

Seasonal Variation in Child Injury



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1. Introduction

Unintentional injuries constitute a significant public health problem⁷. In developed nations, injury has long been recognised as a leading cause of death and disability⁸, while epidemiological attention to injury in poorer nations has increased in recent years⁴.

The burden of childhood injury and the need to develop effective preventative measures is widely recognised⁷. Many case-control, cross-sectional and other studies have been conducted in an effort to identify the risk factors of injury³. Injury Surveillance Systems have been implemented in hospitals around the world and have been invaluable in identifying injury trends and facilitating development of prevention measures⁴.

There has been minimal investigation into the seasonal variation of childhood injury, particularly in Australia. According to Stokes, Van Leeuwen and Ozanne-Smith¹¹, there are complex patterns of variance displayed in injury data, with some causes of injury displaying both seasonality and diurnal variance¹¹. Unfortunately this is one of many papers that notes but does not investigate these variations.

Extrapolating and generalising results from international studies is wrought with problems due to the unique climatic and cultural factors present in Australia. Even within Australia, the climate and seasonal patterns vary greatly between regions. Generalisations and extrapolation of results must therefore be done with caution. Warmer temperatures, limited snow and Christmas festivities held during summer means a very different pattern of injuries than that reported on in International studies^{6, 9}.

Since 2007, Kidsafe WA has conducted a Seasonal Childhood Injury Prevention Program with the support of the WA Department of Health. The Seasonal Childhood Injury Prevention Program (commonly referred to as the Seasonal Campaign), is a multilevel campaign targeted at parents, carers and health professionals. The campaign is designed to highlight key injury risks to children throughout the year, raising awareness and providing simple steps to keep kids safe.

The focus of the seasonal campaigns are:

- Spring: Poisoning Prevention
- Summer: Holiday Safety
- Autumn: Falls Prevention
- Winter: Burn and Scald Prevention

This report examines data collected by the Princess Margaret Hospital Injury Surveillance System (ISS) in the three year period July 2005 to June 2008. The ISS records and collects details on all presentations to the PMH Emergency Department that are coded as an injury.

After an overview of each season, this report looks at the differences and similarities between the data from each season. The four topics of the Seasonal Childhood Injury Prevention Program are then focused on, before a discussion on the seasonal variations observed.

2. Demographic Data

PMH Emergency Department Presentations for Injury

During the study period July 2005 to June 2008, the Princess Margaret Hospital Emergency Department saw a total of 156,278 presentations, an average of 52,000 per year. Of these presentations, 35,477 (22.7%) were due to injury.

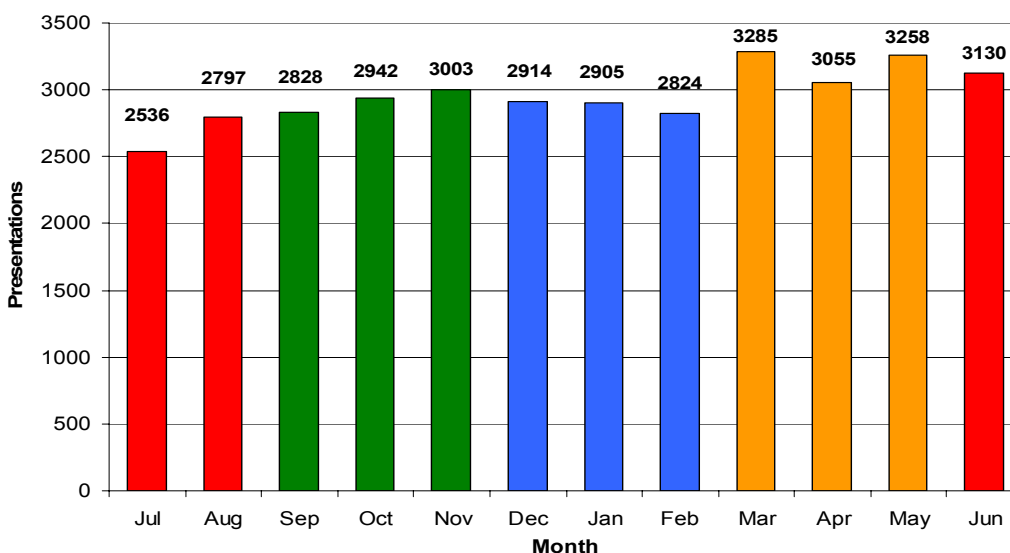
Autumn accounted for the highest number of injury presentations (n=9,598, 27.05%), while winter accounted for the lowest number of presentations (n=8,463, 23.85%). Annual injury presentations increased over the three year period, this trend only broken in winter 2007-08 when presentations fell by 198 (Table 1).

