

## Playground Injuries



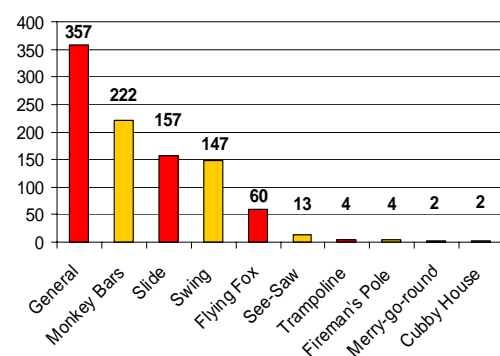
### Childhood Injury Presentations: January to March 2008

- There were 12,134 presentations to Princess Margaret Hospital Emergency Department (PMH ED) between January and March 2008
- This was a 10.8% decrease in presentations from the previous quarter, but was an increase on the same quarter in 2007
- There were 3,150 injury presentations in the quarter, representing 26% of total presentations
- This was slightly higher than the long term average of 25% of presentations due to injury
- Children aged 5 to 9 years again dominated presentations (44%)
- The highest number of presentations occurred between 6.00 and 9.00pm (27%) on week days, and 30 minutes later on weekends
- As seen in previous months of daylight saving, the peak presentation period is delayed compared to previous years
- The proportion of Aboriginal presentations (6%) was greater than the population proportion of 4%,
- A significantly higher percent of rural (16%) and assault (20%) presentations were for Aboriginal children
- For the first time, admissions from rural presentations fell below 50% to 46.4%

### Introduction - Playground Injuries

- Between January 2006 and December 2007 there were a total 968 presentations to PMH ED for injuries sustained in a playground
- This is an average of 484 per year for the period
- Over 35% of these injuries occurred on weekends
- Spring was the most common season for playground injuries to occur
- Children were most likely to present to PMH ED with playground injuries between 4.00pm and 5.00pm
- Primary school aged children represented the majority of presentations. More than half of playground injuries were sustained by children aged 5-9 years
- The gender presentation ratio of 1:1 shows that boys are not at greater risk of playground injuries as they are for most injuries (gender ratio for total injuries 2:3)
- Most injuries occurred on public playgrounds (45%)
- Falls accounted for more than 82% of all playground injuries. 70% of these occurred from a height of less than 1 metre
- Monkey bars accounted for the highest number of injury presentations (n=222)

### Playground injury by Equipment type January 2006 to December 2007



## Results

The data analysed in this report was collected by the PMH ED ISS between 1<sup>st</sup> January 2006 and 31<sup>st</sup> December 2007.

There were 968 presentations to the ED during this two year period by children with injuries sustained in a playground. This averages 484 presentations per year. A 3% increase in presentations was observed over the two years (477 to 491).

The highest proportion of presentations occurred in spring (28%), with 106 presentations being in November alone. This is 2.5 times more presentations than seen in July (n=44), which made winter the season with fewest presentations (21%).

Sunday was the most common day for playground injuries to occur (19%), followed by Saturday (17%). A drop in presentations was experienced mid-week, falling to 12% on Wednesday.

Recorded triage times show that the majority of playground injuries are sustained in the afternoon (55.6%). The highest number of presentations occurred between 4.00pm and 4.59pm. These presentations are comprised of injuries sustained both at school and after or outside of school hours.

The playground injury presentation ratio of 1:1 is not consistent with the long term gender presentation ratio for all injuries of 2:3 (f:m). This data alone does not indicate whether the ratio convergence is a result of the proportions of female and male children utilising playground equipment, or due to an equal risk of sustaining injury while in a playground.

More than 51% of children presenting with playground injuries were aged between five and nine years (n=499). A further 34% were aged less than five (n=326) and 14% (n=131) aged between ten and thirteen years. Only 12 children were fourteen years of age or older (1.2%).

Of the children presenting with a playground injury, 3.5% were coded as Aboriginal. This is less than the proportion of Aboriginal children

recorded for total causes of injury, which was 4.7% in 2006-07.

