (corresponding to 2.9% of a total of 43,794 city parturients). In the hypertensive and in the reference populations the following prevalence figures were registered, respectively: age below 25 years, 52% and 23% (P < 0.0005); nulliparity, 33% and 19% (P < 0.0005); twin pregnancies, 3.9% and 1.7% (P < 0.0005); stillbirths, 5.7% and 2.3% (P < 0.0005); and low birthweight (LBW), 22.9% and 10.7% (P < 0.0005). In the hypertensive population the prevalence of LBW newborns was 20.1% in the liveborn group, while it was 68.4% in the stillborn group (P < 0.0005). In the ongoing perinatal audit it was found useful to review hypertensive women separately, in order to assess current routines in cases of pregnancy hypertension.

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Data sources


Cameroon


Introduction: Our objective was to determine the prevalence and determinants of excessive daytime sleepiness (EDS) among a group of sub-Saharan Africans living with hypertension.

Methods: A cross-sectional study. Setting: Cardiology outpatient unit of the Douala General Hospital in Cameroon. Participants: Patients aged 15 years and over, being followed for hypertension between 1st January and 31st July 2013. Patients with unstable heart failure, stroke and head trauma were excluded. Main outcome measure: EDS was the outcome of interest. It was defined as an Epworth sleeping scale greater or equal to 10. Logistic regression was used to identify factors associated with EDS. Results: A total of 411 patients participated in this study,
with a sex ratio (male/female) of 0.58 and a mean age of 55.56 years. No patient was underweight and the mean body mass index was 30 kg/m². Controlled blood pressure was found in 92 (22.4%) patients. The prevalence of EDS was 62.78% (95% CI 58.08 to 67.47). The factors independently associated with EDS were: type 2 diabetes (OR 2.51; 95% CI 1 to 6.29), obesity (OR 2.75; 95% CI 1.52 to 4.97), snoring (OR 7.92; 95% CI 4.43 to 14.15) and uncontrolled blood pressure (OR 4.34; 95% CI 2.24 to 8.40). **Conclusion:** A significant proportion of hypertensive patients suffer from EDS and present a high risk of sleep apnea. Preventive measures targeted on weight loss, type 2 diabetes and snoring should be considered among these patients.

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Abstract: Accurate estimates of the prevalence rate of hypertension and determinants in Cameroon are crucial to inform efficient prevention and control policies. The authors carried out a cluster-specific cross-sectional survey in urban areas of the 10 regions of Cameroon to assess the prevalence and risk factors of hypertension in Cameroonian adults using the WHO STEPS approach to Surveillance (STEPS). Sociodemographic data were collected and blood pressure and glycaemia were measured using standardized methods. Participants were adults of both sexes aged 16 years or older. A total of 15,470 participants were surveyed. The age-standardized prevalence rate of hypertension was 29.7%. The awareness rate was 14.1%. Independent correlates of hypertension included higher age, male sex, obesity, hyperglycemia, and living in the Savannah zone. The prevalence of hypertension is high in urban areas of Cameroon, with very low awareness. Prevention and control strategies should emphasize on improvement and vulgarization of population opportunistic screening and education.

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Introduction: This study was conducted to assess the knowledge and approach of primary care physician (PCP) towards the management of hypertension in Cameroon. Methods: In 2012 we surveyed 77 PCPs among the 111 working in the West region of Cameroon. We used a standardized questionnaire assessing practices regarding the detection, evaluation and treatment of hypertension, and source of information about updates on hypertension. Results: Participants had a mean duration of practice of 10.1 (SD 7.6) years, and received an average of 10.5 (SD 5.8) patients daily. Most of the PCPs (80.5%, n=62) measured blood pressure (BP) for all adult patients in consultation, however, only 63.6% (n=49) used correct BP thresholds to diagnose hypertension. Sixty-seven PCPs (87.0%) ordered a minimal work-up for each newly diagnosed hypertensive patient, but only the work-up offered by 8 (10.4%) PCPs was adequate. Regarding treatment, the
most commonly prescribed medications as monotherapy were loop diuretics (49.3%). Biotherapy mostly included the combination of a diuretic with other drug classes. Most of PCPs used incorrect target BP, with a general tendency of using higher target levels. PCPs received updates on hypertension management mostly through drug companies representatives (53.2%, n=41). Up to 97.4% were willing to receive continuing medical training on hypertension. **Conclusion:** PCPs' knowledge and management of hypertension is poor in this region of Cameroon. Our data point to a need for continually updating the teaching curricula of medical schools with regard to the management of hypertension, and physicians in the field should receive continuing medical education.

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**Introduction:** Hypertension and diabetes mellitus are increasingly common in population within Africa. We determined the rate of coincident diabetes and hypertension and assessed the levels of co-awareness, treatment and control in a semi-urban population in Cameroon. **Methods:** A total of 1702 adults (967 women) self-selected from the community were consecutively recruited in Bafoussam (West region of Cameroon) during November 2012. Existing diabetes and hypertension and treatments were investigated and blood pressure and fasting blood glucose measured. Multinomial logistic regressions models were used to investigate the determinants of prevalent diabetes and hypertension. **Results:** Age-standardized prevalence rates (95% confidence intervals) men vs. women were 40.4% (34.7 to 46.1) and 23.8% (20.4 to 27.2) for hypertension alone; 3.3% (1.5 to 5.1) and 5.6% (3.5 to 7.7) for diabetes alone; and 3.9% (2.6 to 5.2) and 5.0% (3.5 to 6.5) for hypertension and diabetes. The age-standardized awareness, treatment and control rates for hypertension alone were 6.5%, 86.4% and 37.2% for men, and 24.3%, 52.1% and 51.6% in women. Equivalent figures for diabetes alone were 35.4%, 65.6% and 23.1% in men and 26.4%, 75.5% and 33.7% in women; and those for hypertension and diabetes were 86.6%, 3.3% and 0% in men, and 74.7%, 22.6% and 0% in women. Sex, age and adiposity were the main determinants of the three conditions. **Conclusion:** Coincident diabetes and hypertension is as high as diabetes alone in this population, driven by sex, age and adiposity. Awareness, treatment and control remain unacceptably low.

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Democracy Republic of Congo


Introduction: Hypertension remains a public health challenge worldwide. In the Democratic Republic of Congo, its prevalence has increased in the past three decades. Higher prevalence of poor blood pressure control and an increasing number of reported cases of complications due to hypertension have also been observed. It is well established that non-adherence to antihypertensive medication contributes to poor control of blood pressure. The aim of this study is to measure non-adherence to antihypertensive medication and to identify its predictors.

Methods: A cross-sectional study was conducted at Kinshasa Primary Health-care network facilities from October to November 2013. A total of 395 hypertensive patients were included in the study. A structured interview was used to collect data. Adherence to medication was assessed using the Morisky Medication Scale. Covariates were defined according to the framework of the World Health Organization. Logistic regression was used to identify predictors of non-adherence.

Results: A total of 395 patients participated in this study. The prevalence of non-adherence to antihypertensive medication and blood pressure control was 54.2 % (95 % CI 47.3-61.8) and 15.6 % (95 % CI 12.1-20.0), respectively. Poor knowledge of complications of hypertension (OR = 2.4; 95 % CI 1.4-4.4), unavailability of antihypertensive drugs in the healthcare facilities (OR = 2.8; 95 % CI 1.4-5.5), lack of hypertensive patients education in the healthcare facilities (OR = 1.7; 95 % CI 1.1-2.7), prior experience of medication side effects (OR = 2.2; 95 % CI 1.4-3.3), uncontrolled blood pressure (OR = 2.0; 95 % CI 1.1-3.9), and taking non-prescribed medications (OR = 2.2; 95 % CI 1.2-3.8) were associated with non-adherence to antihypertensive medication. Conclusion: This study identified predictors of non-adherence to antihypertensive medication. All predictors identified were modifiable. Interventional studies targeting these predictors for improving adherence are needed.

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Introduction: In the Democratic Republic of Congo (DRC), a country in a post-conflict period, high priority cannot be given to non-communicable diseases other than to emergencies. This certainly involves inadequacy in raising awareness for prevention of these diseases. Objective: To evaluate the level of knowledge of the Congolese general population on hypertension and diabetes mellitus. Methods: Responses to a questionnaire from 3% of the general population aged 15 and older in the city of Bukavu and two rural areas: Hombo and Walungu (South Kivu, eastern DRC), recruited after stratification by ward in the city of Bukavu and a group of prone villages were expected. The questions focused on identification, testing, causes, complications and treatment of hypertension and diabetes mellitus. Results: Of the 7770 respondents, screening for hypertension and diabetes mellitus affected only 14.9% and 7.3% of subjects respectively. Knowledge of these two conditions was generally low in the general population, although better in the subgroups of patients and those with higher socioeconomic level (P<0.05). Use of the medias was also associated with better knowledge (P<0.05). Conclusion: This study shows that
knowledge about hypertension and diabetes mellitus and their testing in South Kivu is low. It is imperative that the Congolese government includes non-communicable diseases in its priorities of the millennium. Similarly, the WHO should actively contribute to screening for them in low-income countries.

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**Hypertension in the adult Congolese population of Southern Kivu: Results of the Vitaraa Study.**

**Introduction:** Our objective was to assess the prevalence of cardiovascular risk factors in adult urban and rural Congolese subjects. **Methods:** We obtained anthropometric data and information on life habits and medical history in 699 people ≥ 20 years, 444 in an urban, 255 in a rural setting. We determined the body mass index and recorded two blood pressure measurements that were averaged for analysis. Hypertension was BP ≥ 140/90mmHg, awareness and/or use of antihypertensive treatment. Diabetes mellitus was self-reported diagnosis or a casual glycemia ≥ 200mg/dL. We assessed the probability of hypertension in stepwise multiple logistic analysis, and awareness, and control of hypertension. **Results:** We found higher (P<0.001) prevalence in the urban than the rural subjects for hypertension (41.4% vs 38.1%), diabetes (4.9% vs 3.2%), overweight/obesity (37.6% vs 16.5%), abdominal obesity (30.9% vs 12.9%), use of alcohol (45% vs 17.6%) and smoking (11.6% vs 1.2%). Hypertension was associated (P<0.05) to aging in 51.3%, overweight/obesity in 54.5%, diabetes in 69%, abdominal obesity in 63.8%, low physical activity in 42.4%, to stress in urban environment in 43.2% and professional position (executives: 53.2%, workers: 38.6%). Of these hypertensive subjects, 57.5% were unaware, 30.5% were treated, with control achieved in only 13.6% (17.4% women vs 6.9% men; P<0.01). In the logistic model, the probability of hypertension increased with age (OR for age>55 years: 2.35; P<0.001), overweight/obesity (2.22; P<0.001) and diabetes mellitus (2.67; P<0.05). **Conclusion:** Our results indicate a heavy burden of uncontrolled risk factors in the Congolese population the potential complications of which run at a high mortality rate. They highlight the need for reasonable prevention measures at the population level.

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**Data sources**

**Ethiopia**


**Introduction:** The prevalence of hypertension (HTN) is increasing rapidly in Ethiopia, but data are limited on hypertension prevalence in specific workplaces. Therefore, the aim of this study was to assess the prevalence and associated factors of hypertension among federal ministry civil servants. **Methods:** Institutional based cross sectional study was conducted from February to
April 2014. Simple random sampling technique was used to select 655 study participants. A standardized questionnaire adapted from The World Health Organization's (WHO) STEP tool was used to collect the data. In this study, HTN was defined as mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) of 140/90 mmHg and above, and patients on regular drug therapy for H. Data were entered into EPI-Info 3.5.2 and analyzed by SPSS version 20. Binary logistic regression model was used to identify associated factors. Odds ratio with 95 % CI was computed to assess the strength of the association and significant level. **Results:** The prevalence of hypertension was found to be 27.3 % (95 % CI 23.3 - 31 %). Civil servants of age 48 years and above [AOR = 5.88, 95 % CI: 2.36-14.67], age 38-47 years [AOR = 2.80, 95 % CI: 1.18-6.60] and age 28-37 years [AOR = 2.35, 95 % CI: 1.00-5.56]) were more likely to be hypertensive. Similarly, ever cigarette smoking [AOR =2.34(1.31-4.17), family history of hypertension [AOR = 3.26, 95 % CI 1.96-5.40], self-reported Diabetes Mellitus (DM) [AOR = 13.56, 95 % CI: 6.91-26.6], and body mass index (BMI > 25 kg/m(2)) [AOR = 7.36, 95 % CI: 2.36-14.67] were found to be significantly associated with hypertension. **Conclusion:** The prevalence of hypertension among federal ministry civil servants was found to be high; which is an indication for institution based hypertension-screening programs especially focusing on those aged 28 years and above, obese, DM patients and cigarette smokers.

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**Introduction:** Hypertension is one of the most common causes of premature death and morbidity and has a major impact on health care costs. It is an important public health challenge to both developed and developing countries. The aim of this study was to determine the magnitude and correlates of hypertension. **Methods:** A community-based cross-sectional study was conducted in June 2014 among 681 adult residents of Bahir Dar city using multistage sampling techniques. An interview-administrated questionnaire and physical measurements such as blood pressure (BP), weight, height, and waist and hip circumferences were employed to collect the data. The data were coded, entered, and analyzed with SPSS version 16 software package. **Results:** A total of 678 responses were included in the analysis resulting in a response rate of 99.6%. The findings declared that 17.6%, 19.8%, and 2.2% of respondents were prehypertension, hypertension stage I, and hypertension stage II, respectively, on screening test. The overall prevalence of hypertension (systolic BP ≥140 mmHg, or diastolic BP ≥90 mmHg, or known hypertensive patient taking medications) was 25.1%. According to the multivariate logistic regression analysis, age; having ever smoked cigarette; number of hours spent walking/cycling per day; number of hours spent watching TV per day; history of diabetes; adding salt to food in addition to the normal amount that is added to the food during cooking; and body mass index were statistically significant predictors of hypertension. **Conclusion:** One out of every four respondents of the study had hypertension, and more than one out of three cases of hypertension (38.8%) did not know that they had the hypertension; 17.6% of the respondents were in prehypertension stage, which adds to overall future risk of hypertension. Therefore, mass screening for hypertension, health education to prevent substance use, regular exercise, reducing salt consumption, and life style modifications are recommended.
Appendix – Country-specific Information: Hypertension

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Introduction: Hypertension, being the root cause of many of the body system and organs failure, remains to be a major public health challenge globally. Though the problem is huge in both developed and developing countries, data are scarce in developing countries like Ethiopia. Therefore, this study was aimed to determine the magnitude and associated factors of hypertension in North West Ethiopia. Methods: A cross-sectional survey was conducted on adults aged 35 years and above in the rural and urban communities of Dabat district and Gondar town in 2012. The data were collected using the WHO STEPwise strategy. Hypertension was defined as having a Systolic blood pressure of ≥140 mmHg and/or a Diastolic BP of ≥ 90mmHg or a reported use of anti-hypertensive medications for raised blood pressure. Prevalence was computed with a 95% confidence interval. Selected risk factors were assessed using a bivariate logistic regression. Results: A total of 2200 participants were included in the study. The median age (±SD) was 47 (±12.4) years. The overall prevalence of hypertension was found to be 27.9% [95% CI 26.0, 29.8], with the proportion in the urban and rural residents being 30.7% and 25.3% respectively. The prevalence of hypertension was 29.3% for women and 26.3% for men. Out of the 598 hypertensive patients 241 (40.3%) had blood pressure measurements, and 99 (16.6%) had known hypertension and were on treatment. The proportion of systolic and diastolic hypertension in this subgroup of adults was 133(6.2%). The multivariable logistic regression analysis showed older age (AOR = 1.06; 1.05, 1.07), raised fasting glucose (AOR = 1.01; 1.001, 1.01), alcohol consumption (AOR = 1.71; 1.24, 2.36), and raised BMI (AOR =1.07; 1.04, 1.10) were significantly associated with hypertension. Conclusion: The prevalence of hypertension was considerably higher in rural areas than previously reported. The health system needs to develop strategies to increase the reach of relevant screening and diagnostic services to both rural and urban populations.

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Introduction: Hypertensive disorders of pregnancy are the most common causes of adverse maternal & perinatal outcomes. Such investigations in resource limited settings would help to have great design strategies in preventing maternal and perinatal morbidity and mortality. Aim: To determine management outcome and factor associated with pregnancy related hypertensive disorder in Mettu Karl Referral Hospital, Mettu, Ethiopia. Methods: A retrospective study deign was conducted at Mettu Karl Referral Hospital from 1st January 2010 to December 1st 2013 by reviewing medical records and logbooks. Descriptive, binary and multiple logistic regression analysis were used. A 95% CI and P- value of < 0.05 were considered statistically significant. Results: The magnitude of pregnancy related hypertensive disorder was 2.4%. Majority 82.6% of the mothers were in the age range between 18 to 34 year with a mean age and standard deviation (SD) of 24.4 (SD ± 5.12). Sever preeclampsia was the most prevalent diagnosis made to 35.5% of the mother, followed by 19% cases of eclampsia and 12.4% of HELLP. Fetal management
Appendix – Country-specific Information: Hypertension

Appendix

Country-specific Information: Hypertension

outcomes indicates 120.37 perinatal mortality per 1000 deliveries and a stillbirth rate of 10.2%, low birth weight of 30.5%, and low APGAR score of 18.5%, abortion 10.7% and preterm delivery 31.4%. Conclusion: In this study severe preeclampsia is the most common of all pregnancy related hypertension disorders followed by Eclampsia. Fetal complications like low Apgar score and preterm deliveries were statistically significant and associated with fetal management outcomes.

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Data sources


South Africa


Abstract: Studies using the revised hypertension classification are needed to better understand epidemiology of hypertension across full distribution. The sociodemographic, biological, and health behavior characteristics associated with different stages of hypertension in Ghana and South Africa (SA) were studied using global ageing and adult health (SAGE), WAVE 1 dataset. Blood pressure was assessed for a total of 7545 respondents, 2980 from SA and 4565 from Ghana. Hypertension was defined using JNC7 blood pressure classification considering previous diagnosis and treatment. Multivariate multinomial logistic regression analysis using Stata version 12 statistical software was done to identify independent predictors. The weighted prevalence of prehypertension and hypertension in Ghana was 30.7% and 42.4%, respectively, and that of SA was 29.4% and 46%, respectively, showing high burden. After adjusting for the independent variables, only age (OR = 1.32, 95% CI: 1.14-1.53), income (OR = 1.9, 95% CI: 1.04-3.47), and BMI (OR = 1.16, 95% CI: 1.1-1.22) remained independent predictors for stage 1 hypertension in Ghana, while, for SA, age (OR = 2.27, 95% CI: 1.53-3.36), sex (OR = 0.28, 95% CI: 0.08-1), and BMI (OR = 1.15, 95% CI: 1.07-1.25) were found to be independent predictors of stage 1 hypertension. Healthy lifestyle changes and policy measures are needed to promptly address these predictors.

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Abstract: Beyond changing dietary patterns, there is a paucity of data to fully explain the high prevalence of obesity and hypertension in urban African populations. The aim of this study was to determine whether other environmental factors (including sleep duration, smoking and physical activity) are related to body anthropometry and blood pressure (BP). Data were collected on 1311 subjects, attending two primary health care clinics in Soweto, South Africa. Questionnaires were used to obtain data on education, employment, exercise, smoking and sleep duration. Anthropometric and BP measurements were taken. Subjects comprised 862 women (mean age 41
In females, ANOVA showed that former smokers had a higher BMI (p<0.001) than current smokers, while exposure to second hand smoking was associated with a lower BMI (p<0.001) in both genders. Regression analyses demonstrated that longer sleep duration was associated with a lower BMI (p<0.05) in older females only, and not in males, whilst in males napping during the day for >30 minutes was related to a lower BMI (β = -0.04, p<0.01) and waist circumference (β = -0.03, p<0.001). Within males, napping for >30 minutes/day was related to lower systolic (β = -0.02, p<0.05) and lower diastolic BP (β = -0.02, p = 0.05). Longer night time sleep duration was associated with higher diastolic (β = 0.005, p<0.01) and systolic BP (β = 0.003, p<0.05) in females. No health benefits were noted for physical activity. These data suggest that environmental factors rarely collected in African populations are related, in gender-specific ways, to body anthropometry and blood pressure. Further research is required to fully elucidate these associations and how they might be translated into public health programs to combat high levels of obesity and hypertension.

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**Perinatal outcomes after hypertensive disorders in pregnancy in a Low resource setting.**


**Introduction:** Our objective was to evaluate perinatal outcomes of pregnancies complicated by hypertensive disorders in pregnancy in an urban sub-Saharan African setting. **Methods:** A prospective cohort study of 1010 women of less than 17 weeks of gestation was conducted at two antenatal clinics in Accra, Ghana, between July 2012 and March 2014. Information about hypertensive disorders was available for analysis on 789 pregnancies. The main outcomes were pre-term birth, birthweight, Apgar scores, small for gestational age and mortality. Relative risk (RR, 95% confidence interval (CI)) for the association between hypertensive disorders of pregnancy and perinatal outcomes was assessed using logistic regression adjusting for potential confounders. **Results:** A total of 88.7% of women remained normotensive, 7.5% developed pregnancy-induced hypertension, 2.0% had chronic hypertension, and 1.7% developed (pre-)eclampsia. No adverse effects were observed in women with pregnancy-induced hypertension. Women with chronic hypertension were more likely to have a lower gestational age at delivery (38.0 ± 2.3 weeks vs. 39.0 ± 1.9 weeks, P = 0.04) and higher risk of pre-term delivery (aRR 4.63, 95% CI 1.35-15.91). Women with pre-eclampsia had emergency Caesarean section significantly more often (88.9% vs. 50%, P = 0.04), with a higher risk for low birthweight infants (aRR 7.95, 95% CI 1.41-44.80) and a higher risk of neonatal death (aRR 18.41, 95% CI 1.20-283.22). **Conclusion:** Comparable to high-income countries, in Accra hypertensive disorders during pregnancy were associated with increased risk of adverse perinatal outcomes necessitating maternal and newborn care.

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**Data sources**

China


Introduction: We conducted this study to determine levels and correlates of hypertension knowledge among rural Chinese adults, and to assess the association between knowledge levels and salty food consumption among hypertensive and non-hypertensive populations. Methods: This face-to-face cross sectional survey included 665 hypertensive and 854 non-hypertensive respondents in the rural areas of Heilongjiang province, China. Hypertension knowledge was assessed through a 10-item test; respondents received 10 points for each correct answer. Results: Among respondents, the average hypertension knowledge score was 26 out of a maximum of 100 points for hypertensive and 20 for non-hypertensive respondents. Hypertension knowledge was associated with marital status, education, health status, periodically reading books, newspapers or other materials, history of blood pressure measurement, and attending hypertension educational sessions. Conclusion: Hypertension knowledge is extremely low in rural areas of China. Hypertension education programs should focus on marginal populations, such as individuals who are not married or illiterate to enhance their knowledge levels. Focusing on educational and literacy levels in conjunction with health education is important given illiteracy is still a prominent issue for the Chinese rural population. (Survey is available upon request. Contact Qunhong Wu. E-mail: wuqunhong@163.com or Hude Quan at hquan@calgary.ca

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Introduction: In 2009, China started an impressive national healthcare system reform. One of the key components is to promote equity in access to essential healthcare services including chronic disease management. We assessed the changes in hypertension management and its equity before and after China's healthcare reform in 2009. Methods: We used data from the 2008 and 2012 waves of the China Health and Retirement Longitudinal Study (CHARLS). The surveys were conducted in Zhejiang and Gansu provinces, containing 1,961 and 1,836 respondents aged 45 and older in 2008 and 2012 respectively. We measured the prevalence of hypertension, and proportions of respondents with hypertension aware of their conditions, receiving treatment and under effective control, separately for 2008 and 2012. We also reported these measures in provinces and rural/urban areas. Results: From 2008 to 2012, the age standardized prevalence of hypertension was steady at 46.2%, but hypertension management improved substantially. Among those with hypertension, the proportion of patients aware of their conditions increased from 57.8% to 69.9%, the proportion of patients receiving treatment increased from 38.1% to 56.1%, and the proportion of patients with hypertension under effective control increased from 21.7% to 36.4%. The highest improvement was found in rural areas of the underdeveloped province, which indicated that the inequity across regions declined over time. Conclusion: Among Chinese
population aged 45 and older in Zhejiang and Gansu provinces, hypertension management improved following healthcare reform. The rate of improvement was faster in rural and underdeveloped areas, possibly related to additional governmental subsidies to these areas.

