

Top Five Injuries to Children: Why do they occur and How can they be prevented?



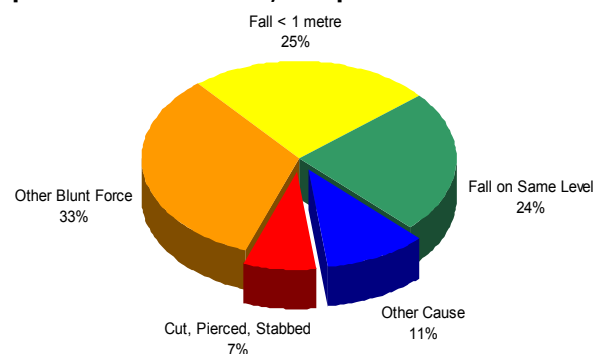
Childhood Injury Presentations: April to June 2008

- There were 14,141 presentations to Princess Margaret Hospital Emergency Department (PMH ED) between April and June 2008.
- This was a 16.5% increase in presentations from the previous quarter (January to March 2008), and a 13% increase on the same quarter in 2007.
- There were 3,298 injury presentations in the quarter, representing 23% of total presentations.
- This was slightly lower than the long term average of 25% of presentations due to injury.
- Children aged 0 to 4 years dominated injury presentations (37.6% n =1,240).
- Only 4.7% of injury presentations to PMH ED were from regional Western Australia.
- 51% of regional presentations resulted in admission to hospital compared to 15.2% of metropolitan presentations.
- Aboriginal children represented 3.9% of injury presentations to PMH ED.
- Aboriginal children accounted for 12.9% of rural injury presentations and only 3.5% of metropolitan injury presentations to PMH ED.
- The majority of injury presentations to PMH ED were for Unintentional Injuries (96.3%), with 1.2% for Alleged Assault & 1.1% Self Harm & a further 1.5% Undetermined.
- More than 98% of injury presentations from regional WA were Unintentional child injuries, with only 0.6% for Self Harm, 0.6% Undetermined and No reports of Alleged Assault.

Introduction: Top Five Causes of Trauma

- There are 35 "Causes of Trauma" codes in the Princess Margaret Hospital Injury Surveillance dataset.
- In the full data "Other Blunt Force" is the leading cause of trauma to children presenting at PMH ED, with "Falls from less than 1 metre" and "Falls on the Same level" representing positions two & three.
- For the purpose of this report the 35 Causes of Trauma codes have been combined into 10 main categories.

Top 5 Causes of Trauma, complete dataset



- Between July 2005 and June 2008 there were a total 34,477 presentations to PMH ED.
- When the codes are combined, the leading cause of trauma to children presenting at PMH ED is from Falls.
- The top five "Causes of Trauma" when the data is combined represent 83% of all injury presentations to PMH ED during this period.

Results

Between July 2005 and June 2008 there were a total 34,477 presentations to PMH ED. Each injury presentation to PMH ED is entered into the EDIS (Emergency Department Information System) which allows injury risk factors to be identified and described. Collecting "Cause of Trauma" data enables analysis that can assist with the identification of means to prevent injuries.

The PMH Injury Surveillance System uses 35 codes for "causes of trauma". In the complete dataset "Other Blunt Force" is the leading cause of trauma to children presenting at PMH ED, with "Falls from less than 1 metre" and "Falls on the Same level" representing positions two & three.

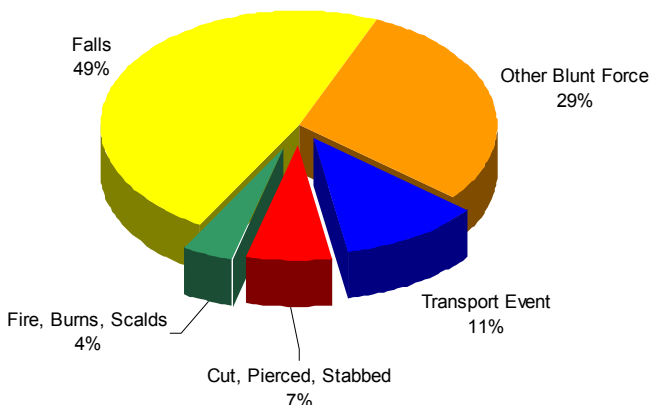
For the purpose of this report the standard 35 codes for "Cause of Trauma" have been combined and reduced to 10 main codes.

