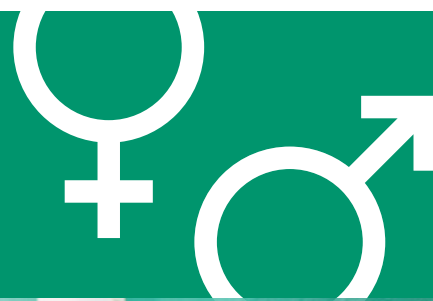# Knowledge Briefs on **Gender** and **CRVS**

Brief 3, Paper 3

The Dangers of Gender Bias in CRVS and Cause of Death Data: The Path to Health Inequality

Photo: Dominic Chavez / World Bank

KEY MESSAGES

- **Women and men are not equal when it comes to health outcomes anywhere in the world.** Understanding these differences is essential for designing and implementing policies that aim to reduce gender inequities.

- **Civil registration and vital statistics (CRVS) systems provide critical sex-disaggregated data** on the number of deaths and the leading causes of deaths occurring in a country.

- **Gender bias can result from diagnoses made by physicians, incentives to under-report certain conditions, or inadequate reporting of some causes of death specific to women** (e.g. maternal conditions) which then go unreported, impacting the quality and representativeness of cause of death statistics.

- **CRVS systems can help countries understand inequities in health outcomes for men and women.** By providing routine, timely data on the number of deaths by age and sex, CRVS systems allow countries to more easily identify and understand changes in the mortality pattern for different population groups over time.

- **The quality of cause of death reporting for women varies by region and level of performance of the CRVS system.** At the global level, causes of death reported by countries for women are of lower quality than those reported for men.

- **CRVS systems play a critical role in documenting and exposing gender-based violence (GBV) statistics.** However, current classification systems make it difficult to produce robust estimates of intimate partner violence resulting in death from vital registration systems.

INTRODUCTION

Evidence proves that women and men are not equal when it comes to health outcomes across time, location, and culture (**WHO 2019**). There are biological differences that impact the likelihood of dying at a given age, such as a higher life expectancy for women than men, and some causes that lead to death in males, such as testicular cancer, or females, such as pregnancy-related deaths. However, biological sex only accounts for a fraction of these differences.

> It is essential to differentiate between sex and gender. In this brief, we have used the World Health Organization's (WHO) definition of sex to refer to the biological characteristics that define humans as male, female, or intersex (**WHO 2019**). Gender refers to the socially constructed norms, roles, and relations among women, men, boys, and girls as well as the expressions and identities of women, men, boys, girls, and gender-diverse individuals.

There are also socio-cultural norms associated with gender roles that influence the life experience of men and women differently and impact their health and wellbeing (**Heymann et al. 2019**). The mechanisms for this differential impact include exposure to different risk factors (**Hawkes and Buse 2013**), inequities in access to health care, specific health-related behaviours (**Vari et al. 2016**), and gender norms (**Weber et al. 2019**). Understanding these differences helps countries design and implement policies that aim to reduce gender inequities in health, and move towards achieving the Sustainable Development Goals (SDGs) (**UN Women 2018**; **Tannenbaum et al. 2019**).

> "Sustainable Development Goal indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability, and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics" (UN General Assembly Resolution 68/261).

Countries need sex and gender-disaggregated data to inform health policy decision-making and prioritize interventions that improve the health status of the population as a whole, and ensure that no one is left behind (**Heymann et al. 2019**). Even though there has been considerable progress in the availability of gender statistics,[1] there are still unacceptable gaps (**Tannenbaum et al. 2019**; **Perez 2019**). This lack of sex-disaggregated data has resulted in an incomplete picture of women's and men's health, and the gaps that persist between them. Such data are required to identify key challenges and opportunities to accelerate progress towards ending extreme poverty and boosting shared prosperity in a sustainable manner (**World Bank 2016**).

Civil registration and vital statistics (CRVS) systems are responsible for capturing, registering, and compiling all of a country's vital events to produce reliable and timely statistics about the number of vital events in a country or region, including at least births, deaths, and causes of death (**AbouZhar et al. 2019**). Vital statistics are the cornerstone of population and socioeconomic policies and provide a country's decision-makers with critical information for resource allocation and health priorities, including women's and girls' health (**Phillips et al. 2015**).

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1   Gender statistics are defined as statistics that adequately reflect differences and inequalities in the situation of women and men in all areas of life (United Nations 2006).

CRVS systems are critical for monitoring and achieving 12 of the 17 SDGs by providing information for 67 of the 232 SDG indicators (**Mills et al. 2017**). This makes CRVS systems effective tools for women's empowerment and essential for closing the gender data gap (**Dincu and Malambo 2019**). Seventy-three SDG indicators require sex disaggregation and 13 additional indicators apply only to women, resulting in a total of 86 gender-relevant indicators.

This brief explores the gender data gap in mortality reporting systems through CRVS systems worldwide. We describe the differences in death registration for males and females, as well as the quality of cause of death (COD) assigned to these by physicians. We also specifically look at deaths caused by gender-based violence and how these are reported (or not) by countries.

Men, women, and other genders face different health problems during their lifetime, and the leading causes of death are different for each group. Our study looks at the different patterns of death registration, as well as the quality of death certification from a sex perspective. As available data included only sex information (male and female), we were unable to explore differences with intersex or other non-binary gender identities.

To our knowledge, this is the first and largest study exploring global mortality from a gender perspective. We used the WHO mortality database and included more than 100 countries.[2] Our analysis includes all countries with a population over 90,000 people that reported to WHO from 2000 to present. It is important to remember that countries that report to WHO have relatively stronger CRVS systems than those that do not. This limits the generalization of our findings.

GENDER, MORTALITY, AND CRVS

The performance of CRVS systems in registering births and deaths is heterogeneous across the globe (**Bhatia et al. 2019**). In many low- and middle-income countries (LMICs), the level of registration completeness is poor and the quality of information collected is below international standards (**AbouZhar et al. 2019**). Even within the same country, death registration completeness is not equal across population groups, meaning that individuals do not all have the same probability of being registered by the CRVS system when they are born or when they die. Some factors that influence the probability of an individual being registered at birth or after death include the sex of the deceased, residence in rural vs. urban areas, mother's education level, socioeconomic status, or distance to a civil registration office (**Suthar et al. 2019**; **Peralta et al. 2019**).

Differences in mortality rates for males and females have been thoroughly reported and analyzed (**Alkema et al. 2014**; **Crimmins et al. 2019**). Multiple studies have investigated whether these differences are the result of biological sex (**Waldron 1983**), health behaviours specific to women or men, or social norms linked to gender roles (**Heymann et al. 2019**). Most of these studies assumed that women and men were properly represented in civil registration information systems. There has been less investigation into whether women or men have been systematically excluded from civil registration systems or if the quality of recorded information is different. This is especially important for deaths that occur in communities or rural areas for which there is little incentive, or even disincentives, for death registration (**Dincu and Malambo 2019**).

