

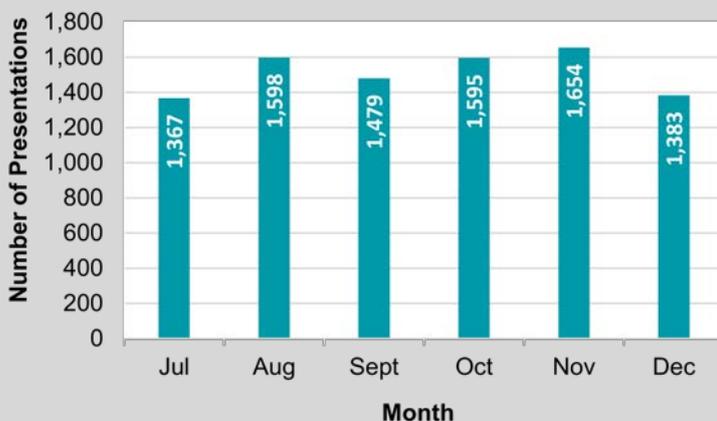


Button Batteries

PMH ED Presentations July to December 2015

- Between July and December 2015 there were 32,798 presentations to the Princess Margaret Hospital Emergency Department (PMH ED).
- Injury presentations accounted for 27.9 percent (n=9,076) of the total number of presentations during this time period.

Injury Presentation by Month; July to December 2015



- The majority of injury presentations were from children under the age of five (36.7%, n=3,331). Children aged one and two years accounted for 9.5% (n=866) and 9.1% (n=829) of presentations respectively, the highest of any age.
- Males represented 57.0% (n=5,179) of injury presentations.
- The home was the most common location for childhood injuries to occur (19.7%, n=1,790). Within the home, outdoor areas accounted for the largest number of injuries (18.9%, n=339).
- Falls were the most common cause of injury, representing 37.3% (n=3,389) of all injury presentations.
- The majority of children were recorded as living within a Perth Metropolitan Area of residence (93.1%, n=8,455).
- Children of Aboriginal and/or Torres Strait Islander ethnicity accounted for 3.7% (n=334) of presentations.
- Unintentional injuries accounted for 97.5% (n=8,853) of injury presentations.

A snapshot of Button Battery Injuries

- Between 2011 and 2015, there was a total of **163** button battery related presentations to the PMH ED.
- Children under five years of age** are at greater risk of button battery related injury, accounting for 76.1% (n=124) of presentations.
- Toddlers** aged one and two years of age recorded the greatest number of button battery related presentations to the PMH ED, accounting for 19.0% (n=31) and 18.4% (n=30) of presentations respectively.



- Males** are at greater risk of button battery related injury, accounting for 61.3% (n=100) of presentations.
- All button battery related presentations to the PMH ED were due to **unintentional** circumstances.
- Aside from unknown, the **home** was the most common location for button battery related injuries to occur (25.1%, n=41).
- The majority of presentations were allocated a triage category of 3 - **urgent** (58.3%, n=95).
- Although many children were able to leave the emergency department with their treatment complete (74.2%, n=121), a further 24.5% (n=40) required **admission to hospital**.



Introduction

Around our homes there is a little-known danger to children. Increasingly found in a number of household items such as remote controls, small calculators, watches, remote keyless entry systems, flameless candles, singing greeting cards, toys, novelty items, hearing aids, and other small electronic devices, may be a powerful coin-sized battery known as a button battery.^{1,2} Specifically 3V lithium button batteries that are >20mm in diameter and roughly the same size as a ten cent coin have been associated with the greatest danger when swallowed.^{3,4} Smaller sized button batteries have been known to cause serious injury when placed in the ear or nose.