Table 1: PMH Emergency Department injury presentations - July 2005 to June 2008

	SUMMER	AUTUMN	WINTER	SPRING	TOTAL
2005-06	2,837	3,039	2,725	2,744	11,345
2006-07	2,883	3,164	2,968	2,975	11,990
2007-08	2,923	3,395	2,770	3,054	12,142
	8,643	9,598	8,463	8,773	35,477

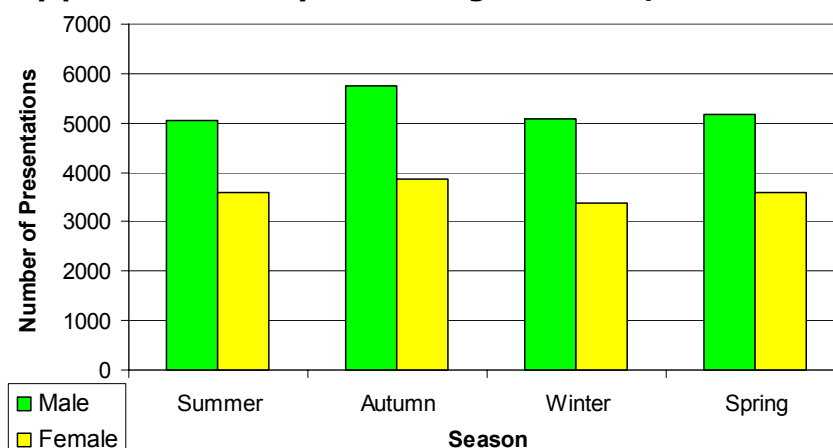
The monthly distribution of injury presentations correlated to the seasonal figures. The autumn months of March and May displayed the highest proportion of presentations (9.26% and 9.18%), while the winter months of July and August had the lowest (7.15% and 7.88%).

Figure 1a: Injury presentations by month - July 2005 to June 2008



Males accounted for more injury presentations in each season, than females as shown in figure 1b, which is consistent with the male:female ratio of total injury presentations to PMH ED.

Figure 1b: Injury presentations by season & gender - July 2005 to June 2008



3. Seasonal Summaries

SUMMER

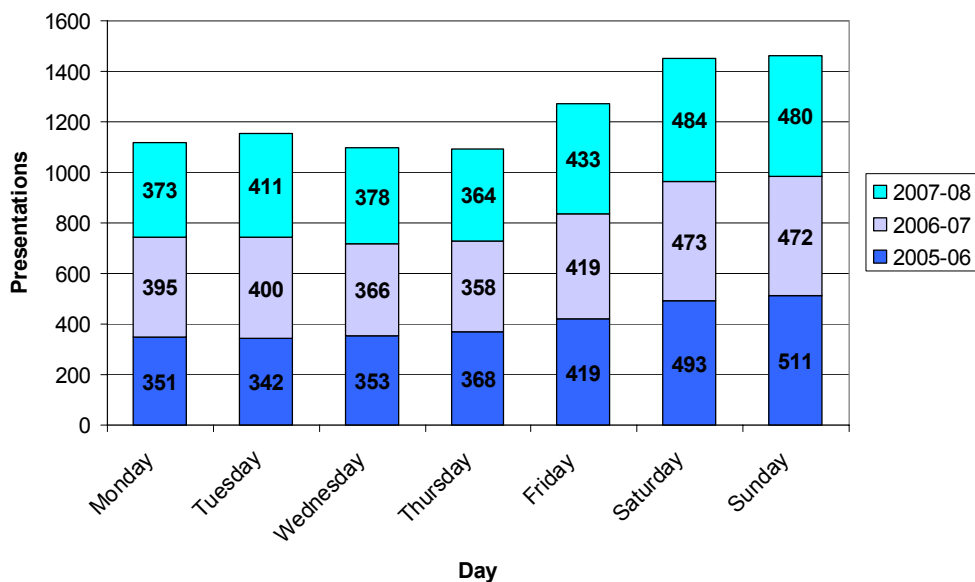
In the summer months between 2005 and 2008 there were 8,643 injury presentations to PMH ED. This accounted for 24.36% of total injury presentations for the period. February recorded the least number of presentations with 2,824 while January recorded 2,905 and December had the highest number with 2,914.

The gender ratio of males to females was approximately 3:2, with males accounting for 58.48% of presentations and females 41.52%.

The highest proportion of presentations were made by children aged 0-4 years, with 46.01% (n=3,814). Children 5-9 years accounted for 28.34% of presentations, with the remaining 25.65% being by children 10-14 years.

The weekend saw the highest number of injury presentations to PMH ED, with 16.8% of injuries occurring on a Saturday and 16.9% occurring on a Sunday. The middle of the week saw the fewest injuries occurring, with 12.6% occurring on Thursdays and 12.69% on Wednesdays.

Figure 2: Summer injury presentations by day of injury - July 2005 to June 2008



Of the 8,643 summer presentations, 467 were by persons classified as Aboriginal. A further 67 were recorded as having unknown ethnicity, leaving 93.82% categorised as "other".

The majority of summer injuries occurred in the home (n=5,771). A further 624 injuries were sustained on public roadways, 552 in a public building or recreation area, 492 at school, 340 in an open nature space and 326 in a sporting area.

Falls were the most common cause of injury at 37.66%. Other blunt force injuries totalled 22.73% and transport events 10.94%. There were 22 (0.25%) presentations for drowning or near drowning, and 382 (4.42%) for bites and stings.

Only 938 injury presentations during summer were the result of a sporting activity.

The majority (97%) of cases recorded during the summer months are unintentional injuries. The remaining 3% make up intentional self harm, alleged assault and undetermined intent.

WINTER

The winter months had the lowest number of injury presentations during the study period, accounting for only 23.85% of total presentations during this time. The lowest number of presentations occurred during the winter month of July, with only 2,536 presentations (7.15%).

The male to female gender ratio was again approximately 3:2. Males accounted for 60.12% (n=5,088) of presentations and the girls for 39.88% (n=3,375). A slightly greater gender difference was evident in the older age bracket 10-14 years, where males accounted for 65% of the presentations.

