HHS Public Access
Author manuscript
Can J Public Health. Author manuscript; available in PMC 2018 January 29.

Published in final edited form as:
Can J Public Health. ; 108(2): e185–e191.

Trends in the leading causes of injury mortality, Australia, Canada and the United States, 2000–2014

Karin A. Mack, PhD[1], **Angela J. Clapperton, BSc, MCounsel**[2], **Alison Macpherson, PhD**[3], **David Sleet, PhD**[1], **Donovan Newton, MPA**[1], **James Murdoch, MPP**[1,4], **J. Morag Mackay, MSc, NBSc**[5], **Janneke Berecki-Gisolf, PhD**[2], **Wilkins Wilkins, PhD**[1], **Angela Marr, MPH**[1], **Michael F. Ballesteros, PhD**[1], and **Roderick McClure, PhD**[1]

[1]US Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Atlanta, GA

[2]Monash University Accident Research Centre, Monash University, Melbourne, Victoria, Australia

[3]School of Kinesiology & Health Science, York University, Toronto, ON

[4]2M Research, Arlington, TX

[5]Safe Kids Worldwide, Washington, DC

Abstract

OBJECTIVES—The aim of this study was to highlight the differences in injury rates between populations through a descriptive epidemiological study of population-level trends in injury mortality for the high-income countries of Australia, Canada and the United States.

METHODS—Mortality data were available for the US from 2000 to 2014, and for Canada and Australia from 2000 to 2012. Injury causes were defined using the *International Classification of Diseases, Tenth Revision* external cause codes, and were grouped into major causes. Rates were direct-method age-adjusted using the US 2000 projected population as the standard age distribution.

RESULTS—US motor vehicle injury mortality rates declined from 2000 to 2014 but remained markedly higher than those of Australia or Canada. In all three countries, fall injury mortality rates increased from 2000 to 2014. US homicide mortality rates declined, but remained higher than those of Australia and Canada. While the US had the lowest suicide rate in 2000, it increased by 24% during 2000–2014, and by 2012 was about 14% higher than that in Australia and Canada. The poisoning mortality rate in the US increased dramatically from 2000 to 2014.

CONCLUSION—Results show marked differences and striking similarities in injury mortality between the countries and within countries over time. The observed trends differed by injury cause category. The substantial differences in injury rates between similarly resourced populations raises

Correspondence: Karin A. Mack, PhD, Division of Analysis, Research and Practice Integration, NCIPC, CDC, 4770 Buford Highway NE F62, Atlanta, GA 30341, Tel: 770-488-4389, kmack@cdc.gov.

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.

Conflict of Interest: None to declare.

important questions about the role of societal-level factors as underlying causes of the differential distribution of injury in our communities.

Keywords

Injury prevention; suicide; global injury; homicide; falls; poisonings; motor vehicle injury; population level change

Epidemiology is the study of the distribution and determinants of health conditions in human populations.[1] Implicit in the definition of epidemiology is that a principal activity of epidemiologists is to compare rates, and this comparison of rates leads to the generation of hypotheses that might explain the differences. Geoffrey Rose (1992) described the concept of sick populations versus sick individuals, noting that within-population variation in exposure around the population's mean is usually less than the exposure variation between populations.[2] As a corollary of this, Rose generalized that while one might not know how to cure a health condition, at the very least we can work to advance health of the least healthy population towards that of the most healthy by trying to redress the population differences in the exposure to risks that threaten health.

While these are basic epidemiological principles, their application to injury prevention has been limited. National efforts to study the distribution and determinants of injury remain largely focused on identifying high-risk individuals within populations rather than exploring population-level differences for injury rate between populations. Although the mass strategy is common in injury (e.g., the recommended use of seatbelts for all vehicle occupants), efforts to address the identified problems frequently focus on energy control in high-risk settings rather than on structural interventions that address the underlying causes of injury and consequently reduce risk in the entire population. The limitations of this approach are described by Frieden (2010) in his presentation of a Health Impact Pyramid, where it is argued that addressing socio-economic factors has the greatest potential to improve health, with the next most effective strategy being to change the context for individual behaviour to make the healthiest choices the easiest choices, followed by clinical interventions, with the least effective methods suggested as educating people about how to reduce their individual level of risk.[3] In injury prevention, it may be necessary to address all four levels in the pyramid simultaneously, as each can build on the other to facilitate change.[4,5]