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**Introduction:** Poor adherence to medications is one of the major public health challenges. Only one-third of the population reported successful control of blood pressure, mostly caused by poor drug adherence. However, there are relatively few reports studying the adherence levels and their associated factors among Chinese patients. This study aimed to study the adherence profiles and the factors associated with antihypertensive drug adherence among Chinese patients.

**Methods:** A cross-sectional study was conducted in an outpatient clinic located in the New Territories Region of Hong Kong. Adult patients who were currently taking at least one antihypertensive drug were invited to complete a self-administered questionnaire, consisting of basic socio-demographic profile, self-perceived health status, and self-reported medication adherence. The outcome measure was the Morisky Medication Adherence Scale (MMAS-8). Good adherence was defined as MMAS scores greater than 6 points (out of a total score of 8 points).

**Results:** From 1114 patients, 725 (65.1%) had good adherence to antihypertensive agents. Binary logistic regression analysis was conducted. Younger age, shorter duration of antihypertensive agents used, job status being employed, and poor or very poor self-perceived health status were negatively associated with drug adherence. **Conclusion:** This study reported a high proportion of poor medication adherence among hypertensive subjects. Patients with factors associated with poor adherence should be more closely monitored to optimize their drug taking behavior.

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**Data sources**
- China Health and Retirement Longitudinal Study (CHARLS): http://charls.ccer.edu.cn/en
- www.healthdata.org/china
- China National Nutrition and Health Survey 2002
- Mobilization of Allies in Noncommunicable Disease Action (MOANA)

**Experts**
- Salt Restriction: Juan Chen, Department of Social Medicine and Health Education, School of Public Health, Peking University, Beijing

**Country-specific needs/attention**
- Salt consumption, education in rural areas
Bangladesh


**Introduction**: This article reports the prevalence and prediction factors of undiagnosed and uncontrolled hypertension among the adults in rural Bangladesh. **Methods**: A cross-sectional study of the major noncommunicable disease risk factors was conducted in rural surveillance sites of Bangladesh in 2005. In addition to the self-report questions on risk factors, height, weight, and blood pressure were measured using standard protocols of the WHO STEPwise approach to Surveillance. Undiagnosed hypertension was defined when people reported no hypertension but were found hypertensive when measured, and uncontrolled hypertension was defined when people reported receiving antihypertensive treatment but their blood pressure was above the normal range when measured. **Results**: The prevalence of undiagnosed hypertension was 11.1%, increasing with age to 22.7% among those aged 60 years and above. Among the hypertensive patients receiving treatment, 54.9% were found to be uncontrolled (34.5% among 25-39 years and 67.9% among 60+ years). Increasing age and higher BMI were significantly positively associated with undiagnosed hypertension in multivariate analysis. Increasing age and more wealth have significant independent association with uncontrolled hypertension. **Conclusion**: High prevalence of undiagnosed hypertension, and more than 50% of the treated hypertension being uncontrolled puts a great challenge ahead for Bangladesh, a resource-poor setting. Regular health check or health screening along with implementation of hypertensive guidelines should be reinforced.

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**Introduction**: Cardiovascular diseases and risk factors are disproportionally concentrated among the socioeconomically disadvantaged in high-income countries; however, this relationship is not well-understood or documented in resource-limited countries. **Methods**: We analysed data from the 2011 Bangladesh Demographic and Health Survey to estimate age-, sex- and location-adjusted differences in blood pressure and blood glucose outcomes by categories of a standardized wealth index and education levels. Body mass index (BMI) was examined as a secondary outcome and also assessed as a potential confounder. **Results**: There was strong evidence that the prevalence of hypertension was higher among Bangladeshi women than among men (33.6% vs 19.6%, P < 0.001), whereas the overall prevalence of hyperglycemia was 7.1% with no evidence of sex differences. The likelihood of having hypertension was more than double for individuals in the highest vs lowest wealth quintile [odds ratio (OR) for men: 2.82, 95% confidence interval (CI): 2.32-3.44; OR for women: 2.25, 95% CI: 1.90-2.67], and for individuals with the highest level of education attained vs those with no education (OR for men: 2.55, 95% CI: 2.06-3.16; OR for women: 1.42, 95% CI: 0.99-2.03). Likewise, the likelihood of having hyperglycemia was more than
four times higher in the wealthiest compared with the poorest individuals (OR for men: 6.48, 95% CI: 5.11-8.22; OR for women: 4.77, 95% CI: 3.72-6.12), and in individuals with the highest level of education attained vs those with no education (OR for men: 4.68, 95% CI: 3.56-6.15; OR for women: 5.02, 95% CI: 3.30-7.64). There were no appreciable differences in these trends when stratified by geographical location. BMI did not attenuate these associations and exhibited similarly positive associations with education and wealth. **Conclusion:** Increasing levels of wealth and educational attainment were associated with an increased likelihood of having hypertension and hyperglycemia in Bangladesh.

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**Introduction:** A well-established belief regarding inequalities in health around the world is that hypertension and diabetes are higher in groups of lower socioeconomic status. We examined whether rates of hypertension, diabetes, and the coexistence of hypertension and diabetes are higher in people from a lower socioeconomic status than in those from a higher socioeconomic status in Bangladesh. **Methods:** We investigated a nationally representative dataset from the 2011 Bangladesh Demographic and Health Survey with objective measures for hypertension and diabetes. A wealth index was constructed from data on household assets using principal components analysis. Chi-square tests and logistic regressions were performed to test the associations between wealth level, hypertension and diabetes. **Results:** People from the highest wealth quintile were significantly more likely to have hypertension (Adjusted odds ratios [AOR] = 1.65, 95% confidence interval [CI] = 1.22-2.25), diabetes (AOR = 1.81, 95% CI = 1.21-2.71), and the coexistence of hypertension and diabetes (AOR = 2.17, 95% CI = 1.05-4.49) than people from the lowest wealth quintile. The odds of having hypertension, diabetes, and their coexistence were higher for older people, women, people who engaged in less physical labor, and people who were overweight and obese. **Conclusion:** Wealthier people, particularly people from the fourth and highest wealth quintiles, should be careful to avoid unhealthy lifestyles to prevent hypertension and diabetes. Health policy makers and planners are urged to target wealthier strata in terms of hypertension and diabetes initiatives while paying special attention to older people, women, people who engage in less physical labor, and individuals who are overweight.

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India


**Introduction**: Estimating the prevalence of prehypertension and its risk factors in a population becomes important to design preventive measures and hence reduce the burden of hypertension. The aim of this study was to estimate the prevalence of prehypertension and determine the factors associated with hypertension. **Methods**: This is a cross-sectional study and was carried out in a rural population. The study included 402 participants. Data regarding basic demographic characteristics were collected along with anthropometric measurements including height and weight. Information regarding smoking alcohol intake, dietary habits were collected. Prehypertension was defined as systolic blood pressure 120-139 mm Hg and/or diastolic blood pressure 80-89 mm Hg. Chi-square-test was used to find the association of various risk factors; t-test was used to compare the means. Multiple linear regression analysis was used to know the relationship of various risk factors. **Results**: Prevalence of prehypertension was estimated to be 28.8%. Factors such as salt intake, tobacco consumption, alcohol consumption, stress, family history of hypertension, history of diabetes mellitus had a significant association with prehypertension (P < 0.05). **Conclusion**: The prevalence of prehypertension was found to be high among the rural population. Early intervention is needed to decrease the burden of hypertension and its complications in future.

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**Introduction**: Hypertensive disorders during pregnancy occur in women with preexisting primary or secondary chronic hypertension, and in women who develop new-onset hypertension in the second half of pregnancy. The present study was undertaken to study the prevalence and correlates of hypertension in pregnancy in a rural block of Haryana. **Methods**: This cross-sectional study was carried out in the all 20 sub centers under Community Health Center (CHC) Chiri, Block Lakhanmajra. All the pregnant women registered at the particular sub center at a point of time of visit were included in the study. Appropriate statistical tests were used for analysis. **Results**: A total of 931 pregnant women were included in the present study. Prevalence of hypertension in pregnancy was found to be 6.9%. Maternal age ≥25 years, gestational period ≤20 weeks, history of cesarean section, history of preterm delivery, and history of hypertension in previous pregnancy were found to be significantly associated with prevalence of hypertension in pregnancy. **Conclusion**: Nearly one in 14 pregnant women in rural areas of Haryana suffers from a hypertensive disorder of pregnancy. Early diagnosis and treatment through regular antenatal checkup is a key factor to prevent hypertensive disorders of pregnancy and its complications.

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**Introduction**: World Health Organization/International Society of Hypertension (WHO/ISH) charts have been employed to predict the risk of cardiovascular outcome in heterogeneous settings. The aim of this research is to assess the prevalence of Cardiovascular Disease (CVD) risk factors and to estimate the cardiovascular risk among adults aged >40 years, utilizing the risk charts alone, and by the addition of other parameters. **Methods**: A cross-sectional study was performed in two of the villages availing health services of a medical college. Overall 570 subjects completed the assessment. The desired information was obtained using a pre-tested questionnaire and participants were also subjected to anthropometric measurements and laboratory investigations. The WHO/ISH risk prediction charts for the South-East Asian region was used to assess the cardiovascular risk among the study participants. **Results**: The study covered 570 adults aged above 40 years. The mean age of the subjects was 54.2 (±11.1) years and 53.3% subjects were women. Seventeen percent of the participants had moderate to high risk for the occurrence of cardiovascular events by using WHO/ISH risk prediction charts. In addition, CVD risk factors like smoking, alcohol, low High-Density Lipoprotein (HDL) cholesterol were found in 32%, 53%, 56.3%, and 61.5% study participants, respectively. **Conclusion**: Categorizing people as low (<10%)/moderate (10%-20%)/high (>20%) risk is one of the crucial steps to mitigate the magnitude of cardiovascular fatal/non-fatal outcome. This cross-sectional study indicates that there is a high burden of CVD risk in the rural Pondicherry as assessed by WHO/ISH risk prediction charts. Use of WHO/ISH charts is easy and inexpensive screening tool in predicting the cardiovascular event.

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**Indonesia**


**Introduction**: Hypertension is prevalent in the elderly, but treatment is often inadequate, particularly in developing countries. The objective of this study was to explore the role of a community-based program in supporting patients with hypertension in an Indonesian rural community. **Methods**: A qualitative study comprising observation and in-depth interviews was conducted in an Integrated Health Service Post for the Elderly (IHSP-Elderly) program in Bantul
district (Yogyakarta province). Eleven members of IHSP-Elderly program (i.e., hypertensive patients), 3 community health workers (CHWs), and 1 district health staff member were interviewed to obtain their views about the role of the IHSP-Elderly program in hypertension management. Data were analyzed using thematic analysis. **Results:** CHWs played a prominent role as the gatekeepers of health care in the rural community. In supporting hypertension management, CHWs served members of the IHSP-Elderly program by facilitating blood pressure checks and physical exercise and providing health education. Members reported various benefits, such as a healthier feeling overall, peer support, and access to affordable health care. Members felt that IHSP-Elderly program could do more to provide routine blood pressure screening and improve the process of referral to other health care services. **Conclusion:** CHWs have the potential to liaise between rural communities and the wider health care system. Their role needs to be strengthened through targeted organizational support that aims to improve delivery of, and referral to, care. Further study is needed to identify the key factors for effective CHW-based programs in rural communities and the incorporation of these programs into the health care system.

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**Abstract:** Hypertension is a significant health issue in Indonesia. Health professionals in a rural district of West Java identified hypertension as a priority health issue. In this study, we describe healthy-lifestyle behaviors as perceived by the district’s middle-aged Muslims with hypertension. A qualitative case-study design was used. Twelve married couples, directly or indirectly impacted by hypertension, and who visited community health centers, were purposively recruited. Semi-structured interviews provided data that were systematically analyzed for categories and subcategories. Categories of healthy-lifestyle behaviors currently practiced were eating behavior, physical activity, resting, not smoking, managing stress, seeking health information, seeking health care, caring other people, and fulfilling an obligation to God. Categories of reasons for practicing healthy-lifestyle behaviors were behavioral beliefs, competence, religious support, prior experience, social support, and health system support. Categories for not practicing healthy-lifestyle behaviors were personal, social, and environmental barriers. To achieve healthy-lifestyle behaviors changes, it is essential for rural middle-aged Muslim individuals to be supported by reinforcing their positive reasons and to address their negative reasons to practice healthy-lifestyle behaviors.

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**Abstract:** Although hypertension has been recognized as one of the major public health problems, few studies address economic inequality of hypertension among urban women in developing
Appendix – Country-specific Information: Hypertension

countries. To assess this issue, we analysed data for 1400 women from four of Indonesia’s major cities: Jakarta, Surabaya, Medan and Bandung. Women were aged ≥15 years (mean age 35.4 years), and were participants in the 2007/2008 Indonesia Family Life Survey. The prevalence of hypertension measured by digital sphygmomanometer among this population was 31%. Using a multivariable logistic regression model, socioeconomic disadvantage (based on household assets and characteristics) as well as age, body mass index and economic conditions were significantly associated with hypertension (P<0.05). Applying the Fairlie decomposition model, results showed that 14% of the inequality between less and more economically advantaged groups could be accounted for by the distribution of socioeconomic characteristics. Education was the strongest contributor to inequality, with lower education levels increasing the predicted probability of hypertension among less economically advantaged groups. This work highlights the importance of socioeconomic inequality in the development of hypertension, and particularly the effects of education level.

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Vietnam


Introduction: To respond to growing prevalence of hypertension in Vietnam, it is critical to have an in-depth understanding about quality of life (QOL) among people living with hypertension and related factors. This study aimed to measure QOL among hypertensive people in a rural community in Vietnam, and its association with socio-demographic characteristics and factors related to treatment. Methods: This study was conducted in a rural community located 60 km from Ho Chi Minh City. Face-to-face interviews were conducted among 275 hypertensive people aged 50 years and above using WHOQOL-BREF questionnaire. Descriptive statistics were used to examine mean scores of quality of life. Cronbach’s alpha coefficient and Pearson's correlation coefficient were applied to estimate the internal consistency, and the level of agreement between different domains of WHOQOL-BREF, respectively. Independent T-test and ANOVA test followed by multiple linear regression analyses were used to measure the association between QOL domains and independent variables. Results: Both overall WHOQOL-BREF and each domain had a good internal consistency, ranging from 0.65 to 0.88. The QOL among hypertensive patients was found moderate in all domains, except for psychological domain that was fairly low (mean = 49.4). Backward multiple linear regressions revealed that being men, married, attainment of higher education, having physical activities at moderate level, and adherence to treatment were positively associated with QOL. However, older age and presence of co-morbidity were negatively associated with QOL. Conclusion: WHOQOL-BREF is a reliable instrument to measure QOL among hypertensive patients. The results revealed low QOL in psychological domain and inequality in QOL across socio-demographic characteristics. Given the results, encouraging physical activities and strengthening treatment adherence should be considered to improve QOL of hypertensive people, especially for psychological aspect. Actions to improve QOL among hypertensive patients targeted towards women, lower educated and unmarried patients are needed in the setting.

**Introduction**: Hypertension has recently been identified as the leading risk factor for global mortality. This study aims to present the national prevalence of hypertension and prehypertension and, their determinants in Vietnamese adults. **Methods**: Nationally representative data were obtained from the National Adult Overweight Survey 2005. This one visit survey included 17,199 subjects aged 25-64 years, with a mean body mass index (BMI) of 20.7 kg/m\(^2\). **Results**: The overall census-weighted JNC7 (the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) defined prevalence of hypertension was 20.7% (95% confidence interval (CI) = 19.4-22.1); the prevalence of prehypertension was 41.8% (95% CI = 40.4-43.1). Hypertension and prehypertension were more prevalent in men. Higher age, overweight, alcohol use (among men), and living in rural areas (among women) were independently associated with a higher prevalence of hypertension, whereas higher physical activity and education level were inversely associated. Age, BMI, and living in rural areas were independently associated with an increased prevalence of prehypertension. Among the hypertensives, 25.9% were aware of their hypertension, 12.2% were being treated, and 2.8% had their blood pressure under control; among the treated hypertensives, 32.4% had their blood pressure controlled. **Conclusion**: Hypertension and prehypertension are prevalent in Vietnam, but awareness, treatment, and control are low. The findings suggest that lifestyle modifications, including the prevention of overweight, the promotion of physical activity particularly in urban areas, and the reduction of high alcohol consumption, may help to prevent hypertension in Vietnam. Furthermore, increased efforts regarding education, detection, and treatment could be important in management of hypertension and cardiovascular disease risk prevention.

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**Introduction**: Cardiovascular disease (CVD) is one of the leading causes of morbidity and mortality in Vietnam and hypertension (HTN) is an important and prevalent risk factor for CVD in the adult Vietnamese population. Despite an increasing prevalence of HTN in this country, information about the awareness, treatment, and control of HTN is limited. The objectives of this study were to describe the prevalence, awareness, treatment, and control of HTN, and factors associated with these endpoints, in residents of a mountainous province in Vietnam. **Methods**: Data from 2,368 adults (age≥25 years) participating in a population-based survey conducted in 2011 in Thai Nguyen province were analyzed. All eligible participants completed a structured questionnaire and were examined by community health workers using a standardized protocol. **Results**: The overall prevalence of HTN in this population was 23%. Older age, male sex, and being overweight were associated with a higher odds of having HTN, while higher educational level was associated
with a lower odds of having HTN. Among those with HTN, only 34% were aware of their condition, 43% of those who were aware they had HTN received treatment and, of these, 39% had their HTN controlled. **Conclusion:** Nearly one in four adults in Thai Nguyen is hypertensive, but far fewer are aware of this condition and even fewer have their blood pressure adequately controlled. Public health strategies increasing awareness of HTN in the community, as well as improvements in the treatment and control of HTN, remain needed to reduce the prevalence of HTN and related morbidity and mortality.

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### PAHO Region

**Guatemala**


**Introduction:** Hypertension (HT) epidemiological studies in developing regions of the world like rural Guatemala are lacking. **Methods:** A sample size of 1104 subjects (552 females, all 18 years or older) was obtained through quota and geographical clustering in the entire Department of Sololá, Guatemala. Descriptive statistics and logistic regression were used. **Results:** Average systolic, diastolic, and mean arterial pressures were significantly higher in men compared with women (116.24 vs 113.80 mm Hg, 75.24 vs 72.69 mm Hg, and 88.91 vs 86.39 mm Hg, respectively; all with P < .05). The crude prevalence of HT was 12.5% with no gender differences. Women had a significantly higher mean body mass index (BMI) than men (26.25 vs 24.71 kg/m(2), P < .001). An abnormally high waist circumference (WC) was found in 12.7% of men and in 50.7% of women. Significant associations were found between the presence of HT, age ≥55 years, and increased WC. The single most important isolated risk factor for HT was age in women (OR 6.76, 95% CI 3.59-12.72) and WC in men (OR 3.23, 95% CI 1.52-6.87). Increased BMIs (≥25-30 or ≥30 kg/m(2)) were not associated with HT in this study. Residing in Sololá's capital was a protective factor in women (OR 0.33, 95% CI 0.13-0.83). **Conclusion:** Hypertension and associated anthropometric risk factors are present in rural regions of Guatemala. Significant associations are found between gender, age ≥55 years, and increased WC but not with an increased BMI in this population.

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**Abstract:** Corazón Sano y Feliz is a hypertension management intervention developed to address deficiencies in the management of hypertensive patients in Guatemala. From 2007 to 2009, Corazón Sano y Feliz was pilot-tested in the community of Mexico. Corazón Sano y Feliz comprises
a clinical risk assessment and treatment component implemented primarily by nurses, and a health education component implemented by community health workers. To accomplish our secondary objective of determining Corazon Sano y Feliz’s potential for change at the patient level, we implemented a one-group pretest-posttest study design to examine changes in clinical measures, knowledge and practices between baseline and the end of the 6-month intervention. Two nurses and one physician set up a hypertension clinic to manage patients according to risk level. Twenty-nine community health workers were trained in CVD risk reduction and health promotion and in turn led six educational sessions for patients. Comparing baseline and 6-month measures, the intervention achieved significant improvements in mean knowledge and behavior (increase from 54.6 to 59.1 out of a possible 70 points) and significant reductions of mean systolic and diastolic blood pressure (27.2 and 7.7 mmHg), body mass index (from 26.5 to 26.2 kg/m²) and waist circumference (89.6-88.9 cm). In this pilot study we obtained preliminary evidence that this community-oriented hypertension management and health promotion intervention model was feasible and achieved significant reduction in risk factors. If scaled up, this intervention has the potential to substantially reduce CVD burden.

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### Nicaragua


**Introduction:** Our objective was to describe the prevalence of hypertension. **Methods:** Population based cross-sectional survey. Setting: Six Nicaraguan communities with varying economies. Participants: 1,355 adults aged 20-60 years who completed both self-reported and quantitative measures of health. Main outcome measures: Prevalence of hypertension (systolic ≥140 mm Hg, diastolic ≥90 mm Hg, or self-reported medical history with diagnosis by a health care professional), uncontrolled hypertension (systolic ≥140 mm Hg or diastolic ≥90 mm Hg), diabetes (urinary glucose excretion ≥100 mg/dL or self-reported medical history diagnosed by a health care professional), and uncontrolled diabetes (urinary glucose excretion ≥100 mg/dL only). **Results:** The prevalence of hypertension was 22.0% (19.2% in men, 24.2% in women). Blood pressure was controlled in 31.0% of male hypertensives and 55.1% of female hypertensives (odds ratio [OR] 2.86; 95% confidence interval [CI] 1.74-4.69). Older age and higher body mass index were strongly associated with hypertension. Women who completed primary school had a lower risk of hypertension (OR .40; 95% CI .19-.85) compared to those with no formal education. A history of living in both urban and rural settings was associated with lower prevalence of hypertension (OR .52; 95% CI .34-.79). Diabetes mellitus was found in 1.2% of men and 4.3% of women. Male sex was independently associated with decreased risk of diabetes (OR .31; 95% CI .11-.86). **Conclusion:** At least one cardiovascular risk factor was found in half of this Nicaraguan sample. Cardiovascular risk factors should be the target of educational efforts, screening, and treatment.

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**Abstract:** The prevalence, awareness, treatment and control of hypertension were assessed in 1303 persons who attended a free vision care clinic in rural Nicaragua. The prevalence of hypertension was 37.8% in men and 43.2% in women. Hypertension was found to be a highly prevalent disease in this group, and presumably in the local population, with low levels of awareness and control.

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**Introduction:** Globally about 40% of adults are diagnosed with hypertension, with high-income countries having a lower prevalence than low-income countries. However, there are limited data about adult hypertension prevalence in Nicaragua. The purpose of this study was to determine the prevalence of hypertension in rural coffee farm workers. **Methods:** A convenience sample of 229 adult coffee farm workers was used. Blood pressure was measured using an established protocol and the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC-7) guidelines. **Results:** Nearly 60% of the sample reported at least one prior blood pressure measurement. Hypertension was detected in 16.7% of males and 26.3% of females (20.7% of the total). Prehypertension was detected in 59.3% of males and 27.7% of females (46.2% of the total). Of the men, 51.4% reported smoking at least some days and just over one third of the sample reported adding extra salt to their food. **Conclusion:** While the prevalence of hypertension in this sample is lower than global estimates, almost half of the sample had prehypertension, demonstrating an area where health promotion efforts could be focused. Given the limited funding and resources often available in these areas, increasing disease prevention efforts (including health promotion and wellness programs) and establishing settings that provide outreach and education, may improve chronic disease management and prevent comorbidities from occurring.