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2   We included all countries reporting to WHO since 2000 with a population higher than 90,000 people and a completeness of the dataset over 70 percent.

One of the first attempts to show that women were not being captured in CRVS systems was the analysis of birth and death rates in India, which concluded that the difference between the sex ratios in several Asian countries and Europe was the result of discrimination against girls and women (**Sen 1990**). More recent studies in Ecuador (**Peralta et al. 2019**) and Brazil (**França et al. 2014**) not only reveal disparities in registration completeness among regions, but also show that women are less likely to be registered at death. These studies also looked into the quality of the causes of death reported through the mortality registration system. They concluded that the proportions of unusable codes[3] and ill-defined codes[4] were higher among women than men. This was also reported in a study of deaths in rural areas in Morocco (**Silva 2016**).

When CRVS systems do not capture all deaths, they are prone to misrepresent some population groups. In other words, the statistics produced from incomplete civil registration systems are unlikely to capture the real picture of mortality, reflecting instead statistics of those with more access to CRVS services, and leading to biased estimates of measured outcomes. On the other hand, strengthening CRVS systems will provide better quality and more accurate information for both women and men, which will help uncover differences in leading causes of deaths.

We calculated the ratio of the crude death rate (CDR) in males over females for all countries in the WHO mortality dataset.[5] This analysis shows that the ratio of death rates for males and females varies across countries and regions.

Sex ratios between countries ranged from higher mortality rates in females in a few countries (e.g. Norway or Switzerland) to higher mortality rates in males in most countries. For example, Northern European countries had a median ratio of 0.95 for the studied period, compared to 1.31 in Southern and Central America (Figure 1).
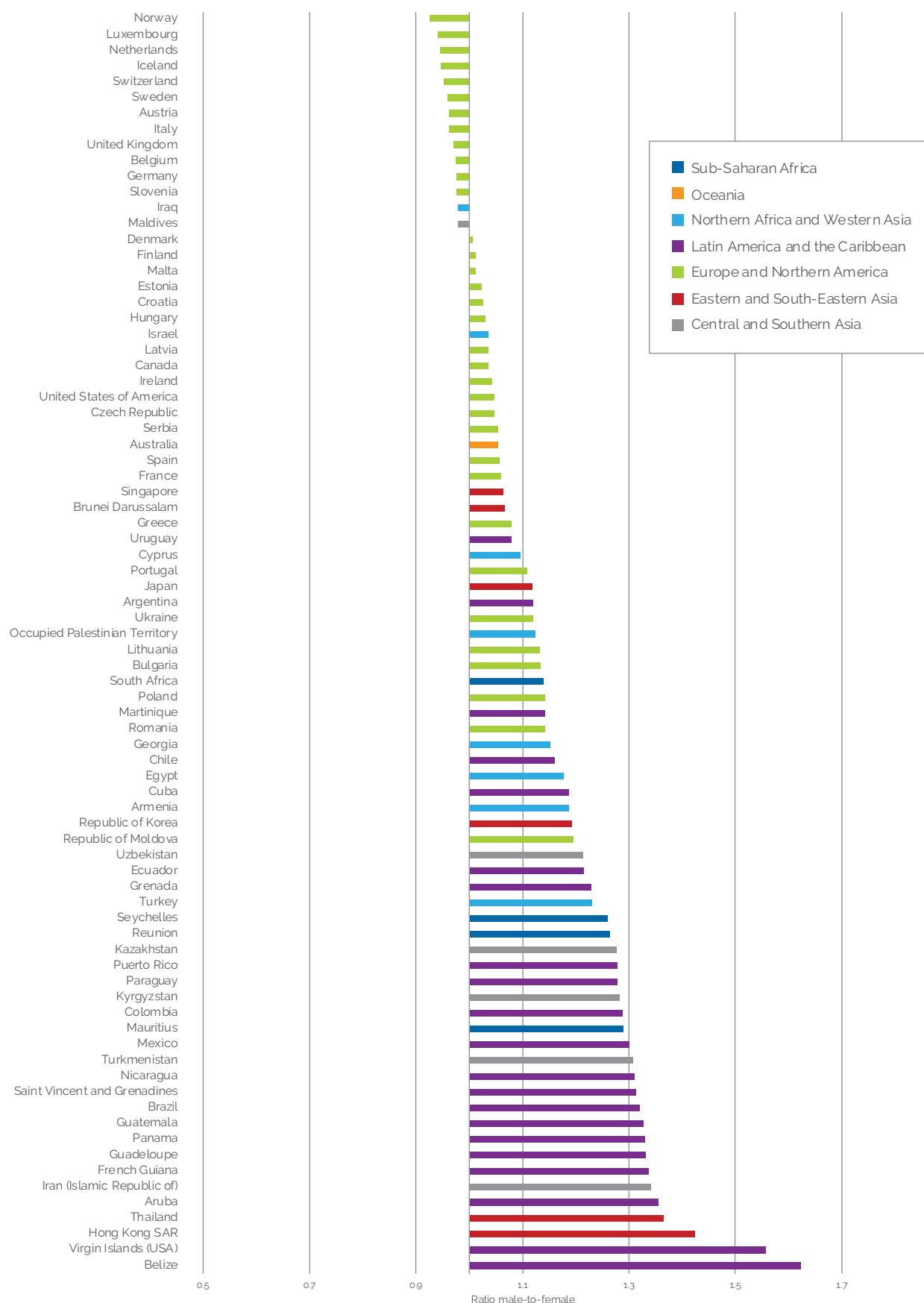
When looking at the progression of the ratio over time, we can see two different phenomena. First, ratios for most regions have moved closer to 1 in the past 20 years in all regions. Second, regions are becoming more homogeneous in terms of the ratio of death rates for males and females with a narrower range of ratios (see Figures 2 and 3). It is also apparent that the considerable differences between countries and regions tend to decrease over the years, approximating the "natural sex-ratio" of 1.0 to 1.1. This means that most countries are moving towards narrowing the gap in death rates between males and females. The distinction between male and female mortality rates depends heavily on the circumstances in which individuals live and mortality-related epidemiological conditions (**Crimmins et al. 2019**). The fluctuation over time in the relative level of mortality rates for men and women does not simply mirror epidemiological changes in the distribution of cause of death, but also reflects differential changes in exposures to risk or behavioural patterns for men and women (**Yang and Kozloski 2012**).

The differences in mortality ratios between countries and their declining time trends demonstrate the need to better account for underlying causes. Functioning CRVS systems can expose these differences as a first step in

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3   Unusable codes are those that have no use in informing public health policy, as the related underlying cause of death is too vague, or simply impossible.

