

2000-2010

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Winnipeg Health Region Injury Report, 2000–2010

injury report

Population Health Surveillance Team
Population and Public Health Program



Winnipeg Regional
Health Authority

Caring for Health

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2000-2010

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Winnipeg Health Region Injury Report 2000-2010

Population Health Surveillance Team,
Population and Public Health
Program, WRHA.

FORWARD

THE NUMBERS TELL WINNIPEG'S INJURY STORY.

Injury has been referred to as the hidden epidemic. It is the leading cause of death in Canadians 1–44 years of age and the leading cause of hospitalizations among Canadians aged 10–24 years. For the most part, injuries are not caused by “accidents”. Year after year, people die and are hospitalized due to similar circumstances, making injuries predictable and therefore preventable.

The Winnipeg Health Region Injury Data Report 2000-2010 provides a picture of the burden of injury experience among residents of the Winnipeg Health Region. The information is intended to assist policy makers, program planners and service providers in prioritizing and planning injury prevention programs.

In this report you will find...

- Injuries in perspective with other leading causes of death and hospitalization
- Overview of injuries in the Winnipeg Health Region for years 2000 to 2010
- Injury-specific sections with figures and detailed data tables prefaced with key epidemiological highlights
- Trends for each injury area
- Analysis of injury by major cause, including self- inflicted injuries and suicide, assaults, falls and road traffic injuries.

HOW TO USE THIS REPORT

The Winnipeg Health Region Injury Report is available online. Users can download the entire report or the chapters that are most relevant to them.

For more information or inquiries regarding injury surveillance, contact EPI@wrha.mb.ca or visit <http://www.wrha.mb.ca/surveillance>.

For more information about injuries in Winnipeg and prevention programs, contact:

IMPACT, Injury Prevention
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Website: <http://www.wrha.mb.ca/community/publichealth/services-injury-prevention.php>

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FOR FURTHER INFORMATION

For comments or inquiries concerning the material in this publication, contact EPI@wrha.mb.ca.

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THE WINNIPEG HEALTH REGION (WHR)

- The largest health region in the province of Manitoba with a population of 709,827 in 2011, more than half of the total provincial population.
- Includes the capital city of Winnipeg, and the rural municipalities of East St. Paul and West St. Paul.
- For planning and management purposes, the WHR is divided into 12 Community Areas.
- The Winnipeg Regional Health Authority (WRHA) is responsible for the delivery of acute care, public health and other community services to the residents of the WHR.
- In 2012, the Churchill Health Region became an operating division of the WRHA; however, residents of Churchill are not included in this report.