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**El Salvador**

**Data sources**

- Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors by the Central America Diabetes Initiative
- PAHO/El Salvador Cooperation Strategy
- [www.who.int/countryfocus/cooperation_strategy/ccsbrief_slv_en.pdf](http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_slv_en.pdf)
- El Salvador Encuesta Nacional
Honduras


**Introduction:** We formed a self-funded hypertension treatment group in a resource-poor community in rural Honduras. After training community health workers and creating protocols for standardized treatment, we used group membership fees to maintain the group, purchase generic medications in bulk on the local market, and hire a physician to manage treatment. We then assessed whether participation in the group improved treatment, medication adherence, and hypertension control. **Methods:** This is a program evaluation using quasi-experimental design and no control group. Using data from the 86 members of the hypertension treatment group, we analyzed baseline and follow-up surveys of members, along with 30 months of clinical records of treatment, medication adherence, and blood pressure readings. **Results:** Our initial hypertension needs assessment revealed that at baseline, community hypertensives relied on the local Ministry of Health clinic as their source of anti-hypertensive medications and reported that irregular supply interfered with medication adherence. At baseline, hypertension group members were mainly female, overweight or obese, physically active, non-smoking, and non-drinking. After 30 months of managing the treatment group, we found a significant increase in medication adherence, from 54.8 to 76.2% (p<0.01), and hypertension control (<140/90 mmHg), from 31.4 to 54.7% (p<0.01). We also found a mean monthly decrease of 0.39 mmHg in systolic blood pressure (p<0.01). At the end of the 30-month observation period, the local Ministry of Health system had increased provision of low-cost anti-hypertensive medications and adopted the hypertension treatment group's treatment protocols. **Conclusion:** Formation of a self-funded, community-based hypertension treatment group in a rural, resource-poor community is feasible, and group participation may improve treatment, medication adherence, and hypertension control and can serve as a political driver for improving hypertension treatment services provided by the public system.

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**Introduction:** Hypertension and other noncommunicable diseases represent a growing threat to low/middle-income countries (LMICs). Mobile health technologies may improve noncommunicable disease outcomes, but LMICs lack resources to provide these services. We evaluated the efficacy of a cloud computing model using automated self-management calls plus home blood pressure (BP) monitoring as a strategy for improving systolic BPs (SBPs) and other outcomes of hypertensive patients in two LMICs. **Methods:** This was a randomized trial with a 6-week follow-up. Participants with high SBPs (≥140 mm Hg if nondiabetic and ≥130 mm Hg if diabetic) were enrolled from clinics in Honduras and Mexico. Intervention patients received weekly automated monitoring and behavior change telephone calls sent from a server in the United States, plus a home BP monitor. At baseline, control patients received BP results, hypertension information, and usual healthcare. The primary outcome, SBP, was examined for all patients in addition to a preplanned subgroup with low literacy or high hypertension information needs. Secondary outcomes included perceived health status and medication-related problems.
**Results:** Of the 200 patients recruited, 181 (90%) completed follow-up, and 117 of 181 had low literacy or high hypertension information needs. The median annual income was $2,900 USD, and average educational attainment was 6.5 years. At follow-up intervention patients' SBPs decreased 4.2 mm Hg relative to controls (95% confidence interval -9.1, 0.7; p=0.09). In the subgroup with high information needs, intervention patients' average SBPs decreased 8.8 mm Hg (-14.2, -3.4, p=0.002). Compared with controls, intervention patients at follow-up reported fewer depressive symptoms (p=0.004), fewer medication problems (p<0.0001), better general health (p<0.0001), and greater satisfaction with care (p<0.004). **Conclusion:** Automated telephone care management plus home BP monitors can improve outcomes for hypertensive patients in LMICs. A cloud computing model within regional telecommunication centers could make these services available in areas with limited infrastructure for patient-focused informatics support.

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**Data sources**
- Global Health Data Exchange
- Secretaria de Salud, Gobierno de la Republica de Honduras

**Public health campaigns/programs**
- AmeriCares

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**Panama**


**Abstract:** Is migration from isolated indigenous island communities to Panama City associated with an increase in stress? Individuals were randomly sampled from two Kuna communities: 325 individuals in Panama City and 133 on a Caribbean island. Stress was assessed through the Milcom questionnaire, which explores physical symptoms and symptoms relevant to mood and emotional state, and Cantril’s ladder, which examines life satisfaction. Physical symptoms were more common in the urban community (p < 0.001), and complaints reflecting mood were also significantly higher on the mainland (p < 0.001); the two measures were highly correlated. While systolic and diastolic blood pressure was higher in the mainland community (p < 0.001), there was no relation between blood pressure level and any index of stress. Despite unambiguous evidence of an increase in stress in migrants to the city, there was no indication that the stress contributed to the rise in blood pressure level. Migration to an urban setting is associated with an increase in physical symptoms and symptoms reflecting depressed mood, suggesting increased stress level. Life satisfaction is less influenced, possibly providing a measure of the degree of stress.

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Abstract: The indigenous Kuna who live on islands in the Panamanian Caribbean were among the first communities described with little age-related rise in blood pressure or hypertension. Our goals in this study were to ascertain whether isolated island-dwelling Kuna continue to show this pattern, whether migration to Panama City and its environs changed the patterns, and whether the island-dwelling Kuna have maintained their normal blood pressure levels despite partial acculturation, reflected in an increased salt intake. We enrolled 316 Kuna participants who ranged in age from 18 to 82 years. In 50, homogeneity was confirmed by documentation of an O+ blood group. In 92 island dwellers, diastolic hypertension was not identified and blood pressure levels were as low in volunteers over 60 years of age as in those between 20 and 30 years of age. In Panama City, conversely, hypertension prevalence was 10.7% and exceeded 45% in those over 60 years of age (P < .01), blood pressure levels were higher in the elderly, and there was a statistically significant positive relationship between age and blood pressure (P < .01). In Kuna Nega, a Panama City suburb designed to maintain a traditional Kuna lifestyle but with access to the city, all findings were intermediate. Sodium intake and excretion assessed in 50 island-dwelling Kuna averaged 135 +/- 15 mEq/g creatinine per 24 hours, exceeding substantially other communities free of hypertension and an age-related rise in blood pressure. Despite partial acculturation, the island-dwelling Kuna Indians are protected from hypertension and thus provide an attractive population for examining alternative mechanisms.


Introduction: Our objective was to estimate the prevalence, treatment, and control of high blood pressure, hypertension (HBP) in Panama and assess its associations with sociodemographic and biologic factors. Methods: A cross-sectional, descriptive study was conducted in Panama by administering a survey on cardiovascular risk factors to 3590 adults and measuring their blood pressure 3 times. A single-stage, probabilistic, and randomized sampling strategy with a multivariate stratification was used. The average blood pressure, confidence intervals (CIs), odds ratio (OR), and a value of P ≤ 0.05 were used for the analysis. Results: The estimated prevalence of HBP was 29.6% (95% CI, 28.0-31.1); it was more prevalent in men than in women, OR = 1.37 (95% CI, 1.17-1.61); it increased with age and was more frequent among Afro-Panamanians (33.8%). HBP was associated with a family history of HBP with being physically inactive and a body mass index ≥25.0 kg/m or a waist circumference >90 cm in men and >88 cm in women (P < 0.001). Of those found to have HBP, 65.6% were aware of having HBP and taking medications, and of these, 47.2% had achieved control (<140/90 mm Hg). Conclusion: HBP is the most common cardiovascular risk factor among Panamanians and consequently an important public health problem in Panama. The health care system needs to give a high priority to HBP prevention programs and integrated care programs aimed at treating HBP, taking into consideration the changes in behavior that have been brought about by alterations in nutrition and sedentary lifestyles.

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**Introduction:** Our objective was to determine the maternal outcome associated with severe chronic hypertension during the second half of pregnancy. **Methods:** An analysis of data obtained of women with severe chronic hypertension (> or = 160/110 mm Hg) and > or = 20 weeks' gestation who were hospitalized and delivered during a 5-year period. The pregnancy outcome data were collected retrospectively from medical records. Each patient was observed closely throughout hospitalization with intensive monitoring of the clinical status of both mother and fetus. Antihypertensive drugs were used for systolic or diastolic blood pressure > or = 160 and > or = 110 mm Hg, respectively. Women with superimposed preeclampsia received magnesium sulfate. The main outcome measures were peak of blood pressure, superimposed preeclampsia, and major maternal complications. **Results:** Of 154 women studied, 111 (72%) had pregestational chronic hypertension, and 120 (78%) developed superimposed preeclampsia. The mean weeks' gestation was 34.5 +/- 4.6. Overall, 110 (71.4%) pregnancies were delivered by cesarean section. Maternal age and parity were significantly higher among women who had pregestational chronic hypertension than those who had chronic hypertension diagnosed during the first half of pregnancy. Abruptio placentae (8.4%), HELLP syndrome (8.4%), acute renal insufficiency (3.9%), pulmonary edema (1.3%), and postpartum hypertensive encephalopathy (1.3%) were the most frequent maternal complications. There were no maternal deaths, disseminated intravascular coagulation, or eclampsia. **Conclusion:** Three-quarters of women with severe chronic hypertension in the second half of pregnancy developed superimposed preeclampsia. Intensive monitoring of the clinical status of the mother was associated with low maternal morbidity and the absence of maternal deaths. Pregestational chronic hypertension does not change the maternal prognosis.

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**Belize**


**Abstract:** This study assesses the effectiveness of a hypertension-screening programme in Independence, Belize. Forty-nine of the 101 patients screened were found to have elevated blood pressure readings and were advised to seek medical care. Four months later, interviews with 35 of the 49 patients from the hypertensive group revealed that 85.7% of the patients had sought medical care. Women, elderly patients and patients with a previous history of hypertension were more likely than men, younger patients and those without a history of hypertension to seek follow-up medical care. The screening programme successfully directed a high proportion of patients with elevated blood pressure to seek appropriate medical care.

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**Abstract:** This paper reports results of a survey of mean arterial pressures (MAP) in a population of 125 control patients and 30 cases who developed pregnancy induced hypertension. The
Appendix – Country-specific Information: Hypertension

investigation was carried out to see if MAP would be a useful addition to methods used to screen for PIH. More of the cases had elevated MAP than did the controls, suggesting that use of this easily obtainable information may be helpful in identifying patients at risk for pregnancy--induced hypertension. Addition baseline information on the 155 patients and their pregnancy outcome is also presented.

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**Abstract:** A total of 1316 individuals were studied in seven villages in Belize, Central America. This represented 92% of the area population aged over 18. Generally, they were members of three ethnic groups--Maya, Spanish, and Creole. The systolic and diastolic IV and V blood pressures were recorded using standardized procedure. Significant differences in blood pressure, weight, and obesity were found between ethnic groups in both sexes, Creoles having higher means than the other groups. Significant relationships with blood pressure were found with obesity, age, and number of children. An early morning urine specimen was obtained from a random 50% of the men, and only in Creoles was there an association between raised blood pressure and sodium/potassium urinary excretion ratio.

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**Public health campaigns/programs**

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<th>Project Hope</th>
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**Costa Rica**


**Abstract:** Organizations and governments globally are making great efforts to develop strategies to reduce population salt intake, and thus reduce the prevalence of hypertension and CVD. The objective of this study was to explore the perceptions and knowledge about salt, sodium and their effects on health of adults of middle income in the urban area of San José; in order to provide information for the development of educational strategies. Four hundred interviews to subjects between 40 to 55 years old, belonging to middle income socioeconomics strata, sub-divided into three levels (high, medium and low) were performed. Frequencies analyses were performed, and the Chi-square test was applied. We found that people felt that they are not at risk of developing hypertension regardless of the sub-middle socioeconomic strata (p > 0.05) and 68% of individuals did not consider that their consumption of salt and/or sodium was excessive. In addition, 70% of subjects had no knowledge about the relationship between salt and sodium, and an association (p < 0.05) between the sub-division of the socioeconomic status and knowledge about this relationship was found. Individuals had an average knowledge about the risk of excessive salt/sodium consumption and the benefits of reduced intake. It was concluded that there is a knowledge gap in subjects and there is a need for developing initiatives to reduce salt/sodium intake, shocking enough to make people be more aware of their risk and change their eating habits.
Introduction: The burden of cardiovascular disease is growing in the Mesoamerican region. Patients' disease self-management is an important contributor to control of cardiovascular disease. Few studies have explored factors that facilitate and inhibit disease self-management in patients with type 2 diabetes and hypertension in urban settings in the region. This article presents patients' perceptions of barriers and facilitating factors to disease self-management, and offers considerations for health care professionals in how to support them.

Methods: In 2011, 12 focus groups were conducted with a total of 70 adults with type 2 diabetes and/or hypertension who attended urban public health centers in San José, Costa Rica and Tuxtla Gutiérrez, Chiapas, Mexico. Focus group discussions were transcribed and coded using a content analysis approach to identify themes. Themes were organized using the trans-theoretical model, and other themes that transcend the individual level were also considered.

Results: Patients were at different stages in their readiness-to-change, and barriers and facilitating factors are presented for each stage. Barriers to disease self-management included: not accepting the disease, lack of information about symptoms, vertical communication between providers and patients, difficulty negotiating work and health care commitments, perception of healthy food as expensive or not filling, difficulty adhering to treatment and weight loss plans, additional health complications, and health care becoming monotonous. Factors facilitating disease self-management included: a family member's positive experience, sense of urgency, accessible health care services and guidance from providers, inclusive communication, and family and community support. Financial difficulty, gender roles, differences by disease type, faith, and implications for families and their support were identified as cross-cutting themes that may add an additional layer of complexity to disease management at any stage. These factors also relate to the broader family and societal context in which patients live.

Conclusion: People living with type 2 diabetes and hypertension present different barriers and facilitating factors for disease self-management, in part based on their readiness-to-change and also due to the broader context in which they live. Primary care providers can work with individuals to support self-management taking into consideration these different factors and the unique situation of each patient.

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Introduction: Reliable information on the prevalence of hypertension is crucial in the development of health policies for prevention, control, and early diagnosis of this condition. This study describes the prevalence of hypertension among Costa Rican elderly, and identifies co-factors associated with its prevalence, unawareness and treatment. Methods: The prevalence of hypertension is estimated for the Costa Rican elderly. Measurement error is assessed, and factors associated with high blood pressure are explored. Data for this study came from a nationally
representative sample of about 2,800 individuals from CRELES (Costa Rica: Longevity and Healthy Aging Study). Two blood pressure measures were collected using digital monitors. Self-reports of previous diagnosis, and medications taken were also recorded as part of the study. Results: No evidence of information bias was found among interviewers, or over time. Hypertension prevalence in elderly Costa Ricans was found to be 65% (Males = 60%, Females = 69%). Twenty-five percent of the studied population did not report previous diagnoses of hypertension, but according to our measurement they had high blood pressure. The proportion of unaware men is higher than the proportion of unaware women (32% vs. 20%). The main factors associated with hypertension are: age, being overweight or obese, and family history of hypertension. For men, current smokers are 3 times more likely to be unaware of their condition than nonsmokers. Both men and women are less likely to be unaware of their condition if they have a family history of hypertension. Those women who are obese, diabetic, have suffered heart disease or stroke, or have been home visited by community health workers are less likely to be unaware of their hypertension. The odds of being treated are higher in educated individuals, those with a family history of hypertension, elderly with diabetes or those who have had heart disease. Conclusion: Sex differences in terms of hypertension prevalence, unawareness, and treatment in elderly people have been found. Despite national programs for hypertension detection and education, unawareness of hypertension remains high, particularly among elderly men. Modifiable factors identified to be associated with prevalence such as obesity and alcohol intake could be used in educational programs aimed at the detection and treatment of those individuals who have the condition.

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EMRO/EURO Region

Kazakhstan


Introduction: In the Republic of Kazakhstan, the State screening program for early detection of Arterial Hypertension (AH) and other cardiovascular diseases (CVD) for the target age groups was established in 2008. Methods: The results of cross-sectional survey conducted at 8 primary health care facilities of Almaty city and Almaty region of Kazakhstan from September 2012 until May 2013 was used. A multistage sampling approach was used to select patients with diagnosed arterial hypertension between 18 to 64 years of age residing in a city (n=405, 50.6%) or village (n=395, 49.4%). Data collection was done via face-to-face interviews using a semi-structured questionnaire. Results: Rural residents (62.7%) mainly were "no-screened". These patients get treatment in policlinics only in case of serious health problems. At younger ages of 18 and 39 years, AH is diagnosed less often among rural than among urban residents (P<0.05). In addition, 71% of the rural residents have incomes below the national average, which has a significant impact on their ability to purchase quality medicines and food and to engage in sports; 16.3% of the rural respondents do not follow doctor's prescriptions due to the lack of money to buy
Appendix – Country-specific Information: Hypertension

medications. **Conclusion:** The screening for AH and the dissemination of information about screening in rural areas needs a lot of improvement, and that it is necessary to reconsider and improve the public policy for the distribution of free medications.

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**Introduction:** Very little is known about prevalence of common cardiovascular risk factors in Central Asia. The aim of the study was to assess the prevalence, awareness, treatment and control of arterial hypertension, and factors associated with these indices in a population sample of Astana, the new capital city of Kazakhstan. **Design:** Cross-sectional study of subjects registered in eight outpatient policlinics in Astana. **Methods:** A total of 497 adults (response rate 56%) aged 50-75 years randomly selected from registers of the policlinics were examined. Hypertension was defined as a mean systolic and/or diastolic blood pressure of ≥140/90 mm Hg and/or antihypertensive medication use during the last two weeks. Awareness and treatment were based on self-report. Hypertension control was defined as blood pressure <140/90 mm Hg among hypertensive subjects. **Results:** The overall prevalence of hypertension was 70%. Among hypertensive subjects, 91% were aware of their condition, 77% took antihypertensive medications, and 34% had blood pressure controlled (<140/90 mm Hg). The prevalence of hypertension and its awareness, treatment and control was more common in women, among persons aged 60 years or more and (except control) among those with high body mass index. None of several available socio-economic or lifestyle measures was associated with any of hypertension indices. **Conclusion:** The levels of awareness, treatment and control of hypertension were higher than in most Eastern European and Central Asian populations with available data, most likely reflecting high education and large proportion of civil servants in the new capital city. However, even in this privileged population the rates of successful control of hypertension were modest.

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**Abstract:** This paper presents findings from the assessment of a strategy aimed at improving case-finding and management of hypertension patients. Study findings suggest that providers' orientation to clinical guidelines, public information on hypertension risks, promotion of yearly blood pressure screening, and universal access to an outpatient drug benefit package, improve case-finding and management. In addition, training of providers at pilot sites resulted in a substantial and significant difference in patient care and health outcomes. Provider training and tools, especially focused on effective patient counselling, made a significant contribution to increased case-finding, patient adherence to prescribed drugs, reducing salt, and increasing regular exercise. However, further refinements are required to achieve the expected adherence
of patients to medication and lifestyle advice. In the pilot area, we compared two samples of patients before and after the initiation of the intervention. We found an increase in the proportion of patients with blood pressure <140/90 mmHg, and a significant decrease in the proportion of patients with blood pressure > or =160/100 mmHg. The strategy involved the joint efforts of the Research Institute of Cardiology and Internal Diseases, Karaganda Drug Information Centre, Karaganda Oblast Health Department, Kazakhstan Association of Family Physicians, Almaty Postgraduate Institute for Physicians, and USAID ZdravPlus Project in Central Asia.

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**Data sources**
- Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine in 2001
- Living Conditions, Lifestyles and Health (LLH) study: [www.llh.at](http://www.llh.at)
- Health in Times of Transition (HITT) study: [www.hitt-cis.net](http://www.hitt-cis.net)

**Georgia**


**Introduction:** Mental health problems in those with physical ailments are often overlooked, especially in the former Soviet Union (fSU) where this comorbidity has received little attention. Our study examines the comorbidity of psychological distress and hypertension in the fSU.

**Methods:** Nationally representative household survey data from Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine in 2001 and 2010 were analysed to compare the levels of psychological distress in people with and without self-reported hypertension. Multivariate regression analysed determinants of psychological distress in hypertensive respondents, and prevalence rate ratios were calculated to compare the change in distress between the two groups. **Results:** There were significantly higher levels of psychological distress among hypertensive respondents (9.9%) than in the general population (4.9%), and a significant association between the two conditions [odds ratio (OR) = 2.27 (1.91; 2.70)]. Characteristics associated with distress among hypertensive respondents included residing in Armenia or Kyrgyzstan, being female, over age 50, with a poor economic situation, lower education, poor emotional support and limited access to medical drugs. Levels of distress declined between 2001 and 2010, but at a lesser rate in hypertensive respondents [rate ratio (RR) = 0.85 (0.75; 0.95)] than non-hypertensive respondents [RR = 0.65 (0.56; 0.75)]. **Conclusion:** There is a significant association between psychological distress and hypertension in the region.

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**Abstract:** The aim of the subject is to represents the connection of the Arterial Hypertension and thrombocyte number in blood and to find prevention ways. A clinical case of depression
Appendix – Country-specific Information: Hypertension

Symptoms as outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) is a disorder with both physical and mental characteristics that negatively disrupts an individual’s ability to function day to day in social and work environments. According to the DSM, real depression is a condition of this nature that lasts for more than two weeks. The subject is actual because Arterial Hypertension according to WHO’s data’s is one the 1st place, while Depression - one the 2nd. According to Georgian Disease Controlling and Medical Statistic National Centre data’s, depression is characterized from 15% to 25% of people. We’ve searched for the clinical methods in Batumi Republic Hospital departments. 30 patient is studied by us - 15 women and 15 men. Among them, 20 patients was fallen ill with Arterial Hypertension, 5 with Ischemic insult and 5 - with Discirculating Encephalopathy. We’ve the question are of Beck. According to which we were able to ascertain the depression quality. The question are consists of 21 questions; by them it was possible to ascertain depression qualities light, medium and complex. The depression quality was defined as follows: the absence of depression in 13%; mild depression in 17%; medium - 30% and severe in 60%. Thus, Depression quality is very high in people with Arterial Hypertension. The number of thromocyte is high also. Thromocytes depression causes significant changes in the function, Thrombocytes Activation, Thrombosis increases the risk. So, it's necessary to treat this patient with Antithrombotic medicines and Antidepressants. That will contribute to solving the problem.

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**Introduction:** 52% of adults have uncontrolled hypertension in the Republic of Georgia. We incorporated a blood pressure control program into an existing primary healthcare system in an attempt to improve the rate of blood pressure control. **Methods:** We conducted standardized trainings of rural primary care providers--doctors and nurses--in accurate measurement of blood pressure according to the Shared Care Method of Training and Certification. Our attention was focused especially on patient management based on Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC) guidelines. Antihypertensive treatment was implemented by a stepped-care approach; hydrochlorothiazide and atenolol were given to patients at follow-up visits at no cost. The treatment goal was < 140/90 mm Hg based on the office blood pressure. **Results:** A total of 251 patients with uncontrolled hypertension were enrolled in the program; 32% had stage I hypertension, 41% had stage II hypertension, and 27% had stage III, as defined by JNC VI. During the first 30 months of follow-up, blood pressure decreased gradually from 170/95 to 140/82 mm Hg. The rate of high blood pressure control increased progressively up to 59%. **Conclusion:** We conclude that hypertension control can be improved in all groups of patients, even in a healthcare system with limited resources. We emphasize that Georgia or any other healthcare system should not wait for universal health care to improve high blood pressure control. It can be incorporated into whatever system exists today.

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**Data sources**

- Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine in 2001
- Living Conditions, Lifestyles and Health (LLH) study. [www.llh.at](http://www.llh.at)
- Health in Times of Transition (HITT) study: [www.hitt-cis.net](http://www.hitt-cis.net)
Iraq


**Abstract:** Type A behavior pattern has been found to be associated with coronary heart diseases, but its association with hypertension is inconsistent. To investigate the association between type A behavior pattern and hypertension, 221 known hypertensive patients and a control group of 221 non-hypertensive patients in Basra, Iraq, were interviewed for type A behavior using a special questionnaire. Blood pressure, height and weight were measured. The proportion with type A behavior was significantly higher in hypertensive than non-hypertensive patients (57.5% versus 24.9%) and a highly significant association was found between type A behavior and hypertension (OR 4.08, 95% CI: 2.72-6.11). Type A behavior pattern was shown to be an independent risk factor for the development of hypertension.

