WESTERN AUSTRALIA
CHILDHOOD INJURY REPORT

Patterns of Injuries among 0-19 year olds in Western Australia, 2001-2011
Western Australia Childhood Injury Report:
Patterns of Injuries among 0-19 year olds in Western Australia, 2001-2011

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A copy of this report is available on the Kidsafe WA website: www.kidsafewa.com.au

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EXECUTIVE SUMMARY

Injuries are a leading cause of morbidity and mortality among children in Western Australia (WA). This report uses data from the HealthTracks Reporting application of the Epidemiology Branch at the Department of Health WA and Injury Surveillance Data from the Princess Margaret Hospital Emergency Department (PMH ED) to provide an overview of unintentional and intentional childhood injuries in WA.

Key findings from this report include:

CHILD INJURY DEATHS

- **Every year 79 children aged 0-19 years die in WA due to injury**
  During the 10 year period from 2001-2010, a total of 790 children aged between 0-19 years died as a result of injury, accounting for 35.6 percent of all child deaths in WA.

- **Every year 27 children aged 0-14 years die in WA due to injury**
  Kidsafe typically focuses on the prevention of injuries in children 0-14 years of age. During the 10 year period from 2001-2010, there were 274 deaths of children within this age bracket in WA.

- **Child injury deaths in WA have decreased**
  During the previous reporting period from 1989-2000 a total of 1,258 children aged between 0-19 years died as a result of injury, averaging 105 child injury deaths per year. The rate of child injury death has also decreased from 20.3 per 100,000 during 1989-2000 to 14.0 per 100,000 during 2001-2010.

- **Children aged 15-19 and 0-4 years are at greater risk of injury death**
  The highest rates of injury death were for children aged 15-19 years at 34.9 per 100,000 and 0-4 years at 11.9 per 100,000.

- **Males are at greater risk of injury death**
  Males had a higher injury death rate in comparison to females at 18.8 per 100,000 and 13.1 per 100,000 respectively.

- **Transport injuries are the most common cause of injury death**
  Transport injuries had the highest rate of injury deaths at 6.4 per 100,000.

CHILD INJURY HOSPITALISATIONS

- **Every year 10,588 children aged 0-19 years are hospitalised in WA due to injury**
  During the 10 year period from 2002-2011 a total of 105,883 children were hospitalised as a result of injury, accounting for 12.9 percent of all child hospitalisations in WA.

- **Every year 6,841 children aged 0-14 years are hospitalised in WA due to injury**
  During the 10 year period from 2002-2011, there were 68,415 hospitalisations of children aged between 0-14 years in WA.

- **Child injury hospitalisations in WA have decreased**
  During the previous reporting period from 1989-2000 WA children were hospitalised for injury at a rate of 1,979.8 per 100,000. This has decreased to a rate of 1,860.1 per 100,000 during 2002-2011.
• Children aged 15-19 and 0-4 years are at greater risk of injury related hospitalisation
  The highest rates of injury hospitalisation were for children aged 15-19 years at 2,508.3 per 100,000 and 0-4 years at 1,876.6 per 100,000.

• Males are at greater risk of injury related hospitalisation
  Males had a higher injury hospitalisation rate in comparison to females at 2,362.3 per 100,000 in comparison to 1,327.3 per 100,000.

• Falls are the most common cause of injury related hospitalisation
  Falls had the highest rate of injury related hospitalisation at 508.3 per 100,000.

CHILD INJURY PRESENTATIONS TO EMERGENCY DEPARTMENTS

• Every year 50,146 children aged 0-19 presented to an emergency department (ED) in WA due to injury
  During the four year period from 2007-2010 a total of 200,584 children aged between 0-19 years presented to an ED as a result of injury, accounting for 19 percent of all child ED presentations in WA.

• Every year 35,214 children aged 0-14 presented to an ED in WA due to injury
  During the four year period from 2007-2010 a total of 140,855 children aged between 0-14 years presented to an ED as a result of injury.

• Children aged 15-19 and 0-4 years are at greater risk of presenting to an ED for injury
  The highest rates of ED presentation for injury were children aged 15-19 years at 9,707.3 per 100,000 and 0-4 years at 9,696.0 per 100,000.

• Males are at greater risk of presentation to an ED for injury
  Males had a higher rate of ED presentation for injury in comparison to females at 10,234.9 per 100,000 and 6,767.2 per 100,000 respectively.

• Child injury presentations to PMH ED have increased
  Over the past 10 years there has been a steady increase in the number of children presenting to PMH ED as a result of injury. In 2002, a total of 9,537 child injury presentations were recorded, while in 2011 there were 19,194 presentations.

• Falls are the most common cause of injury presentation to PMH ED
  During 2002-2011 falls were the most common cause of injury related presentation to the PMH ED accounting for 38.3 percent of presentations.
FORWARD

Injury is among the most under-recognised public health problems facing Western Australia today. Every week in WA at least one child aged between 0-19 years will die from a preventable injury, which is more than the number of children who die from cancer, asthma and infectious diseases combined.

For every one child who dies as a result of an injury, more than 134 will require admission to hospital and 634 will seek medical attention at an emergency department, costing millions of dollars in medical costs every year.

Today we recognise that the majority of injuries are predictable and preventable. Kidsafe WA works closely with the Department of Health WA, state and federal jurisdictions and the wider community to gather the evidence to support strategies to further reduce deaths and disablement resulting from injuries in WA.

The release of this report highlights the nature of childhood injury in Western Australia in comparison to Australia as a whole and the world.

This report has been prepared by Kidsafe WA in consultation with the Epidemiology Branch of the Department of Health WA and Injury Surveillance at the Princess Margaret Hospital Emergency Department. It is designed to provide an overview of the child injury problem in Western Australia. It aims to further support the work of key child injury prevention stakeholders, health practitioners, policy-makers, and researchers to better understand the problem and take the necessary steps to reduce the burden that childhood injuries place on Western Australia.

The report looks at the most recent ten year period of data which enables closer analysis of specific injury issues affecting our children. In addition to this report, a series of Regional Snapshots have been produced to highlight child injury in each of the designated health regions of WA.

This report was prepared to align with the CDC Childhood Injury Report: Patterns of Unintentional Injuries among 0-19 year olds in the United States, 2000-2006, however not all details are reported due to data limitations and identified time periods available in the HealthTracks Reporting application of the Epidemiology Branch, Department of Health WA.

We trust you will find the report provides sufficient evidence to support the continuation and expansion of child injury prevention initiatives in Western Australia. While reductions have been seen in many areas, there is still more that can be done to reduce the unnecessary burden of child injuries.

Scott Phillips
Chief Executive Officer
Kidsafe WA
INTRODUCTION

Childhood injuries continue to be a growing problem around the world. Every year approximately 875,000 children are killed and between 10 million and 30 million children are affected by non-fatal injuries globally. In addition, 95 percent of fatal and non-fatal injuries occur in low and middle income countries, but childhood injuries are also a problem in high income countries. In Australia, approximately 630 children between 0-19 years of age die from injury related causes every year.

Injuries are a leading cause of morbidity and mortality among children in WA, accounting for 35.6 percent of deaths in children aged between 0-19 years (figure 1). During the study period, an average of one child died every 4.6 days as a result of an injury. There were also 10,588 childhood injuries requiring hospital admission and 50,146 presentations to an emergency department (ED) in WA per year.

![Figure 1: Cause of Child Death by Injury Status and Intent in WA, 2001-2010](image)

The data available within the HealthTracks Reporting is restricted to pre-set age groups. This means that children aged less than one year couldn’t be excluded from the data. The result of this is a reduced proportion of injury deaths in comparison to all other causes of deaths due to the high rate of perinatal, pregnancy, childbirth and congenital conditions related deaths in children less than one year of age. If this data was able to be extracted, it would show that children die from injury at a rate greater than all other causes combined, as is the reported trend nationally for children aged 1-14 years.

METHODS & DATA LIMITATIONS

Data utilised in this report was obtained from two sources; HealthTracks Reporting from the Epidemiology Branch at the Department of Health WA, and Injury Surveillance Data from the Princess Margaret Hospital Emergency Department (PMH ED). It provides an overview of unintentional and intentional injuries during the period 2001-2011. Results are presented by age group, gender, Aboriginality, cause and regional distribution across the state.