The essential value of studying deaths in the population as a population approach to public health was underscored by William Farr in the early 19th century: "The death-rate is a fact; anything beyond this is an inference."[6] Deaths are the facts we are setting out to prevent, and comparing rates between populations allows us to make inferences about causation that will support preventive efforts.[7]

When the population is the unit of analysis, then systemic explanations for population-level injury rates can only be identified by comparing one population with another, because within a single population the overall injury rate is simply the consequence of the social system that population defines. As a first step in a program of work seeking to quantify systemic risk factors for population-level injury rates, we undertook a descriptive epidemiological study of population-level trends in injury mortality for Australia, Canada and the US over the period from 2000 to 2014. The aim of this descriptive study was to describe and compare the incidence of external cause injury by cause category, country and year.

METHODS

Study design and setting

A descriptive epidemiological study was undertaken reporting trends in injury mortality since 2000 in Australia, Canada and the United States. Data were available for the US from 2000 to 2014, and for Canada and Australia from 2000 to 2012. The primary country of interest was the US, with Canada and Australia chosen as comparison countries given their close match to the US in terms of historical and cultural development. The demographic profile of each country in terms of summary socio-demographic indicators is provided in Table 1.

Data and data sources

Injury causes were defined using the *International Classification of Diseases, Tenth Revision (ICD-10)* external cause codes for select causes and overall (Table 2). The source data for each of the three countries were national vital statistics systems. US data were obtained from WISQARS (http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html), Canadian data from Statistics Canada (http://www.statcan.gc.ca/), and Australian data (provided by the Victorian Injury Surveillance Unit (VISU)) from the Australian Coordinating Registry for the Cause of Death Unit Record File (COD URF). The Australian Bureau of Statistics introduced a revision process for all coroner-certified deaths registered after January 1, 2006. The process means data are preliminary when published for the first time, revised when published the following year, and final when published two years after initial publication. Analyses used final data for the period 2000 to 2010, revised data for 2011, and preliminary data for 2012. We obtained the number of deaths by 5-year age groups, but did not obtain this information by gender or any other category.

Data management and analysis

Mortality data were available for Canada and Australia 2000–2012 inclusive, and for the United States 2000–2014. Injury causes were grouped into major causes, as shown in Table 2 (Unintentional motor vehicle traffic, Unintentional fall, Unintentional poisoning, Assault/homicide, and Intentional self-harm/suicide). Codes for terrorism-related deaths (U01–U02) were included in the homicide cause, which matches WISQARS coding and output. Rates were age-adjusted using a direct method and the standard age distribution chosen was the US total 2000 projected population (listed here: http://wonder.cdc.gov/wonder/help/mcd.html#). Rates for each country were adjusted to the same standard to control for differences in age distributions within the countries and over time. Confidence intervals were calculated for the adjusted rates based on the gamma distribution[8] and trends were tested for significance using an OLS regression model. Confidence intervals and rates are available in Table 3, but not presented in the figures in order to keep the charts brief.

US and Canadian de-identified aggregate data were obtained from administrative datasets already in the public domain, therefore ethics approval was not sought. VISU has ethics approval for the use and dissemination of the COD URF.

RESULTS

All-cause injury deaths

All-cause injury age-adjusted mortality rates per 100 000 (Figure 1A) in the US rose monotonically from 52.8 in 2000 to 59.6 in 2007, dropped for two years, and then rose again monotonically so that by 2014, rates (59.9) exceeded the 2007 level. Australia and Canada tracked together in both pattern and rates, with trend lines that essentially covered each other from 41.7 and 41.6 in 2000, to 37.6 and 39.4 respectively by 2012. The trends in injury mortality rates fell slightly during this study period. The US vs. Australia/Canada lines diverged over the study period, with the US rate about 25% higher than both Canada's and Australia's in 2000 and increasing over the period to being roughly 40% higher by 2012.

