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# **UNINTENTIONAL HOSPITAL TREATED INJURY VICTORIA 2019/20**

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# ABBREVIATIONS

DH	Department of Health
ED	Emergency Department
VAED	Victorian Admitted Episodes Dataset
VEMD	Victorian Emergency Minimum Dataset

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# UNINTENTIONAL HOSPITAL-TREATED INJURY IN VICTORIA 2019/20

This is the twenty-third in a series of regular E-bulletins that provide an overview of the injury profile for Victoria. This edition provides an overview of unintentional hospital-treated injury in 2019/20 utilising two injury surveillance datasets that separately record hospital admissions and Emergency Department (ED) presentations for injury.

The case selection criteria used in this edition remain the same as those used in the previous edition.

## SUMMARY RESULTS

There were 128,227 injury cases admitted to Victorian hospitals in 2019/20 of which 90.9% were unintentional (n=116,496). At least 372,809 injury cases presented to Victorian EDs, 85.0% of which were unintentional (n=317,037).

TABLE 1: SUMMARY RESULTS FOR 2019/20

	ALL	CHILDREN (0-14 YEARS)	ADOLESCENTS AND YOUNG ADULTS (15-24 YEARS)	ADULTS (25-64 YEARS)	OLDER ADULTS (65+ YEARS)
ADMISSIONS					
n	116,496	13,655	12,432	46,659	43,750
Rate/100,000	1,749.5	1,126.3	1,447.9	1,314.4	4,215.8
Age standardised rate/100,000	1,648.2	1,125.8	1,447.6	1,303.3	4,066.6
Rate change (% per year)	+3.8	+3.2	+2.6	+4.3	+3.9
% males	53.7%	61.8%	69.9%	61.1%	38.6%
Leading cause (%)	Falls (48.3)	Falls (44.5)	Transport (24.3)	Falls (29.7)	Falls (77.8)
Most common setting (%)	Home (27.9)	Home (25.5)	Road/street/hwy (15.9)	Home (19.5)	Home (42.9)
Most common injury (%)	Fracture upper limb (16.5)	Fracture upper limb (27.9)	Fracture upper limb (18.3)	Fracture upper limb (16.4)	Fracture lower limb (18.0)
% of all serious injury cases (row %)	n/a	1.0	2.7	13.4	82.9
ED PRESENTATIONS					
n	317,037	87,546	45,874	132,403	51,214
Rate/100,000	4,761.2	7,220.8	5,342.6	3,729.7	4,935.0
Age standardised rate/100,000	4,787.9	7,205.1	5,394.0	3,719.2	4,850.2
Rate change (% per year)	+0.2 (N.S.)	+0.7	-1.8	+0.3 (N.S.)	+1.5
% males	57.2%	58.0%	64.2%	59.5%	44.0%
Leading cause (%)	Falls (36.7)	Falls (43.6)	Falls (25.3)	Falls (27.1)	Falls (59.8)
Most common setting (%)	Home (43.2)	Home (52.4)	Home (28.8)	Home (38.9)	Home (54.0)
Most common injury (%)	Fracture to upper limb (11.6)	Fracture upper limb (17.4)	Dislocation, sprain & strain to lower limb (11.9)	Open wound upper limb (9.8)	Fracture lower limb (12.0)

### Notes:

- 1) Rate change (% per year) refers to the modelled annual change in rate over 10 years: 2010/11 to 2019/20.
- 2) Blue highlighted cells represent an increase and green represents a decrease (statistically significant at p<0.05). N.S. = not statistically significant at p<0.05.
- 3) A serious injury is defined as one with an ICD based Injury Severity Score (ICISS) of less than or equal to 0.941 (see Box 1 in Appendix 1 for details).
- 4) Percentage of serious injuries is based solely on hospital admissions as this measure is not available in the ED presentation data.

## ALL AGES

- The annual rate of injury admissions increased statistically significantly by 3.8% per year over the 10-year period from 2010/11 to 2019/20.
- The annual rate of injury ED presentations did not show a statistically significant consistent upward or downward trend over the ten year period from 2010/11 to 2019/20.
- In 2019/20 there were 4,986 fewer unintentional injury admissions compared to 2018/19 (n=116,496 and n=121,482, respectively).
- In 2019/20 there were 26,214 fewer unintentional ED injury presentations compared to 2018/19 (n=317,037 and n=343,251, respectively).
- In 2019/20 males were overrepresented, accounting for 53.7% of admissions and 57.2% of ED presentations.
- Falls were the leading cause of injury among admissions and ED presentations, accounting for 48.3% of admissions and 36.7% of ED presentations.
- The home was the most common setting for injury among admissions and ED presentations: 27.9% of hospital admissions and 43.2% of ED presentations.
- Fracture to upper limb was the most common injury for both admissions and ED presentations (16.5% and 11.6%, respectively).

## CHILDREN (0-14 YEARS)

- In 2019/20, in total 13,655 children were admitted to Victorian hospitals and at least 87,546 presented to Victorian EDs for unintentional injury.
- In 2019/20 there were 1,383 fewer unintentional admissions among 0-14 year olds compared to 2018/19 (n=13,655 and n=15,038, respectively).
- In 2019/20 there were 9,510 fewer unintentional ED presentations among 0-14 year olds compared to 2018/19 (n=87,546 and n=97,056, respectively).
- The annual rate of injury admissions among children aged 0-14 years increased statistically significantly by 3.2% per year over the 10-year period from 2010/11 to 2019/20.
- The annual rate of injury ED presentations among children aged 0-14 years showed a small but statistically significant increase of 0.7% per year over the 10-year period from 2010/11 to 2019/20.
- In 2019/20 males were overrepresented, accounting for 61.8% of admissions and 58.0% of ED presentations.
- Falls were the leading cause of both injury admissions (44.5%) and ED presentations (43.6%).
- Twenty six percent of hospital admissions and more than half of ED presentations (52.4%) were for injuries that occurred in the home. Children were also commonly injured in schools and other educational institutions (11.1% of admissions and 11.5% of ED presentations) and sports and athletics areas (6.9% of admissions and 6.6% of ED presentations).
- Fracture to upper limb was the most common injury for both admissions and ED presentations among children (27.9% and 17.4%, respectively).

## ADOLESCENTS AND YOUNG ADULTS (15-24 YEARS)

- In 2019/20 in total 12,432 adolescents and young adults were admitted to Victorian hospitals and at least 45,874 presented to Victorian EDs for unintentional injury.
- In 2019/20 there were 2,078 fewer unintentional admissions among 15-24 year olds compared to 2018/19 (n=12,432 and n=14,510, respectively).
- In 2019/20 there were 8,644 fewer unintentional ED presentations among 15-24 year olds compared to 2018/19 (n=45,874 and n=54,518, respectively).
- The annual rate of injury admissions among adolescents and young adults increased statistically significantly by 2.6% per year over the 10-year period from 2010/11 to 2019/20.
- The annual rate of injury ED presentations among adolescents and young adults decreased statistically significantly by -1.8% per year over the 10-year period from 2010/11 to 2019/20.
- In 2019/20 males were overrepresented, accounting for 69.9% of admissions and 64.2% of ED presentations.
- Transport was the leading cause of injury admissions (24.3%) followed by falls (18.1%) and hit/struck/crush injuries (13.8%). Among ED presentations, falls were the leading cause of injury (25.3%), followed by hit/struck/crush injuries (21.7%) and cutting & piercing injuries (10.6%).
- The road, street and highway (15.9%) and sports and athletics areas (14.7%) were the most common settings for adolescent and young adult injuries resulting in hospital admission, whereas the home (28.8%) and sports and athletics areas (13.7%) were the leading settings for injuries resulting in ED presentation.
- Fracture to upper limb was the most common injury among adolescent and young adult hospital admissions (18.3%), while dislocation, sprain & strain to lower limb was the most common reason for ED presentations (11.9%).

## ADULTS (25-64 YEARS)

- In 2019/20, in total 46,659 adults were admitted to Victorian hospitals while at least 132,403 presented to Victorian EDs for unintentional injury.
- In 2019/20 there were 1,588 fewer unintentional admissions among 25-64 year olds compared to 2018/19 (n=46,659 and n=48,247, respectively).
- In 2019/20 there were 6,546 fewer unintentional ED presentations among 25-64 year olds compared to 2018/19 (n=132,403 and n=138,949, respectively).
- The annual rate of injury admissions among adults increased statistically significantly by 4.3% per year over the 10-year period from 2010/11 to 2019/20.
- The annual rate of injury ED presentations among adults did not show a statistically significant consistent upward or downward trend over the ten year period from 2010/11 to 2019/20.
- Males were overrepresented in 2019/20, accounting for 61.1% of admissions and 59.5% of ED presentations.
- The leading cause of adult hospital-treated injury was falls: 29.7% of hospital admissions and 27.1% of ED presentations. Other major causes were hit/struck/crush (8.3% of admissions and 16.0% of ED presentations), transport (19.8% of admissions and 9.1% of ED presentations) and cutting and piercing (11.4% of admissions and 11.6% of ED presentations).
- Twenty percent of hospital admissions and 38.9% of ED presentations were for injuries that occurred in the home. Another major setting for injury was roads/streets/highways (15.4% of admissions and 8.3% of ED presentations).
- Fracture to upper limb was the most common injury among adult hospital admissions (16.4%) while open wound to upper limb (9.8%), fracture to upper limb (8.8%) and dislocation, sprain & strain to lower limb (8.3%) were the most common reasons for ED presentations.

## OLDER ADULTS (65+ YEARS)

- In 2019/20, in total 43,750 older adults were admitted to Victorian hospitals and at least 51,214 presented to Victorian EDs for unintentional injury.
- In 2019/20 there were 63 more unintentional admissions among those aged 65 years and older compared to 2018/19 (n=43,750 and n=43,687, respectively).
- In 2019/20 there were 1,514 fewer unintentional ED presentations among those aged 65 years and older compared to 2018/19 (n=51,214 and n=52,728, respectively).
- The age-standardised annual rate of injury admissions among older adults increased statistically significantly by 3.9% per year over the 10-year period from 2010/11 to 2019/20.
- The age-standardised annual rate of injury ED presentations among older adults increased statistically significantly by 1.5% per year over the 10-year period from 2010/11 to 2019/20.
- In 2019/20 females were overrepresented, accounting for 61.4% of admissions and 56.0% of ED presentations.
- Falls accounted for more than three-quarters of hospital admissions (77.8%) and more than half of ED presentations (59.8%) among older adults.
- Forty three percent of hospital admissions and more than half of ED presentations (54.0%) were for injuries that occurred in the home. Other common settings for injuries were residential institutions (16.9% of admissions and 7.1% of ED presentations) and the road/street/highway (7.3% of admissions and 5.8% of ED presentations).
- Fracture to lower limb was the most common injury among older adult hospital admissions (18.0%) and ED presentations (12.0%).

# INTRODUCTION

This E-bulletin provides information on unintentional hospital-treated injury in 2019/20. There were 128,227 injury hospital admissions in Victoria in 2019/20, 90.9% of which were unintentional (n=116,496). The remaining injury cases were either intentional i.e. self-harm or assault (7.8%, n=9,968) or of other or undetermined intent (1.4%, n=1,763). In this same year, there were 372,809 injury cases presenting to Victorian hospital EDs, 85.0% of which were unintentional (n=317,037), 4.2% were intentional (self-harm or assault) (n=15,577) and 10.8% were of other or undetermined intent (n=40,195).

## METHOD

### DATA SOURCES

Hospital admissions data were extracted from the Victorian Admitted Episodes Dataset (VAED) and ED presentations data from the Victorian Emergency Minimum Dataset (VEMD). The VAED records all hospital admissions in public and private hospitals in the state of Victoria and the VEMD records all presentations to Victorian public hospitals with 24-hour emergency departments<sup>1</sup>.

ED presentations that resulted in subsequent hospital admission have not been excluded from the ED presentations dataset. This results in some duplication if summing the total number of ED presentations (VEMD) and the hospital admissions (VAED) in this bulletin. However, this is done in order to estimate the incidence of injury-related ED presentations (regardless of the subsequent admission status). Furthermore, removing these cases from the VEMD would result in a biased sample of relatively less severe injury presentations. For this report the VEMD records included 77,374 unintentional cases that were admitted to hospital for further treatment, which represents 23.1% of unintentional emergency department injury presentations in 2019/20.

### CASE SELECTION CRITERIA

Cases were selected if the admission (VAED) or presentation (VEMD) date occurred in the financial year 2019/20, if gender was male or female<sup>2</sup>, and if the injury was unintentional (VAED: external cause code in the range V00-X59, VEMD: human intent=1). Hospital admission cases were selected only if the first occurring diagnosis code was a community injury (see Box 2 in Appendix 1) and the episode was an incident (i.e., the case was not a statistical separation from another unit within the same hospital or an inward transfer from another hospital and not a repeat admission for the same injury). ED presentation case selection was restricted to incident cases: return visits and pre-arranged visits were excluded.

In order to minimise the influence of the hospital admission policy change in 2012/13 on the trend in admissions over time, cases that spent the entire episode in the ED in prior years were removed from the VAED (see Box 3 in Appendix 1).

For ease of comparison, VEMD causes, where possible, were recoded to match VAED cause groups.

The age groups (0-14, 15-24, 25-64, 65+ years) have been selected to match those in the *National Injury Prevention and Safety Promotion Plan: 2004 - 2014* (NIPSP Plan).

See Appendix 2 for a detailed explanation of the case selection criteria.

### RATES AND TRENDS ANALYSIS

Rates per 100,000 population were calculated for the 10-year period 2010/11 to 2019/20 for the VAED and the VEMD. The denominators used for calculating rates were December population estimates from the Australian Bureau of Statistics. Age standardisation of rates was carried out using 5-year age groups and the direct method. The standard population used was the Victorian resident population at 30 June, 2001.

Time trends in the rate of admissions/ED presentations were modelled using Poisson models, as the annual number of events as a function of time in years (continuous), age group and gender, with the log of the annual Victorian residential population as offset.

Time trend results are presented as the modelled % change in rate per year, calculated as:  $percentage\ change = [e^{\alpha} - 1] \times 100\%$  where  $\alpha$  is the parameter estimate of year, in the Poisson model. A trend was considered to be statistically significant if the p-value of the slope of the regression model was less than 0.05. The analyses were conducted using the PROC GENMOD procedure in SAS V9.4.

For further discussion of data sources and issues, particularly issues relating to the Victorian hospital admission policy change and how this may have influenced admission trends, please refer to Appendix 1.

#### Note:

The terms “admissions” and “presentations” in succeeding sections of this report refer to “injury admissions” and “injury presentations”; results are limited to the State of Victoria.

1. Currently 38 hospitals contribute to the VEMD (Bass Coast Regional Health was added to the collection in July 2011).

2. Cases where the patients sex is recorded as Indeterminate or Other were excluded in the VAED and VEMD case selection due to data confidentiality concerns related to small numbers.

# ALL AGES

## TREND

- During the 10-year period 2010/11 to 2019/20, there were on average 98,704 injury admissions and 310,666 injury ED presentations per year in Victoria. The average age-standardised annual rates were 1,547 admissions and 5,174 ED presentations per 100,000 population.
- The age-standardised annual rates of **injury admissions** are shown in Figure 1. The modelled trend in rate showed a statistically significant annual increase of 3.8% [95% CI 2.8 to 4.7%].
- The age-standardised annual rates of **injury ED presentations** are shown in Figure 2. The modelled trend in rate did not show a statistically significant consistent upward or downward trend over the ten year period.

