Availability and quality of cause-of-death data for estimating the global burden of injuries

Kavi Bhalla,[a] James E Harrison,[b] Saeid Shahraz[a] & Lois A Fingerhut[c] on behalf of the Global Burden of Disease Injury Expert Group

Objective To assess the availability and quality of global death registration data used for estimating injury mortality.

Methods The completeness and coverage of recent national death registration data from the World Health Organization mortality database were assessed. The quality of data on a specific cause of injury death was judged high if fewer than 20% of deaths were attributed to any of several partially specified causes of injury, such as "unspecified unintentional injury".

Findings Recent death registration data were available for 83 countries, comprising 28% of the global population. They included most high-income countries, most countries in Latin America and several in central Asia and the Caribbean. Categories commonly used for partially specified external causes of injury resulting in death included "undetermined intent," "unspecified mechanism of unintentional injury," "unspecified road injury" and "unspecified mechanism of homicide". Only 20 countries had high-quality data. Nevertheless, because the partially specified categories do contain some information about injury mechanisms, reliable estimates of deaths due to specific external causes of injury, such as road injury, suicide and homicide, could be derived for many more countries.

Conclusion Only 20 countries had high-quality death registration data that could be used for estimating injury mortality because injury deaths were frequently classified using imprecise partially specified categories. Analytical methods that can derive national estimates of injury mortality from alternative data sources are needed for countries without reliable death registration systems.

Introduction

Reliable estimates of the burden of death and disability due to injury are essential for shaping national and global health priorities. Although the quality of the information available in developing countries is relatively poor, past efforts at quantifying the global burden of disease[1–3] have convincingly established that injuries contribute approximately 10% to global mortality and 12% to global morbidity. A study into the global burden of disease was commissioned by The World Bank in 1991 and a new study is currently under way.[4] Substantial collaborative efforts by the global injury research community will ensure that the best available evidence is incorporated into new estimates of the global burden of injuries.[5] Thus, this is an opportune time to undertake an evaluation of the global data sources used for estimating the global burden of injuries. This paper focuses on the availability and quality of global mortality data reported by national death registration systems to the World Health Organization (WHO) mortality database.[6]

The WHO mortality database is the largest single repository of international data on causes of death. Our study builds on past work by Mathers et al.,[7] who examined the quality of cause-of-death data in this database. They assessed quality by examining the proportion of deaths assigned to ill-defined cause-of-death codes, or "dump" codes. Unfortunately, some of the most important dump codes for injury were not included in their quality assessment. For instance, there was no assessment of code X59 of the *International classification of diseases and related health problems, tenth revision* (ICD-10), namely "accidental exposure to other and unspecified factors," which is extensively used in death registers to classify injury deaths. Moreover, the WHO mortality database has grown over the past 5 years and a reassessment of data quality is now due.

Following the lead of Mathers et al.,[7] our aim was to assess the availability of recent mortality data, the completeness and coverage of regional death registration, and the quality of data derived from injury dump codes. In addition, we discuss the effect of data quality on the reliability of estimates of deaths due to road traffic injury, suicide and homicide.

Methods

Availability of mortality data

We obtained death registration data for a range of countries from the publicly available WHO mortality database (21 April 2009 update).[6] The database includes details of deaths registered by national civil registration systems in which the underlying cause of death is coded by the relevant national authority in accordance with ICD rules.[8] The analysis included only WHO member countries (listed at: http://www.who.int/countries) for which data were available from after 2000. For most countries, the latest data available were coded using ICD-10. For some, however, the latest available data were classified using the ICD-9 basic tabulation list, which is not adequate for estimating injury mortality, as subsequently discussed. We also included data classified using detailed ICD-9 codes from countries that made such data available to WHO: Guyana, Kiribati, the Netherlands (for Aruba), Saint Vincent and the Grenadines, Singapore, Slovenia and Thailand.

[a] Department of Global Health and Population, Harvard School of Public Health, 718 Huntington Avenue, Boston, MA, 02115, United States of America (USA).
[b] Research Centre for Injury Studies, Flinders University, Adelaide, Australia.
[c] International Collaborative Effort on Injury Statistics, Washington, USA.
Correspondence to Kavi Bhalla (e-mail: kavi_bhalla@harvard.edu)

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Completeness of registration

The completeness of national death registration was quantified by comparing the number of deaths recorded by death registration data for each country with estimates of projected mortality from the United Nations Population Division.[9] Clearly such estimates of completeness are only crude indicators and should not be used for deriving incidence rates for cause-specific mortality. Nevertheless, they do provide some indication of the level of completeness of death registration in each country. In our study, we judged completeness to be high when it was greater than 80% of the expected value, medium when between 60% and 80%, and low otherwise.

Data quality

We classified all injury deaths using 48 categories of specified external causes of death, which constitute the reporting categories recommended by the injury expert group of the 2005 Global Burden of Diseases, Injuries and Risk Factors Study (i.e. the GBD Injury Expert Group),[10] and 21 categories of partially specified external causes (Table 1, available at: http://www.who.int/bulletin/volumes/88/11/09-068809). Several countries coded the cause of death using condensed versions of ICD-9 and ICD-10, which do not contain sufficient detail to classify injury deaths according to the full list of external causes of injury shown in Table 1. In addition, these condensed versions group together dump codes with imprecise definitions. For example, the ICD-10 basic tabulation list includes the code X59, for unspecified unintentional injury, in the category 1103 (i.e. all other external causes). The impossibility of separating dump codes means that deaths classified using these codes cannot be reassigned to specified causes and, consequently, the incidence of these causes cannot be estimated. Thus, we excluded countries that used basic tabulation lists from further quality assessment.