These codes are:

- Bites & Stings
- Fire, Burns & Scalds
- Cut, Pierced or Stabbed
- Drowning or Near Drowning
- Falls
- Transport Event
- Other Blunt Force
- Poisoning
- Threat to Breathing
- Other Cause

The Top Five causes of trauma to children presenting at PMH ED are Falls; Other Blunt Force; Transport Event; Cut, Pierced or Stabbed; and Fire, Burns & Scalds (See Figure 1).

Figure 1: Top 5 Causes of Trauma, 10 category data set



These Top Five "Causes of Trauma" represent 83% of all injury presentations to PMH ED during this period.

This bulletin will examine each of these Top Five causes of trauma for similarities and variations, such as gender and age differences, as well as present a specific issue case study, followed by some common safety practices for preventing injuries from occurring.

Number 1: Fall Injuries

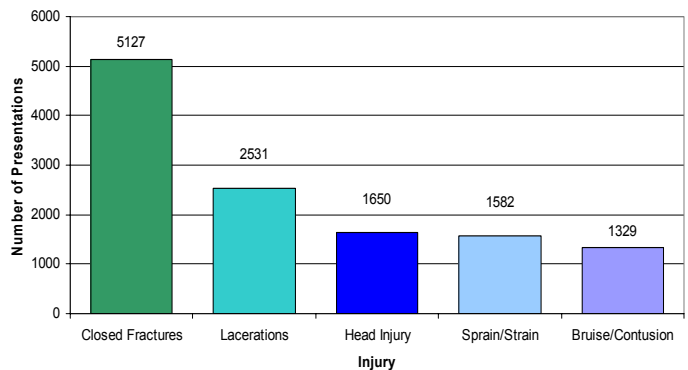
Between July 2005 and June 2008 there were a total 14,197 fall presentations to PMH ED. Of these presentations 17.4% were admitted to hospital.

The most common falls were from heights of less than 1 metre (n=6,539). Falls on the same level (n=6,164) ranked second and Falls from heights greater than 1 metre (n=1,494) ranked third.

Aboriginal children accounted for 3.8% of Fall injury presentations to PMH ED.

The most common injury sustained as a result of a fall was "Closed Fractures", accounting for more than 36% of presentations (See Figure 2).

Figure 2: Top 5 Injuries sustained as a result of a fall, 2005-2008.



Almost all fall injuries are unintentional (99.6%), with only 0.4% coded as either Alleged Assault, Intentional Self Harm or Undetermined Intent.

Fall injuries usually occur in the home (n=8,380), however the school (14.3%) and sport / recreational venues (16.5%) also rank highly.

Just over 13% of the Fall Injuries were classified as occurring while participating in sport. Of these presentations, 432 involved a trampoline, 334 occurred during Football, 220 during Soccer and a further 166 at Netball.



Falls from Trampolines – a Case Study

Trampolines are the most common cause of falls involving a sporting or recreational activity, with a total of 432 falls presentations to PMH ED between July 2005 and June 2008. More than 20% of fall injuries from Trampolines result in hospital admission.

Although there is little variation in seasonal presentation numbers, the majority of Trampoline fall injury presentations occur in Summer (n=123), followed by Autumn (n=116) and Spring (n=110), with a considerably lower

number occurring in Winter, most likely reflecting the times when outdoor activity is more common.

The percentage of Aboriginal children who present at PMH ED as a result of a Trampoline fall (3.4%) is only marginally less than those who present for all fall injuries.