FIGURE 1: TREND IN INJURY HOSPITAL ADMISSION RATES PER 100,000 POPULATION, VICTORIA 2010/11-2019/20

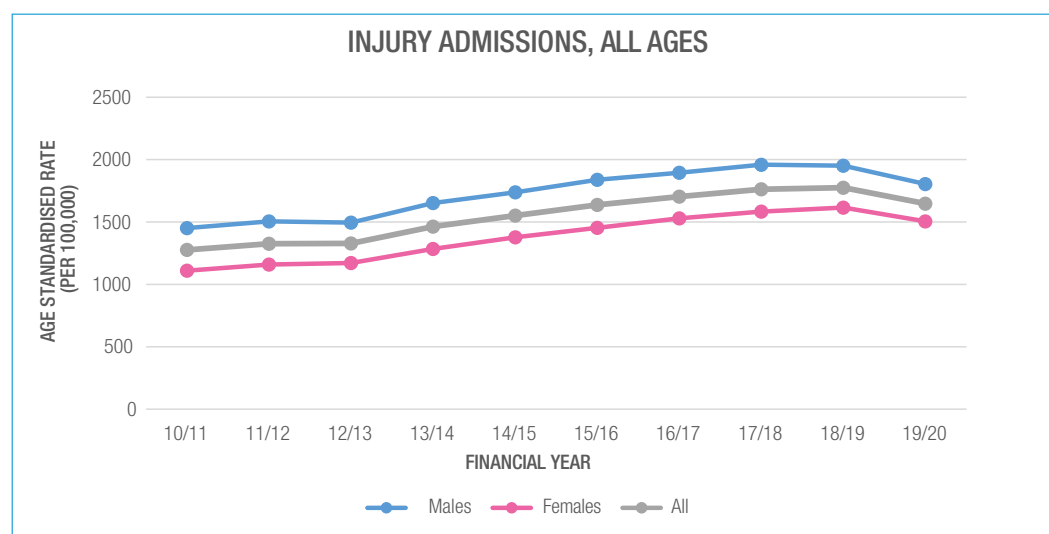
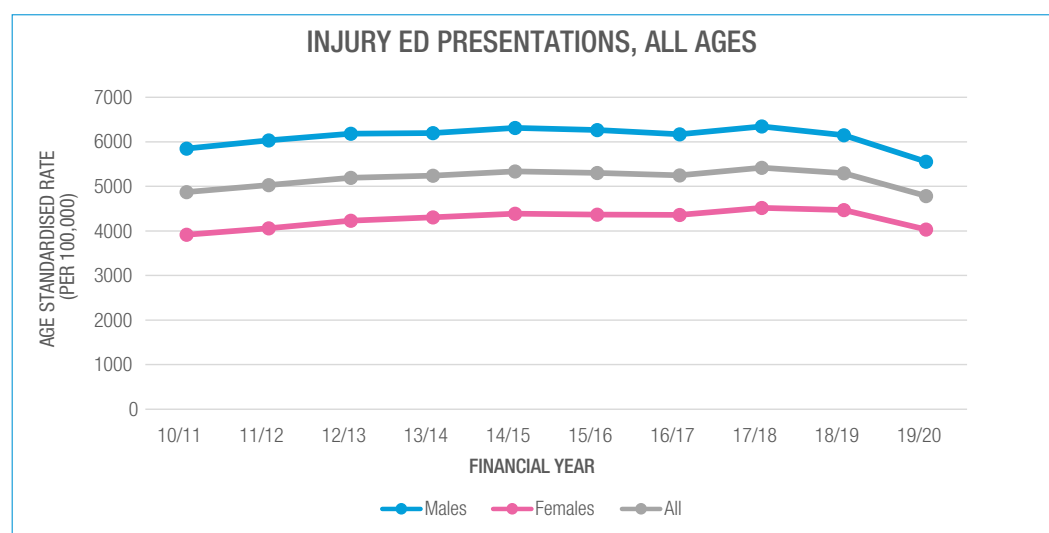


FIGURE 2: TREND IN INJURY ED PRESENTATION RATES PER 100,000 POPULATION, VICTORIA 2010/11-2019/20





HOSPITAL TREATED INJURY - GENDER AND AGE

- Males were overrepresented accounting for 53.7% of all injury admissions (n= 62,529) and 57.2% of ED presentations (n=181,450) in Victoria in 2019/20.
- Seventy-eight percent (n=90,406) of hospital admissions occurred among persons aged 25 years and older; forty percent of those admitted were aged 25-64 years (n=46,659) and 38% were aged 65 years and above (n= 43,750). Adults aged 25-64 years accounted for 41.8% of ED presentations (n=132,403).
- Males accounted for more hospital admissions and ED presentations than women in all age groups up to 64 years. However, in the 65 years and older group, females accounted for more hospital admissions and ED presentations than males (Figure 3 & Figure 4).

FIGURE 3: INJURY HOSPITAL ADMISSIONS BY GENDER AND AGE, VICTORIA 2019/20

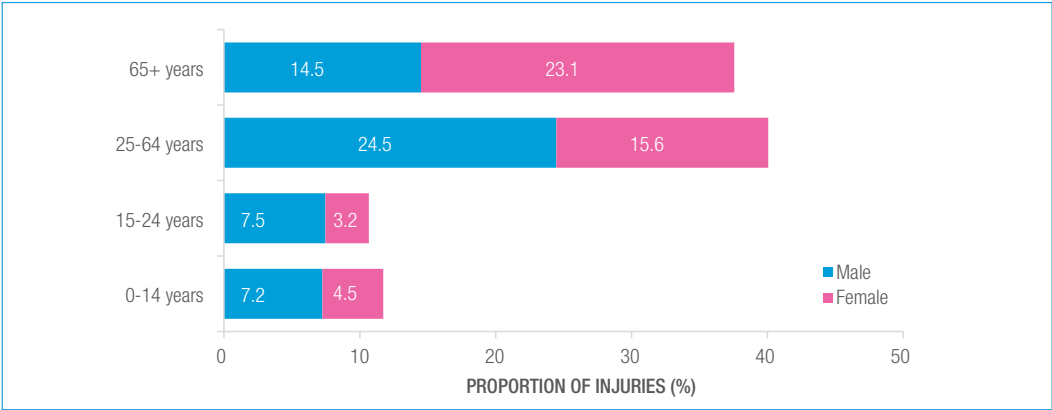
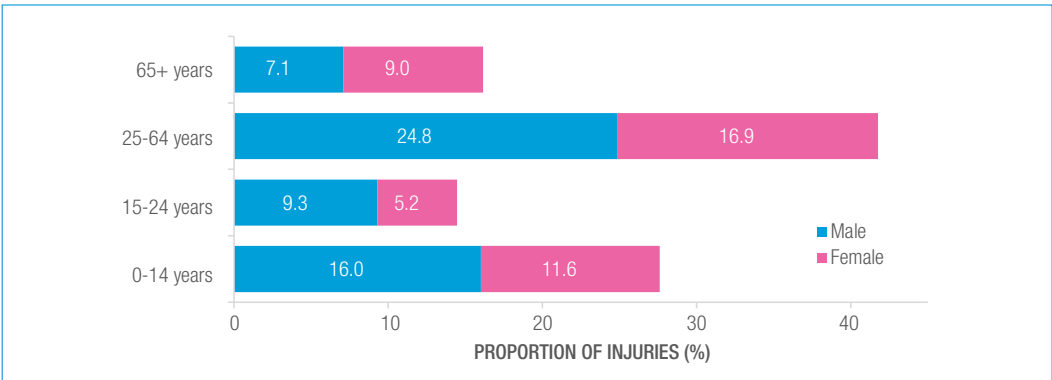


FIGURE 4: INJURY ED PRESENTATIONS BY GENDER AND AGE, VICTORIA 2019/20





An overview of unintentional hospital-treated injury in Victoria during 2019/20 is provided in Table 2. Overall, there were 116,496 admissions and 317,037 presentations.

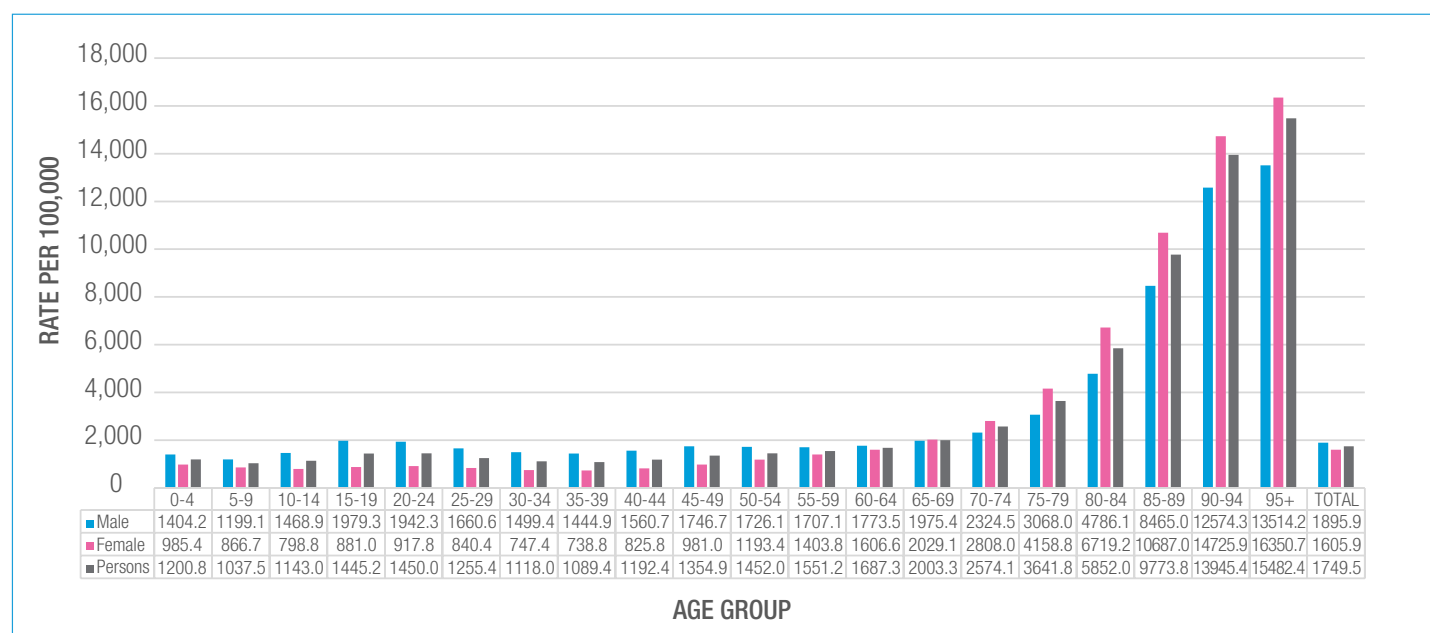
- The age standardised rate of injury hospital admission and ED presentation was higher for males than females: 1,805.3 vs. 1,504.5 per 100,000 for admissions and 5,556.5 vs 4,036.4 per 100,000 for ED presentations.
- The age standardised hospital admission rate per 100,000 population was highest in older adults (4,066.6) and lowest in children (1,125.8). In contrast, the age standardised ED presentation rate per 100,000 population was highest in children (7,205.1) and lowest in adults (3,719.2) (Table 2).

**TABLE 2: FREQUENCY, AGE-SPECIFIC AND AGE STANDARDISED RATES OF INJURY HOSPITAL ADMISSIONS AND ED PRESENTATIONS BY GENDER AND AGE, VICTORIA 2019/20**

AGE GROUP	GENDER	HOSPITAL ADMISSIONS			ED PRESENTATIONS		
		n	RATE PER 100,000 POPULATION	AGE STANDARDISED RATE PER 100,000 POPULATION	n	RATE PER 100,000 POPULATION	AGE STANDARDISED RATE PER 100,000 POPULATION
0-14 years	Male	8,443	1,355.0	1,356.5	50,742	8,143.4	8,133.9
	Female	5,212	884.4	881.5	36,804	6,245.4	6,221.7
	All	13,655	1,126.3	1,125.8	87,546	7,220.8	7,205.1
15-24 years	Male	8,693	1,958.6	1,960.8	29,438	6,632.5	6,701.2
	Female	3,739	901.4	899.5	16,436	3,962.4	3,999.1
	All	12,432	1,447.9	1,447.6	45,874	5,342.6	5,394.0
25-64 years	Male	28,496	1,628.4	1,625.0	78,742	4,499.7	4,491.4
	Female	18,163	1,009.0	987.6	53,661	2,981.1	2,959.6
	All	46,659	1,314.4	1,303.3	132,403	3,729.7	3,719.2
65+ years	Male	16,894	3,511.4	3,254.9	22,528	4,682.4	4,518.3
	Female	26,856	4,824.6	4,783.8	28,686	5,153.4	5,139.1
	All	43,750	4,215.8	4,066.6	51,214	4,935.0	4,850.2
All	Male	62,526	1,895.9	1,805.3	181,450	5,501.8	5,556.5
	Female	53,970	1,605.9	1,504.5	135,587	4,034.4	4,036.4
	All	116,496	1,749.5	1,648.2	317,037	4,761.2	4,787.9

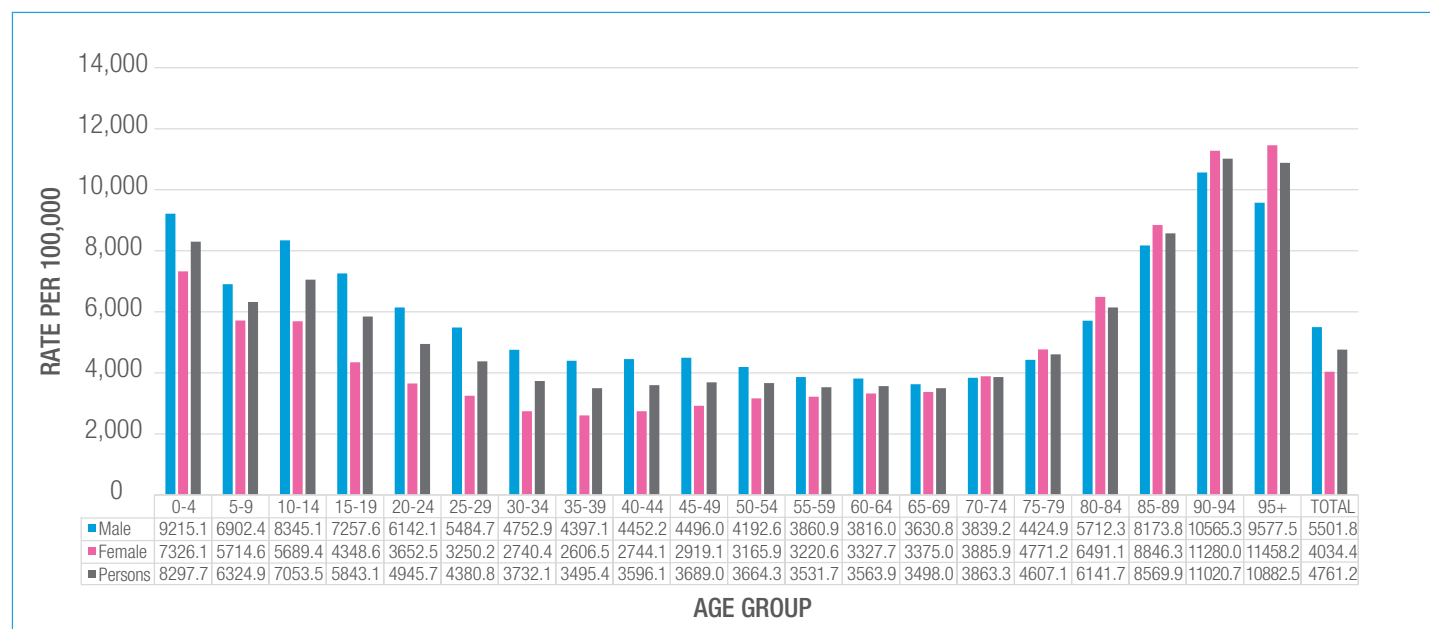
Hospital admission injury rates by age and gender for Victoria in 2019/20 are shown in Figure 5. Age-specific hospital admitted injury rates rose after childhood, were slightly higher in young adults than adolescents, and peaked in older adults. The overall male age-specific hospital admitted injury rate was higher than the female rate in all 5-year age groups up to age 64 years.

**FIGURE 5: AGE-SPECIFIC HOSPITAL ADMITTED INJURY RATES BY AGE GROUP AND GENDER, VICTORIA 2019/20**



ED presentation injury rates by age and gender for Victoria in 2019/20 are shown in Figure 6. Age-specific injury ED presentation rates were high among younger children (0-4 years) and among older children (10-14 years); then decreased throughout the adolescent and adult age groups until age 69 then increased again, peaking at 90 years and over. The overall male age-specific injury ED presentations rate was higher than the female rate in all 5-year age groups up to age 69 years.

**FIGURE 6: AGE-SPECIFIC INJURY ED PRESENTATION RATES BY AGE GROUP AND GENDER, VICTORIA 2019/20**



## LEADING CAUSES OF INJURY

- Four of the five major causes of injury admissions and injury ED presentations were the same (falls, transport, hit/struck/crush injuries & cutting/piercing), but the ranking on frequency of cases was different (Figure 7 & Figure 8).
- The leading cause of both hospital admissions and ED presentations was falls. Falls accounted for 48.3% (n=56,220) of hospital admissions and 36.7% (n=116,282) of ED presentations.
- Transport accounted for 13.8% of admissions (n=16,115) but just 7.0% of presentations (n=22,132).
- Hit/struck/crush injuries accounted for 7.5% of admissions (n=8,688) but a higher proportion of ED presentations (15.8%, n=50,235).
- Cutting and piercing injuries accounted for 7.3% of admissions (n=8,531) and 8.3% of ED presentations (n=26,240).
- The fifth ranking cause of injury-related admissions was natural/environmental/animals (3.6%, n=4,153) whereas for ED presentations it was injuries caused by a foreign body in a natural orifice e.g. ear, nose, eye (4.8%, n=15,212).