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**Abstract:** We studied the relationship between waist circumference and hypertension among the Iraqi population in Baghdad. The study was carried out during 1999-2000. Body weight, height, waist circumference, and blood pressure were measured. According to multivariate analyses that included control for age and body mass index, waist circumference for men was positively and significantly correlated with systolic and diastolic blood pressure (r = 0.31 for systolic pressure and r = 0.30 for diastolic pressure; p < .009). For women, the correlations were r=0.39 for systolic and r = 0.40 for diastolic pressure (p < .001). Intervention programs designed to reduce waist circumference may have significant public health significance in reducing the incidence of hypertension.

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**Introduction:** Diabetes and hypertension are major risk factors for cardiovascular disease, a leading cause of death in humans. The aim of our study was to determine the prevalence of hypertension, and hypertension control among adults with diabetes in Basrah (Southern Iraq).

**Methods:** A prospective cohort study was conducted at Al-Faiha Diabetes and Endocrine Center in Basrah. It was started in August 2008 to April 2011. **Results:** The total number of recruited patients with diabetes was 5578. Results: Hypertensive diabetic patients constituted 89.6% of this study cohort, with 45.3% of them newly discovered in the center. From hypertensive patients, 48.2% achieved the target blood pressure of less than 130/80 mmHg. The results of the multivariate analyses showed that the factors independently associated with the hypertension were aged > 50 years (odds ratio, 0.4; 95% CI, 0.3 to 0.5; p < 0.001), body mass index equal or more than 25 (odds ratio, 0.5; 95% CI, 0.4 to 0.6; p < 0.001), insulin use (odds ratio, 0.6; 95% CI, 0.5 to 0.8; p < 0.001) and duration of diabetes > 5 years (odds ratio, 0.6; 95% CI, 0.5 to 0.7; p <
**Morocco**


**Abstract:** The major objectives of this work are to estimate the hypertension (HT) frequency in the east of Morocco and to study the relationship between HT, type 2 diabetes and obesity. Our sample is composed of 1628 adults aged 40 years and older, recruited voluntarily by using the convenience sampling method through 26 screening campaigns in urban and rural areas of the east of Morocco. We enumerated 516 hypertensive people (31.7%), without significant difference between women (32.5%) and men (30.2%). The known hypertensive people represent 10.1% of the whole sample. The frequency of HT, increases with age and it is more marked in rural (39.9%) than in urban areas (29%) ($p < 0.001$). It is significantly very high in diabetic subjects (69.9%) than among the non-diabetic ones (27.4%) ($p < 0.001$). The odd ratio (OR) of the diabetics to HT is 6.16 (IC95% [4.33-8.74]). Among the obese persons, HT is present at (40.8%) vs. (30.2%) among the subjects of normal weight ($p < 0.05$). The OR of the obese to HT is 1.6 (IC95% [1.26 - 2.04]). In conclusion, our results show a high frequency of HT in the east of Morocco; it affects nearly one third of the adult population aged 40 years and older. The relations between type 2 diabetes and obesity have also been identified and estimated.

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**Abstract:** This study aimed to estimate the prevalence of hypertension among a group of adolescents and to assess the relationship of systolic and diastolic blood pressure (SBP, DBP) with body fat mass (BFM), body mass index (BMI) and waist circumference (WC). A total of 167 subjects aged 11-17 years were recruited, 29.3% and 12.6% were overweight and obese respectively. BMI, WC, SBP and DBP were determined using standardized equipment. BFM was estimated by the deuterium oxide dilution. Hypertension (HT) and prehypertension (pre-HT) were observed in 17.4% and 9.6%, of the study population, respectively. The prevalence of HT and pre-HT was significantly higher in boys and in overweight-obese groups ($p = 0.044; p = 0.003$ respectively). Both SBP and DBP were significantly higher in overweight-obese compared to healthy-weight groups ($p < 0.001; p = 0.002$ respectively). SBP was significantly higher in boys than girls ($p = 0.013$). With some exceptions, SBP and DBP were significantly correlated with BMI, WC and BFM in the study population and different weight-status groups of both genders. The relationship of blood pressure with BMI appeared to be more significant than with WC and BFM. The prevalence of hypertension was higher in boys than girls and in overweight-obese than
healthy-weight adolescents. Overall SBP and DBP were associated with BFM, BMI and WC. However, the strong association between these variables was seen in girls, and the greater risk of developing hypertension could be associated with increasing BMI.

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**Introduction:** To evaluate the evolution of consumption of antihypertensive drugs generic among 1991-2010, to assess the impacts after the institution of Mandatory Health Insurance and the marketing of generic drugs. **Methods:** We used sales data from the Moroccan subsidiary of IMS Health Intercontinental Marketing Service. **Results:** Consumption of generic antihypertensive drugs increased from 0.08 to 10.65 DDD/1 000 inhabitants/day between 1991 and 2010. In 2010, generic of the calcium channel blockers (CCBs) represented 4.08 DDD/1 000 inhabitants/day (82.09%), followed by angiotensin converting enzyme inhibitors (ACEI) by 2.40 DDD/1 000 inhabitants/day (48.29%). The generics market of CCBs is the most dominant and represented in 2010, 79.21% in volume and 62.58% in value. **Conclusion:** In developing countries like Morocco, the generic drug is a key element for access to treatment especially for the poor population.

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**Pakistan**


**Introduction:** The most prevalent form of hypertension is systolic blood pressure (SBP) and it is considered to be predisposing risk factor for cardiovascular disease. The objective of the study was to assess self-care practices, knowledge and awareness of hypertension, especially related to SBP among cardiac hypertensive patients. **Methods:** A Cross sectional study was conducted on 664 cardiac hypertensive patients, which were selected by non-probability convenience sampling from cardiology outpatient department of three tertiary care hospitals. Face to face interviews were conducted using a pre designed questionnaire. Data was entered and analyzed by SPSS (V17). **Results:** 81.8%, did not know that hypertension is defined as high blood pressure. 97.1% of the sample population did not know that top measurement of blood pressure was referred to as systolic and only 25.0% correctly recognized normal systolic blood pressure to be less than 140mmHg. 7.4% of the patients consulted their doctor for hypertension once or twice in a month. Risk factor for high blood pressure most commonly identified by the participants was too much salt intake. **Conclusion:** The results state that there is an inadequate general knowledge of hypertension among cardiac patients and they do not recognize the significance of elevated SBP levels. There is a need to initiate programs that create community awareness regarding long term
complications of uncontrolled hypertension, particularly elevated SBP levels so that there is an improvement in self-care practices of the cardiac patients.

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**Introduction:** Diabetes and hypertension are prevalent chronic diseases among the general population of Pakistan with an exponential progress expected over the upcoming years. Mobile Health services can be an efficient method of helping curtail this rise and improve quality of life of such patients as proven in developed countries. We aim to assess the acceptability of using Mobile Health services among diabetic and hypertensive patients in Pakistan. **Methods:** A total of 100 patients were approached in a large tertiary care Government Hospital of Karachi, Pakistan, using a nonprobability convenient sampling technique. Co-authors conducted an interview based sampling of a modified questionnaire to each participant after consent. All data was recorded and analyzed on SPSS 16. **Results:** A total of 100 patients participated in our study with 66 (66%) males and 34 (34%) females having a mean prevalence age of 54.27. All the 100 participants had easy access to cell phones with 88% participants (88/100) stating that they would be willing to participate in Mobile Health based interventions. A statistically significant number (p=0.014) of them preferred receiving phone calls (85.2%) rather than SMS (14.8%) reminders for these interventions. 85% of the participants even agreed to participate in such intervention on cash incentives. **Conclusion:** The use of phone call reminders or SMS reminders seems like an acceptable and favorable option among hypertensive and diabetic patients. This can greatly improve their self-management and help curtail this rise in the future.

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**Introduction:** Non-compliance to anti-hypertensive drugs can have negative impact on cardiovascular outcome. Various studies have been conducted on the issue but the factors are not yet explored properly, particularly in Pakistan. This study was conducted to determine the frequency and factors associated with non-compliance to anti-hypertensive medications in Karachi. **Methods:** This descriptive cross sectional study was conducted on 113 indoor hypertensive patients included by purposive sampling, aged 30 years and above diagnosed at least 6 months back in public sector tertiary care institutes of Karachi from March to October 2011. Data was collected through a questionnaire in Urdu. Demographic data, hypertension diagnosis, medical co-morbidity, current number of anti-hypertensive medicines, frequency of missing prescribed antihypertensive therapy and other factors affecting compliance pertaining to medicines, patient, physician and health care centre were included in the questionnaire. **Results:** This study revealed that 68.14% patients were non-compliant. Non-compliance was found to be associated with gender and socioeconomic status. Duration of hypertension, duration between follow up visits to physician, number of drugs, careless attitude, role of physician and limiting
access to health care center are found to be important factors in non-compliance. **Conclusion:** Multiple factors including patients, medicine and health care system related, which can be prevented with simple measures, were found responsible for higher prevalence of non-compliance against anti-hypertensive medicines.

| Data sources | Pakistan Bureau of Statistics: [www.pbs.gov.pk/content/data-dissemination](http://www.pbs.gov.pk/content/data-dissemination) |

### Afghanistan


**Introduction:** The prevalence of hypertension is rising worldwide with an estimated one billion people now affected globally and is of near epidemic proportions in many parts of South Asia. Recent turmoil has until recently precluded estimates in Afghanistan so we sought, therefore, to establish both prevalence predictors in our population. **Methods:** We conducted a cross-sectional study of adults ≥40 years of age in Kabul from December 2011-March 2012 using a multistage sampling method. Additional data on socioeconomic and lifestyle factors were collected as well as an estimate of glycemic control. Bivariate and multivariable analyses were undertaken to explore the association between hypertension and potential predictors. **Results:** A total of 1183 adults (men 396, women 787) of ≥40years of age were assessed. The prevalence of hypertension was 46.2% (95% CI 43.5 - 49.3). Independent predictors of hypertension were found to be: age ≥50 (OR = 3.86, 95% CI: 2.86 - 5.21); illiteracy (OR = 1.90, 1.05 - 1.90); the consumption of rice >3 times per week (OR = 1.43, 1.07 - 1.91); family history of diabetes (OR = 2.20, 1.30 - 3.75); central obesity (OR = 1.67, 1.23 - 2.27); BMI ≥ 30 Kg/meter squared (OR = 2.08, 1.50 - 2.89). The consumption of chicken and fruit more than three times per week were protective with ORs respectively of 0.73 (0.55-0.97) and 0.64 (0.47 - 0.86). **Conclusion:** Hypertension is a major public health problem in Afghan adults. We have identified a number of predictors which have potential for guiding interventions.

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**Introduction:** Obesity has become a major global health challenge due to established health risks and substantial increases in prevalence. Being a complex condition it contributes to burden of chronic diseases by affecting virtually all ages and socioeconomic groups. This study aims to identify the prevalence of obesity and blood lipid profile and their associated factors in Jalalabad city, Afghanistan. **Methods:** A cross-sectional study was conducted in Jalalabad within May–June 2013. Multistage random sampling technique was used to enroll 1200 adults of 25–65 years. WHO STEP wise approach used to collect data on demographic and behavioral factors. Physical measurement including height, weight and blood pressure was collected and blood samples were drawn in fast condition for biochemical measurements including blood lipids. Obesity was defined and categorized using body mass index. Descriptive and inferential analyses were performed
using SPSS v.20. **Results:** The overall prevalence of obesity was 27.4% with significant difference between sexes (35.9% females and 16% males). The mean age was 38.76 ± 11.06 years with 60% female, 71.5% illiterate and 6.3% of smokers. Average total cholesterol, high density lipoprotein, low density lipoprotein, and total glycerides were 198.8 mg/dL, 39.2 mg/dL, 122.9 mg/dL and 186.1 mg/dL respectively. **Age, sex, education status, use of mouth snuff, rice as a meal, nature of job, diabetes and high blood pressure were significantly associated with obesity.** **Conclusion:** Approximately one third of adult population in Jalalabad city is suffering from obesity which is a cause of concern. Blood lipid profile is either borderline or more than average among study participants which could contribute to non-communicable diseases. Measures such as raising awareness and lifestyle modifications may help to reduce the burden of obesity among Jalalabad adults.

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COLORECTAL CANCER

AFRO Region

Nigeria


**Introduction:** Of the 24 million people predicted to have cancer by 2050, 70% will live in low- and middle-income countries (LMIC). As a result, cancer care is becoming a priority for health care systems in West Africa. This study compares the presentation and pattern of spread of colorectal cancer (CRC) observed in a hospital in West Africa with that of a North American referral center.

**Methods:** Data on all adults presenting with CRC at a hospital in Nigerian patients (West Africa; 1990-2011) and all adults with stages III or IV CRC at a specialty hospital in (New York City, New York, North America; 2005-2011) were examined retrospectively. Demographic data, stage of disease, site of metastasis, and survival were compared.

**Results:** There were 160 patients identified in West Africa and 1,947 patients identified in North America. Nigerian patients were younger (52 vs 59 years; P < .01) and presented with a later stage of disease (58% stage IV vs 47%; P < .01). Site of disease presentation was different between West African and North American patients (P < .01); 2.2% of West African patients presented with liver metastases only compared with 48.1% of North American patients. Conversely, 61.3% of patients in West Africa presented with peritoneal metastases only compared with 5.4% in North America. Overall survival stratified by stage at presentation (III/IV) showed worse prognosis for patients in either stage subgroup in Nigeria than North America. **Conclusion:** We found differences in the presentation, metastatic pattern, and outcomes of CRC in Nigerian (West Africa) when compared with New York City (North America). Late detection and differential tumor biology may drive the differences observed between the sites. Future studies on early CRC detection and on tumor biology in LMIC will be critical for understanding and treating CRC in this region.

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**Introduction:** The incidence of colorectal carcinoma has been on the increase in the developing countries, including Nigeria, as a result of change in diet and adoption of western lifestyle. The aim of this review is to highlight the prevalence, age and sex distribution, anatomical location, and morphological characteristics of colorectal carcinomas in Ilorin, Nigeria. **Methods:** This is a retrospective study of all cases of histologically diagnosed colorectal carcinoma in the University of Ilorin Teaching Hospital, Ilorin, Nigeria, over a 30-year period (January 1979-December 2008), using the departmental record and histological slides of the cases. **Results:** A total of 241 cases of...
Appendix – Country-specific Information: Colorectal Cancer


Abstract: One hundred and forty-four cases of histologically confirmed colorectal cancer in patients managed at the Jos University Teaching Hospital (JUTH) over a 10 year period from January, 1989 to January, 1999 is discussed with special consideration to incidence, distribution and unfavorable prognosis. Altogether, 144 patients were treated for colorectal carcinoma. Eighty-seven were males while fifty-seven were females, giving a male to female ratio of 1.51:1. The mean age was 44.3 years. The commonest clinical presenting features were weight loss, bloody mucoid diarrhea, anorectal mass, anaemia, low-back pain and constipation/increased noise in the abdomen, present for not less than 3 months. The rectum and recto sigmoid junction were the commonly affected sites. All, except four patients, had advanced disease at first presentation. Treatment was basically palliative with only 43.5 percent of those offered such treatment alive at 6 months while 25 percent had died. Prognosis is unfavorable. Though, predisposing factors are not clear, promotion of educational programme highlighting the dangers of concealing chronic large bowel symptoms and screening efforts will most probably reduce morbidity and mortality rates associated with this condition.

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Introduction: Gastrointestinal (GI) endoscopy is currently performed by different specialties. Information on GI endoscopy resources in Nigeria is limited. Training, cost, availability and maintenance of equipment are some unique challenges. Despite these challenges, the quality and completion rates are important. Methods: Prospective audit of endoscopic procedures by an endoscopist in a Nigerian hospital over a 24 month period. Results: One hundred and ninety endoscopic procedures were performed in 187 patients (109 male, 78 female) by a surgeon during this period. Mean age was 47.6 years (range 17 - 90 years). All patients were symptomatic. One hundred and twenty-two procedures (64.2%) were upper GI endoscopy, 52 (27.4%) colonoscopy and 16 (8.4%) sigmoidoscopy. Majority of endoscopies 182 (95.8%) were performed
electively and only 7 (3.7%) were therapeutic. Upper GI endoscopy findings included 14 (11.5%) cases of peptic ulcer disease, 5 complicated by gastric outlet obstruction, and 21 (17.3%) cases of upper gastrointestinal cancer. Lower gastrointestinal endoscopy findings included 7 cases of polyps, 3 cases of colorectal cancer and 2 cases of diverticulosis. Commonest lesion on lower GI endoscopy was hemorrhoids (41.7%). Adjusted caecal intubation was 81.4% for colonoscopies performed. Overall adenoma detection rate for male and female patients were 18.2% and 5.3% respectively; in patients over 50 years these were 6.3% and 14.3%. Two complications, rupture of esophageal varices, and respiratory arrest in bulbar palsy patient occurred. Conclusion: An endoscopist can perform GI endoscopy effectively in developing countries like Nigeria but attention to equipment need and training is important. Corresponding author: Bashiru Ismaila, Department of Surgery, Jos University Teaching Hospital, P.M.B. 2076 Jos, Plateau State, Nigeria

Data sources
- Abuja Cancer Registry (2009-2012)
- Calabar Cancer Registry (2009-2011)
- Ibadan Cancer Registry (2006-2009)

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- KO Ibrahim, Department of Pathology, College of Health Sciences, University of Ilorin. E-mail: ookazeemibrahim@yahoo.co.uk
- AZ Sule. Department of Surgery, Jos University Teaching Hospital, Jos, Nigeria.
- Bashiru Ismaila, Department of Surgery, Jos University Teaching Hospital, P.M.B. 2076 Jos, Plateau State, Nigeria

Kenya


Introduction: CRC rates are low but increasing in Africa. Data on detection, treatment, and outcome are scarce. The aim of this study was to evaluate the presentation, treatment, and outcome pattern of CRC and to compare the care processes for two time periods. Setting: The setting was Kenyatta National Hospital (KNH), a teaching and referral center. Methods: A total of 259 patients seen over two time periods (1993-1998 and 1999-2005) were analyzed for admission date, sex, subsite involvement, diagnostic process, treatment, follow-up, and outcome. The distribution of variables between the time periods were analyzed using Student's t-test and chi2 as appropriate. Survival trends were generated using Kaplan Meier method; p<0.05 was statistically significant. Results: The average number of CRC diagnoses showed a 2.7-fold increase during the study periods. The mean age at presentation was 49.7 years. The mean duration of symptoms was 29.6 weeks; and the commonest subsite was the rectum (55.3%). The overall resection rate was 67.7%. For rectal tumors the abdominoperineal rate was 51.4%. Mortality was higher for poorly differentiated cancer, advanced disease, age>50 years, and emergency surgery. There was no change in the age, duration of symptoms, proportion of patients<40 years, or the colon/rectal ratios of the cancer site. The second time period saw more adjuncts for diagnosis, less in-hospital mortality, and better staging data. Conclusion: CRC peaks during the fifth decade of life in Kenyans. The disease is characterized by late presentation, rectal preponderance, and
inadequate pathology data. Improved patient follow-up will unravel the true pattern of disease outcome.

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**Introduction:** Our objective was to evaluate the colorectal cancer clinical data with respect to the anatomical location and stage of disease. **Methods:** Retrospective observational study. Setting: Kenyatta National Hospital (KNH), Nairobi, Kenya. Subjects: Two hundred and fifty three tumors were categorized as right colonic (RCC), left colonic (LCC) and rectal (RC) lesions. The distribution of symptoms (rectal bleeding, tenesmus, change in bowel habits, abdominal pain, intestinal obstruction, rectal mass), anaemia, transfusion requirement, and the Dukes’ stages were compared for right colon, left colon and rectal tumors. **Results:** There were 54 RCC, 59 LCC, 140 RC lesions. Patient delay from onset of symptom(s) to presentation was a mean of 26.6 +/- 43, 20 +/- 25 and 33.7 +/- 42 weeks for right, left and rectal lesions respectively (p = 0.092). The proportion of patients presenting with rectal bleeding was 21%, 44% and 79% for RCC, LCC and RC lesions, respectively. The prevalence of intestinal obstruction was 14.8%, 27.1% and 43.6% in right, left and rectal lesions, respectively. The hemoglobin levels were significantly lower for right sided lesions (p = 0.05 for right colon/rectum pair; p = 0.059 for right colon/left colon pair). The sites of the lesions had no relationship to the stage of disease at presentation. **Conclusion:** In patients with colorectal cancer, the duration of symptoms was prolonged irrespective of the anatomical sub-sites. Symptoms were evenly distributed across the anatomical regions except for bleeding and obstruction which predominated in rectal and left colon cancers respectively. This underlines the need for early investigations in patients with rectal bleeding, change of bowel habit, intestinal obstruction and anaemia.

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**Data sources**
- Eldoret Cancer Registry (2008-2011)
- Nairobi Cancer Registry (2006-2008)

**Namibia**

**Data sources**
- Namibian Cancer Registry

**Tanzania**


**Introduction:** Colorectal cancer is one of the most common cancers worldwide and its incidence is reported to be increasing in resource-limited countries, probably due to the acquisition of a western lifestyle. However, information regarding colorectal cancer in Tanzania and the study area in particular is limited. This study was conducted in our local setting to describe the clinic-
Appendix – Country-specific Information: Colorectal Cancer

Methods: This was a retrospective study of histologically confirmed cases of colorectal cancer seen at Bugando Medical Center between July 2006 and June 2011. Data were retrieved from patients’ files and analyzed using SPSS computer software version 17.0.

Results: A total of 332 colorectal cancer patients were enrolled in the study, representing 4.7% of all malignancies. Males outnumbered females by a ratio of 1.6:1. The median age of patients at presentation was 46 years. The majority of patients (96.7%) presented late with advanced stages. Lymph node and distant metastasis at the time of diagnosis was recorded in 30.4% and 24.7% of cases, respectively. The recto sigmoid region was the most frequent anatomical site (54.8%) involved and adenocarcinoma (98.8%) was the most common histopathological type. The majority of adenocarcinomas (56.4%) were moderately differentiated. Mucinous and signet ring carcinomas accounted for 38 (11.6%) and 15 (4.6%) patients, respectively. Three hundred and twenty-six (98.2%) patients underwent surgical procedures for colorectal cancer. Only 54 out of 321 (16.8%) patients received adjuvant treatment. Postoperative complication and mortality rates were 26.2% and 10.5%, respectively. The overall median duration of hospital stay was 12 days. Only nine out of 297 survivors (3.0%) were available for follow-up at the end of 5 years. Cancer recurrence was reported in 56 of 297 survivors (18.9%). Data on long-term survival were not available as the majority of patients were lost to follow-up. Conclusion: Colorectal cancer is not uncommon in our environment and shows a trend towards a relative young age at diagnosis and the majority of patients present late with advanced stage. There is a need for screening of high-risk populations, early diagnosis and effective cost-effective treatment and follow-up to improve outcome of these patients.

