



Kidsafe WA Childhood Injury Report: Farm Injuries 2012 - 2022

Partner:



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

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FARM INJURIES AT A GLANCE

106

Children were seen in the Perth Children's Hospital Emergency Department (PCH ED) due to a farm-related injury between July 2012 and June 2022.



11

Children per year are seen in PCH ED for a farm-related injury.



35.8%

Of farm-related injuries occurred in children between 10 and 14 years.

Activity Type

Most common recreational activities associated with farm-related injuries.



11.3%

Equestrian Activity



9.4%

Quad Biking



7.5%

Motorcycling



5.7%

Cycling



31.1%

Of farm-related injuries were caused by a fall.



58.5%

Of children injured on a farm were male.

Location

Area of residence of children presenting to PCH ED for farm-related injuries.



69.8%

Metro

11.3%

Wheatbelt

5.7%

Great Southern

INTRODUCTION

Kidsafe WA

Kidsafe WA is the leading independent not-for-profit organisation dedicated to promoting safety and preventing childhood injuries and accidents in Western Australia. Injuries are the leading cause of death in Australian children aged one to 14 and many of these deaths and injuries can be prevented. Kidsafe WA works in the community to educate and inform parents and children on staying safe at home, at play and on the road.

Perth Children's Hospital Emergency Department

Perth Children's Hospital (PCH) is the only paediatric hospital in Western Australia and is the referral centre for paediatric illness and injury within the state. Each year approximately 64,000 children present to the PCH Emergency Department (ED). The PCH ED Injury Surveillance System is designed to capture data related to all children who present with an injury. This research report provides a summary of the Injury Surveillance System data collected at PCH between July 2012 and June 2022 relating to injuries occurring to children on farms within WA. While this data does not take into account all Emergency Department presentations in Western Australia, it offers a useful snapshot of injury occurrences and patterns of presentation.

Farm-related Injuries

Injury is the leading cause of death and hospitalisation for Australian children¹. On average, 23 Western Australian children die each year as a result of injury, with a further 8,000 children hospitalised². Farms have consistently remained a high risk setting for child injury, with 222 child fatalities on Australian farms between 2001 and 2019, with 10 percent of these occurring in Western Australia^{3,4}. Over the past 20 years, there has been no significant decrease in the rate of farm-related child fatalities, with children under 15 years old consistently representing around 15 percent of all farm-related fatalities annually^{3,4}.

Australian farms are a unique setting for child injury prevention. While growing up on a farm can provide many benefits to children including opportunities to develop important life skills, children can also be exposed to a number of hazards that can put them at risk of fatal injuries^{3,5}. In Australia, over 90 percent of farms are family owned and operated³, meaning that the home environment often overlaps with an agricultural workplace. This overlap can create many challenges in separating young children from potential hazards, which is often impractical and unfeasible as older children become more involved in farm work^{4,6}.

The risk of injury to children on farms can also vary between age groups. Young children are vulnerable to farm-related injury as they are naturally inquisitive and do not have the ability to assess their surroundings for potential hazards^{1,3}. As children get older, they are often given on-farm responsibilities and use the farm environment for recreational activities^{5,7}. Children that are visitors on a farm are also vulnerable to injury as they have less knowledge and experience around typical farm hazards and risks⁶. In the past 20 years, one third of child farm-related fatalities were visitors to the farm³.

With the majority of Australian farms being located in rural and remote areas, the risk of serious injury or death increases for children in these settings^{1,8}. Particularly in Western Australia, regional and remote communities are often spread out across large expanses with limited access to medical facilities⁸. If a child is seriously injured on a farm, there can be a significant delay in accessing first aid or appropriate treatment facilities such as PCH⁸.

There are a number of environmental and behavioural factors that can increase the risk of injury for children on farms. This includes increased exposure to hazards, lack of safety equipment, lack of supervision, risk-taking behaviours and attitudes of parents, involvement in farm work, and the lack of appropriate safe play areas⁶. The leading causes of farm-related child fatalities in Australia have largely remained the same over the past 20 years and includes drowning, quad bikes, tractors, utes, cars, motorbikes and horses^{3,5}. Other hazards resulting in injury can include farm machinery, chemicals, electricity, noise, and other large animals such as cattle^{1,3}.

Drowning

In Australia, drowning is a leading cause of child fatalities with children under four years of age being most at risk⁹. Between 2001 and 2019, drowning accounted for 31 percent of all child fatalities on Australian farms, with the most common location being dams^{3,10}.

Accessible water sources such as dams, creeks, rivers, tanks and troughs are often present on Australian farms, making them a high risk setting for child drowning¹¹. Drowning incidents on farms often involve a child wandering away unnoticed and into a source of water unsupervised¹². Having a water source within close proximity to the home, without an adequate barrier, significantly increases a child's risk of drowning on a farm¹². As it is not always feasible to have a barrier around large water sources such as a dam or creek, the most effective way to prevent drowning on farms is to provide a fenced safe play area around the home. This should always be accompanied by close and active supervision along with rules for caretakers and children^{10,12}. Designated safe play areas are also effective in reducing the risk of other injuries for children on farms and exposure to other common workplace hazards¹².