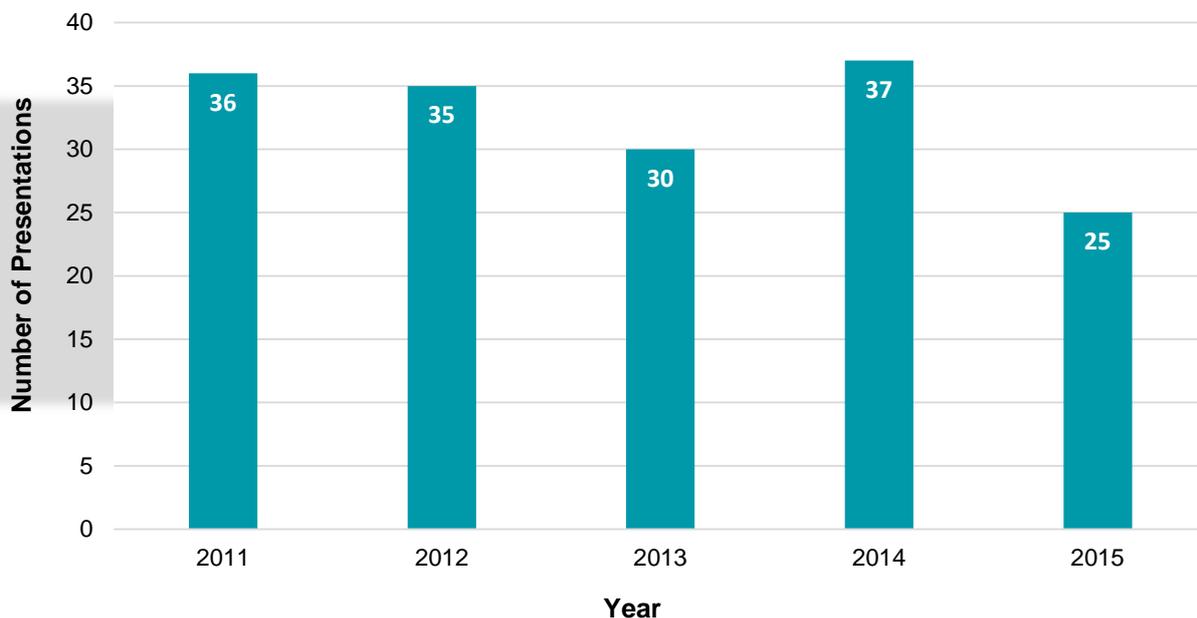
The majority of injuries from button batteries occur in children under five years of age.⁴ Often young children have easy access to devices containing button batteries, with parents unaware that there is a potential risk of injury.¹ When swallowed, a battery can get lodged in a child's oesophagus. The saliva triggers an electrical current, initiating a chemical reaction that can cause severe burns and tissue damage of the oesophagus within two hours of ingestion.^{1,4} Button battery ingestions can have serious complications, often requiring multiple surgeries, and in severe cases may result in death.

Diagnosis can be difficult as the symptoms of swallowing a button battery present as non-specific^{2,3} and can be similar to other childhood illnesses.¹ Symptoms can include coughing, drooling, discomfort, vomiting, abdominal pain, fever, diarrhoea and respiratory distress.^{1,3} Unless the event is witnessed, a high level of suspicion should be employed if a child presents with any of the above symptoms.² If a button battery is swallowed or is suspected of being swallowed, go to the emergency department immediately.

In Australia, two children have died from button battery related injuries⁵ and it is estimated that around 20 children per week present to emergency departments around Australia with an injury related to a button battery.⁵

Between 2011 and 2015 there were 163 injury presentations to the Princess Margaret Hospital Emergency Department (PMH ED) related to button batteries. This equates to an average of 33 presentations per year or between 1 and 2 presentations per week. Over the five year time period the number of presentations has decreased from 36 to 25, peaking in 2014 with 37 presentations (Figure 1). The low number of button battery presentations in 2015 may be due to greater parental awareness of the dangers of button batteries, and in part, lower overall PMH ED presentations when compared to 2014.