FIGURE 7: INJURY HOSPITAL ADMISSIONS BY CAUSE, VICTORIA 2019/20

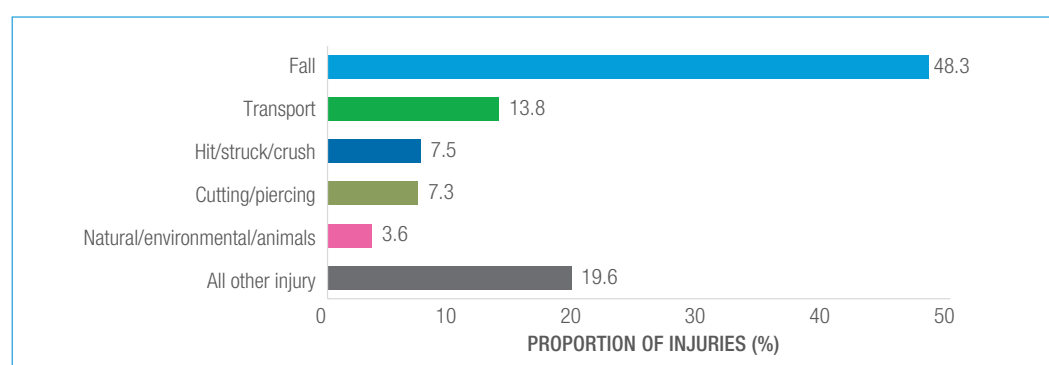
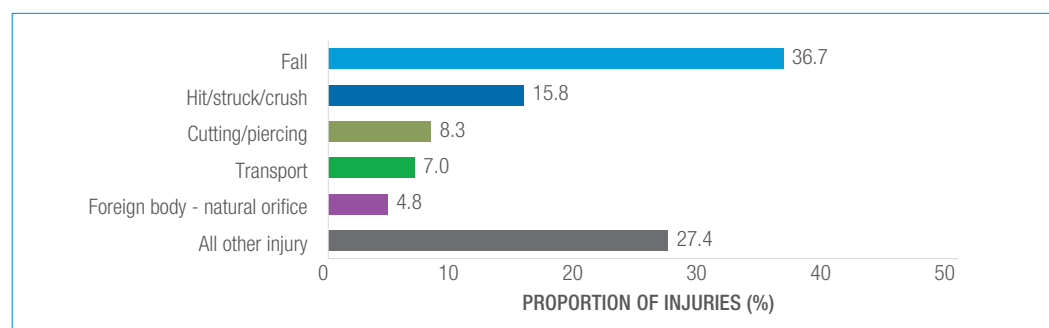


FIGURE 8: INJURY ED PRESENTATIONS BY CAUSE, VICTORIA 2019/20



Note: "Other specified" and "unspecified" cases were included in the 'All other injury' category regardless of their ranking

MAJOR INJURY TYPE (BODY SITE AND NATURE OF INJURY)

Figure 9 and Figure 10 show the five most common specific injury types for hospital admissions and ED presentations.

- Fracture to the upper limb accounted for 16.5% (n=19,190) of hospital admissions and 11.6% (n=36,930) of ED presentations.
- Fracture to the lower limb was the second most common type of injury requiring hospital admission (12.9%, n=14,970) and accounted for 6.6% of ED presentations (n=20,850).
- Dislocations, sprains and strains to the lower limb (7.5%, n=23,845) and upper limb (6.8%, n=21,470) were common among ED presentations.
- Fracture to the trunk accounted for 7.3% of admissions (n=8,466).
- Open wounds to the upper limb accounted for 7.1% of admissions (n=8,258) and 6.9% of ED presentations (n=21,771).
- Open wounds to the head/face/neck accounted for 6.2% of admissions (n=7,275).

FIGURE 9: MAJOR INJURY TYPE, HOSPITAL ADMISSIONS, VICTORIA, 2019/20

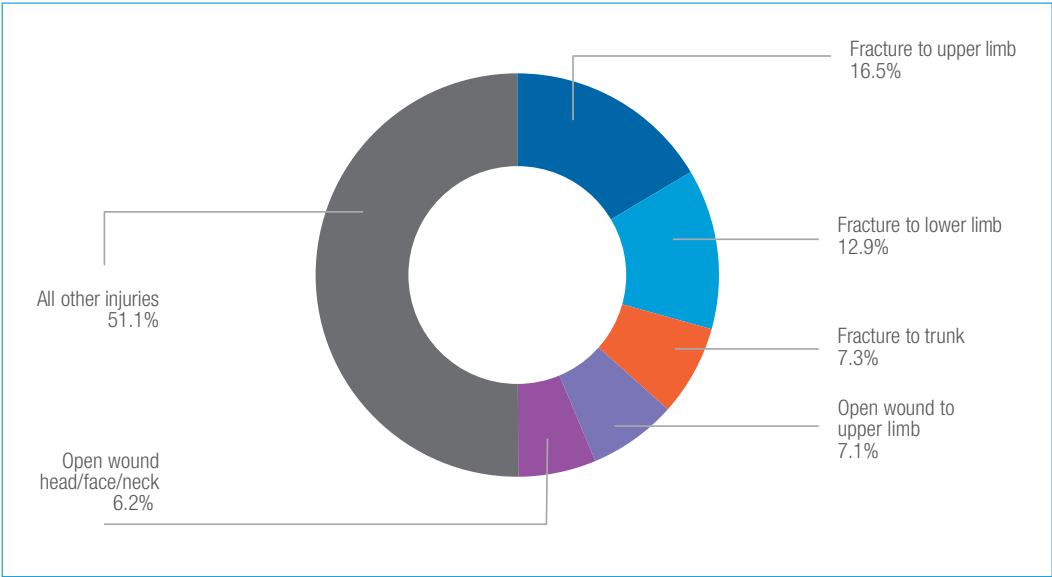
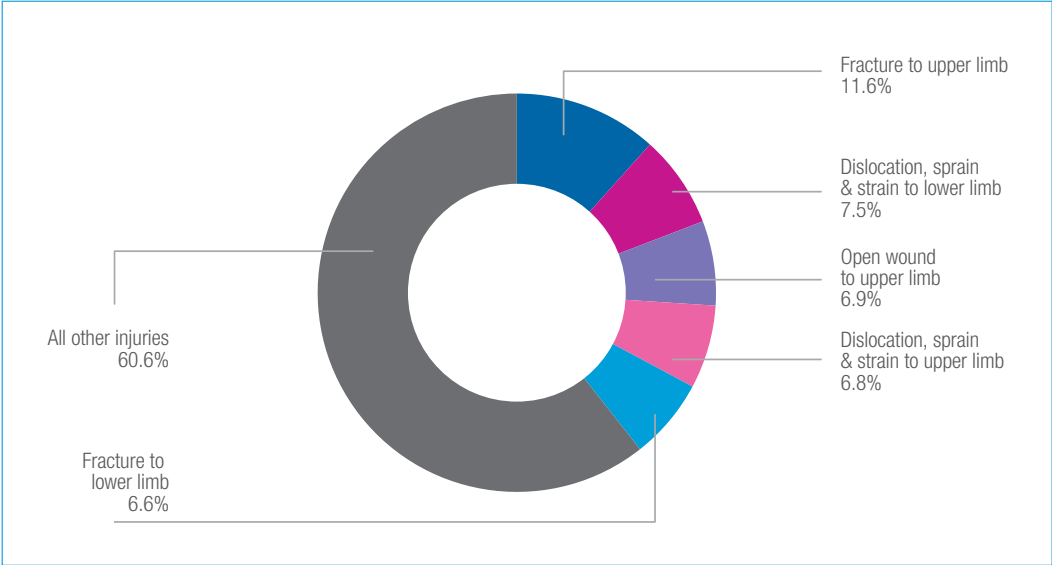


FIGURE 10: MAJOR INJURY TYPE, ED PRESENTATIONS, VICTORIA 2019/20



SETTING

- In 2019/20 27.9% (n=32,530) of all injuries requiring hospital admission and 43.2% (n=136,920) of injuries resulting in ED presentation occurred in the home.
- Injuries also commonly occurred on roads/streets/highways (11.0% of admissions and 5.9% of ED presentations), and in sports settings (4.5% of admissions and 5.6% of ED presentations). Around 6.7% of admissions resulted from injuries that occurred in residential institutional settings (Figure 11 & Figure 12).

FIGURE 11: INJURY HOSPITAL ADMISSIONS BY SETTING, VICTORIA 2019/20

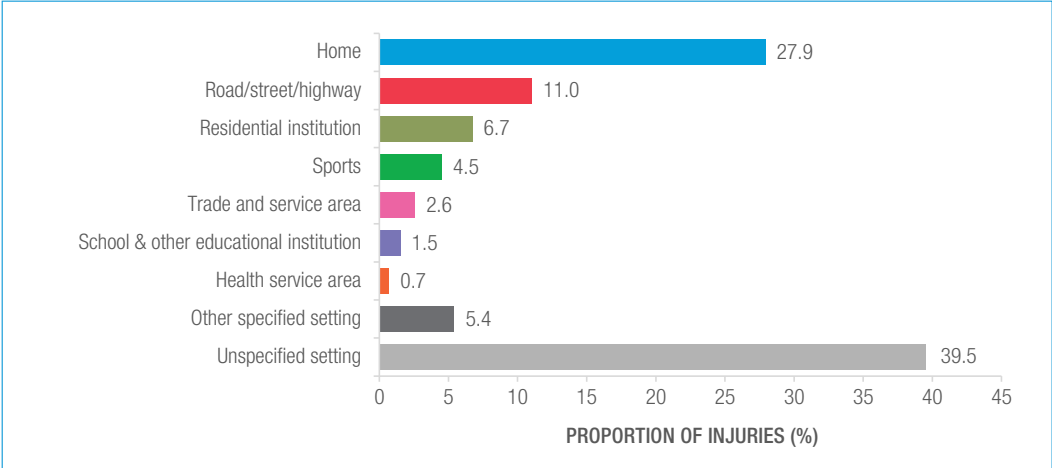
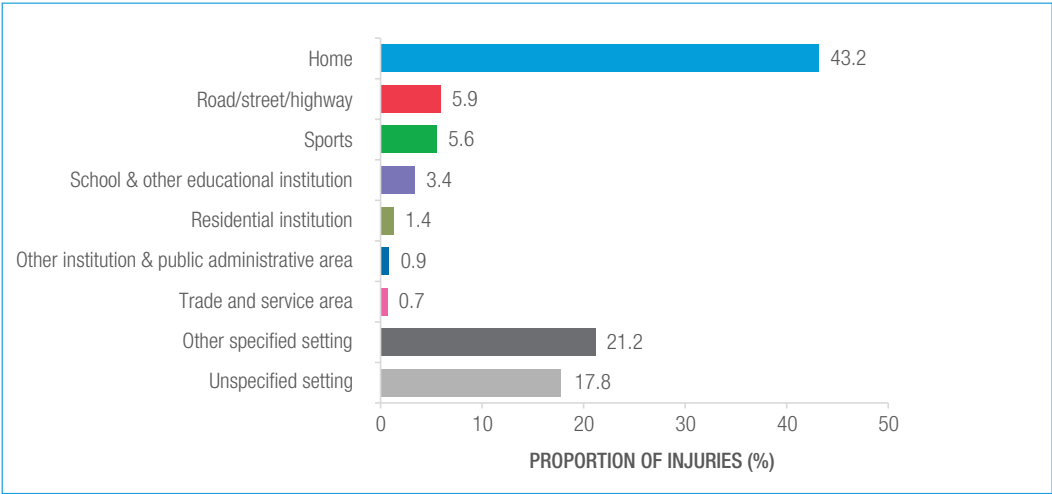


FIGURE 12: INJURY ED PRESENTATIONS BY SETTING, VICTORIA 2019/20



An overview of severity of unintentional injury hospital admissions by age group is provided in Table 3. Serious injury cases are defined using the International Classification of Disease based Injury Severity Score (ICISS) which reflects threat to life (see Box 1 in Appendix 1).

- Adults aged 25-64 years accounted for 40.1% of unintentional hospital admissions in 2019/20 and older adults aged 65+ accounted for 37.6% of injury admissions during this period. Children (0-14 years) accounted for 11.7% of injury admissions and adolescents & young adults (15-24 years) accounted for 10.7% of injury admissions during 2019/20.
- Older adults aged 65+ years accounted for the majority of serious injury admissions (82.9%, n=14,516). They also accounted for more than two-thirds of hospital bed-days (67.4%, 401,421 days).
- Those aged 75-94 years accounted for just under a quarter of all unintentional injury hospital admissions (24.5%) and were particularly over-represented when serious injuries and bed-days are taken into account (62.6 and 49.4% respectively).

**TABLE 3: UNINTENTIONAL INJURY HOSPITAL ADMISSIONS BY AGE GROUP: FREQUENCY, SERIOUS INJURY CASES AND HOSPITAL BED DAYS (2019/20)**

	FREQUENCY		SERIOUS INJURY CASES		HOSPITAL BED-DAYS	
	n	%	n	%	n	%
0-4	4,873	4.2	57	0.3	6,341	1.1
5-9	4,301	3.7	43	0.2	6,062	1.0
10-14	4,481	3.8	69	0.4	6,714	1.1
<b>0-14</b>	<b>13,655</b>	<b>11.7</b>	<b>169</b>	<b>1.0</b>	<b>19,117</b>	<b>3.2</b>
15-19	5,489	4.7	197	1.1	10,378	1.7
20-24	6,943	6.0	271	1.5	14,694	2.5
<b>15-24</b>	<b>12,432</b>	<b>10.7</b>	<b>468</b>	<b>2.7</b>	<b>25,072</b>	<b>4.2</b>
25-34	12,652	10.9	532	3.0	27,517	4.6
35-44	10,344	8.9	462	2.6	25,339	4.3
45-54	11,640	10.0	648	3.7	36,896	6.2
55-64	12,023	10.3	707	4.0	50,475	8.5
<b>25-64</b>	<b>46,659</b>	<b>40.1</b>	<b>2,349</b>	<b>13.4</b>	<b>140,227</b>	<b>25.2</b>
65-74	13,106	11.3	2,612	14.9	85,256	14.3
75-84	14,691	12.6	4,930	28.2	139,269	23.4
85-94	13,846	11.9	6,014	34.4	155,031	26.0
<b>95+</b>	<b>2,107</b>	<b>1.8</b>	<b>960</b>	<b>5.5</b>	<b>21,865</b>	<b>3.7</b>
<b>65+</b>	<b>43,750</b>	<b>37.6</b>	<b>14,516</b>	<b>82.9</b>	<b>401,421</b>	<b>67.4</b>
Total	116,496	100.0	17,052	100.0	595,837	100.0