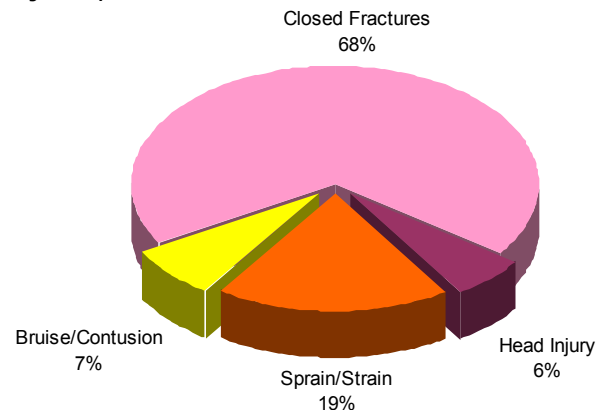
More girls (51.6%) are injured on trampolines than boys (48.4%), which is contrary to the general trend of boys presenting more frequently for injuries than girls. Children aged 5 to 9 years are most at risk of falling from a Trampoline (n=194).

Scenarios:

- Child bouncing on trampoline in the backyard and fell off on the downward bounce.
- Two children collide with each other while bouncing on a trampoline; the force results in both children falling backwards onto the edge of the trampoline.
- Child falls off trampoline onto concrete paving or into garden wall.

The most common injuries sustained from a fall involving a trampoline are closed fractures of the upper limb (n=184). A further 5% sustain a head injury and 15% a sprain/strain (See Figure 3).

Figure 3: Most common trampoline related fall injuries, 2005-2008.



Trampoline Safety Tips

1. Choose a trampoline with side enclosures to reduce the risk of falls and with pads that completely cover the frame and springs or that have a soft edge, to reduce the risk of other injuries.
2. Ensure that the area around and above the trampoline is free from hazards like walls, play equipment or garden furniture.
3. Only one child at a time should be allowed on the trampoline.
4. Supervise children at all times

For more information on Trampoline Safety visit www.kidsafewa.com.au

Number 2: Other Blunt Force

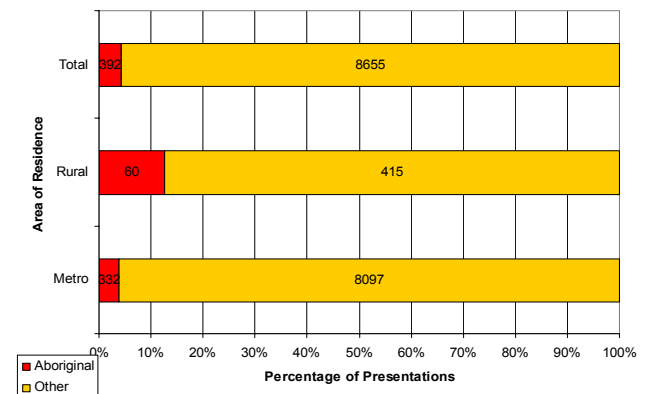
As a single category, prior to condensing the Cause of Trauma codes for this report, Other Blunt Force ranks as the leading cause of trauma for children presenting to Princess Margaret Hospital Emergency Department.

Between July 2005 and June 2008 there were a total 8,655 presentations to PMH ED for injuries from Other Blunt Force.

Other Blunt Force injuries may be related to MVA's, mishaps, falls, crush injuries from animals, blunt objects or a person. Blunt Force injuries occur when a moving object strikes the body, as in a blow, or a moving body strikes a fixed object or surface, as in a fall. Other Blunt Force injuries can overlap with many of the other injury codes.

Similarly to Falls, 94.4% of Other Blunt Force injuries are unintentional, with only 3.2% recorded as Alleged Assault, and 2.3% recorded as Undetermined Intent.

Figure 4: Area of Residence & Aboriginality for Other Blunt Force Injuries, 2005-2008.



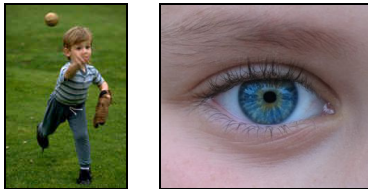
A total of 4.5% of Other Blunt Force injury presentations were Aboriginal children, however that percentage increases when presentations from a rural postcode are examined. Aboriginal children account for 14.4% of Other Blunt Force injury presentations to PMH ED (See Figure 4, above) from rural postcodes.