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Data sources
- Kilimanjaro Cancer Registry (2003-2007)
- Eastern Africa and Dar Es Salam (2011-2012) Cancer Registry

Uganda


Introduction: It has been shown that colorectal carcinoma is increasing in incidence in African countries. This could be due to change in life style. Molecular pathogenesis of colorectal cancer commonly involves mutation in p53 gene which leads to expression of p53 protein in tumor cells. Expression of p53 protein has been associated with poor clinical outcome and reduced survival in patients. This was a retrospective laboratory based study carried out in the Department of Pathology Makerere University, Kampala, Uganda. The aim of the study was to evaluate the expression of p53 protein in colorectal carcinoma in Ugandan patients, specifically its association with histological types, degree of differentiation, sites of the tumor and demographic characteristics of the patients. Methods: Immunohistochemistry was carried out on 109 patient’s paraffin embedded tissue blocks of colorectal carcinoma diagnosed in the Pathology Department, Faculty of Medicine Makerere University Kampala during the period 1995 to 2005. The indirect immunoperoxidase method using monoclonal antibody p53 DO-7 and Envision (+) Dual link system-HRP to detect p53 expression was used. Hematoxylin and eosin stain was used for evaluation of histological types and degree of differentiation of the tumors. Topography of the
tumors and demographic data were obtained from accompanying histological request forms. **Results:** Out of 109 patient's tissue blocks that were studied, 61 cases (56%) expressed p53 protein in the nucleus of malignant cells. Right sided colonic tumors were commoner (53.2%) than left sided colonic tumors (46.8%). p53 protein was expressed more in left sided colonic tumors with a significant difference (p<0.05), it was also expressed more in well differentiated tumors and non-mucinous adenocarcinomas but with no significant difference (p>0.05). p53 expression was not affected by age or sex. **Conclusion:** Frequency of p53 protein expression in Ugandan patients did not differ from that reported in the other parts of the world. It was expressed more in the left sided colonic tumors and this could support the hypothesis that right and left colonic tumors could have different pathogenesis and probably also responsible for difference in prognosis in these two topographic sites.

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**Abstract:** Epidemiological data on the occurrence of cancer in sub-Saharan Africa are sparse, and population-based cancer survival data are even more difficult to obtain due to various logistic difficulties. The population-based Cancer Registry of Kampala, Uganda, has followed up the vital status of all registered cancer patients with one of the 14 most common forms of cancer, who were diagnosed and registered between 1993 and 1997 in the study area. We report 5-year absolute and relative survival estimates of the Ugandan patients and compare them with those of black American patients diagnosed in the same years and included in the SEER Program of the United States. In general, the prognosis of cancer patients in Uganda was very poor. Differences in survival between the two patient populations were particularly dramatic for those cancer types for which early diagnosis and effective treatment is possible. For example, 5-year relative survival was as low as 8.3% for colorectal cancer and 17.7% for cervical cancer in Uganda, compared with 54.2 and 63.9%, respectively, for black American patients. The collection of good-quality follow-up data was possible in the African environment. The very poor prognosis of Ugandan patients is most likely explained by the lack of access to early diagnosis and treatment options in the country. On the policy level, the results underscore the importance of the consistent application of the national cancer control programme guidelines as outlined by the World Health Organization.

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**Introduction:** Disability-adjusted life years (DALYs) link data on disease occurrence to health outcomes, and they are a useful aid in establishing country-specific agendas regarding cancer control. The variables required to compute DALYs are however multiple and not readily available in many countries. We propose a methodology that derives global DALYs and validate variables and DALYs based on data from various cancer registries. **Methods:** We estimated DALYs for four
countries (Norway, Bulgaria, India and Uganda) within each category of the human development index (HDI). The following sources (indicators) were used: Globocan2008 (incidence and mortality), various cancer registries (proportion cured, proportion treated and duration of disease), treatment guidelines (duration of treatment), specific burden of disease studies (sequelae and disability weights), alongside expert opinion. We obtained country-specific population estimates and identified resource levels using the HDI. DALYs are computed as the sum of years of life lost and years lived with disabilities.

**Results:** Using mortality: incidence ratios to estimate country-specific survival, and by applying the human development index we derived country-specific estimates of the proportion cured and the proportion treated. The fit between the estimates and observed data from the cancer registries was relatively good. The final DALY estimates were similar to those computed using observed values in Norway, and in WHO’s earlier global burden of disease study. Marked cross-country differences in the patterns of DALYs by cancer sites were observed. In Norway and Bulgaria, breast, colorectal, prostate and lung cancer were the main contributors to DALYs, representing 54% and 45%, respectively, of the totals. These cancers contributed only 27% and 18%, respectively, of total DALYs in India and Uganda.

**Conclusion:** Our approach resulted in a series of variables that can be used to estimate country-specific DALYs, enabling global estimates of DALYs and international comparisons that support priorities in cancer control.

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<th>Data sources</th>
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<td>• Peter F. Rambau Department of Pathology, Bugando University College of Health sciences P.O. Box 1464 Mwanza, Tanzania. Phone +255 28 25 0881, Mobile +255 754 277957. Fax +255 28 25 2678. E-mail: moc.oohay@zt2791ar or zt.ca.odnagub@uabmarp</td>
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**Zambia**


**Abstract:** There is a shortage of information on the epidemiology of digestive disease in developing countries. In the belief that such information will inform public health priorities and epidemiological comparisons between different geographical regions, we analysed 2132 diagnostic upper gastrointestinal endoscopy records from 1999 to 2005 in the University Teaching Hospital, Lusaka, Zambia. In order to clarify unexpected impressions about the age distribution of cancers, a retrospective analysis of pathology records was also undertaken. No abnormality was found in 31% of procedures, and in 42% of procedures in children. In patients with gastrointestinal hemorrhage, the common findings were esophageal varices (26%), duodenal ulcer (17%) and gastric ulcer (12%). Gastrointestinal malignancy was found in 8.8% of all diagnostic procedures, in descending order of frequency: gastric adenocarcinoma, esophageal...
squamous carcinoma, Kaposi's sarcoma, esophageal adenocarcinoma. Data from endoscopy records and pathology records strongly suggest that the incidence in adults under the age of 45 years is higher than in the USA or UK, and pathology records suggest that this effect is particularly marked for colorectal carcinoma.

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| Data sources | Lusaka Cancer Registry (2008-2010) |

**Cameroon**


**Abstract:** The diagnosis of double primary cancers may be enhanced by greater clinical awareness and interest in such patients. A retrospective study involving the analysis of patient files and operative registers was carried out at the University Hospital Centre (UHC), Yaounde, Cameroon. Thirteen cases of double primary cancers, each involving at least one gynecological malignancy, were managed over a nine year period at the University Hospital Centre. Nine different cancer associations were identified. There was a preponderance of cervical cancer, reflecting the high prevalence of this malignancy in our environment. Apart from the association between cervical and breast cancers that occurred in four patients, and cervical and large bowel cancers that occurred in two patients, no other preferential cancer association were observed. A patient with a gynecological malignancy requires a thorough initial evaluation and lifelong follow-up in order to diagnose any possible second primary malignancy.

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**Abstract:** In order to present the main types of colo-rectal polyps in Cameroon, we reviewed all those cases received and examined in our Pathology laboratories during a six and a half year period (1st January 1984-30th June 1990). The polyps were sent by gastro-enterologists after resection during total colonoscopy, with information about age and sex of patients, signs and symptoms and sites and number of polyps. One hundred and two colorectal polyps were taken from 88 patients with a maximum of two polyps per patient. Out of these 102 polyps, we noted: 55 juvenile polyps (54%), 23 hyperplastic polyps (22.5%), 13 adenomatous polyps (12.5%), 10 inflammatory polyps (10%) and one polyp of the Peutz-Jeghers type. One case of hyperplastic polyposis and one of familial polyposis with adenomas on histological examination were registered. On the whole, juvenile polyps predominated and adenomas which can become carcinomas were less frequent than what is seen in Western developed countries. This may be due to the fact that the polyps we examined were only taken only from patients seen in outpatient department for gastrointestinal complaints.
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Data sources
Yaounde Cancer Registry (2004-2006)

Experts
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Democratic Republic Of Congo


Abstract: A retrospective study was conducted to evaluate the frequency of colorectal cancer in the patient population of Congolese hospitals, to delineate their clinico-pathological characteristics, and to look for risk factors. A total of 210 cases of colorectal cancer seen over a 17-year period (1980-1996) were included. The diagnosis was based on histological findings (n=118), radiological and/or endoscopic findings (n=52), intraoperative findings (n=24), or a constellation of clinical and laboratory test findings (n=16). Colorectal cancer contributed to 5.5% of all cancers and 63.2% of gastrointestinal tract cancers during the study period. None of the patients had precancerous lesions. Mean age was only 46 years in the patients with colon cancer and 49 years in those with rectal cancer; 36.0% of patients were younger than 40 years of age. A male bias was noted. Rectal cancer was more common than colon cancer, and adenocarcinoma was the most common histological type. These data suggest that colorectal cancer is infrequent in the Congo and that etiopathogenic factors specific to tropical climates may explain the frequently young patient age and the absence of precancerous lesions.

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Abstract: The Brazzaville cancer registry was created in 1996 with the support of the International Agency Research against Cancer (IARC) which is located in Lyon, France. The Brazzaville cancer registry is a registry which is based on population which records new cancer cases occurring in Brazzaville by using Canreg 4.0 Software. Its aim is to supply useful information to fight against cancer to physicians and to decision makers. We conducted this study whose target was to determine the incidence of cancer in Brazzaville during twelve years, from January 1st, 1998 to December 31, 2009. During that period 6,048 new cancer cases were recorded: 3,377 women (55.8%), 2,384 men (39.4%), and 287 children (4.8%) from 0 to 14 years old with an annual average of 504 cases. Middle age to the patient's diagnosis was 49.5 years in female sex and 50.5 years old for male sex. The incidence rate of cancers in Brazzaville was 39.8 or 100.000 inhabitants per year and by sex we observed 49 to female sex and 35.2 for male sex. The first cancers localizations observed to women were in order of frequency: breast, cervix uterine, liver ovaries, hematopoietic system, to men: liver, prostate, hematopoietic system, colon and stomach; to
children: retina, kidney, hematopoietic system, liver and bones. These rates are the basis to know
the burden of cancer among all pathologies of Brazzaville and the achievement of a national
cancer control program.

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**Data sources**
- Brazzaville cancer registry

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**Ethiopia**

**The frequency of large bowel cancer as seen in Addis Ababa University, Pathology Department.**

**Abstract:** Colorectal carcinoma (CRC) once thought rare in Africans is being seen more frequently. Diet and life style modify the risk of CRC. Its frequency, age, sex and site distribution has not been studied systematically in our country. The presentation of CRC was studied and compared in two 5-year periods with a 10 year time gap. The biopsies of 255 patients with a diagnosis of CRC during two periods were reviewed. CRC constituted 0.8% of the total of biopsies and 34% of colorectal biopsies. The mean age at presentation was 47 years while 61.4% occurred below the age of 50 years, 36% below 40 and 16% occurred below the age of 30 years. Of all CRC 66.7% were located in the rectum and 33.3% in the colon. The male to female ratio for both rectal and colonic cancers was 2:1. These findings did not show any major change during the two study periods. CRC occur at a much younger age in Ethiopia than in the developed world. More than half of the cases were in the rectum. Therefore, the shift of CRC to the right colon reported of elsewhere was not observed. The clinician should expect CRC also in young patients, and most of these carcinomas are still detectable by proctosigmoidoscopy.

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**Data sources**
- Addis Ababa Cancer Registry (2012)

**South Africa**


**Abstract:** There are few cancer trend data reported in sub-Saharan Africa notably due to the scarcity of population-based cancer registries (PBCRs). The Eastern Cape Province PBCR is amongst the few registries in sub-Saharan Africa that reports data for a rural population. Trends in cancer incidence are reported for the period 1998-2012. Registered cases, age-standardized rates (ASRs) and standardized rate ratios are presented for the most common cancers in both
males and females in three periods (1998-2002, 2003-2007 and 2008-2012). In males, the most commonly diagnosed cancer during the 15 year period was cancer of the esophagus; incidence rates showed a significant decline over the 15 year period, entirely due to a 30% decrease between 2003-2007 and 2008-2012, to an ASR of 23.2 per 100,000 population. This was followed by prostate cancer, the incidence of which was more than doubled to a level of 9.9/100,000. In women, cancer of the cervix uteri has become the most common malignancy, with a significant increase in incidence during the period to 29.0/100,000. Esophageal cancer is second in frequency, with (as in males) a significant decline in the final 10 years to an incidence of 14.5/100,000 in 2008-2012. The incidence of breast cancer increased by 61%, although the absolute rate remains low (12.2/100,000). The incidence rates of colorectal cancer are low, and the increases in incidence, although relatively large (35% in men, 63% in women) were not statistically significant. Kaposi sarcoma showed a dramatic increase in incidence in both sexes (3.5-fold in men, 11-fold in women) although the incidence remains relatively low by southern African standards. Cancer prevention and control activities in the area need to be informed by these data and strengthened.

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Introduction: Adherence to screening guidelines has been widely accepted to reduce morbidity, mortality, and cost outcomes. The aim of this study was to identify predictors of adherence to screening guidelines for chronic diseases of lifestyle (CDL), cancers, and HIV in a health-insured population in South Africa, some of whom voluntarily opt into a wellness program that incentivizes screening. Methods: A cross-sectional study for the period 2007-2011 was conducted using a random sample of 170,471 health insurance members from a single insurer. Adherence to screening guidelines was calculated from medical claims data. Results: Adherence to screening guidelines ranged from 1.1% for colorectal cancer to 40.9% for cholesterol screening. Members of the wellness program were up to three times more likely to screen for diseases (odds ratio [OR] = 3.2 for HIV screening, confidence interval [CI] = 2.75-3.73). Plan type (full comprehensive plan) was most strongly associated with cholesterol screening (OR = 3.53, CI = 3.27-3.80), and most negatively associated (hospital-only core plan) with cervical cancer screening (OR = 0.44, CI = 0.28-0.70). Gender was a negative predictor for glucose screening (OR = 0.88, CI = 0.82-0.96). Provincial residence was most strongly associated with cervical cancer screening (OR = 1.89, CI = 0.65-5.54). Conclusion: Adherence to screening recommendations was <50%. Plan type, gender, provincial residence, and belonging to an incentivized wellness program were associated with disproportionate utilization of screening services, even with equal payment access.

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**Introduction:** Data pertaining to Lynch syndrome within a developing country are sparse. This study explored the emotional reaction to a mutation-positive test result among a group of individuals from South Africa. As genetic information is not only limited to the individual but extends to the biological family, communication patterns and uptake of testing among at-risk family members was also investigated. **Methods:** Eighty individuals participated in this qualitative interview study. **Results:** Eight emotional reactions were observed, of which two were of particular concern: (1) secrecy due to disbelief and (2) interpretation of a mutation-positive result as a cancer diagnosis. Disclosure rates of personal genetic test results were high to family members, but low to general healthcare providers. Disclosing the test result was not always followed by a discussion of implications of the genetic information or availability of predictive testing for at-risk family members. The uptake rate of predictive testing among the participants’ siblings and children was 97% and 73.6%, respectively. **Conclusion:** Awareness of concerning emotional reactions following the delivery of a genetic test result and insight into disclosure patterns, especially the information that is not communicated, will prove beneficial in improving the effectiveness of counselling and management in Lynch syndrome families. Practice Implications: Implementation of these findings into the PT programme will have a positive effect on the genetic counseling process.

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Estimating the incidence of colorectal cancer in Sub-Saharan Africa: a systematic analysis.

**Introduction:** Nearly two-thirds of annual mortality worldwide is attributable to non-communicable diseases (NCDs), with 70% estimated to occur in low- and middle-income countries (LMIC). Colorectal cancer (CRC) accounts for over 600 000 deaths annually, but data concerning cancer rates in LMIC is very poor. This study analyses the data available to produce an estimate of the incidence of colorectal cancer in Sub-Saharan Africa (SSA). **Methods:** Data for this analysis came from two main sources: a systematic search of Medline, EMBASE and Global Health which found 15 published data sets, and an additional 42 unpublished data sets which were sourced from the IARC and individual cancer registries. Data for case rates by age and sex, as well as population denominators were extracted and analysed to produce an estimate of incidence. **Results:** The crude incidence of CRC in SSA for both sexes was found to be 4.04 per 100 000 population (4.38 for men and 3.69 for women). Incidence increased with age with the highest rates in Southern Africa, particularly in South Africa. The rates of CRC in SSA were much lower than those reported for high-income countries. **Conclusion:** Few health services in SSA are equipped to provide timely diagnosis and treatment of cancer in SSA. In addition, data collection systems are weak, meaning that the available statistics may underestimate the burden of disease. In order to improve health care services it is vital that accurate measurements of disease burden are available to policy makers.
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SEARO/WPRO Region

China


Introduction: The National Central Cancer Registry (NCCR) of China collected population-based cancer registration data from all cancer registries in China. This study aimed to compile national cancer incidences and mortalities in 2011 and estimate cancer incident new cases and cancer deaths. Methods: In 2014, there were 234 cancer registries that submitted records of new cancer cases and cancer deaths that occurred in 2011 to the NCCR. All datasets were evaluated based on the criteria of data quality of the NCCR. The data of 177 registries was of sufficient quality and was compiled to evaluate cancer statistics in 2011. The pooled data were stratified by area, sex, age group, and cancer type. Cancer incident cases and deaths were estimated using age-standardized rates (ASR) and the Chinese population. All incidences and mortalities were age-standardized to the 2000 Chinese standard population and Segi’s population. Results: The estimates of new cancer incident cases and cancer deaths were 3,372,175 and 2,113,048 in 2011, respectively. The crude incidence was 250.28/1,00,000 (277.77/1,00,000 for males and 221.37/1,00,000 for females). The ASRs of incidence by the Chinese standard population (ASRIC) and by the world standard population (ASRIW) were 186.34/1,00,000 and 182.76/1,00,000, respectively, with a cumulative incidence (0-74 years old) of 21.20%. Cancers of the lung, female breast, stomach, liver, colorectum, esophagus, cervix, uterus, prostate, and ovary were the most common cancers, accounting for approximately 75% of all new cancer cases. Lung, liver, gastric, esophageal, colorectal, female breast, pancreatic, brain, and cervical cancers and leukemia were the leading causes of cancer death, accounting for approximately 80% of all cancer deaths. Cancer incidence, mortality, and spectrum were all different between urban and rural areas and between...
Appendix – Country-specific Information: Colorectal Cancer

males and females. **Conclusion:** The population covered by the cancer registries greatly increased from 2010 to 2011. The data quality and representativeness of cancer registries have gradually improved. Cancer registries have an irreplaceable role in research on cancer prevention and control. The disease burden of cancer is increasing, and the health department must implement effective measures to contain the increased cancer burden in China.

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**Introduction:** Our objective was to survey the acceptance and willingness-to-pay for colorectal cancer colonoscopy screening among high risk populations in urban China. **Methods:** From 2012 to 2013, a Cancer Screening Program in Urban China (CanSPUC) was initiated in 9 provinces, the current survey was conducted among those participants who were evaluated as "high risk for colorectal cancer" by a risk-factor-evaluation-model (community-based) and then went through a colonoscopy screening procedure (hospital-based). All the data were obtained through a questionnaire-based interview (face-to-face or self-completed), mainly focusing on the acceptance and willingness-to-pay of the participants for colorectal colonoscopy screening.

**Results:** The current analysis included a total of 1 624 participants, with a median age of 55.0 years (P25 = 49.0, P75 = 61.0 years) and an annual income per capita of 17 thousand (range: 10-25 thousand) Chinese Yuan (CNY), 42.8% (695/1 624) of whom were males. Of all the participants, 87.0% (1 414/1 624) could totally or substantially accept the colonoscopy screening, particularly in those at higher education level (junior high school: OR = 0.34, 95% CI: 0.22-0.52; high school OR = 0.41, 95% CI: 0.26-0.66; college or over OR = 0.35, 95% CI: 0.20-0.59). Of all the participants, 13.0% (210/1 624) could not or hardly accept it, particularly in those with older age (60-69 years) (OR = 1.48, 95% CI: 1.06-2.07), not in marriage (OR = 2.15, 95% CI: 1.25-3.70) or with family member(s) to raise (OR = 1.60, 95% CI: 1.17-2.20). 1 388 (85.5%) of all the participants had willingness-to-pay for a long-term colonoscopy screening service, particularly in those working in public (OR = 0.61, 95% CI: 0.44-0.84) or enterprise sectors (OR = 0.60, 95% CI: 0.38-0.94), but 82.3% (1 141/1 386) of whom would only pay less than 100 CNY; 14.5% (236/1 624) of total had no willingness-to-pay, particularly in those living in areas with moderate (OR = 4.08, 95% CI: 2.75-6.33) or high GDP per capita (OR = 3.26, 95% CI: 2.11-4.92), or with an absence of willingness-to-pay for colonoscopy screening (OR = 3.98, 95% CI: 2.81-5.65). **Conclusion:** Although a larger community-based colorectal cancer screening program was warranted to examine the extrapolation of these findings, it suggested that the acceptance for colorectal cancer colonoscopy screening among the selected high-risk populations was considerable. The willing-to-pay was relatively high but the amount of payment was limited, the indicated subgroups with potentially less acceptance or willingness need to be more focused in the future to reach a higher participation rate. The data will also be informative in integrating the screening service into the local health insurance system.
Appendix – Country-specific Information: Colorectal Cancer

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Introduction: Colorectal cancer is the third most common type of cancer and the fourth leading cause of cancer-related death in the world. This article provides the most up-to-date overview of colorectal cancer burden in China. Methods: Totally 234 cancer registries submitted data of 2011 to the National Central Cancer Registry (NCCR). Qualified data from 177 registries was pooled and analyzed. The crude incidence and mortality rates of colorectal cancer were calculated by age, gender and geographic area. The numbers of new cases and deaths were estimated using the 5-year age-specific cancer incidence/mortality rates and the corresponding populations. China census in 2000 and Segi’s world population were applied for age standardized rates. Results: The estimate of new cases diagnosed with colorectal cancer of China in 2011 was 310,244 (178,404 for males and 131,840 for females, 195,117 in urban areas and 115,128 in rural areas), accounting for 9.20% of overall new cancer cases. The crude incidence of colorectal cancer ranked fourth in all cancer sites with rate of 23.03/100,000 (25.83/100,000 for males and 20.08/100,000 for female, 28.25/100,000 in urban areas and 17.54/100,000 in rural areas). The age-standardized rates by China population and by World population were 16.79/100,000 and 16.52/100,000, respectively. The estimated number of colorectal cancer deaths of China in 2011 was 149,722 (86,427 for males and 63,295 for females, 91,682 in urban areas and 58,040 in rural areas), accounting for 7.09% of overall cancer deaths. The crude mortality rate for colorectal cancer ranked fifth leading cause of cancer-related death in all cancer sites with rate of 11.11/100,000 (12.51/100,000 for males and 9.64/100,000 for female, 13.27/100,000 in urban areas and 8.84/100,000 in rural areas). The age-standardized rates by China population and by World population for mortality were 7.77/100,000 and 7.66/100,000, respectively. For both of incidence and mortality, the rates of colorectal cancer were much higher in males than in females, and in rural areas than in urban areas. The rate of colorectal cancer increased greatly with age, especially after 40 or 45 years old. Conclusion: Colorectal cancer is a relative common cancer in China, especially for males in urban areas. Targeted prevention and early detection programs should be carried out.

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Introduction: Studies of physical activity and colon cancer risk by anatomic site have provided inconsistent results. Methods: We analyzed data from a population-based case-control study conducted in Iowa involving 685 colon cancer cases and 2434 control subjects. Results: Among those who reported recreational activity more than twice per week, a 30% risk reduction of colon cancer was observed for all sites with a 40% risk reduction for cancer of the right colon. Occupational physical activity was also associated with a reduced risk of colon cancer. The risk was the lowest for those with both high occupational and recreational physical activity (odds
Appendix – Country-specific Information: Colorectal Cancer

Conclusion: Increased physical activity was inversely associated with colon cancer risk. The inverse associations were stronger for the right than for the left colon.

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Data sources
- National Center Cancer Registry (NCCR) of China- collects population-based cancer registration data from all cancer registries in China
- Beijing Cancer Registry

Experts
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- Chinese National Cancer Center
- China Center for Disease Control
- Health Economic Evaluation Working Group of the Cancer Screening Program in Urban China [CanSPUC]

Country-specific needs/attention
- During the period of 1988–1992 to 2009, the raw colorectal cancer incidence rates were more than doubled.
- The increase in colorectal cancer is likely due to dietary and lifestyle changes such as increased meat and calorie intake, decreased physical activity, and increased consumption of alcohol and tobacco.(Yu et al., 2015)

Public health campaign/programs
- Cancer Screening Program in Urban China (CanSPUC)

Bangladesh

[This article does not focus on colorectal cancer, but relevant data may have been collected (given the “Colorectal-Anal Distress Inventory” questionnaire mentioned). Also, the article presents barriers/challenges in this population that may be relevant to colorectal cancer-related studies.