TABLE 4: RANKING OF CAUSES OF INJURY HOSPITAL ADMISSIONS BY AGE GROUPS

RANK	AGE GROUPS (YEARS)												
	0-4yrs	5-9yrs	10-14yrs	15-19yrs	20-24yrs	25-34yrs	35-44yrs	45-54yrs	55-64yrs	65-74yrs	75-84yrs	85-94yrs	95+yrs
1	fall 2,263 46.4%	fall 2,184 50.8%	fall 1,626 36.3%	transport 1,332 24.3%	transport 1,693 24.4%	transport 2,955 23.4%	fall 2,373 22.9%	fall 3,620 31.1%	fall 5,464 45.4%	fall 8,312 63.4%	fall 11,590 78.9%	fall 12,212 86.2%	fall 1,916 90.9%
2	hit/struck/ crush 793 16.3%	hit/struck/ crush 611 14.2%	transport 981 21.9%	fall 999 18.2%	fall 1,257 18.1%	fall 2,404 19.0%	transport 2,194 21.2%	transport 2,291 19.7%	transport 1,807 15.0%	transport 1,168 8.9%	unspec. unintentional. 783 5.3%	unspec. unintentional. 511 3.7%	unspec. unintentional. 77 3.7%
3	unspec. unintentional. 339 7.0%	transport 448 10.4%	hit/struck/ crush 653 14.6%	unspec. unintentional. 899 16.4%	unspec. unintentional. 1,011 14.6%	cutting/ piercing 1,795 13.2%	unspec. unintentional. 1,497 14.5%	unspec. unintentional. 1,519 13.0%	unspec. unintentional. 1,328 11.0%	unspec. unintentional. 1,134 8.7%	transport 742 5.1%	transport 310 2.2%	hit/struck/ crush 32 1.5%
4	foreign body 303 6.2%	unspec. unintentional. 288 6.7%	unspec. unintentional. 514 11.5%	hit/struck/ crush 865 15.8%	cutting/ piercing 885 12.7%	unspec. unintentional. 1,676 13.2%	cutting/ piercing 1,288 12.5%	cutting/ piercing 1,236 10.6%	cutting/ piercing 986 8.2%	cutting/ piercing 634 4.8%	hit/struck/ crush 330 2.2%	hit/struck/ crush 241 1.7%	transport 27 1.3%
5	cutting/ piercing 285 5.8%	cutting/ piercing 273 6.3%	cutting/ piercing 238 5.3%	cutting/ piercing 579 10.5%	hit/struck/ crush 848 12.2%	hit/struck/ crush 1,412 11.2%	hit/struck/ crush 979 9.5%	hit/struck/ crush 833 7.2%	hit/struck/ crush 636 5.3%	hit/struck/ crush 455 3.5%	ovext./ stren. mmts 308 2.1%	ovext./ stren. mmts 152 1.1%	poisoning 17 0.7%
6	poisoning 272 5.6%	nat./envir./ animals 170 4.0%	nat./envir./ animals 164 3.7%	ovext./ stren. mmts 207 3.8%	nat./envir./ animals 307 4.4%	nat./envir./ animals 634 5.0%	nat./envir./ animals 544 5.3%	nat./envir./ animals 694 6.0%	nat./envir./ animals 573 4.8%	nat./envir./ animals 404 3.1%	cutting/piercing 245 1.7%	poisoning 98 0.7%	ovext./ stren. mmts 14 0.7%
7	nat./envir./ animals 190 3.9%	foreign body 169 3.9%	ovext./ stren. mmts 117 2.6%	nat./envir./ animals 157 2.9%	ovext./ stren. mmts 301 4.3%	ovext./ stren. mmts 556 4.4%	ovext./ stren. mmts 452 4.4%	ovext./ stren. mmts 446 3.8%	ovext./ stren. mmts 387 3.2%	ovext./ stren. mmts 328 2.5%	nat./envir./ animals 224 1.5%	nat./envir./ animals 88 0.6%	cutting/piercing 5 0.2%
8	transport 167 3.4%	poisoning 43 1.0%	foreign body 62 1.4%	poisoning 139 2.5%	poisoning 217 3.1%	poisoning 331 2.6%	poisoning 283 2.7%	poisoning 265 2.3%	foreign body 219 1.8%	poisoning 204 1.6%	poisoning 179 1.2%	cutting/piercing 82 0.6%	fires/burns/ scalds 5 0.2%
9	fires/burns/ scalds 151 3.1%	fires/burns/ scalds 42 1.0%	other spec. unintentional. 48 1.1%	other spec. unintentional. 97 1.8%	machinery 132 1.9%	machinery 283 2.2%	machinery 230 2.2%	machinery 250 2.1%	machinery 218 1.8%	foreign body 201 1.5%	foreign body 122 0.8%	foreign body 73 0.5%	nat./envir./ animals * *
10	choking/ suffoc. 50 1.0%	ovext./ stren. mmts 41 1.0%	fires/burns/ scalds 33 0.7%	foreign body 78 1.4%	other spec. unintentional. 106 1.5%	foreign body 216 1.7%	foreign body 207 2.0%	foreign body 200 1.7%	poisoning 208 1.7%	machinery 113 0.9%	fires/burns/ scalds 58 0.4%	fires/burns/ scalds 30 0.2%	other spec. unintentional. * *
11	ovext./ stren. mmts 18 0.4%	machinery 14 0.3%	poisoning 28 0.6%	machinery 59 1.1%	fires/burns/ scalds 85 1.2%	fires/burns/ scalds 182 1.4%	fires/burns/ scalds 150 1.5%	fires/burns/ scalds 160 1.4%	fires/burns/ scalds 111 0.9%	fires/burns/ scalds 80 0.6%	machinery 40 0.3%	choking/suffoc. 30 0.2%	foreign body * *
12	drowning 17 0.3%	other spec. unintentional. 9 0.2%	machinery 8 0.2%	fires/burns/ scalds 58 1.1%	foreign body 76 1.1%	other spec. unintentional. 178 1.4%	other spec. unintentional. 109 1.1%	other spec. unintentional. 106 0.9%	other spec. unintentional. 53 0.4%	other spec. unintentional. 41 0.3%	other spec. unintentional. 37 0.3%	choking/suffoc. 18 0.1%	choking/suffoc. * *
13	other spec. unintentional. 15 0.3%	drowning * *	drowning * *	explosions/ firearms 10 0.2%	explosions/ firearms 15 0.2%	explosions/ firearms 18 0.1%	explosions/ firearms 26 0.3%	choking/ suffoc. 13 0.1%	choking/ suffoc. 20 0.2%	choking/ suffoc. 27 0.2%	choking/ suffoc. 30 0.2%	machinery 11 0.1%	machinery * *
14	machinery 10 0.2%	choking/ suffoc. * *	choking/ suffoc. * *	drowning * *	drowning 5 0.1%	choking/ suffoc. * *	choking/ suffoc. * *	explosions/ firearms 7 0.1%	explosions/ firearms * *	explosions/ firearms 5 0%	explosions/ firearms * *	explosions/ firearms 0 0.0%	drowning * *
15	explosions/ firearms 0 0.0%	explosions/ firearms * *	explosions/ firearms * *	choking/ suffoc. * *	choking/ suffoc. 5 0.1%	drowning * *	drowning * *	drowning 0 0.0%	drowning * *	drowning 0 0.0%	drowning * *	drowning 0 0.0%	explosions/ firearms 0 0.0%
All	4,873	4,301	4,481	5,489	6,943	12,652	10,344	11,640	12,023	13,106	14,691	13,846	2,107

Note: (1) nat./envir./ animals= natural/environmental/animals; choking/suffoc.= choking/suffocate; other unintent.= other specified unintentional; unspec.unintentional.= unspecified unintentional;  
(2) Frequency less than 5 has been suppressed with an \*\*\*. Other cells in the same row and/or column may be suppressed with \*\*\*\* in order to maintain confidentiality.



TABLE 5: RANKING OF CAUSES OF INJURY ED PRESENTATIONS BY AGE GROUPS

RANK	AGE GROUPS (YEARS)												
	0-4yrs	5-9yrs	10-14yrs	15-19yrs	20-24yrs	25-34yrs	35-44yrs	45-54yrs	55-64yrs	65-74yrs	75-84yrs	85-94yrs	95+yrs
1	fall 13,975 41.5%	fall 12,458 47.5%	fall 11,710 42.3%	fall 6,256 28.2%	fall 5,369 22.7%	fall 9,260 21.4%	fall 7,766 24.1%	fall 8,863 29.0%	fall 9,998 37.9%	fall 10,277 48.5%	fall 10,366 61.3%	fall 8,776 75.4%	fall 1,208 81.6%
2	other spec. unintent. 5,569 16.5%	hit/struck/ crush 4,763 18.2%	hit/struck/ crush 6,407 23.2%	hit/struck/ crush 5,313 23.9%	hit/struck/ crush 4,658 19.7%	hit/struck/ crush 8,178 18.9%	hit/struck/ crush 5,647 17.5%	hit/struck/ crush 4,406 14.4%	other spec. unintent. 3,127 11.9%	other spec. unintent. 2,468 11.6%	other spec. unintent. 1,706 10.1%	unspec. unintent. 904 7.8%	unspec. unintent. 87 5.9%
3	hit/struck/ crush 4,972 14.8%	other spec. unintent. 3,157 12.0%	other spec. unintent. 3,562 12.9%	other spec. unintent. 3,006 13.5%	cutting/ piercing 3,003 12.7%	cutting/ piercing 5,719 13.2%	other spec. unintent. 4,113 12.1%	other spec. unintent. 3,854 12.6%	hit/struck/ crush 2,977 11.3%	unspec. unintent. 2,038 9.6%	unspec. unintent. 1,596 9.4%	other spec. unintent. 800 6.9%	other spec. unintent. 76 5.1%
4	foreign body 2,605 7.7%	unspec. unintent. 1,347 5.1%	transport 1,970 7.1%	transport 2,096 9.4%	other spec. unintent. 3,001 12.7%	other spec. unintent. 5,449 12.6%	cutting/ piercing 3,895 12.1%	cutting/ piercing 3,304 10.8%	unspec. unintent. 2,470 9.4%	hit/struck/ crush 1,657 7.8%	hit/struck/ crush 840 5.0%	hit/struck/ crush 374 3.2%	hit/struck/ crush 43 2.9%
5	unspec. unintent. 2,201 6.5%	cutting/ piercing 1,226 4.7%	unspec. unintent. 1,642 5.9%	cutting/ piercing 1,871 8.4%	transport 2,526 10.7%	transport 4,301 9.9%	unspec. unintent. 2,994 9.3%	unspec. unintent. 2,947 9.6%	cutting/ piercing 2,427 9.2%	cutting/ piercing 1,559 7.4%	cutting/ piercing 690 4.1%	transport 239 2.1%	cutting/ piercing 17 1.1%
6	cutting/ piercing 1,267 3.8%	foreign body 1,216 4.6%	cutting/ piercing 1,059 3.8%	unspec. unintent. 1,616 7.3%	unspec. unintent. 2,002 8.5%	unspec. unintent. 3,815 8.8%	transport 2,927 9.1%	transport 2,755 9.0%	transport 2,051 7.8%	transport 1,162 5.5%	transport 685 4.1%	cutting/ piercing 200 1.7%	poisoning 13 0.9%
7	fires/burns/ scalds 1,249 3.7%	transport 1,000 3.8%	foreign body 429 1.6%	foreign body 613 2.8%	foreign body 1,075 4.5%	foreign body 2,607 6.0%	foreign body 2,047 6.4%	foreign body 1,797 5.9%	foreign body 1,408 5.3%	foreign body 863 4.1%	foreign body 418 2.5%	foreign body 128 1.1%	transport 19 1.3%
8	nat./envir./ animals 679 2.0%	nat./envir./ animals 536 2.0%	nat./envir./ animals 421 1.5%	nat./envir./ animals 438 2.0%	nat./envir./ animals 737 3.1%	nat./envir./ animals 1,590 3.7%	nat./envir./ animals 1,122 3.5%	nat./envir./ animals 1,135 3.7%	nat./envir./ animals 886 3.4%	nat./envir./ animals 565 2.7%	nat./envir./ animals 315 1.9%	nat./envir./ animals 112 1.0%	nat./envir./ animals 8 0.5%
9	poisoning 560 1.7%	fires/burns/ scalds 342 1.3%	fires/burns/ scalds 265 1.0%	poisoning 419 1.9%	fires/burns/ scalds 560 2.4%	fires/burns/ scalds 1,047 2.4%	fires/burns/ scalds 786 2.4%	fires/burns/ scalds 694 2.3%	fires/burns/ scalds 447 1.7%	fires/burns/ scalds 243 1.1%	fires/burns/ scalds 109 0.6%	poisoning 53 0.5%	foreign body 6 0.4%
10	transport 401 1.2%	poisoning 96 0.4%	poisoning 106 0.4%	fires/burns/ scalds 379 1.7%	poisoning 455 1.9%	poisoning 772 1.8%	poisoning 522 1.6%	poisoning 414 1.4%	machinery 291 1.1%	poisoning 172 0.8%	poisoning 99 0.6%	fires/burns/ scalds 39 0.3%	fires/burns/ scalds * *
11	choking/ suffoc. 128 0.4%	choking/ suffoc. 44 0.2%	choking/ suffoc. 42 0.2%	machinery 106 0.5%	machinery 218 0.9%	machinery 398 0.9%	machinery 344 1.1%	machinery 323 1.1%	poisoning 259 1.0%	machinery 160 0.8%	machinery 59 0.3%	machinery 8 0.1%	choking/ suffoc. * *
12	drowning 49 0.1%	drowning 19 0.1%	machinery 21 0.1%	choking/ suffoc. 55 0.2%	choking/ suffoc. 57 0.2%	choking/ suffoc. 87 0.2%	choking/ suffoc. 32 0.1%	choking/ suffoc. 35 0.1%	choking/ suffoc. 31 0.1%	choking/ suffoc. 13 0.1%	choking/ suffoc. 9 0.1%	drowning 6 0.1	machinery ** **
13	machinery ** **	machinery 17 0.1	drowning ** **	drowning 15 0.1%	drowning ** **	drowning 23 0.1%	drowning 17 0.1%	drowning ** **	drowning ** **	drowning ** **	drowning ** **	choking/ suffoc. * *	drowning 0 0.0%
14	explosions/ firearms * *	explosions/ firearms 0 0.0%	explosions/ firearms * *	explosions/ firearms 9 0.0%	explosions/ firearms * *	explosions/ firearms 8 0.0%	explosions/ firearms 6 0.0%	explosions/ firearms * *	explosions/ firearms * *	explosions/ firearms * *	explosions/ firearms * *	explosions/ firearms ** **	explosions/ firearms 0 0.0%
All	33,673	26,221	27,652	22,192	23,682	43,254	32,221	30,540	26,388	21,191	16,900	11,642	1,481

Note: (1) nat./envir./ animals= natural/environmental/animals; choking/suffoc.= choking/suffocate; other unintent.= other specified unintentional; unspec.unintent.= unspecified unintentional;  
(2) Frequency less than 5 has been suppressed with an \*\*\*. Other cells in the same row and/or column may be suppressed with \*\*\* in order to maintain confidentiality.

# CHILDREN (0-14 YEARS)

## TREND

- During the 10-year period 2010/11 to 2019/20 there were on average 12,679 injury admissions and 87,570 injury ED presentations per year among children aged up to and including 14 years. Average age-standardised injury rates were 1,258 admissions and 8,118 ED presentations per 100,000 children per year.
- The rate of **injury admissions** among children aged 0-14 years increased during the ten years. The modelled trend in rate showed a statistically significant annual increase of 3.2% [95% CI 1.9 to 4.4%].
- The rate of **injury ED presentations** among children aged 0-14 years increased during the ten years. The modelled trend in rate showed a small but statistically significant annual increase of 0.7% [95% CI 0.1 to 1.4%].
- The age-specific rates of **injury admissions** and **injury ED presentations** among the age groups 0-4, 5-9 and 10-14 years are shown in Figures 13 and 14, respectively.

FIGURE 13: TREND IN INJURY HOSPITAL ADMISSION RATES PER 100,000 CHILDREN, VICTORIA 2010/11-2019/20

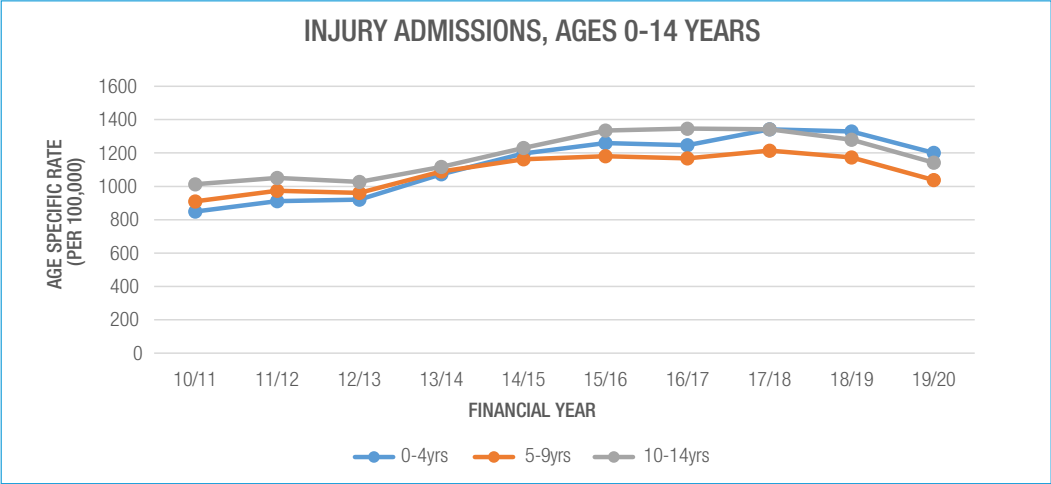
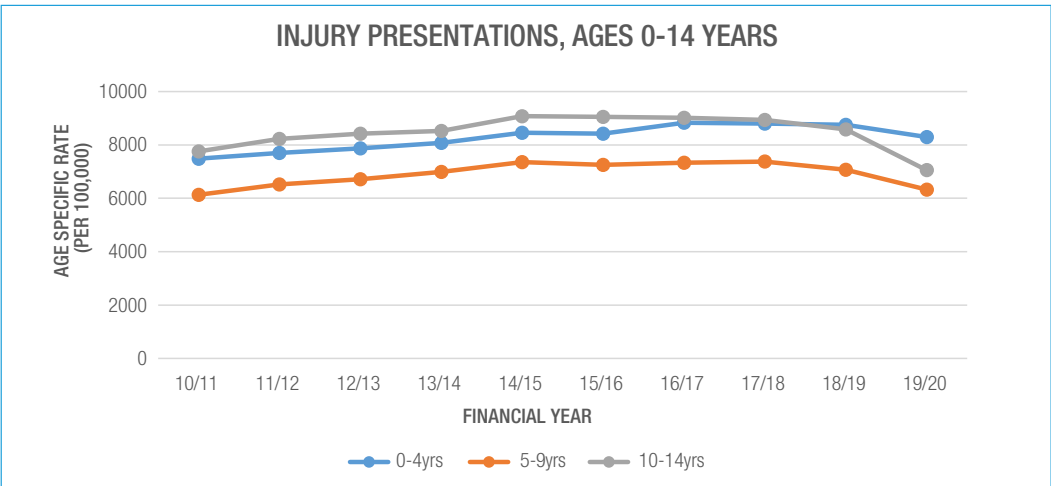


FIGURE 14: TREND IN INJURY ED PRESENTATION RATES PER 100,000 CHILDREN, VICTORIA 2010/11-2019/20



HOSPITAL TREATED INJURY - GENDER AND AGE

- Males were overrepresented in child hospital-treated injury cases, accounting for 61.8% of admissions (n=8,443) and 58.0% of ED presentations (n=50,742) in 2019/20 (Figure 15 & Figure 16).
- Child injury admissions and ED presentations were fairly evenly distributed across the 5-year age groups.
- Children aged 0-4 years accounted for 35.7% of child admissions and 38.5% of child ED presentations.
- Children aged 5-9 years accounted for 31.5% of child admissions and 30.0% of child ED presentations.
- Children aged 10-14 years accounted for 32.8% of child admissions and 31.6% of child ED presentations.