Of the presentations occurring in June, July and August, 41.98% (n=3,379) were by children 0-4 years. Children aged one year accounted for 924 of the presentations. Presentations slowed for children 5-9 years (n=1,952), and then increased again for children 10-14 years (n=2,718).

There were a total of 1,406 presentations made on Saturdays (16.6%) and 1,438 made on Sundays (17.0%). Presentations dropped to 12.1% on Mondays and increased steadily from there after.

Injuries in the home comprised 54% of presentations in winter (n=4,558). There were a further 13.7% that occurred in schools and 13.4% that occurred in sports areas. There were just 145 (1.7%) of injuries that occurred in an open nature area during winter.

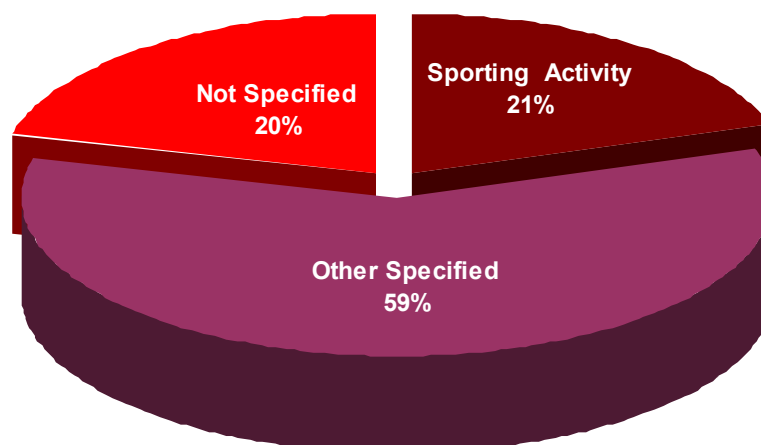
Falls dominated the winter injuries, accounting for 42.68% of injuries during the winter months (n=3,612). Transport events accounted for only 7.29% of injuries (n=617) and cutting/piercing for only 4.92% (n=416).

There were 88 cases of intentional self harm during winter and a further 130 cases of injuries with undetermined intent. June saw the highest number of intentional self harm cases, accounting for over half of the self harm presentations during winter (n=45) and the highest number of cases of all months.

Unintentional Injuries continued to make up the highest proportion of presentations to PMH ED accounting for 96.4% (n=8,163).

Winter sports activities resulted in 21% of presentations, many of which were from Australian Rules Football.

Figure 4: Winter injury presentations by activity - July 2005 to June 2008



SPRING

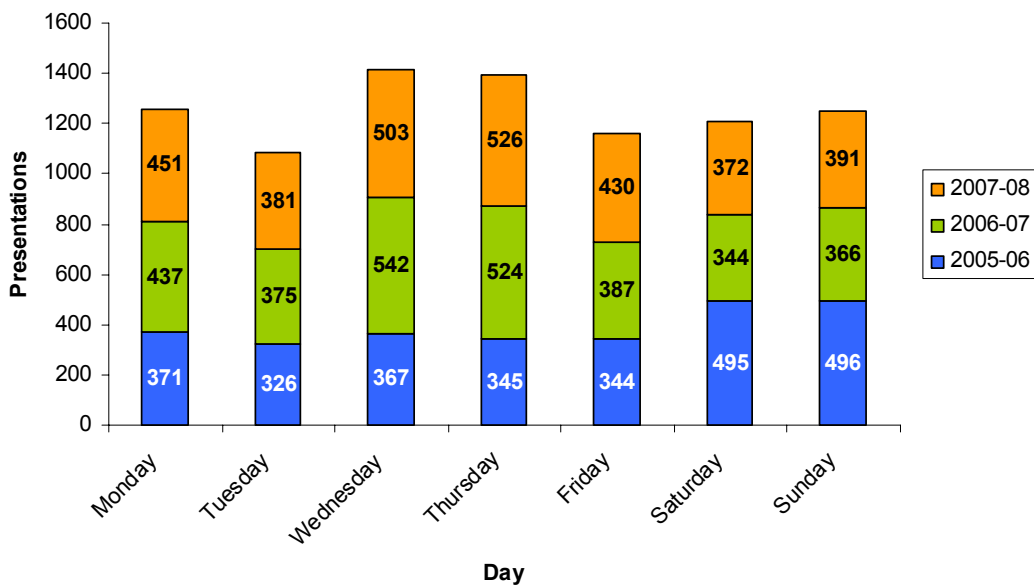
During the spring months there were a total of 8,773 injury presentations to the PMH ED. Presentations increased as spring progressed, with September having the least presentations (n=2,828) and November having the greatest number (n=3,003). This was true of all three years, with an overall increase in presentations over the study period.

The number of male children who presented to the PMH Emergency Department was 1.5 times greater than the number of female children. The gender ratio widened with increasing age bracket; males 0-4 years comprised 55% of presentations for their age group, males 5-9 comprised 58% and males 10-14 comprised 65%.

Presentation numbers were highest by children 0-4 years (n=3,517 41.98%). Children 5-9 accounted for 27.4% of presentations (n=2,295) and children 10-14 accounted for 30.06% (n=2,565).

There was a mid-week spike in presentations during spring. Wednesdays recorded 1,412 presentations (16.1%) and Thursdays 1,395 (15.9%). There were only 1,211 presentations recorded on Saturdays (13.8%) and 1,253 on Sundays 14.3%.