4   Codes included in Chapter XVIII of the ICD-10 classification. This chapter includes symptoms, signs, abnormal results of clinical or other investigative procedures, and ill-defined conditions regarding which no diagnosis classifiable elsewhere is recorded.

5   We have calculated the crude death rate for each country and then estimated the ratio of male-to-female rates. See the "Methodological note" section for details.

Figure 1: Ratio of male-to-female death rates from 2015 deaths.

Legend:
- Sub-Saharan Africa
- Oceania
- Northern Africa and Western Asia
- Latin America and the Caribbean
- Europe and Northern America
- Eastern and South-Eastern Asia
- Central and Southern Asia

Countries (top to bottom): Norway, Luxembourg, Netherlands, Iceland, Switzerland, Sweden, Austria, Italy, United Kingdom, Belgium, Germany, Slovenia, Iraq, Maldives, Denmark, Finland, Malta, Estonia, Croatia, Hungary, Israel, Latvia, Canada, Ireland, United States of America, Czech Republic, Serbia, Australia, Spain, France, Singapore, Brunei Darussalam, Greece, Uruguay, Cyprus, Portugal, Japan, Argentina, Ukraine, Occupied Palestinian Territory, Lithuania, Bulgaria, South Africa, Poland, Martinique, Romania, Georgia, Chile, Egypt, Cuba, Armenia, Republic of Korea, Republic of Moldova, Uzbekistan, Ecuador, Grenada, Turkey, Seychelles, Reunion, Kazakhstan, Puerto Rico, Paraguay, Kyrgyzstan, Colombia, Mauritius, Mexico, Turkmenistan, Nicaragua, Saint Vincent and Grenadines, Brazil, Guatemala, Panama, Guadeloupe, French Guiana, Iran (Islamic Republic of), Aruba, Thailand, Hong Kong SAR, Virgin Islands (USA), Belize

X-axis: Ratio male-to-female (0.5, 0.7, 0.9, 1.1, 1.3, 1.5, 1.7)

understanding inequities in health outcomes for men and women. By providing routine and timely data on the number of deaths by age and sex, countries can more easily identify and understand changes in the mortality pattern for different population groups over time.

Note that the WHO mortality dataset used in this analysis contains data from countries reporting to this dataset. This is not a random selection of countries across regions or income status. Countries included in this dataset are usually those with functional CRVS systems capable of producing cause of death statistics routinely. As mentioned above, there is evidence that the completeness of civil registration systems may affect the ratio of death rates for males and females, since females are less likely to be registered in these environments (**Dincu and Malambo 2019**; **Silva 2016**). Further data collection is required to determine exactly how sex ratios from CRVS systems are affected by completeness of birth and death registration.

Figure 2: Ratio of male-to-female death rates by region 2000–2015.
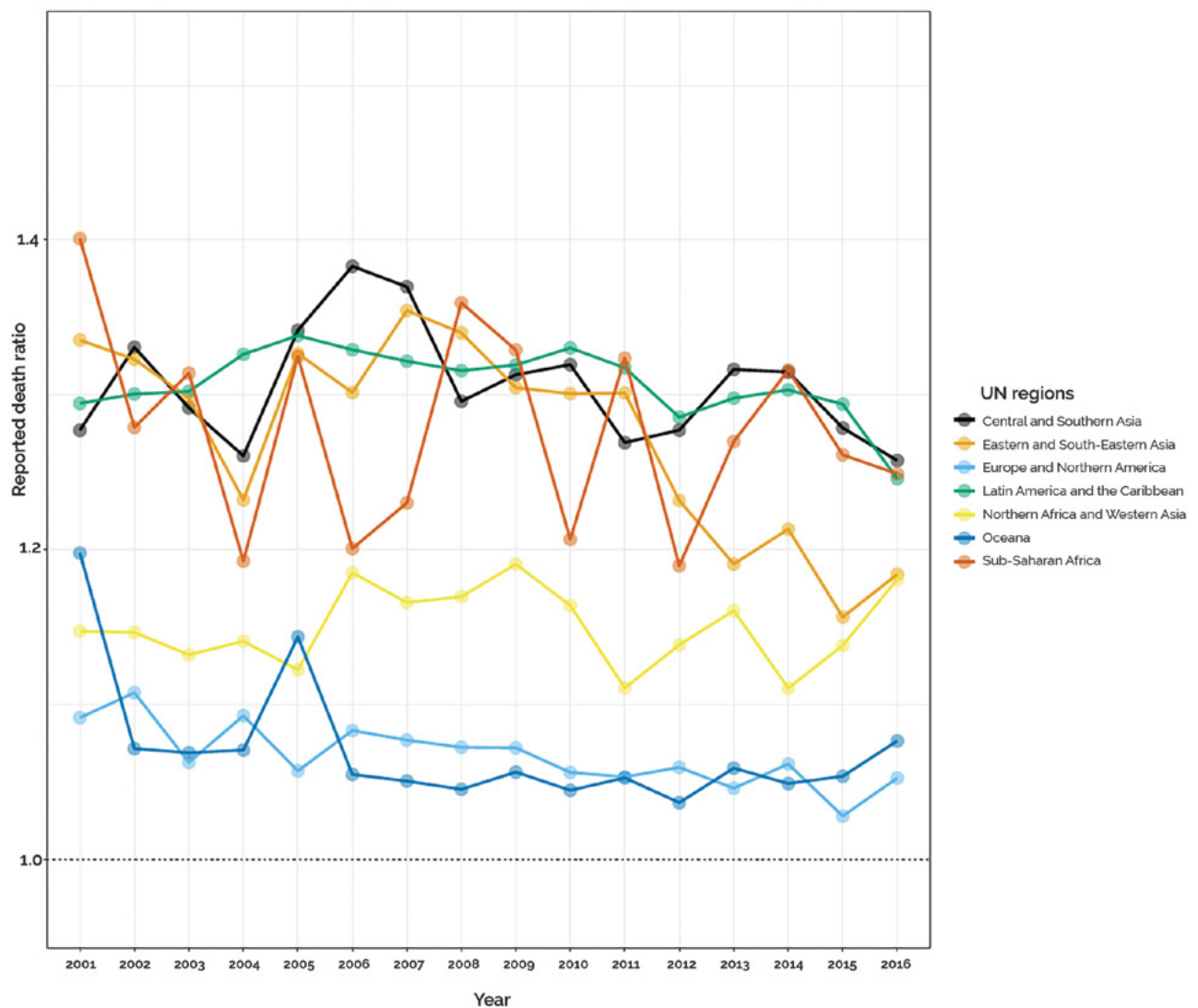
Figure *3*: **Map representing male-to-female sex ratios from reported deaths.**
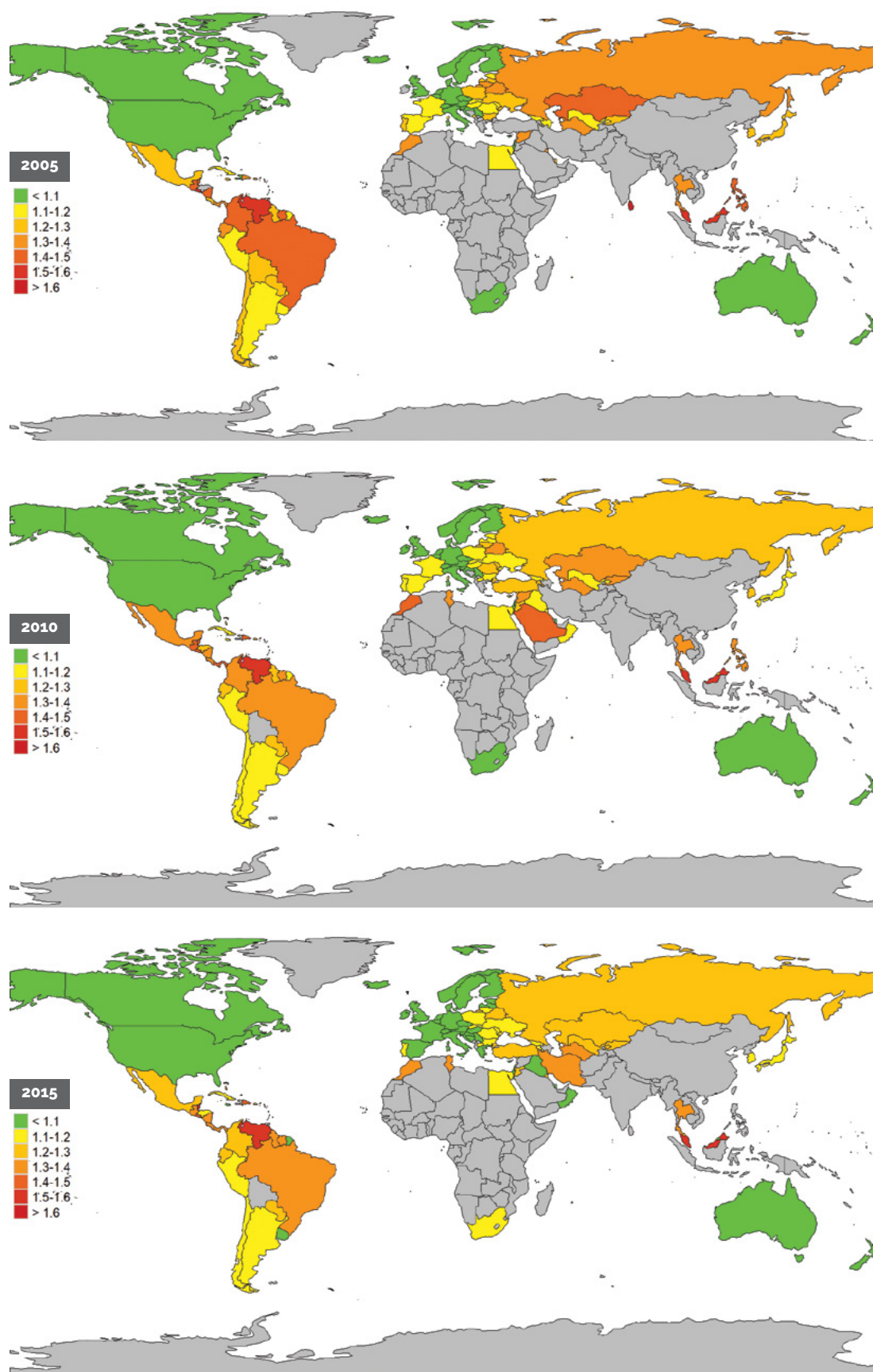
HEALTH SYSTEM BIAS AND CAUSES OF DEATH

