Kidsafe Western Australia

WA Childhood Injury Surveillance

BULLETIN

Princess Margaret Hospital for Children, Emergency Department

No. 16 October 2008

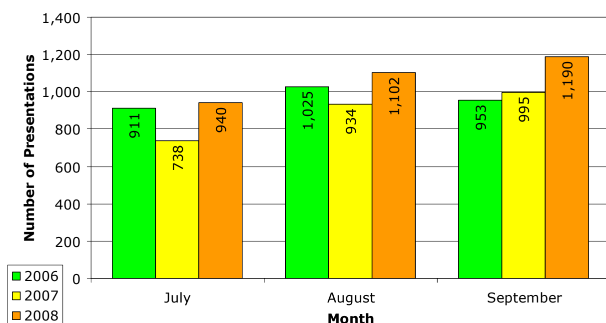
Gender Variations in Injury:

Children Aged 0 to 12 years

Childhood Injury Presentations: July to September 2008

- There were 16,030 presentations to the Princess Margaret Hospital Emergency Department (PMH ED) from July to September 2008.
- Injury presentations accounted for 16.9% (n=3,232) of the total number of presentations to PMH ED during this time period.
- This is considerably lower than the long term average of 25%, but is comparable with a drop observed in the same quarter in 2007 where injury presentations represented 14% of total presentations to PMH ED.
- These figures represent a 17.4% increase in injury presentations, but a 17.5% decrease for total presentations to PMH ED for the same quarter in 2007.

Figure: Number of Injury Presentations per month, 2006 to 2008.



- Falls were the leading cause of injury (n= 1,189; 43.9%). A total of 1.6% of Injury presentations were for either alleged assault or intentional self harm with the remainder being unintentional (97%) or undetermined (1.4%).
- Aboriginal children represented 3.6% of children attending the PMH ED during these three months.
- 93% of the injured children seen by the emergency department were from metropolitan regions, with rural patients presenting for more serious injuries.
- Only 18.75% of injury presentations resulted in admission for further treatment.

Introduction – Gender Variations in Injury: Children aged 0 to 12 years

- Between July 2005 and June 2008, there were a total of 29,451 injury presentations to Princess Margaret Hospital Emergency Department (PMH ED) by children aged 0 to 12 years.

- Boys represented a total of 16,991 injury presentations to PMH ED during this period.
- Males (n=1,010) were more likely to be injured in a Sports or Athletics area than females.
- A higher percentage of Male presentations were from the Metropolitan region of WA than female presentations.

- Girls accounted for a total of 12,460 injury presentations to PMH ED.
- Of the girls who presented to PMH ED, 4.8% were Aboriginal, higher than the percentage of Aboriginal boys.
- A higher percentage of girls presented to PMH ED as a result of poisoning, Animal bites and fall injuries than Males.
- This report analyses the data on gender differences by percentage, due to Males being overrepresented in numbers of presentations in almost every category analysed.

Results

Each year we are shown that more boys present to hospital than girls – but does this mean that there should only be on concentration on preventing injuries in Male children?

Of course not.

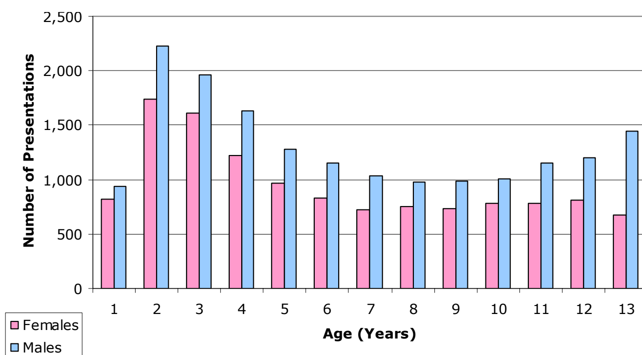
All children are as equally at risk of injury regardless of gender, but it is a matter of identifying the types of injuries they sustain, where they are most likely to be injured and whether these lead us to particular risk factors for each gender.

We all know that we more commonly associate risk taking with male children, but many female children can be as equally as adventurous. The truth is that every child is different, regardless of gender and we need to be aware of the preventability of injuries in all areas of our life to keep children safe.

Between July 2005 and June 2008, there were a total of 29,451 presentations to Princess Margaret Hospital Emergency Department (PMH ED) by children aged 0 to 12 years.

Boys represented a total of 16,991 presentations to PMH ED during this period, while girls recorded a total of 12,460 presentations. The percentage difference between Male and Female presentations to PMH ED is 15.4%. For every 3 Female presentations there are almost 4 Male presentations (See Figure 1).

Figure 1: Number of Presentations by Gender & Age



The following report will separately analyse the injury data available for children aged 0 to 12 years who presented to PMH ED from July 2005 to June 2008. It will initially address the data related to Male children, followed by Female children before completing a comparison on the data to address some of the key prevention strategies that may vary by gender.