Quad Bikes

Quad bikes are a leading cause of farm-related injuries and fatalities in Australia, widely used for both agricultural tasks and recreational purposes^{6,13}. Over the past 10 years, there have been more than 150 quad bike related fatalities in Australia, with 23 of these being children under 16 years¹⁴. Quad bikes are also a leading cause of injury hospitalisations, with children between 10 and 14 years being most at risk^{11,3}. Quad bikes are four-wheeled devices that are often powerful and top-heavy with a high centre of gravity, making them susceptible to rolling over when used on unstable ground^{15,16}. Children are at a significantly higher risk of being seriously injured or killed while using a quad bike. This is due to their small body size and their lack of ability to control the bike¹⁷. If a child is involved in a rollover incident, they are at high risk of being crushed by the bike which can result in asphyxiation and/or serious head and spine injuries^{17,18}.



While there has been action taken to reduce the risk of serious injury on quad bikes in Australia, including the introduction of a new safety standard in 2019¹⁶, quad bikes are still highly accessible to many children on farms¹⁴. Adult-sized quad bikes that comply with this standard and have a roll-over protection bar in place, still pose serious risks when used by children¹⁸. It is essential that parents are made aware of these dangers and never allow children under 16 to ride or be a passenger on adult-sized quad bikes¹⁶.

Machinery and Vehicles

Children on farms are often exposed to heavy machinery and other vehicles that are operating throughout the farm. This can include large farm machinery such as tractors and harvesters, and other vehicles including trucks, utes, and cars⁶. These vehicles are an essential part of farming operations; however, they are also a contributor to serious injuries and fatalities. Common situations for machinery and vehicle-related injuries include small children being struck or runover by a slow-moving vehicle, falling from a tractor as a passenger, falling when riding in the tray of a ute, and being involved in a vehicle rollover while unrestrained³.

To reduce the risk of machinery and vehicle related injuries to children, it is recommended that children do not ride as passengers on large farm machinery including tractors, do not ride in the tray of utes, and are appropriately restrained with seatbelts and child car restraints when travelling in any vehicle^{3,14}. Similarly to drowning prevention, providing a designated safe play area around the home will help limit young children's access to moving machinery and vehicles³.

Animals

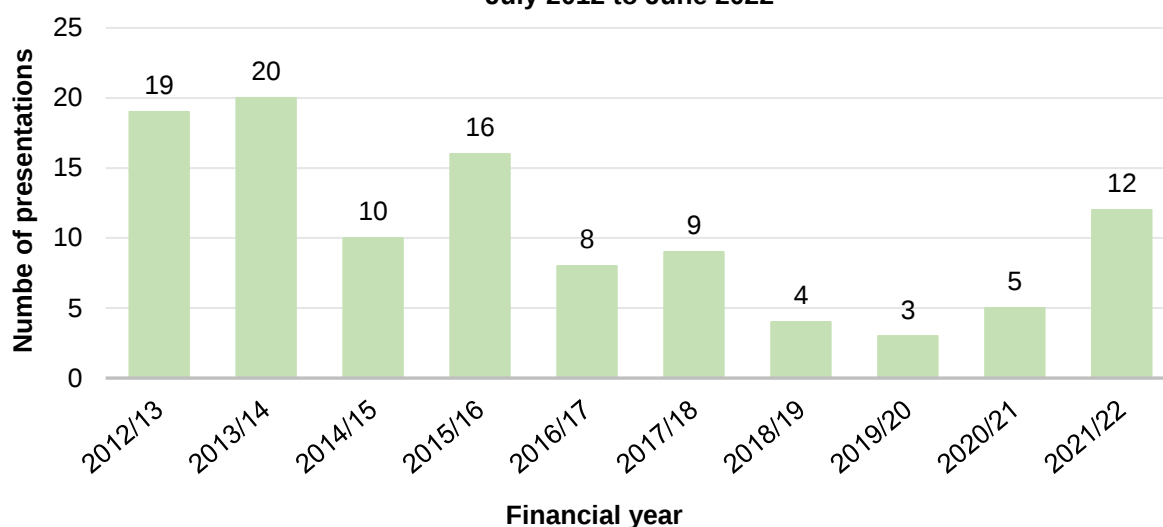
Children on farms have many opportunities to interact with a variety of animals. This can range from large groups of cattle or sheep involved in the operation of the farm, or with animals used for recreational activities such as horse-riding¹⁹. Due to the large size of some farm animals and their often-unpredictable nature, children can be at risk of serious injury when interacting with them¹⁹. The most common type of animal involved in child injury cases in Australia are horses, where children have fallen off or been kicked, bitten or crushed by a horse^{3,11}. To reduce the risk of animal-related injury, children should be provided with appropriate safety equipment such as a helmet when horse-riding, should be constantly supervised, and taught how to interact with animals safely^{3,14}.