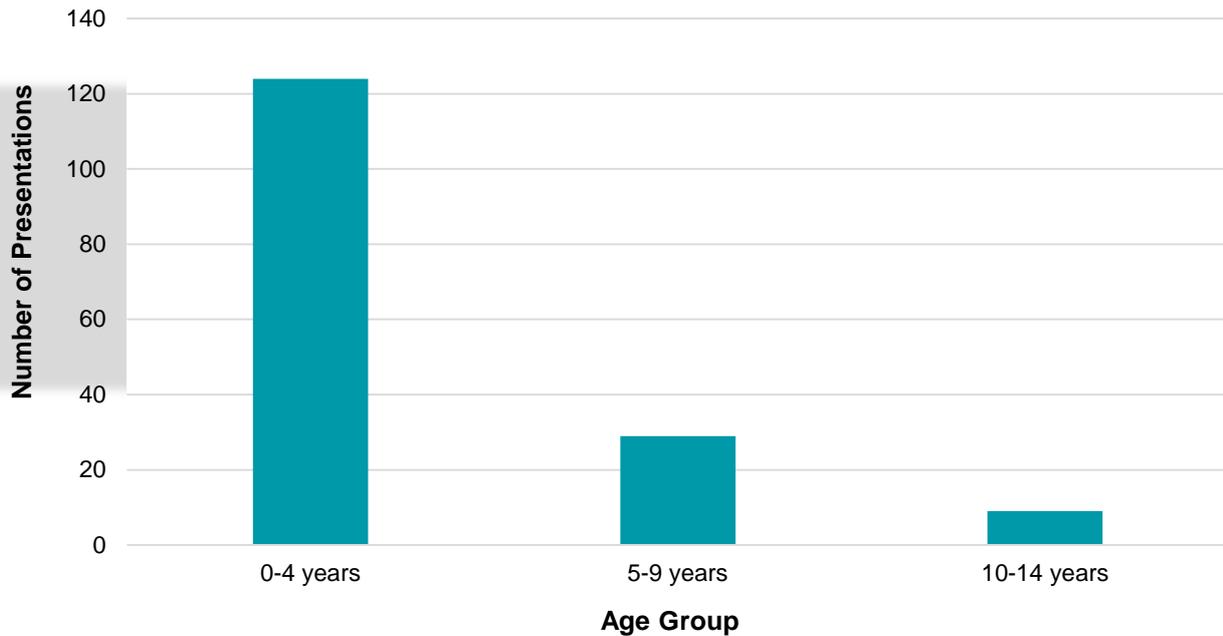
Figure 1: Button Battery Presentations; 2011-2015



Demographic Data

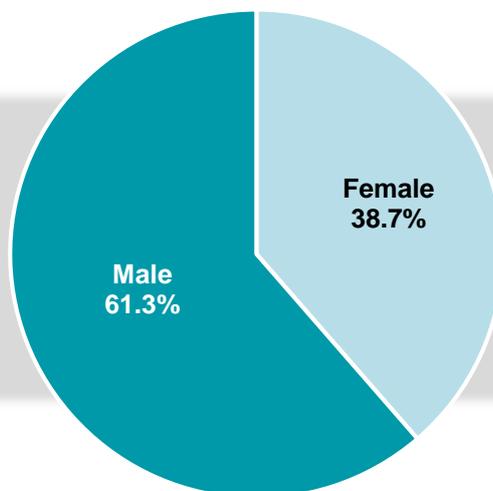
Children under five years of age are at greater risk of sustaining an injury relating to a button battery, accounting for 76.1 percent (n=124) of presentations to the PMH ED (Figure 2). While the median age of button battery presentations is 3, toddlers aged one and two years recorded the highest number of presentations accounting for 19.0% (n=31) and 18.4% (n=30) of presentations respectively. Children at these young ages are becoming increasingly mobile and are often highly curious of the world around them. They aren't however always able to assess potentially dangerous situations, relying on adults for their safety and wellbeing.