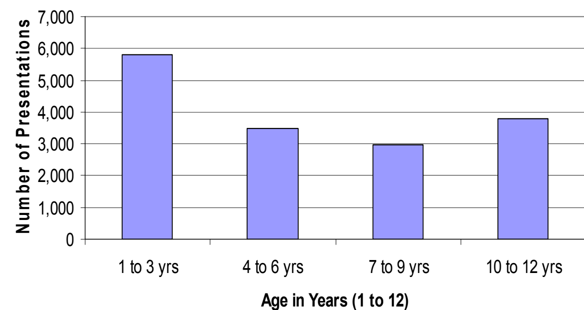
Injuries to Boys aged 0 to 12 years

Each year an average of 5,600 boys present at PMH ED as a result of injury.

This is based on data from July 2005 to June 2008 which shows that a total of 16,991 Males aged 0 to 12 years presented at PMH ED as a result of an injury during this period.

Male children aged 1 year of age lead the attendance numbers, representing a total of 2,224 injury presentations. In fact the top three ages for injury presentations were male children aged 1 to 3 years of age (See Figure 2).

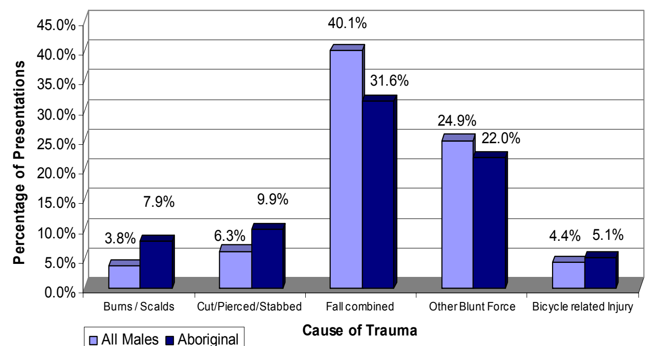
Figure 2: Number of Male presentations for children aged 1 to 12 years, by Age Group.



The majority of presentations to PMH ED are assessed as Triage code 4 (meaning Maximum waiting time of 60 minutes), and when the Male presentations were isolated this remained consistent with 75.2% of male injury presentations being coded as 4.

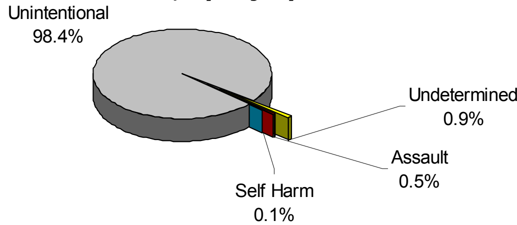
When "Other Cause" was excluded, the top five causes of trauma for Males were Falls combined (n=6,810), Other Blunt Force (n=4,225), Cut/Pierced/Stabbed (n=1,065), Bicycle Related injuries (n=749), and Burns/Scalds (n=653) as shown in figure 3.

Figure 3: Comparison of Cause of Trauma Presentations, All Male versus Aboriginal Male.



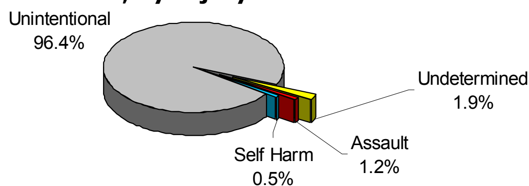
A total of 801 (4.7%) of male injury presentations were Aboriginal Males. The top five causes of injury to Aboriginal Males were: Falls (n=253), Other Blunt Force (n=176), Cut/Pierced/Stabbed (n=80), Burns & Scalds (n=63) and Other Cause (n=50).

Figure 4a: Percentage of Non-Aboriginal (Other) Male Presentations, by Injury Intent



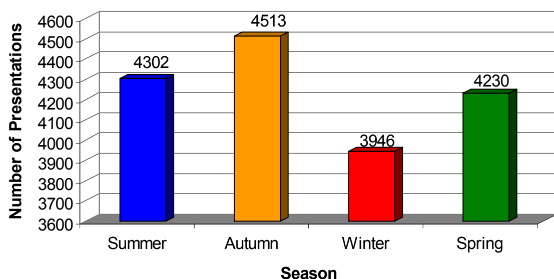
Only 1.5% of Male injury presentations to PMH ED were identified as intentionally caused (either alleged assault, Intentional Self Harm or Undetermined Intent). The remaining 98.4% were listed as Unintentional. This was the same as the percentages for Non-aboriginal (Other) males shown in figure 4a. However 3.6% of Aboriginal Males (see figure 4b) presented at PMH ED for injuries that were determined to have occurred intentionally.

Figure 4b: Percentage of Aboriginal Male Presentations, by Injury Intent



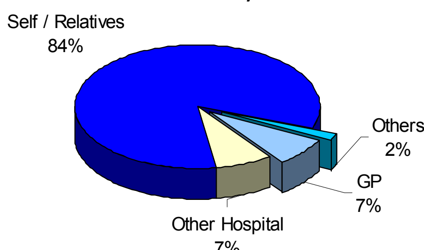
The majority of presentations to PMH ED were from the Metropolitan region, which accounted for 94% of the Male presentations. A further 4.8% were from rural areas, and the remainder from Overseas or interstate.