US trends were significantly different (at least $p < 0.05$) from those of Australia and Canada for all causes and overall. Trends were not significantly different between Australia and Canada for any cause or overall. The trends for injury deaths from motor vehicle crashes, falls, suicides, and poisonings were all significant (at least $p < 0.05$) within each country; in addition, the trend for homicide deaths in the US was also significant ($p < 0.001$).

Motor vehicle traffic-related deaths

Motor vehicle injury age-adjusted mortality rates in the US declined from 14.9 in 2000 to 10.3 in 2014. The rate declined 20% in the 2-year period from 2007 to 2009, with minimal downward trends on either side of this sudden drop. Australia and Canada had similar rates, from 9.1 and 8.1 in 2000 dropping to 5.1 and 5.8 respectively by 2012, but followed a slightly different trend over the study period (Figure 1B). As with the US, Canada's rate remained unchanged between 2000 and 2007, dropped quickly between 2007 and 2009, and continued to decrease slightly to 2012. The rate dropped 21% during the 2007–2009 period. Australia's rates essentially followed a monotonic reduction with minor upticks in 2006 and 2009. The US rates were over 50% higher than the Australian and Canadian rates in 2000, and this separation increased slightly over the course of the study period to 66% in 2012.

Fall-related death

Fall injury age-adjusted mortality rates in the US increased monotonically from 4.8 in 2000 to 8.7 in 2014, representing an 81% change. Canada began the study period with a rate of 6.7 in 2000 and from 2001 rose consistently to 10.8 in 2012, with a 41.6% change between 2007 and 2012. In 2000, the rate in Australia was half Canada's rate at 3.1, but rose quickly to 6.1 in 2006, and subsequently increased at a slower rate to 7.8 in 2012; nevertheless there was a 149% increase over the study time period. The effect of these changes kept Australia and Canada moving at approximately the same rate of change but 30% apart, with the US starting closer to the Canadian rate and ending more closely approximate to the Australian rate (Figure 1C).

Unintentional poisoning-related deaths

Unintentional poisoning age-adjusted mortality rates in the US increased dramatically from 4.5 in 2000 to 13.1 in 2014; a 189.4% increase. Australia and Canada began the period with rates similar to each other and the US, but both countries diverged from the US over the study period (Figure 1D). Australia ended where it started at 4.1 and Canada went from 3.0 to 4.8 between 2000 and 2012. The US and Australian rates were similar in 2000, but by 2012 the US rate was nearly three times greater.

Homicide deaths

Homicide age-adjusted mortality rates in the US declined from 5.9 in 2000 to 5.0 in 2014. The time trend included a brief sharp increase in 2001 due to 9/11 terrorism-related deaths, then no change until 2007 followed by what appears to be a small gradual decrease since 2008 (Figure 1E). Australian and Canadian trends have essentially followed each other with no material change in rates from 1.5 and 1.5 in 2000 to 1.2 and 1.4 respectively in 2012. The US rate was four times the Australian rate in 2000, and the gap increased slightly to four and a half times in 2012.

Suicide deaths

Suicide age-adjusted mortality rates in the US increased 23.9% from 10.4 in 2000 to 12.9 in 2014. Australia and Canada had similar rates that trended downward over time, from 12.2 and 11.4 in 2000 to 10.9 and 10.5 respectively by 2012 (Figure 1F). Australia’s rate began the period slightly higher than Canada’s, dropped between 2001 and 2004 reaching a point Canada reached in 2006, and then both countries have followed each other up slightly to 2012. The US started the period with the lowest rate, but by 2012 had a rate about 15% higher than that of the other two countries.

DISCUSSION

There were four main findings in this analysis: 1) there were marked differences and striking similarities in injury mortality rates between the countries; 2) the nature and extent of the differences and similarities between countries fluctuated by injury cause; 3) there were compelling variations in the *trends* between countries; and 4) the nature of these trends differed by injury cause. The observed within- and between-country differences in the distribution of injury implies a difference in injury-related risk exposure – and thus indicates the potential for future improvements in injury-related health. Because the results of this study are descriptive in nature, they do not support identification of the causal factors nor elucidation of causal pathways. The value of the descriptive results lies in their dramatic demonstration of the extent to which countries of similar socio-economic and technological context can have entirely different injury profiles. The results lay the foundation for further inquiry into population-level factors that differ across these countries and drive these distinct patterns in population-level outcomes. There are a number of methodological strengths and limitations that need to be taken into account when interpreting the results of this study. One strength of the study was the focus on the US data in comparison with two countries perhaps closest to the United States in terms of historical and cultural development. All three are high-income countries, covering large land masses, with motor vehicle-dependent rural–

urban designs that have similar basic population demographics. All three countries also have centralized repositories for vital statistics data coded to injury using the same approach and same coding systems. All three countries use a definition of a traffic death as any death occurring within 30 days of the crash or incident.[9]