FIGURE 15: CHILD INJURY HOSPITAL ADMISSIONS BY GENDER AND AGE, VICTORIA 2019/20

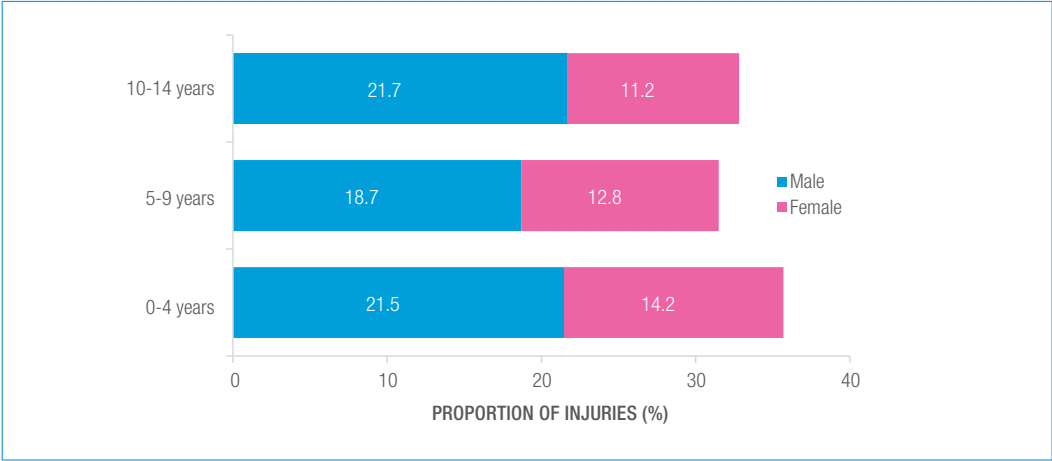
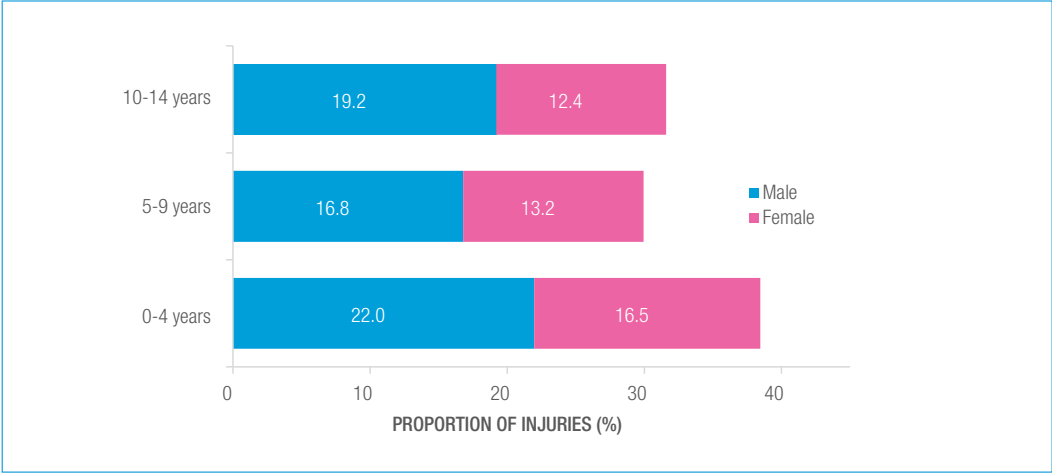


FIGURE 16: CHILD INJURY ED PRESENTATIONS BY GENDER AND AGE, VICTORIA 2019/20



- Child injury admission and ED presentation rates were higher for males than females: 1,355.0 vs 884.4 per 100,000 population (admissions) and 8,143.4 vs. 6,245.4 per 100,000 population (ED presentations).
- Table 6 shows that age-specific hospital admission rates for children were fairly equal across age groups whereas there was a high rate of ED presentations in the 0-4 age group, followed by the 10-14 age group.

**TABLE 6: FREQUENCY AND AGE-SPECIFIC RATE OF INJURY ADMISSIONS AND ED PRESENTATIONS IN CHILDREN BY GENDER AND AGE, VICTORIA 2019/20**

AGE GROUP	GENDER	HOSPITAL ADMISSIONS		ED PRESENTATIONS	
		n	RATE PER 100,000 POPULATION	n	RATE PER 100,000 POPULATION
0-4 years	Male	2,931	1,404.2	19,235	9,215.1
	Female	1,942	985.4	14,438	7,326.1
	All	4,873	1,200.8	33,673	8,297.7
5-9 years	Male	2,554	1,199.1	14,702	6,902.4
	Female	1,747	866.7	11,519	5,714.6
	All	4,301	1,037.5	26,221	6,324.9
10-14 years	Male	2,958	1,468.9	16,805	8,345.1
	Female	1,523	798.8	10,847	5,689.4
	All	4,481	1,143.0	27,652	7,053.5
All	Male	8,443	1,355.0	50,742	8,143.4
	Female	5,212	884.4	36,804	6,245.4
	All	13,655	1,126.3	87,546	7,220.8

LEADING CAUSES OF INJURY

- The five leading causes of injury in children were the same for hospital admissions and ED presentations, although the ranking on frequency of cases was different (Figure 17 & Figure 18).
- The leading cause of child injury admissions and ED presentations was falls, accounting for 44.5% of hospital admissions (n=6,073) and 43.6% of ED presentations (n=38,143).
- Hit/struck/crush injuries were the next major cause of injury accounting for 15.1% of admissions (n=2,057) and 18.4% of ED presentations (n=16,142).
- Transport accounted for 11.7% of admissions (n=1,596) and only 3.9% of ED presentations (n=3,371).
- Foreign body in a natural orifice, e.g. ear, nose, eye injuries, and cutting and piercing related injuries accounted for 3.9% and 5.8% of admissions (n=534 & n=796) respectively, and 4.9% and 4.1% of ED presentations, respectively (n=4,250 & n=3,552).

FIGURE 17: CHILD INJURY HOSPITAL ADMISSIONS BY CAUSE, VICTORIA 2019/20

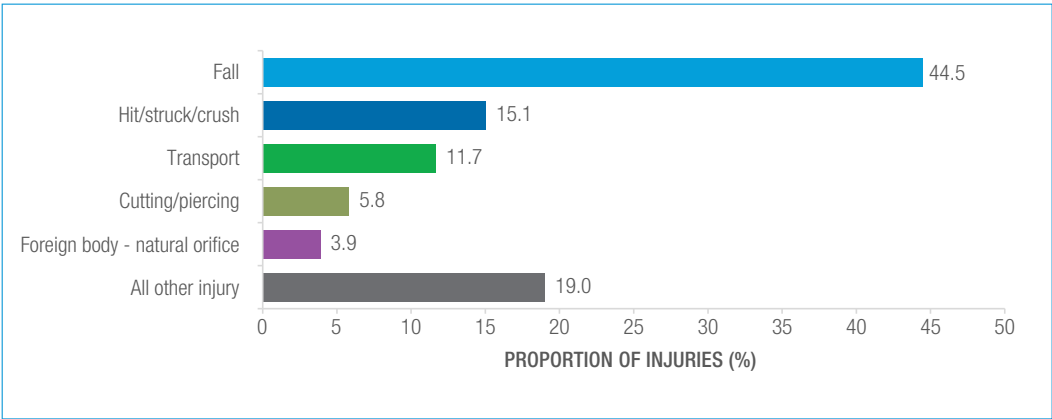
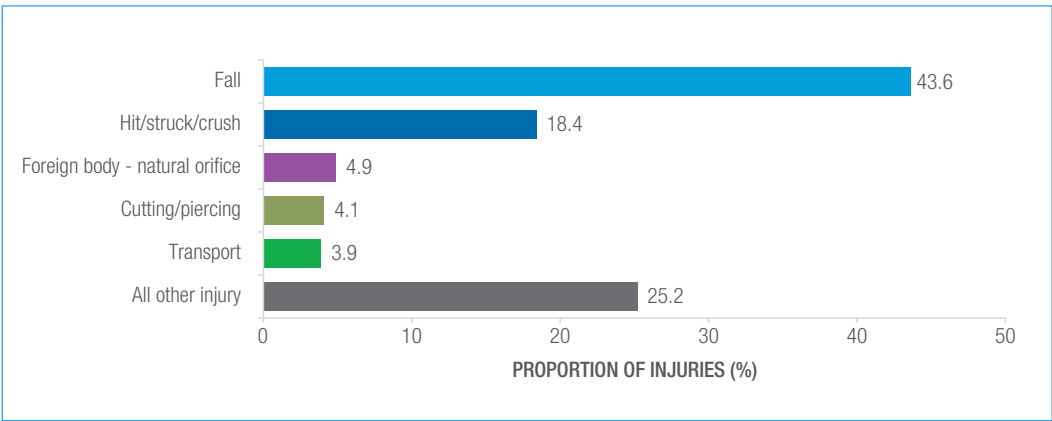


FIGURE 18: CHILD INJURY ED PRESENTATIONS BY CAUSE, VICTORIA 2019/20



Note: ‘Other specified’ and ‘unspecified’ cases were included in the ‘All other injury’ category regardless of their ranking

MAJOR INJURY TYPE (BODY SITE AND NATURE OF INJURY)

Figure 19 & Figure 20 show the five most common injury types for child injury admissions and ED presentations.

- Fracture to the upper limb accounted for 27.9% (n=3,810) of admissions and 17.4% (n=15,270) of ED presentations.
- Open wounds to the head/face/neck accounted for 12.9% of admissions (n=1,762) and 11.1% of ED presentations (n=9,690).
- Intracranial injury was common among hospital admissions (7.3%, n=1,001), as was fracture to the lower limb (6.3%, n=866) and open wound to the upper limb (6.2%, n=847). Other types of injuries most common among ED presentations were dislocations, sprains & strains to the upper limb (8.7%, n=7,590) and the lower limb (5.3%, n=4,681), as well as superficial injury to the head/face/neck (7.7%, n=6,700).

FIGURE 19: MAJOR INJURY TYPE, CHILD HOSPITAL ADMISSIONS, VICTORIA 2019/20

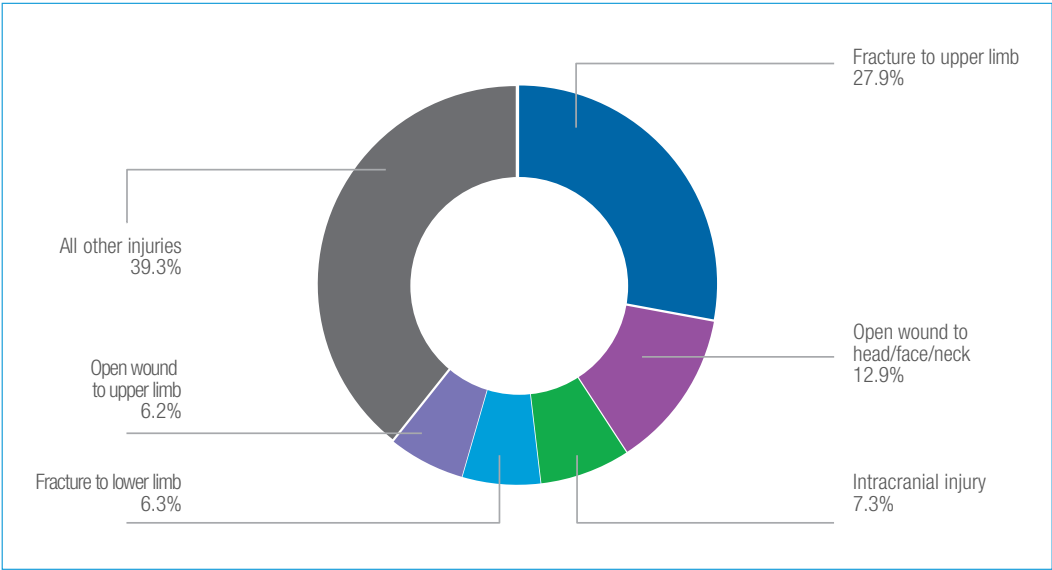
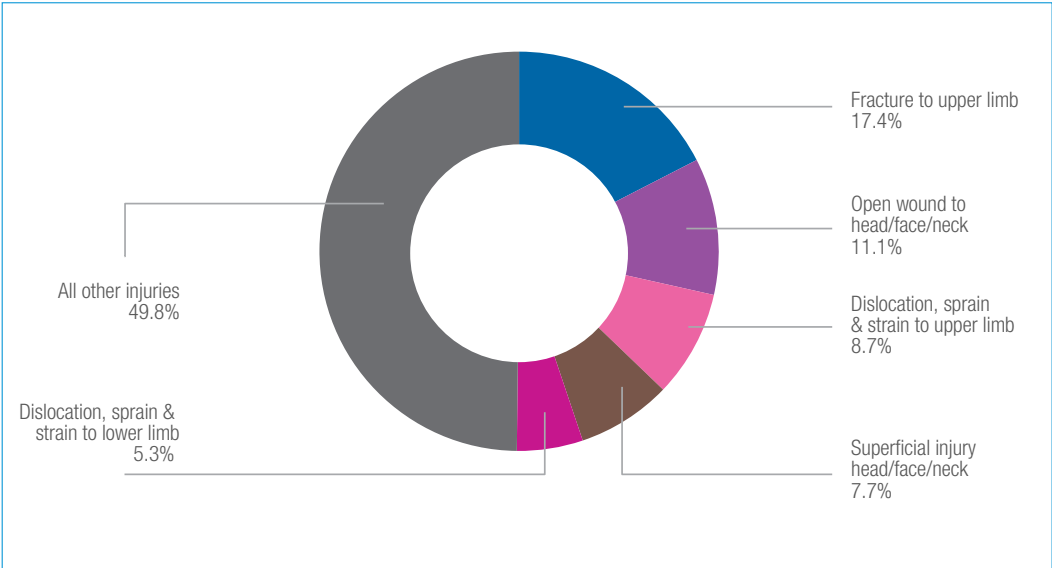


FIGURE 20: MAJOR INJURY TYPE, CHILD ED PRESENTATIONS, VICTORIA 2019/20



SETTING

- Setting where the injury occurred was unspecified in 45.0% of child injury admissions and 10.5% of child injury ED presentations
- Injuries among children were most likely to occur in the home, accounting for 25.5% (n=3,482) of admissions and 52.4% (n=45,917) of ED presentations (Figure 21 & 22).
- Children were also commonly injured in schools and other educational settings (11.1% of admissions and 11.5% of ED presentations) and sports settings (6.9% of admissions and 6.6% of ED presentations).

FIGURE 21: CHILD INJURY HOSPITAL ADMISSIONS BY SETTING, VICTORIA 2019/20

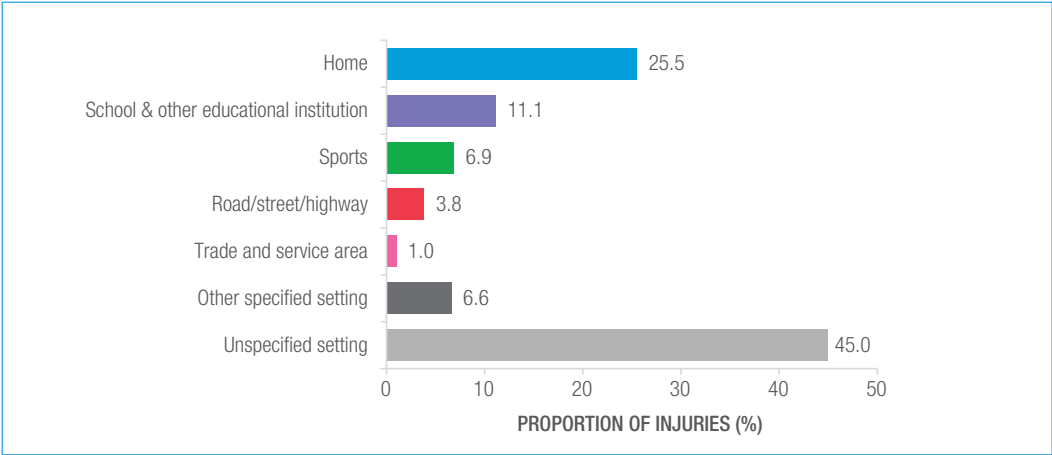
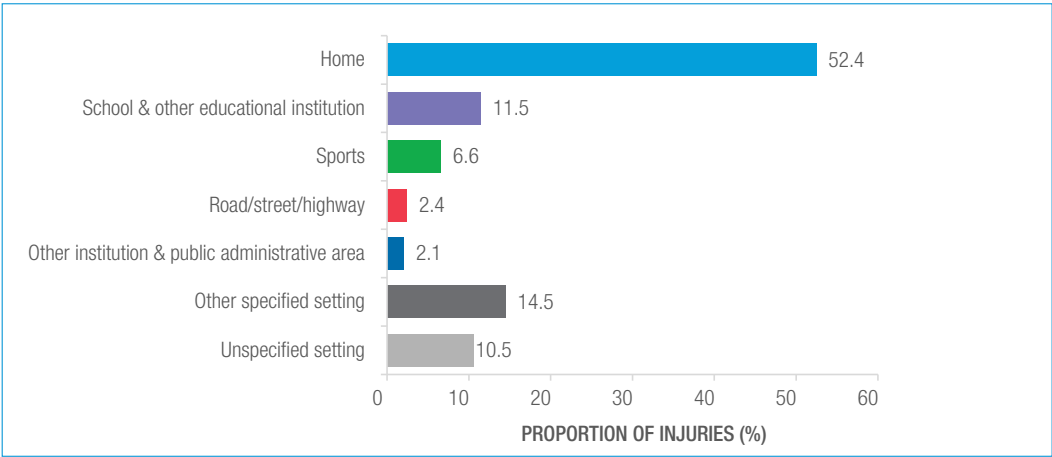


FIGURE 22: CHILD INJURY ED PRESENTATIONS BY SETTING, VICTORIA 2019/20





# ADOLESCENTS AND YOUNG ADULTS (15-24 YEARS)

## TREND

- During the 10-year period 2010/11 to 2019/20, there were on average 12,257 injury admissions and 53,119 injury ED presentations per year among adolescents and young adults aged 15-24 years. The average age-standardised injury rates were 1,685 admissions and 6,396 ED presentations per 100,000 adolescents and young adults per year.
- The rate of **injury admissions** among adolescents and young adults increased during the ten years. The modelled trend in rate showed a statistically significant annual increase of 2.6% [95% CI 1.5 to 3.7%].
- The rate of **injury ED presentations** among adolescents and young adults decreased during the ten years. The modelled trend in rate showed a statistically significant annual decrease of -1.8% [95% CI -2.5 to -1.1%].
- The age-specific rates of **injury admissions** and **injury ED presentations** among the age groups 15-19 and 20-24 years are shown in figures 23 and 24, respectively.