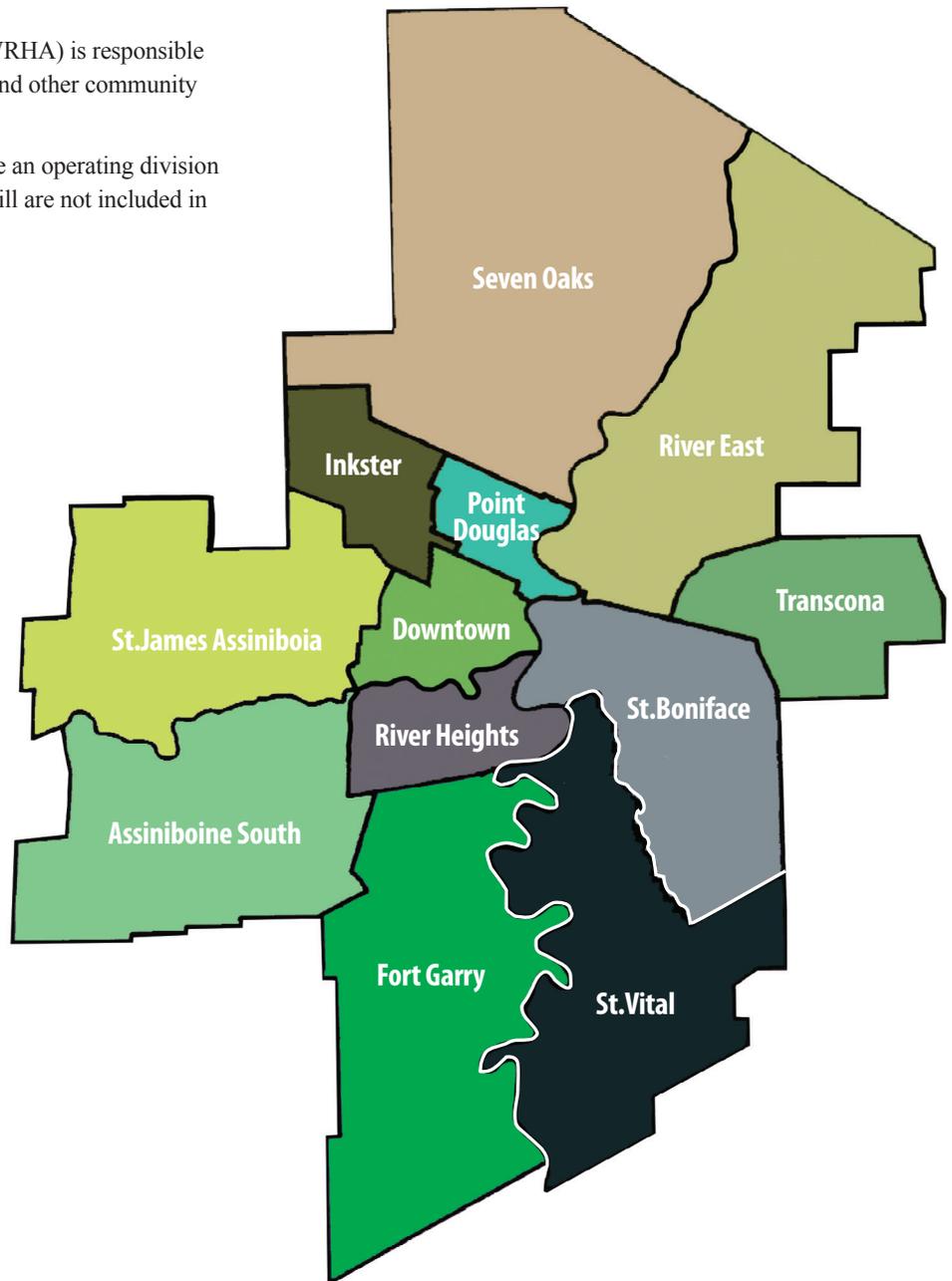


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EXECUTIVE SUMMARY

Deaths and hospitalizations due to injuries are preventable and represent a significant opportunity to reduce the morbidity and mortality experienced by Winnipeg Health Region (WHR) residents.

This report describes the burden of injury experienced by residents of the WHR for calendar years 2000 to 2010 and was created to provide policy makers, program planners and service providers with the information they need to prioritize, plan for and develop injury prevention programs. This report is organized into discrete topic areas consisting of a set of figures and detailed data tables prefaced with key epidemiological highlights. This format provides end-users with a succinct overview of the main findings in injury by topic area, as well as detailed tabular information required to plan prevention programs.

The report first places injuries in perspective with other leading causes of death and hospitalization in the WHR followed by a summary overview of injuries in the health region for years 2000 to 2010. A detailed analysis of injury by leading cause (of deaths and hospitalizations) is included. These categories include self-inflicted injuries and suicide, assaults, falls and road traffic injuries.