Limitations of the study relate largely to the potential for observed differences within and between countries to be a product of systematic measurement error, rather than reflecting real differences in rates. Each country may have slightly different coroner/medical examiner practices and a formal assessment of the reliability of deaths certification across the three countries has not been conducted. The quality of causes of death coding can be affected by changes in the way information is reported by coroners or by lags in completion of coroner cases. Despite World Health Organization coding guidelines for assigning undetermined intent, country-specific use of the codes may vary.[10,11] Further, while the coding system for injury deaths used in each country was the same, there may have been some variation between and within countries in the application of that system.[12] Quality of comparisons overall improved with the work of the International Collaboration on Effort on Injury Statistics.[11,13] Comparison of injury data in the elderly may continue to be problematic because of the difficulty of assigning a single underlying cause. A related issue is the extent to which heterogeneity of specific causes are lost when collapsing causes into higher-level categories for analytic purposes. For example, the motor vehicle category includes deaths from different road users (pedestrians, motorcyclists, motor vehicle occupants), each with very different risks of injury and different factors in the causal web. This collapsing has been undertaken for simplicity, and while the signal in this analysis persists despite the noise created by the higher-level categories, it would be expected that in a motor vehicle crash, specific analyses breaking the cause categories down further by road user group would refine the strength of the findings. It is unlikely that the potential limitations of the study methods had sufficient impact on the study results to affect the interpretations that can be drawn from them. Changes in injury rates over time were for the most part gradual, as opposed to the single-point shifts that might occur with coding changes. Furthermore, between-country differences were least for those conditions (e.g., falls) that were most likely to be affected by coding differences.

The results of this study are consistent with previous research describing the frequency of injury between countries.[14] What this research adds to the literature is a contemporary, cross-country analysis in a selection of countries that might be expected to have similar injury rates. The perhaps counterintuitive findings of large differences in injury rates evident in the within- and between-country comparisons focused attention on questions of causation that operate at the population level.

A number of features of the results are helpful as background considerations for the formation of hypotheses about these population-level causes. The US injury mortality rate, while highest for all countries at all study points, was not uniformly so across all causes. However, if the US injury mortality rate had matched that of Australia or Canada from 2000 to 2014, nearly 980 000 lives would have been saved in the US over the past 15 years. Motor vehicle-related deaths accounted for over one third of those potential lives saved, with unintentional poisonings (16%) and homicide (20%) making up a large proportion of the remaining deaths. Injury deaths are the consequence of a deterministic combination of causal factors.[15] If rates are different between countries then there are by definition causal reasons why the countries differ. While our descriptive analysis does not allow us to infer what those causal differences might be, arguably they are not due to differences in technical or knowledge capacity of the countries.

The biggest differences in mortality rates between the US and Canada/Australia lie in homicide, motor vehicle traffic, and unintentional poisoning, and less in falls and suicide. While the within-country trends were mostly gradual increases or decreases, there were clear examples (for instance, motor vehicle traffic-related deaths) of reductions that occurred in stepwise manner, with big reductions occurring in just a few years.[16] While it cannot be known from the data in this study what caused these sudden changes in rates, what can be noted is that the changes were sufficiently large to suggest the causes could be discoverable on further examination. If societal-level changes have occurred, then it is theoretically feasible that such big changes could be created again by purposive intervention. The fact that the most dramatic intra-country changes in rates were related to certain injury causes supports previous observations about these injury causes being most amenable to exogenous intervention.