Figure 5: Spring injury presentations by day of injury - July 2005 to June 2008



Aboriginal children comprised 4.81% of spring presentations (n=422). A further 1% (n=88) of presentations were by children of unknown ethnicity and 94.19% (n=8,263) of other ethnicity.

The majority of injuries during spring occurred in the home (n=5,186 59.1%), followed by injuries at school (n=1,114 12.7%). Public roadways were the location of a further 7.2% of injuries (n=631). The breakdown of injury causes during September, October and November mirrored the overall proportions for the study period. One fifth of injury presentations were due to falls (n=3,489) and nearly a quarter due to blunt force (n=2,090).

The majority of injuries (96.5%) were unintentionally caused. A further 96 children presented to PMH ED during spring with an injury due to alleged assault (1.09%); 91 had injuries as a result of intentional self harm (1.04%) and 117 were of undetermined intent.

4. Seasonal Comparisons

GENDER

There was little variation in gender between the seasons. Overall, there were 21,055 male children who presented during the study period (59.35%) and 14,422 female children (40.65%). This equates to an approximate gender ratio of male to females of 3:2 which is the standard ratio observed by the PMH ISS.

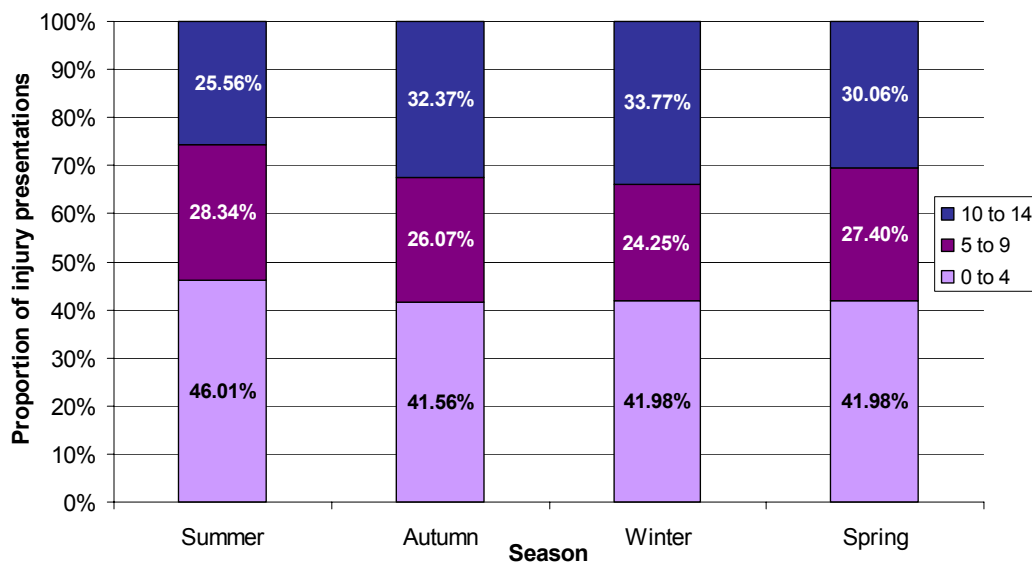
The largest gender disparity occurred during winter with males constituting 60.12% of presentations. Gender presentations were most comparable during summer, when male presentations reduced to 58.48%.

AGE

Children 0-4 years dominated the injury presentations across all seasons. Summer was the only season that displayed any variation in age distribution. There were a higher proportion of injuries by younger children during summer; children 0-4 years accounted for 46.01% of presentations compared to an average of 41.84% in the other seasons. Summer was also the only season where presentations by children 5-9 years (28.34%) exceeded the presentations by children 10-14 years (25.56%).

Older children were more at risk of injury during winter, when the proportion of presentations by the age group rose to 33.77% compared to an average of 29.36% across the other seasons. This could be linked to the spike in sporting activities that occurred during winter, which are dominated by the older age group.

Figure 6: Injury presentations by season and age group - July 2005 to June 2008



DAY

The majority of injury presentations during the study period occurred over the weekend; 16.4% occurring on Sundays and 16.24% on Saturdays. This was followed by Fridays with 14.01% while the remaining week days hovered around 13.5%. This is the standard distribution of injuries that is usually observed at PMH ED.

The pattern varied during spring however. During the spring months, children were more likely to sustain an injury in the middle of the week. 16.1% of injuries occurred on Wednesdays and a further 15.9% on Thursdays. Only 28.1% of injuries occurred over the weekend during spring compared to an average of 34.1% across the other months.

ETHNICITY

Aboriginal children constituted 4.88% of presentations during the study period. They were most at risk during summer when they accounted for 5.4% of presentations (n=467). This differs from the general seasonal pattern of injury where summer presentations were exceeded by both autumn and spring.

Although they are not statistically significant differences, the proportion of Aboriginal injury presentations decreased with average seasonal temperatures. In spring, Aboriginal children (n=422) comprised 4.81% of presentations, in autumn (n=453) 4.72% and winter (n=391) 4.62%.

The causes of injury differed slightly for the Aboriginal presentations. The proportion of falls was lower across all seasons for Aboriginal children. The largest discrepancy was observed in winter, where falls accounted for 29.92% of Aboriginal presentations compared to 42.68% of total presentations. The low proportion of falls was countered by increased burn, cutting/piercing, transport and poisoning presentations in all seasons.