Figure 5: Number of Male Presentations by Season



The highest number of Male presentations to PMH ED occurred in March with 1,577 presentations. This was followed by April (n=1,498) and October (n=1,491) rounding out the Top three. Taking this into consideration, this is why Autumn ranks as the leading season for presentations to PMH ED (n=4,513). See Figure 5.

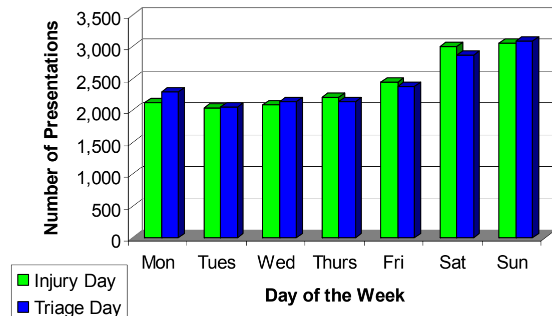
Figure 6: Source of Referral, Male Presentations



A total of 83.1% of Male children presented to PMH ED as a result of Self/Relative referral, with a further 7.4% referred by another hospital and 7.5% from a GP (See Figure 6).

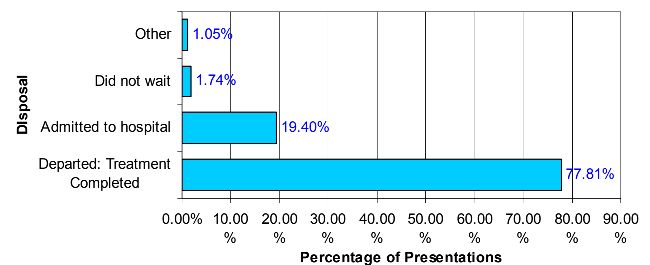
Male children were more likely to be injured on a Sunday (n=3,061), with 84% of injuries occurring on a Sunday then presenting to PMH ED on the same day, a further 11% presented on Monday, and 1.8% on Tuesday, with less than 1% presenting a week after the injury (See Figure 7).

Figure 7: Comparison of Injury Day and Triage Day data for Male Presentations



Once male children presented at PMH ED 77.8% departed after treatment was completed, however 19.4% were admitted for further treatment with 1.7% not waiting for treatment at all (Figure 8).

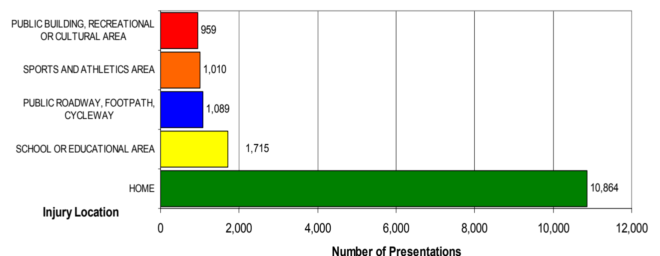
Figure 8: Disposal of Male Presentations



13.8% of Male Injury presentations presenting to PMH ED were coded as occurring during sport. The top five sports boys were participating in at the time of injury were:

1. Cycling – BMX (n=369)
2. Football – Aussie Rules (n=369)
3. Trampoline (n=245)
4. Soccer (n=210)
5. Cycling – Road (n=175)

Figure 9: Top Five locations for Boys to be injured



Injuries to males aged 0 to 12 years most commonly occurred at Home (63.9%), followed by School or Education Area (10.1%) and then Public Roadway, Footpath or Cycleway (6.4%) (See figure 9). This is consistent with overall injury presentations, with the home being the most common location where injuries occur.

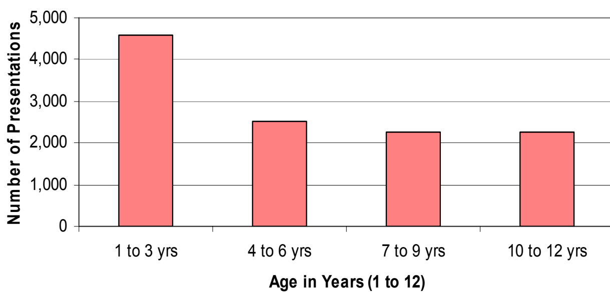
Injuries to Girls aged 0 to 12 years

In general, fewer girls present to PMH ED each year than boys. Approximately 4,000 girls present at PMH ED as a result of injury every year.

This is based on data from July 2005 to June 2008 which tells us that a total of 12,460 Females aged 0 to 12 years presented at PMH ED as a result of an injury during this period.

Female children aged 1 year of age lead the attendance numbers to PMH ED, representing a total of 1,736 injury presentations. In fact the top three ages for injury presentations were female children aged 1 to 3 years of age (See Figure 10).