While results of this study do not support definitive explanation of the reasons for the observed differences in injury outcomes, they do suggest several key hypotheses worthy of further exploration. First, while the three countries might be generally similar, the distribution of the social resources within the three countries may be differentially distributed (and this different distribution may be a cause of the difference in injury rates). Second, each of the three countries might place a different value compared to the other two on safety in their ranking of socially desired outcomes (and so differentially focus their efforts of injury prevention compared to some other good). Third, the countries may differ in the extent to which their systems for effecting change can support the recommended evidence-based injury prevention practices.

The findings of this study and the resulting hypotheses provide a sound base for future analytic studies. A recent systematic review of child injury prevention programs discussed the potential benefits of multilevel modeling techniques to assist with understanding the population-level factors involved in the causation and prevention of child injury.[17] The review identified a number of critical challenges in obtaining the required appropriate and valid data. Quality analytic studies designed to address the hypotheses raised above would require access to information about individual risks, small area risk factors (with areas small enough to maintain homogeneity of the characteristic under exploration), and higher-level data about the attributes of the institutions and policies defining the social characteristics and capacities within which populations function. Individual-level outcome data are generally available from hospital service delivery data bases and fatality files, which can be aggregated at the required level, but are generally only available at the population level for the small percent of all injuries that are serious enough to require hospitalization or result in death. Census data are an excellent source of relevant social exposure data, and are available for small or large area analyses, but are limited in that neighbourhood variables are generally constructed by aggregating lower-level data rather than being truly area-level in nature. The main challenge for researchers is that there are few searchable datasets capturing the higher-level explanatory variables of social structure (e.g., societal leadership, governance, capacity, and community partnerships), and these would need new data collection activity specifically for the respective analytic purpose.

CONCLUSION

The most powerful feature of between-system comparisons is that they reveal opportunities for change that are rarely recognized by within-system exploration. The results of this paper raise questions that cannot be answered by the research we have undertaken. However, the value of this reported research is that it demands those questions be answered. Our results should encourage a shift in perspective, and challenge assumptions about the nature of the public health problem that is injury and the nature of the factors that could be considered "determinants".

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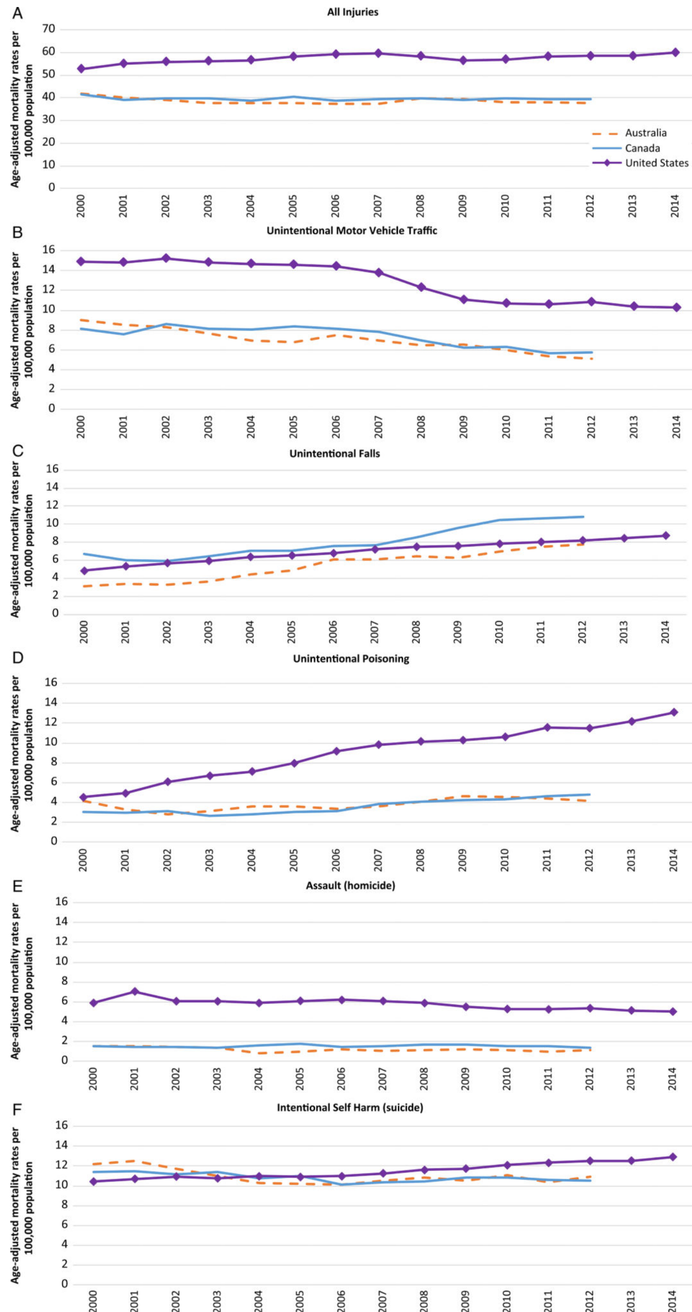