DEMOGRAPHIC DATA

Emergency Department Farm-Related Injury Presentations

Between July 2012 and June 2022, there were a total of 192,809 injury presentations to PCH ED. During the same time period, 106 of those occurred on a farm, with the highest number of presentations seen between 2012 and 2014 (36.8%, n=39) (Figure 1). Although farm-related injuries remain a highly preventable cause of morbidity and mortality in children, farm-related fatality rates across Australia have remained the same over the past 20 years³.

**Figure 1: Farm-Related Injury Presentations by Financial Year;
July 2012 to June 2022**



Overall, farm-related injuries in children contribute to a small percentage of total injury presentations to PCH ED (Table 1). As most farming properties in Western Australia are quite remote, it is likely that many child farm-related injuries do not present to PCH ED and are not captured in this data. Children in regional and remote areas are likely to present to regional hospitals or local general practitioners, with more serious injuries being transferred to PCH.

Table 1: Total Injury and Farm-Related Injury Presentations by Financial Year

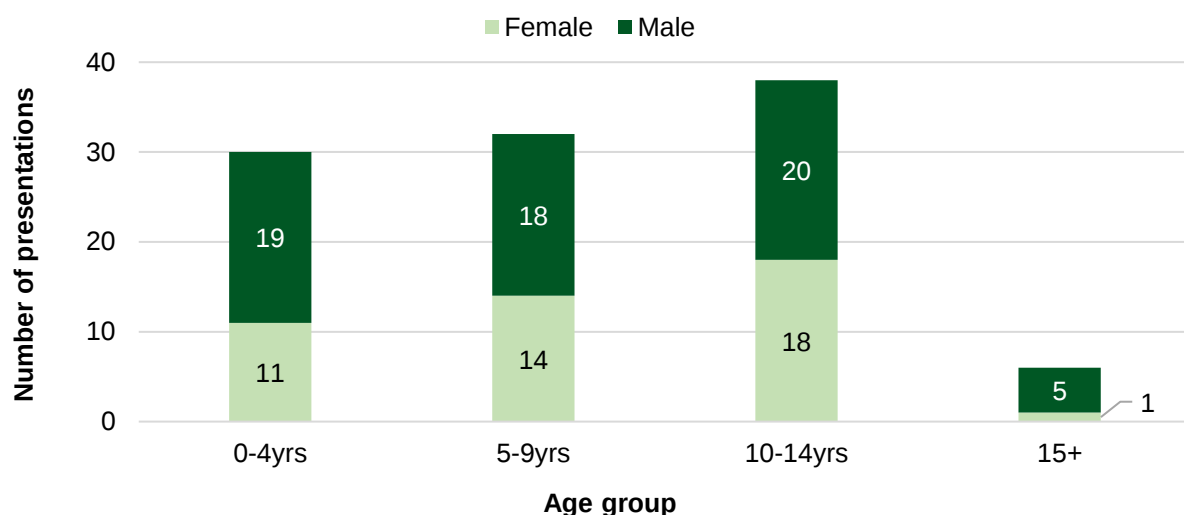
Financial Year	Total Injury Presentations	Farm-Related Injury Presentations
2012/13	19,252	19
2013/14	19,645	20
2014/15	19,854	10
2015/16	18,423	16
2016/17	17,939	8
2017/18	17,720	9
2018/19	18,708	4
2019/20	18,912	3
2020/21	22,115	5
2021/22	20,241	12
Total	192,809	106

Age and Sex

Children between the ages of 10 and 14 years accounted for the highest number of farm-related injuries to PCH ED (35.8%, n=38). This is followed by children between five and nine years (30.2%, n=32) and children between zero and four years (28.3%, n=30) (Figure 2). This contrasts with general childhood injury patterns where children zero to four are most at risk. Children between 10 and 14 years may be at higher risk of injury on farms as they are often involved in farm work and use the farm environment for recreational activities⁷. Children aged 15 years and over experienced the lowest number of presentations to PCH ED (5.7%, n=6). This low number may be attributed to children in this age group often presenting to non-paediatric facilities.

Like other injury presentations, males accounted for a higher number of farm-related injuries to PCH ED (58.5%, n=62) with females accounting for 41.5 percent (n=44) (Figure 2). This is a common pattern throughout all age groups with greatest variation between males and females seen in adolescents.