Males are overrepresented in Other Blunt Force injury presentations, accounting for 65.2%. Children aged 10 to 14 years were the age group who presented the most commonly for these injuries (n=3179).

A total of 1,699 Other Blunt Force injuries are grouped as occurring during a sporting activity, with Football (n=531), Soccer (n=240), and Rugby (n=189) forming the top three sporting activities for injury to occur.

The most common injury sustained from Other Blunt Force were Lacerations (n=2,191), Closed Fractures (n=1,913) and Bruise/Contusion (n=1,270).

Eye injuries are another type of injury that can be sustained within this injury coding, accounting for just over 5% of all Other Blunt Force presentations.



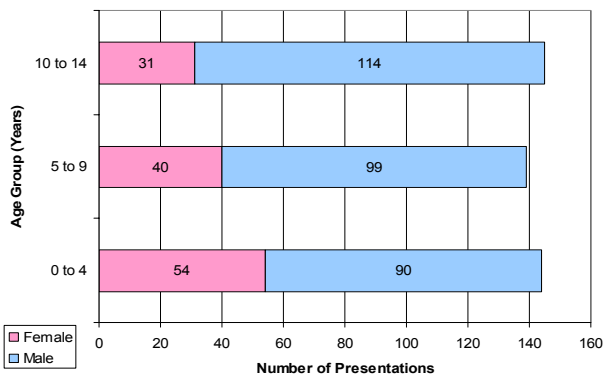
Other Blunt Force: Eye Injuries – a Case Study

Although numbers are usually low, eye injuries are often serious and can lead to permanent loss of sight. A total of 446 eye injury presentations to PMH ED from July 2005 to June 2008 resulted from an Other Blunt Force.

The majority of eye injuries were Lacerations (n=128), with 89 of these to the eyelid/periorcular region; these were followed by Abrasions (n=106), with 79 of these being Corneal Abrasions.

Boys were almost 3 times more likely to sustain an eye injury from an Other Blunt Force than girls, with children aged 10 to 14 (n=145) most at risk of an eye injury (See Figure 5).

Figure 5: Age & Gender Variations for Eye Injuries sustained from Other Blunt Force, 2005-2008.



Scenarios:

- Child struck in the eye with a hockey stick while contesting a ball during a game.
- Hit on the eye by sister with a plastic sword while playing in the backyard.
- Hit in the eye by a toy at Daycare – the child became lethargic, irritable and didn't want to open eye.

A total of 15.7% eye injury presentations were sport related, with 90% of these related to ball sports such as cricket, hockey, football and tennis.

The most common causes of eye injuries to children include:

- Misuse of toys
- Falls from beds, against furniture, on stairs, and when playing with toys
- Misuse of everyday tools and objects (work and garden tools, knives and forks, pens and pencils)
- Contact with harmful household products (detergents, paints, glues, etc.)
- Automobile accidents.

Four out of five eye injuries result from Other Blunt Force.

Preventing eye injuries

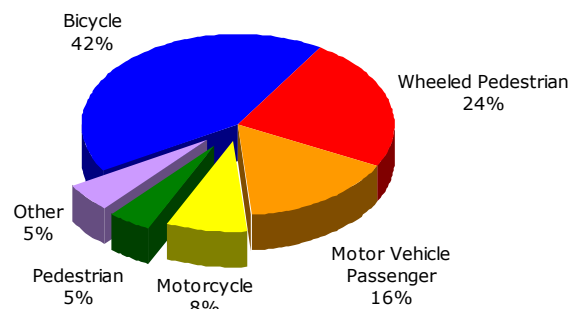
1. **At Home:**
 - Pad or cushion sharp corners.
 - Keep all sharp or pointed objects out of kid's hands.
 - Keep your child out of work areas.
2. **At Play:**
 - Read all warnings and instructions on toys.
 - Avoid toys with sharp edges or hard points, spikes, and rods.
 - Avoid projectile toys that fly or shoot.
 - Be aware of items in playgrounds and play areas that are hazards.
 - Wear proper eye protection when playing high impact ball sports.