Bites and stings were more common amongst Aboriginal presentations compared to non-Aboriginals during autumn (4.46% vs. 3.16%) and spring (7.82% vs. 3.66%). However, they were lower during winter (1.53% vs. 2.14%) and comparable during summer (4.45% vs. 4.42%).

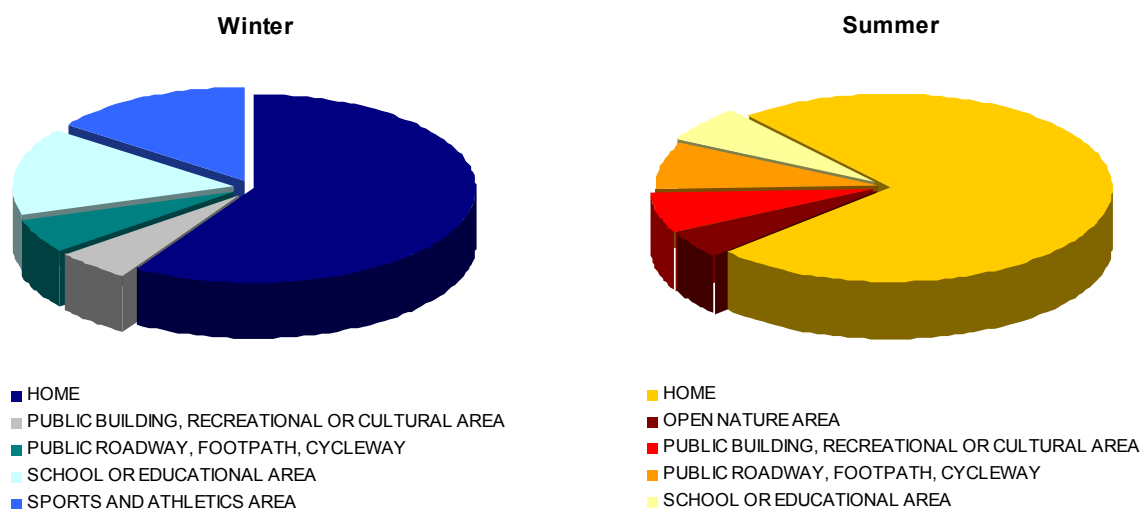
LOCATION

The greatest variance in location of injury occurred in the summer months, when school injuries were not the second most common location of injury. This is understandable due to the absence of children from school for much of the summer period, with most children having a six week holiday over Christmas and into the New Year. School injuries fell from an average of 12.7% of all injuries during the other months to 5.7% over summer. There was a similar rise in home injuries over summer, rising to 66.8% compared to an average of 56.6%.

The proportion of sporting injuries rose during the winter months. In winter the proportion of injuries sustained in a sports area was 13.4% of all injuries, compared to 9.7% in autumn, 6.3% in spring and 3.8% in summer.

Injuries sustained on public roadways were lowest in the winter months (5.4%) and greatest during summer (6.4%). Injuries sustained in open nature areas were also lowest during winter (1.7%) and highest in summer (3.9%).

Figure 7: Injury presentations by Top five locations: winter vs. summer



CAUSE

The dominant cause of injury across all seasons was falls, accounting for 40.02% of total injury presentations. Falls peaked in winter when they made up 42.68% of presentations, followed by autumn with 40.03%.

Although the most common causes of injury presentation for all seasons is falls and other blunt force, Summer was the peak season for a variety of injury types, including transport events (10.94%), cutting and piercing (6.63%), bites and stings (4.42%), poisonings (3.72%) and drowning/near drowning (0.25%). Burns and scalds however were decreased during these months, particularly when the 40 presentations listed as "other thermal" were removed, all of which were sunburn cases.

Burns and scalds (omitting "other thermal" mechanisms) comprised the greatest proportion of presentations in winter, when the 281 cases equated to 3.33% of the seasons presentations.

Poisoning presentations were also slightly elevated during spring (3.73%), with causes ranging from poisonous plant ingestion, to prescription medications and household cleaners.

INTENT

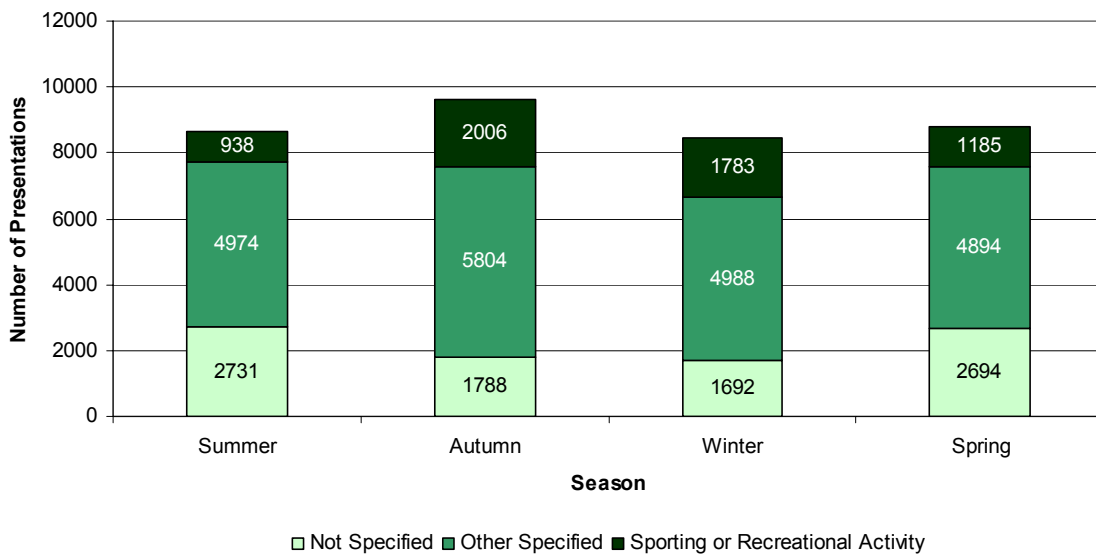
Unintentional injuries constituted 96.6% of presentations over the three year study period. A further 1% of injury presentations were for alleged assaults, 1% for intentional self harm and 1.4% were of undetermined intent.