FIGURE 23: TREND IN INJURY HOSPITAL ADMISSION RATES PER 100,000 ADOLESCENT & YOUNG ADULTS, VICTORIA 2010/11-2019/20

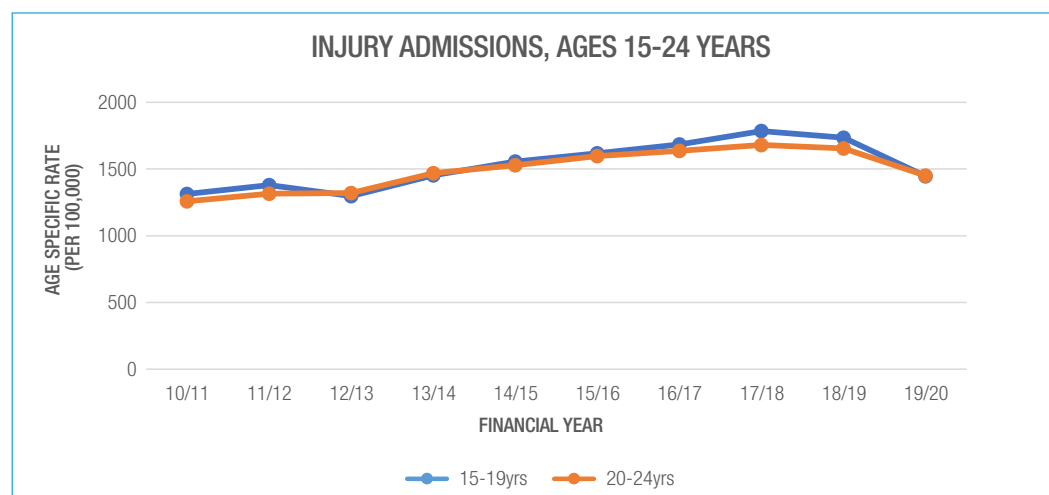
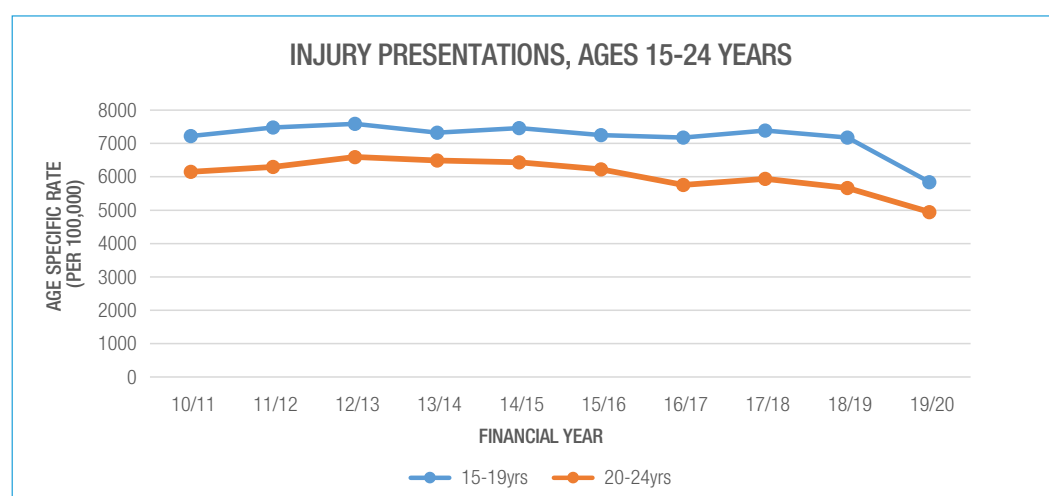


FIGURE 24: TREND IN INJURY ED PRESENTATION RATES PER 100,000 ADOLESCENT & YOUNG ADULTS, VICTORIA 2010/11-2019/20



HOSPITAL TREATED INJURY - GENDER AND AGE

- Males were overrepresented in hospital-treated injury cases among adolescents and young adults, accounting for 69.9% of hospital admissions (n=8,693) and 64.2% of ED presentations (n=29,438) in 2019/20 (Figure 25 & Figure 26).
- Among hospital admissions there was a higher proportion in the 20-24 year age group (55.8%) compared to the 15-19 year age group (44.2%). ED presentations were evenly spread across both the 5-year age groups.

FIGURE 25: ADOLESCENT AND YOUNG ADULT HOSPITAL ADMISSIONS BY GENDER AND AGE, VICTORIA 2019/20

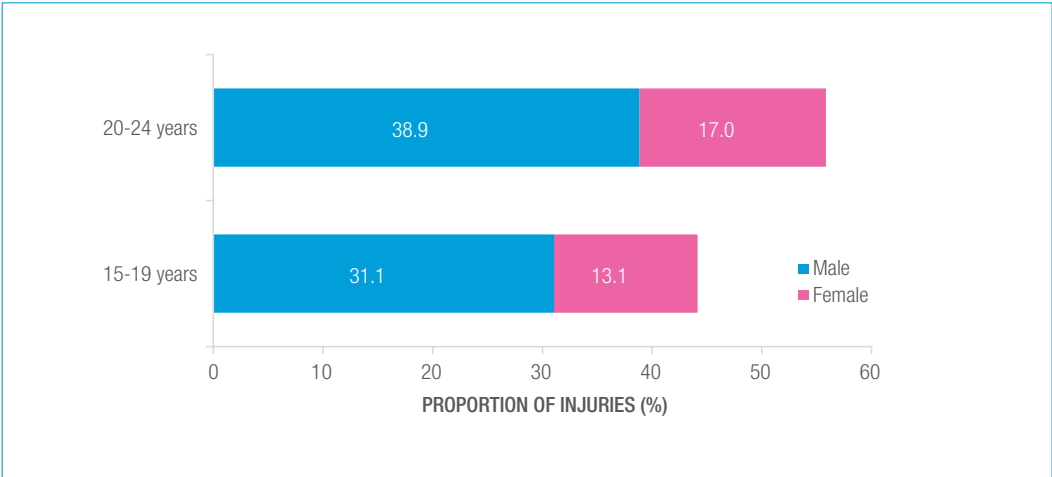
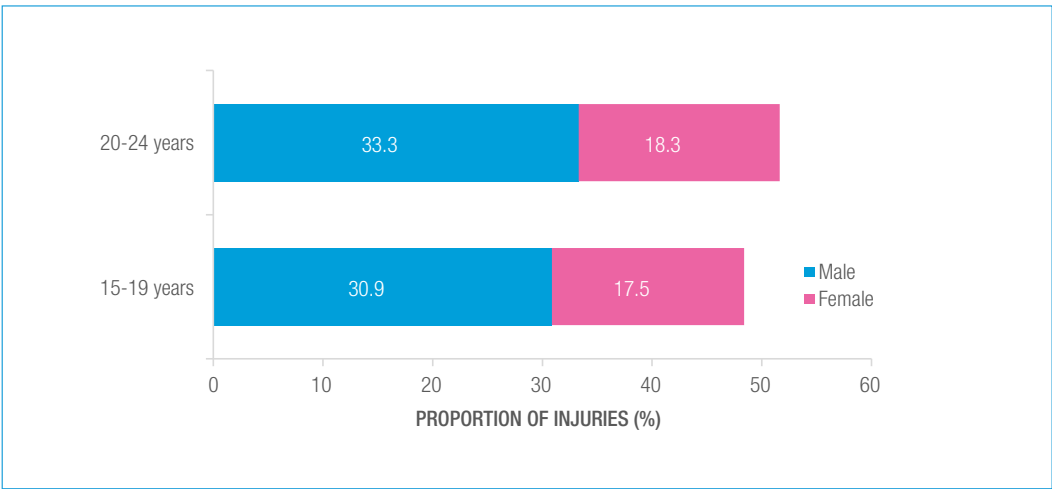


FIGURE 26: ADOLESCENT AND YOUNG ADULT ED PRESENTATIONS BY GENDER AND AGE, VICTORIA 2019/20



- Among adolescents and young adults, age-specific injury admission and ED presentation rates were higher for males than females: 1,958.6 vs. 901.4 per 100,000 population; 6,632.5 vs. 3,962.4 per 100,000 population (Table 7).
- For admissions the rates per 100,000 population were similar for both age groups, whereas for ED presentations the rates per 100,000 population were higher in the 15-19 year age group than the 20-24 year age group.

**TABLE 7: FREQUENCY AND AGE-SPECIFIC RATE OF INJURY ADMISSIONS AND ED PRESENTATIONS IN ADOLESCENTS AND YOUNG ADULTS BY GENDER AND AGE, VICTORIA 2019/20**

AGE GROUP	GENDER	HOSPITAL ADMISSIONS		ED PRESENTATIONS	
		n	RATE PER 100,000 POPULATION	n	RATE PER 100,000 POPULATION
15-19 years	Male	3,862	1,979.3	14,161	7,257.6
	Female	1,627	881.0	8,031	4,348.6
	All	5,489	1,445.2	22,192	5,843.1
20-24 years	Male	4,831	1,942.3	15,277	6,142.1
	Female	2,112	917.8	8,405	3,652.5
	All	6,943	1,450.0	23,682	4,945.7
All	Male	8,693	1,958.6	29,438	6,632.5
	Female	3,739	901.4	16,436	3,962.4
	All	12,432	1,447.9	45,874	5,342.6

## LEADING CAUSES OF INJURY

- Four of the five leading causes of adolescent and young adult injury were the same for admissions and ED presentations although the ranking on frequency of cases was different (Figure 27 & Figure 28).
- Transport was the leading cause of adolescent and young adult hospital admissions (24.3%, n=3,025) but only accounted for 10.1% of ED presentations (n=4,622).
- Falls was the second most common cause of hospital admissions (18.1%, n=2,256) and the leading cause of ED presentations (25.3%, n=11,625) in this age group.
- Hit/struck/crush injuries accounted for 13.8% of hospital admissions (n=1,713) and were the second most common cause of ED presentations (21.7%, n=9,971).
- Cutting and piercing injuries accounted for 11.8% of admissions (n=1,464) and 10.6% of ED presentations (n=4,874).
- The fifth ranking cause of adolescent and young adult hospital admissions was overexertion and strenuous movements (4.1%, n=508), whereas for ED presentations it was injuries caused by a foreign body in a natural orifice e.g. ear, nose, eye (3.7%, n=1,688).

FIGURE 27: ADOLESCENT AND YOUNG ADULT INJURY HOSPITAL ADMISSIONS BY CAUSE, VICTORIA 2019/20

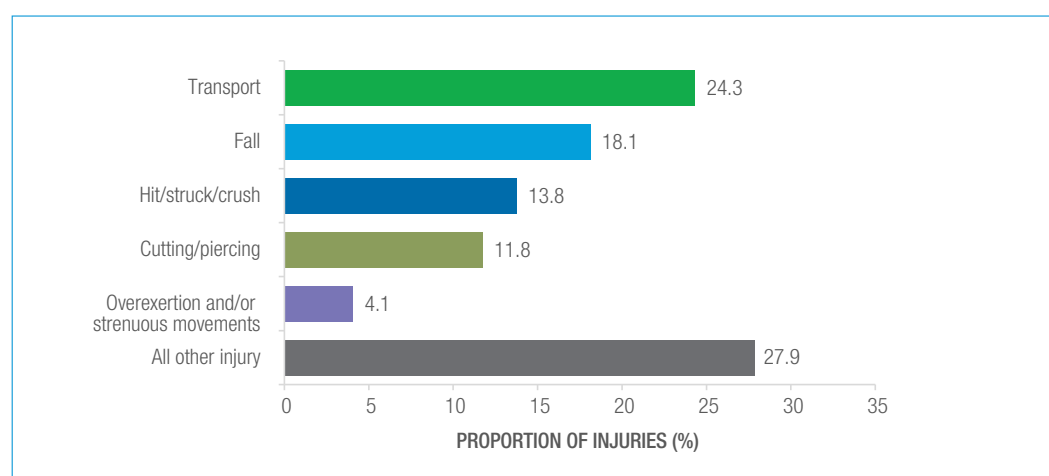
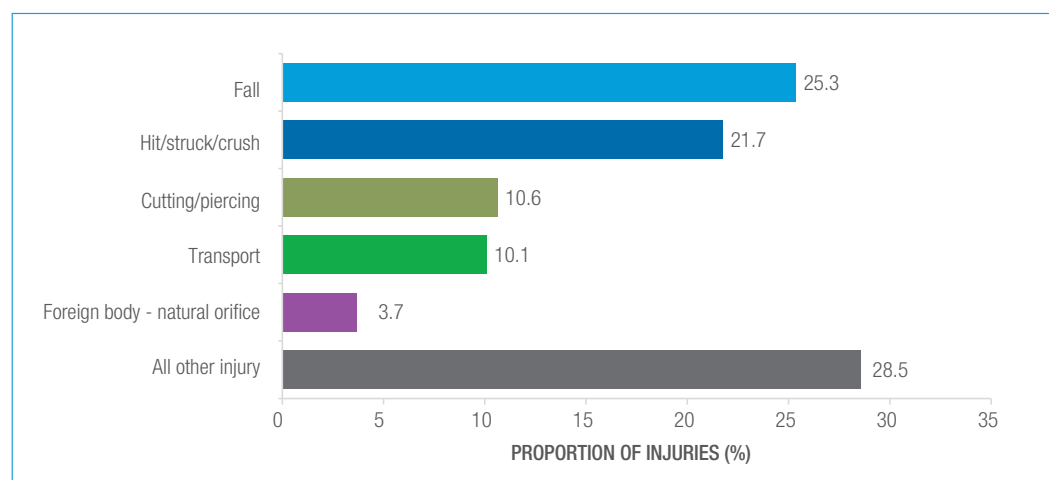


FIGURE 28: ADOLESCENT AND YOUNG ADULT INJURY ED PRESENTATIONS BY CAUSE, VICTORIA 2019/20



Note: 'Other specified' and 'unspecified' cases were included in the 'All other injury' category regardless of their ranking

MAJOR INJURY TYPE (BODY SITE AND NATURE OF INJURY)

Figure 29 & Figure 30 show the five most common injury types for adolescent and young adult hospital admissions and ED presentations.

- Fracture to the upper limb accounted for 18.3% (n=2,273) of injury admissions and 10.2% of ED presentations (n=4,659).
- Dislocations, sprains and strains to the lower limb were common among admissions (8.5%, n=1,052) and were the most common type of injury among ED presentations (11.9%, n=5,479).
- Open wounds to the upper limb were common among admissions (9.0%, n=1,114) and ED presentations (8.8%, n=4,019). Fractures to the lower limb (8.9%, n=1,112) were common among admissions and accounted for 4.8% of ED presentations (n=2,207).
- Dislocations, sprains and strains to the upper limb were also common among ED presentations (8.6%, n=3,950).
- Intracranial injuries accounted for 5.2% of admissions (n=649).