Information was analysed for children between the ages of 0-19. They are reported in five year age groups of 0-4, 5-9, 10-14 and 15-19, and are all referred to as ‘children’ throughout the report.
To enable comparisons between international and national child injury rates, the WA injury statistics have been compared to published reports from around the world. An introductory overview summarises the international child injury picture from reports including the World Report on Child Injury Prevention, published by the World Health Organisation (WHO) and Patterns of Unintentional Childhood Injury among 0-19 year olds in the United States, 2000-2006, published by the Centre for Disease Control (CDC). In addition information has been gathered from published reports in Australia and modified datasets provided by the National Injury Surveillance Unit (NISU) and the Australian Institute of Health and Welfare (AIHW) to compare the WA picture to the rest of the country.

Kidsafe, The Child Accident Prevention Foundation of Australia, focuses on the prevention of unintentional injuries in children under 15 years. Traditionally child injury reports in Australia have focused on children aged 0-14 years, however for the purpose of this report and to enable International comparison, the age group of 0-19 years has been selected. This has resulted in a higher proportion of intentional injuries being included in the results. Consequently this may skew the recommended prevention strategies that generally focus on unintentional injuries, which make up the greatest proportion of injuries amongst children aged between 0-14.

The WA data presented strictly adheres to the period of 2001-2010 for injury deaths and 2002-2011 for injury hospitalisations. Princess Margaret Hospital Injury Surveillance Data is from 2002-2011 and the limited data available for state-wide emergency department presentations is from the period of 2007-2010. The limitations in the availability of published data for National and International comparisons from other sources, resulted in selected years being identified for analysis which created difficulty when comparing results.

While the use of emergency department data, through the HealthTracks Reporting and the PMH ED, does not capture the burden of all injuries (such as those treated at regional health centres, General Practitioners and those that didn’t seek medical assistance), this information when combined with other injury data can be helpful to State and Local health officials for prioritising programs targeting their at-risk populations. Other beneficiaries include researchers tracking trends or evaluating prevention programs, policy makers at all levels determining the best use of limited public health resources and the general public in identifying injury prevention strategies for themselves, their families and their community.

Other Data Limitations
The data available through the HealthTracks Reporting is restricted by its pre-determined categories and time periods. It was difficult to breakdown the data to enable analysis and comparisons across data types. The detailed data is usually available for the most recent five year period, however in order to analyse Aboriginality, the data used had to be extracted from the Aboriginal versus non-Aboriginal comparison tables. This posed a difficulty for data interpretation as all data tables were separated into Aboriginal or non-Aboriginal but not a combined total for all persons. In addition, the data sets for Aboriginal and non-Aboriginal comparisons were set up as 10 year data set for mortalities and seven year data set for hospital admissions.

Deaths Data
The WA Death Registrations Database contains a record of every registered death in WA. This information is collected by the Registrar of Births, Deaths and Marriages before being compiled and coded by the Australian Bureau of Statistics (ABS). It contains information about the primary and antecedent causes of death, demographic data of the deceased person and where applicable the circumstances of death. Data is coded according to the International Classification of Diseases 10th Edition (ICD-10).
For this report, death records with a date of death between 1 January 2001 and 31 December 2010 were extracted from the HealthTracks Reporting held on the intranet of the Department of Health WA, using the Deaths by Condition dataset which uses cause of death by ICD-10 chapter (i.e. major category) and sub-chapter (i.e. specific category) defined by Epidemiology Branch, Department of Health WA and sourced from WA Death Registrations. Data was accessed from the following reports:

- **Health Topic Overview**
  This report provides an overview by sex at the major category level in a specified dataset. Configurable options: dataset; area type; area; min age; max age; Aboriginality.

- **Aboriginal and non-Aboriginal Comparisons**
  This report provides a comparison of rates between the Aboriginal and non-Aboriginal population for a selected major or specific category in a dataset by age, sex and proportion of total specific and/or major category. Configurable options: dataset; major category; specific category; area type; area; min age; max age.

**Hospitalisation Data**
In WA, all public hospitals began recording hospitalisation data in 1968. Private hospitals started recording hospitalisation data three years later, in 1971. The WA Hospital Morbidity Data System (HMDS) commenced in 1970, containing a record of every hospitalisation in public, private and freestanding day surgery hospitals in WA. The HMDS includes information about the hospital, patient demographic data, administrative data and clinical data.

Hospitalisation data for the period from 1 January 2002 to 31 December 2011 was extracted from the HealthTracks Reporting using the Hospitalisations by Condition and Hospitalisations by External Cause datasets. This uses hospital separations by principal diagnosis (for separations with a principal diagnosis of injury/poisoning (S00-T98), external cause codes are used to determine cause) ICD-10-AM (Australian Modification) chapter and sub-chapter defined by Epidemiology Branch, Department of Health WA. The HMDS data was sourced from the WA Hospital Morbidity Data Collection. Data was accessed from the Aboriginal and non-Aboriginal comparison reports after modifications by staff within the Epidemiology Branch to make it a 10 year period.

**Emergency Department Attendance**
The WA Emergency Department Database (EDD) contains a record of every emergency department attendance to a WA public or private hospital under contract with the WA Government. The database has data from 2000 to 2009, however data availability varies considerably. Attendance data for the four year period from 2007 to 2010 was made available for the completion of this report through HealthTracks Reporting. To enable further comparisons, data was extracted from the PMH ED Injury Surveillance System for the period 2002-2011 and was analysed during the preparation of this report.

**Rate Calculations and Statistics**
All data was collated and analysed using the Rates Calculator, version 9.5.5, maintained by Epidemiology Branch. Western Australian resident population numbers were extracted from the Rates Calculator. National standardised data rates were reported as provided in published reports and age adjusted rates were derived using the 2011 Australian Standard Population.
GLOBAL CHILD INJURY BURDEN

Injury is a major cause of death for children around the world and is responsible for about 950,000 deaths in children under the age of 18 every year. Unintentional injuries account for almost 90 percent of these cases. In addition, millions of children suffer the consequences of non-fatal injuries, such as hospital care and disability.

More than 2,000 children die every day due to unintentional injuries and millions of children around the world are treated in hospitals with injuries that often leave them with lifelong disabilities. Over the past 30 years many high-income countries have reduced child injury deaths by half. Injury however is still a major health problem, with unintentional injuries accounting for 40 percent of child deaths in these countries.

High-income countries such as Australia, New Zealand, Sweden, the United Kingdom and the United States of America have the lowest rates of child injury (figure 2). The rate of child injury death is 3.4 times higher in low and middle income countries than in high-income countries.

The top five leading causes of child injuries, that account for 60 percent of all child injury deaths, include transport injuries, drowning, burns, falls and poisoning. Another significant category contributing to 23 percent of child injury deaths is other unintentional injuries resulting from smothering, asphyxiation, choking, animal or snakebites, hypothermia and hyperthermia amongst others (figure 3).

Globally the types of injury associated with child deaths vary from those that cause hospital admissions. For example in Australia, the leading causes of deaths among children are transport injuries and drowning, while the most common cause of hospitalisation are falls. Focusing on mortality data alone, may result in injury prevention strategies overlooking frequent injuries that can be costly to the health system.
Head injuries are the most severe injury that is sustained by children. Minor injuries such as cuts and bruises are seen more frequently, while the most common cause of unintentional injury in children that require hospital treatment are fractures to the arms and legs.

Nearly 50 percent of children under the age of 12 years who have suffered an unintentional injury severe enough to present to a hospital ED were left with some form of disability. Children injured in transport accidents were significantly more likely to be left with some form of disability.

Injury death rates vary considerably by age. Children between 15-19 years of age living in high-income countries have an injury rate over four times that of 5-9 year olds (table 1).