Figure 2: Farm-Related Injury Presentations by Age Group and Sex

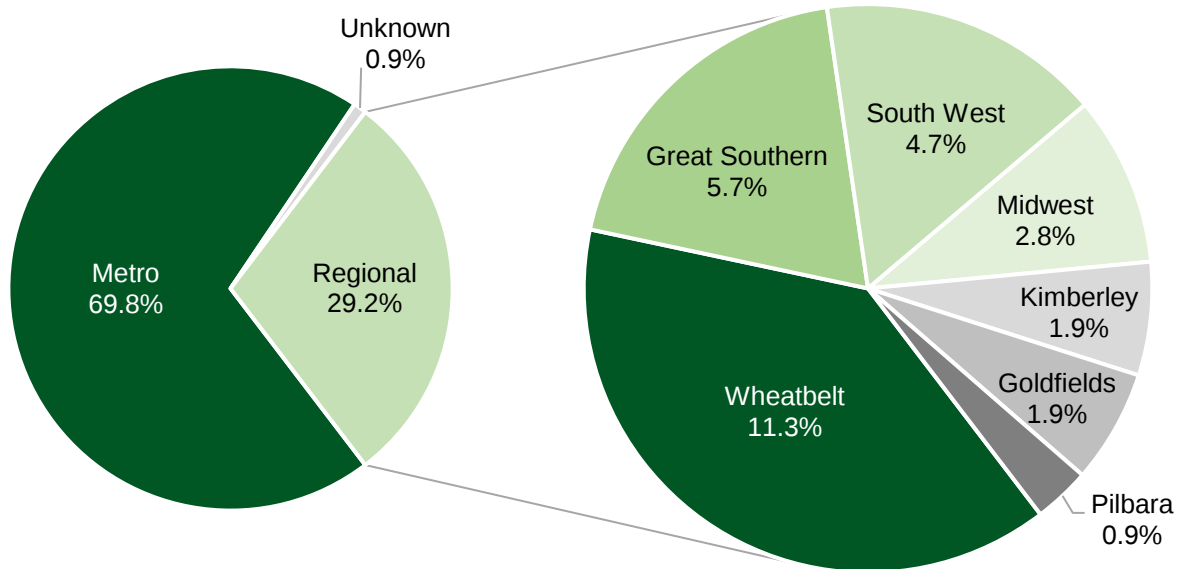


Area of Residence

The majority of children presenting to PCH ED for farm-related injuries reside within the Perth metropolitan area (69.8%, n=74), with 29.2 percent residing in regional Western Australia (n=31) and 0.9 percent unknown (n=1) (Figure 3). This proportion of presentations from regional locations is significantly higher than general childhood injury patterns, which usually accounts for only five percent of total injury presentations each year.

Of the children presenting from regional locations, the Wheatbelt region accounted for the highest number of farm-related injuries (11.3%, n=12), followed by the Great Southern (5.7%, n=6) and South West (4.7%, n=5). The remaining presentations (7.5%, n=8) resided in the Midwest, Kimberley, Goldfields and Pilbara (Figure 3). This contrasts with general childhood injury patterns in regional locations where children residing in the Pilbara and Kimberley are most at risk of injury. This variation can be explained by the distribution of agricultural activity across Western Australia with the majority of cropping agricultural activity occurring in the Great Southern, Wheatbelt and lower Midwest regions. These regions are also in closer proximity to PCH compared to northern regions of Western Australia²⁰.

Figure 3: Farm-Related Injury Presentations by Area of Residence



Ethnicity

From the total number of child farm-related injury presentations, less than two percent identified as Aboriginal and/or Torres Strait Islander decent (1.9%, n=2). This contrasts with general childhood injury patterns where children who identify as Aboriginal and/or Torres Strait Islander are significantly overrepresented in injury presentations, particularly those who reside in regional locations. This may be explained by the low percentage of Aboriginal and Torres Strait Islander peoples in the agricultural workforce²¹. Despite a long history of traditional agriculture in Australia and a strong connection to Country²², only one percent of people employed in the agricultural industry identify as Aboriginal and Torres Strait Islander²¹— a result of historical and intergenerational inequities and barriers experienced by Aboriginal and Torres Strait Islander peoples in this industry^{22,23}.

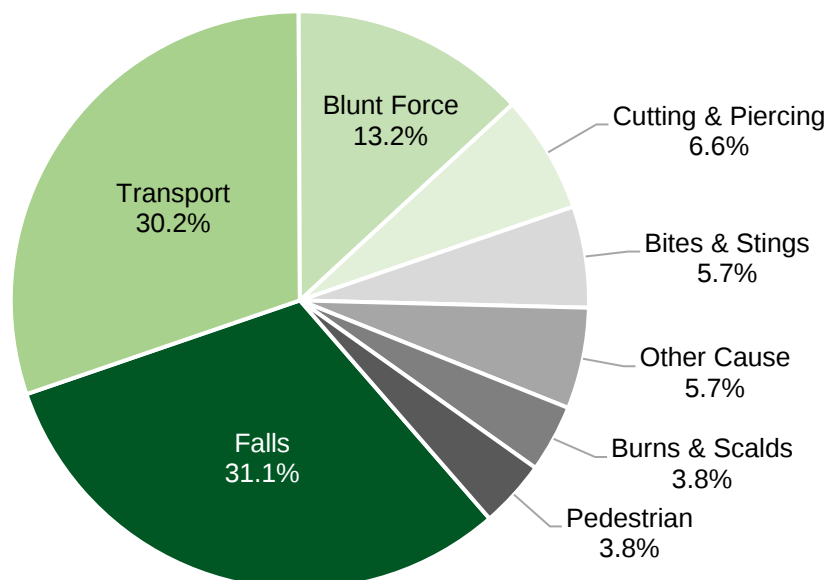
INJURY DATA

Cause of Injury

The leading cause of farm-related injury to PCH ED was falls accounting for 31.1 percent of presentations (n=33), followed by transport accidents (30.2%, n=32). Injuries caused by transport included situations where children were injured as a motor vehicle occupant, a motorcyclist, a cyclist, or involved in other transport events. The remaining causes of farm-related injuries included blunt force (13.2%, n=14), cutting and piercing (6.6%, n=7), bites and stings (5.7%, n=6), other causes (5.7%, n=6), burns and scalds (3.8%, n=4) and being a pedestrian (3.8%, n=4) (Figure 4).