Figure 2: Button Battery Presentations by Age Group; 2011-2015



During the five year period males accounted for 61.3 percent (n=100) of button battery related injuries to the PMH ED, while females accounted for the remaining 38.7 percent (n=63) (Figure 3). This remains in line with total injury presentations with an approximate male to female ratio of 3:2.

Figure 3: Button Battery Presentations by Gender; 2011-2015

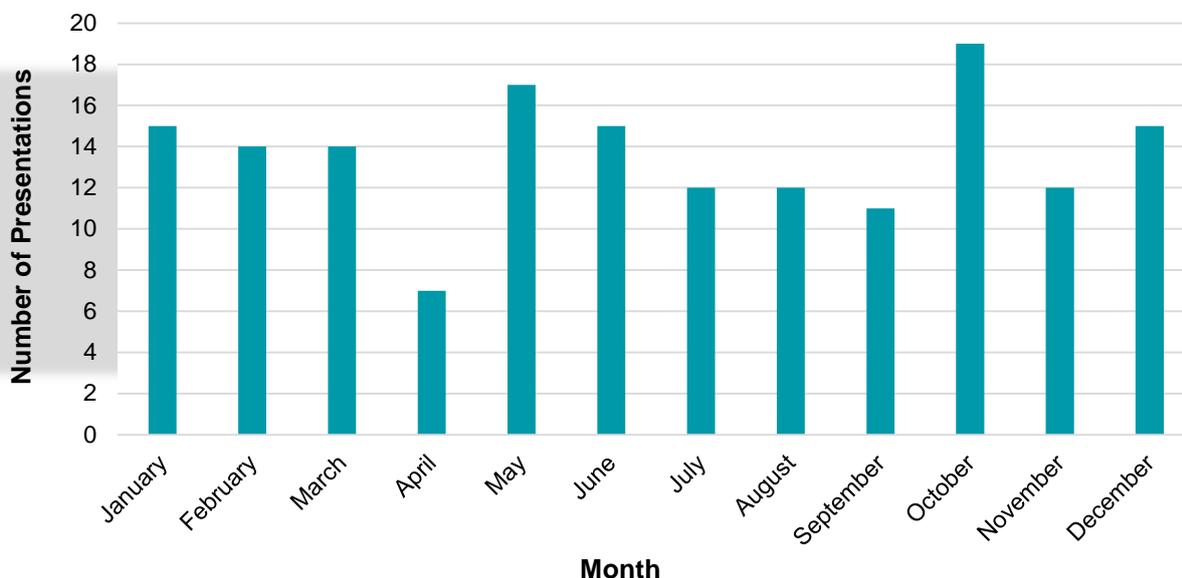


The majority of children (94.5%, n=154) presenting for button battery related injuries did not identify as Aboriginal and/or Torres Strait Islander, and lived within the Perth Metropolitan Area (86.5%, n=141), with the remainder residing in either regional Western Australia or an unknown area.