**Table 1: Unintentional Injury Death Rates per 100,000 Children by Age and Country Income Level Globally, 2004**

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Under 1</th>
<th>1-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>0-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Income Countries</td>
<td>28.0</td>
<td>8.5</td>
<td>5.6</td>
<td>6.1</td>
<td>23.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Low and Middle Income Countries</td>
<td>102.9</td>
<td>49.6</td>
<td>37.6</td>
<td>25.8</td>
<td>42.6</td>
<td>41.7</td>
</tr>
<tr>
<td>World</td>
<td>96.1</td>
<td>45.8</td>
<td>34.4</td>
<td>23.8</td>
<td>40.6</td>
<td>38.8</td>
</tr>
</tbody>
</table>

In most countries, the gender gap for fatal injuries increases with age. At a global level, injury death rates among children aged 0-4 years are about the same for males and females. However, in children aged 5-9 years, male death rates are a third higher than female rates, a discrepancy that increases to almost two thirds among those aged between 10-14 years.

Overall the global childhood injury picture, particularly when looking at high income countries, closely resembles child injury patterns in Western Australia. While the numbers and rates may vary, the contributing factors, leading causes, gender and age variations all closely align.
CHILD INJURY IN AUSTRALIA

Injury is a leading cause of death of children in Australia and is a major cause of hospitalisation. For each child injury death and hospitalisation, there are many more visits to an ED and health professionals outside the hospital setting. Injury has a major impact on the health of Australians and is largely preventable. In 1986 injury prevention and control was made a National Health Priority Area and the National Injury Prevention and Safety Promotion Plan: 2004-2014 identified children as a major priority area for injury prevention.

Injury Deaths in Australia
In the period 2001 to 2010, injuries contributed to 6,294 deaths of Australian children at a rate of 11.6 per 100,000 population. This equates to an average of 629 child injury deaths annually. Over the past 10 years there has been a steady decline in the number and rate of injury deaths amongst children, from 735 deaths in 2001 (13.9 per 100,000) to 557 deaths in 2010 (9.8 per 100,000). Overall males (15.7 per 100,000) were more likely to die from injury than female (7.3 per 100,000) across all age groups (table 2).

Table 2: Age-Specific Mortality Rates (per 100,000 population) for all External Causes of Injury and Poisoning (ICD-10 V01-Y98) in Australia, 2001-2010

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Males</th>
<th>Females</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 years</td>
<td>11.0</td>
<td>8.2</td>
<td>9.6</td>
</tr>
<tr>
<td>5-9 years</td>
<td>4.3</td>
<td>2.5</td>
<td>3.4</td>
</tr>
<tr>
<td>10-14 years</td>
<td>5.6</td>
<td>3.3</td>
<td>4.5</td>
</tr>
<tr>
<td>15-19 years</td>
<td>40.9</td>
<td>14.9</td>
<td>28.2</td>
</tr>
<tr>
<td>0-19 years</td>
<td>15.7</td>
<td>7.3</td>
<td>11.6</td>
</tr>
</tbody>
</table>

Injury deaths comprised a substantial proportion of all deaths among 0-19 year olds accounting for 26.6 percent of all deaths in this age group. Injury deaths vary substantially when broken down by individual age groups, with injury deaths accounting for 8.6 percent of all deaths for 0-4 years old, 31.8 percent for 5-9 year olds, 39.4 percent for 10-14 year olds and 70 percent of all deaths for 15-19 year olds.

Children aged 1-4 years usually have a greater proportion of injury deaths when compared to other age groups if the infancy period (<1 year) is removed. Infants have a higher proportion of deaths due to other causes in the first year of life, such as conditions relating to pregnancy, birth and congenital anomalies, which distorts the injury risk for 1-4 year olds. Due to the limitations of the data available, this was not able to be broken down for further investigation in this report.

When looking at an individual period of time, in 2004-05, the national injury death rate for all ages was 46.7 per 100,000 population. Queensland and Western Australia were slightly above the national rate, whilst New South Wales and Victoria were significantly below. Rates were highest for the Northern Territory and Tasmania, which had age-adjusted rates of 97.2 and 60.0 deaths per 100,000 population respectively.

During the same time period in Australia, but looking specifically at children aged 0-19 years, 606 children died as a result of injury, resulting in the national age-specific death rate being 11.3 per 100,000 population (figure 4). This is slightly lower than the 10 year period combined rate of 11.6 per 100,000. Due to the high number of missing cases (cell counts with fewer than five cases being suppressed to protect confidentiality), it was difficult to
determine the individual State and Territory death rates for 0-19 year olds in the Northern Territory*, Australian Capital Territory* and Tasmania*.

**Figure 4: Age-Specific Rates (per 100,000 population) for Community Child Injury Deaths by States and Territories in Australia, 2004-2005**

In 2004-05, more than 182 children’s lives would have been saved if the lowest state/territory death rate of 3.4 per 100,000 was achieved nationally.

*where no number was recorded a count of one was added to the total to enable an approximate rate to be calculated for these jurisdictions.*

In the same period, the most common cause of death was transport injuries, followed by other unintentional injury, suicide, drowning and fire & burns. There was a slight variation in the leading cause of death when data was broken down by age group. Children aged 0-4 years accounted for the highest age-specific rate for drowning (1.8 per 100,000), fire & burns (1.6 per 100,000), homicide (1.4 per 100,000) and poisoning (1.2 per 100,000) related deaths of all age groups. Children aged 15-19 years had the highest age-specific rate of transport injury (15.0 per 100,000), suicide (8.2 per 100,000) and other unintentional (3.9 per 100,000).

When comparing unintentional and intentional child injury deaths, for every one intentional injury death there are four unintentional injury deaths. This ratio is a lot closer for children aged 15-19 years with approximately one intentional injury death for every two unintentional injury deaths. When looking at children under 15 years of age for every one intentional injury death there are eight unintentional injury deaths. This demonstrates the importance of targeting prevention programs towards the most prevalent injury issues for the age of children to reduce the injury burden.
Injury Hospitalisations in Australia
According to the Australian Hospital Statistics, between July 2010 and June 2011, hospitalisations attributed to injury, poisoning and certain other consequences of external causes (S00–T98) ranked fifth in the total number of hospitalisations.\textsuperscript{11} During 2009-2010, the national injury hospitalisation rate for all ages was 1,859 per 100,000 population (figure 5). The highest injury hospitalisation rates were in Northern Territory (3,023 per 100,000) and Queensland (2,014 per 100,000). All other jurisdictions recorded rates close to or below the national rate, with Tasmania reporting the lowest with 1,532 per 100,000 followed by Western Australia (1,677 per 100,000).\textsuperscript{12}

Figure 5: Age-Standardised Rates (per 100,000 population) of Community Injury Deaths, by States and Territories among all Ages in Australia, 2009-2010\textsuperscript{12}

In the period 2001-02 to 2010-11, injuries contributed to 912,480 hospitalisations of children aged 0-19 years in Australia, a rate of 1,673.2 per 100,000 population. This equates to an annual hospitalised injury average of 91,248 for 0-19 year olds.

Almost one million children aged 0-19 years were hospitalised as a result of an injury during the reporting period (2001-2002 to 2010-2011), with males outnumbering females by a factor of two to one (table 3).