Over the course of their lifetime, men and women have different health needs and interact differently with the health system. As in society, gender norms are embedded in health systems, which contributes to disparate health outcomes for men and women. Gender differences in health have been historically neglected by health system interventions. Health systems are not gender neutral, yet health interventions are designed and implemented with a gender-blind approach that neglects differences (**Heymann et al. 2019**; **Hay et al. 2019**; **Percival et al. 2018**). Among other reasons, this has contributed to the inability to reduce maternal mortality in the poorest areas of the world, HIV incidence in young girls in Southern Africa, and fatality rates among young men due to road traffic crashes (**Morgan et al. 2018**; **Gupta et al. 2019**).

Photo: Aye Zaw Myo / World Bank

The lack of gender lens has led to a bias in the health system (**Vong et al. 2019**). Gender bias[6] has implications in the diagnosis and treatment of both male and female patients. Historically, only male participants were included in clinical research, which led to a lack of evidence and knowledge of other genders (**Hamberg 2008**). Evidence from high-income countries shows that gender bias contributes to excess mortality for women as compared to men in conditions that affect both sexes beyond maternal conditions. Even though this could be partly explained by different biological responses for males and females, such as the link between menopause and the risk of cardiovascular diseases (CVD), it is also influenced by physician gender bias, which leads to men and women being treated and diagnosed differently (**Salles et al. 2019**; **Gudnadottir et al. 2017**; **Horton et al. 2016**).

One of the most prominent examples of physician gender bias is related to cardiovascular diseases (**Aggarwal et al. 2018**). Historically, CVD has been seen as a health problem linked to men, even though it is also the leading cause of death (COD) among women (**Woodward 2019**). Guidelines for managing CVD in women relied on studies for which only males were recruited, leading to "wrong treatment" recommendations for women. In addition, physicians are less compliant with the application of these protocols for women (**The Lancet 2019**). A growing body of evidence shows that females are less likely than males to receive treatment for ischemic heart disease, especially if they are young (**Gudnadottir et al. 2017**; **D'Onofrio et al. 2015**; **Daugherty et al. 2017**). Women suffering from myocardial infarction are less likely to receive secondary prevention treatment, despite substantial efforts made recently to reduce sex disparities in the implementation of guidelines (**Peters et al. 2018**). As a consequence of this

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6   Gender bias in medicine has been described as either an unintended, but systematic neglect of women's or men's wishes or health needs, or as a neglect of gender issues relevant to the topic of interest.

unequal and not evidence-based treatment, women have worse health outcomes than men after suffering from CVD (**Pagidipati and Peterson 2016**).

Women are also negatively affected by gender bias among healthcare providers for treatment of mental health disorders. A study of gender and mental health in China found significantly higher rates of schizophrenia among women than men (**Pearson 1995**). The same study showed that hospital bed occupancy did not reflect the male-female ratio, since males were more likely to occupy a bed.