FIGURE 29: MAJOR INJURY TYPE, ADOLESCENT AND YOUNG ADULT HOSPITAL ADMISSIONS, VICTORIA 2019/20

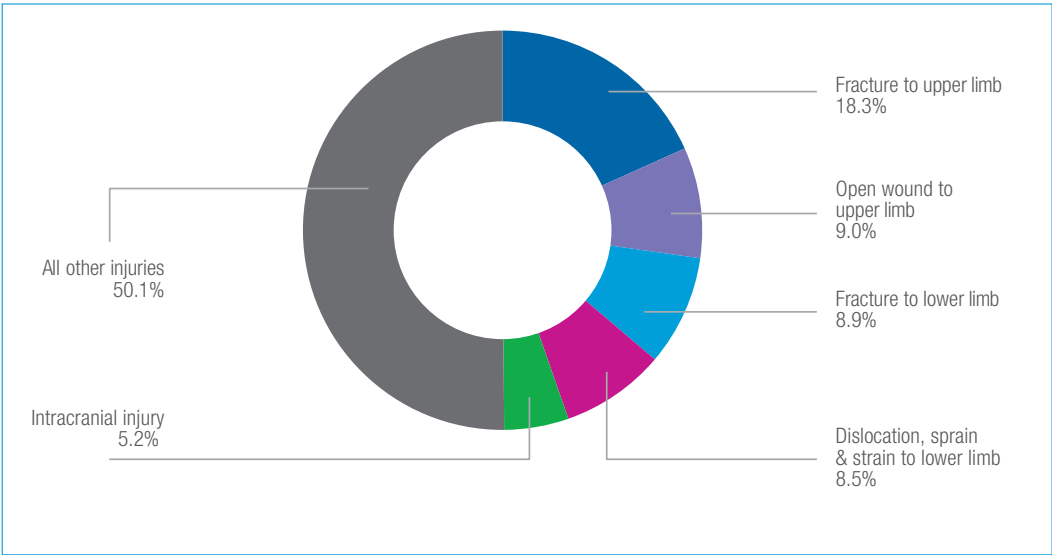
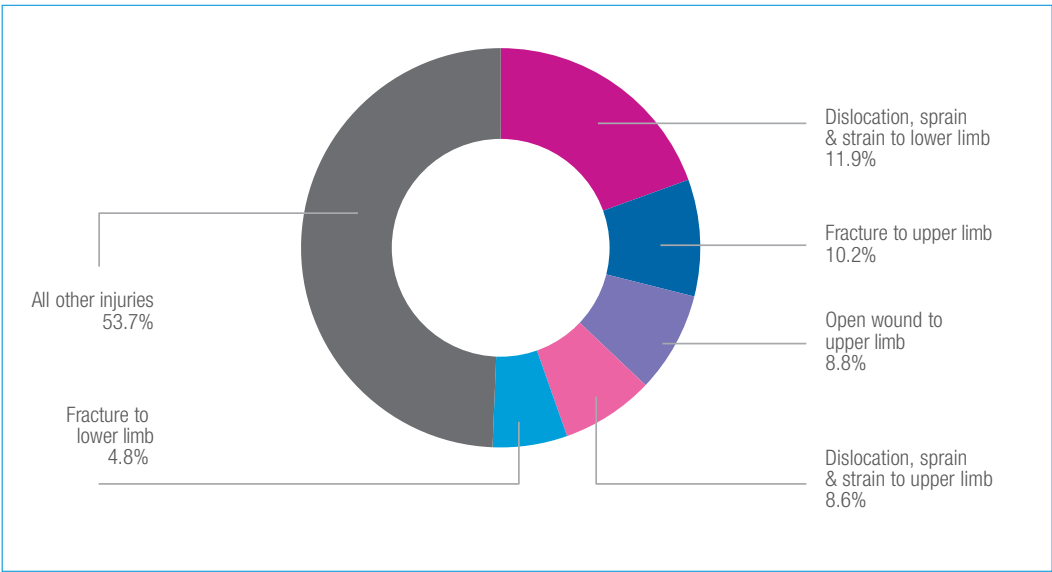


FIGURE 30: MAJOR INJURY TYPE, ADOLESCENT AND YOUNG ADULT ED PRESENTATIONS, VICTORIA 2019/20



SETTING

- Setting where the injury occurred was unspecified in 48.6% of adolescent and young adult injury admissions and 19.0% of ED presentations.
- The road, street and highway (15.9%, n=1,972) and sports settings (14.7%, n=1,822) were the most common settings resulting in hospital admissions (Figure 31). Another common setting among admissions was the home (9.3%, n=1,153).
- Among ED presentations, the home (28.8%, n=13,192) and sports settings (13.7%, n=6,265) were the most common places of injury occurrence (Figure 32). Another common setting was the road, street and highway (7.9%, n=3,634).

FIGURE 31: ADOLESCENT AND YOUNG ADULT INJURY HOSPITAL ADMISSIONS BY SETTING, VICTORIA 2019/20

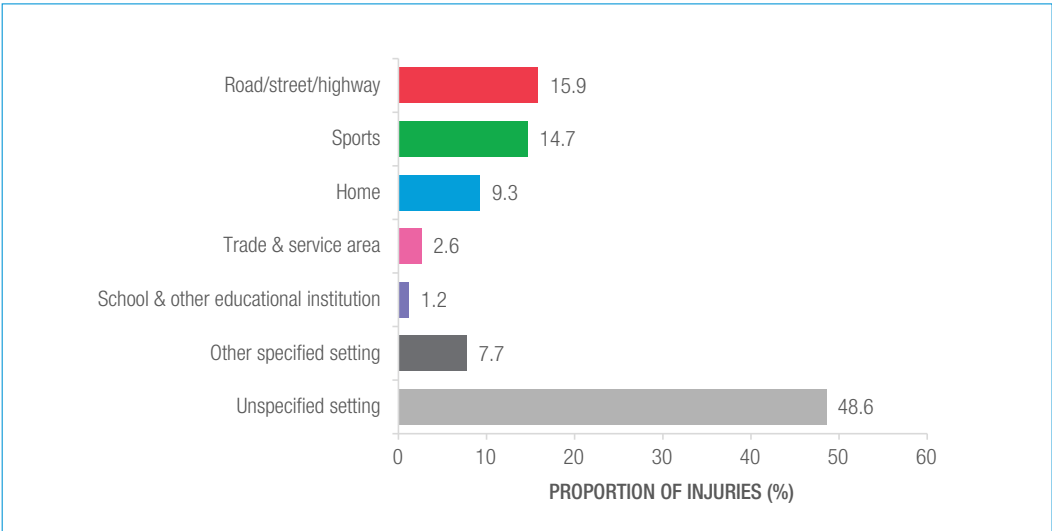
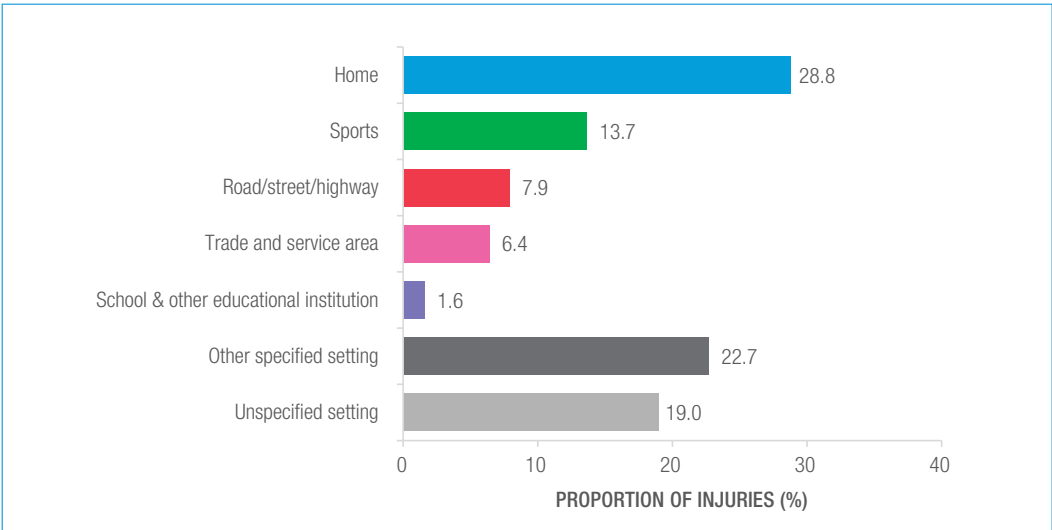


FIGURE 32: ADOLESCENT AND YOUNG ADULT INJURY ED PRESENTATIONS BY SETTING, VICTORIA 2019/20



# ADULTS (25-64 YEARS)

## TREND

- During the 10-year period 2010/11 to 2019/20, there were on average 39,063 injury admissions and 125,433 injury ED presentations per year among adults aged 25-64 years. The average age-standardised injury rates were 1,384 admissions and 3,994 ED presentations per 100,000 adults per year.
- The rate of **injury admissions** among adults increased during the ten years. The modelled trend in rate showed a statistically significant annual increase of 4.3% [95% CI 3.4 to 5.2%].
- The rate of **injury ED presentations** among adults did not show a statistically significant consistent upward or downward trend over the ten year period.
- The age-specific rates of injury admissions and injury ED presentations among the age groups 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64 years are shown in figures 33 and 34, respectively.

FIGURE 33: TREND IN INJURY HOSPITAL ADMISSION RATES PER 100,000 ADULTS, VICTORIA 2010/11-2019/20

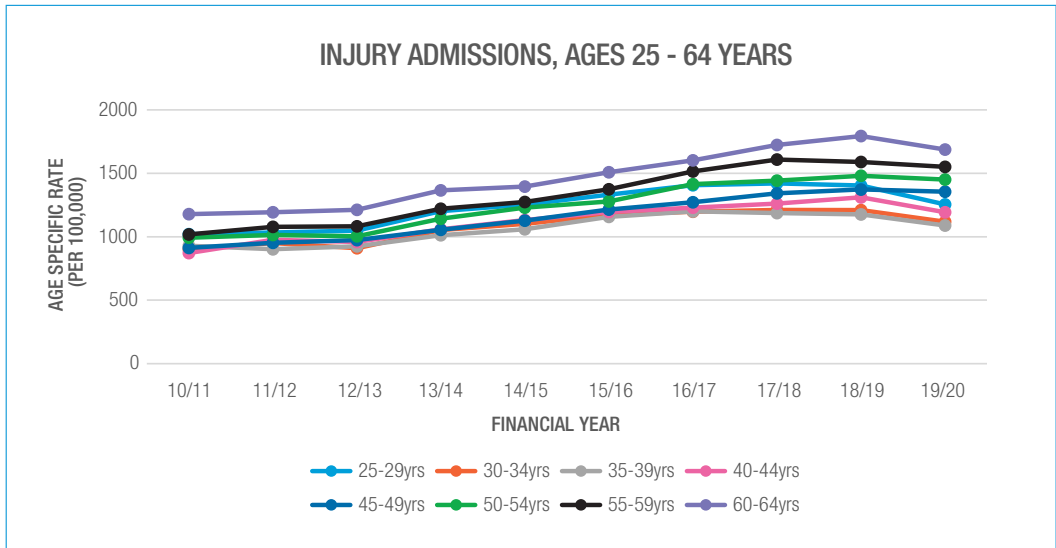
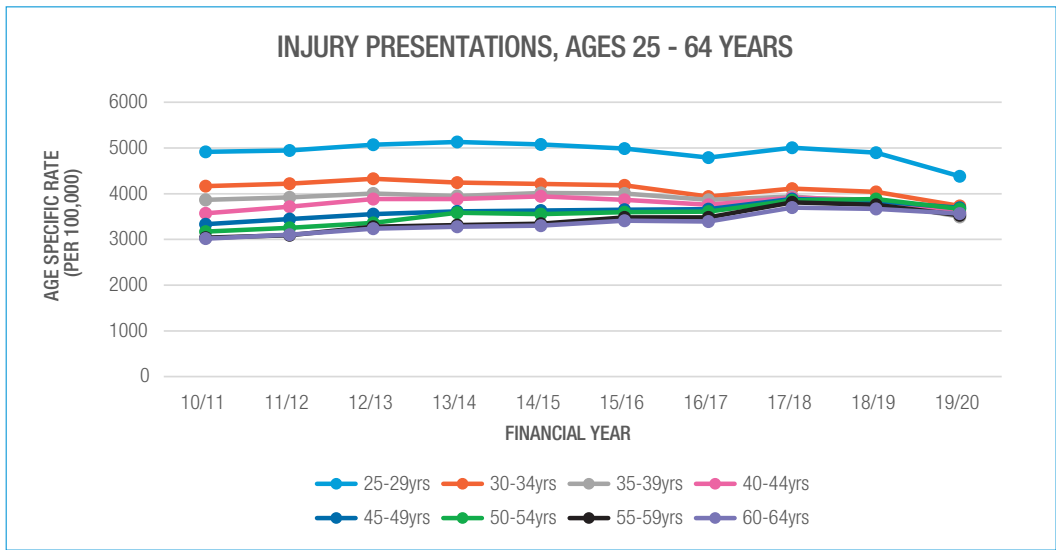


FIGURE 34: TREND IN INJURY ED PRESENTATION RATES PER 100,000 ADULTS, VICTORIA 2010/11-2019/20





HOSPITAL TREATED INJURY - GENDER AND AGE

- Males were overrepresented in hospital injury data for adults aged 25 to 64 years, accounting for 61.1% of hospital admissions (n=28,496) and 59.5% of ED presentations (n=78,742) in 2019/20 (Figure 35 & Figure 36).
- The proportion of injuries was fairly evenly distributed among all age groups for admissions whereas a decrease can be seen with increasing age for ED presentations.

FIGURE 35: ADULT INJURY HOSPITAL ADMISSIONS BY GENDER AND AGE, VICTORIA 2019/20

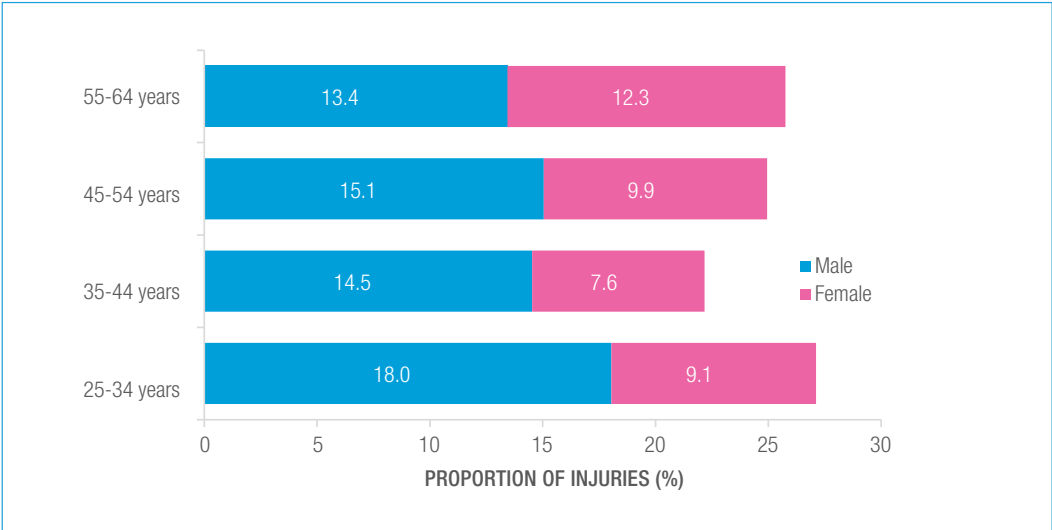
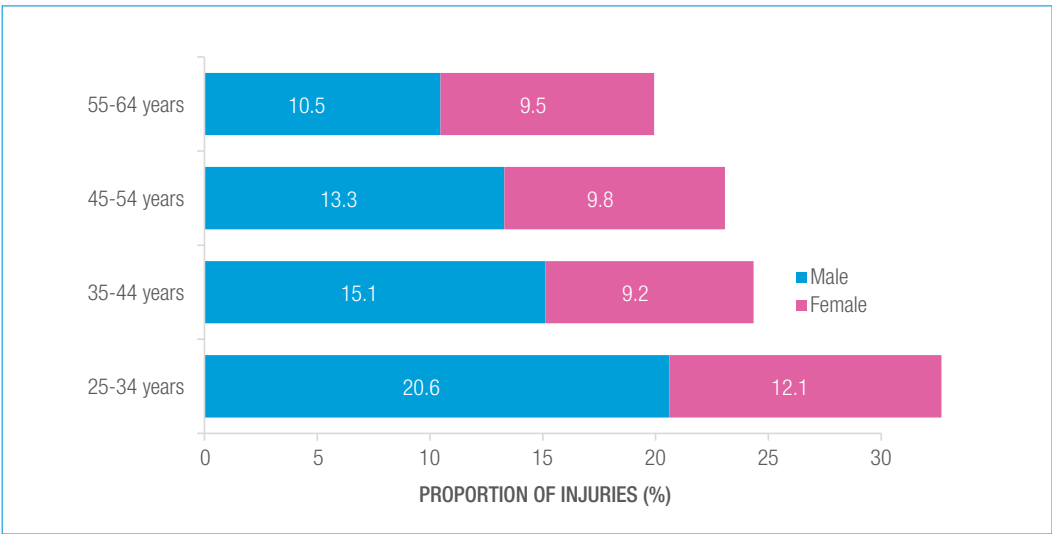


FIGURE 36: ADULT INJURY ED PRESENTATIONS BY GENDER AND AGE, VICTORIA 2019/20



- The total age-specific injury admission and ED presentation rates were higher for males compared with females: 1,628.4 vs. 1,009.0 per 100,000 population (admissions) and 4,499.7 vs. 2,981.1 per 100,000 population (presentations).
- Overall rates (male and female combined) were highest in the 55-64 years age group for admissions and in the 25-34 years group for ED presentations (Table 8).