Falls were the most common cause of injury in a playground, with 799 playground falls seen during the study period (83%). Sixty nine percent of these (n=555) were from a height less than 1 metre. The next most common cause of injury were blunt force injuries (n=124, 13%). Many of these were due to being hit by a swing or other pieces of equipment.

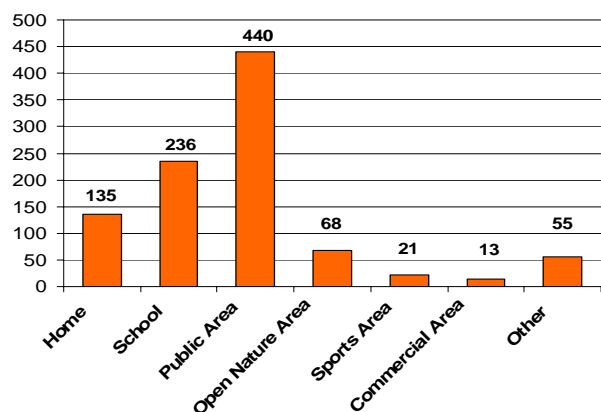
Fractures were the most frequently sustained injury in a playground, with 473 (49%) recorded over the two year period. Lacerations (n=153), head injuries (n=129), contusions (n=88) and sprains (n=88) were also frequent.

Forty three percent of children injured in playgrounds sustained injuries to their upper limbs, the majority occurring during a fall. Facial (14%), head (13%) and spinal injuries (13%) were more serious injuries that were commonly seen.

231 (24%) children presenting with playground injuries were admitted to hospital during the study period. This is 4% higher than the long-term admission rate for all injury presentations to PMH.

This report further analyses playground injury based on the location of the playground. This breakdown enables consideration to be given to the different characteristics that affect each location. This gives insight into the risk factors for playground injuries and the intervention opportunities available to reduce the injuries occurring in each location

### Playground injury by Location: Jan 2006-Dec 2007



## Public Area

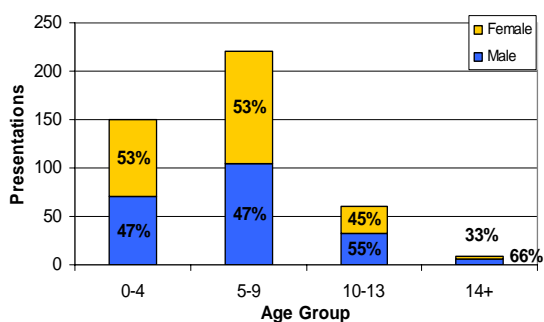
Over 45% of playground injury presentations during the study period occurred in public playgrounds. A public playground is a playground that is situated in a public area, such as public buildings, recreational areas and cultural areas. All playgrounds located in public parks, public aquatic centres, amusement parks and places of worship are included in this category.

## Demographics

The gender presentation ratio for public playground injuries was 1:1. Female children accounted for 51% of presentations (n=226).

Primary school aged children represented 50% of all presentations, with a further 34% by children under five years. The gender presentation ratio remained consistent in the lowest three age groups, before widening to 1:2 (female: male) for presentations by children 14 years and older (n=9).

### Public Area Playground Injuries by Age Group and Gender: Jan 2006-Dec 2007



The proportion of playground injury presentations by Aboriginal children (4.3%) was greater than for total playground injuries.

## Time Trends

In 2007, playground injuries occurring in public areas increased by 37% from the previous year (2006 = 186, 2007 = 254).

Presentation numbers varied between 94 during winter (21%) up to 123 (28%) in spring. This may be a reflection of increased outdoor activities undertaken during times of finer weather.

The majority (40%) of injuries occurred over the weekend. More playground injuries occurred on Sundays than any other day.