Introduction: Our objective was to understand the challenges and experiences encountered during data collection for Bangladesh Midlife Women’s Health Study (BMWHS) that investigated the low uptake of cervical cancer (CCa) screening barriers, understanding of breast cancer (BCa) knowledge and practices, the prevalence of urinary and fecal incontinence and menopausal symptoms. Methods: A multistage cluster sampling technique was used to recruit women from the 32 districts of Bangladesh that had offered CCa screening. Female interviewers were trained to undertake structured face-to-face interviews that incorporated both non-validated and several
validated questionnaires, such as Question for Urinary Incontinence Diagnosis, Pelvic Organ Prolapse Distress Inventory, Colorectal-Anal Distress Inventory and Menopause-Specific Quality of Life. **Results:** We completed surveys of 1590 women, estimated age 30-59 years, between September 2013 and March 2014. We implemented several strategies to deal with low literacy and used the temporal relationship between marriage and childbirth, and the average age of onset of menarche, to estimate age. Cultural and religious sensitivities and personal security were managed by engaging community leaders, limiting activities to daylight hours, adopting local codes of dress, such as the wearing of head scarves. Our major challenges and experiences included difficulties in age determination, selection of and access to households, interview privacy, lack of basic and health literacy, transportation, political unrest and security of the interviewers. **Conclusion:** By anticipating challenges, we have been able to comprehensively survey a representative sample of Bangladeshi women. Disseminating information about the field challenges and experiences from the BMWHS should assist other researchers planning to conduct surveys about women's health issues in similar context.

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**Data sources**

- Cancer Registry Report, National Institute of Cancer Research and Hospital in Dhaka (2005-2007)
- Bangladesh Midlife Women’s Health Study (BMWHS)

**Experts**

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**India**


**Introduction:** During the past 3 decades, the incidence of colorectal cancer was at a low level in urban and rural populations in India, in comparison with figures observed in developed countries of North America and Europe. Objective: The aim of this study was to describe the time trends of incidence and mortality, and the survival rates of colorectal cancer, as well, in India. **Methods:** This is an ecological study. Main outcome measures: the primary outcome measured is the incidence data extracted from selected Indian cancer registries in the volumes on cancer incidence in 5 continents. **Results:** Low and stable incidence and mortality rates from colon and rectum cancers were observed in India in both men and women. However, this low incidence rate was associated with a low 5-year relative survival rate. **Conclusion:** It is likely that the prevailing environmental factors and lifestyle, including a reduced consumption of sugars, calories and fat-rich food, an increased consumption of vegetables and fruits, and an adequate physical activity with avoidance of overweight and obesity, are responsible for the low risk of colorectal cancers. In contrast, the low survival, even for localized cases, suggests severe deficiencies in early diagnosis and effective treatment in India. A strategy to control the disease in India, based on improving awareness of the risk factors for colorectal cancer while keeping the traditional
lifestyle, and on investments in early diagnosis and adequate treatment should be implemented. However, an organized, population-based screening of colorectal cancer may not prove cost-effective, given the low burden of colorectal cancer.

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### Data sources
- National Cancer Registry Programme, Indian Council of Medical Research. [www.ncrpindia.org/](http://www.ncrpindia.org/)
- Million Deaths Study

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### Indonesia


**Introduction:** Colorectal cancer is currently the third most common cancer in Indonesia, yet colonoscopy—the most accepted mode of screening to date—is not done routinely and national data are still lacking. Objective: To determine the detection rate of colorectal cancers and adenomas in unselected patients undergoing colonoscopy for various large bowel symptoms at the Digestive Disease and GI Oncology Centre, Medistra Hospital in Jakarta, Indonesia. **Methods:** Colonoscopy data from January 2009 to December 2012 were reviewed. New patients referred for colonoscopy were included. Data collected were patient demographic and significant colonoscopy findings such as the presence of hemorrhoids, colonic polyps, colonic diverticula, inflammation, and tumor mass. Histopathological data were obtained for specimens taken by biopsy. Associations between categorical variables were analyzed using chi-square test, while mean differences were tested using the t-test. **Results:** A total of, 1659 cases were included in this study, 889 (53.6%) of them being men. Polyps or masses were found in 495 (29.8%) patients while malignancy was confirmed in 74 (4.5%). Patients with a polyp or mass were significantly older (60.2 vs 50.8 years; p<0.001; t-test) and their presence was significantly associated with male gender (35.0% vs 23.9%; prevalent ratio [PR] 1.71; 95% confidence interval [CI] 1.38-2.12; p<0.001) and age>50 years (39.6% vs 16.6%; PR 3.29; 95% CI 2.59-4.12; p<0.001). Neoplastic lesions was found in 257 (16.1%), comprising 180 (11.3%) adenomas, 10 (0.6%) in situ carcinomas, and 67 (4.2%) carcinomas. **Conclusion:** Polyps or masses were found in 30% of colonoscopy patients and malignancies in 16.1%. These figures do not represent the nation-wide demographic status of colorectal cancer, but may reflect a potentially increasing major health problem with colorectal cancer in Indonesia.

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Vietnam


**Abstract:** Vietnamese Americans are the fourth largest Asian ethnic group in the USA. Colorectal cancer (CRC) ranks as one of the most common cancers in Vietnamese Americans. However, CRC screening rates remain low among Vietnamese Americans, with 40% of women and 60% of men reporting never having a sigmoidoscopy, colonoscopy, or fecal occult blood test (FOBT). We partnered with a Federally Qualified Health Center (FQHC) in Seattle, WA, to conduct focus groups as part of a process evaluation. Using interpreters, we recruited and conducted three focus groups comprised of six women screened for CRC, six women not screened for CRC, and seven men screened for CRC, which made up a total of 19 FQHC patients of Vietnamese descent between 50 and 79 years old. Three team members analyzed transcripts using open coding and axial coding. Major themes were categorized into barriers and facilitators to CRC screening. Barriers include lack of health problems, having comorbidities, challenges with medical terminology, and concerns with the colonoscopy. Participants singled out the risk of perforation as a fear they have toward colonoscopy procedures. Facilitators include knowledge about CRC and CRC screening, access to sources of information and social networks, and physician recommendation. Our focus groups elicited information that adds to the literature and has not been previously captured through published surveys. Findings from this study can be used to develop more culturally appropriate CRC screening interventions and improve upon existing CRC screening programs for the Vietnamese American population.

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**Data sources**
- Ho Chi Minh city cancer registry (2006-2010)
- Ha Noi city cancer registry (2007-2009)

**PAHO Region**

Guatemala


**Introduction:** Guatemala is currently undergoing an epidemiologic transition. Preventive services are key to reducing the burden of non-communicable diseases, and smoking counseling and
cessation are among the most cost-effective and wide-reaching strategies. Internal medicine physicians are fundamental to providing such services, and their knowledge is a cornerstone of non-communicable disease control. **Methods:** A national cross-sectional survey was conducted in 2011 to evaluate knowledge of clinical preventive services for non-communicable diseases. Interns, residents, and attending physicians of the internal medicine departments of all teaching hospitals in Guatemala completed a self-administered questionnaire. Participants' responses were contrasted with the Guatemalan Ministry of Health (MoH) prevention guidelines and the US Preventive Services Task Force (USPSTF) recommendations. Analysis compared knowledge of recommendations within and between hospitals. **Results:** In response to simulated patient scenarios, all services were recommended by more than half of physicians regardless of MoH or USPSTF recommendations. Prioritization was adequate according to the MoH guidelines but not including other potentially effective services (e.g. colorectal cancer and lipid disorder screenings). With the exception of colorectal and prostate cancer screening, less frequently recommended by interns, there was no difference in recommendation rates by level. **Conclusion:** Guatemalan internal medicine physicians' knowledge on preventive services recommendations for non-communicable diseases is limited, and prioritization did not reflect cost-effectiveness. Based on these data we recommend that preventive medicine training be strengthened and development of evidence-based guidelines for low-middle income countries be a priority.

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Panama


**Abstract:** Screening for colorectal neoplasia in an average risk population has been recommended for many years, through fecal occult blood testing, flexible sigmoidoscopy, double contrast barium enema, and more recently, through colonoscopy. The efficacy of these recommendations depend not only on the instruments being used, but also on the population being studied, as recommendations may not apply across all regions. One such example is the recent modification to begin screening at an earlier age (45 year) in African-American individuals.

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[Not specific to colorectal cancer but example of using Panamanian National Cancer Registry and Joinpoint Regression Analysis program]


**Abstract:** Cancer is one of the leading causes of death worldwide and its incidence is expected to increase in the future. In Panama, cancer is also one of the leading causes of death. In 1964, a nationwide cancer registry was started and it was restructured and improved in 2012. The aim of this study is to utilize Joinpoint regression analysis to study the trends of the incidence and mortality of cancer in Panama in the last decade. Cancer mortality was estimated from the
Panamanian National Institute of Census and Statistics Registry for the period 2001 to 2011. Cancer incidence was estimated from the Panamanian National Cancer Registry for the period 2000 to 2009. The Joinpoint Regression Analysis program, version 4.0.4, was used to calculate trends by age-adjusted incidence and mortality rates for selected cancers. Overall, the trend of age-adjusted cancer mortality in Panama has declined over the last 10 years (−1.12% per year). The cancers for which there was a significant increase in the trend of mortality were female breast cancer and ovarian cancer; while the highest increases in incidence were shown for breast cancer, liver cancer, and prostate cancer. Significant decrease in the trend of mortality was evidenced for the following: prostate cancer, lung and bronchus cancer, and cervical cancer; with respect to incidence, only oral and pharynx cancer in both sexes had a significant decrease. Some cancers showed no significant trends in incidence or mortality. This study reveals contrasting trends in cancer incidence and mortality in Panama in the last decade. Although Panama is considered an upper middle income nation, this study demonstrates that some cancer mortality trends, like the ones seen in cervical and lung cancer, behave similarly to the ones seen in high income countries. In contrast, other types, like breast cancer, follow a pattern seen in countries undergoing a transition to a developed economy with its associated lifestyle, nutrition, and body weight changes.

**Corresponding author:** Michael Politis. The Gorgas Memorial Institute for Health Studies, Panama City, Panama. E-mail: michaelpolitis@gmail.com

<table>
<thead>
<tr>
<th><strong>Data sources</strong></th>
<th>Panamanian National Cancer Registry</th>
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<tr>
<td><strong>Experts</strong></td>
<td>Michael Politis. The Gorgas Memorial Institute for Health Studies, Panama City, Panama. E-mail: <a href="mailto:michaelpolitis@gmail.com">michaelpolitis@gmail.com</a></td>
</tr>
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</table>

**Costa Rica**


[Not colorectal cancer-specific but uses data from National Tumor Registry]

**Abstract:** Data from the national tumor registry of Costa Rica for the years 1979–1983 have been used to calculate incidence rates for the major cancer sites by age, sex, urban-rural residence, and geographic region. Recent trends in mortality rates are also presented. Results are compared with data from elsewhere in Latin America, U. S. A., Europe, and Japan. Stomach cancer is the most frequent neoplasm in Costa Rica; although rates are declining, they are second only to those observed in Japan. There are marked variations in risk by region, suggesting important environmental influences in etiology. The cervix is the major female site; rates are declining in young women, probably due to the introduction of screening programs, although these do not seem to account for the geographic variations in invasive cancer incidence. Breast and prostate cancer show moderate rates, while those for colon and rectum cancer are low; increases in mortality rates for these sites are small, and involve mainly the older age groups. In contrast, rates of lung cancer are increasing dramatically in both sexes. In the childhood age group, very high incidence rates are observed for two neoplasms: Hodgkin's disease and acute lymphocytic leukemia.

**Corresponding author:** Rafaela Sierra. Institute of Health Research, University of Costa Rica, San José, Costa Rica.
Appendix – Country-specific Information: Colorectal Cancer

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<tr>
<th>Data sources</th>
<th>Costa Rica National Tumor Registry</th>
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<td>Experts</td>
<td>Rafaela Sierra. Institute of Health Research, University of Costa Rica, San José, Costa Rica.</td>
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### EMRO/EURO Region

#### Kazakhstan

| Experts | Kazakh Research Institute of Oncology & Radiology developing screening program for colorectal cancer. [www.onco.kz](http://www.onco.kz/) |

#### Iraq


**Introduction:** This study is aiming to show the steady rise in the number of cases presented with colorectal cancer in Iraq after the Gulf War. **Methods:** A combined retrospective and prospective study of 715 patients with colorectal cancer presented to us during the period 1965–1999 at three centres in Baghdad. Age, sex and race incidence were reported. Anatomical distribution, precancerous lesions and histopathological types were studied. Its prevalence was studied and compared with the national figures published by the Iraqi Cancer Registry. **Results:** Age ranged between 13 and 84 years, a peak age incidence at 50–59 years. Those under 40 years of age were 17%. Male : Female ratio = 1.4:1.0. Arabs were more affected than Kurds. The sigmoid and descending colon account for 42.8% of colonic cancer, while lower rectum account for 40-2% of rectal cancer. Precancerous lesion was reported in 7% of cases. The prevalence of colorectal cancer was 43 in 10 000 patients seen in years 1970–1979, raised to 58 in 1980–1989 and 91 per 10 000 patients seen in 1990–1999, this dramatic rise especially between years 1980–1989 and 1990–1999 has a P-value < 0.05, which is statistically significant. Such a rise was also reported by the Iraqi Cancer Registry. **Conclusion:** There is significant increase in the incidence and prevalence of colorectal cancer in Iraq and became the most common gastrointestinal cancer after the Gulf War.

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*[Not colorectal cancer- or Iraq-specific but includes Iraq and has a possible contact]*

**Introduction:** The Arab world, stretching from Lebanon and Syria in the north, through to Morocco in the west, Yemen in the south and Iraq in the east, is the home of more than 300 million people. Cancer is already a major problem and the lifestyle changes underlying the markedly increasing rates for diabetes suggest that the burden of neoplasia will only become heavier over time, especially with increasing obesity and aging of what are now still youthful populations. The age-distributions of the affected patients in fact might also indicate cohort
effects in many cases. There are a number of active registries in the region and population-based
data are now available for a considerable number of countries. A body of Arab scientists are also
contributing to epidemiological research into the causes of cancer and how to develop effective
control programs. The present review covers the relevant PubMed literature and cancer incidence
data from various sources, highlighting similarities and variation in the different cancer types,
with attempts to explain disparities with reference to possible environmental factors. In males,
the predominant cancers vary, with lung, urinary bladder or liver in first place, while for females
throughout the region breast cancer is the greatest problem. In both sexes, non-Hodgkin’s
lymphomas and leukemia are relatively frequent, along with thyroid cancer in certain female
populations. Adenocarcinomas of the breast, prostate and colorectum appear to be increasing.
Coordination of activities within the Arab world could bring major benefits to cancer control in
the eastern Mediterranean region.

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<th>Data sources</th>
<th>Iraqi Cancer Registry (2005-2006)</th>
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**Morocco**

**Clinical and molecular characterization of colorectal cancer in young Moroccan patients.**

**Introduction:** Early-onset colorectal cancers are relatively rare. About 20% of colorectal cancers
are familial or hereditary. Two autosomal dominantly inherited cancer syndromes are more
studied: Lynch syndrome accounts for 2-5% of colorectal cancers and familial adenomatous
polyposis represents 1% of total colorectal cancers. Unlike the familial adenomatous polyposis
syndrome, there are no clinical features that help in easily recognizing Lynch syndrome. The
young age of cancer occurrence could be a criterion that should raise a suspicion of Lynch
syndrome. In Morocco, the average age at diagnosis of colorectal cancers according to the
register of cancers of Casablanca is 56 years, which is 10 years earlier than in European countries.
Our study aimed to assess the frequency and molecular characteristics of the Lynch syndrome in
Moroccan early-onset colorectal cancers patients. **Methods:** The population analyzed included 70
patients. The criteria for inclusion of patients in this study were a colorectal cancers before age 50
and the exclusion of familial adenomatous polyposis. We started by searching for microsatellite
instability, first by immunohistochemistry of 3 mismatch repair proteins (MLH1, MSH2 and MSH6)
and with second confirmation using 4 monomorphic markers (BAT25, BAT26, NR21, and CAT25).

**Results:** We found instability in 10/70 (15%) of the cases. The loss of expression affects more
often the MLH1 protein, with 8 cases, versus 2 cases of altered MSH2. None of the 70 patients of
the series fulfilled the Amsterdam II criteria, indicative of Lynch syndrome. **Conclusion:** Further
work needs to be done to discriminate hereditary cases from sporadic ones, but testing for
microsatellite instability as a first step is important.

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Pakistan


Introduction: Early onset colorectal carcinoma (CRC) is rare and has been hypothesized to be a biologically and clinically distinct entity personifying aggressive disease and worse survival. 

Methods: Data for 131 patients was collected by retrospective chart review. Cox proportional hazard model was used to compute prevalence ratios and 95% confidence intervals. Results: Early onset sporadic CRC accounted for 32% of all CRC treated in the specified time period. The mean age was 33.3 ± 7.9 years and the male to female ratio was 2:1. Colon and rectal cancers accounted for 55% and 45% of patients, respectively. 96% of rectal carcinoma patients received appropriate therapy as opposed to 65% of colon cancers. On multivariable analysis, appropriate reception of therapy (PR 4.99; 95% CI, 1.21-20.6) and signet ring morphology (PR 2.40; 95% CI, 1.33-4.32) were significantly associated with rectal cancers as opposed to colon cancer. Kaplan-Meier analysis revealed a trend towards inferior survival for rectal carcinoma 2 years after diagnosis. Conclusion: A high prevalence of early onset CRC was noted in the study. A trend towards inferior survival was seen in patients with rectal cancer. This finding raises the possibility of rectal carcinoma being an aggressive subset of young CRC.

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Data sources
- Punjab cancer registry (2008-2010)

Experts
Muhammad Nauman Zahir, Department of Oncology, Aga Khan University Hospital, Stadium Road, P.O. Box 3500, Karachi 74800, Pakistan. E-mail: moc.liamg@rihaz.namuan
CERVICAL CANCER

AFRO Region

Tanzania


**Introduction:** Our objective was to determine cervical cancer screening coverage and the knowledge, attitudes and barriers toward screening tests among women in rural and urban areas of Tanzania, as well as explore how they view the acceptability of the HPV vaccine and potential barriers to vaccination. **Methods:** A cross-sectional study using interview-administered questionnaires was conducted using multistage random sampling within urban and rural areas in Kilimanjaro Region, Tanzania. Participants: Women aged 18–55 were asked to participate in the survey. The overall response rate was 97.5%, with a final sample of 303 rural and 272 urban dwelling women. Primary and secondary outcome measures: Descriptive and simple test statistics were used to compare across rural and urban strata. Multivariate logistic regression models were used to estimate ORs and 95% CIs. **Results:** Most women (82%) reported they had heard of cervical cancer, while self-reported cervical cancer screening among women was very low (6%). In urban areas, factors associated with screening were: older age (OR=4.14, 95% CI 1.86 to 9.24 for ages 40–49, and OR=8.38, 95% CI 2.10 to 33.4 for >50 years), having health insurance (OR=4.15, 95% CI 1.52 to 11.4), and having knowledge about cervical cancer (OR=5.81, 95% CI 1.58 to 21.4). In contrast, among women residing in rural areas, only condom use (OR=6.44, 95% CI 1.12 to 37.1) was associated with screening. Women from both rural and urban areas had low vaccine-related knowledge; however, most indicated they would be highly accepting if it were readily available (93%). **Conclusion:** The current proportion of women screened for cervical cancer is very low in Kilimanjaro Region, and our study has identified several modifiable factors that could be addressed to increase screening rates. Although best implemented concurrently, the availability of prophylactic vaccination for girls may provide an effective means of prevention if they are unable to access screening in the future.


**Introduction:** There are few data on factors influencing human papillomavirus (HPV) vaccination uptake in sub-Saharan Africa. We examined the characteristics of receivers and non-receivers of HPV vaccination in Tanzania and identified reasons for not receiving the vaccine. **Methods:** We conducted a case control study of HPV vaccine receivers and non-receivers within a phase IV cluster-randomized trial of HPV vaccination in 134 primary schools in Tanzania. Girls who failed to receive vaccine (pupil cases) and their parents/guardians (adult cases) and girls who received dose 1 (pupil controls) of the quadrivalent vaccine (Gardasil™) and their parents/guardians (adult controls) were enrolled from 39 schools in a 1:1 ratio and interviewed about cervical cancer, HPV vaccine knowledge and reasons why they might have received or not received the vaccine.
Conditional logistic regression was used to determine factors independently associated with not receiving HPV vaccine. **Results:** We interviewed 159 pupil/adult cases and 245 pupil/adult controls. Adult-factors independently associated with a daughter being a case were older age, owning fewer household items, not attending a school meeting about HPV vaccine, and not knowing anyone with cancer. Pupil-factors for being a case included having a non-positive opinion about the school de-worming programme, poor knowledge about the location of the cervix, and not knowing that a vaccine could prevent cervical cancer. Reasons for actively refusing vaccination included concerns about side effects and infertility. Most adult and pupil cases reported that they would accept the HPV vaccine if it were offered again (97% and 93% respectively). **Conclusion:** Sensitization messages, especially targeted at older and poorer parents, knowledge retention and parent meetings are critical for vaccine acceptance in Tanzania. Vaccine side effects and fertility concerns should be addressed prior to a national vaccination program. Parents and pupils who initially decline vaccination should be given an opportunity to reconsider their decision.


**Introduction:** As human papillomavirus (HPV) vaccines become available in developing countries, acceptability studies can help to better understand potential barriers and facilitators of HPV vaccination and guide immunization programs. **Methods:** Prior to a cluster-randomized phase IV trial of HPV vaccination delivery strategies in Mwanza Region, Tanzania, qualitative research was conducted to assess attitudes and knowledge about cervical cancer and HPV, and acceptability of and potential barriers to HPV vaccination of Tanzanian primary schoolgirls. Semi-structured interviews \((n = 31)\) and group discussions \((n = 12)\) were conducted with a total of 169 respondents (parents, female pupils, teachers, health workers and religious leaders). **Results:** While participants had heard of cancer in general, most respondents had no knowledge of cervical cancer, HPV, or HPV vaccines. Only health workers had heard of cervical cancer but very few knew its cause or had any awareness about HPV vaccines. After participants were provided with information about cervical cancer and HPV vaccination, the majority stated that they would support HPV vaccination of their daughter to protect them against cervical cancer. Opt-out consent for vaccination was considered acceptable. Most preferred age-based vaccination, saying this would target more girls before sexual debut than class-based vaccination. Potential side effects and infertility concerns were raised by 5/14 of participating male teachers. **Conclusion:** Reported acceptability of HPV vaccination amongst parents, teachers and other community members was high in this population. Respondents stressed the need to provide adequate information about the vaccine to parents that also addresses side effects and infertility concerns.

| Data sources | • Human Papillomavirus and Related Diseases Report Tanzania: [www.hpvcentre.net/statistics/reports/TZA.pdf](http://www.hpvcentre.net/statistics/reports/TZA.pdf)  
• Demographic and Health Surveys (DHS) -World Contraceptive Use, United Nations: Department of Economic and Social Affairs |
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<tr>
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<tr>
<td>Country-specific information</td>
<td>There is an availability to cervical cancer screening programs, however there is no quality assurance structure or mandate to monitor or supervise the</td>
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South Africa


Introduction: Cervical cancer is preventable, but still highly prevalent in South Africa (SA). Screening strategies in the country have been ineffective, and new ways to prevent the disease are needed. Objectives: To investigate the feasibility of linking cervical cancer screening in adult women to human papillomavirus (HPV) vaccination in schoolgirls. Methods: Ten primary schools in the South-West District of Tshwane, Gauteng Province, SA, took part in the study. Cervical cancer and HPV vaccine information was provided to schoolgirls and their parents. Consented schoolgirls were vaccinated and their female parents were invited to participate in self-screening. Results: Among 1 654 girls invited for vaccination, the consented and invited uptake rates were 99.4% and 64.0%, respectively. Vaccine completion rates were higher in schools where the vaccination programme was completed in the same calendar year than in those where it was administered over two calendar years. Of 569 adult females invited, 253 (44.5%) returned screen tests; 169 (66.8%) tested negative and 75 (29.6%) positive for any high-risk HPV (hrHPV). There were no differences in level of education, employment status or access to healthcare between women with positive and those with negative screen results. Conclusion: Implementation of HPV vaccination in a primary school-based programme was successful, with high vaccine uptake and completion rates. Self-screening reached the ideal target group, and it is possible to link cervical cancer screening to the cervical cancer vaccine by giving women the opportunity of self-sampling for hrHPV testing. This is a novel and feasible approach that would require some adaptive strategies.