Month, Day and Time of Injury

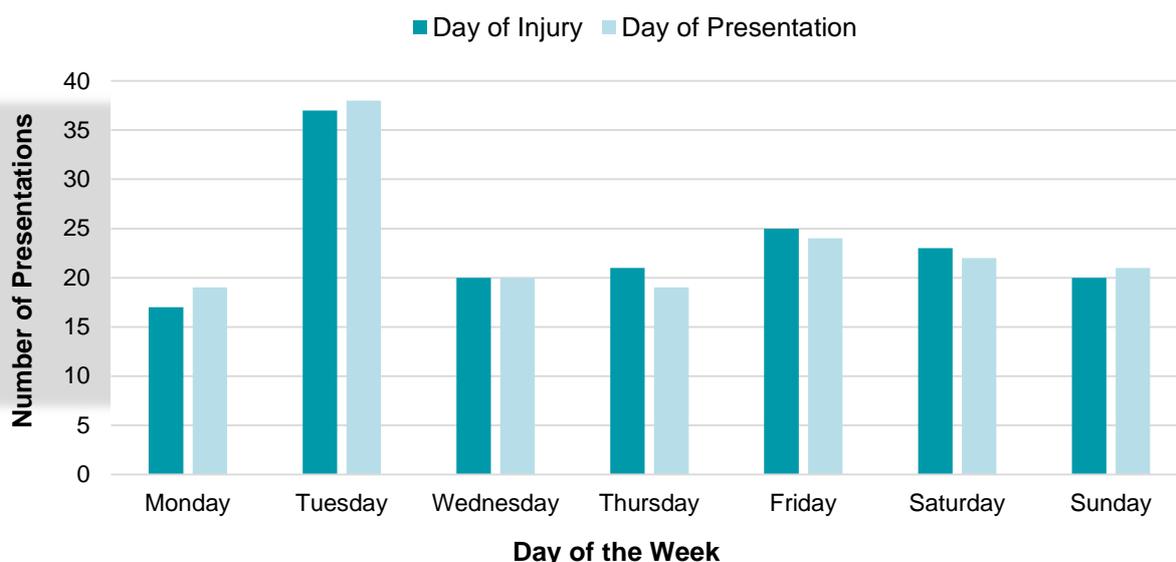
There does not appear to be any seasonal variation in button battery presentations. On average October recorded the highest number of presentations (11.7%, n=19), followed by May (10.4%, n=17) and December (9.2%, n=15). April recorded the lowest number of button battery related injury presentations (4.3%, n=7) (Figure 4).

Figure 4: Button Battery Presentations by Month; 2011-2015



Button battery related injuries occurred most regularly on Tuesdays, accounting for 22.7 percent (n=37) of injuries (Figure 5). Similarly Tuesday was the most common day for button battery related injuries to present to the PMH ED (23.3%, n=38). Monday recorded the lowest number of injury occurrences (10.4%, n=17), while both Monday and Thursday shared the lowest number of injury presentations to the PMH ED both accounting for 11.7% (n=19) of presentations.

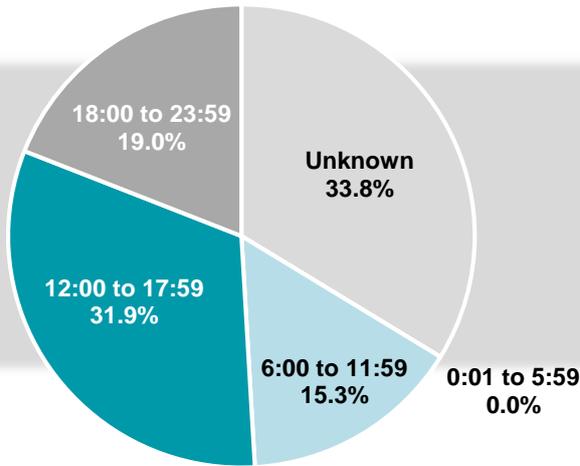
Figure 5: Button Battery Presentations by Day of Injury and Day of Presentation; 2011-2015



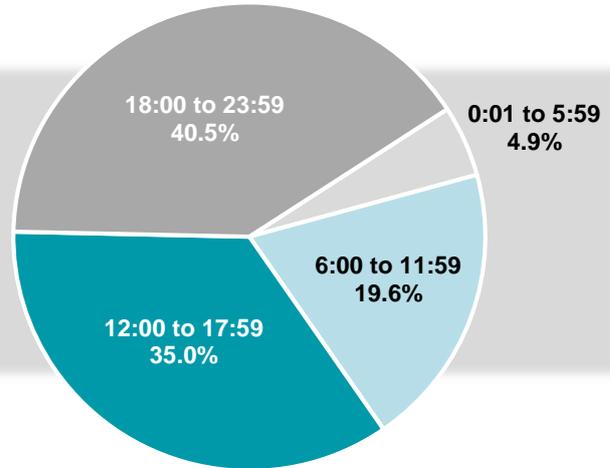
The time an injury occurred is also recorded for each presentation to the PMH ED. The most common time for a button battery related injury was between 12:00 and 17:59 accounting for 31.9 percent (n=52) of injuries (Figure 6a). The exact time of injury was unknown for 33.8 percent (n=55) of presentations.