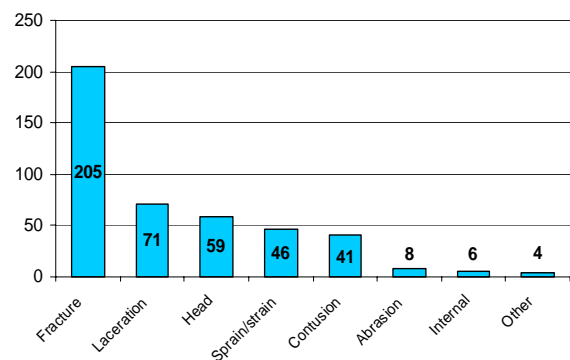
As seen with overall playground injuries, most injuries in public area playgrounds occurred during the afternoon. 57% of children who presented were triaged between 12.00-6.59pm.

## Injury Data

Four fifths of injuries sustained on public playgrounds were fall injuries. 73% of these were from a height less than one metre.

Fractures were the most prevalent injury (47%), with lacerations making up a further 16% of injuries. Upper limbs were the most frequently injured body part (40%), followed by facial (16%), lower limb and head injuries (13%).

### Public Area Playground Injuries by Age Group and Gender: Jan 2006-Dec 2007



Nearly one quarter of the presentations were admitted to hospital (24.7%), a figure that exceeds the long-term admission rate for all injury presentations (20%). Children who sustained a fall injury were most likely to be admitted (27%). The likelihood of hospitalisation was greatest for falls from a height more than 1 metre (31%).

## Schools

Between January 2006 and December 2007, 237 children presented with playground injuries that were coded as occurring at school. While over 90% of these presentations occurred in a Primary school, the category also includes injuries that occurred at secondary schools, pre-schools, child care centres, day care centres and university grounds.

## Demographics

The gender presentation ratio again averaged 1:1, with 127 (54%) presentations being by female children.

The age distribution of presentations reflects the finding that most school playground injuries were sustained in Primary schools. 68% of presentations were by children 5-9 years of age, with a further 15% by children between 10 and 13 years.

Aboriginal children comprised just 3% of presentations for injuries occurring in a school playground.



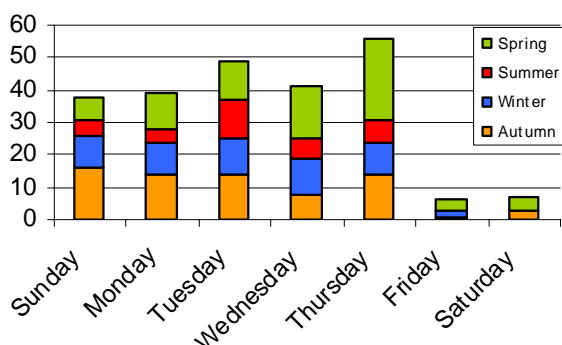
### Time Trends

In both 2006 and 2007, 118 children presented to PMH ED with injuries sustained in a school playground.

There is a pronounced seasonal variation for school playground injuries. Summer experiences the least number of presentations (14%), while spring remains the most common season for playground injuries, accounting for 33% of presentations.

Unlike total playground injuries, school playground injuries peak mid-week, with 24% of injury presentations occurring on Thursdays. Only 3% of presentations were made on a Saturday and 16% on a Sunday. Sunday presentations were considerably greater during autumn and winter (68%), possibly due to the use of school grounds for Sunday winter sports.

**School Playground Injuries by Day and Season: Jan 2006-Dec 2007**



Consistent with total playground injury figures, the majority of injuries in school playgrounds occurred during the afternoon (66%).

### Injury Data

Falls dominated school playground injuries (89%). Sixty five percent of these were from a height of less than 1 metre.

Over half (52%) of injuries sustained were fractures, followed by lacerations (36%), head injuries and contusions (26%). Half of injuries sustained were to the upper limb, with 13% to the face, and 11% to both head and lower limbs.

### Home

In contrast to the long term trend for all injury presentations, the home was not the predominant location for playground injuries. Only 14% (n=135) of playground injuries occurred in the home, compared to 59% of all injury presentations occurring in the home in 2006-07.

### Demographics

52% of home playground injuries were sustained by male children during the study period (n=70).