Number 3: Transport Injuries

Between July 2005 and June 2008 there were a total 3,353 presentations to PMH ED as a result of Transport Injuries. Almost 6% of these injury presentations were for Aboriginal children. Children from rural postcodes accounted for 8.9% of all Transport presentations.

Transport related injuries are a combination of six codes. The most common transport related Cause of Trauma is "Bicycle" (n=1,418), closely followed by 794 cases for "Wheeled Pedestrian". This category includes skateboards, scooters and rollerblades. (See Figure 6)

Figure 6: Causes of Transport related injury, 2005-2008.



Transport injuries that involved wheeled devices such as Motorcycle, Bicycle, Scooters & Skateboards were most common in children aged 10 to 14 years (n=1,384), while injuries sustained as either a passenger in a vehicle or as a pedestrian were most common in children aged 0 to 4 years (n=251).

Of the 3,353 transport injury presentations, 2,386 were linked to whether Safety devices were in use at the time of injury. A total of 433 were identified as wearing a helmet, 323 specified No Safety Equipment, 227 were recorded as wearing a seatbelt and a further 61 recorded as using an approved child car restraint. The remainder were either not coded or insufficient information was provided to determine whether safety equipment was being used.

A total of 1,869 transport injuries were classified as occurring during a sporting activity, with the most common activity being Cycling – BMX (724 presentations), followed by Cycling – Road (289 presentations). The remainder of the Top 5 activity categories included Skateboarding (n=256), Scootering (n=212) and Motorcycle (n=201).



Pedestrian Injuries - a Case Study

A total of 1,060 child pedestrians presented at PMH ED as a result of an injury between July 2005 and June 2008.

Pedestrian injuries are grouped into three categories: Pedestrian (n=153); Wheeled Pedestrian (n=794) which includes scooters, skateboards & rollerblades and Other Pedestrian Conveyance (n=112), eg a child being pushed in a pram.

This case study will focus on those cases grouped under the main "Pedestrian" injury coding (n=153), and concentrate on injuries sustained in driveways.

Children aged 0 to 4 years were most at risk of sustaining an injury as a pedestrian. The majority of pedestrian related injuries to children aged 1 to 2 years occurred when a child was struck by a vehicle being moved in a driveway.

More than 61% of all pedestrian injury presentations were admitted to hospital, of these two children died in ED. At least 41% of children admitted to PMH were less than 5 years of age.

Almost 17% of pedestrian injury presentations were Aboriginal children, while a total of 13% of children presenting for pedestrian injuries were from rural areas.

Scenario 1:

Because six-year-old Toby's parents both worked an early shift, Toby walked to school with his 10 year old sister & her friends. Most mornings they used the pedestrian crossing two blocks down near their school.

On this particular morning Toby's sister was keen to buy some chips for lunch, so they crossed the road early to stop at a milk bar.

They were halfway across the road when a car came out of a nearby side street and accelerated towards them. The others made it over safely, but Toby hesitated before following. By then it was no longer safe. He ran straight into the path of the car.

As a result of the crash, Toby suffered severe head injuries. He spent 1 ½ weeks in intensive care, a further 7 weeks in hospital, and two more months in a rehabilitation facility before returning to his family.

Scenario 2:

Unknown to his parents, a 20-month-old child had exited the house through an open backdoor and was playing in the driveway at home. There was nothing restricting access to the driveway. The father reversed his four-wheel-drive vehicle out of the garage and felt a bump. He stopped and discovered his son underneath the vehicle between the tyres.

Preventing driveway injuries

1. Create a safe play area for children by restricting access to the driveway from the house by using security doors, fencing or gates.
2. Drivers should walk around their vehicle before moving it, especially where children may have been.
3. When near cars hold children's hand or hold them close to keep them safe.
4. Do not let children play around cars.
5. Always supervise children

Number 4: Cut, Pierced or Stabbed

The fourth leading cause of trauma for children is the Cut, Pierced or Stabbed category which recorded a total of 2,076 presentations to PMH ED from July 2005 to June 2008.