KEY FINDINGS

- From 2000 to 2010 inclusive, 3610 residents of the WHR died of injuries. Over the same time period there were 51,236 injury-related hospitalizations.
 - Injury was the fourth leading cause of death and the fifth leading cause of hospitalizations among WHR residents during this period.
 - Injuries accounted for a substantial proportion of deaths among young children and young adults. In young children (1-4 years), injuries accounted for 31% of deaths overall, increasing to nearly 70% among 15 to 24 year olds, and then declining to less than 6% in older adults (55 years of age and older). In almost all age groups, the percentage of deaths due to injuries was greater in males than in females.
 - Falls were the single leading cause of injury death, accounting for 28.1% of all injury deaths, followed by suicide (22.4%), poisoning (11.3%), and motor vehicle traffic injuries (9.9%). These four leading injury causes accounted for 71.7% of all injury deaths in WHR residents.
 - The leading causes of injury-related hospitalization were falls (51.8%), assaults (7.9%), self-inflicted injuries (7.1%) and motor vehicle traffic injuries (6.6%). Collectively these leading causes of injury accounted for 73.4% of all injury-related hospitalizations.
- The majority of deaths and hospitalizations due to falls occurred in adults 75 years and older.
 - In contrast, the majority of deaths and hospitalizations due to assaults, suicide/self-inflicted injuries, and motor vehicle traffic injuries occurred in young and middle-aged males.
 - Over the study period, the highest rates of injury-related deaths and hospitalization occurred in the Point Douglas and Downtown Community Areas.

RECOMMENDATIONS

- A major focus of injury prevention in the WHR should be falls as this is the leading cause of injury death and the primary cause of injury-related hospitalizations. Prevention programs need to identify and focus on the circumstances and factors leading to falls in the elderly, since 82% of all deaths and 56% of hospitalizations due to falls occur in the population 75 years of age and older.
- In children and young adults, the major focus of injury prevention programs should be on the prevention of poisoning, suicide and self-inflicted injuries, assaults, and road traffic injuries.
- From a health equity perspective, prevention efforts for all injury types should focus on low income areas of the WHR (such as the Point Douglas and the Downtown Community Areas) since these communities have dramatically higher rates of injury-related hospitalizations.

INTRODUCTION

INJURY DEFINED

Injuries occur whenever energy is applied to the body beyond which it can be tolerated without significant damage. The World Health Organization specifically defines injury as the “physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy”.¹

It may be difficult to view “injury” as a single health problem since many diverse events and conditions may result in an injury. A motor vehicle injury, a suicide, an elderly person falling in their home or on the sidewalk may at first appear to be quite unrelated. However, what is common to all of these examples is that energy has been applied to the body beyond which it can be tolerated without damage.

Injuries can be categorized into two main groups: unintentional and intentional. An unintentional injury is an involuntary injury that is not caused with purpose or with intention to harm and may include events such as motor vehicle collisions, falls, drowning and poisonings. These injuries are often referred to as “accidents” by the public and the media, since the sentiment is that no one intended for the event to happen. Intentional injuries on the other hand, result from purposeful actions to harm oneself or others and include suicide and assault events.

INJURIES ARE PREVENTABLE

Injuries are not unavoidable accidents or random events that are an inevitable part of life. They follow predictable patterns associated with known risk factors such as age, gender, socioeconomic status, geographical location, environmental risks, and risk taking behaviors, and are therefore potentially amenable to successful prevention efforts. It is estimated that a significant proportion of injury would be prevented if we were able to apply all currently known strategies that have demonstrated effectiveness, such as known interventions to prevent falls among older adults. In Manitoba, the Pediatric Death Review Committee of the College of Physicians and Surgeons estimated that nine out of ten pediatric injury deaths could have been prevented.²

INJURIES ARE A MAJOR PUBLIC HEALTH ISSUE

The impact of injury in Canada is immense in terms personal loss, quality of life and suffering, and the associated economic costs. Injuries affect almost everyone at some point in their lives. While the result of a single injury may often be minor, at the population level, the impact of injuries is huge. It is estimated that there are 13,000 deaths and over 200,000 hospitalizations per year in Canada due to injury.³ Injury is the leading cause of death for Canadians between the ages of 1 and 44 and the fourth leading cause of death for Canadians of all ages.⁴ Among Canadians aged 10–24, injury is the leading cause of hospitalization and the third leading cause of all hospitalizations for Canadians of all ages.⁴