Figure 1.

(A–F) Age-adjusted mortality rates* per 100 000 population for five causes of injury death and overall injury deaths, Australia, Canada and United States, 2000–2014. * 2000 projected population of the US as the standard population. Data sources: US data from WISQARS, Canadian data from Statistics Canada, Australian data (provided by the Victorian Injury Surveillance Unit) from the Australian Coordinating Registry for the Cause of Death Unit Record File. (Note: the 2000–2010 Australian data are considered final; the 2011, revised; and the 2012, preliminary.)

Table 1

Demographic country comparison, 2015 estimates

Demographic measure	Australia	Canada	United States
Percentage of population 0–14 years	17.9	15.5	19.0
Percentage of population 65 years or older	15.5	17.7	14.9
Life expectancy (years)	82.2	81.7	79.7
Physician density (per 1000 population)*	3.27	2.07	2.45
Gini index†	30.3	32.1	45.0
Total population (thousands)	22 751	35 099	321 368
Land mass (square miles)	7 682 300	9 093 507	9 147 593
Population density (persons per square mile)	3.0	3.9	35.1
Percent urban	89.3	81.8	81.6
Gross domestic product (GDP)	$1.2 trillion	$1.6 trillion	$17.9 trillion
Government type	Federal parliamentary democracy and Commonwealth realm	Parliamentary democracy, federation, and constitutional monarchy	Constitution-based federal republic
Administrative divisions	8 states	10 provinces	50 states (1 district)

Source: CIA The World Factbook.[18]

*Physician density = 2011 for Australia and United States; 2010 for Canada.

†Gini Index = 2008 Australia, 2005 Canada, 2007 United States (range 0–100: The more nearly equal a country’s income distribution, the lower its Gini index).

Table 2

Mortality cause ICD-10 code classification

Cause	ICD-10 codes
All injury	V01-Y36, Y85–Y87, Y89
Unintentional motor vehicle traffic related deaths	V02–V04 (0.1, 0.9), V09.2, V20–V28 (0.3–0.9), V29 (0.4–0.9), V12–V14 (0.3–0.9), V19 (0.4–0.6), V30–V39 (0.4–0.9), V40–V49 (0.4–0.9), V50–V59 (0.4–0.9), V60–V69 (0.4–0.9), V70–V79 (0.4–0.9), V80 (0.3–0.5), V81.1, V82.1, V83–V86 (0.0–0.3), V87 (0.0–0.8), V89.2
Unintentional fall deaths	W00–W19
Unintentional poisoning deaths	X40–X49
Homicide deaths	X85-Y09, Y87.1, *U01– *U02
Suicide deaths	X60–X84, Y87.0, *U03

*U codes are injury resulting from terrorism in the US.

Table 3

Age-adjusted mortality rates and confidence intervals for five causes of injury death and overall injury, Australia, Canada and United States, 2000–2014