It is important to note that while drowning is a leading cause of farm-related fatalities, it did not account for any injury presentations at PCH ED in this time-period. This is likely explained by the circumstances around non-fatal drowning cases where children may be rescued without needing further treatment or present to a regional medical facility where treatment can be provided²⁴. Taking into consideration the location of most farms in Western Australia, it is likely that most non-fatal drowning incidents would present to regional medical facilities rather than PCH.

Figure 4: Farm-Related Injury Presentations by Cause



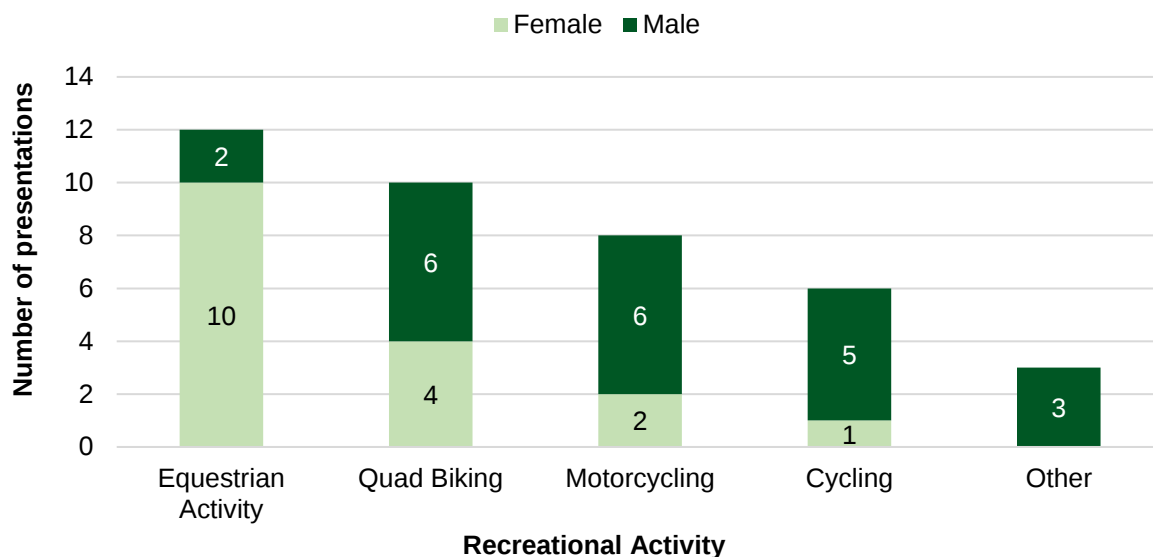
Injury Intent

Almost all farm-related injuries were due to unintentional circumstances (99.0%, n=105). This is similar to general childhood injury patterns with 97.5 percent of injury presentations to PCH ED being unintentional, and the remainder being deemed as undetermined intent or intentional circumstances²⁵.

Type of Activity

The majority of farm-related injury presentations to PCH ED were classified as other specified activity (63.2%, n=67) with the remaining 36.7 percent classified as recreational activity (n=39). The most common type of recreational activity associated with farm-related injury was equestrian activity (11.3%, n=12), followed by quad biking (9.4%, n=10), motorcycling (7.5%, n=8), cycling (5.7%, n=6), and other (2.8%, n=3) (Figure 5). Females accounted for the majority of injuries associated with equestrian activity while males accounted for most injuries associated with quad bikes, motorcycling and cycling.

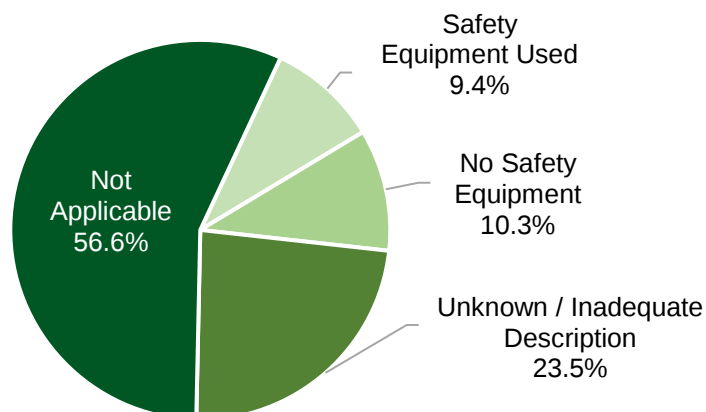
Figure 5: Farm-Related Injury Presentations by Recreational Activity



Safety Equipment

For many farm-related injuries, the use of safety equipment at the time of the incident was recorded as not applicable (56.6%, n=60). Of the cases where safety equipment was considered necessary, 23.5 percent (n=25) of the presentations noted that the use of safety equipment was unknown or inadequately described, 10.3 percent (n=11) noted that no safety equipment was used, and 9.4 percent (n=10) noted that safety equipment was used (Figure 6).