Figure 6: Button Battery Presentations by Time of Injury and Time of Presentation; 2011-2015

(a) Time of Injury



(b) Time of Presentation

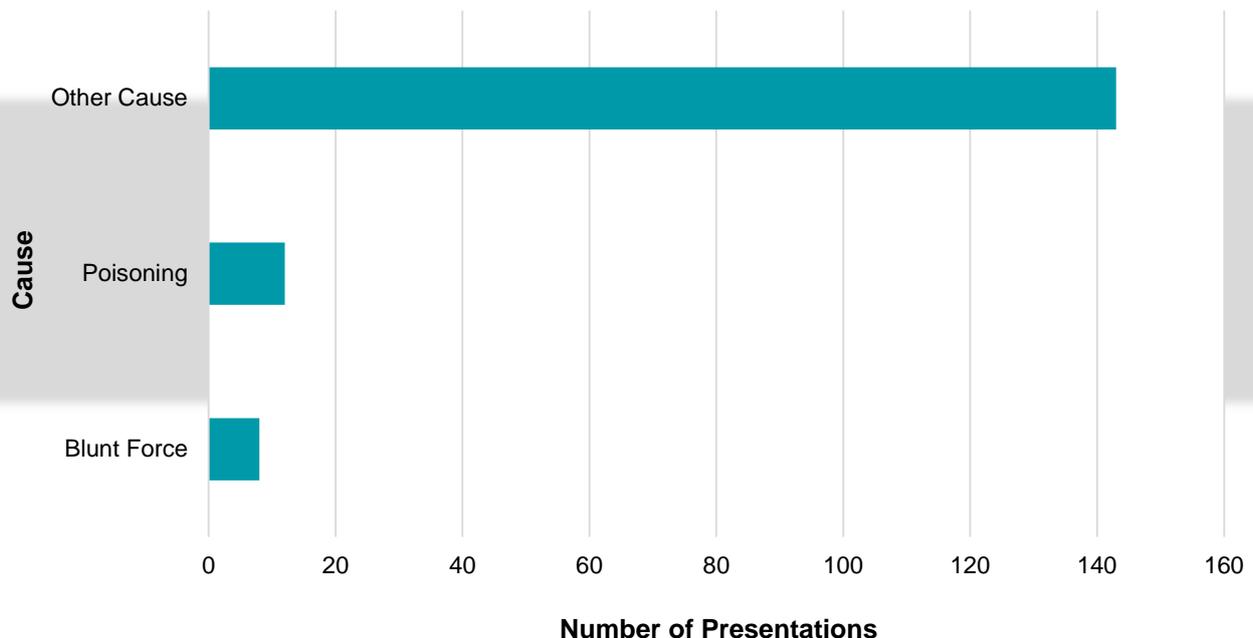


The time of presentation is also recorded for each injury presenting to the PMH ED. The most common time for button battery related presentations to the PMH ED was between 18:00 and 23:59 (40.5%, n=66).

Injury Data

The majority of button battery related injuries were recorded as other cause (87.7%, n=143) (Figure 7). A small number of presentations were recorded as poisoning (7.4%, n=12) or blunt force (4.9%, n=8). Safety equipment data was not collected.