How can gender bias in health systems influence statistics about causes of death?

The gold standard for reporting cause of death is to have a physician identify the underlying cause of death (uCOD) and code the cause using the rules and procedures established by the International Classification of Diseases for Mortality and Morbidity Statistics (ICD) (**WHO 2020**). Among other factors, the quality of cause of death statistics depends on the ability of the certifier to identify the true underlying cause of death[7] and report it according to international standards.

Errors in cause of death certification are common across the world, even in countries with very advanced health information systems. This greatly reduces the policy value of mortality data used to inform policy decisions (**Mikkelsen et al. 2020**). In six high-income countries, the quality of medical certification of cause of death was suboptimal with the potential to misguide the design or implementation of health interventions (**Mikkelsen et al. 2020**). This is due to a lack of training for physicians on how to fill out death

certificates, which leads to poor quality reporting (**McGivern et al. 2017**). In LMICs, this certification issue, combined with low registration rates, makes mortality statistics mostly unusable (**AbouZahr et al. 2019**). This has implications at many levels, ranging from higher costs to conduct surveys that estimate the disease burden in a population, to a lack of action to address priorities such as women's health issues (**Mills et al. 2017**).

Gender bias in diagnoses made by physicians, incentives to underreport certain conditions, or a lack of incentives to register certain causes of death specific to women, such as maternal conditions, could impact the quality of COD statistics. So far, there has been little research into how gender bias in the health system influences the quality of cause of death statistics in terms of the proportion of unspecific codes, ill-defined codes or conditions not useful for health policy-making (formerly known as "garbage codes").

The WHO advocates for further research to investigate sex differences in the completeness of death registration and possible biases in reporting causes of death (**WHO 2019**). An analysis of the quality and completeness of COD statistics in Ecuador revealed that more unusable codes were present in death certificates for women than men. This was true for all regions of the country, especially in Indigenous areas (**Peralta et al. 2019**).

The analysis of the WHO mortality dataset that includes more than 113 million deaths since 2000 shows that the quality of cause of death assignment is worse for women than for men overall and for all years (Figure 4).

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7   The disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury.

Figure 4: Proportion of unusable codes for health policy in COD reporting for males and females.

Legend:
- Chapter I - Certain infectious and parasitic diseases
- Chapter II - Neoplasms*
- Chapter II & III - Diseases of the blood and blood-forming organs**
- Chapter IV - Endocrine, nutritional, and metabolic diseases
- Chapter IX - Diseases of the circulatory system
- Chapter X - Diseases of the respiratory system
- Chapter XI - Diseases of the digestive system
- Chapter XIV - Diseases of the genitourinary system
- Chapter XVI - Certain conditions originating in the perinatal period
- Chapter XVIII - Symptoms, signs, and abnormal clinical and lab findings
- Chapter XX - External causes of morbidity

* Only includes codes starting with C

** Also includes codes D00-D49

When we look at the distribution of unusable codes across ICD10 chapters, we can see that most are from Chapter IX (diseases of the circulatory system) and Chapter XVIII (ill-defined codes). This distribution of unusable codes is stable over time from 2000–2015. For all years combined, 5.7 percent and 8 percent of all deaths reported were assigned an unusable code included in Chapter IX, for males and females respectively. Similarly, 4.9 percent and 5.7 percent of all deaths had ill-defined codes in males and females. The chapter on deaths due to injuries and other external causes recorded more unusable codes for males than

for females. In ICD-10 chapter XX, 1 percent and 0.4 percent of the causes of death reported were assigned unusable codes for males and females respectively. This might be explained by the higher probability of males dying of injuries compared to women.

The disaggregation of unusable codes by age group and ICD-10 chapter shows that unusable codes are more frequently used in older age groups and follow a pattern similar to the one previously described with a higher proportion of unusable codes in ICD-10 chapters IX and XX (Table 1).

Table 1: Proportion of unusable codes per age group and by ICD-10 chapter for males and females.

| Sex | ICD-10 chapter | Age group | | | | | |
		0-4	5-19	20-29	50-69	70+	Total
Male	Chapter I - Certain infectious and parasitic diseases	2.1%	1.0%	0.9%	1.0%	1.0%	1.0%
	Chapter II - Neoplasms*	0.1%	0.3%	0.6%	1.5%	1.2%	1.2%
	Chapter II & III - Diseases of the blood and blood-forming organs**	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
	Chapter IV - Endocrine, nutritional, and metabolic diseases	0.4%	0.1%	0.1%	0.0%	0.1%	0.1%
	Chapter IX - Diseases of the circulatory system	1.9%	2.0%	3.0%	5.2%	7.0%	5.7%
	Chapter X - Diseases of the respiratory system	0.8%	0.5%	0.4%	0.5%	0.6%	0.5%
	Chapter XI - Diseases of the digestive system	0.2%	0.2%	0.5%	0.6%	0.2%	0.3%
	Chapter XIV - Diseases of the genitourinary system	0.3%	0.7%	1.0%	1.4%	1.8%	1.5%
	Chapter XVI - Certain conditions originating in the perinatal period	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chapter XVIII - Symptoms, signs, and abnormal clinical and lab findings	6.2%	4.8%	6.0%	4.4%	4.7%	4.9%
	Chapter XX - External causes of morbidity	0.8%	7.0%	4.3%	0.7%	0.2%	1.0%
Female	Chapter I - Certain infectious and parasitic diseases	2.0%	1.6%	1.3%	1.3%	1.1%	1.2%
	Chapter II - Neoplasms*	0.1%	0.5%	1.2%	1.9%	1.1%	1.2%
	Chapter II & III - Diseases of the blood and blood-forming organs**	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
	Chapter IV - Endocrine, nutritional, and metabolic diseases	0.5%	0.2%	0.1%	0.1%	0.2%	0.2%
	Chapter IX - Diseases of the circulatory system	2.0%	2.9%	3.5%	5.4%	9.4%	8.0%
	Chapter X - Diseases of the respiratory system	0.8%	0.7%	0.5%	0.5%	0.6%	0.6%
	Chapter XI - Diseases of the digestive system	0.2%	0.3%	0.4%	0.5%	0.1%	0.2%
	Chapter XIV - Diseases of the genitourinary system	0.3%	1.3%	1.4%	1.7%	1.6%	1.6%
	Chapter XVI - Certain conditions originating in the perinatal period	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chapter XVIII - Symptoms, signs, and abnormal clinical and lab findings	6.2%	6.4%	6.2%	4.1%	6.1%	5.7%
	Chapter XX - External causes of morbidity	0.8%	4.3%	1.8%	0.4%	0.1%	0.4%

% of garbage codes

0.0%   9.4%

There is little evidence around the sex differences in death certification quality. Our findings support emerging work in Ecuador and Brazil, which reports that unusable codes were more frequent in death certificates of women than men (and consistent across regions in both countries) (**Peralta et al. 2019**; **França et al. 2014**).