Figure 6: Farm-Related Injury Presentations by Safety Equipment

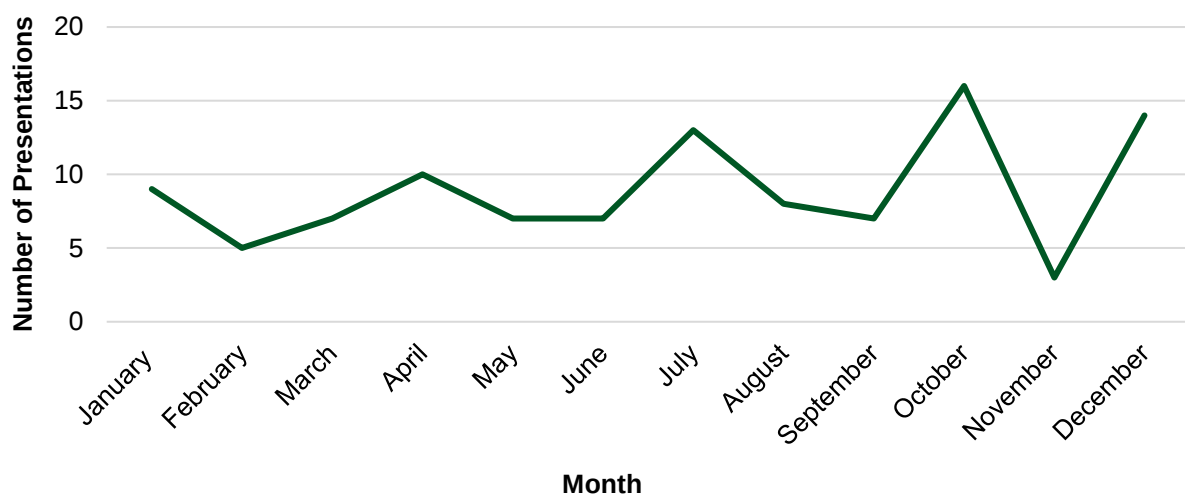


TREATMENT DATA

Time of Injury

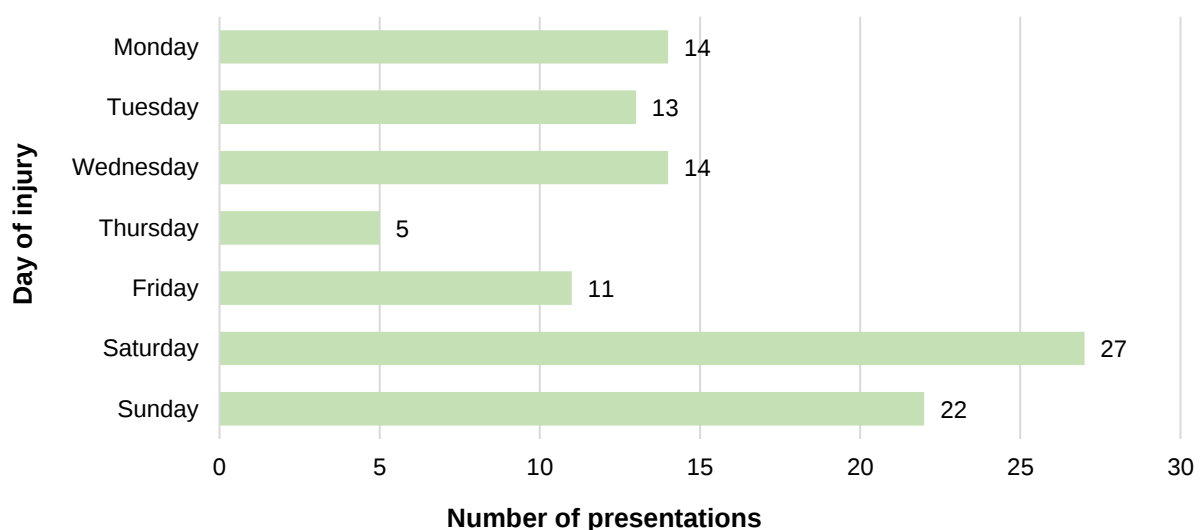
A trend can be seen in farm-related injury presentations to PCH ED with peaks in April (9.4%, n=10), July (12.3%, n=13), October (15.1%, n=16) and December (13.2%, n=14) (Figure 7). Presentations may be higher during these months as they fall within Western Australia's school holiday periods. Children residing on farms are more likely to be engaging in recreational activities and being involved in farm work while on school holidays, while there may also be an increase in child visitors to farming properties.

Figure 7: Farm-Related Injury Presentations by Month



Saturday and Sunday recorded the highest number of farm-related injuries accounting for 25.5 percent (n=27) and 20.8 percent (n=22) respectively (Figure 8). Like the peaks seen during school holiday periods, presentations may also be higher on weekends when children are home from school and visitors are more likely to be present.