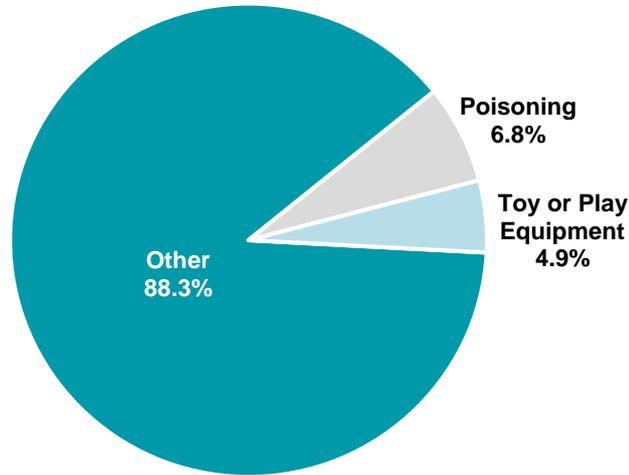
Figure 7: Button Battery Presentations by Cause; 2011-2015



For the majority of presentations, the location of button battery related injury was recorded as unknown (73.0%, n=119). Secondary to unknown was the home, accounting for 25.1 percent (n=41) of presentations. The home is then further broken down by rooms of the house, however the majority of presentations within the home were recorded as occurring within an unspecified location within the home (70.7%, n=29).

Presentations to the PMH ED are allocated an injury factor related to the source of the injury. The majority of button battery related injuries were allocated an injury factor of other, accounting for 88.3 percent (n=144) (Figure 8). A small portion were recorded as poisoning (6.7%, n=11) and toy or play equipment (4.9%, n=8).

Figure 8: Button Battery Presentations by Injury Factor; 2011-2015



All button battery related injury presentations were deemed to be due to unintentional circumstances. Just under 98 percent of total injury presentations to the PMH ED are also recorded as due to unintentional circumstances.



Diagnosis and Treatment Data

Most children presenting to the PMH ED with a button battery related injury do so based on the concerns of themselves or a relative (74.2%, n=121). A further 18.4 percent (n=30) of children were referred by another hospital and 4.3 percent (n=7) were referred by a general practitioner.

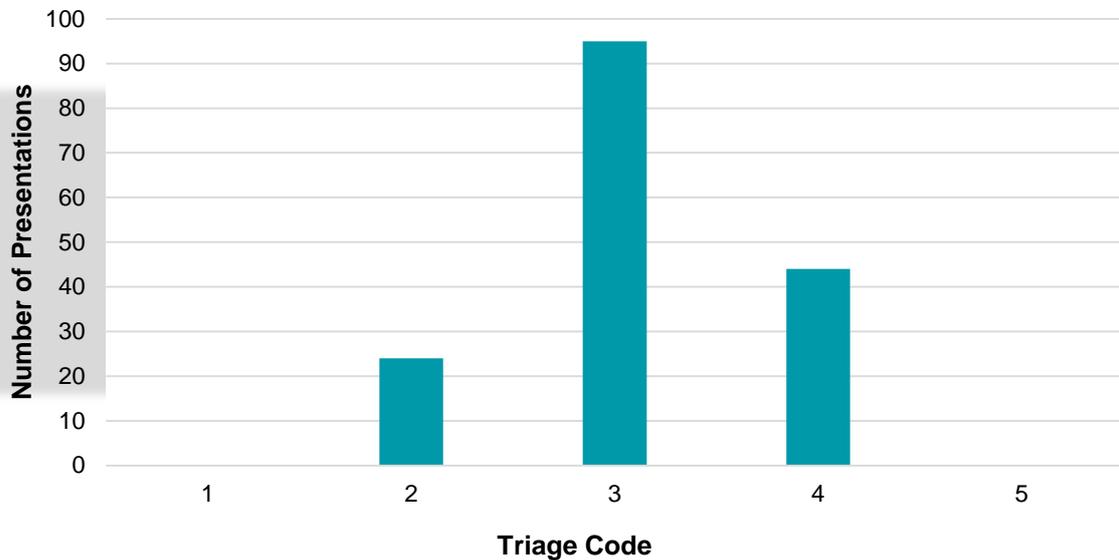
All children that present to the PMH ED are initially assessed by a triage nurse who assigns them a triage code based on the perceived severity of their injury (Table 1).