Data quality was assessed by determining the proportion of deaths that were classified as belonging to various partially specified categories: the quality of the data improves as the proportion of deaths assigned to partially specified categories decreases. Moreover, the partially specified categories may form a hierarchy in terms of their information content. This hierarchy is related to the specificity of the definition of each category. For example, the death of a car occupant who was killed in a road traffic accident may be coded using any of the following categories in a hierarchy of partially specified categories whose definition shows less specificity towards the end of the list:

i) unspecified road injury not including a pedestrian or bicyclist (ICD-10 codes: V87–V88);
ii) unspecified unintentional road injury (ICD-10 codes: V89, Y85.0);
iii) unspecified unintentional transport injury (ICD-10 codes: V99, Y85.9);
iv) unspecified unintentional injury (ICD-10 code: X59);
v) unspecified injury mechanism (ICD-10 code: Y89.9);
vi) unknown cause of death (ICD-10 codes: R95–R99).

To determine data quality, we computed the proportion of deaths in each partially specified category relative to the corresponding total number of deaths at that level of specificity: e.g. the proportion of road injuries recorded as an unspecified unintentional road injury. Data quality was rated as high when this proportion was smaller than 20%.

Finally, we examined the distribution of deaths classified as belonging to the partially specified categories to determine the circumstances in which the data can, nevertheless, be used to derive reliable estimates of mortality for various specific external causes of death. The countries for which deaths due to road injury, homicide and suicide can be reliably estimated are given as an illustrative example.

Results

Availability of mortality data

Table 2 (available at: http://www.who.int/bulletin/volumes/88/11/09-068809) summarizes the availability of death registration data in the WHO mortality database for countries in the 21 different regions of the world defined by the 2005 Global Burden of Diseases, Injuries and Risk Factors Study.[10] For each country, the most recent year for which data are available and the number of years of data availability are listed. In all, 83 countries met the inclusion criteria. They accounted for 28% of the global population. Recent data were available from most countries in high-income regions except for a few notable exceptions: Switzerland used a basic tabulation list and no recent data were available from Belgium. The coverage of death registration data in low- and middle-income regions was more irregular. Three of the four Asian regions (i.e. South, South-East and East

Asia) were severely underrepresented, with less than 15% of the regional population covered. The continent of Africa was even less well covered. Data from sub-Saharan Africa were available for only one country (i.e. South Africa). However, low- and middle-income countries in Latin America and the Caribbean were well represented, with over 80% of the population covered. The availability of injury data from eastern Europe, central Europe and central Asia was limited, primarily because of the use of basic tabulation lists.

While historical death registration data were available for over a decade for many high-income countries, the most recent data for many of these countries dated from before 2005 (Table 3), which suggests that there were delays in reporting to WHO. Although low- and middle-income countries had been reporting data for a shorter time, 5 years of recent data were available for many. It should be noted that all of the ICD-9 data in the WHO mortality database were coded using the ICD-9 basic tabulation list, which limits the length of the historical record in these cases.

Completeness of registration

Of the 83 countries analysed, completeness was high (i.e. > 80%) in 62, medium (i.e. 60–80%) in 9, low (< 60%) in 5, and could not be assessed in the 7 for which no estimate of all-cause deaths was available from the United Nations Population Division. Table 3 lists the completeness of national death registration and the proportion of deaths assigned to various partially specified causes for selected countries. The figures for the remaining countries are listed in Appendix A (available at: http://www.globalburdenofinjuries.org/gimd/Quality_Global_Injury_Mortality_Data.pdf).

Data quality

Use of the broadest unspecified cause-of-death category, i.e. unknown cause of death (ICD-10 codes: R95–R99), was relatively rare. Only Haiti assigned more than 20% of all-cause deaths to this category. However, the use of codes for undetermined intent (ICD-10 codes: Y10–Y34, Y87.2) was common, with 18 countries, including one high-income country (i.e. Singapore), classifying more than 20% of injury deaths as due to undetermined intent. Two of the three countries from North Africa and the Middle East (i.e. Bahrain and Egypt) placed over one-third of all injury deaths in this category. The other countries with

an exceptionally high number of deaths in this category included: Azerbaijan (83%), the Dominican Republic (45%), Egypt (42%), Guatemala (37%), Maldives (98%), Suriname (35%) and South Africa (66%). In contrast, the number of deaths classified as being due to an unspecified injury mechanism with undetermined intent (ICD-10 code: Y89.9) was negligible in all countries.

With regard to unintentional injuries, many countries coded a large number of deaths using the broadest unspecified mechanism category: unspecified unintentional injury (ICD-10 code: X59). In 15 countries, over half of which were in Western Europe, over 20% of unintentional injury deaths were allocated this code. The proportion of deaths coded to the unspecified non-transport injury subcategory of unspecified unintentional non-transport injury (ICD-10 code: Y86) was negligible in all countries, with the notable exception of Cuba.

With regard to transport deaths, only Georgia (46%) and Serbia (22%) allocated more than 20% of deaths to the broadest unspecified category: unspecified unintentional transport injury (ICD-10 codes: V99, Y85.9). However, many countries coded a large number of deaths due to road injury using the broadest unspecified category: unspecified unintentional road injury (ICD-10 codes: V89, Y85.0). In total, 40 countries used this code for more than 20% of road deaths. Many were high-income countries, including two in North America (i.e. Canada and the USA) and six in Western Europe, two of which (i.e. France and Portugal) allocated over 80% of road deaths to this category. The other partly specified subcategory of road injury, unspecified road injury not including a pedestrian or bicyclist (ICD-10 codes: V87–V88), was used less often. Only seven countries used this category for more than 20% of vehicle occupant deaths. Three of these (i.e. Greece, Ireland and San Marino) used ICD-9, which does not differentiate between different types of vehicle occupant.