Table 3: Number of Hospitalised Injury Cases by Gender and Age Group in Australia, 2001-02 to 2010-11

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Males</th>
<th>Females</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 years</td>
<td>111,827</td>
<td>82,919</td>
<td>194,746</td>
</tr>
<tr>
<td>5-9 years</td>
<td>105,706</td>
<td>72,131</td>
<td>177,837</td>
</tr>
<tr>
<td>10-14 years</td>
<td>149,843</td>
<td>63,805</td>
<td>213,648</td>
</tr>
<tr>
<td>15-19 years</td>
<td>231,765</td>
<td>94,470</td>
<td>326,235</td>
</tr>
<tr>
<td>0-19 years</td>
<td>599,141</td>
<td>313,325</td>
<td>912,466</td>
</tr>
</tbody>
</table>
Over the past 10 years there was an increase in the number of hospitalisations among 0-19 year olds in Australia from 88,841 in 2001-2002 to 93,689 in 2010-2011.\textsuperscript{13, 14} The rate of hospitalised injury amongst 0-19 years olds overall changed very little during the reporting period, with around 1,650 cases per 100,000 (1,673.6 per 100,000 in 2001-02 to 1,651.5 per 100,000 in 2010-11).\textsuperscript{14}

The rates of injury among children has decreased over time, specifically in children aged 0-4 and 5-9 years of age. For males aged 0-4 years, the rate was 1,736.1 per 100,000 in 2001-2002 decreasing to 1,593.7 in 2010-2011. For females aged 0-4 years, the rate was 1,359.0 in 2001-2002 and 1,228.8 in 2010-2011. The rate of injury among children aged 15-19 years however, has increased over time from 2,188.6 per 100,000 in 2001-2002 to 2,400.4 per 100,000 in 2010-2011.\textsuperscript{14}

Two specific causes of injury show significant increases in hospitalisation numbers; falls (+15.42%) and other unintentional injuries (+15.22%) (table 4). Significant downward trends were seen in the number of hospitalisations due to poisoning by pharmaceuticals (-39.74%), poisoning by other substances (-40.56%) and transport injury hospitalisations (-16.33%).\textsuperscript{15}

Table 4: Number of Hospitalised Injury Cases by Cause in Australia, 2001-02 to 2010-11

<table>
<thead>
<tr>
<th>Injury Cause</th>
<th>2001/02</th>
<th>2010/11</th>
<th>Percentage Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>15,097</td>
<td>12,632</td>
<td>-16%</td>
</tr>
<tr>
<td>Drowning/Near Drowning</td>
<td>310</td>
<td>293</td>
<td>-6%</td>
</tr>
<tr>
<td>Poisoning, Pharmaceutical</td>
<td>2,909</td>
<td>1,753</td>
<td>-40%</td>
</tr>
<tr>
<td>Poisoning, Other</td>
<td>1,043</td>
<td>620</td>
<td>-40%</td>
</tr>
<tr>
<td>Falls</td>
<td>27,711</td>
<td>31,984</td>
<td>+15%</td>
</tr>
<tr>
<td>Burns</td>
<td>2,497</td>
<td>2,588</td>
<td>+4%</td>
</tr>
<tr>
<td>Other Unintentional Injuries</td>
<td>29,674</td>
<td>34,191</td>
<td>+15%</td>
</tr>
<tr>
<td>Assault</td>
<td>3,778</td>
<td>3,738</td>
<td>-1%</td>
</tr>
</tbody>
</table>

*While it is possible to derive the numbers of Intentional Self Harm cases during these periods, these statistics have been excluded from this table as a condition of data supplied by AIHW for the purpose of this report.

Data Source: Sections of this report are based on data made available by the AIHW who provided the data tables for the traditional five year age groups. The authors are responsible for the use made of the data in this article report. For further information about these tables see: Pointer S. 2013. Trends in hospitalised injury, Australia, 1999–00 to 2010–11. Injury research and statistics series no. 86. cat. no. INJCAT 162. Canberra: AIHW.

With the number of presentations increasing in line with an increasing population and injury hospitalisation rates remaining fairly steady, there is still a lot more work that can be done to reduce the injury burden among 0-19 year olds.
CHILD INJURY IN WESTERN AUSTRALIA

Unintentional injuries are a leading cause of morbidity and mortality among children in WA. The data presented in this section has been broken down into three categories:

- Child Injury Deaths (2001-2010)
- Child Injury Hospitalisations (2002-2011)

For every 1 child that dies in WA, there are...

- 134 hospitalisations
- 634 ED presentations
- Many more treated by GP’s and health centres.

Between 2001 and 2010 a total of 2,217 children died in WA, 790 as a result of an injury. A further 105,883 children were admitted to hospital as a result of an injury during the period between 2002-2011 and 200,584 children presented to hospital emergency departments across the state during the period between 2007-2010.

Every year this equates to 79 deaths, 10,588 hospital admissions and 50,146 ED presentations by WA children aged 0-19 years.

During the most recent five years of the study period, there has been a reduction in the rate of child injury deaths and child injury hospitalisations, but an increase in ED presentations. In 2006 there were a total of 80 child injury deaths recorded, which reduced to 64 in 2010. This is a reduction in the child injury death rate for WA from 14.0 per 100,000 persons in 2006 to 10.3 per 100,000 persons in 2010.

At the PMH ED there was an increase in the number of injury related presentations from 11,799 in 2006 to 17,352 in 2010. The increasing numbers of child injury presentations to PMH ED requires further investigation to determine whether there has been a real increase in injury occurrence or a combination of other factors such as; an overall increase in WA’s population; a high annual birth rate; a perceived decrease in local services; or the inability to get an urgent appointment to see local GPs.
CHILD INJURY DEATHS IN WESTERN AUSTRALIA

Between 2001-2010 a total of 2,217 children aged 0-19 years died in Western Australia, with 35.6 percent (n=790) as a result of an injury. Males (46.5 per 100,000) had a higher death rate than females (31.5 per 100,000) for all causes of death.

Of the 19 causes of death represented in the data extracted from the HealthTracks Reporting application, the most common causes of death were the same regardless of gender. Differences did emerge however when being separated into age groups (table 5).

Table 5: Top Three Leading Causes of Child Death by Age in WA, 2006-2010

<table>
<thead>
<tr>
<th>Rank</th>
<th>0-4 years (n=599)</th>
<th>5-9 years (n=58)</th>
<th>10-14 years (n=77)</th>
<th>15-19 years (n=326)</th>
<th>All: 0-19 years (n=1,060)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perinatal conditions 31.9%</td>
<td>Injury &amp; Poisoning 31.0%</td>
<td>Injury &amp; Poisoning 36.4%</td>
<td>Injury &amp; Poisoning 77.6%</td>
<td>Injury &amp; Poisoning 35.5%</td>
</tr>
<tr>
<td>2</td>
<td>Congenital Malformations 18.7%</td>
<td>Neoplasms 31.0%</td>
<td>Neoplasms 22.1%</td>
<td>Neoplasms 7.4%</td>
<td>Perinatal conditions 18.2%</td>
</tr>
<tr>
<td>3</td>
<td>Injury &amp; Poisoning 12.8%</td>
<td>Respiratory conditions 8.6%</td>
<td>Nervous system diseases 20.8%</td>
<td>Circulatory diseases 4.0%</td>
<td>Congenital Malformations 11.5%</td>
</tr>
</tbody>
</table>

Most child deaths are infants aged less than one and are related to perinatal and congenital factors. Once the infancy period has passed, injury deaths emerge as the leading cause of death for children. Over the ten year period from 2001-2010, 35.6 percent of deaths of children aged 0-19 years were related to injury (790 children).

Injury Deaths by Age Group and Gender
The overall death rate for injury was 14.0 per 100,000 children. The rate was highest amongst 15-19 year olds (34.9 per 100,000) and 0-4 year olds (11.9 per 100,000). Children aged 10-14 years (4.3 per 100,000) and 5-9 years (3.8 per 100,000) had the lowest injury death rates. Similarly, the number of injury deaths varied by age group. Of the 790 deaths among children 0-19 years of age during 2001-2010, 65.3 percent (n=516) occurred in children 15-19 years, followed by 20.3 percent (n=160) among children 0-4 years of age (figure 6).

Kidsafe typically focuses on the prevention of injuries in children between 0-14 years of age. There were 274 deaths of children within this age bracket in WA from 2001-2010, representing an injury death rate of 6.6 per 100,000 children.
Males had a higher injury death rate compared to females in all age groups. The overall injury death rates among males and females aged 0-19 years were 18.8 per 100,000 and 13.1 per 100,000 respectively with males being at a greater risk of injury than females. During the study period a total of 557 male and 233 female children died from injury causes.

When examining rates by gender and age groups, the death rate was highest among males 15-19 years (rate 49.7 per 100,000) (figure 7).

**Injury Deaths by Cause**

Injury death rates differed by cause, with the highest injury rates due to transport accidents (6.4 per 100,000) and the lowest due to fire, burns & scalds (0.2 per 100,000) (figure 8).