The gender difference in the quality of cause of death statistics is probably the result of a complex interplay of multiple determinants ranging from individual and biological characteristics to health system factors. One potential explanation for this difference is that women live longer than men, with more complex constellations of diseases that make it more difficult to identify the underlying cause of death (**Martins et al. 2016**). Also, men die more frequently from easily identifiable causes, such as injuries, which makes the coding of these conditions more straightforward (**Bhalla et al. 2010**).

Gender inequity can also be explained in terms of gender bias at the time of diagnosis or treatment. There are several mechanisms that may affect the quality of death certificates, which can occur in isolation or in combination. These mechanisms include the

- lack of understanding of women's health issues by physicians (**Dijkstra et al. 2008**);

- bias of physicians against women and certain minorities (**Woodward 2019**); and

- fact that in some cultures, women's lives are less valued than men's (**Kapilashramic et al. 2015**; **Bambra et al. 2009**). This may lead to a smaller investment of time and resources to clarify the reasons behind their deaths and could be especially relevant for those cases in which an autopsy would be required.

These results suggest that the reliability of causes of death recorded in CRVS systems differs for men and women. More research is required to confirm these results at the local level and to investigate the underlying reasons for this difference.

THE GENDERED DIMENSIONS OF INTIMATE PARTNER VIOLENCE

When it comes to injuries, the difference in rates of occurrence between men and women are striking. Extensive research has shown that males are four times more likely to die due to an injury than women (**WHO 2019**). In 2016, there were over 3 million deaths due to injuries worldwide, among which road traffic accidents and homicides were the most prevalent (**WHO 2019**). The leading cause of injury death for men and women was road traffic, followed by interpersonal violence.

However, when looking at the sex-disaggregated data of interpersonal violence, an important difference arises: 38 percent of homicides of women are committed by an intimate partner compared to 6 percent of men (**Stöckl et al. 2013**). Intimate partner violence (IPV) is a type of gender-based violence inflicted by the victim's current partner or ex-partner (**Devries et al. 2013**) that has a substantial impact on women's physical, mental, sexual, and reproductive health, and also affects their children and communities (**Stöckl et al. 2013**; **Garcia-Moreno et al. 2006**; **Campbell 2002**). The World Bank suggests that about 350 million women have suffered severe physical violence from their spouses (**Sumner 2015**), and the World Health Organization declared IPV as a "global public health problem of epidemic proportions" (**WHO 2013**). A multi-country study showed that between 15.4 and 70.9 percent of women who

had ever been married or lived with a partner reported having experienced physical or sexual violence from their partner (Garcia-Moreno et al. 2006). This same study suggested that the prevalence of IPV is highest and has the worst consequences for women living in LMICs.

Sixty percent of countries worldwide have no useful CRVS data regarding homicide deaths (Butchart and Mikton 2014). This is of special concern in LMICs where deaths are recorded using different information systems (police, mortuary, or health sector) and may not be reflected in the national mortality statistics (Samuel et al. 2012). The existing body of evidence shows that estimates coming from CRVS systems consistently underestimate the burden of IPV and IPV-caused mortality (Devries et al. 2013; Redding 2017; Abrahams et al. 2009). IPV administrative data is incomplete and fragmented, with information scattered across institutional silos and using non-specific codes. One study showed that with the current state of data in England, it was not possible to robustly extract data on IPV for governance or auditing purposes, and coders were more reluctant to use IPV codes compared to codes for assault (Olive 2018). A study in South Africa showed that police or mortuaries collect most data about IPV deaths. These institutions are generally not connected with the health sector responsible for generating public health relevant data. In addition, in cases where information flows into the health sector, the relationship between victim and offender is usually not recorded, which is essential for identifying and preventing IPV (Stöckl et al. 2013).

All of this leads to a mismatch between what countries report through their vital statistics system and global estimates for the number of IPV fatalities. One of the reasons for this lies with the way IPV can be reported within the ICD-10

Photo: Vincent Tremeau / World Bank

classification. There are only 4 codes in which the relationship with the perpetrator can be reported (T74.1, Y06, Y07, and Z63). Even if this information is available, there is no option for coders to report it in a way that it will be accurately reflected in vital statistics. Codes related to assault by weapons, drowning, or hanging do not differentiate between IPV and other types of violence. Consequently, there are no reliable estimates of IPV fatalities from CRVS systems as they are hidden within other ICD-10 codes.

The analysis of the WHO mortality database with data from over 100 countries resulted in very low numbers of IPV fatalities over the past 20 years (Figure 5). We have estimated the total number of deaths coded for one of the IPV specific codes in the ICD-10 classification.[8] These results differ from the findings presented by Stöckl et al., who estimated much higher rates of IPV homicides. Most probably, IPV homicides are being reported by countries in ICD-10 Chapter XX (External causes of morbidity and mortality) under codes unspecific to IPV (for example, X93 – Assault by handgun discharge).

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8   Y06.0, Y07.0, Z63.0-9, T74.1, and Z70.2