During spring there was a higher proportion of alleged assaults (1.09%) and intentional self harm (1.04%). The summer months had the lowest proportion of alleged assaults and cases of intentional self harm, with unintentional injuries accounting for 97.07% of all presentations.

ACTIVITY

The proportion of injuries incurred during sporting / recreational activity was almost twice as high in winter as compared to summer. In the summer months sporting injuries dropped to 11% (n=938) of all presentations, before climbing to 20.9% during autumn (n=2,006) and peaking in winter with 21.07% (n=1,783).

Figure 7: Injury presentations by season and activity



5. Kidsafe WA Seasonal Campaign

Kidsafe WA developed the Seasonal Childhood Injury Prevention Program after identifying a need to focus on the key causes of child injury, in order to comprehensively promote the unique risks and preventative measures. These risks needed to be focused on repeatedly in order to capture the new influx of parents and carers each year.

Focusing on injury topics by season was a logical method of achieving this, as it enabled the major causes of childhood injury (particularly in to children less than 5 years of age) to be covered for a sufficient period of time. The first three causes chosen were 1) falls: the most common cause of child injury; 2) burns and scalds; a serious cause of injury resulting in high hospital admissions and ongoing care; and 3) poisoning: a serious cause of injury resulting in high hospital admissions. These causes were allocated to seasons based not solely on their times of peak incidence, but also based on what seemed logically appropriate and relevant. The final category chosen was Holiday Safety, which comprised a number of injury causes that peak during holiday periods.

FALL PREVENTION: *Let leaves, not children, fall this autumn*

Being the leading cause of child injury across all months and seasons, there was not a definitive season that fall prevention had to be assigned to. The topic was assigned to autumn based on the play-on-words that existed between the topic and the American term for autumn, both being "fall".

Between July 2005 and June 2008 there were 14,097 presentations to PMH ED for fall injuries, accounting for over one third of all injury presentations (39.74%). The majority of fall injuries were from a height less than one metre (n=6,539), a further 6,164 were falls on the same level where children trip over things left on the ground or their own feet and only 1,494 were for falls from heights of greater than 1m.

While scrapes, bumps and bruises are the most common injury from falls, falls can also cause more serious injuries. Nearly 18% of children presenting with a fall injury were admitted to hospital. Fractured arms are the most frequent hospitalised injury, while serious head, facial, spinal and internal injuries occur far more frequently than most people would suspect.

Fall height is a contributing factor to the seriousness of fall injury; the greater the height, the more serious the injury is likely to be. The rate of hospital admission for fall injuries rose from 12.83% for falls from ground level to 18.91% for falls from a height less than one metre, to 34.54% for falls from a height greater than one metre.

Children under the age of 5 were most at risk of falls (45.91%). Infants and toddlers were most likely to sustain falls from items of furniture or from nursery products such as cots, prams and change tables. Younger children were frequently injured on items of play equipment, while older children were most at risk of falls from sporting activities. The majority of all falls occurred in the home (54.45%).

The measures promoted during the campaign to prevent fall injuries, while still allowing children to play, explore and have fun are:

- Use nursery products and play equipment that comply with the relevant Australian Standards
- Never leave babies and young children unattended on raised surfaces
- Ensure sides of cots are up and secured
- Always use safety harnesses in highchairs and strollers
- The use of baby walkers is not recommended
- Use gates at the top and bottom of stairs
- Don't place furniture near windows or large toys in cots – children may use them to climb up and out
- Use play equipment suitable for children's age and stage of development
- Use protective gear during sports and helmets on bikes
- **Supervise** children and help them learn new skills

BURN AND SCALD PREVENTION: *Get Warm, not Burnt this Winter*

When all causes of burn and scald injuries are included, winter has the second fewest number of burns injury presentations (n=285; 3.37%) of all seasons. However, when the cases of sunburn are omitted, winter becomes the season with the highest number and greatest proportion of burns and scalds injury presentations (n=281; 3.33%).

Regardless of the greater proportion of injury presentations for burns & scalds during the winter months when the data is manipulated, the topic of burns and scalds fits well with the increasing consumption of hot drinks and use of heating devices during the winter months.

Winter is the time when people start to look for ways to keep warm to combat the dropping temperatures and coming rains. Heaters, hot water bottles and electric blankets are pulled out of storage and steaming hot baths, soups, drinks and porridge become more frequent. All of these help to keep us warm - but they also put us at risk of burns and scalds.

Approximately 400 children presented to PMH ED each year with a burn or scald injury (total n=1,204), with nearly one third requiring admission (30.40%). Nearly half of all hospitalisations of more than seven days are the result of a burn or scald.