Injuries that were identified as being intentional or of undetermined intent, accounted for 26.4 percent of child injury deaths for 0-19 year olds in WA.
Variations were observed in the causes of child injury deaths when broken down by age groups. Transport accidents were the leading cause of injury death in all age groups, aside from children aged 0-4 years where other unintentional and accidental drowning ranked higher (table 6).

**Table 6: Top Five Leading Causes of Child Injury Death in WA, 2001-2010**

<table>
<thead>
<tr>
<th>Rank</th>
<th>0-4 years (n=160)</th>
<th>5-9 years (n=52)</th>
<th>10-14 years (n=62)</th>
<th>15-19 years (n=516)</th>
<th>All: 0-19 years (n=790)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Other unintentional 31.3%</td>
<td>Transport accidents 51.9%</td>
<td>Transport accidents 51.6%</td>
<td>Transport accidents 53.5%</td>
<td>Transport accidents 46.7%</td>
</tr>
<tr>
<td>2</td>
<td>Accidental Drowning 28.8%</td>
<td>Other unintentional 13.5%</td>
<td>Other unintentional 22.6%</td>
<td>Intentional Self Harm 28.9%</td>
<td>Intentional Self Harm 19.9%</td>
</tr>
<tr>
<td>3</td>
<td>Transport accidents 21.3%</td>
<td>Accidental Drowning 11.5%</td>
<td>Intentional Self Harm 12.9%</td>
<td>Other unintentional 5.0%</td>
<td>Other unintentional 12.2%</td>
</tr>
<tr>
<td>4</td>
<td>Interpersonal Violence 8.8%</td>
<td>Interpersonal Violence 11.5%</td>
<td>N/A</td>
<td>Accidental poisoning 4.7%</td>
<td>Accidental Drowning 7.7%</td>
</tr>
<tr>
<td>5</td>
<td>Fire, Burns &amp; Scalds 3.8%</td>
<td>N/A</td>
<td>N/A</td>
<td>Interpersonal Violence 3.1%</td>
<td>Interpersonal Violence 4.6%</td>
</tr>
</tbody>
</table>

*Cell counts with five or less cases were suppressed and therefore the ranking order could not be determined. N/A is used to denote this.

**Injury Deaths by Aboriginality and Health Region**
Aboriginal children aged 0-19 years residing in WA had a death rate that was up to four times greater than non-Aboriginal populations (figure 9).
Figure 9: Difference in Child Injury Death Rates by Area and Aboriginality in WA, 2001-2010

The Kimberley region had the highest child injury death rate (54.3 per 100,000) when compared to all regions across WA (figure 10). The Wheatbelt region was the next most common health region for child injury deaths to occur (34.3 per 100,000), followed by the Pilbara (33.5 per 100,000).

Figure 10: Child Injury Deaths by Health Region in WA, 2001-2010
Changes in Child Injury Deaths

When comparing the current reporting period of data to the previous published data report, there has been a significant decrease in overall child injury deaths in WA. In the 12 year period between 1989 and 2000, a total of 1,258 children aged 0-19 died as a result of injury. This equates to approximately 105 deaths per annum. In comparison, during the 10 year period from 2001-2010, a total of 790 child injury deaths were recorded for the same age group, equating to 79 deaths per annum (table 7). This is an overall reduction in child injury deaths between the two reporting periods of 24.8 percent.

Table 7: Comparisons of Child Injury Death by Age in WA, 1989-2000 versus 2001-2010

<table>
<thead>
<tr>
<th>Age Group</th>
<th>1989 to 2000</th>
<th>2001 to 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deaths per annum</td>
<td>Rate per 100,000</td>
</tr>
<tr>
<td>0-4 years</td>
<td>19.4</td>
<td>15.3</td>
</tr>
<tr>
<td>5-9 years</td>
<td>10.1</td>
<td>7.7</td>
</tr>
<tr>
<td>10-14 years</td>
<td>11.8</td>
<td>9.0</td>
</tr>
<tr>
<td>15-19 years</td>
<td>63.6</td>
<td>49.0</td>
</tr>
<tr>
<td>0-19 years</td>
<td>105</td>
<td>20.3</td>
</tr>
</tbody>
</table>

When looking at individual injury causes, the only three categories to record an increase in the number of deaths were falls (45.5% increase), fire, burns & scalds (8.3% increase) and undetermined intent (128.6% increase) (table 8).

Table 8: Comparisons for Child Injury Death by Cause in WA, 1989-2000 versus 2001-2010

<table>
<thead>
<tr>
<th>Injury Cause</th>
<th>1989 to 2000 (12 years)</th>
<th>2001 to 2010 (10 years)</th>
<th>Percentage Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidental Drowning</td>
<td>11.2</td>
<td>6.1</td>
<td>- 45.5%</td>
</tr>
<tr>
<td>Accidental Poisoning</td>
<td>4.1</td>
<td>2.5</td>
<td>- 39.0%</td>
</tr>
<tr>
<td>Falls</td>
<td>1.1</td>
<td>1.6</td>
<td>+ 45.5%</td>
</tr>
<tr>
<td>Fire/Burns/Scalds</td>
<td>1.2</td>
<td>1.3</td>
<td>+ 8.3%</td>
</tr>
<tr>
<td>Transport Accidents</td>
<td>54.7</td>
<td>36.9</td>
<td>- 32.5%</td>
</tr>
<tr>
<td>Other Unintentional</td>
<td>8.8</td>
<td>9.6</td>
<td>+ 9.1%</td>
</tr>
<tr>
<td>Undetermined Intent</td>
<td>0.7</td>
<td>1.6</td>
<td>+ 128.6%</td>
</tr>
<tr>
<td>Intentional Self Harm</td>
<td>16.5</td>
<td>15.7</td>
<td>- 4.8%</td>
</tr>
<tr>
<td>Interpersonal Violence</td>
<td>6.3</td>
<td>3.6</td>
<td>- 42.9%</td>
</tr>
</tbody>
</table>

Overall it is positive to see reductions in child injury deaths across all age groups but there is still a lot more that can be done to reduce the burden. Further investigation is needed to determine the reasons behind increases in other unintentional injuries and those injuries of undetermined intent which may be related to coding rather than true increases.
CHILD INJURY HOSPITALISATIONS IN WESTERN AUSTRALIA

From 2002-2011 a total of 820,230 children aged 0-19 were hospitalised in WA, with 12.9 percent (n=105,883) as a result of an injury. Of the 21 different causes of hospitalisation represented in the data extracted from the HealthTracks Reporting application, the most common causes of hospitalisation for children aged 0-19 years varied by age group (table 9).

Table 9: Top Five Leading Causes of Child Hospitalisation in WA, 2002-2011

<table>
<thead>
<tr>
<th>Rank</th>
<th>0-4 years (n=327,003)</th>
<th>5-9 years (n=133,198)</th>
<th>10-14 years (n=243,823)</th>
<th>15-19 years (n=243,823)</th>
<th>All 0-19 years (n=820,230)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Respiratory diseases 20.6%</td>
<td>Digestive diseases 17.5%</td>
<td>Injury &amp; Poisoning 20.0%</td>
<td>Digestive diseases 22.3%</td>
<td>Digestive diseases 14.9%</td>
</tr>
<tr>
<td>2</td>
<td>Perinatal Conditions 16.3%</td>
<td>Respiratory diseases 17.3%</td>
<td>Digestive diseases 18.0%</td>
<td>Injury &amp; Poisoning 15.4%</td>
<td>Respiratory diseases 14.1%</td>
</tr>
<tr>
<td>3</td>
<td>Infectious diseases 8.0%</td>
<td>Injury &amp; Poisoning 14.6%</td>
<td>Respiratory diseases 9.6%</td>
<td>Pregnancy and Childbirth 13.6%</td>
<td>Injury &amp; Poisoning 12.9%</td>
</tr>
<tr>
<td>4</td>
<td>Injury &amp; Poisoning 7.9%</td>
<td>Ear diseases 9.2%</td>
<td>Ill-defined conditions 6.1%</td>
<td>Mental disorders 8.7%</td>
<td>Perinatal conditions 6.5%</td>
</tr>
<tr>
<td>5</td>
<td>Ill-defined conditions 7.6%</td>
<td>Nervous system diseases 4.9%</td>
<td>Musculoskeletal diseases 5.5%</td>
<td>Respiratory diseases 5.8%</td>
<td>Ill-defined conditions 6.0%</td>
</tr>
</tbody>
</table>

When comparing to the overall gender variations in hospitalisations of all children in WA, the top three are made up of digestive diseases, respiratory diseases and injury & poisoning, with gender changing the ranking order (figure 11).