With regard to suicide, the mechanism of death was usually specified. With the exception of Georgia, Haiti and Saint Lucia, no country attributed more than 20% of suicide deaths to an unspecified mechanism. However, the mechanism of homicide deaths was much less likely to be specified. In 13 countries, the mechanism was not specified for more than 20% of homicides. These countries included Portugal (27%) and Spain (22%) in Western Europe

and, notably, Israel (43%). The mechanism of deaths classified as being due to a legal intervention was always specified. In no country, were more than 3% of these deaths attributed to an unspecified mechanism.

In general there was considerable heterogeneity between countries in the use of unspecified codes. While Australia and the United Kingdom of Great Britain and Northern Ireland classified a large proportion (i.e. 18% and 24%, respectively) of injury deaths as due to unspecified unintentional injury (ICD-10 code: X59), far fewer deaths were coded in this way in the USA (5%). On the other hand, 12% of all injury deaths were coded as due to undetermined intent (ICD-10 codes: Y10–Y34, Y87.2) in the United Kingdom, while the proportions were much smaller in Australia and the USA (1% and 3%, respectively).

Overall, only 20 countries did not allocate more than 20% of deaths to any partially specified category (Table 4). However, since the use of most partially specified categories influences data on only certain external causes of death, the number of countries whose data can be used to provide reliable estimates of deaths due to a particular external cause may be much larger than 20. For example, Table 4 lists 47 countries for which reliable estimates of road injury deaths were available and 60 for which reliable estimates of death due to suicide or homicide were available.

Discussion

Previous work on national and global mortality patterns has not paid sufficient attention to injuries. We undertook this analysis because the only other assessment of the quality of global cause-of-death data[7] did not consider the use of the most common injury dump codes. Furthermore, the external causes of injuries are often poorly categorized in many administrative data systems. For instance, even in high-income countries with an extensive history of disease surveillance, hospital administration records commonly omit the external cause of an injury.[11–13] Similarly, in an unpublished analysis of mortality surveillance data based on verbal autopsy, which is the only source of mortality data in many information-poor settings, we found that often only the nature of the injury was reported for injury deaths. This is a serious shortcoming that will hamper attempts to develop injury prevention

strategies since reliable estimates of the incidence of external causes of injuries are needed.[14,15]

The inadequate classification of injuries by ICD basic tabulation lists is another reason why injury deaths have not been fully considered. These summary lists do not provide codes for the mechanism of a suicide or homicide. Thus, the incidence of many important mechanisms of injuries (e.g. firearm injury, poisoning and burn injury) cannot be determined. In addition, the summary lists pose a more substantial problem for assessing mortality due to specific causes of injury. Usually the key injury dump codes identified in our analysis (e.g. ICD-10 code: X59) are grouped together with other specified mechanisms. Without access to data on these injury dump codes, the quality of the data overall cannot be assessed and injury mortality cannot be reliably estimated.

Ultimately, the purpose of this analysis was to identify those countries where the incidence of death due to injury can be reliably estimated. In the absence of empirical evidence to support a more nuanced characterization of quality, we adopted a maximum of 20% for each partially specified category for the cause of death to define high-quality data. While this threshold is to some extent arbitrary, it is based on the understanding that, when a large number of deaths have been allocated to partially specified categories, reapportioning deaths to specified categories can introduce substantial biases. Nevertheless, we showed that these categories contain a hierarchy of information content (i.e. they are partially specified) that should be harnessed fully to derive estimates of the incidence of death due to injury. Thus, although only 20 countries had high-quality data on all quality indicators, many more had high-quality data for specific external causes such as road injury, suicide and homicide.

The considerable heterogeneity between countries in the use of partially specified codes shows that they differ in coding practices. An understanding of those differences may enable us to identify biases arising from the dump codes used in specific countries and to derive appropriate reclassification rules for these deaths. There may also be commonalities in coding practices across countries that could help explain, for instance, why death registers in most countries tend to report the mechanism of suicides but not the mechanism of homicides.

Table 3. **Completeness of national death registration, the number of deaths due to different causes and the proportion of deaths assigned to various partially specified causes for selected countries included in the WHO mortality database, 2000–2007**[a]

	Region,[b] country and year of most recent data											
	Asia Pacific, high-income countries	Central Asia	East Asia	South-East Asia	Australasia	Caribbean	Central and Eastern Europe	Western Europe	Latin America	Northern Africa and the Middle East	North America, high-income countries	Southern sub-Saharan Africa
	Japan	Uzbekistan	China, Hong Kong SAR	Thailand	Australia	Cuba	Poland	Germany	Brazil	Egypt	USA	South Africa
	2007	2005	2007	2002	2004	2006	2006	2006	2005	2000	2005	2005
Completeness of death registration	High	High	High	High	High	High	High	High	Medium	High	High	Medium
All-cause deaths, No.	1083796	140585	38678	380364	132314	84824	368285	830227	1006827	382138	2448017	591213
% of all-cause deaths ascribed to an unknown cause (ICD-10 codes: R95–R99)	0	1	1	14	1	1	4	2	9	1	1	11
Injury deaths, No.	75380	10142	2150	42803	7970	7047	25363	33024	127608	16709	176406	53124
% of injury deaths ascribed to unspecified mechanism and intent	0	0	0	0	0	0	0	0	0	0	0	0
% injury deaths ascribed to undetermined intent	3	13	6	**24**	1	4	10	7	9	**42**	3	**66**
Deaths due to unintentional injury, No.	41937	6356	827	24117	5603	4670	16134	19993	59519	9424	120462	12853
% of unintentional injury deaths ascribed to an unspecified unintentional injury	7	11	11	13	18	0	5	5	4	0	5	19
Deaths due to transport injury, No.	9968	2395	197	13389	1687	1315	5959	5657	36592	5446	48047	5454
% of transport injury deaths ascribed to unspecified transport injury	1	3	1	0	0	0	3	0	1	6	0	0
Deaths due to road injury, No.	9434	2277	175	13251	1582	1255	5456	5409	35736	4381	45812	5354
% of road injury deaths ascribed to unspecified unintentional road injury	4	7	0	**39**	7	2	11	**28**	**26**	1	**25**	**87**