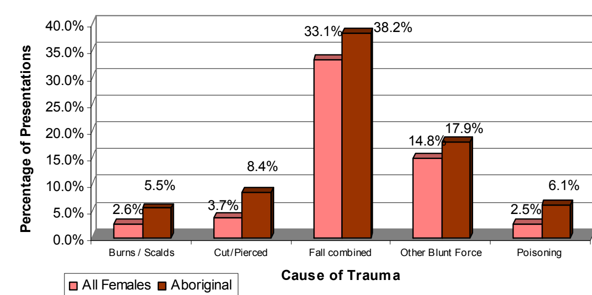
Figure 10: Number of Female presentations for children aged 1 to 12 years, by Age Group.



The majority of presentations to PMH ED are assessed as Triage code 4, followed by a Triage code of 3 (meaning Maximum waiting time of 30 minutes). When Female presentations were isolated, this remained consistent with 76.5% of female injury presentations being coded as 4.

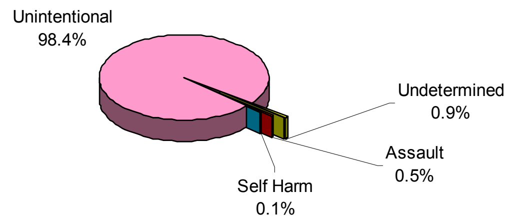
When "Other Cause" was excluded the top five causes of trauma for Females were Falls combined (n=5,631), Other Blunt Force (n=2,514), Cut/Pierced/Stabbed (n=627), Burns/Scalds (n=434), and Poisoning (n=420). These Causes of Trauma are the same for aboriginal girls, but with a slight variation in the order as shown in figure 11.

Figure 11: Comparison of Cause of Trauma Presentations, All Girls versus Aboriginal Girls.



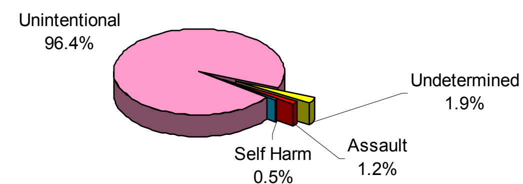
A total of 605 (4.9%) of female injury presentations were Aboriginal Girls. The top five causes of injury to Aboriginal Girls were: Falls (n=231), Other Blunt Force (n=108), Cut/Pierced/Stabbed (n=53), Poisoning (n=37) and Burns & Scalds (n=33).

Figure 12a: Percentage of Non-Aboriginal (Other) Female Presentations, by Injury Intent



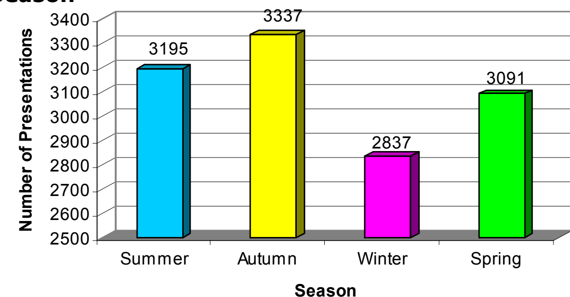
Only 1.4% of Female injury presentations to PMH ED were identified as intentionally caused (either alleged assault, Intentional Self Harm or Undetermined Intent) as shown in figure 12a. The remaining 98.6% were listed as Unintentional. This was the same as the percentages for Non-aboriginal (Other) females shown in figure 12a. However 4% of Aboriginal Girls (see figure 12b) presented at PMH ED for injuries that were determined to have occurred intentionally.

Figure 12b: Percentage of Aboriginal Female Presentations, by Injury Intent



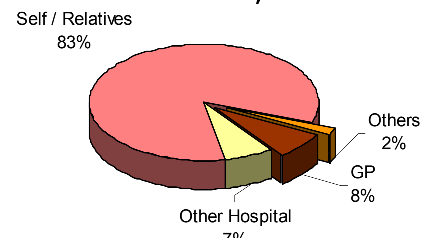
The majority of presentations to PMH ED were from the Metropolitan region, which accounted for 93.4% of the Female presentations. A further 5.3% were from rural areas, and the remainder from Overseas or interstate.

Figure 13: Number of Female Presentations by Season



The highest number of Female presentations to PMH ED occurred in March with 1,146 presentations. This was followed by January (n=1,117) and April (n=1,104) rounding out the Top three. Taking this into consideration, this is why Autumn ranks as the leading season for girls to present to PMH ED (n=3,337). See Figure 13.