Hot liquid was the most common cause of scalds, with 580 cases (48.17%) being a combination of hot tap water and hot drinks. A further 35.80% of cases were from contact with a hot object, 9.05% from contact with fire or flame and 6.89% from other thermal mechanism (predominantly sunburn).

Young children are even more at risk of these injuries as they lack the ability to assess the risks and avoid the dangers. Children less than 5 years of age comprised 64.17% of burn and scald presentations. Aboriginal children were also at increased risk, accounting for 8.64% of burn and scald injuries compared to 4.88% for combined causes of injury.

Kidsafe WA promotes that burns and scalds can be easily prevented through the use of safety equipment, minor household modifications, child education and *supervision*.

- Keep matches and lighters out of reach of children
- Install guards around fires, heaters and ovens
- Think twice about using a baby walker. They enable children to move quickly into danger, and to reach potential hazards
- Control the delivery temperature of your bathroom hot tap water to a maximum of 50°C. This has been law in WA for all new homes for more than 10 years.
- Supervise young children in the bathroom
- Keep kettles, cords, pots, pans and microwaves at the back of the bench
- Use non-slip place mats instead of table cloths
- Put your child down before having a hot drink

POISONING PREVENTION: *Spring Clean for Poisons Safety*

Each year more than 400 children present to Princess Margaret Hospital for emergency treatment for poisoning. The majority of these are unintentional injuries, with most at risk being toddlers between 1 and 3 years of age. Children at this age are becoming mobile and automatically put objects into their mouths. They are highly inquisitive but lack the ability to assess dangers.

Many household products are potentially poisonous. Over the counter medication, prescription medication, cleaning products, personal hygiene products and an array of gardening and outdoors products all have the potential to be poisons. The most common product involved in poisoning cases is paracetamol - a common painkiller found in almost every household and handbag.

Prevention of childhood poisoning involves identifying the potential poisons in the home and managing their storage and use.

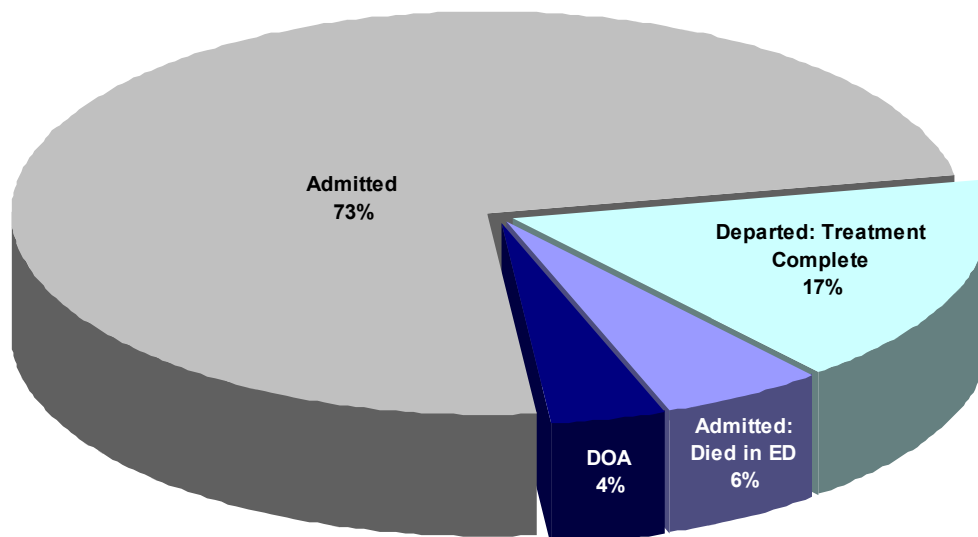
- Keep all poisonous products in a locked container or cabinet that is out of reach of children – “Lock up and Away”. This includes products found in the laundry, kitchen, garage or shed.
- If medications require storage in the fridge, first place them in a small lockable container such as a computer disk box
- Return all poisons to their safe storage area immediately after use or purchase
- Ask for and use products in child resistant containers and make sure the lids are on properly after use. Remember however that *child resistant is not child proof* – many toddlers can open child resistant containers
- Store all poisons in their *original containers* that are *clearly labelled*
- Dispose of unwanted and out of date medicines and chemicals
- Keep handbags out of reach of children. Many people keep medications in their bags, making them readily accessible by children
- Check that the plants in the garden are not poisonous. If any are, either remove them or fence them off so children can not access them
- Keep the Poisons Information Centre phone number 13 11 26 on or near the phone

HOLIDAY SAFETY: *Stay Safe this Summer*

During summer the sun is shining, the kids are on holidays and Christmas festivities are underway. These unique set of injury risks means there are a variety of injury topics that are relevant during the summer months; Water safety, travel safety, toy safety and celebration safety.

Water safety is paramount during summer. Increased temperatures and time off from school means that more time is spent at the beach and pool in water based activities. Nearly 42% of all drowning/near drowning presentations during the study period occurred over summer (n=22). Although drowning/near drowning only accounted for 0.15% of all injury presentations, the severity of the injuries make it an issue in need of attention. Of the 53 cases that presented to PMH ED, 9.43% did not survive.

Figure 8: Drowning/near drowning by disposal – July 2005 to June 2008



Transport related injuries also peaked during the summer months. The 945 transport related presentations made up 10.4% of all presentations over summer. The summer holidays are the one time of year that many families have time to pack up the kids and head off to visit family and friends, or just get away for a much deserved break. More people on the roads, longer trips and driver distractions increase the risk of motor vehicle crashes. Before embarking on a long trip or even a short drive to the shops, children need to be correctly restrained in the correct type of restraint for their age/weight/size. Failing to use a restraint or rushing children into the next stage seat before they are ready can result in serious injury in the event of a crash.