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Region,[b] country and year of most recent data

	Asia Pacific, high-income countries	Central Asia	East Asia	South-East Asia	Australasia	Caribbean	Central and Eastern Europe	Western Europe	Latin America	Northern Africa and the Middle East	North America, high-income countries	Southern sub-Saharan Africa
	Japan	Uzbekistan	China, Hong Kong SAR	Thailand	Australia	Cuba	Poland	Germany	Brazil	Egypt	USA	South Africa
	2007	2005	2007	2002	2004	2006	2006	2006	2005	2000	2005	2005
% of road injury deaths of vehicle occupants ascribed to unspecified unintentional road injury not including pedestrian or bicyclist	6	0	0	0	1	2	0	0	2	**45**	16	10
Deaths due to non-transport injury, No.	29 205	3 237	538	7 601	2 921	3 343	9 446	13 305	20 477	3 976	65 864	4 911
% of non-transport injury deaths ascribed to unspecified unintentional non-transport injury	5	0	0	0	2	**21**	0	0	0	4	1	0
Deaths due to intentional injury, No.	31 159	1 959	1 185	8 328	2 278	2 083	6 603	10 730	56 701	315	51 202	5 435
Deaths due to interpersonal injury, No.	600	735	36	3 402	162	684	558	454	47 590	50	18 124	4 950
% of interpersonal injury deaths ascribed to an unspecified mechanism	6	14	6	19	11	3	5	7	6	4	11	11
Deaths due to self-inflicted injury, No.	30 557	1 221	1 149	4 905	2 114	1 398	6 045	10 270	8 552	49	32 637	462
% of self-inflicted injury deaths ascribed to an unspecified mechanism	0	4	0	8	0	0	0	2	4	4	1	5
Deaths due to legal intervention, No.	1	2	0	21	2	1	0	2	559	216	414	17
% of legal intervention deaths ascribed to an unspecified mechanism	0	0	0	0	0	0	0	0	1	0	2	0
Deaths due to collective violence, No.	1	1	0	0	0	0	0	4	0	0	27	6

ICD, *International classification of diseases and related health problems*; SAR, Special Administrative Region; USA, United States of America; WHO, World Health Organization.

[a] **Boldfaced** table entries highlight instances where the percentage of injury deaths ascribed to a partially specified cause exceeds 20%, which is the upper limit for describing the data quality as high.

[b] Countries were grouped into the 21 global regions defined by the 2005 Global Burden of Diseases, Injuries and Risk Factors Study.[10] The most populous country in each region from which data were analysed is shown. However, only one country is listed from the four Latin America regions and one from central and eastern Europe combined. The figures for all 83 countries analysed in the study are included in Appendix A (available at: http://www.globalburdenofinjuries.org/gimd/Quality_Global_Injury_Mortality_Data.pdf).

Table 4. **Countries whose death registration data can be used to derive reliable[a] national estimates of deaths due to all external causes of injury, road injury, or suicide or homicide**

Region[b]	Country		
	Reliable estimates of deaths due to all external causes of injury ($n=20$)	Reliable estimates of deaths due to road injury ($n=47$)	Reliable estimates of deaths due to suicide or homicide ($n=60$)
Asia Pacific, high-income countries	Japan, Republic of Korea	Japan, Republic of Korea	Japan, Republic of Korea
Central Asia	Uzbekistan	Kyrgyzstan, Uzbekistan	Kyrgyzstan, Uzbekistan
East Asia	China, Hong Kong SAR	China, Hong Kong SAR	China, Hong Kong SAR
South-East Asia		Mauritius	Mauritius
Australasia	Australia, New Zealand	Australia, New Zealand	Australia, New Zealand
Caribbean	Barbados, Trinidad and Tobago	Bahamas, Barbados, Belize, Cuba, Guyana, Saint Lucia, Trinidad and Tobago	Bahamas, Barbados, Belize, Cuba, Guyana, Martinique, Saint Lucia, Trinidad and Tobago
Central Europe	Hungary, Poland, Slovakia, Slovenia	Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia	Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia
Eastern Europe	Estonia, Lithuania	Estonia, Latvia, Lithuania, the Republic of Moldova	Estonia, Latvia, Lithuania, the Republic of Moldova
Western Europe	Finland, Iceland, Ireland, Luxembourg, Malta	Austria, Finland, Germany, Greece, Iceland, Ireland, Luxembourg, Malta, Portugal, Spain	Austria, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom
Latin America – Andean countries			Ecuador
Central Latin America	Panama	Colombia, Costa Rica, El Salvador, Mexico, Panama	Colombia, Costa Rica, El Salvador, Mexico, Panama
Southern Latin America		Chile	Argentina, Chile, Uruguay
Tropical Latin America		Brazil, Paraguay	Brazil, Paraguay
North Africa and the Middle East		Kuwait	Kuwait
North America, high-income countries		Canada, United States of America	Canada, United States of America

SAR, Special Administrative Region.

[a] Data on a particular external cause of death were rated as reliable if no more than 20% of deaths due to that external cause were attributed to any partially specified category. For example, deaths due to road injury can be reliably estimated if no more than 20% of deaths were attributed to the following categories: unknown cause of death (*International classification of diseases and related health problems, 10th revision* codes: R95–R99); injury death of unspecified mechanism; injury death of undetermined intent; death due to unintentional injury of unspecified mechanism; and death due to unintentional transport injury of unspecified mechanism. Similarly, deaths due to suicide or homicide can be reliably estimated if no more than 20% of deaths were attributed to the following categories: unknown cause of death (*International classification of diseases and related health problems, 10th revision* codes: R95–R99); injury death of unspecified mechanism; and injury death of undetermined intent.