Figure 14: Source of Referral, Females

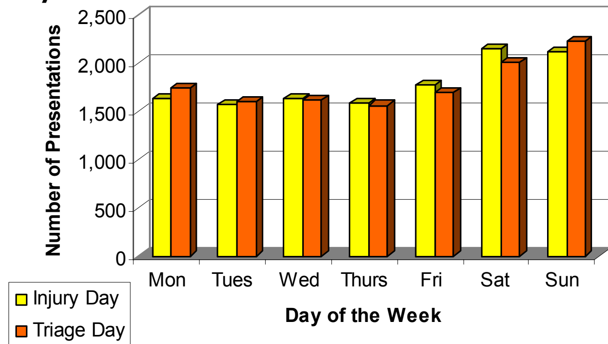


A total of 83.5% of Female children presented to PMH ED as a result of Self/Relative referral, with

a further 6.9% referred by another hospital and 7.7% from a GP (See Figure 14).

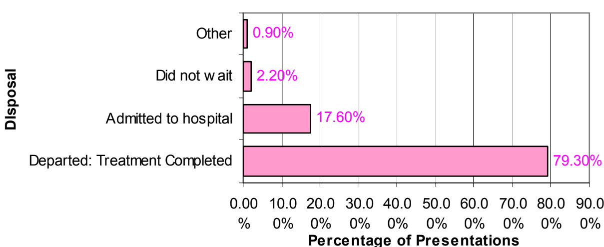
Female children were more likely to be injured on a Saturday (n=2,150), with 78% of injuries occurring on a Saturday then presenting to PMH ED on the same day, a further 16% presented on Sunday, and 3% on Monday, with only 0.3% presenting a week after the injury (Figure 15).

Figure 15: Comparison of Injury Day and Triage Day data for Female Presentations



Once girls presented at PMH ED 79.3% departed after treatment was completed, however 17.6% were admitted for further treatment with 2.2% not waiting for treatment at all (Figure 16).

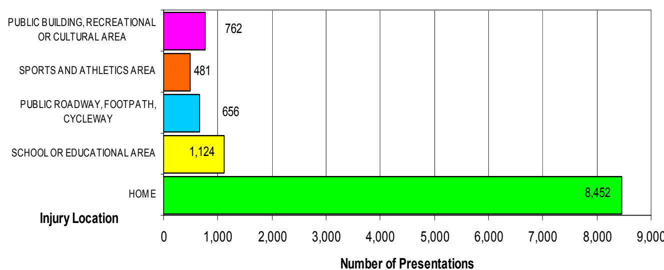
Figure 16: Disposal of Female Presentations



Only 9.6% of Female Injury presentations presenting to PMH ED were coded as occurring during sport. The top five sports girls were participating in at the time of injury were:

1. Trampoline (n=252)
2. Netball (n=141)
3. Cycling – BMX (n=119)
4. Scootering (n=74)
5. Rollerskating/Rollerblading (n=73)

Figure 17: Top Five locations for Girls to be injured



Injuries to females aged 0 to 12 years most commonly occurred at Home (67.8%), followed by School or Education Area (9%) and then Public Building, Recreational or Cultural Area (6.1%) (See figure 17). This is consistent with overall injury presentations, with the home being the most common location where injuries occur.

Gender Variations & Comparisons

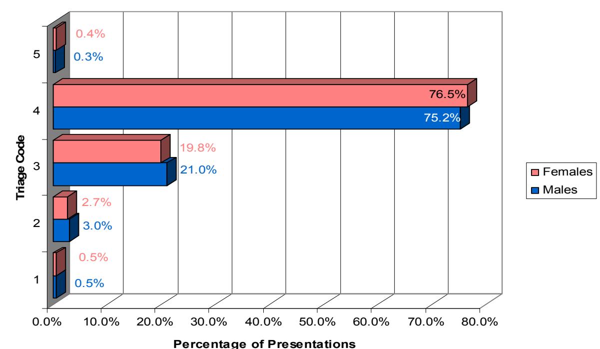
Every year, a consistent trend sees greater number of male children present to PMH ED than female children.

Between July 2005 to June 2008, a total of 16,991 boys presented to PMH ED, while girls recorded a total of 12,460 presentations. The percentage difference between Male and Female presentations to PMH ED is 15.4%. For every 3 Female presentations there are almost 4 Male presentations.

Although some of the variations between the sexes are only small, there is more gender variation evident than just the total number of presentations.

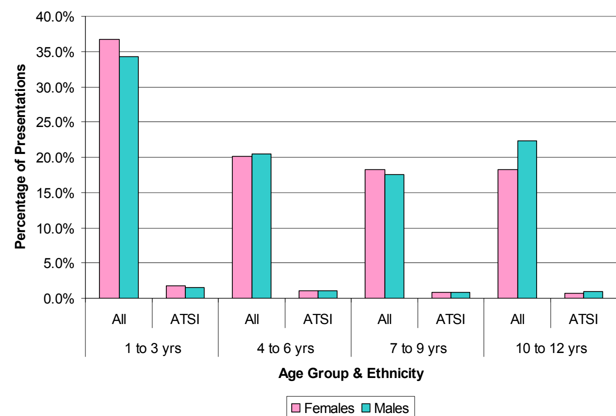
A higher percentage of females (76.5%) who presented at PMH ED, were triage coded 4 (males = 75.2%); while male (21%) children were more likely to be triage coded 3 than females (19.8%) as shown in figure 18.