Although the greatest impact of injury is human suffering and loss, the financial costs are substantial. In Canada, the total economic burden of injuries is greater than 19 billion dollars annually.³ In 2004, it was estimated that injuries cost Manitobans \$915 million in hospital and non-hospital treatment costs, not including costs related to reduced productivity, disability, and premature death.⁵ In addition, it has been estimated that for every suicide death (over 4000 Canadians per year), five to six lives are profoundly affected in both social and economic terms.⁶

PURPOSE OF THIS REPORT

The purpose of this report is to inform program planning and policy review and development within the Winnipeg Health Region by providing empirical evidence that quantifies and characterizes the magnitude and patterns of injury. It is anticipated that the information contained within this report will act as a guide to action, and form the basis of an ongoing public health approach to injury prevention, where key community partners and stakeholders actively collaborate in the planning, implementation and evaluation of injury prevention programs.

1 *Injury Surveillance Guidelines*. World Health Organization, 2004. <http://whqlibdoc.who.int/publications/2001/9241591331.pdf>.

2 *Annual Report, 1998*. Winnipeg: College of Physicians and Surgeons of Manitoba. The Pediatric Death Review Committee, 1998.

3 *Quick Facts and Statistics: The Injury Issue*. Parachute Canada. <http://www.parachutecanada.org/backgrounders/item/337>.

4 *Injury in Review: 2012 Edition*. Public Health Agency of Canada, 2012. http://www.parachutecanada.org/downloads/research/reports/InjuryInReview2012_EN.pdf.

5 *The Economic Burden of Injury in Canada*. SMARTRISK, 2009. <http://www.parachutecanada.org/research/topic/C79>.

6 Diekstra RF, Garnefski N. (1995). *On the nature, magnitude and causality of suicidal behavior: an international perspective*. *Suicide and Life Threatening Behavior*; 25: 36-57.

ORGANIZATION OF THE REPORT AND HOW TO USE IT

This report is organized in a format intended to provide easy access to detailed and specific information required by the end-user to inform their specific scope of practice or research and is focused around a series of stand-alone chapters comprising a comprehensive set of detailed data tables.

Each chapter includes the following sections: (a) introduction; (b) epidemiological highlights – a section that outlines the main findings and trends; (c) an implications or “so what” section that outlines the significance for program and policy development; and, (d) a section containing background tables and graphics relevant to that chapter. All tables and graphics are produced in grayscale to facilitate photocopying and reproduction.

Individuals interested in a quick synopsis of a particular injury issue may refer to the epidemiological highlights and implications sections, while planners requiring detailed injury mortality or hospitalization data by age, gender, or community area, may navigate to the required graphic or table within each chapter. If work is being undertaken on a specific injury issue (e.g., falls), that specific chapter may be selected and used independently of the remainder of the report.

For each chapter, a number of different metrics or measures are defined to describe injury trends and burden and are defined as follows:

- a. **Number of Cases:** Number of Cases (no. cases) refers to the number of deaths due to injury, or to the number of injury-related hospitalizations. This measure may be used to assess or communicate the magnitude of the injury problem, for example, the total number of individuals who have died from injury or who have been hospitalized due to injury.
- b. **Age-Specific Rates:** Age-specific rates refer to the number of injury deaths or hospitalizations occurring in a particular age category divided by the population at risk in this age group. The result is multiplied by a constant (100,000) for ease of presentation. Age-specific rates may be used to identify age groups experiencing the highest rate of injury-related death or hospitalization.
- c. **Crude Rates:** Crude rates are the number of injury deaths or hospitalizations in a given time-frame divided by the population at risk. Rates for multiple years combined are calculated by incorporating the total numerator and population counts for all years in the calculation. The result is multiplied by a constant (100,000) for ease of presentation. Crude rates may be used to assess or communicate the injury rate in a specific year, but should not be used when comparing rates between years or between community areas. Instead, age-standardized rates should be used.
- d. **Age-Standardized Rates:** Age-standardized rates are rates that have been re-scaled to reflect the rate that would exist if the population of interest had the same age structure as a standard population. The result is multiplied by a constant (100,000) for ease of presentation. By comparing age-standardized rates over time or between community areas, the effect of age is controlled for. Age-standardized rates should be utilized when comparing rates across years or across geographic areas in order to ensure that observed differences or changes in rates are not impacted by the age structure of the population.
- e. **95% Confidence Intervals (CI):** A 95% CI provides a measure of the reliability of the estimated rates. The narrower the confidence interval, the more precise the rate estimate is likely to be. When confidence intervals do not overlap, rates can be considered as significantly different from one another. Rates with overlapping confidence intervals should be considered as not different from one another.
- f. **Potential Years of Life Lost (PYLL):** The potential years of life lost reflects the number of years of life lost prematurely (before age 75) due to a particular disease or condition, in this case injury. PYLL places emphasis on the loss of life at younger ages.
- g. **Potential Years of Life Lost (PYLL) Sum:** Potential years of life lost (sum) is the total number of years of life lost prematurely (before age 75) over the reported time period. This measure may be used to assess the total magnitude or impact of injury on premature death.
- h. **Average Potential Years of Life Lost (PYLL) per Injury:** Average PYLL per injury is the average potential years of life lost per injury in a given time-frame, and may be used to assess whether injuries are occurring at younger or later ages.
- i. **Annual Potential Years of Life Lost (PYLL) Average:** Annual PYLL average is calculated by dividing the total potential years of life lost by the number of years.
- j. **Length of Stay (LOS) Sum:** LOS Sum is the total number of days spent in hospital by year and may be used when one wants to assess the magnitude of hospital resources utilized for injury-related hospitalizations.
- k. **Average Length of Stay (LOS) per Injury:** Average (LOS) per injury is the average number of days spent in hospital per admission for a defined time frame. This measure may be used to assess the extent of hospital resources attributed to each injury-related hospitalization, or to assess whether the level of hospital resources (days) associated with each injury is increasing or decreasing over time.

- l. **Disparity Rate Ratio (DRR):** The DRR is a measure of socioeconomic gap and is the *ratio* of the rate of injury-related hospitalizations between the highest and lowest income quintile/community area.
- m. **Absolute Rate Difference (ARD):** The absolute rate difference is another measure of socio-economic gap and is the *difference* in the rate of injury-related hospitalizations between the highest and lowest income quintile/community area.
- n. **Income Quintile (IQ):** An income quintile divides the population into five income categories, ranked from lowest to highest income, so that approximately 20% of the population is in each category or quintile. In order to assign injury cases to income quintiles, each case was attributed with the average household income of the dissemination area they were residing in at the time of injury, based upon 2006 Census Canada estimates.

METHODS

DATA SOURCES

Mortality Data: Mortality data were obtained from the Manitoba Vital Statistics Agency. Variables include underlying cause of death (ICD-10-CA), region of residence, age, sex and date of death.

Hospital Discharge Abstract Database (DAD): The DAD includes administrative information (e.g., dates of admission and discharge), demographic data (e.g., date of birth, sex, region of residence) and clinical information (e.g., up to 25 diagnoses) coded at the time of discharge for inpatients and day surgery procedures (includes diagnostic and surgical procedures for which inpatient hospitalization is not required) for both Manitoba residents and non-Manitoba residents hospitalized in acute and chronic care facilities in the province, as well as for all Manitobans admitted to out-of-province facilities. Prior to April 2004, ICD-9-CM was the classification system in use within Manitoba, after which, ICD-10-CA was implemented.

DATA MANAGEMENT

Injury-Specific Case Definitions

An *injury-specific death* was defined by the presence of an ICD-10-CA V, W, X, Y code as the underlying cause of death (refer to Appendix A). An *injury-specific hospitalization* was defined as any inpatient admission with the presence of one of the external cause of injury codes (ICD-9 E-Codes or ICD-10 V, W, X, Y-Codes) in *any* of the diagnoses fields in the DAD (refer to Appendix A). For injuries within the context of other health issues, only the *most responsible diagnosis* was used to define an injury regardless of other diagnoses that may have been coded. This enabled each hospitalization to be attributed to one health issue.