Figure 5: Number of deaths reported with IPV-specific ICD-10 codes from 2000–2015 (ICD-10 codes Y06.0 and Y07.0).
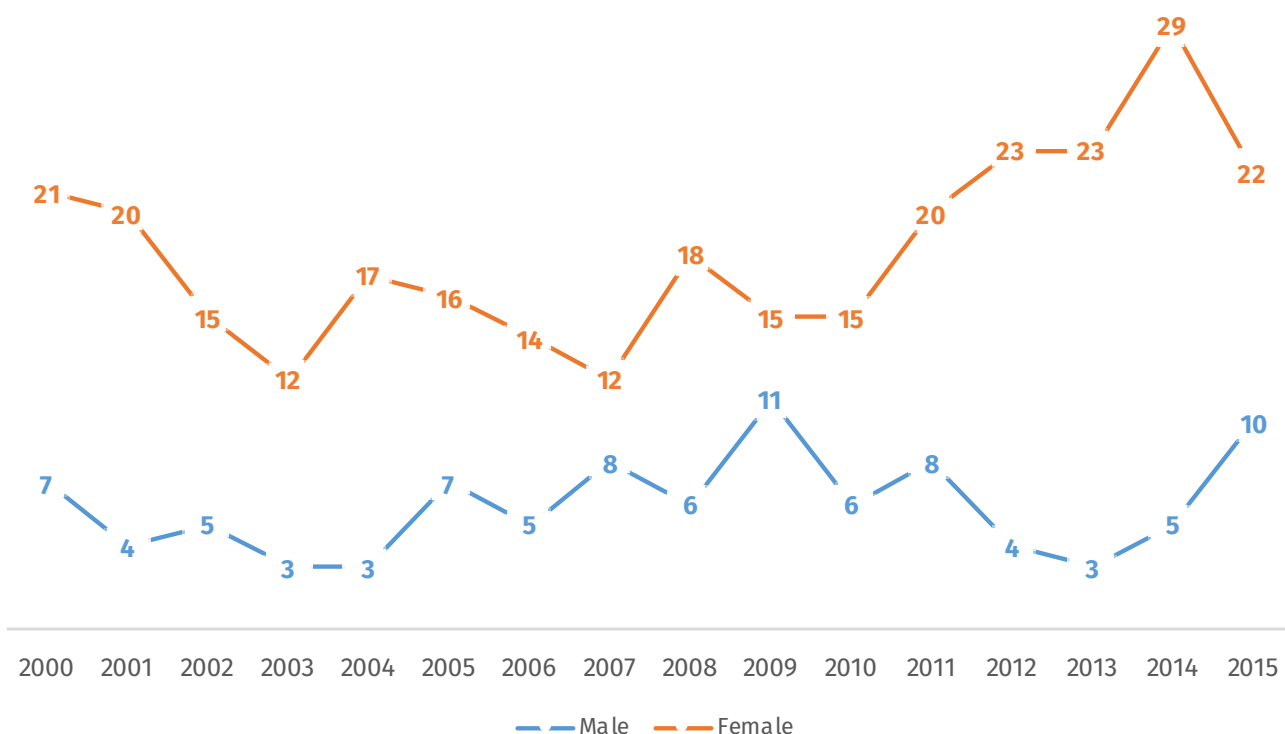
An analysis of global intimate partner homicides estimates that 13.5 percent of all homicides were perpetrated by an intimate partner (**Stöckl et al. 2013**). Further, homicides in which the perpetrator was the partner were six times more frequent in women than in men. This means that more than one-third of female homicides have been perpetrated by an intimate partner. The biggest difference was found in Southeast Asia, with 58.7 percent of all female homicides being considered IPV compared to 0.87 percent of men.

When compared to global analysis based on multiple sources of information, CRVS systems underreport IPV homicides. It is especially concerning to see that there are almost no LMICs reporting this type of death given the especially high prevalence of violence against women in these countries (**Garcia-Moreno et al. 2006**; **Alesina et al. 2016**).

However, the issue extends beyond how to code IPV fatalities. Immature CRVS systems can contribute to low estimates of IPV. Fragmented mortality information systems contribute to the loss of essential information for public health (**Devries et al. 2013**). IPV deaths are often recorded in mortuaries or police stations, but due to the lack of integration of information systems, these deaths are often invisible to the official vital statistics. This is a common phenomenon that has also been described for other types of external causes of death, such as road traffic accidents (**Bhalla et al. 2010**).

RECOMMENDATIONS

- Strengthening routine data collection within CRVS systems can help countries understand the differences in mortality between men and women;

- More efforts are required to improve the quality of cause of death determination by the CRVS system, especially for women's deaths;

- Gender-sensitive health systems require reliable information about the number and causes of deaths for men and women. Countries need to understand the nature of sex differences in their mortality statistics to prevent bias in mortality statistics;

- There is currently little useful information from low performing CRVS systems. More research is needed to understand how completeness affects the male-to-female ratio of deaths, as well as the quality of cause of death reporting; and

- CRVS systems should provide robust estimates about gender-based violence fatalities. This will require improvements to the classification of diseases and a redesign of the CRVS notification systems to avoid silos and inefficiencies.

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Photo: Dominic Chavez / World Bank

METHODOLOGICAL NOTE

The analysis presented in this paper relies on the WHO mortality dataset that is the largest single dataset with information about global causes of death. In total, 137 countries report annual aggregate figures of number of deaths by cause, age, and sex. The analyzed dataset contains a total of 113,608,547 deaths recorded since 2000 (**WHO Mortality Database 2019**). The data reported by countries represents, in most cases, the deaths registered in their CRVS system and constitute their official mortality statistics.

For the purpose of this analysis, we have used data reported from 2000 for all countries with a population above 90,000 people, building on similar studies conducted previously. We have included only years being reported using the ICD-10 classification.

We calculated the total number of deaths by cause, age, sex, country, and year of reporting and summarized the information in different ways. We have calculated the ratio of deaths of males-to-females for each year by country that has at least 70 percent data completeness.

Quality of cause of death reporting was assessed using the distribution of codes not usable for policy-making (formerly known as "garbage codes") for males and females and for each ICD-10 chapter (**WHO 2014**). There are different types of errors that doctors can make when certifying the underlying cause of death. Understanding the types of errors is essential to prioritize interventions to reduce the number of unusable codes (for example, training activities).

We have grouped the codes and countries in the following categories defined in the global health estimates structure and by WHO region. Finally, we have estimated the total number of deaths in each country by year that could be considered as intimate partner violence (IPV). ICD-10 codes considered as IPV were:

- Y06.0
- Y07.0
- Z63.0-9
- T74.1
- Z70.2

ANNEX

Ratio of male-to -female deaths from reported deaths in different regions (2001-2016).