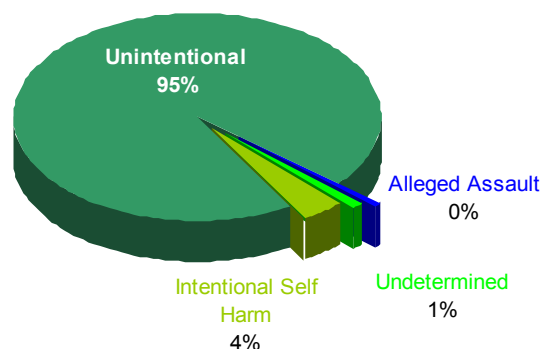
Males once again dominated the Cut, Pierced or Stabbed Cause of Trauma, accounting for 62% of the presentations to PMH ED.

Surprisingly children aged 0 to 4 years were most at risk of injury, recording 725 presentations, followed by children aged 5 to 9 years with 622 presentations and children aged 10 to 14 years with 592 presentations.

Aboriginal children accounted for just over 8% of Cut, Pierced or Stabbed injury presentations to PMH ED, the highest percentage of the top 5 causes of trauma.

Of the Top 5 causes of trauma, Cut, Pierced or Stabbed is the first category to record any cases of 'Intentional Self Harm', accounting for 4% of presentations in this category (See Figure 7).

Figure 7: Intent of Cut, Pierced or Stabbed injury presentations, 2005-2008.



Almost all of the injury presentations recorded as either Intentional Self Harm, Alleged Assault or Undetermined Intent occurred to children who were at least 10 years and older, with only 4 cases of intentional self harm occurring in children aged 7 & 8 years (1 male: 3 female).

The most common injury sustained from Cut, Pierced or Stabbed causes of trauma not surprisingly are Lacerations with a total of 1,471 presentations. The second most common injury is Foreign Body with 221 presentations.

An overwhelming 77% of Cut, Pierced or Stabbed injuries occurred at Home. 5.8% occurred in rural areas.



Scenario 1:

On a warm autumn day an 11 month old child was playing in the bedroom at the rear of the house and wandered over to the table where a fan was sitting. The fan was on, and out of curiosity the child reached forward catching his hand in the fan belt causing lacerations to the child's left hand. The child was taken to the local emergency department and then transferred to PMH ED where the injury to his hand was assessed by plastics and he was admitted for further treatment.

Scenario 2:

A 10 month old baby girl was in her Jolly Jumper when her mother walked passed and accidentally dropped a glass bottle next to the child. The glass bottle shattered resulting in glass fragments lacerating the child's face. The child presented at PMH ED where the injury was treated, glass fragments removed and then sent home.

No one specific issue has been presented as a case study for this Cause of Trauma category due to the nature of "Cut, Pierced or Stabbed" injuries.

Preventing Cut, Piercing or Stab injuries.

1. Always supervise children.
2. Use ceiling or wall mounted fans for children's rooms fitted with a safety casing to prevent children from coming into contact with the blades.
3. When visiting your local playground always ensure children are wearing shoes, and that you check the sand or impact absorbing surface underneath for foreign objects such as glass, sticks, syringes, or broken bottles.
4. Store knives, glasses, scissors and other sharp object out of reach of young children to avoid unintended access.

Number 5: Fire, Burns & Scalds

Burn injuries are the fifth leading cause of injury to children, however they are an injury that can result in lifelong scarring both physically and emotionally.