Figure 8: Farm-Related Injury Presentations by Day of Injury



Triage Category

Each child that attends PCH ED is allocated a triage category based on the urgency of medical attention required (Table 2). The majority of farm-related injury presentations were triaged as semi-urgent (62.3%, n=66), followed by urgent (24.5%, n=26), emergency (11.3%, n=12), and resuscitation (1.89%, n=2). The percentage of urgent and emergency triaged presentations seen in farm-related injury is higher than general childhood injury patterns. This is likely influenced by the high number of referrals from regional hospitals where appropriate treatment was not available for the seriousness of the injury.

Table 2: Triage Category

Category	Seen within (minutes)
(1) Resuscitation	0
(2) Emergency	10
(3) Urgent	30
(4) Semi-urgent	60
(5) Non-urgent	120

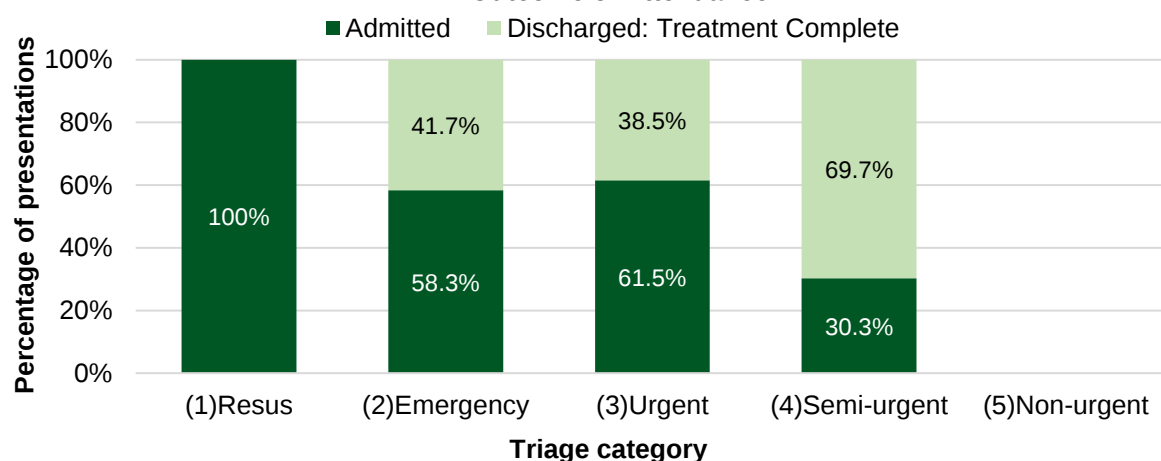
Referral Source

Most children who present to PCH ED for a farm-related injury were referred by themselves or a relative (63.2%, n=67), followed by referral by another hospital (29.2%, n=31). The remaining referral sources were from general practitioners (6.6%, n=7) and other (0.9%, n=1). The proportion of referrals from other hospitals is significantly high in comparison to general childhood injury patterns, where this referral source usually accounts for only three to five percent of all presentations.

Outcome of Attendance

Just over half of the farm-related injury presentations to PCH ED were able to depart with treatment complete (57.5, n=61) with the remaining 42.5 percent of presentations requiring admission (n=45). This is significantly higher than general childhood injury patterns where the proportion of cases requiring admission is usually between 10 and 12 percent. All farm-related presentations triaged as resuscitation were admitted (n=2), followed by 58.3 percent of emergency cases (n=7), 61.5 percent of urgent cases (n=16), and 30.3 percent of semi-urgent cases (n=20) (Figure 9).

Figure 9: Farm-Related Injury Presentations by Triage Code and Outcome of Attendance



DISCUSSION

Growing up in a farming environment can provide a unique and rewarding upbringing for Australian children⁵. While there are many benefits to this lifestyle, children are inevitably exposed to an increased number of hazards that can put them at risk of serious injury or death³. With many Australian farms being family owned and operated, the home environment often overlaps with an agricultural workplace³, creating numerous challenges when it comes to reducing typical child injury risks.

Between July 2012 and June 2022, 106 children presented to PCH ED with an injury that occurred on a farm. While this accounts for a small percentage of total injury presentations to PCH ED, farm-related injuries tend to be more serious in nature, with a significantly higher number of cases requiring hospital admission when compared to other childhood injuries. Due to the regional and remote location of farms across Western Australia, it is likely that many farm-related injuries present to local health facilities, and those that require more urgent treatment are transferred to PCH.

Children aged between 10 and 14 years are at greatest risk of sustaining an injury on a farm, accounting for 35.8 percent of all farm-related injuries to PCH ED. Children in this age group are often exposed to a higher number of hazards as they become involved in farm work and use the farm environment for recreational activities⁷. While the majority of farm-related injuries occurred to children residing in the Perth metropolitan area (69.8%, n=74), the proportion of regional children presenting to PCH ED was significantly higher than other child injuries. Of the regional presentations, the Wheatbelt (11.3%, n=12) and Great Southern (5.7%, n=6) accounted for the highest number of presentations. This is likely due to the high amount of agricultural activity in these regions and their close proximity to PCH ED compared to northern regions of Western Australia.