Central and Southern Asia

Eastern and South–Eastern Asia

Europe and Northern America

Latin America and the Caribbean
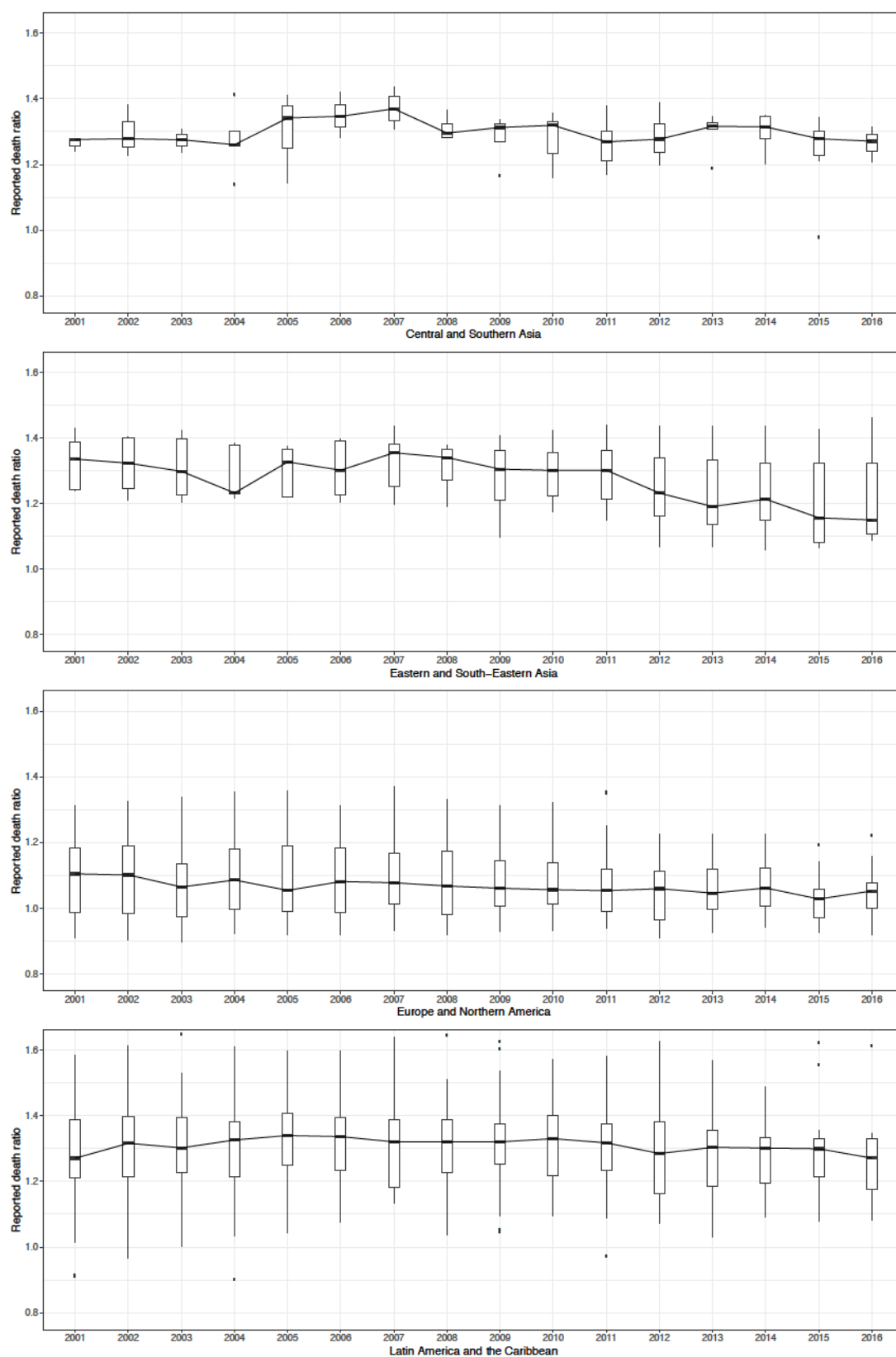
Ratio of male-to -female deaths from reported deaths in different regions (2001-2016). *(continued)*

Northern Africa and Western Asia

Oceania

Sub–Saharan Africa
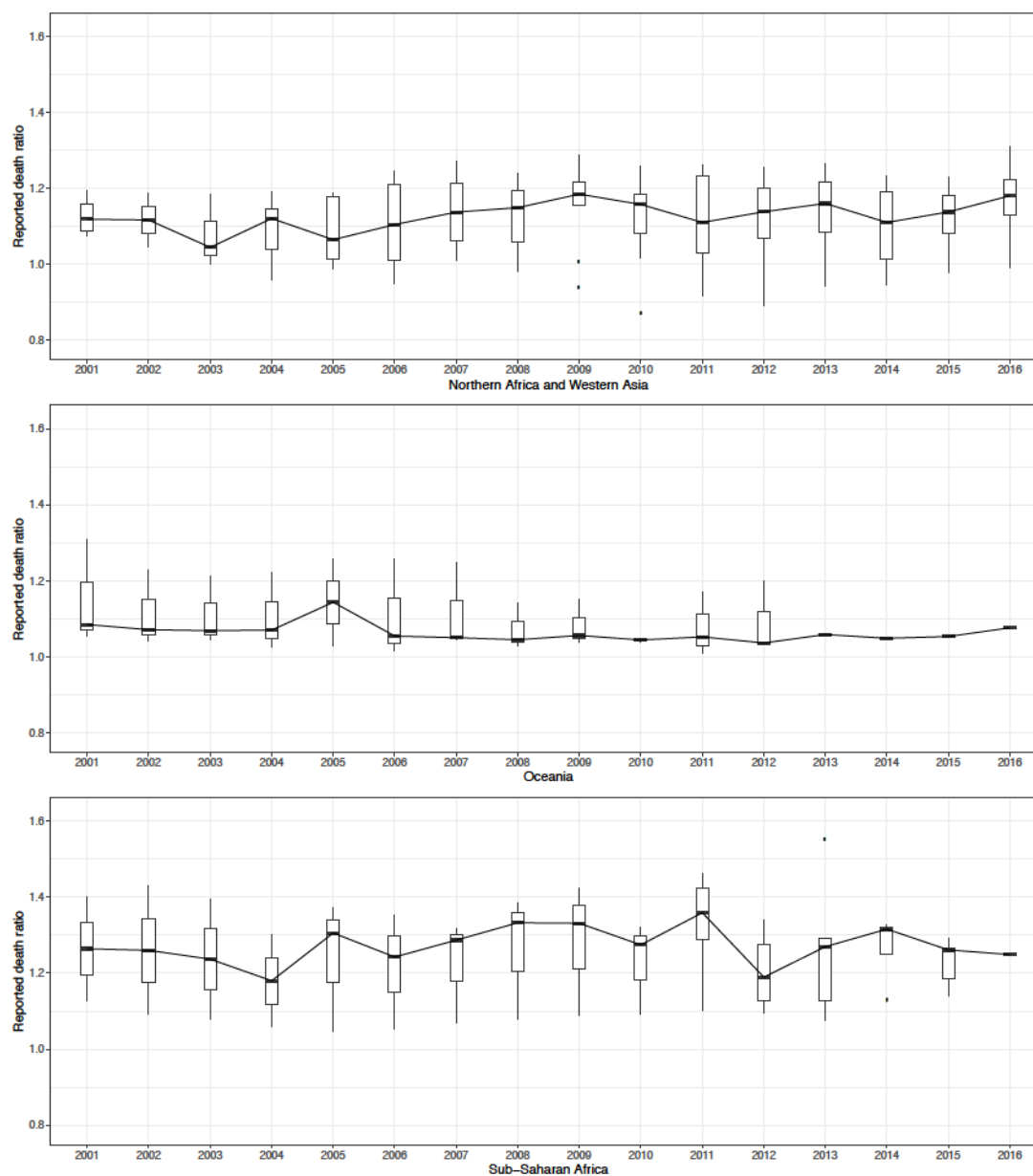
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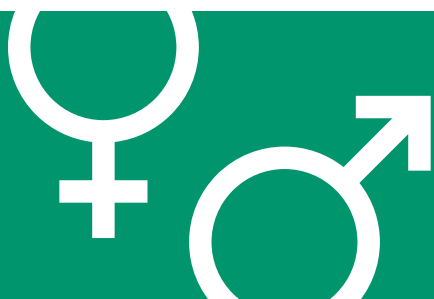
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