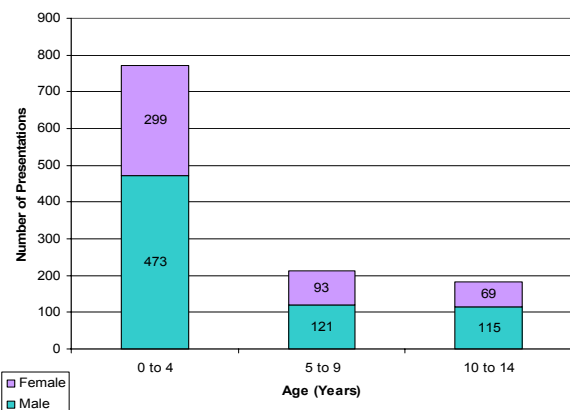
Between July 2005 and June 2008, 1,203 children presented at PMH ED as a result of burns.

Burns have one of the highest percentages (30.4%) of admission out of the Top Five Causes of Trauma.

Aboriginal children accounted for 8.6% of burns injury presentations. 11.5% of all burns presentations came from rural areas.

Children aged 0 to 4 years had the highest number of presentations (n= 772), almost double the other age group's combined (See Figure 8).

Figure 8: Age & Gender for Burn Injury Presentations, 2005-2008.



Almost all burn injury presentations (98.5%) were Unintentional. The remaining 1.5% of presentations were recorded as "undetermined intent". There was just one case of alleged assault and two cases of intentional self harm during this period related to burn injury.

The majority of burn injuries occurred at Home accounting for 1,025 of presentations to PMH ED.

Burns injuries can be broken down into four categories:

- Contact with Fire/Flame 109
- Contact with Hot Liquid/Steam 580
- Contact with Hot Object/Solid 431
- Other Thermal Mechanism 83

Hot Liquid/Steam burns tend to be as the result of hot tap water or hot food and drinks, while contact with hot object can be heaters, ovens and other hot surfaces. Other Thermal mechanism is generally as a result of sunburn and electrical/rope burns.

The majority of burn injuries occur during Autumn with a total of 339 presentations, peaking in March. Summer is the season where the least number (n=284) of burn injury presentations occur.

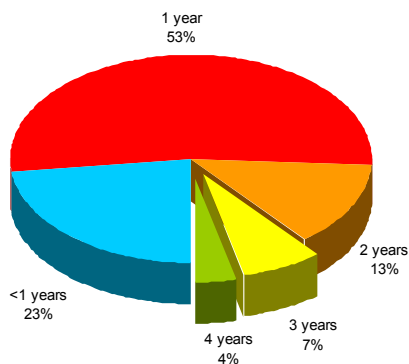


Scalds from Hot Food & Drink – A Case Study

Of the burns presentations to PMH ED between 2005 and 2008, more than 41% (n=498) were a scald from hot food or drink.

Approximately 68% of these hot food and drink scalds occurred to children under 5 years of age, with the numbers peaking for children aged 1 (n=169) presenting to PMH ED (See Figure 9).

Figure 9: Hot Food & Drink Scald presentations, children 0 to 4 years, 2005-2008.



The most common hot food and drink scalds were from cups of tea or coffee, followed by scalds from a recently boiled kettle and hot oil scalds.

Less than half of all presentations had any form of first aid given by the caregiver at the time of the injury.

The male to female ratio was almost even with 227 girls and 271 boys presenting for scalds from hot food or drinks.

Almost 38% of hot food and drink scalds required admission to hospital, 8% higher than the overall admission percentage for burns as a whole.

All presentations to PMH ED for hot food and drink scalds were unintentional.

The highest number of Hot food and drink scalds occurred during the hours of 6pm & Midnight (n=149), and 12 noon & 5.59pm (n=134). A total of 48% hot food and drink scalds occurred during meal preparation times (between 12 noon to 1pm and 5pm to 8pm).

Aboriginal children accounted for 8.6% of hot food and drink scald presentations.

The home was the most common location for this form of scalds to occur, with 94% of presentations occurring at a home location.

Scenario:

- A two year old girl reaches up to the top of the stove and grabs at the pot handle, tipping boiling water from the pot onto her upper torso and face and suffering severe burns.
- A 12 month old boy grabs the table cloth on the dining room table to try to pull himself up. A freshly made cup of tea tips down his right side.
- A 6 month old baby was being nursed at a café when a waitress walked passed bumping the parents arm spilling hot milky coffee over the baby's left arm, shoulder and leg.