Figure 18: Comparison of Injury Presentations by Triage Code & Sex of patient



Overall, a slightly higher percentage of aboriginal girls (4.9%) aged 0 to 12 years presented at PMH ED than aboriginal boys (4.7%).

Figure 19: Comparison of Injury Presentations by Age Group, Ethnicity & Sex of patient

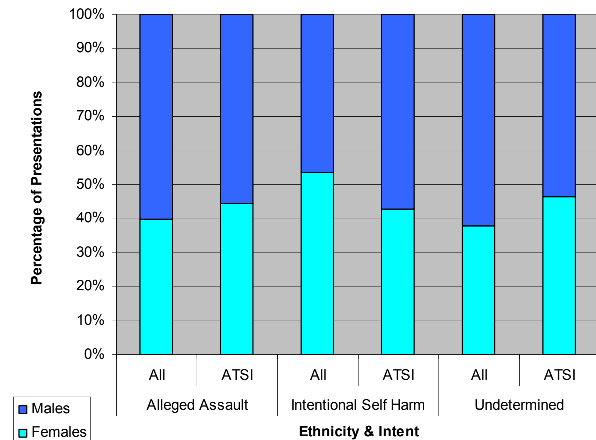


A higher percentage of girls aged 1 to 3 years presented at PMH ED than boys for both aboriginal and non-aboriginal children, while a significantly higher percentage of boys aged 10 to 12 years presented at PMH ED than girls, as shown in figure 19.

Girls aged 0 to 12 years of age were more likely to present at PMH ED than boys of the same age for self harm injuries, with 20 males and 23 female presentations during this time. Whereas boys (n=85) aged 0 to 12 years were more likely to present from Assault injuries than girls (n=56) of the same age.

Male Aboriginals exceeded Female Aboriginal presentations for both Intentional self harm and alleged assault during the same period (See Figure 20).

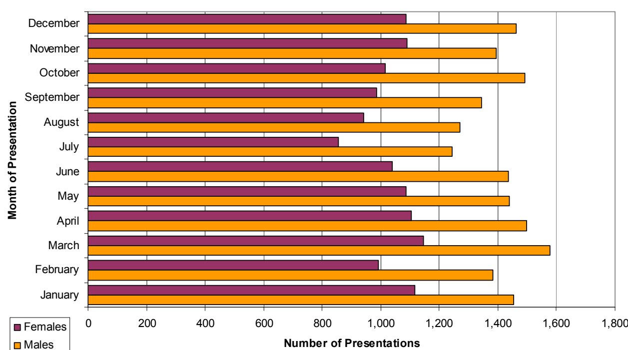
Figure 20: Comparison of Injury Presentations by Intent, Ethnicity & Sex of patient (excluding Unintentional presentations)



There was no clear seasonal variation in injury presentations by sex for children aged 0 to 12 years, with Autumn (March to May) providing the highest number of injury presentations for both males and females.

The only variation was in the order of the individual months of presentations with more girls presenting to PMH ED during March (9.2%), January (9%) and then April (8.9%); while for boys the order was March (9.3%), April (8.8%) then October (8.8%) (See figure 21).

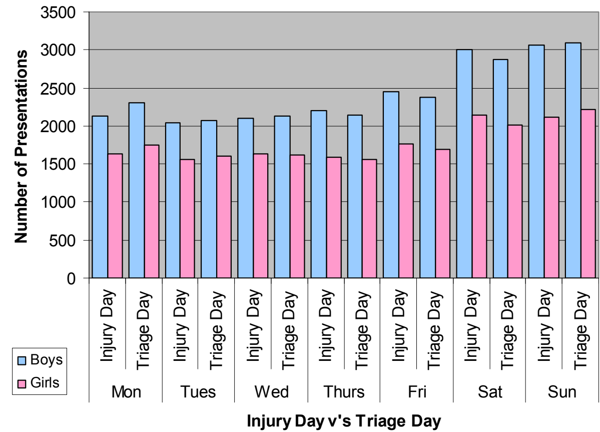
Figure 21: Comparison of Injury Presentations by Month & Sex



A higher percentage of male injury presentations were triaged on the same day the injury occurred and admitted for further treatment than females. For example, the highest injury day recorded for males was Sunday, for which 84% then presented on the same day for treatment. Overall a total of 19.4% of male injury presentations were admitted for further treatment.

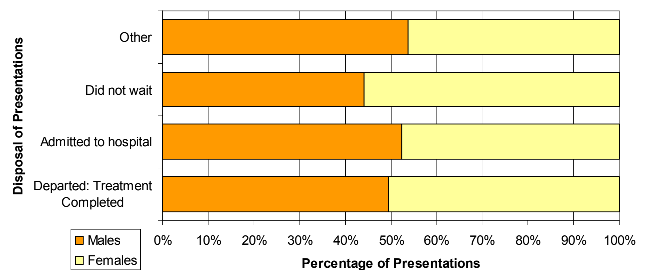
In comparison, the highest number of presentations to PMH ED for females was Saturday, with only 78% of these injuries presenting on the same day for treatment. Overall 17.6% of female presentations to PMH ED were then admitted for further treatment.