Figure 11: Ranking of Child Injury and Poisoning Hospitalisations by Gender in WA, 2002-2011

Injury Hospitalisations by Age Group and Gender
Of the 105,883 hospitalisations among children 0-19 years of age during 2002-2011, 15-19 year olds accounted for 35.4 percent (n=37,418), followed by 0-4 year olds (24.3%, n=25,770) (figure 12).
The overall hospitalisation rate for injury was 1,860.1 per 100,000 children. The rate was highest amongst 15-19 year olds (2,508.3 per 100,000) and 0-4 year olds (1,876.6 per 100,000). The rate was lowest amongst 10-14 year olds (1,603.1 per 100,000) and 5-9 years olds (1,412.1 per 100,000).

Similarly with deaths, Kidsafe typically focuses on the prevention of injuries in children between 0-14 years of age. There were 68,415 hospitalisations of children between 0-14 years of age in WA from 2002-2011, representing an injury hospitalisation rate of 1629.8 per 100,000 children.

Males had a higher injury hospitalisation rate compared to females in all age groups. The overall injury hospitalisation rate among males and females aged 0-19 years was 2,362.3 per 100,000 and 1,327.3 per 100,000 respectively. During the study period, a total of 36,642 females and 69,191 males were hospitalised from injury related causes.

When examining rates by gender and age group, the hospitalisation rate was highest among males 15-19 years (rate 3,447.1 per 100,000) and amongst females 0-4 years (1,621.5 per 100,000) (figure 13).
Injury Hospitalisations by Cause

Hospitalisation rates differ by cause, with the highest rates due to falls (508.3 per 100,000) and the lowest due to drowning (10.7 per 100,000) (figure 14). Injuries that were identified as being intentional or of undetermined intent accounted for 9.4 percent of all child injury hospitalisations for 0-19 year olds in WA.

![Figure 14: Child Injury Hospitalisation Rates by Cause in WA, 2002-2011](chart.png)

Males had higher hospitalisation rates compared with females for all injury causes, except for intentional self-harm (107.1 per 100,000 females compared to 37.9 per 100,000 males) and undetermined intent (13.0 per 100,000 females compared to 11.5 per 100,000 males). The highest rate for both males and females was falls (624.8 per 100,000 and 384.6 per 100,000, respectively).

When broken down by age groups, variations can be observed in the ranking order of child injury hospitalisations (table 10).

### Table 10: Top Five Leading Causes of Child Injury Hospitalisation in WA, 2002-2011

<table>
<thead>
<tr>
<th>Rank</th>
<th>0-4 years (n=25,770)</th>
<th>5-9 years (n=19,477)</th>
<th>10-14 years (n=23,168)</th>
<th>15-19 years (n=37,418)</th>
<th>All 0-19 years (n=105,833)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accidental Falls</td>
<td>Accidental Falls</td>
<td>Accidental Falls</td>
<td>Transport accidents</td>
<td>Accidental Falls</td>
</tr>
<tr>
<td></td>
<td>34.3%</td>
<td>43.3%</td>
<td>31.9%</td>
<td>21.4%</td>
<td>27.3%</td>
</tr>
<tr>
<td>2</td>
<td>Mechanical Forces</td>
<td>Mechanical Forces</td>
<td>Mechanical Forces</td>
<td>Mechanical Forces</td>
<td>Mechanical Forces</td>
</tr>
<tr>
<td></td>
<td>24.1%</td>
<td>23.8%</td>
<td>21.8%</td>
<td>21.2%</td>
<td>22.5%</td>
</tr>
<tr>
<td>3</td>
<td>Accidental poisoning</td>
<td>Transport accidents</td>
<td>Transport accidents</td>
<td>Other unintentional</td>
<td>Transport accidents</td>
</tr>
<tr>
<td></td>
<td>10.9%</td>
<td>12.3%</td>
<td>21.7%</td>
<td>14.4%</td>
<td>15.7%</td>
</tr>
<tr>
<td>4</td>
<td>Other unintentional</td>
<td>Other unintentional</td>
<td>Other unintentional</td>
<td>Accidental Falls</td>
<td>Other unintentional</td>
</tr>
<tr>
<td></td>
<td>7.5%</td>
<td>7.8%</td>
<td>11.1%</td>
<td>11.3%</td>
<td>10.8%</td>
</tr>
<tr>
<td>5</td>
<td>Fire, Burns &amp; Scalds</td>
<td>Fire, Burns &amp; Scalds</td>
<td>Intentional Self Harm</td>
<td>Interpersonal Violence</td>
<td>Interpersonal Violence</td>
</tr>
<tr>
<td></td>
<td>6.1%</td>
<td>2.2%</td>
<td>2.2%</td>
<td>11.0%</td>
<td>4.9%</td>
</tr>
</tbody>
</table>
Injury Hospitalisations by Aboriginality and Health Region
Aboriginal children in WA had hospitalisation rates that were double that of the non-Aboriginal population (figure 15).

The injury hospitalisation rate for Aboriginal children aged 0-19 years was significantly higher compared to their non-Aboriginal equivalents in almost every health region across WA. However exceptions occurred in the South West and Wheatbelt regions, where the rate for non-Aboriginal child injury hospitalisations was slightly higher (figure 16). The highest injury hospitalisation rate of Aboriginal children in WA occurred in the Pilbara region (4,625.4 per 100,000), closely followed by the Kimberley region (4,504.8 per 100,000). The lowest injury hospitalisation rate of Aboriginal children was seen in the South West region (1,750.7 per 100,000).

The North Metropolitan Area Health Service (NMAHS) and South Metropolitan Area Health Service (SMAHS) recorded the lowest rate of hospitalisations in all children across WA, accounting for 1,727.8 per 100,000 and 1,665.3 per 100,000 respectively (figure 17). The Kimberley region has the highest child injury hospitalisation rate (3,805.5 per 100,000) when compared to the rest of WA, followed by the Pilbara (2,714.3 per 100,000) and Wheatbelt (2,543.7 per 100,000). This closely aligns to the regions recording the highest child injury death rates in WA.
Changes in Child Injury Hospitalisations

When comparing the current reporting period of data to the previous published report, there has been a slight decrease in child injury hospitalisation rates in WA (1,979.8 per 100,000 in 1989-2000 compared to 1,860.1 per 100,000 in 2002-2011).

In the 12 year period from 1989 to 2000, a total of 122,942 children were hospitalised as a result of an injury, equating to approximately 10,245 hospitalisations per annum. In the 10 year period from 2002-2011, a total of 105,883 child injury hospitalisations were recorded for the same age group, equating to 10,588 hospitalisations per annum. This shows a slight increase in hospitalisation of approximately 3.3 percent. When broken down by age groups, only children aged 0-4 and 5-9 years experienced overall decreases in injury hospitalisation numbers. However, when comparing the age-specific rates for each reporting period, all age groups experienced decreases in child injury hospitalisations (table 11).
Table 11: Comparisons for Child Injury Hospitalisations in WA, 1989-2000 versus 2002-2011

<table>
<thead>
<tr>
<th>Age Group</th>
<th>1989 to 2000</th>
<th>2002 to 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hospitalisation per annum</td>
<td>Rate per 100,000</td>
</tr>
<tr>
<td>0-4 years</td>
<td>2,583</td>
<td>2.036.9</td>
</tr>
<tr>
<td>5-9 years</td>
<td>2,080</td>
<td>1,589.3</td>
</tr>
<tr>
<td>10-14 years</td>
<td>2,262.5</td>
<td>1,739.9</td>
</tr>
<tr>
<td>15-19 years</td>
<td>3,319.6</td>
<td>2,558.1</td>
</tr>
<tr>
<td>0-19 years</td>
<td>10,245</td>
<td>1,979.8</td>
</tr>
</tbody>
</table>

When looking at individual injury causes, the only category to record an increase in the number of hospitalisations was undetermined intent (4.6% increase) (table 12).