Other Scald Facts

Hot Water Burns like Fire!

At 60°C, hot water will severely scald a child in less than a second. The temperature of the hot tap water in most Australian homes is about 65°C. This is 15° more than the ideal maximum safe temperature of 50°C. At 50°C, hot water takes five minutes to cause a major burn. (By comparison, most adults shower at 38°C to 42°C).

Hot water can scald for up to 30 minutes after it is boiled. A fresh, piping hot drink can scald in a second.

A cup of hot liquid spilled over a baby or toddler is equivalent to a bucket of hot water being spilled over an adult.



How to prevent scalds from hot food & drinks

1. Separate young children from scald hazards. In particular, keep them out of the kitchen or cooking areas during meal preparation.
2. Never hold a child while consuming a cup of tea/coffee, place them down safely.
3. Use non-slip placemats instead of tablecloths.
4. Use cordless kettles, and only boil enough water for what you require, and leave the kettle empty.
5. Always use the rear elements on stovetops first and turn the handles towards the back.

Discussion

The Top Five Causes of Trauma presented in this report are only the tip of the iceberg for child injury presentations to Princess Margaret Hospital Emergency Department (PMH ED). They provide a snapshot behind some of the causes of child injuries and what requires presentation to hospital.

Limitations in the data categories make it difficult to determine the exact activity occurring at the time of injury and specific details around whether first aid was applied despite the best efforts of Triage staff to include additional details not captured by the data codes available.

The Top Five "Causes of Trauma" represent 83% of all injury presentations to PMH ED during this period. That is a total of 29,484 injury presentations to PMH ED, an average of 9,828 presentations per year.

Just 1.35% of the presentations for the Top Five Causes of Trauma were determined to be intentionally caused either as Alleged Assault or Intentional Self Harm.

A further 1% was coded as Undetermined Intent, meaning that intent could not be conclusively determined. This left a total of 28,774 injury presentations that were Unintentionally caused.

Despite the relatively small numbers of intentional injuries presenting at PMH ED, it is this classification of injury that gains the greatest attention in the media and from policy makers.

All injuries to children are important however the reality is that many more children are likely to be unintentionally injured than intentionally injured.

Every available avenue should be taken to promote the simple steps to prevent injuries sustained by children regardless of the intent associated with the injury.

Consistent messages on how easily many of these injuries could have been prevented need to be regularly disseminated to parents, caregivers and the wider community.

Kidsafe WA continues to lead the action in Western Australia to raise awareness of the preventability of child injuries and works with child and community health nurses and other

community groups to ensure that child injury prevention messages are consistent.

The media can also play a valuable role in getting information out to the community and is a valued partner for distributing these simple but important messages to all parents and carers alike.

Many of the causes of trauma presented in this report could have been prevented by simple means including parent supervision, adequate use of protective equipment during sports, setting safety rules and creating a safe play space for children to live and learn.

Preventing injuries in children is not about stopping children from having fun, nor is it about preventing them learning from the actions and mistakes they make along the way, it is about creating an environment that provides challenges, promotes creativity and where rules are reinforced to make sure that the environment they are in is a safe place.

The continuing rise in the number of children using hospital services for preventable causes should be a focus for all. There are not only monetary costs from injuries to children, but also social, emotional and physical costs to each child and their family when an injury is sustained.

Over the past three years, there has been a steady increase in the number of presentations to Princess Margaret Hospital, with injuries alone increasing from 11,344 presentations in 2005/06 to 12,142 presentations in 2007/08.

Overall childhood injury prevention needs to remain a priority for the health system in Western Australia and nationally to ensure the ongoing education of new and existing parents, carers and grandparents on the preventability of injuries can be provided.

By working together and continuing to look at new ways to engage and educate parents on child safety we can continue to strive for the creation of a safer world for kids to live, learn and play.

Suggested Citation:

Leeds M, Wicks S. 2008. Top Five Injuries to Children. Kidsafe WA (No.15).

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