Injuries were classified into four categories based on the manner or intent of injury: unintentional, intentional (self-inflicted, assault), undetermined and other. Unintentional injuries were further classified based on the cause or mechanism of the injury. To facilitate the consistent reporting of injury mortality and hospitalization causes across all study years, an injury matrix was developed combining both ICD-9-CM and ICD-10-CA based on the original matrix constructed by the United States Centers for Disease Prevention and Control and International Collaborative Effort on Injury¹ (refer to Appendix A and B).

Inclusion/Exclusion Criteria*

All deaths meeting the injury-specific case definition that occurred among residents of the WHR (regardless of where the death occurred) between January 2000 and December 2010 were included in the analysis. For injury-specific hospitalizations (based on the presence of one of the cause of injury codes within any one of the diagnosis fields), inpatient hospitalizations for residents of the WHR occurring between January 2000 and December 2010 that occurred in a Manitoba facility were included. When more than one cause of injury code was encountered, only the first was retained for analysis.

Misadventures during surgical or medical care, reactions or complications due to medical care or adverse effects due to drugs were *excluded* for both hospitalizations and deaths as these events occurred within the hospital setting and were not amenable to public health interventions.

For the review of injuries in the context of other health issues, all deaths and in-patient hospitalizations meeting the case definition and occurring among WHR residents who died within or out of the province or who were hospitalized in a facility in Manitoba or outside of the province between January 2000 and December 2010 were included. To fully place all injuries within context of other health issues, misadventures during surgical or medical care, reactions or complications due to medical care, or adverse effects due to drugs were *included*. As a result, the number of hospitalizations (and associated length of stay) reported in this section is less than in the detailed injury analysis.

When reviewing in detail road traffic injuries, a number of exclusions were made to focus on preventable injuries: water and transport accidents (E830-E838, V90-V94), air and space transport accidents (E840-E845, V95-V97), occupant of heavy transport vehicle (V60-V69), occupant of bus injured in transport accident (V70-V79) and other land transport accidents (V80-V89).

To remain consistent with national and provincial injury reports and to quantify the extent of resource utilization due to injury hospitalizations, transfers between facilities were not accounted for. That is, each inpatient hospitalization was considered as a single hospital stay regardless of transfers that may have occurred.

* Injury-specific information for residents of Churchill was excluded as amalgamation of health regions occurred in 2012.

¹ External Cause of Injury (E-code) Matrices, Centers for Disease Control and Prevention. http://www.cdc.gov/nchs/injury/injury_matrices.htm.

VARIABLE DEFINITIONS

Hospitalizations and deaths were assigned to **calendar year** based on date of hospital admission or death. Age at death and at hospital admission were defined using date of death or date of hospital admission and, **age-groups** were defined based on standard convention or as determined by the frequency of hospitalizations or deaths for a specific injury. Hospitalized cases were assigned to **Community Areas (CAs)** using the postal code of residence at the time of admission and the May 2011 Manitoba postal code conversion file. Geographic assignment of deaths was not possible as the source data did not include postal code. **Income quintile**, a measure of neighborhood socioeconomic status was assigned to hospitalized cases by dividing the population into five income groups (from lowest income to highest income) so that approximately 20% of the population (based on the 2006 census) was included within each group. Income quintiles for two distinct population groups were further defined: **urban** (Winnipeg and Brandon) and **rural** (other Manitoba areas).

STATISTICAL METHODS

Crude and annual age standardized rates of hospitalization and deaths due to injury were calculated using the corresponding year's mid-point WHR population as the denominator. Rates across multiple years were calculated by incorporating the total numerator and population counts for all years in the calculation (average annual rate). Population data were derived from the Manitoba Health Insurance Registry and provided (in electronic format by Manitoba Health) in December 2012. Rates were directly age-standardized to the 2006 Canadian population and the associated 95% confidence intervals (95% CIs) were calculated. The purpose of reporting 95% CIs is to provide a measure of the reliability of the estimated rates; the more narrow the confidence interval, the more precise the rate estimate is likely to be. For crude rates, 95% confidence intervals were calculated assuming a Poisson distribution. For age-standardized rates, the associated 95% CIs were calculated using a modified gamma distribution.² The confidence intervals derived using this method have been shown to be especially valid in situations where case counts are small.