Christmas gifts for children are dominated by toys and sporting equipment. While these can bring hours of entertainment and enjoyment, they also have the potential to cause a variety of injuries including falls, choking and suffocation if not carefully selected. Young children place just about anything they find into their mouths, which can cause choking if the object is small or has small removable / breakable parts. Children are most at risk of choking and suffocation injuries during summer (n=71, 0.82%).

Festivity safety refers to the general caution that needs to be exercised during festive celebrations. Christmas decorations and wrapping pose a choking, suffocation and strangulation risk, candles and BBQs put children at risk of burns and visits to other homes not set up for children can be hazardous.

The summer safety campaign recommends these simple steps to keep kids and visitors safe:

- Always follow age recommendations when buying toys and gifts. Age recommendations relate to developmental appropriateness, not to the ability of a child to master the toy or game.
- Ensure sure children are restrained in an appropriate child car restraint or seat belt when traveling in a car.
- Create safe play areas for children to separate them from hazards such as moving vehicles or an adult work place (eg. Farm machinery).
- Know where children are, and ensure they are in the care of another adult before moving vehicles to prevent driveway run-over.
- Never leave children alone in a car. If you have to leave the car, even if to just run a quick errand, take children with you.
- Children under age 5 have the highest risk of drowning. They are attracted to water but they don't understand the risks. Always actively supervise children around water – be within arms reach.
- Don't neglect the supervision of children during family gatherings and holiday parties.

6. Discussion

The seasonal variation in child injury as observed through presentations to PMH ED July 2005 – June 2008 were minimal.

Males consistently outnumbered females 3:2, children 0-4 years dominated presentations and the majority of injuries were unintentional and occurred in the home, usually caused by a fall or blunt force.

The notable variations were:

- 1) younger children are injured over summer
- 2) midweek spike in injuries during spring
- 3) higher proportion of Aboriginal children presenting over summer
- 4) increased injuries occurring at home and on the roads over summer
- 5) increased bites, stings, drowning and transport events over summer
- 6) increased burns and scalds over winter
- 7) increased sporting injuries over winter

The majority of these variations occur over summer and can be explained by the difference in children's routines in these months. During spring, autumn and winter, children spend the majority of their waking hours in a school setting and follow a consistent routine. For approximately half of summer however, children are not at school and lose much of their structure and routine. Children spend more time at home, more time travelling and in unfamiliar environments, more in the car and more time for leisure pursuits.

Archer (2009) reported a similar spike in drowning, bicycle, skateboard and transport events over summer in the USA¹. The PMH ISS data did not however support the conclusion that summer is a "trauma season" experiencing a spike in injury presentations. Conversely, summer injuries were down from the number of presentations in both autumn and spring.

Transport related injuries were also reported by DiMaggio & Durkin² (2002), who found a sharp increase in incidence of injuries over the summer months. Laskowski-Jones⁵ (1999) attributed summer injuries to climatic specifics. High temperatures 1) cause heat stroke and heat exhaustion, 2) increase insect and snake activity and thus the risk of bites and stings, and 3) increase the amount of time spent in aquatic environments and thus the risk of drowning. All of these were evident in the PMH ISS data.

Laskowski-Jones' findings on winter injuries are not relevant to Western Australia however⁶. Western Australia does not experience the extreme cold temperatures and the accompanying snow and ice sports which result in many injuries in other nations. Skiing, snowboarding, sledding and hypothermia are all frequent causes of injury where snow and ice sports are common^{6,9}.

Sporting injury presentations to PMH did however increase over winter due to the types of sports being played. Australian rules football, rugby, soccer, and netball are all sports that result in a high proportion of childhood injuries. Junior fixtures for these sports run from mid autumn, through winter until mid spring. The proportion of injuries incurred in sporting areas and during sporting activities reflects this, with injuries peaking in winter and being least during summer.

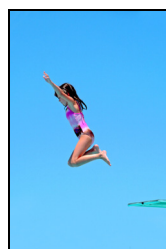
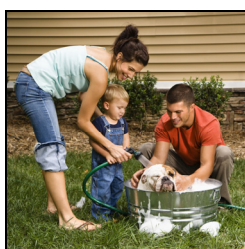
Leung et al (2009) investigated the seasonal variation of paediatric injury in Malawi using the ISS in place at Mzuzu Central Hospital⁴. Results are difficult to compare due to seasonal differences between Malawi and Australia. Malawi experiences only three seasons; 1) hot-dry from September to October, 2) warm-wet from November to April, and 3) cool-dry from May to October. Despite these obvious differences in seasonal patterns, some comparisons to Leung's findings can be made. Road traffic injuries were greatest during the hot-dry season, similar to the PMH ISS results of increased road traffic injuries over summer. Burns were most common in Malawi in the cool-dry season, similar to the increase in burn cases at Perth during winter

Although there does appear to be some seasonal variation in child injury, it is minimal and does not suggest that radically different prevention measures need to be employed each season. Vigilance is needed through out the year to protect children from all causes of injury. Continuous monitoring of children's development, their environment and activities can provide timely indication of risks.

At all times of the year, supervision is essential to child safety. Always watch over children and keep them safe.

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