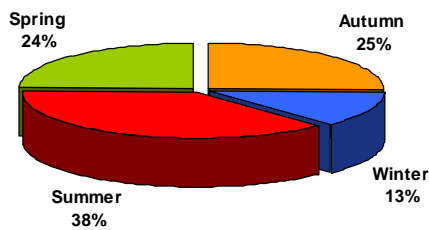
Children less than 5 years of age were most likely to be injured in home playgrounds (59%). The proportion of children presenting aged 5-9 years fell to 33%, with the remaining 8% being by children 10-14 years. No children aged 14 years or older were injured in home playgrounds.

### Time Trends

A decrease in presentations was experienced during the study period, falling from 72 in 2006 to 63 in 2007.

Home playground injuries peak in the summer months; the months of June, July and August combined account for 38% of presentations. The high proportion of home playground injuries occurring over summer may be due to the increased time children spend at home during the summer holidays. This corresponds with the decreased school playground injuries that occur over this season.

**Home Playground Injuries by Season: Jan 2006- Dec 2007**



The weekend is the most common time for home playground injuries, with 29% occurring on Saturdays, and a further 14% on Sundays.

The highest number of presentations occurred during the afternoon (40%), consistent with overall playground injuries. However, there was a 10% increase in the proportion of presentations occurring between 6.00 and 11.59pm (35%).

**Injury Data**

Again, the majority of injuries were the result of a fall (80%). Seventeen percent of these were from a height greater than one metre.

Fractures accounted for 47% of injuries (n=64). Head injuries were the next most frequent (17%). Upper limbs were injured in 43% of cases, with lower limbs affected in 12% of the cases.



The proportion of children admitted following a home playground injury was lower than for all playground injuries, with 21% of casualties admitted to PMH.

**Sports Area**

Sports areas include all sporting grounds, public swimming pools, racetracks and sporting stadiums/halls. There were only 21 playground injury presentations during the study period that were coded as occurring in a sports area. This equates to less than one playground injury per month.

**Demographics**

Thirteen of the twenty one presentations (62%) were by male children. Eleven of the children were aged between five and nine years (52%). No presentations were made by children fourteen years of age or older.

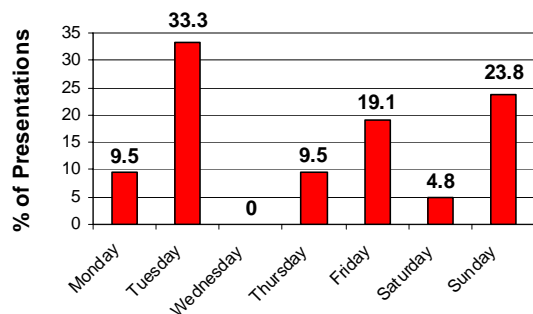
**Time Trends**

The number of presentations for injuries sustained in a sports area located playground halved between 2006 (n=14) and 2007 (n=7).

The autumn months of March, April, May saw the most sports area playground injuries occurring (38%). The winter months constituted only 14% of presentations.

The highest number of injuries occurred on Tuesdays (n=7), followed by Sundays (n=5). No presentations were recorded for injuries sustained on a Wednesday. Due to the low number of presentations, no accurate conclusions can be made on the distribution of sports area playground injuries.

**Sports Area Playground Injuries by Day: Jan 2006-Dec 2007**



The majority of presentations were made in the afternoon period between noon and 5.59pm (n=11, 52%).

**Injury Data**

86% of the injuries were the result of a fall (n=11). Nine of these were from a height less than 1 metre, 8 from a height greater than 1 metre, and the remaining one being from the same level as the child was standing.

One third of injuries sustained in sports area playgrounds were fractures (n=7). A further six were lacerations.

Sports area playground injuries were the first category in which facial injuries (n=8) surpassed upper limb injuries (n=7). Head injuries, spinal injuries and internal/abdominal injuries also were seen in the ED.

The proportion of children admitted to PMH was consistent with overall playground injury figures (24%).

### Open Nature Area

The location "open nature area" encompasses beaches, rivers, streams and bushland. This means that some parks may be coded as an open nature area, as opposed to a public area. 7% (n=68) of playground injury presentations occurred in an open nature area.

### Demographics

The playground injury gender presentation ratio remains at 1:1 for open nature areas. Fifty one percent of presentations during the two year period were by female children.