	Year														
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
All injury															
Australia	41.73	39.99	38.98	37.70	37.75	37.67	37.52	37.32	39.68	39.52	38.11	37.93	37.55	–	–
	(40.81–42.67)	(39.1–40.9)	(38.11–39.87)	(36.84–38.57)	(36.9–38.61)	(36.83–38.53)	(36.69–38.37)	(36.5–38.15)	(38.85–40.53)	(38.69–40.35)	(37.31–38.93)	(37.14–38.73)	(36.77–38.34)		
Canada	41.56	39.20	39.80	39.96	38.93	40.55	38.74	39.31	39.66	39.01	39.93	39.38	39.41	–	–
	(40.82–42.32)	(38.51–39.91)	(39.11–40.5)	(39.27–40.66)	(38.25–39.61)	(39.87–41.24)	(38.07–39.41)	(38.65–39.98)	(39.00–40.32)	(38.36–39.67)	(39.28–40.59)	(38.74–40.03)	(38.77–40.06)		
US	52.75	55.05	55.92	56.23	56.66	58.16	59.16	59.56	58.41	56.40	56.97	58.24	58.43	58.46	59.92
	(52.48–53.02)	(54.78–55.33)	(55.65–56.19)	(55.96–56.5)	(56.39–56.94)	(57.88–58.43)	(58.89–59.44)	(59.29–59.84)	(58.14–58.68)	(56.14–56.67)	(56.7–57.23)	(57.97–58.51)	(58.16–58.7)	(58.2–58.73)	(59.65–60.19)
Motor vehicle															
Australia	9.06	8.51	8.30	7.68	6.98	6.77	7.47	6.94	6.45	6.58	5.99	5.39	5.13	–	–
	(8.63–9.49)	(8.1–8.93)	(7.9–8.72)	(7.3–8.07)	(6.62–7.36)	(6.42–7.14)	(7.1–7.86)	(6.59–7.31)	(6.11–6.79)	(6.24–6.93)	(5.67–6.32)	(5.09–5.7)	(4.85–5.44)		
Canada	8.13	7.59	8.66	8.18	8.03	8.38	8.12	7.85	6.96	6.21	6.29	5.66	5.76	–	–
	(7.81–8.46)	(7.29–7.9)	(8.34–8.99)	(7.87–8.5)	(7.72–8.34)	(8.07–8.7)	(7.81–8.43)	(7.55–8.15)	(6.68–7.24)	(5.95–6.48)	(6.03–6.56)	(5.42–5.92)	(5.51–6.01)		
US	14.89	14.83	15.23	14.84	14.70	14.61	14.44	13.77	12.31	11.06	10.70	10.60	10.84	10.39	10.26
	(14.75–15.04)	(14.69–14.97)	(15.09–15.38)	(14.7–14.98)	(14.56–14.84)	(14.47–14.75)	(14.31–14.58)	(13.64–13.9)	(12.18–12.43)	(10.94–11.18)	(10.59–10.82)	(10.49–10.72)	(10.72–10.95)	(10.27–10.5)	(10.15–10.37)
Falls															
Australia	3.11	3.39	3.29	3.66	4.39	4.89	6.11	6.10	6.48	6.22	6.97	7.44	7.75	–	–
	(2.85–3.38)	(3.13–3.67)	(3.04–3.56)	(3.4–3.94)	(4.11–4.7)	(4.59–5.21)	(5.78–6.45)	(5.78–6.44)	(6.15–6.82)	(5.91–6.55)	(6.64–7.31)	(7.11–7.79)	(7.41–8.1)		
Canada	6.70	5.98	5.91	6.43	7.07	7.03	7.58	7.63	8.52	9.58	10.48	10.65	10.80	–	–
	(6.35–7.05)	(5.7–6.27)	(5.64–6.2)	(6.15–6.72)	(6.78–7.37)	(6.74–7.32)	(7.29–7.88)	(7.34–7.92)	(8.22–8.82)	(9.27–9.9)	(10.16–10.81)	(10.33–10.98)	(10.49–11.12)		
US	4.82	5.33	5.69	5.93	6.37	6.53	6.78	7.21	7.50	7.58	7.82	8.03	8.21	8.44	8.74
	(4.74–4.9)	(5.25–5.42)	(5.6–5.78)	(5.84–6.02)	(6.28–6.46)	(6.44–6.62)	(6.68–6.87)	(7.11–7.3)	(7.4–7.59)	(7.49–7.68)	(7.73–7.92)	(7.94–8.13)	(8.12–8.31)	(8.35–8.54)	(8.65–8.84)
Poisoning															
Australia	4.20	3.27	2.85	3.15	3.64	3.62	3.39	3.61	4.12	4.63	4.56	4.41	4.14	–	–
	(3.92–4.5)	(3.03–3.54)	(2.62–3.1)	(2.91–3.41)	(3.38–3.91)	(3.37–3.89)	(3.14–3.65)	(3.36–3.88)	(3.85–4.4)	(4.35–4.93)	(4.28–4.86)	(4.13–4.69)	(3.88–4.42)		
Canada	3.04	2.95	3.12	2.69	2.84	3.03	3.16	3.86	4.06	4.24	4.35	4.65	4.82	–	–
	(2.85–3.24)	(2.77–3.15)	(2.93–3.31)	(2.51–2.87)	(2.66–3.03)	(2.85–3.22)	(2.98–3.36)	(3.66–4.07)	(3.85–4.28)	(4.03–4.47)	(4.13–4.57)	(4.43–4.89)	(4.6–5.06)		
US	4.53	4.93	6.10	6.70	7.14	7.96	9.18	9.84	10.17	10.29	10.63	11.58	11.50	12.18	13.11