For each death, the **potential years of life lost (PYLL)** was calculated by subtracting the client's age at death from 75. PYLL is a measure that places emphasis on loss of life at younger ages. Summary PYLL measures were reported in three ways: (a) PYLL (Sum) was calculated as the total number of years of life lost prematurely over the study period; (b) PYLL (Annual Average) was calculated by dividing the total number of years lost prematurely by the number of years of data; and, (c) PYLL (Average Per Injury) was calculated by dividing the total number of years of life lost by the number of injuries.

To approximate severity and to quantify the utilization of resources, average **length of stay** and **total length of stay** were calculated for each injury-specific hospitalization using dates of admission and discharge. However, as there may have been other health conditions (or diagnoses) that were treated during the same hospital stay, it was not possible to determine if the entire stay was due to injury alone or due to other factors; or alternatively, what proportion of the stay was due to injury.

Disparity rate ratios (DRR) were calculated for all analyses where community area and income quintile data were available and is the *ratio* of the rate of injury-related hospitalizations between the highest and lowest income quintile/community area. In addition to the DRR, the **absolute rate difference (ARD)** was calculated as the difference in the rate of injury-related hospitalizations between the highest and lowest income quintile/community area. Both measures (DRR and ARD) are an attempt to capture disparities between geographic areas (CA) and area-level wealth (income quintile).

LIMITATIONS

There are a number of limitations to consider when interpreting the findings. Data sources used in this population-based report rely on existing administrative data compiled for other purposes. The quality of the data is reliant on the expertise of professional data coders who must interpret written descriptive information into a numerical coding system.

This report used data that spanned the use of the ICD-9-CM and ICD-10-CA coding systems, requiring the construction of a cross-walk between the two classification systems. While tremendous care and review was undertaken to ensure that this cross walk was accurate and consistent, it is possible that some injury causes may have been miscoded. In addition, injury hospitalizations may have been inconsistently coded across facilities during the transition period from ICD-9-CM to ICD-10-CA (2004-2006).

Administrative databases used for this study do not permit analysis of populations defined by factors other than geography, age and sex. As a result, analyses exploring at-risk groups such as those with less education, or people with substance abuse issues could not be readily undertaken.

Transfers between hospitals were not accounted for in this report. As a result, the reported number of injury hospitalizations may be higher than the actual incidence since a single injury event may have triggered more than one hospital admission when there were transfers between hospitals. As well, hospitalization statistics are based on separations at acute care hospitals only. Injuries treated in the home or in a physician's office are not captured in the report, nor are injuries treated at "after hours" clinics, urgent care clinics, Emergency Departments or in day surgery.

2 Tiwari RC, Clegg LX, Zou Z. Efficient interval estimation for age-adjusted cancer rates. *Statistical Methods in Medical Research* 2006; 15: 547-569.

For the Injury Overview and injury-specific chapters, if more than one cause of injury code was included within the DAD record, only the first was selected and reported on within the analysis.

In 2008/2009, Winnipeg Health Region facilities began reporting the rehabilitation portion of a patient's hospital stay within the National Rehabilitation Reporting System (NRS). Patients are discharged on completion of the acute portion of their stay within the DAD; and, the remaining rehabilitation portion is abstracted within the NRS. As a result, length of stay (and corresponding bed days) has declined following implementation of the NRS making it difficult to interpret changes over the 11-year time frame; and overall, total bed days are under-reported in this analysis. Additionally, injury severity measures are not well defined in the report and are limited to length of hospital stay.

In the Road Traffic Injuries section, the number of occupant-related deaths is under-reported by approximately four-fold. Discussions are ongoing with the Manitoba Vital Statistics Agency to determine why this discrepancy was found.

Despite these limitations, this report provides timely, important and quantifiable insights into the burden of illness and mortality associated with injury in the WHR population to inform the planning of programs and policies for injury prevention.