[b] Countries were grouped into the 21 global regions defined by the 2005 Global Burden of Diseases, Injuries and Risk Factors Study.[10]

In many countries, vital registration is the only comprehensive source of data for estimating mortality due to specific causes. Consequently, it has been proposed that national data should be validated and data quality should be improved, and this has already been done in several settings.[16–18] Although we focused on injury deaths, the standardized method for assessing data quality we used could be implemented by national agencies as part of their routine quality assurance practices. Temporal changes in data quality could be evaluated and one country's data could be compared with those from other countries.

An important finding of our analysis is that reliable national death registration data were available for less than 30% of the global population, which means that alternative data sources must be used for estimating global injury mortality. The two most populous countries in the world, India and China, do not have reliable national death registration systems though they do have sample registration systems[19] that may be useful for deriving estimates of death due to injury. Similarly, at present there are no national death registration systems in most of Africa and such systems are unlikely to become a reliable source of data for decades. Nevertheless, even in these information-poor settings there are several alternative data sources that can be used to estimate injury mortality. Notably these include demographic surveillance sites,[20] mortuaries,[21,22] national censuses containing information on the cause of death,[23] and national health surveys that report the details of sibling mortality.[24] Analytical methods that can derive national estimates of injury mortality from multiple data sources are urgently needed.

Our evaluation of the availability and quality of global death registration data has several limitations. First, we considered only the data available from the WHO mortality database, supplemented by additional data from a few

countries. While this data set is the single largest global death registration repository, there are many countries that collect death registration data but do not report to WHO. It is also likely that more recent data are available from the national vital statistics agencies of many countries included in the WHO database. Second, our judgment of data quality was based on the proportion of deaths that was assigned to partially specified categories. However, the misclassification of deaths was not considered. For instance, it is likely that some deaths due to suicide were coded as due to an unintentional or undetermined cause because of the stigma associated with suicide, and other deaths may have been similarly coded because of medico-legal considerations

associated with intentional death. Moreover, these misclassifications may vary substantially between countries. Misclassification could have significant impact on the accuracy of injury mortality estimates derived from death registration data.

Despite these shortcomings, this analysis is a step towards making global injury data comparable across countries. The next step in this process is to develop methods for processing death registration data sets such that reasonable estimates of cause-specific injury mortality can be derived. This would lead to the construction of an international database of injury deaths that could provide useful insights into the structural causes of variations in the incidence of injury mortality between countries. With access to such a database, the international injury

research community could learn from the experiences of different countries and could identify the social, political and environmental prerequisites of safe and sustainable living conditions. ■

الملخص

توافر وجودة المعطيات المتعلقة بأسباب الوفيات من أجل تقدير العبء العالمي للإصابات

الغرض تقدير مدى توافر وجودة المعطيات العالمية المتعلقة بتسجيل الوفيات، والتي تستخدم لتقدير معدلات الوفيات الناجمة عن الإصابات.

الطريقة تم تقييم مدى الاكتمال والتغطية بأحدث المعطيات الوطنية المتعلقة بتسجيل الوفيات، وهي المعطيات المتوافرة في قاعدة معطيات منظمة الصحة العالمية حول معدلات الوفيات. وتعتبر جودة المعطيات الخاصة بسبب معين للوفاة الناجمة عن الإصابات، عالية إذا ما عزيت نسبة تقل عن 20% من الوفيات إلى أي من الأسباب العديدة والمحدَدة جزئياً للإصابات، مثل "الإصابة غير المقصودة وغير المحددة".

الموجودات توافرت أحدث معطيات تسجيل الوفيات لـ 83 بلداً، مشكلة بذلك 28% من إجمالي سكان العالم، واشتملت على غالبية البلدان ذات الدخل المرتفع، ومعظم بلدان أمريكا اللاتينية، وعدد من بلدان آسيا الوسطى وجزر الكاريبي. وكانت الفئات المستخدمة والأكثر شيوعاً للأسباب الخارجية والمحدَدة جزئياً للإصابة المفضية للوفاة تشمل " نية غير محددة"، و "آلية

غير محددة لإصابة غير مقصودة"، و"إصابة غير محددة على الطريق"، و"آلية غير محددة لجرائم القتل". ولقد اقتصرت المعطيات العالية الجودة على 20 بلداً فقط، ورغم ذلك، وبسبب احتواء الفئات المُحدَدة جزئيا على بعض المعلومات الخاصة بآليات الإصابات، مكن الحصول على تقديرات يعول عليها للوفيات الناجمة عن أسباب خارجية للإصابات، مثل الإصابات على الطرق، والانتحار وجرائم القتل، وذلك لعدد أكبر من البلدان.

الاستنتاج 20 بلداً فقط هو عدد هو عدد البلدان التي كانت لديها معطيات عالية الجودة حول تسجيل الوفيات، والتي أمكن استخدامها في تقدير معدلات الوفيات الناجمة عن الإصابات، حيث أن هذه الوفيات يشيع تصنيفها في فئات محدَدة جزئياً وغير دقيقة. ويحتاج الأمر إلى طرائق تحليلية مكن من خلالها الحصول على تقديرات وطنية للوفيات الناجمة عن الإصابات وذلك من مصادر بديلة للمعطيات، وهذا في البلدان التي لا تمتلك نظما يعوَّل عليها لتسجيل الوفيات.

Résumé

Disponibilité et qualité des données relatives aux causes de décès dans l'estimation du poids mondial des traumatismes

Objectif Évaluer la disponibilité et la qualité des données mondiales d'enregistrement des décès utilisées pour estimer la mortalité d'origine traumatique.