The most common causes of farm-related injury were falls (31.%, n=33) and transport accidents (30.2%, n=32). Research shows that children on farms are often at risk of injury when participating in recreational activities³. Over one third (36.7%, n=39) of farm-related injuries seen at PCH ED occurred while a child was participating in a recreational activity, with the highest number of injuries associated with equestrian activity (11.3%, n=12) and quad biking (9.4%, n=10). While males accounted for the majority of farm-related injury presentations (58.5%, n=62), variations in sex were observed when looking at the type of recreational activity. These findings support research that shows girls are more likely to be injured while horse riding and boys are more at risk when riding quad bikes and motorbikes^{3,11}.

Farm-related injuries were more common on weekends and during months that coincide with Western Australia's school holiday periods. These are often times when children are home from school, participating in farm work and recreational activities, and visitors may be present. Research shows that children who are visitors on a farm are at higher risk of injury^{3,6}, highlighting the need for community-wide injury prevention methods that are not isolated to farming families²⁶, combined with on-farm inductions and rules provided to all visitors⁴.

The data in this report provides a snapshot of farm-related injuries in Western Australia. While the injury risks to children on Australian farms are well documented, the rate of child fatalities on farms has not decreased over the past 20 years³. This demonstrates the need for new and innovative injury prevention methods for children in these settings.

PREVENTION

Injury prevention for children on Australian farms can present many complex challenges for public health initiatives targeted at farming families⁶. In Western Australia alone, there are over 5,700 agricultural businesses ranging from small hobby farms to large stations undertaking a range of agricultural work¹⁴. Injury prevention methods need to be tailored to the unique range of hazards present on farms and to address specific needs of farming families⁶.

For younger children, the use of designated safe play areas around the home can be an effective method to reduce exposure to common farm hazards such as un-fenced water sources, farm machinery and vehicles^{3,12}. Like injury prevention measures in other settings, it is vital that safe play areas are also accompanied by close active supervision^{3,6} and that a clear set of rules are in place for both supervising adults and children²⁷.

As research highlights, there is a need for improved safety measures and risk-reduction methods for older children that are most vulnerable to injury on farms⁷. In Australia, succession planning is common for farming families. This is where the farming business is set up to be taken over by future generations, making it common practice to get children involved in farm work from an early age³. Typical injury prevention methods of separating children from hazards in these circumstances are not often feasible or practical⁴. While older children on farms are inevitably exposed to hazards, it is important that the injury risks are controlled where possible. This can include the provision of safety equipment, supervising children undertaking tasks that are appropriate for their age and developmental stage and providing them with the appropriate training so that they can undertake tasks safely^{6,7}.

Australian research into adolescents on farms highlights the importance of targeted farm safety education for older children and the flow on effect that this can potentially have on adult injury trends as children transition into agricultural workforces⁷. It is also vital that safe behaviours are reinforced and modelled by parents and other adults on farms to create a positive culture around safety in future generations^{14,26}. Safety education delivered through school systems can provide opportunities for the wider community to learn about farm hazards, which could potentially reduce the number of fatal injuries to visitors on farms²⁶.

While legislative action has been taken to address the high-risk nature of the agricultural industry in Australia²⁷, it is important that injury prevention initiatives focus on children as a priority target group. Education programs should focus on both parents as caregivers and older children to influence the current safety culture and behaviours on farms^{4,7}. Farms should remain an environment where children can be immersed in the unique and rewarding agricultural lifestyle, however their safety needs to be the forefront of farming operations.



To minimise the risk and severity of injury to children on farms, the following preventative measures can be followed:

Drowning

- Provide a secure safe play area around the home to restrict young children's access to water sources.
- Always provide close active supervision for all children around water.
- Ensure any pools and spas are fenced and comply with pool fencing regulation.
- Familiarise children with water and introduce them to basic water safety and survival skills from a young age.
- Ensure tanks and wells have child resistant covers and remove any ladders from tanks to prevent access for young children.
- Learn how to perform CPR and update these skills regularly.

Quad Bikes

- Do not allow children under 16 years of age to ride or be a passenger on a quad bike.
- Ensure young children are always supervised when they are around quad bikes.
- Always wear a helmet and safety equipment when riding a quad bike to model safe practices for children.
- Ensure quad bikes ridden by adults comply with the Australian Standard and have an operator protection device (OPD) in place.

Machinery and Vehicles

- Do not allow children to ride as passengers on large farm machinery including tractors.
- Do not allow children to ride in the tray of utes and trucks unrestrained.
- Always ensure children are restrained in vehicles with seatbelts or the appropriate child car restraint.
- Always wear a seatbelt while driving on the farm to model safe practices.
- Before starting a machine or vehicle, ensure children are a safe distance away under supervision of another adult.

Animals

- Always supervise children around animals and when riding horses.
- Teach children how to safely interact with animals.
- Ensure children wear safety equipment when horse riding, including a helmet that meets Australian Standards.
- Ensure animal related tasks are appropriate for a child's age and developmental stage.

For further information: Kidsafe WA has a range of farm safety resources outlining methods of protection including *A Parent's Guide to Kidsafe Farms*. To access this guide and other injury prevention resources visit www.kidsafewa.com.au/resources/.

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