Figure 21: Comparison of Injury Presentations by Triage Day, Injury Day & Sex



According to Figure 21, the most common Injury Day for girls is Saturday, while the busiest triage day is Sunday. Males on the other hand have Sunday as the most common injury and triage day. This is reflected in the percentage of injury presentations that occurred on same day the injury occurred for both sexes.

Figure 22: Comparison of Injury Presentations by Disposal & Sex



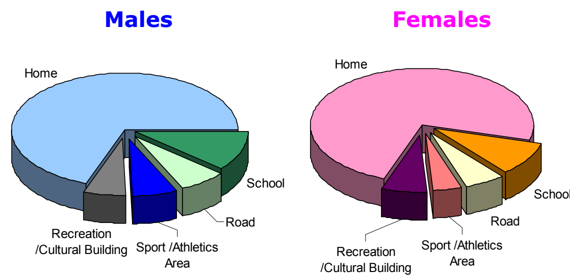
A marginally higher percentage of male injury presentations resulted in admission to hospital than females, while more females did not wait for treatment at all (as shown in figure 22).

For both Males and Females the most common area of residence for the presenting children were those from the metropolitan region, followed by children from Rural Western Australia. There were a slightly higher percentage of girls (5.3%) from rural WA who presented at PMH ED than boys (4.8%), however boys represented a slightly higher percentage of the metropolitan presentations.

The source of referral for presentations to PMH ED between males and female children ages 0 to 12 years was almost identical. An almost insignificantly higher percentage of female presentations (83.5%) were referred by self/relative compared to males (83.1%), but a high percentage of males referrals were from other hospitals (7.4%), while females only recorded 6.9%.

The most common location for all injuries to occur is the home – with an average of 70% of injury presentations for all age groups combined occurring here. For children aged 0 to 12 years this remained consistent, with a 65.6% injuries occurring in the home.

Figure 23: Comparison of Injury Presentations by Location



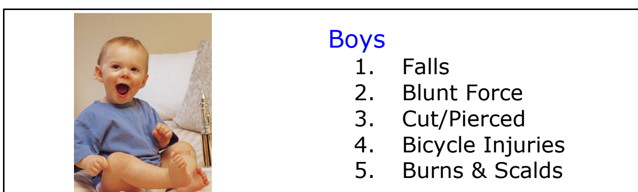
Taking this into consideration, a slightly higher percentage of female injuries occurred in the home environment than males, with 67.8% compared with 63.9% respectively (Figure 23).

When looking at the top 3 locations for injury to occur, the top 2 locations were the same, while the 3rd location varied between the sexes.

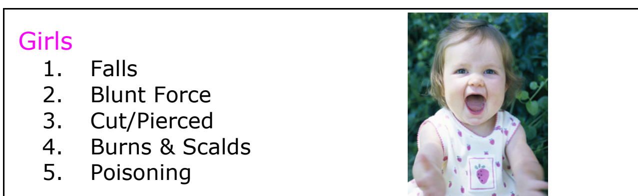
Males	Female
1. Home *(64%)*	1. Home *(68%)*
2. School *(10%)*	2. School *(9%)*
3. Roadway, Footpath Cycleway *(6.4%)*	3. Public Building, rec/ cultural centre *(6.1%)*

The most common cause of Trauma for children aged 0 to 12 years is Falls, which is consistent with all age groups.

As with location of injuries, the top 3 causes of trauma for boys and girls is consistent regardless of sex, with Falls, Other Blunt Force & Cut/Pierced/Stabbed making up the top three. Both sexes also have Burns & scalds included in the top five causes, but in slightly different order.



Boys
1. Falls
2. Blunt Force
3. Cut/Pierced
4. Bicycle Injuries
5. Burns & Scalds



Girls
1. Falls
2. Blunt Force
3. Cut/Pierced
4. Burns & Scalds
5. Poisoning

When looking at the WA Department of Health Priority injury issues of Falls, Burns & Scalds, Poisoning & Drowning, children aged 0 to 12 years figures are represented in the table below.

	Boys	Girls
Falls	6,810	5,631
Burns/Scalds	653	434
Poisoning	458	420
Drowning	28	25

Finally, all injury presentations to PMH ED are coded as to whether the injury occurred during sport.

A total of 13.8% male presentations to PMH ED were coded as having occurred during sport, whereas females presentations reported only 9.3% sports related injuries.