Méthodes Nous avons évalué l'exhaustivité et la couverture des données récentes d'enregistrement des décès nationaux, données provenant de la base de l'OMS sur la mortalité. La qualité des données relatives à une cause spécifique de décès par traumatisme a été jugée élevée si moins de 20% des décès étaient attribuables à l'une des causes de blessure partiellement définies, comme une «blessure non définie et involontaire».

Résultats Les données récentes d'enregistrement des décès étaient disponibles pour 83 pays, soit 28% de la population globale. Elles incluaient la plupart des pays à revenu élevé, la majorité des pays d'Amérique latine et plusieurs pays d'Asie centrale et des Caraïbes. Les catégories les plus utilisées pour les causes de traumatismes externes partiellement définies entraînant le décès comprenaient: une «intention indéterminée», un «mécanisme non défini de traumatisme involontaire»,

des «blessures non définies suite à des accidents de la circulation» et un «mécanisme non défini d'homicide». Seuls 20 pays présentaient une qualité de données élevée. Néanmoins, comme les catégories partiellement définies contiennent des informations sur les mécanismes des traumatismes, il est possible d'obtenir des estimations fiables des décès dus à des causes de traumatismes externes spécifiques pour de nombreux autres pays, notamment les accidents de la circulation, les suicides et les homicides.

Conclusion Seuls 20 pays ont présenté des données d'enregistrement des décès de qualité élevée, pouvant être utilisées pour estimer la mortalité attribuable à un traumatisme car les décès d'origine traumatique ont souvent été classés à l'aide de catégories partiellement définies et imprécises. Les méthodes analytiques qui peuvent fournir des estimations nationales sur la mortalité par traumatisme à partir d'autres sources de données sont nécessaires aux pays qui ne disposent pas de systèmes fiables d'enregistrement des décès.

Resumen

Disponibilidad y calidad de los datos sobre las causas de defunción para calcular la carga mundial de traumatismos

Objetivo Evaluar la disponibilidad y la calidad de los datos de los registros mundiales de defunción utilizados para calcular la mortalidad por traumatismos.

Métodos Se han evaluado la integridad y el alcance de los datos recientes de los registros nacionales de defunción procedentes de la base de datos de mortalidad de la Organización Mundial de la Salud. Se consideró que la calidad de los datos en un caso específico de defunción por traumatismos era elevada si menos del 20% de las muertes se atribuyeron a cualquiera de las causas de traumatismos especificadas parcialmente, como «traumatismos no intencionados y no especificados».

Resultados Se dispuso de los datos recientes de los registros de defunciones de 83 países, lo que representa el 28% de la población mundial, entre los que se encontraban la mayoría de los países de ingresos elevados, la mayor parte de los países de América Latina y algunos de Asia Central y el Caribe. Las categorías empleadas generalmente para las causas externas parcialmente especificadas de los traumatismos con resultado de muerte fueron: «intención indeterminada», «mecanismo no especificado de traumatismo no intencional», «traumatismos por accidente de tránsito no especificados» y «mecanismo no especificado del homicidio». Únicamente 20 países poseían datos de alta calidad. No obstante, debido a que las categorías especificadas parcialmente contienen cierta información sobre los mecanismos de los traumatismos, en muchos países se pudieron extrapolar estimaciones fiables de las defunciones por traumatismos externos específicos, tales como los traumatismos por accidentes de tránsito, los suicidios y los homicidios.

Conclusión Sólo 20 países disponían de datos de alta calidad de registro de defunciones que se pudieran utilizar para calcular la mortalidad por traumatismos, debido a que las defunciones por traumatismos se clasificaron con frecuencia en categorías imprecisas y sólo parcialmente especificadas. Es necesario aplicar métodos analíticos que permitan obtener las estimaciones nacionales de mortalidad por traumatismos a partir de fuentes de datos alternativos para aquellos países que carezcan de sistemas fiables de registro de defunciones.

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Research
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Table 1. **Categories of specified and partially specified external causes of death used to classify deaths due to injury**[a]

Specified external causes of death	Detailed category	Code	ICD-10 code[b]	ICD-9 code[b]
Unintentional				
Road injury	Pedestrian	1	V01–V04, V06, V09	E811–825 (0.7 subsections only), E826–829 (0.0 subsections only)
	Bicyclist	2	V10–V19	E810–825 (0.6 subsections only), E826–829 (0.1 subsections only)
	Two-wheeler rider[c]	3	V20–V29	E810–825 (0.2 and 0.3 subsections only)
	Three-wheeler occupant[c]	4	V30–V39	
	Car occupant[d]	5	V40–V49	E810–825 (0.0 and 0.1 subsections only)
	Van occupant[d]	6	V50–V59	
	Truck occupant[d]	7	V60–V69	
	Bus occupant[d]	8	V70–V79	
	Other road injury	9	V80, V82–V85	E810–825 (0.4, 0.5 and 0.8 subsections only), E826–829 (0.2, 0.3, 0.4 and 0.8 subsections only)
Rail transport injury	Rail	10	V05, V81	E800–807, E810.7
Other transport injury	Other transport	11	V86, V91, V93–V98	E831, E833–838, E843
Fall	Fall	12	W00–W19	E880–886, E888, E929.3
Threats to breathing	Drowning	13	V90, V92, W65–W74	E830, E832, E910
	Other threats to breathing	14	W75–W84	E911–913
Fire	Fire	15	X00–X19	E890–899, E924, E929.4
Mechanical force	Firearm	16	W32–W34	E922
	Sharp object	17	W25–W29, W45–W46	E920
	Machinery	18	W24, W30–W31	E919
Poisoning	Gas	19	X46–X47	E862, E867–869
	Pesticide	20	X48	E863
	Other poison	21	X40–X45, X49	E850–858, E860–861, E864–866, E929.2
Adverse effects of medical treatment	Adverse effects of medical treatment	22	Y40–Y84, Y88	E870–879, E930–949
Animal contact	Animal contact	23	W53–W59, X20–X27, X29	E905.0–E905.6, E905.8, E905.9, E906
Forces of nature	Forces of nature	24	X30–X39	E900–904.9 (excluding E900.1 and E901.1), E907–909, E929.5
Other unintentional	Other unintentional	25	W20–W23, W35–W44, W49–W52, W60–W64, W85–W99, X28, X50–X58	E840, E841, E842, E844–848, E900.1, E901.1, E902–904, E905.7, E914–918, E921, E923, E925–928.8, E929.8
Intentional, self-inflicted				
Fall	Fall	26	X80	E957
Threats to breathing	Drowning	27	X71	E954
	Other threats to breathing	28	X70	E953
Fire	Fire	29	X76–X77	E958.1
Mechanical force	Firearm	30	X72–X74	E955 (except E955.5)
	Sharp object	31	X78	E956
Poisoning	Gas	32	X67	E951–952
	Pesticide	33	X68	E950.6
	Other poison	34	X60–X66, X69	E950.0–950.5, E950.7–950.9
Other self-inflicted injury	Other self-inflicted injury	35	X75, X79, X81–X83	E955.5, E958.0, E958.2–958.8
Intentional, interpersonal				
Fall	Fall	36	Y01	E968.1
Threats to breathing	Drowning	37	X92	E964
	Other threats to breathing	38	X91	E963
Fire	Fire	39	X97–X98	E968.0