Table 12: Comparisons for Child Injury Hospitalisation by Cause in WA 1989-2000 versus 2002-2011

<table>
<thead>
<tr>
<th>Injury Cause</th>
<th>1989 to 2000</th>
<th>2002 to 2011</th>
<th>Percentage Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hospitalisation per annum</td>
<td>Hospitalisation per annum</td>
<td></td>
</tr>
<tr>
<td>Accidental Drowning</td>
<td>59.1</td>
<td>36.3</td>
<td>- 38.6%</td>
</tr>
<tr>
<td>Accidental Poisoning</td>
<td>524.6</td>
<td>212.5</td>
<td>- 59.5%</td>
</tr>
<tr>
<td>Falls</td>
<td>2,812.3</td>
<td>1,830.1</td>
<td>- 34.9%</td>
</tr>
<tr>
<td>Fire/Burns/Scalds</td>
<td>391.7</td>
<td>176.4</td>
<td>- 55.0%</td>
</tr>
<tr>
<td>Transport Accidents</td>
<td>1,826.9</td>
<td>1,202.4</td>
<td>- 34.2%</td>
</tr>
<tr>
<td>Other Unintentional</td>
<td>3,161.8</td>
<td>806.5</td>
<td>- 74.5%</td>
</tr>
<tr>
<td>Undetermined Intent</td>
<td>32.2</td>
<td>33.7</td>
<td>+ 4.6%</td>
</tr>
<tr>
<td>Intentional Self Harm</td>
<td>405.0</td>
<td>110.9</td>
<td>- 72.7%</td>
</tr>
<tr>
<td>Interpersonal Violence</td>
<td>403.1</td>
<td>376.3</td>
<td>- 6.6%</td>
</tr>
</tbody>
</table>
CHILD INJURY EMERGENCY DEPARTMENT PRESENTATIONS IN WESTERN AUSTRALIA

From 2007-2010 more than one million children (n=1,050,743) aged 0-19 years presented at an ED for treatment in WA, with 19.1 percent (n=200,584) of the presentations being as a result of an injury. Of the 24 different causes for ED attendance represented in the data extracted from the HealthTracks Reporting tool, the most common causes for children aged 0-19 years varied by age group (table 13).

Table 13: Top 3 Leading Causes of Child ED Attendance in WA, 2007-2010

<table>
<thead>
<tr>
<th>Rank</th>
<th>0-4 years (n=432,003)</th>
<th>5-9 years (n=188,933)</th>
<th>10-14 years (n=175,501)</th>
<th>15-19 years (n=222,872)</th>
<th>All 0-19 years (n=1,050,743)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diseases and disorders of the ear, nose, mouth and throat 18.8%</td>
<td>Injury &amp; Burns 20.0%</td>
<td>Injury &amp; Burns 26.6%</td>
<td>Injury &amp; Burns 26.8%</td>
<td>Injury &amp; Burns 19.1%</td>
</tr>
<tr>
<td>2</td>
<td>Diseases and disorders of the Respiratory system 14.4%</td>
<td>Diseases and disorders of the ear, nose, mouth and throat 16.6%</td>
<td>Diseases and disorders of the musculoskeletal system and connective tissue 14.1%</td>
<td>Diseases and disorders of the skin, subcutaneous tissue and breast 9.9%</td>
<td>Diseases and disorders of the ear, nose, mouth and throat 13.9%</td>
</tr>
<tr>
<td>3</td>
<td>Injury &amp; Burns 13.2%</td>
<td>Diseases and disorders of the skin, subcutaneous tissue and breast 10.5%</td>
<td>Diseases and disorders of the skin, subcutaneous tissue and breast 10.3%</td>
<td>Diseases and disorders of the musculoskeletal system and connective tissue 9.5%</td>
<td>Diseases and disorders of the Digestive system 9.5%</td>
</tr>
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Injury ED Presentations by Age Group and Gender

Of the 200,584 injury related ED presentations by children during 2007-2010, 29.8 percent (n=59,729) occurred among those aged 15-19 years, followed by 0-4 years (28.1%, n=56,406). This replicates the order of age groups recording the highest number of child injury deaths & hospitalisations (figure 18).

Figure 18: Percentage of Child Injury ED Attendance by Age Group in WA 2007-2010

The ED attendance rate for injury was 8,555.9 per 100,000 children. The rate was highest amongst those between 15-19 years (9,707.3 per 100,000) and 0-4 years (9,696.0 per 100,000) and lower for children between 10-14 years (7,930.4 per 100,000) and 5-9 years (6,759.7 per 100,000).
Males had a higher ED attendance rate for injury compared to females across all age groups. The injury ED attendance rate among males and females was 10,234.9 per 100,000 and 6,767.2 per 100,000 respectively. During the study period a total of 123,769 males and 76,815 females attended EDs in WA due to injury related causes.

When examining rates by gender and age group, the ED attendance rate was highest among males 15-19 years (12,507.0 per 100,000) and amongst females 0-4 years (8,539.7 per 100,000) (figure 19).

![Figure 19: Child Injury ED Attendance Rates by Gender and Age Group in WA, 2007-2010](image)

**Injury ED Presentations Aboriginality and Health Region**

Aboriginal children aged 0-19 years in WA had an ED attendance rate that was almost three times higher than that of non-Aboriginal children (figure 20). Among both Aboriginal and non-Aboriginal populations in WA, males had a higher ED attendance rate for injuries than females.

![Figure 20: Child ED Attendance Rate by Aboriginality in WA, 2007-2010](image)

The injury ED attendance rate for children residing in regional areas was significantly higher than their metropolitan counterparts (figure 21). The highest overall injury ED attendance rate for WA children occurred in the Wheatbelt (20,640.5 per 100,000) closely followed by the Goldfields (20,414.5 per 100,000). The lowest injury ED attendance rates was recorded in the North Metropolitan region (5,563.5 per 100,000).
As no further details on ED attendance specific to injuries was available through Health Track Reporting, the remaining data examined under this section is from the PMH ED for the period 2002-2011. PMH is the only tertiary paediatric facility for WA and is therefore the reference for paediatric illness and injury for the state. It is important to note that PMH doesn’t regularly treat children over the age of 16 years and therefore data for children in the 15-19 year old age group is limited.

Princess Margaret Hospital Emergency Department Injury Presentations
From 2002-2011 more than 500,000 children (n=509,394) presented to the PMH ED for treatment, with 25.6 percent (n=130,441) as a result of an injury. Males attended THE PMH ED as a result of an injury at a higher rate than females across all age groups. During the study period a total of 53,538 females and 76,899 males attended PMH ED for an injury equating to a ratio of 2:3 (figure 22).

Figure 22: Presentations to the PMH ED by Gender in WA, 2002-2011

Of the 130,441 PMH ED presentations from 2002-2011, 41.3 percent (n=53,818) occurred among those 0-4 years, followed by 28.8 percent (n=37,611) among those 10-14 years of age (figure 23). Children aged 5-9 years and 10-14 years accounted for 25.5 percent (n=33,217) and 28.8 percent (n=37,611) of presentations respectively. Children aged 15 years or older accounted for the lowest proportion of presentations (4.4%, n=5,776). Once children reach adolescence, there is a gradual decline in the number of PMH ED
presentations reported, possibly due to a general tendency for children in this age group to present to non-paediatric facilities for treatment.

**Figure 23: Percentage of Presentations to the PMH ED by Age Group in WA, 2002-2011**

The majority of children presenting to the PMH ED as a result of injury were metropolitan residents, accounting for 93.3 percent (n=121,701) of presentations. The remaining 6.7 percent were from regional locations across WA (5.1%, n=6,706), other (0.9%, n=1,128) including interstate, international, or were unknown (0.7%, n=906). The majority of injury presentations were non-Aboriginal children. Approximately 4.8 percent (n=6,264) of all presentations were children of Aboriginal and/or Torres Strait Islander descent.