Abstract: Worldwide, cervical cancer is one of the leading causes of morbidity and mortality among women. Even though women in developing countries account for approximately 85% of the cervical cancer cases and deaths, disparities in cervical cancer rates are also documented in developed countries like the United States (U.S.). Recently, formative research conducted in the U.S. and developing countries like South Africa have sought to gain a better understanding of the knowledge, beliefs, and attitudes about cervical cancer prevention, HPV, and the acceptance of the HPV vaccine. This study compares findings from two independent focus group studies. One study was conducted in a segregated township in Johannesburg, South Africa (n = 24) and the other study was conducted in Ohio Appalachia (n = 19). The following seven themes emerged during the discussions from both studies: HPV and cervical cancer; health decision making; parent–child communication; healthy children; HPV vaccine costs; sexual abuse; and HPV vaccine education. Findings from both studies indicate the importance of the role of mothers and grandmothers in the health care decision-making process for children and a lack of awareness of HPV and its association with cervical cancer. While there was interest in the HPV vaccine, participants voiced concern about the vaccine’s cost and side effects. Some participants expressed concern that receipt of the HPV vaccine may initiate adolescent sexual behavior.
However, other participants suggested that the HPV vaccine may protect young women who may experience sexual abuse. The importance of developing culturally appropriate educational materials and programs about cervical cancer prevention and the HPV vaccine were expressed by participants in both countries.


Abstract: Introduction: HIV-infected women are at increased risk for developing cervical cancer. Women living in resource-limited countries are especially at risk due to poor access to cervical cancer screening and treatment. We evaluated three cervical cancer screening methods to detect cervical intraepithelial neoplasia grade 2 and above (CIN 2+) in HIV-infected women in South Africa; Pap smear, visual inspection with 5% acetic acid (VIA) and human papillomavirus detection (HPV). Methods: HIV-infected women aged 18–65 were recruited in Johannesburg. A cross-sectional study evaluating three screening methods for the detection of the histologically-defined gold standard CIN-2+ was performed. Women were screened for cervical abnormalities with the Digene HC2 assay (HPV), Pap smear and VIA. VIA was performed by clinic nurses, digital photographs taken and then later reviewed by specialist physicians. The sensitivity, specificity and predictive values


Introduction: Attitudes and beliefs affect women’s cervical cancer screening behavior. Methods: We surveyed 228 women in Cape Town, South Africa about their screening history, knowledge, beliefs, and access barriers regarding Papanicolaou (Pap) smears and cervical cancer. Results: More than half of the participants had never had a Pap smear or had 1 more than 10 years ago. One third did not know what a Pap smear was. Lengthy wait times and fatalistic beliefs also affected screening behavior. Ethnicity was associated with differences in beliefs. Conclusion: Opportunistic cancer screening events are an effective way that women can obtain Pap smears and cancer education.


Introduction: Invasive cervical cancer is the commonest cause of cancer morbidity and mortality in South African women. This study provides information on adult women’s sexual activity and cervical cancer risk in South Africa. Methods: The data were derived from a case-control study of hormonal contraceptives and cervical cancer risk. Information on age of sexual debut and number of lifetime sexual partners was collected from 524 incident cases and 1541 hospital controls. Prevalence ratios and adjusted prevalence ratios were utilized to estimate risk in exposures considered common. Crude and adjusted relative risks were estimated where the outcome was uncommon, using multiple logistic regression analysis. Results: The median age of sexual debut and number of sexual partners was 17 years and 2 respectively. Early sexual debut was associated with lower education, increased number of life time partners and alcohol use. Having a greater
number of sexual partners was associated with younger sexual debut, being black, single, higher educational levels and alcohol use. The adjusted odds ratio for sexual debut < 16 years and ≥ 4 life-time sexual partners and cervical cancer risk were 1.6 (95% CI 1.2 – 2.2) and 1.7 (95% CI 1.2 – 2.2), respectively. Conclusion: Lower socio-economic status, alcohol intake, and being single or black, appear to be determinants of increased sexual activity in South African women. Education had an ambiguous effect. As expected, cervical cancer risk is associated with increased sexual activity. Initiatives to encourage later commencement of sex, and limiting the number of sexual partners would have a favorable impact on risk of cancer of the cervix and other sexually transmitted infections.

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<th>Data sources</th>
<th>Cancer Incidence and Mortality Worldwide: <a href="http://www.hpvcentre.net/statistics/reports/ZAF.pdf">www.hpvcentre.net/statistics/reports/ZAF.pdf</a></th>
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<td>Country-specific information</td>
<td>Country has a national vaccine program in place</td>
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**Nigeria**


**Abstract:** The incidence of cervical cancer has declined in developed nations due to routine use of cervical cancer screening services. In developing nations opportunistic screening is the practice, and many women present with late-stage disease. This study was designed to ascertain the knowledge of the women in Nigeria to cervical cancer, their practice of cervical cancer screening and factors hindering the use of available screening services. A cross-sectional study was done with interviewer-administered questionnaire. Only the consenting women attending an annual Christian religious meeting in 2007 in three towns in Enugu, South Eastern Nigeria participated. Only 15.5% of the respondents were aware of availability of cervical cancer screening services. The awareness significantly varied with the level of educational attainment (P < 0.0001). Only 4.2% had ever done Pap smear test and all were referred for screening. The most important factors hindering the use of available cervical cancer screening services were lack of knowledge (49.8%) and the feeling that they had no medical problems (32.0%). There is very poor knowledge and practice of cervical cancer screening among Nigerian women. Effective female education and free mass screening are necessary for any successful cervical cancer screening programme in Nigeria.


**Introduction:** Context: Cervical malignancy is the commonest genital tract malignancy in Nigeria. In the absence of a national screening programme, any hope of minimizing death from invasive cervical carcinoma in Nigeria is through increased opportunistic cervical screening by physicians. Recent evidence showed a high awareness but a low practice of cervical screening among Nigerian women, a situation that the respondents attributed to poor physician referral. Objective: To study the attitude toward and practice of cervical cancer screening amongst Nigerian gynecologists, on whom the burden of treating cervical cancer rests. **Methods:** A self-administered, questionnaire survey of 113 Nigerian gynecologists who attended the Annual
Appendix – Country-specific Information: Cervical Cancer

General Meeting and Scientific Conference of the Society of Gynaecology and Obstetrics of Nigeria (SOGON) held in Abuja in November 2000. Results: The 86 (76.1%) gynecologists who practiced in centres with cervical screening services estimated that they screened 15.0 ± 18.9% of their gynecology patients. Pap smear was available to 85 (76.1%) gynecologists, colposcopy to 28 (32.6%), direct visual inspection (after applying 5% acetic acid solution) to 16 (18.6%), human papillomavirus (HPV) DNA testing to 2 (2.3%) and cervicography to 1 (1.2%). Thirty gynecologists had definite cervical screening programmes, most of which were selective and based on specific indications. All the respondents favored a national cervical screening programme. Conclusion: Despite general agreement amongst Nigerian gynecologists on the need for a national cervical screening programme, their level of opportunistic screening of patients is currently low. A plea is made for increased opportunistic screening pending the establishment of a national screening programme.


Abstract: Cancer of the cervix is the commonest genital tract malignancy in the female, and it has been ranked second to breast cancer. It has positive association with infection of human papillomavirus. Cervical cancer incidence and mortality have declined substantially in western countries following the introduction of screening programmes. This present study investigated the knowledge, attitude and practice of nurses in Lagos University Teaching Hospital (LUTH) towards cervical cancer screening as they are important health personnel that are supposed to educate women on the need for cervical cancer screening. The study is a descriptive cross-sectional survey of the knowledge, attitude and practice of 200 nurses in LUTH towards cervical cancer screening. The results obtained showed that 99% of the respondents were aware of cervical cancer and that 92% of the respondents were also aware of the causative organism of cervical cancer (human papillomavirus). Their major sources of information were through electronic media (43.9%) and health professionals (37.4%). Furthermore, the respondents were quiet aware of Pap smear (91%) as one of the screening techniques of cervical cancer and had good attitudes (89%) towards Pap smear, but most of them had never done it before. The study further revealed that majority of the respondents did not know colposcopy as one of the screening techniques for cervical cancer. Finally, it has been made known from this study that nurses have good knowledge of cervical cancer but have limited understanding of the types of cervical cancer screening techniques and poor disposition towards undergoing cervical cancer screening. It may thus be recommended that institutions should periodically organize seminars and training for health personnel especially the nurses which form a group of professionals that should give health education to women about cervical cancer. This training may be done as part of the orientation programme to newly employed staff.


Introduction: Women of childbearing age who are sexually active are at risk of Cervical Cancer (CC), since they may have been exposed to Human Papilloma Virus. Majority of the women with invasive cervical cancer were never screened for this disease which is known to be a major cause of cancer deaths among women, especially in developing nations. This study sought to determine
willingness to utilize Cervical Cancer Screening Services (CCSS) among Antenatal Clinic (ANC) attendees in Ibadan, Nigeria. **Methods:** This cross-sectional study was conducted in selected hospitals in Ibadan. Systematic random sampling was used to select 846 women attending ANC in the Hospitals. Data were collected from the respondents using validated structured questionnaire. Data were analysed using Statistical Package for Social Sciences (SPSS) and hypotheses were tested using Chi-square test at P≤0.05. **Results:** The women’s mean age was 27.9 ±5.8 years. Majority, 94.8% were married, 49.1% had secondary school education and 64.2% were traders. Also, majority (68.0%) earned less than 10,000 naira/month. Awareness of CC was quite low as 84.4% had never heard of cervical cancer while only 15.6% were aware of it. Over 73.6% of the women were willing to utilize CCS services but Uptake of CCS was 2.1%. Perceived hindrances to uptake were non-availability of CCS services, lack of information on CCS and cost of services among others. There was a significant association between awareness and willingness to utilize CCS services (P=0.000) as well as educational level and willingness to undergo screening (P =0.019). There was no significant association between age and willingness to utilize CCS services (P=0.834). **Conclusion:** There was high level of willingness but utilization of Cervical Cancer Screening Services was low among the women. There is need to provide more information on cervical cancer screening as well as make the services available at reduced cost.

### Data sources
- [http://hpvcentre.net/statistics/reports/NGA_FS.pdf](http://hpvcentre.net/statistics/reports/NGA_FS.pdf)

### Country-specific needs/attention
- No HPV Vaccination program in place

### Kenya


**Introduction:** Affordable screening cervical cancer methods using visual inspection with acetic acid (VIA) and with Lugol’s iodine (VILI) are being developed. Scaling up of screening services requires an understanding of the user perceptions about screening. **Objectives:** Determine the perceptions of risk and barriers to previous cervical cancer screening by women attending MCHFP clinic of MTRH, Eldoret, Kenya. **Methods:** Cross-sectional questionnaire survey involving a consecutive sample of 219 consenting non-pregnant women about perceptions on cervical cancer risk, barriers to screening and previous screening. **Results:** Of 219 women interviewed, 12.3% of participants had screened before. Women of over 30 years were more likely to have screened before (p=0.012). While 22.8% felt that they were at risk of the cervical cancer, 65% of all participants, nevertheless, wished to be screened. Perception of being at risk was significantly associated with a felt need for screening (p=0.002), an association that persisted only for women reporting multiple lifetime sex partners (p=0.005). Fear of abnormal results and lack of finances were the commonest barriers to screening reported by 22.4% and 11.4% of respondents, respectively. **Conclusion:** Previous screening was uncommon. Cheaper screening methods are needed. Messages about screening should clarify the meaning and consequences of possible results.

**Knowledge and practice about cervical cancer and Pap smear testing among patients at Kenyatta National Hospital, Nairobi, Kenya.** Gichangi, P., Estambale, B., Bwayo, J., Rogo, K.,

**Abstract:** Invasive cervical cancer (ICC) is the leading cause of cancer-related death among women in developing countries. Population-based cytologic screening and early treatment does reduce morbidity and mortality associated with cervical cancer. Some of the factors related to the success of such a program include awareness about cervical cancer and its screening. The objective of this study was to assess knowledge and practice about cervical cancer and Pap smear testing among cervical cancer and noncancer patients using a structured questionnaire to obtain information. Fifty-one percent of the respondents were aware of cervical cancer while 32% knew about Pap smear testing. There were no significant differences in knowledge between cervical cancer and noncancer patients. Health care providers were the principal source of information about Pap testing (82%). Only 22% of all patients had had a Pap smear test in the past. Patients aware of cervical cancer were more likely to have had a Pap smear test in the past. The level of knowledge is low among ICC and noncancer patients. There is need to increase the level of knowledge and awareness about ICC and screening among Kenyan women to increase uptake of the currently available hospital screening facilities.

**Data sources**


**Uganda**


**Introduction:** Cervical cancer is the commonest cancer of women in Uganda. Over 80% of women diagnosed in Mulago national referral and teaching hospital, the biggest hospital in Uganda, have advanced disease. Pap smear screening, on opportunistic rather than systematic basis, is offered free in the gynecological outpatient clinics and the postnatal/family planning clinics. Medical students in the third and final clerkships are expected to learn the techniques of screening. Objectives: of this study were to describe knowledge on cervical cancer, attitudes and practices towards cervical cancer screening among the medical workers of Mulago hospital. **Methods:** In a descriptive cross-sectional study, a weighted sample of 310 medical workers including nurses, doctors and final year medical students were interviewed using a self-administered questionnaire. We measured knowledge about cervical cancer: (risk factors, eligibility for screening and screening techniques), attitudes towards cervical cancer screening and practices regarding screening. **Results:** Response rate was 92% (285). Of these, 93% considered cancer of the cervix a public health problem and knowledge about Pap smear was 83% among respondents. Less than 40% knew risk factors for cervical cancer, eligibility for and screening interval. Of the female respondents, 65% didn't feel susceptible to cervical cancer and 81% had never been screened. Of the male respondents, only 26% had partners who had ever been screened. Only 14% of the final year medical students felt skilled enough to use a vaginal speculum and 87% had never performed a pap smear. **Conclusion:** Despite knowledge of the gravity of cervical cancer and prevention by screening using a Pap smear, attitudes and practices towards screening were negative. The medical workers who should be responsible for opportunistic screening of women they care for are not keen on getting screened themselves. There is need to explain/understand
the cause of these attitudes and practices and identify possible interventions to change them. Medical students leave medical school without adequate skills to be able to effectively screen women for cervical cancer wherever they go to practice. Medical students and nurses training curricula needs review to incorporate practical skills on cervical cancer screening.


**Introduction:** Our objective was to assess women's willingness to collect their own samples for HPV testing as the first part of a screening program for cervical cancer in Uganda. **Methods:** In March and April 2010, trained assistants from Kisenyi interviewed 300 women aged 30 to 65 years who lived and/or worked in this community. Descriptive data and multivariate modeling were used to identify the predictors of the women's willingness to collect their own cervical samples. **Results:** More than 80% of the 300 participants were willing to collect their own samples. In multivariate modeling, factors positively associated with this willingness were agreement to let outreach workers deliver the necessary swab at their homes (adjusted odds ratio [AOR], 4.10; 95% confidence interval [CI], 1.83–9.18) and willingness to undergo a pelvic examination if the sample was abnormal (AOR, 3.91; 95% CI,1.03–14.90). Factors negatively associated were embarrassment at collecting the sample at home where they lacked privacy (AOR, 0.09; 95% CI, 0.03–0.29) and concern of not collecting the sample properly (AOR, 0.1; 95% CI, 0.05–0.3). **Conclusion:** Self-collection is an option in impoverished settings in Africa. To improve acceptability, women should be taught how to properly collect their own cervical sample and encouraged to find ways to make the collection less embarrassing.

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**Zambia**


**Introduction:** Our objective was to make a rapid assessment of the common myths and misconceptions surrounding the causes of cervical cancer and lack of screening among
Appendix – Country-specific Information: Cervical Cancer

unscreened low-income Zambian women. **Methods**: We initiated a door-to-door community-based initiative, led by peer educators, to inform unscreened women about the existence of a new see-and-treat cervical cancer prevention program. During home visits peer educators posed the following two questions to women: 1. What do you think causes cervical cancer? 2. Why haven’t you been screened for cervical cancer? The most frequent types of responses gathered in this exercise were analyzed thematically. **Results**: Peer educators contacted over 1100 unscreened women over a period of two months. Their median age was 33 years, a large majority (58%) were not educated beyond primary school, over two-thirds (71%) did not have monthly incomes over 500,000 Zambian Kwacha (US$100) per month, and just over half (51%) were married and cohabiting with their spouses. Approximately 75% of the women engaged in discussions had heard of cervical cancer and had heard of the new cervical cancer prevention program in the local clinic. The responses of unscreened low-income Zambian women to questions posed by peer educators in urban Lusaka reflect the variety of prevalent ‘folk’ myths and misconceptions surrounding cervical cancer and its prevention methods. **Conclusion**: The information in our rapid assessment can serve as a basis for developing future educational and intervention campaigns for improving uptake of cervical cancer prevention services in Zambia. It also speaks to the necessity of ensuring that programs addressing women’s reproductive health take into account societal inputs at the time they are being developed and implemented. Taking a community-based participatory approach to program development and implementation will help ensure sustainability and impact. (Global Health Promotion, 2010; Supp (2): pp. 47—50)

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**Cameroon**


**Abstract**: This study was conducted to assess the knowledge, attitudes, and assumption of cervical cancer by women living in Maroua, the capital of the Far North Province of Cameroon. In a 1-month period, 171 women were surveyed as to their socioeconomic status, sexual habits, prior knowledge of cervical cancer, its prevention, and their attitudes toward cervical cancer. Of 171 women, 48 (28%) had prior knowledge of cervical cancer; they were classified as the “aware group” compared with 123 of 171 (72%) women who were uninformed about cervical cancer and they were classified as the “unaware group” (UG). The UG of women tended to be single mothers, illiterate, housewives, and had their first child before the age of 20 (P < 0.005). Despite the awareness of cervical cancer by 28% of women, only a minority of them, 4 of 48 (8.3%), underwent a preventative screening test. Only 71 of 171 (41.5%) women stated that they would be having a screening test in the future. The awareness of cervical cancer by women in Cameroon is still inadequate. Thus, to avoid deaths from cervical cancer, a curable and preventable disease, the need of an aggressive campaign to make Cameroonian women aware of cervical cancer and its prevention is needed.
Awareness of HPV and cervical cancer prevention among Cameroonian healthcare workers.

**Introduction**: Cervical cancer, although largely preventable, remains the most common cause of cancer mortality among women in low-resource countries. The objective of this study was to assess knowledge and awareness of cervical cancer prevention among Cameroonian healthcare workers. **Methods**: A cross-sectional self-administered questionnaire in 5 parts with 46 items regarding cervical cancer etiology and prevention was addressed to healthcare workers in six hospitals of Yaoundé, Cameroon. The investigators enlisted heads of nursing and midwifery to distribute questionnaires to their staff, recruited doctors individually, in hospitals and during conferences and distributed questionnaires to students in Yaoundé University Hospital and Medical School. Eight hundred and fifty questionnaires were distributed, 401 collected. Data were analyzed with SPSS version 16.0. Chi-square tests were used and P-values < 0.05 were considered significant. **Results**: Mean age of respondents was 38 years (range 20-71 years). Most participants were aware that cervical cancer is a major public health concern (86%), were able to identify the most important etiological factors (58%) and believed that screening may prevent cervical cancer (90%) and may be performed by Pap test (84%). However, less than half considered VIA or HPV tests screening tests (38 and 47%, respectively). Knowledge about cancer etiology and screening was lowest among nurse/midwives. **Conclusion**: Knowledge of cervical cancer and prevention by screening showed several gaps and important misconceptions regarding screening methods. Creating awareness among healthcare workers on risk factors and current methods for cervical cancer screening is a necessary step towards implementing effective prevention programs.

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Democratic Republic of Congo


**Introduction**: Cervical cancer is the most frequent cancer of women in the Democratic Republic of Congo (DRC). Nevertheless, the level of women’s awareness about cervical cancer is unknown. Knowledge, attitude and practice (KAP) are important elements for designing and monitoring screening programs. The study purpose was to estimate KAP on cervical cancer and to identify associated factors. **Methods**: A cross-sectional study was conducted in Kinshasa, DRC, including 524 women aged 16–78 years (median age 28; interquartile range 22–35). The women were interviewed at home by trained field workers using a standardized questionnaire. The women’s score on knowledge, attitude and practice were dichotomized as sufficient or insufficient. We used binary and multiple logistic regression to assess associations between obtaining sufficient scores and a series of socio-demographic factors: age, residence, marital status, education, occupation, religion, and parity. **Results**: The women’s score on knowledge was not significantly correlated with their score on practice (Spearman’s rho = 0.08; P > 0.05). Obtaining a sufficient score on knowledge was positively associated with higher education (adjusted odds ratio (OR) 7.65; 95% confidence interval (95% CI) 3.31-17.66) and formal employment (adjusted OR 3.35; 95% CI 1.85-6.09); it was negatively associated with being single (adjusted OR 0.44; 95% CI 0.24-
0.81) and living in the eastern, western and northern zone of Kinshasa compared to the city centre. The attitude score was associated with place of residence (adjusted OR for east Kinshasa: 0.49; 95% CI 0.27-0.86 and for south Kinshasa: 0.48; 95% CI 0.27-0.85) and with religion (adjusted OR 0.55; 95% CI 0.35-0.86 for women with a religion other than Catholicism or Protestantism compared to Catholics). Regarding practice, there were negative associations between a sufficient score on practice and being single (adjusted OR 0.24; 95% CI 0.13-0.41) and living in the eastern zone of the city (adjusted OR 0.39; 95% CI 0.22-0.70). Although 84% of women had heard about cervical cancer, only 9% had ever had a Papanicolaou (Pap) smear test. **Conclusion:** This study shows a low level of knowledge, attitude and practice on cervical cancer among women in Kinshasa. Increasing women’s awareness would be a first step in the long chain of conditions to attain a lower incidence and mortality.

**Data sources**

http://hpvcentre.net/statistics/reports/NGA_FS.pdf

**Country-specific needs/attention**

No HPV Vaccination program in place

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**Ethiopia**


**Introduction:** Cervical cancer is the first most common cancer in women in sub-Saharan Africa followed by breast cancer. In Ethiopia, the incidence of cervical cancer is high i.e. 35.9 per 100,000 women. Low level of awareness, lack of effective screening programs, overshadowed by other health priorities (such as acquired immune deficiency syndrome, tuberculosis and malaria) and insufficient attention to women’s health are the possible factors for the observed higher incidence rate of cervical cancers in the country. Data on knowledge of Ethiopian women regarding cervical cancer is lacking. The aim of this study was to assess the knowledge of women about cervical cancer and associated factors. **Methods:** A community based cross-sectional survey was conducted from April 4-16, 2010 in Gondar town, Northwest Ethiopia. A total of 633 women aged 15 years and above were interviewed using semi-structured questionnaire by 8 trained data collectors and 2 supervisors. SPSS Windows version 15.0 was employed for data entry and analysis. **Results:** Of all the respondents, 495 (78.7%) of them had heard about cervical cancer and only 195 (31%) of them were knowledgeable about the disease. **Conclusion:** The knowledge of women on cervical cancer was found to be poor. Education about the disease must include information on risk factors, sign and symptoms of cervical cancer.