Specified external causes of death	Detailed category	Code	ICD-10 code[b]	ICD-9 code[b]
Mechanical force	Firearm	40	X93–X95	E965.0–965.4, E968.6
	Sharp object	41	X99	E966
Poisoning	Gas	42	X88	E962.2
	Pesticide	43	X87	NA[e]
	Other poison	44	X85–X86, X89–X90	E961, E962.0, E962.1, E962.9
Other interpersonal injury	Other interpersonal injury	45	X96, Y00, Y02–Y08	E960, E965.5–965.9, E967, E968.2–968.5, E968.7–968.8
Intentional, collective violence				
Collective violence	Collective violence	46	Y36	E979, E990–998
Intentional, legal intervention				
Mechanical force	Firearm	47	Y35.0	E970
Other legal intervention	Other legal intervention	48	Y35.1–Y35.6	E971–975, E978
Partially specified external causes of death				
Partially specified, undetermined intent, and unspecified cause				
Road injury	Unspecified unintentional road injury not including pedestrian or bicyclist	49	V87–V88	E810–825 (0.9 subsections only)
	Unspecified unintentional road injury	50	V89, Y85.0	E826–829 (0.9 subsections only), E929.0
Transport injury	Unspecified unintentional transport injury	51	V99, Y85.9	E929.1
Non-transport injury	Unspecified unintentional non-transport injury	52	Y86	NA
Unintentional injury	Unspecified unintentional injury	53	X59	E887, E928.9, E929.9
Self-inflicted injury	Unspecified self-inflicted injury	54	X84, Y87.0	E958.9, E959
Interpersonal injury	Unspecified interpersonal injury	55	Y09, Y87.1	E968.9, E969
Fall	Undetermined intent – fall	56	Y30	E987
Drowning	Undetermined intent – drowning	57	Y21	E984
Threats to breathing other than drowning	Undetermined intent – threats to breathing other than drowning	58	Y20	E983
Fire	Undetermined intent – fire	59	Y26–Y27	E988.1–988.2
Mechanical force	Undetermined intent – firearm	60	Y22–Y24	E985.0–985.4, E985.6–985.7
	Undetermined intent – sharp object	61	Y28	E986
Poisoning	Undetermined intent – gas	62	Y17	E981–982
	Undetermined intent – pesticide	63	Y18	E980.7
	Undetermined intent – other poison	64	Y10–Y16, Y19	E980.0–980.6, E980.8, E980.9, E988.7
Other injury	Undetermined intent – other	65	Y25, Y29, Y31–Y33	E985.5, E988.0, E988.3–988.6, E988.8
All injuries	Undetermined intent – unspecified	66	Y34, Y87.2	E988.9, E989
Collective violence	Sequelae of collective violence	67	Y89.1	E999
Legal intervention	Unspecified legal intervention	68	Y35.7, Y89.0	E976–977
All injury	Unspecified injury mechanism	69	Y89.9	NA

ICD, *International classification of diseases and related health problems*; NA, not applicable.

[a] These ICD-based definitions of external causes of death were developed by the injury expert group of the 2005 Global Burden of Diseases, Injuries and Risk Factors Study.[10]

[b] There are also ICD codes outside the injury chapter that can include injury deaths. We used ICD-10 codes R95–R99 and ICD-9 codes 797–799 for the broadest unspecified cause-of-death category.

[c] ICD-9 does not distinguish between the riders and occupants of motorized two- and three-wheeler vehicles (i.e. codes 3 and 4).

[d] ICD-9 does not distinguish between occupants of different four-wheeled vehicles (codes 5–8).