Table 1: Triage Categories

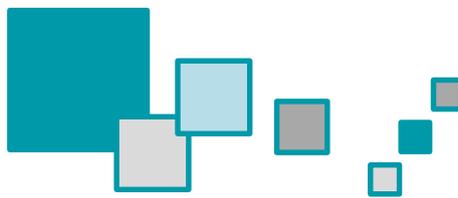
Category	Seen Within (mins)
(1) Resus	0
(2) Emergency	10
(3) Urgent	30
(4) Semi-Urgent	60
(5) Non-Urgent	120

The majority of children presenting with a button battery related injury were assigned a triage code of 3 - Urgent (58.3%, n=95), followed by 4 - Semi-Urgent (27.0%, n=44) and 2 - Emergency (14.7%, n=24). No children presented with injuries that required a triage code of 1 - Resuscitation or 5 - Non-Urgent (Figure 9).

Figure 9: Button Battery Presentations by Triage Code; 2011-2015



Over the five year period the majority of children were able to depart the PMH ED with their treatment complete (74.2%, n=121). The remaining children were either admitted to hospital, transferred to another hospital for treatment or departed without waiting for treatment. In comparison, the proportion of children requiring further hospital treatment for button battery related injuries is ten percent higher than that of total injury presentations.



Preventing Button Battery Injuries

Button batteries can be found in a number of products or electronic devices around the home. Often they can seem invisible to parents as devices regularly come with batteries already installed.¹ Devices that commonly contain button batteries include;

- Remote controls
- Small calculators
- Watches
- Remote keyless entry systems
- Flameless candles
- Singing greeting cards
- Toys
- Novelty Items
- Hearing Aids

Young children under the age of five are most at risk of sustaining a button battery related injury. Toddlers between the age of one and two are particularly vulnerable since they are mobile but can't assess potential hazards around them.



As the majority of button batteries that are ingested by children are obtained from products as opposed to being loose, it is essential that manufacturers ensure battery compartments of their products are child-resistant and cannot be easily opened by a child or exposed if dropped.⁴ This may include robust battery compartments that require a screw driver to open and mandatory product testing.

The battery compartment should be secure regardless of whether the product is intended for a child. Additionally, battery packaging should also be child resistant and include warning labels of the potential battery hazards.⁴

Given the increased incidence of button battery injuries², it is crucial to focus on preventative public health initiatives and ongoing education of parents and carers.

Parents and carers can minimize the risk of a button battery injury by following these preventative measures:

- Try to avoid purchasing products that contain button batteries.
- Identify devices around your home that may contain button batteries.
- Be cautious when visiting other places, as they may have devices containing button batteries.
- Place devices that contain button batteries out of reach and out of sight of young children.
- Always supervise young children when using items that may contain button batteries.
- Keep spare batteries locked away from children.
- Dispose of batteries safely at a battery recycling collection point. Contact your local council for locations.
- Share this information with other parents and carers, friends and family members.
- If a child is suspected of swallowing a button battery, go to the emergency department immediately.

First Aid

If you suspect your child has ingested a button battery:

1. Go to the emergency department immediately.
2. Do not let the child eat or drink and do not induce vomiting.

Learn more at: www.thebatterycontrolled.com.au

References

- ¹ The Battery Controlled (AU). There's a Little-Know Risk to Small Children [Internet]. Energizer; [cited 2016 Feb 10]. Available from: <http://thebatterycontrolled.com.au>
- ² Thomson M, Sharma S. The Hazards of Button Battery Ingestion. Arch Dis Child. 2015 Aug; 100 (11): 101-1011.
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- ⁵ Australian Competition and Consumer Commission. The Battery Controlled – Button Battery Safety [Internet].

Images Sourced: The Battery Controlled

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For further information please contact Kidsafe WA