**Introduction:** Although cervical cancer is a leading cause of cancer related morbidity and mortality among women in Ethiopia, there is lack of information regarding the perception of the community about the disease. **Methods:** Focus group discussions were conducted with men, women, and community leaders in the rural settings of Jimma Zone southwest Ethiopia and in the capital city, Addis Ababa. Data were captured using voice recorders, and field notes were transcribed verbatim from the local languages into English language. Key categories and thematic frameworks were identified using the health belief model as a framework, and presented in
narratives using the respondents own words as an illustration. Results: Participants had very low awareness of cervical cancer. However, once the symptoms were explained, participants had a high perception of the severity of the disease. The etiology of cervical cancer was thought to be due to breaching social taboos or undertaking unacceptable behaviors. As a result, the perceived benefits of modern treatment were very low, and various barriers to seeking any type of treatment were identified, including limited awareness and access to appropriate health services. Women with cervical cancer were excluded from society and received poor emotional support. Moreover, the aforementioned factors all caused delays in seeking any health care. Traditional remedies were the most preferred treatment option for early stage of the disease. However, as most cases presented late, treatment options were ineffective, resulting in an iterative pattern of health seeking behavior and alternated between traditional remedies and modern treatment methods. Conclusion: Lack of awareness and health seeking behavior for cervical cancer was common due to misconceptions about the cause of the disease. Profound social consequences and exclusion were common. Access to services for diagnosis and treatment were poor for a variety of psycho-social, and health system reasons. Prior to the introduction or scale up of cervical cancer prevention programs, socio-cultural barriers and health service related factors that influence health seeking behavior must be addressed through appropriate community level behavior change communications.

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Uganda


Introduction: Symptomatic cervical cancer patients in low- and middle-income countries usually present with late stage disease and have poor survival. We explored the views of cervical cancer patients on their symptom appraisal and interpretations, and their help-seeking including lay consultations. Methods: We conducted an in-depth interview study in two northern Ugandan hospitals. Theoretical models underpinned the study guide for data collection and analysis. We used thematic analysis techniques, informed by the theoretical concepts in the Model of Pathways to Treatment. Sub-themes and themes were identified through consensus among investigators. Results: Eighteen women aged 35–56 years, recently diagnosed with cervical cancer were interviewed. Their first symptoms included abnormal vaginal bleeding, offensive vaginal discharge and lower abdominal pain. Most participants did not perceive themselves to be at risk for cervical cancer and they usually attributed the initial symptoms to normal bodily changes or common illnesses such as sexually transmitted diseases. Lay consultations with husbands, relatives and friends were common and often influenced decisions and timing for seeking care. Prompt help-seeking was frequently triggered by perceived life threatening symptoms such as heavy vaginal bleeding or lower abdominal pain; symptom burden sufficient to interfere with patients’ work routines; and persistence of symptoms in spite of home-based treatments. Participants did not promptly seek care when they perceived symptoms as mild; interpreted symptoms as due to normal bodily changes e.g. menopause; and attributed symptoms to common illnesses they could self-manage. Their cancer diagnosis was often further delayed by
long help-seeking processes including repeated consultations. Some healthcare professionals at private clinics and lower level health facilities failed to recognize symptoms of cervical cancer promptly therefore delayed referring women to the tertiary hospitals for diagnosis and treatment. **Conclusion:** Ugandan patients with symptomatic cervical cancer often misattribute their gynecological symptoms, and experience long appraisal and help-seeking intervals. These findings can inform targeted interventions including community awareness campaigns about cervical cancer symptoms, and promote prompt help-seeking in Uganda and other low- and middle-income countries with high incidence and mortality from cervical cancer.


**Introduction:** Our objective were to: (1) To synthesize sociocultural results from diverse populations related to vaccine decision-making, understanding of cervical cancer and its etiology, experience with previous vaccinations, human papillomavirus (HPV) vaccine concerns, and information needed to foster acceptance; (2) to contextualize findings in light of recent studies; and (3) to discuss implications for communication strategies to facilitate vaccine acceptance. **Methods:** Descriptive qualitative synthesis of sociocultural studies in 4 countries using iterative theme-based analyses. Setting: Four developing countries: India, Peru, Uganda, and Vietnam. Participants: Criterion-based sample of 252 focus-group discussions and 470 in-depth interviews with children, parents, teachers/administrators, health workers/managers, and community/religious leaders. A knowledge, attitudes, and practices survey was administered to 879 children and 875 parents in Vietnam. **Results:** We found that vaccine decision-making was primarily done by parents, with children having some role. Understanding of cervical cancer and HPV was limited; however, the gravity of cancer and some symptoms of cervical cancer were recognized. Vaccination and government-sponsored immunization programs were generally supported by respondents. Sentiments toward cervical cancer vaccines were positive, but concerns about quality of delivery, safety, adverse effects, and the effect on fertility were raised. Communities requested comprehensive awareness-raising and health education to address these concerns. **Conclusion:** Sociocultural studies help elucidate the complexities of introducing a new vaccine from the perspective of children, parents, and communities. Strategies for introducing the HPV vaccine should address community concerns through effective communication, appropriate delivery, and targeted advocacy to make the program locally relevant.


**Abstract:** The Ministry of Health in Uganda in collaboration with the Program for Appropriate Technology for Health (PATH) supported by Bill and Melinda Gates Foundation in 2008–2009 vaccinated approximately 10,000 girls with the bivalent human papilloma virus (HPV) vaccine. We assessed parent’s knowledge, risk perception and willingness to allow son(s) to receive HPV vaccines in future through a cross-sectional survey of secondary school boys aged 10–23 years in 4 districts. 377 questionnaires were distributed per district and 870 were used in analysis. Parents that had ever heard about cervical cancer and HPV vaccines; those who would allow daughter(s) to be given the vaccine and those who thought that HPV infection was associated with genital warts were more willing to allow son(s) to receive the HPV vaccine. Unwilling parents considered
HPV vaccination of boys unimportant (p=0.003), believed that only females should receive the vaccine (p = 0.006), thought their son(s) couldn’t contract HPV (p = 0.010), didn’t know about HPV sexual transmissibility (p = 0.002), knew that males could not acquire HPV (p = 0.000) and never believed that the HPV vaccines could protect against HPV (p = 0.000). Acceptance of HPV vaccination of daughters and likelihood of recommending HPV vaccines to son(s) of friends and relatives predicted parental willingness to allow sons to receive HPV vaccines. Probable HPV vaccination of boys is a viable complement to that of girls. Successfulness of HPV vaccination relies on parental acceptability and sustained sensitization about usefulness of HPV vaccines even for boys is vital.

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<td>Country specific information</td>
<td>Has national vaccine program, cervical cancer is the #1 cause of female cancers in Uganda and first cause of death in females</td>
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SEARO/WPRO Region

Bangladesh


Abstract. Although one-third of the world cervical cancer burden is endured in India, Bangladesh, Nepal and Sri Lanka, there are important gaps in our knowledge of the distribution and determinants of the disease in addition to inadequate investments in screening, diagnosis and treatment in these countries. Prevalence of human papillomavirus (HPV) infection among the general populations varies from 7–14% and the age specific prevalence across age groups is constant with no clear peak in young women. This observation may be the result of a low clearance rate of incident infections, frequent re-infection/reactivation, limited or no data in target high-risk age groups (teenagers), and sexual behavioral patterns in the population. High-risk HPV types were found in 97% of cervical cancers, and HPV-16 and 18 were found in 80% of cancers in India. Beyond research studies, demonstration projects and provincial efforts in selected districts, there are no serious initiatives to introduce population-based screening by public health authorities in these countries. Cervical cancer is a relatively neglected disease in terms of advocacy, screening and prevention from professional or public health organizations. Cytology, HPV testing and visual screening with acetic acid (VIA) or Lugol’s iodine (VILI) are known to be accurate and effective methods to detect cervical cancer and could contribute to the reduction of disease in these countries. While HPV vaccination provides hope for the future, several barriers prohibit the introduction of prophylactic vaccines in these countries such as high costs and low public awareness of cervical cancer. Efforts to implement screening based on the research experiences in the region offer the only currently viable means of rapidly reducing the heavy burden of disease.

Abstract: We investigated the awareness of, and the attitude towards screening for, cervical cancer in Bangladesh. We performed a qualitative study using focus group discussions (FGD). The framework approach to qualitative analysis was used. The study was performed in the catchment areas of Addin Hospital, Jessore, Southern Bangladesh (peri-urban) and LAMB hospital, Parbatipur, North West Bangladesh (rural). A total of 220 men, women and adolescents participated in 28 FGDs. Awareness of cervical cancer was widespread. Knowledge about causes was often inadequate. The perceived consequences of cervical cancer were numerous and awareness of the need for cervical cancer treatment was present. Barriers to accessing care include: low priority for seeking help for symptoms, limited availability of health services and cost. Most women were unaware of the possibility of screening via speculum examination, which was considered acceptable to women (and men), as long as the examination was done by a female healthcare provider in an environment with sufficient privacy. In conclusion, adequate gynecological services are not available or accessible for most women in rural and peri-urban Bangladesh. However, awareness of cervical cancer is widespread. Screening for cervical cancer in these communities is acceptable if done by a female healthcare provider under conditions with sufficient privacy.

Data sources: http://hpvcentre.net/statistics/reports/NGA_FS.pdf

Country-specific needs/attention: No HPV Vaccination program in place

India


Abstract: This study investigates attitudes toward human papillomavirus (HPV) vaccination among parents of adolescent girls in Mysore, India. Seven focus group discussions were held among parents of adolescent girls stratified by sex, religion and region to explore attitudes about cervical cancer and HPV vaccination. The study found that while parents have limited knowledge about HPV or cervical cancer, most are still highly accepting an HPV vaccine. In addition, high acceptability levels appear to reflect positive attitudes toward the government universal immunization program in general, rather than to the HPV vaccine in particular. The results highlight the need for additional education and health promotion regarding HPV and cervical cancer prevention in India.


Introduction: Our objective was to determine the factors associated with participation in cervical cancer screening and follow-up treatment in the context of a randomized controlled trial. The trial was initiated to evaluate the efficacy and cost effectiveness of visual inspection with acetic acid,
cytological screening and testing for human papillomavirus in reducing the incidence of and mortality from cervical cancer in Maharashtra, India. **Methods:** Between October 1999 and November 2003 women aged 30–59 years were randomized to receive one of the three tests or to a control group. Participation was analysed for all three intervention arms. The differences between those who were screened versus those who were not was analysed according to the sociodemographic characteristics of the 100 800 eligible women invited for screening. Those who were treated versus those who were not were analysed according to the sociodemographic characteristics of the 932 women diagnosed with high-grade lesions. Participation in screening and compliance with treatment were also analysed according to the type of test used. **Results:** Compared with women who were not tested, screened women were younger (aged 30–39), better educated and had ever used contraception. A higher proportion of screened women were married and a lower proportion had never been pregnant. Of the 932 women diagnosed with high-grade lesions or invasive cancer, 85.3% (795) received treatment. Women with higher levels of education, who had had fewer pregnancies and those who were married were more likely to comply with treatment. There were no differences in rates of screening or compliance with treatment when results were analysed by the test received. **Conclusion:** Irrespective of the test being used, good participation levels for cervical cancer screening can be achieved in rural areas of developing countries by using appropriate strategies to deliver services. Communication methods and delivery strategies aimed at encouraging older, less-educated women, who have less contact with reproductive services, are needed to further increase screening uptake.

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**Indonesia**


**Introduction:** The purpose of this study was to describe the implementation of single visit approach or See-visual inspection of the cervix with acetic acid (VIA)-and Treat-immediate cryotherapy in the VIA positive cases-model for the cervical cancer prevention in Jakarta, Indonesia. **Methods:** An observational study in community setting for See and Treat program was conducted in Jakarta from 2007 until 2010. The program used a proactive and coordinative with VIA and cryotherapy (Proactive-VO) model with comprehensive approach that consists of five pillars 1) area preparation, 2) training, 3) awareness, 4) VIA and cryotherapy, and 5) referral. **Results:** There were 2,216 people trained, consist of 641 general practitioners, 678 midwives, 610 public health cadres and 287 key people from the society. They were trained for five days followed by refreshing and evaluation program to ensure the quality of the test providers. In total, 22,989 women had been screened. The VIA test-positive rate was 4.21% (970/22,989). In this positive group, immediate cryotherapy was performed in 654 women (67.4%). **Conclusion:** See and Treat program was successfully implemented in Jakarta area. The Proactive-VO model is a promising way to screen and treat precancerous lesions in low resource setting.

| Data sources                  | http://hpvcentre.net/statistics/reports/NGA_FS.pdf |

Introduction: Cervical cancer screening is an effective method for reducing the incidence and mortality of cervical cancer, but the screening attendance rate in developing countries is far from satisfactory, especially in rural areas. Wufeng is a region of high cervical cancer incidence in China. This study aimed to investigate the issues that concern cervical cancer and screening and the factors that affect women’s willingness to undergo cervical cancer screening in the Wufeng area. Methods: A cross-sectional survey of women was conducted to determine their knowledge about cervical cancer and screening, demographic characteristics and the barriers to screening. Results: Women who were willing to undergo screenings had higher knowledge levels. “Anxious feeling once the disease was diagnosed” (47.6%), “No symptoms/discomfort” (34.1%) and “Do not know the benefits of cervical cancer screening” (13.4%) were the top three reasons for refusing cervical cancer screening. Women who were younger than 45 years old or who had lower incomes, positive family histories of cancer, secondary or higher levels of education, higher levels of knowledge and fewer barriers to screening were more willing to participate in cervical cancer screenings than women without these characteristics. Conclusion: Efforts are needed to increase women’s knowledge about cervical cancer, especially the screening methods, and to improve their perceptions of the screening process for early detection to reduce cervical cancer incidence and mortality rates.


Introduction: Our objective was to understand knowledge about, and acceptability of, cervical cancer screening and HPV vaccines among medical students; and to explore potential factors that influence their acceptability in China. Methods: We conducted a survey among medical students at six universities across southwest China using a 58-item questionnaire regarding knowledge and perceptions of HPV, cervical cancer, and HPV vaccines. Results: We surveyed 1878 medical students with a mean age of 20.8 years (standard deviation: 1.3 years). Of these, 48.8% and 80.1% believed cervical cancer can be prevented by HPV vaccines and screening respectively, while 60.2% and 71.2% would like to receive or recommend HPV vaccines and screening. 35.4% thought HPV vaccines ought to be given to adolescents aged 13–18 years. 32% stated that women should start to undergo screening from the age of 25. 49.2% felt that women should receive screening every year. Concern about side effects (38.3% and 39.8%), and inadequate information (42.4% and 35.0%) were the most cited barriers to receiving or recommending HPV vaccination and cervical cancer screening. Females were more likely to accept HPV vaccines (OR, 1.86; 95% CI: 1.47–2.35) or cervical cancer screening (OR, 3.69; 95% CI: 2.88–4.74). Students with a higher level of related knowledge were much more willing to receive or recommend vaccines (P<0.001) or screening (P<0.001). Students who showed negative or uncertain attitudes towards premarital sex were less likely to accept either HPV vaccines (OR, 0.67; 95% CI: 0.47–0.96), or screening (OR, 0.68; 0.47–0.10). Non-clinical students showed lower acceptability of cervical screening compared to students in clinical medicine (OR, 0.74; 95% CI: 0.56–0.96). Conclusion: The acceptability of HPV vaccines and cervical cancer screening is relatively low among medical students in southwest
China. Measures should be taken to improve knowledge about cervical cancer and awareness of HPV vaccines and screening among medical students at university.

**Data sources**
- Demographic and Health Surveys (DHS) - World Contraceptive Use, United Nations: Department of Economic and Social Affairs.

**Country-specific needs/attention**
- No HPV vaccination program, low screening rates
- Country Specific Information: There is an availability to cervical cancer screening programs, however there is no quality assurance structure or mandate to monitor or supervise the process. VIA is the main screening tool used.

**Vietnam**


**Abstract:** Using mathematical models of cervical cancer for the northern and southern regions of Vietnam, we assessed the cost-effectiveness of cervical cancer prevention strategies and the tradeoffs between a national and region-based policy in Vietnam. With 70% vaccination and screening coverage, lifetime risk of cancer was reduced by 20.4–76.1% with vaccination of pre-adolescent girls and/or screening of older women. Only when the cost per vaccinated girl was low (i.e., <$25) was vaccination combined with screening (three times per lifetime or every 5 years) favored in both regions; at high costs per vaccinated girl (i.e., >$100), screening alone was most cost-effective. When optimal policies differed between regions, implementing a national strategy resulted in health and economic inefficiencies. HPV vaccination appears to be an attractive cervical cancer prevention strategy for Vietnam, provided high coverage can be achieved in young pre-adolescent girls, cost per vaccinated girl is <$25 (i.e., <$5 per dose), and screening is offered at older ages.

**Data sources**
[www.hpvcentre.net/statistics/reports/UGA.pdf](http://www.hpvcentre.net/statistics/reports/UGA.pdf)

**Country-specific needs/attention**
- Vaccination rates low, access to screening services low

**PAHO Region**

**Nicaragua**

Appendix – Country-specific Information: Cervical Cancer

**Introduction:** Our objective was to obtain baseline information for designing a community-based intervention programme aimed at increasing the cervical cancer screening coverage of women most at risk. **Methods:** A population-based survey, using proportional stratified two-stage cluster sampling in Rivas, one of the 16 Departments of Nicaragua. The individuals selected were interviewed at home by one of 26 interviewers, using a structured questionnaire. The questionnaire was designed to elicit (1) knowledge, attitudes and practices concerning sexual and reproductive health and behavior, (2) risk factors for cervical cancer and (3) the use of health and cervical cancer screening services. **Results:** A total of 612 men and 634 women participated in the survey. Of the women who had been sexually active at least 3 years, only 41.1% had undergone screening within that period and were considered adequately screened. Correlates of inadequate screening status included low educational level, exclusive use of public health facilities and lack of knowledge about prevention and symptoms of cervical cancer. Negligence, absence of medical problems, fear, lack of knowledge and economic reasons were the main reasons given for not being screened. Reluctance to be screened in the future was related to lack of knowledge of the disease, inadequate screening status, older age and low educational level. **Conclusion:** The current screening programme is not effective in reaching the majority of the population. Complementary activities such as education and information, as well as a more pro-active approach to invite women for screening are necessary.


**Introduction:** Nicaragua has some of the highest rates of cervical cancer in Latin America and the world [Arrossi S, Sankaranarayanan R, Parkin DM. Incidence and mortality of cervical cancer in Latin America. *Salud Publica Mex.* 2003;45 (Suppl 3):S306 – 14]. In 2003, the Nicaraguan Ministry of Health, the Central American Institute of Health and the Maria Luisa Ortiz Clinic combined efforts to create an effective remote rural service network, with centralized quality-controlled cytology, and coordinated treatment. **Methods:** Data was taken from the clinic Pap log, tracking records, patient charts, and pathology reports. Patients were stratified by age (25 and older, and under 25). Standard indicators addressing key components in the entire continuum of an effective screening program were adapted from suggestions by a work group of the Pan American Health Organization. **Results:** A total of 2132 women received Pap screening. 68% (N = 1448) were 25 and older and 32% (N = 684) were under 25. The proportion of high-grade abnormal screens was 3.7% for women over 25 and 0.4% for women under 25. The proportion of women with high-grade abnormal results who received diagnostic work-up and needed treatment was 94% for women over 25 and 100% for women under 25. The proportion of high-grade squamous cell Pap tests resulting in histologically confirmed disease was 68%. The ratio of preinvasive disease to invasive disease was 1.9. The invasive cancer detection rate was 0.62%. **Conclusion:** This program evaluation demonstrates that outreach to high-risk women, quality cytology screening and high rates of diagnostic follow-up and treatment can be conducted in remote, low-resource settings when coordinated efforts are made to remove barriers and ensure quality.

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Honduras


**Introduction:** This study examined changes in knowledge and behavior after a community-based cervical cancer education program in Honduras. **Methods:** The program consisted of radio broadcasts targeting rural women and presentations to community nurses. The effectiveness of the radio broadcasts was assessed using a cross-sectional design (control groups n = 124, n = 243; intervention group n = 233). A pre-/post-test design was used to evaluate the nurses’ training program (n = 32). A subset of nurses (n = 16) was retested two years later. Evaluation included t tests, chi-square and Fisher exact analyses. **Results:** The radio broadcast increased the proportion of women who were familiar with the term "cervical cancer," who could identify means of preventing cervical cancer, and who understood the purpose of the Pap smear. In addition, older and under-screened women were successfully recruited for screening via radio. The nurses’ program improved understanding of the correct use of the Pap smear, the age-related risk of dysplasia, and the proper triage of abnormal results. The nurses retained a significant amount of knowledge two years after this training. **Conclusion:** In developing countries, inexpensive, community-based educational programs using radio broadcasts and lecture presentations can increase cervical cancer knowledge and improve screening behavior.


**Introduction:** We examined the impact of patient adherence and screening test performance on the cost-effectiveness of visual inspection with acetic acid (VIA) and Pap smears when used with colposcopy for diagnosis. **Methods:** Cost-effectiveness analysis was performed using computer modeling. The primary outcome was cancer prevalence in the 10 years after screening. Three hypothetical populations of 35-year-old women were compared: never-screened women, women screened with VIA, and women screened with Pap smears. We used community-based data from our screening program in Honduras to estimate screening test sensitivity and specificity, adherence to follow-up, and costs of screening and colposcopy services. Published data were used to model disease outcomes. **Results:** VIA was more sensitive than Pap smears (70% vs. 4%), less expensive (U.S. $0.23 vs. $3.17), and the 2-visit VIA system had a higher rate of adherence to follow-up than the 3-visit Pap smear system (84% vs. 38%). VIA had a higher false-positive rate than Pap smears resulting in higher colposcopy referral rates, but more dysplasia was detected and treated. Cost-effectiveness analysis revealed that screening with VIA would cost U.S. $3,198 per cancer case avoided and reduce cancer cases by 42%, versus U.S. $36,802 and 2% for Pap screening. Although Pap smear quality was low in Honduras, sensitivity analysis showed that VIA was more cost-effective than Pap smears, even when test accuracy was equivalent. **Conclusion:** In developing countries, systems barriers can limit the cost-effectiveness of Pap smears. VIA may be a cost-effective alternative for some resource-poor settings, although systems barriers, quality control, and feasibility issues must be considered.
Appendix – Country-specific Information: Cervical Cancer

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Pakistan


**Introduction:** Cervical cancer is one of the leading causes of morbidity and mortality amongst the gynecological cancers worldwide, especially in developing countries. It is imperative for at least health professionals in developing countries like Pakistan to have a sound knowledge about the disease. This study was carried out to assess the knowledge and awareness about cervical cancer and its prevention amongst health professionals in tertiary care hospitals in Karachi, Pakistan. **Methods:** A cross-sectional, interview based survey was conducted in June, 2009. Sample of 400 was divided between the three tertiary care centers. Convenience sampling was applied as no definitive data was available regarding the number of registered interns and nurses at each center. **Results:** Of all the interviews conducted, 1.8% did not know cervical cancer as a disease. Only 23.3% of the respondents were aware that cervical cancer is the most common cause of gynecological cancers and 26% knew it is second in rank in mortality. Seventy-eight percent were aware that infection is the most common cause of cervical cancer, of these 62% said that virus is the cause and 61% of the respondents knew that the virus is Human Papilloma Virus (HPV). Majority recognized that it is sexually transmitted but only a minority (41%) knew that it can be detected by PCR. Only 26% of the study population was aware of one or more risk factors. Thirty seven percent recognized Pap smear as a screening test. In total only 37 out of 400 respondents were aware of the HPV vaccine. **Conclusion:** This study serves to highlight that the majority of working health professionals are not adequately equipped with knowledge concerning cervical cancer. Continuing Medical Education program should be started at the hospital level along with conferences to spread knowledge about this disease.

Data sources                | www.hpvcentre.net/statistics/reports/UGA.pdf |
Country-specific needs/attention | Vaccination rates low, access to screening services low |