[e] Poisoning due to pesticides is included with other poisoning in ICD-9 (code 44)

Table 2. **Death registration data available in the WHO mortality database, 2009**

Region[a]	Death registration data available
	Country (most recent year with data available, number of years of data availability)[b,c,d]
Asia Pacific, high-income countries	Japan (2007, 13), Republic of Korea (2006, 12), Singapore (2003, 13); Country with no data, comprising 0.2% of the regional population: Brunei Darussalam
Central Asia	Azerbaijan (2007, 1), Georgia (2001, 4), Kyrgyzstan (2006, 7), Uzbekistan (2005, 2); Countries with no data, comprising 42% of the regional population: Armenia, Kazakhstan, Mongolia, Tajikistan, Turkmenistan
East Asia	China, Hong Kong Special Administrative Region (2007, 7); Countries with no data, comprising 99.5% of the regional population: China,[e] Democratic People's Republic of Korea.
South Asia	Countries with no data, comprising 100% of the regional population: Afghanistan, Bangladesh, Bhutan, India,[e] Nepal, Pakistan
South-East Asia	Maldives (2005, 6), Mauritius (2007, 10), Thailand (2002, 11); Countries with no data, comprising 89% of the regional population: Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Seychelles, Sri Lanka, Timor-Leste, Viet Nam
Australasia	Australia (2004, 8), New Zealand (2005, 9); Countries with no data: none
Caribbean	Antigua and Barbuda (2006, 7), Bahamas (2002, 4), Barbados (2003, 4), Belize (2001, 5), Bermuda (2002, 7), Cuba (2006, 7), Dominica (2004, 5), Dominican Republic (2004, 8), Grenada (2005, 5), Guyana (2005, 9), Haiti (2003, 5), Saint Kitts and Nevis (2005, 10), Saint Lucia (2002, 7), Saint Vincent and the Grenadines (2004, 6), Suriname (2005, 8), Trinidad and Tobago (2002, 4); Country with no data, comprising 6% of the regional population: Jamaica
Central Europe	Croatia (2006, 12), Czech Republic (2007, 14), Hungary (2005, 10), Poland (2006, 8), Romania (2007, 9), Serbia (2007, 10), Slovakia (2005, 12), Slovenia (2007, 23); Countries with no data, comprising 14% of the regional population: Albania, Bosnia and Herzegovina, Bulgaria, Montenegro, The former Yugoslav Republic of Macedonia
Eastern Europe	Estonia (2005, 9), Latvia (2007, 12), Lithuania (2007, 10), the Republic of Moldova (2007, 12); Countries with no data, comprising 95% of the regional population: Belarus, Russian Federation, Ukraine
Western Europe	Austria (2007, 9), Cyprus (2006, 2), Denmark (2006, 13), Finland (2007, 12), France (2006, 10), Germany (2006, 9), Greece (2006, 9), Iceland (2007, 12), Ireland (2007, 11), Israel (2005, 10), Italy (2006, 9), Luxembourg (2005, 8), Malta (2007, 13), Netherlands (2007, 12), Norway (2006, 11), Portugal (2003, 5), San Marino (2000, 6), Spain (2005, 9), Sweden (2006, 11), United Kingdom (2007, 9); Countries with no data, comprising 4% of the regional population: Andorra, Belgium, Monaco, Switzerland
Latin America – Andean countries	Ecuador (2006, 10), Peru (2000, 2); Country with no data, comprising 18% of the regional population: Bolivia
Central Latin America	Colombia (2005, 8), Costa Rica (2006, 10), El Salvador (2006, 10), Guatemala (2006, 7), Mexico (2006, 9), Nicaragua (2005, 9), Panama (2006, 8), Venezuela (2005, 10); Country with no data, comprising 3% of the regional population: Honduras
Southern Latin America	Argentina (2005, 9), Chile (2005, 9), Uruguay (2004, 6); Countries with no data: none
Tropical Latin America	Brazil (2005, 10), Paraguay (2004, 9); Countries with no data: none
North Africa and the Middle East	Bahrain (2001, 5), Egypt (2000, 1), Kuwait (2002, 8); Countries with no data, comprising 81% of the regional population: Algeria, Islamic Republic of Iran, Iraq, Jordan, Lebanon, Libyan Arab Jamahiriya, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, Turkey, United Arab Emirates, Yemen
North America, high-income countries	Canada (2004, 8), United States of America (2005, 9); Countries with no data: none
Oceania	Kiribati (2001, 11); Countries with no data, comprising 99% of the regional population: Cook Islands, Fiji, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu
Southern sub-Saharan Africa	South Africa (2005, 10); Countries with no data, comprising 30% of the regional population: Botswana, Lesotho, Namibia, Swaziland, Zimbabwe
Central sub-Saharan Africa	Countries with no data, comprising 100% of the regional population: Angola, Central African Republic, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon
East sub-Saharan Africa	Countries with no data, comprising 100% of the regional population: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Somalia, Sudan, Uganda, United Republic of Tanzania, Zambia
West sub-Saharan Africa	Countries with no data, comprising 100% of the regional population: Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo

ICD, *International classification of diseases and related health problems*; WHO, World Health Organization.

[a] Countries were grouped into the 21 global regions defined by the 2005 Global Burden of Diseases, Injuries and Risk Factors Study.[10]

[b] Only WHO member countries (listed at:http://www.who.int/countries) for which data were available from after 2000 were included.

[c] Any year in which a country reported data using the ICD-10 basic tabulation list was excluded. Since all ICD-9 data in the WHO mortality database were coded using the basic tabulation list, years reported in this way were generally not included. However, in a few instances, detailed ICD-9 data were available from WHO, enabling the relevant countries to be included. Countries that were excluded because a basic tabulation list was used were: Central Asia: Armenia, Azerbaijan, Kazakhstan, Mongolia, Tajikistan and Turkmenistan; East Asia: China; South Asia: Pakistan; South-East Asia: Malaysia, Philippines, Seychelles and Sri Lanka; Caribbean: Jamaica; Central Europe: Albania, Bosnia and Herzegovina and Bulgaria; Eastern Europe: Belarus, Russian Federation and Ukraine; Western Europe: Monaco and Switzerland; Central Latin America: Honduras; North Africa and the Middle East: Islamic Republic of Iran, Syrian Arab Republic and Turkey; and Oceania: Papua New Guinea.

[d] For example, after applying exclusion criteria, 2007 was the most recent year in which death registration data for Japan were available from the WHO mortality database and 13 years of data were available.

[e] China and India have sample registration systems that report the cause of death in some regions.