The number of presentations to PMH ED differed by cause. The highest numbers related to injuries were due to falls (38.3%, n=49,942) and the lowest related to drowning (0.2%, n=230). This corresponds to the highest and lowest hospitalisation rates for injuries among 0-19 year olds in WA. Injuries that are identified as being intentional or of undetermined intent accounted for 3.2 percent (n=4,223) of injury presentations to PMH ED (figure 24).

**Figure 24: Presentations to the PMH ED by Cause in WA, 2002-2011**
The majority of injuries occurred in the home (46.4%, n=60,559), followed by other place (21.5%, n=28,009), referring to a place that does not fit within a designated category, an unknown location, and a school or residential institution (10.2%, n=13,310) (figure 25).

Figure 25: Presentations to the PMH ED by Location in WA, 2002-2011

Changes in PMH ED Presentations
Over the past 10 years there has been a steady increase in the number of children presenting to PMH ED as a result of an injury. In 2002, a total of 9,537 child injury presentations were recorded, while in 2011 there were 19,194 presentations. During this time there has however been a steady decrease in the percentage of children who were admitted for further treatment. In 2002, 23.8 percent of presentations were admitted, while in 2011 this had reduced to 17 percent. At the same time, 2002 saw 73 percent of presentations depart with treatment complete and in 2011 this had increased to 81 percent.

When looking at individual injury causes for children, all categories experienced increases in presentations to PMH ED. In regards to location of injuries, while there have been decreases in child injury presentations to PMH ED that occur on roads and sports areas, the home and farm area has remained relatively stable (table 14). This may not be a true reduction in injuries in these locations and instead, could be a change in the way items are identified and coded. The largest change is represented in the other place location, which is used when a location is not specified or clearly stated at triage.

Table 14: Number of Child Injury Presentations to the PMH ED by Location in WA, 2002 versus 2011

<table>
<thead>
<tr>
<th>Injury Location</th>
<th>2002 Number (n)</th>
<th>2011 Number (n)</th>
<th>Percentage Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial, Industrial, Medical Area</td>
<td>169</td>
<td>230</td>
<td>+ 36.1%</td>
</tr>
<tr>
<td>Open Nature Area</td>
<td>135</td>
<td>268</td>
<td>+ 98.5%</td>
</tr>
<tr>
<td>Home/Farm</td>
<td>4,787</td>
<td>4,848</td>
<td>+ 1.3%</td>
</tr>
<tr>
<td>Other Place</td>
<td>156</td>
<td>10,304</td>
<td>+ 6,505.1%</td>
</tr>
<tr>
<td>School/Residential Institution</td>
<td>990</td>
<td>1,767</td>
<td>+ 78.5%</td>
</tr>
<tr>
<td>Road, Footpath, Cycleway, Parking</td>
<td>689</td>
<td>498</td>
<td>- 28.7%</td>
</tr>
<tr>
<td>Sports Area</td>
<td>514</td>
<td>224</td>
<td>- 56.4%</td>
</tr>
<tr>
<td>Rec/Cultural Area</td>
<td>784</td>
<td>1,055</td>
<td>+ 34.6%</td>
</tr>
<tr>
<td>Unknown</td>
<td>1,313</td>
<td>0</td>
<td>- 100%</td>
</tr>
</tbody>
</table>
DISCUSSION

The collection of injury data plays a vital role in the development of strategies to prevent and minimise children’s injuries. It relies on an efficient and reliable data system and the co-operation of health service staff. Through the analysis of data, injury trends can be noted as well as the effects of injury prevention programs. It can also highlight the importance of adequately resourcing policies and programs to reduce the burden that child injuries place on the health system.

Injuries are a leading cause of morbidity and mortality among children in WA. During the study period, on average one child died every 4.6 days as a result of an injury in WA. There were 10,580 injuries requiring hospital admission and 50,140 presentations to emergency departments across the state annually.

From 2001 to 2010, 790 children died as a result of an injury in WA. Injury is identified as the leading cause of death for all children aged 0-19 years, accounting for 35 percent of deaths in this age group. Of those deaths 274 were children aged 0-14 years. Aboriginal children in WA had a death rate that was up to four times greater than that of their non-Aboriginal counterparts and transport injuries were the leading cause of death for all children, except those under five years of age. The Kimberley region of WA had the highest injury death rate when compared to the rest of WA.

From 2002 to 2011, 105,883 children were hospitalised in WA as a result of an injury, 6,841 of them were children aged 0-14 years. As with child injury deaths, males outnumbered females with a ratio of two to one in injury hospitalisation statistics. Injuries are the third most common cause of hospital admission among children after digestive diseases and respiratory diseases. Aboriginal children residing in WA had a hospitalisation rate double that of non-Aboriginal populations. Accidental falls were the leading cause of child injury hospitalisation for every age group except 15-19 year olds where transport accidents were higher. As with child injury deaths in WA, the Kimberley region had the highest injury hospitalisation rate when compared to the whole of WA.

More than a million children presented to an ED in WA from 2007-2010, with 200,584 as a result of an injury. Over 35,000 of those injuries were children aged 0-14 years. As with the data previously presented, males continue to outnumber females injury ED presentations. Injury is the most common cause of ED presentations among children and account for more than 19 percent of presentations among 0-19 year olds. Aboriginal children aged 0-19 years had an ED attendance rate that was almost three times higher than that of non-Aboriginal populations. Accidental falls were the leading cause of child injury ED presentation for children aged 0-16 years which corresponds to the highest hospitalisation rates for injuries among 0-19 year olds in WA. The highest overall ED attendance rate for WA children aged 0-19 years occurred in the Wheatbelt region closely followed by the Goldfields region.

Over the past two decades the number of child injury deaths in WA has dropped by almost 25 percent. In addition, the number of child injury hospitalisations in WA has remained fairly steady, with the hospitalisation rate improving slightly from 1,979.8 per 100,000 in 1989-2000 to 1,860.1 per 100,000 in 2001-2010.

While closely analysing the most recent five year study period there has been a reduction in the number of child injury deaths and a decrease in the rate of child injury hospitalisations. However, children presenting to an ED for treatment as a result of an injury has been steadily increasing.
The increasing number of children presenting to an ED, but a reduction in the number of injury hospitalisations and deaths, could reflect a reduction in the severity of injuries being sustained, or improvements in medical care which enables children to be treated and sent home rather than being admitted for treatment.

While Australia may have one of the lowest injury death rates when compared to other high income countries around the world, and a significantly lower rate when compared to low income countries, there are a lot of similarities when it comes to the most common causes of child injury deaths and the proven prevention measures. The World Report on Child Injury Prevention outlines that the five most common causes of injury deaths amongst children worldwide are transport injuries, drowning, burns, falls and poisoning which closely aligns with the injury statistics reported across Australia and in WA. Improvements have been made, but there is still more that can be done to reduce the childhood injury burden in WA. Safety strategies designed specifically for children which take into account various developmental issues, risk taking behaviours, levels of activity and the child's degree of dependence are important for success. If we simply replicate safety strategies designed for adults, we cannot provide adequate protection for children. The most effective programs for reducing childhood deaths and hospitalisations are those that take into account childhood vulnerabilities and use a multidisciplinary approach. The World Report on Child Injury Prevention advises that there is no single strategy for success, but six basic principles that when done together can be successful in preventing child injuries:

1. Legislation and regulations, and their enforcement
2. Product modification
3. Environmental modification
4. Supportive home visits
5. The promotion of safety devices
6. Education and the teaching of skills.

We need to continue to focus on evidence-based interventions and sustained investment in injury prevention and control for children. The data analysed shows the gaps between different population groups and those residing in regional and remote areas of WA. Injury prevention strategies need to be designed to target the specific needs of these individual population groups where injury rates are significantly higher and ensure that there is ongoing community engagement with the communities. We also need to consider the general population and ensure that we continue to focus on providing contemporary programs and interventions for all new parents to ensure the safety of generations to come.

While still allowing children to grow, develop, take risks and play, we can achieve a greater reduction in injuries and a reduced burden on the WA health system and emotional toll on families who have to deal with the loss/serious injuries of a child.
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