Fifteen of the casualties (43%) were in the high risk age group of five to nine years. Ten were aged less than five years, with a further nine between ten and thirteen years. Only one presentation was made by a child aged fourteen years or older, who was a female child fifteen years of age.

None of the sixty eight casualties were coded as Aboriginal or of unknown ethnicity.

### Time Trends

Sixty three percent of the presentations during the study period occurred in the first year (n=43).

The seasonal distribution of presentations was less pronounced than for other locations of playground injuries. Twenty of the injuries treated were sustained during summer (29%), with the least number occurring in spring (n=14).

One third of presentations were due to injuries sustained on a Saturday (n=23). Sundays experienced the lowest number of injuries (n=6), which was shared by both Wednesdays and Thursdays.



### Injury Data

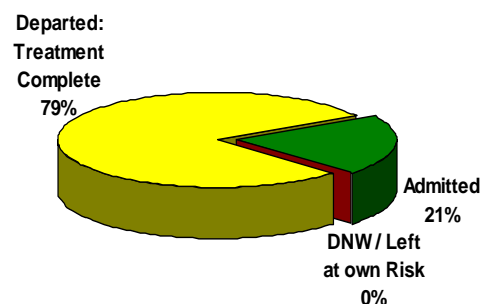
As seen for all locations, falls were the main cause of injury for playgrounds situated in open nature areas. Falls accounted for 82% of injuries, which were made up of 39 from a height less than 1 metre, fifteen from a height greater than one metre, and two from the same level as the child was standing.

Forty three children presented with a fracture, the majority of these being to a limb (60%). Fourteen percent of casualties sustained lacerations, with a further ten percent receiving contusions.

The majority of injuries sustained were to the limbs (61%). Thirty one children sustained injuries to their upper limb, with thirteen injuries sustained to lower limbs. Facial injuries constituted a further 15% of injuries.

Of these injury presentations, 21% warranted admission into PMH. The highest admission rate was for falls from a height of less than 1 metre (26%).

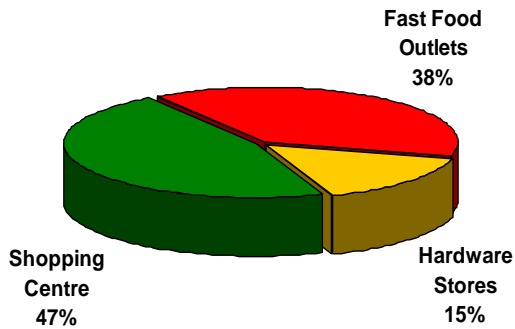
### Open Nature Area Playground Injuries by Disposition: Jan 2006-Dec 2007



### Commercial Area

Thirteen presentations were made between January 2006 and December 2007 by children with injuries sustained in a playground that was situated in a commercial area. According to the PMH Injury Surveillance System (ISS), a commercial area includes shops, stores, office buildings, cafés, hotels and restaurants.

**Commercial Area Playground Injuries by Location:  
Jan 2006-Dec 2007**



Demographics

Eight of the thirteen children who presented with injuries sustained in a commercial area playground were male. Of these, four were less than five years of age, and four were between five and nine years.

Of the five female children who presented during this study period were between five and nine years, with only one less than five years. No presentations were made by children over nine years of age.

Time Trends

Presentations fell by 56% between 2006 and 2007. In terms of numbers however, this only represents a drop of five presentations.

The warmer months of summer and spring accounted for the majority of injuries in commercial area playgrounds.

Most injuries were sustained on a Friday or Saturday, with all presentations made after noon. Nine of the presentations were made after 6.00pm.

Injury Data

With the exception of a single blunt force injury, all injuries sustained in a commercial area playground was the result of a fall. Seven of these falls were from a height of less than one metre, three from greater than one metre, and two from the same level as the child was standing.

Five of the children sustained a fractured limb, four of these being to the upper limb. Four children presented with a head injury, while two

sustained facial injuries, and a further two sustained spinal injuries.