Figure 24: Comparison of Injury Presentations by Sport Code & Sex

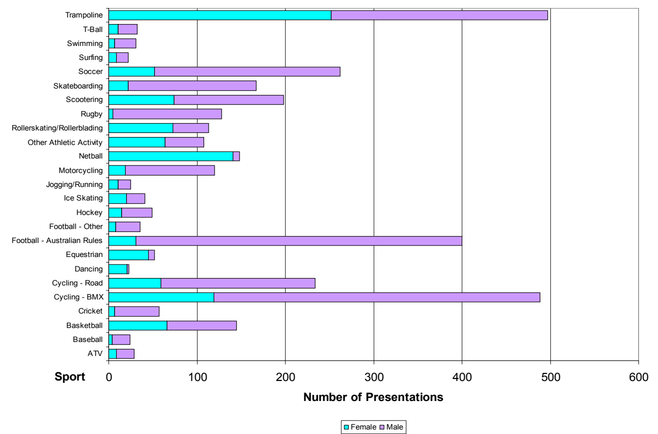


Figure 24 shows the proportion of male sports injuries in comparison to female sports injuries. As mentioned earlier, the top five injuries to males and females differs according to gender dominated sports, with the only consistent sport injury for both sexes being Trampoline and Cycling – BMX, otherwise there are no similarities between the gender's top five.

The top five sports recorded for male presentations for children aged 0 to 12 years were Cycling – BMX & Football Australian Rules (both with 369 presentations), followed by Trampoline (n=245), Soccer (n=210) and finally Cycling – Road (n=175).

This comes as no surprise, with Australian Rules football & Soccer being two of the most common organised sports for boys to play in Western Australia.

When compared to the top five sports recorded for female presentations for children aged 0 to 12 years, Trampoline takes the top spot with 252 presentations, followed by Netball (n=141 – a female dominated organised sport), Cycling – BMX (n=119), Scootering (n=74) and Roller skating/Rollerblading (n=73).

From this comparison, it could be assumed that there are more organised sports available for boys than for girls, with girls preferring more social sports such as scootering and roller skating.

As mentioned at the beginning, although there are some differences in the types of injuries sustained, where the injuries occur and how they occur between boys and girls aged 0 to 12 years of age, the overall number really is the main variation.

Discussion

The figures above show that despite the 15.4% difference in total number of injury presentations between males & females, all children are as equally at risk of injury regardless of gender.

Even after identifying some of the differences in activities, severity of injuries and causes of trauma, there are still more male children injured across the board than females.

Although differences in injury risk by gender is supported by the figures regularly reported through these reports, there is little systematic research that traces the sources and correlates the gender difference particularly in relation to the perspective of stages of a child's development.

In past and current programs, broadly applied interventions to prevent childhood injuries have had the largest, most immediate impact. These interventions address making changes to the child's environment and parents/carers behaviour to reduce the risk of injury.

Designing safer products, removing hazardous materials, and the application of laws and regulations regarding matters such as the use of child car restraints, and hot tap water tempering devices have resulted in a reduction of child injuries without considering differences in children such as gender[1].

However this does not mean that these interventions have been more or less effective because they haven't considered these differences. They are universal measures and differences such as gender, social disadvantage and other factors may need to be considered when planning future injury prevention interventions.

Children as young as preschool age can reliably distinguish between safe and unsafe situations, but whether children's appraisal of injury risk changes with age, and differs for boys and girls, remains to be determined[2].

We all know that we more commonly associate risk taking with male children, but many female children can be as equally as adventurous.

But maybe it isn't just about the risk taking behaviour of boys, but more to do with high activity levels. Research completed by Adam Matheny and others[1] in 1991 drew conclusions that – more active boys and girls are more likely to be injured. This suggests that there is a gender difference by which activity level and injury are correlated. Because boys generally tend to be more active than girls, the conclusions stated that injured boys were the most active of all groups.

Other research on male vulnerability alludes to the possibility that males are more at risk than females to the effects of less optimal environments. The general conclusion from this research is that males are less resilient when subjected to adverse environments, regardless of whether the adversity is physical or psychosocial in nature[1].

No matter who you speak to, or what you read, ultimately the trends are clear: within comparably poor conditions, boys are at greater developmental risk of injury than girls.

Overall, the results shown above indicate that sex differences in injury numbers appear within the first year of life for most types of injuries.

Gender differences cannot be completely explained by differences in exposure to risk however Injury prevention efforts should take these developmental differences into account and focus attention on the high-risk child.

The truth is that every child is different, regardless of gender and we need to be aware of the preventability of injuries in all areas of our life to keep children safe.

[1] *Matheny, AP. 1991. Children's Unintentional Injuries and Gender Differentiation by Environmental and Psychosocial Aspects. Children's Environments Quarterly, 8 (3/4).*
[2] *Hillier, L.M, and Morrongiello, B.A. 1998. Age and Gender Differences in School-Age Children's Appraisals of Injury Risk. Journal of Pediatric Psychology, Vol. 23, No. 4.*

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For further information please contact:
Kidsafe WA
GPO Box D184, PERTH WA 6840
(08) 9340 8509
kidsafe@kidsafewa.com.au

Government of **Western Australia**
Department of **Health**