	Year														
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
	(4.45–4.61)	(4.85–5.01)	(6.01–6.19)	(6.6–6.79)	(7.04–7.24)	(7.86–8.06)	(9.07–9.29)	(9.73–9.96)	(10.05–10.28)	(10.18–10.41)	(10.51–10.75)	(11.46–11.7)	(11.38–11.62)	(12.05–12.3)	(12.99–13.24)
Homicide															
Australia	1.52	1.51	1.43	1.40	0.80	0.97	1.24	1.04	1.17	1.24	1.16	1.02	1.18	–	–
	(1.35–1.71)	(1.35–1.7)	(1.27–1.61)	(1.24–1.57)	(0.68–0.94)	(0.84–1.12)	(1.09–1.4)	(0.9–1.19)	(1.03–1.33)	(1.1–1.4)	(1.02–1.31)	(0.89–1.16)	(1.04–1.33)		
Canada	1.51	1.47	1.46	1.39	1.59	1.76	1.49	1.55	1.71	1.71	1.51	1.57	1.39	–	–
	(1.37–1.65)	(1.34–1.61)	(1.33–1.6)	(1.26–1.52)	(1.45–1.73)	(1.62–1.91)	(1.36–1.63)	(1.42–1.69)	(1.57–1.86)	(1.57–1.85)	(1.39–1.65)	(1.44–1.71)	(1.27–1.52)		
US	5.90	7.06	6.08	6.07	5.89	6.11	6.20	6.10	5.89	5.51	5.29	5.25	5.37	5.15	5.03
	(5.81–5.99)	(6.97–7.16)	(5.99–6.17)	(5.98–6.16)	(5.8–5.98)	(6.02–6.2)	(6.11–6.29)	(6.01–6.19)	(5.8–5.97)	(5.42–5.59)	(5.21–5.38)	(5.17–5.33)	(5.29–5.45)	(5.07–5.23)	(4.95–5.11)
Suicide															
Australia	12.23	12.54	11.70	11.02	10.26	10.23	10.15	10.49	10.88	10.53	11.07	10.39	10.92	–	–
	(11.74–12.74)	(12.05–13.05)	(11.22–12.19)	(10.56–11.49)	(9.83–10.72)	(9.8–10.68)	(9.72–10.59)	(10.06–10.94)	(10.44–11.33)	(10.11–10.97)	(10.63–11.51)	(9.97–10.82)	(10.5–11.36)		
Canada	11.44	11.45	11.18	11.38	10.80	11.04	10.14	10.34	10.48	10.86	10.86	10.62	10.53	–	–
	(11.07–11.82)	(11.08–11.83)	(10.81–11.54)	(11.02–11.75)	(10.45–11.16)	(10.69–11.4)	(9.81–10.48)	(10–10.68)	(10.15–10.83)	(10.52–11.21)	(10.52–11.21)	(10.28–10.96)	(10.2–10.87)		
US	10.44	10.71	10.95	10.77	10.97	10.90	10.97	11.27	11.60	11.75	12.08	12.32	12.53	12.55	12.93
	(10.32–10.56)	(10.59–10.83)	(10.83–11.07)	(10.65–10.89)	(10.85–11.09)	(10.78–11.02)	(10.86–11.09)	(11.15–11.39)	(11.48–11.72)	(11.63–11.87)	(11.96–12.21)	(12.19–12.44)	(12.4–12.65)	(12.42–12.67)	(12.8–13.06)