Three of the presenting children were subsequently admitted to PMH. One of these was a child who had fallen from a height of less than one metre, with the remaining two having fallen from a height greater than one metre. As such, two thirds of all falls greater than one metre required hospitalisation.

Other Areas

All injuries that occurred in a location not defined under the other categories are coded as occurring in an "other area". Fifty five playground injuries fell into this category between January 2006 and December 2007.

Demographics

This location displays the greatest disparity between gender presentations, with more than twice as many presentations made by males (n=38) than females (n=17). The most common age group for presentations were the under five years category (n=7). Seven children were aged less than five years, and four between ten and thirteen years.

Time Trends

Sixty four percent of presentations were made during 2006 (n=35). There was minimal variation observed between the seasons (11<n<15).

The presentations made over the weekend surpassed those made on weekdays, with Sundays accounting for nearly one quarter of all presentations (n=13).

Injury Data

Seventy six injuries sustained resulted from a fall. Of the remaining injuries, two were burn injuries from hot play equipment, one which was serious enough to warrant hospitalisation.

Fractures remained the dominant injury type (47%), and upper limbs were again the most frequently injured body part (n=24).

## Discussion

Play is fundamental for children's growth, development and learning. Children's use of playgrounds should not be restricted. The social, cognitive and physical development that playgrounds provide is invaluable.

However, as this report shows, playgrounds can be hazardous. Each year, over 480 children present to Princess Margaret Hospital Emergency Department alone with injuries sustained at playgrounds. Many more children present to other metropolitan ED's, regional ED's, and to other WA medical facilities.

A balance therefore needs to be reached between the risks that playgrounds pose and the benefits they have towards children's development. This can be achieved by ensuring that playgrounds are designed, installed, and maintained in a way that minimises the risk of serious injury, and that children and parents are aware of the risks and behave accordingly.

The Australian Standards for Playgrounds (main Australian standard: AS 4685: 2004) are a minimum benchmark recommended to manufacturers, designers, installers and owners of playgrounds. Unfortunately, they are not yet mandatory, meaning that many children may be playing on playgrounds that are unsafe.

There are some key points present in these standards, and in national and international research:

- 1) Free height of falls should not exceed 2500mm, or 1500mm in supervised early childhood settings.
- 2) Adequate fall zones should be created around all items of equipment.
- 3) Impact attenuating under-surfacing must be placed beneath any equipment or structure greater or equal to 500mm.

4) No entrapment hazards should be present in equipment that allows a child's head, limb, torso or other body parts to become stuck.

5) All equipment should have structural integrity.

The potential benefit of these recommendations is apparent when examining the PMH data. The majority of injuries were sustained in a fall, with the hospitalisation rate being greatest for falls from a height of more than 1 metre. Ensuring that equipment meets the Australian Standard for playground recommendations will assist in minimising these injuries. Mandating these aspects of the Australian Standards would greatly improve the safety of Australian playgrounds.

However, it is not enough to simply install playgrounds that meet these standards at time of purchase. Correct installation, regular inspection and maintenance are necessary to ensure ongoing safety. Consideration also needs to be given to the age appropriateness of the playground - what is safe for one age group may not be suitable for another.

Parents, caregivers and children themselves also have a role to play in minimising the risk of playground injuries. Supervision of young children is vital in ensuring their safety, while teaching them to use the equipment in its intended manner and to play safely will help keep them from harm as they become older.

Eliminating playground injuries is not a realistic goal. The aim is to minimise the risk of serious injuries that can be easily prevented. By doing so, much pain and distress can be avoided for children and parents alike.

### Suggested Citation:

*Everison, R and Wicks, S. 2008. Playground Injuries. Kidsafe WA (No.14).*

*The WA Childhood Injury Surveillance Bulletins are developed by Kidsafe WA in consultation with the Princess Margaret Hospital Emergency Department Injury Surveillance Officer and Department of Health (Clinical Network Development Team - Injury).*

For further information please contact:  
Kidsafe WA

✉ GPO Box D184, PERTH WA 6840

☎ (08) 9340 8509

💻 [kidsafe@kidsafewa.com.au](mailto:kidsafe@kidsafewa.com.au)