**TABLE 8: FREQUENCY AND AGE-SPECIFIC RATE OF INJURY ADMISSIONS AND ED PRESENTATIONS IN ADULTS BY GENDER AND AGE, VICTORIA 2019/20**

AGE GROUP	GENDER	HOSPITAL ADMISSIONS		ED PRESENTATIONS	
		n	RATE PER 100,000 POPULATION	n	RATE PER 100,000 POPULATION
25-34 years	Male	8,418	1,581.5	27,283	5,125.7
	Female	4,234	793.6	15,971	2,993.4
	All	12,652	1,187.1	43,254	4,058.3
35-44 years	Male	6,783	1,498.8	20,016	4,422.7
	Female	3,561	779.1	12,205	2,670.2
	All	10,344	1,137.1	32,221	3,542.1
45-54 years	Male	7,024	1,736.8	17,595	4,350.8
	Female	4,616	1,083.3	12,945	3,037.9
	All	11,640	1,401.5	30,540	3,677.2
55-64 years	Male	6,271	1,738.7	13,848	3,839.5
	Female	5,752	1,500.8	12,540	3,271.8
	All	12,023	1,616.1	26,388	3,547.1
All	Male	28,496	1,628.4	78,742	4,499.7
	Female	18,163	1,009.0	53,661	2,981.1
	All	46,659	1,314.4	132,403	3,729.7

## LEADING CAUSES OF INJURY

- Four of the five leading causes of adult injury were the same for admissions and ED presentations although the ranking on frequency of cases was different (Figure 37 & Figure 38).
- The leading cause of adult injury admissions and ED presentations was falls, accounting for 29.7% (n=13,861) of hospital admissions and 27.1% (n=35,887) of ED presentations.
- Transport accounted for 19.8% of admissions (n=9,247) but only 9.1% of ED presentations (n=12,034).
- Cutting and piercing injuries accounted for 11.4% of admissions (n=5,305) and 11.6% of ED presentations (n=15,348).
- Hit/struck/crush injuries accounted for just 8.3% of admissions (n=3,860) but 16.0% of ED presentations (n=21,208).
- The fifth ranking cause of hospital admissions was natural/environmental/animals related injury (5.2%, n=2,445) whereas for ED presentations it was injuries caused by a foreign body in a natural orifice e.g. ear, nose, eye (5.9%, n=7,859).

FIGURE 37: ADULT INJURY HOSPITAL ADMISSIONS BY CAUSE, VICTORIA 2019/20

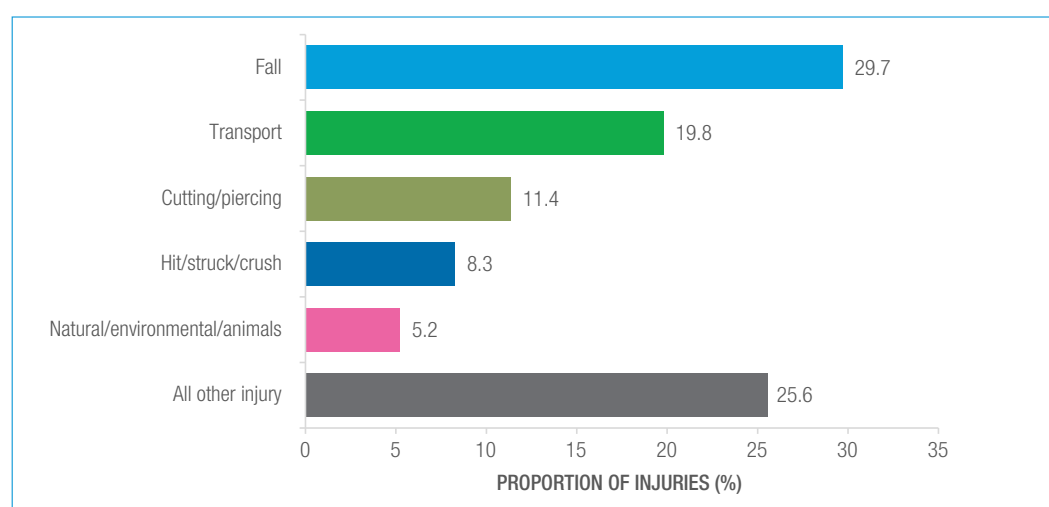
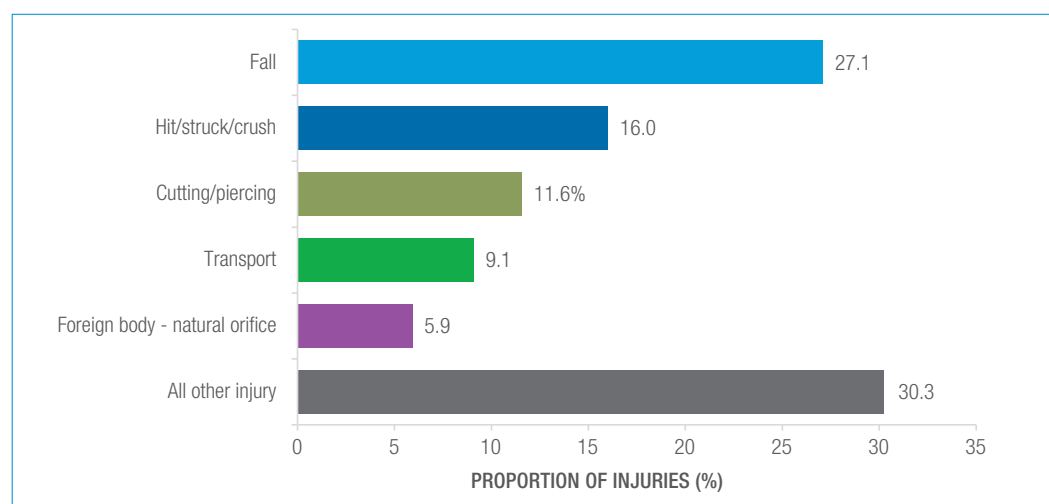


FIGURE 38: ADULT INJURY ED PRESENTATIONS BY CAUSE, VICTORIA 2019/20



Note: 'Other specified' and 'unspecified' cases were included in the 'All other injury' category regardless of their ranking

MAJOR INJURY TYPE (BODY SITE AND NATURE OF INJURY)

- Figure 39 and Figure 40 show the five most common injury types for adult hospital admissions and ED presentations.
- Fracture to the upper limb accounted for 16.4% (n=7,675) of admissions. Fracture to the lower limb was the second most common type of injury requiring hospital admission (11.0%, n=5,111), followed by open wound to upper limb (9.8%, n=4,581).
- Open wound to the upper limb (9.8%, n=12,994), fracture to the upper limb (8.8%, n=11,652) and dislocation, sprain and strain to the lower limb (8.3%, n=11,000) were the most common types of injury among ED presentations.

FIGURE 39: MAJOR INJURY TYPE, ADULT HOSPITAL ADMISSIONS, VICTORIA 2019/20

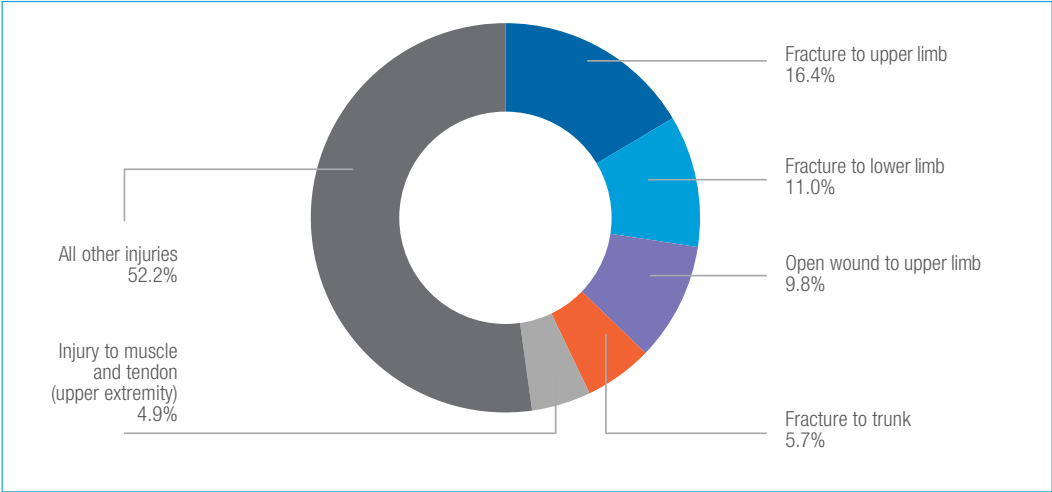
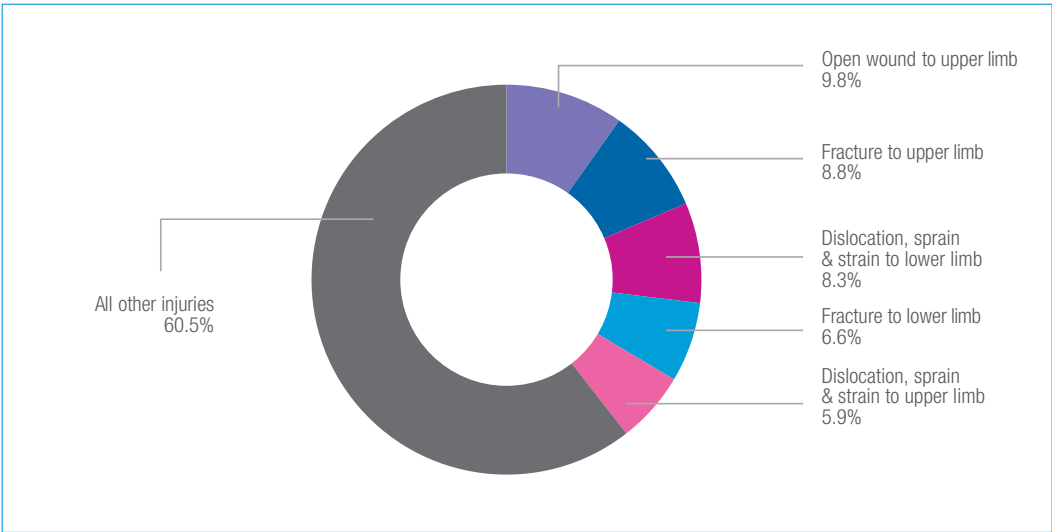


FIGURE 40: MAJOR INJURY TYPE, ADULT ED PRESENTATIONS, VICTORIA 2019/20



## SETTING

- Setting where the injury occurred was unspecified in 48.7% of adult injury admissions and 23.3% of adult injury ED presentations.
- Twenty percent of injuries requiring hospital admission (n=9,114) and 38.9% of injuries resulting in ED presentation (n=51,532) occurred in the home (Figure 41 & Figure 42).
- Other settings where injuries to adults commonly occurred were:
  - Roads, streets and highways (15.4% of admissions (n=7,169) and 8.3% of ED presentations (n=11,050))
  - Sports and athletics setting (4.9% of admissions (n=2,269) and 4.2% of ED presentations (n=5,612))
  - Trade and service areas (2.9% of admissions (n=1,351) and 6.1% of ED presentations (n=8,031))

FIGURE 41: ADULT INJURY HOSPITAL ADMISSIONS BY SETTING, VICTORIA 2019/20

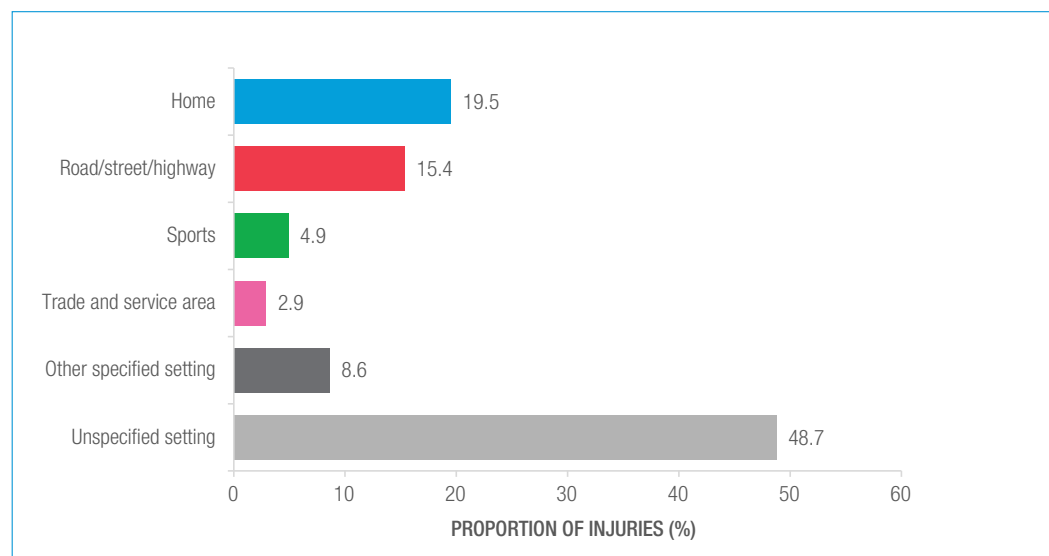
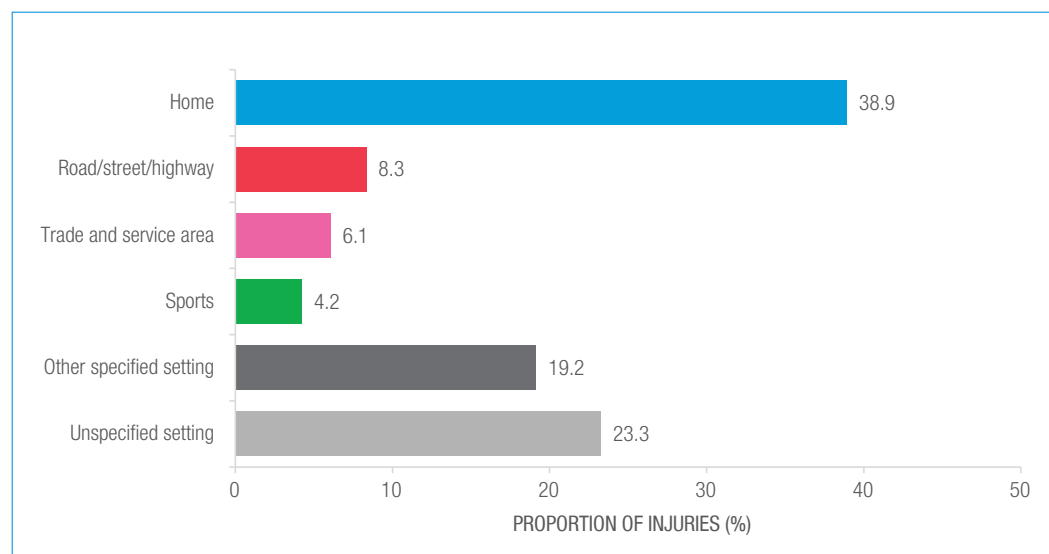


FIGURE 42: ADULT INJURY ED PRESENTATIONS BY SETTING, VICTORIA 2019/20



# OLDER ADULTS (65 YEARS AND OLDER)

## TREND

- During the 10-year period 2010/11 to 2019/20, there were on average 34,706 injury admissions and 44,544 injury ED presentations per year among older adults aged 65 years and above. The average age-standardised injury rates were 4,300 admissions and 5,182 ED presentations per 100,000 older adults per year.
- The rate of **injury admissions** among older adults increased during the ten years. The modelled trend in rate showed a statistically significant annual increase of 3.9% [95% CI 3.4 to 4.4%].
- The rate of **injury ED presentations** among older adults increased during the ten year. The modelled trend in rate showed a statistically significant annual increase of 1.5% [95% CI 1.1 to 1.8%].
- The age-specific rates of injury admissions and injury ED presentations among the age groups 65-69, 70-74, 75-79, 80-84, 85-89, 90-94 and 95+ years are shown in figures 43 and 44, respectively.

FIGURE 43: TREND IN INJURY HOSPITAL ADMISSION RATES PER 100,000 OLDER ADULTS, VICTORIA 2010/11-2019/20

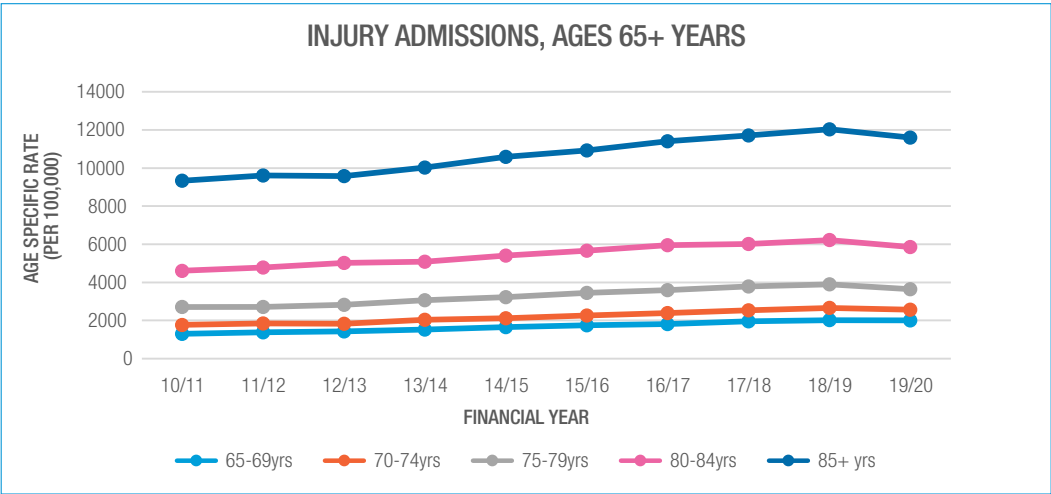
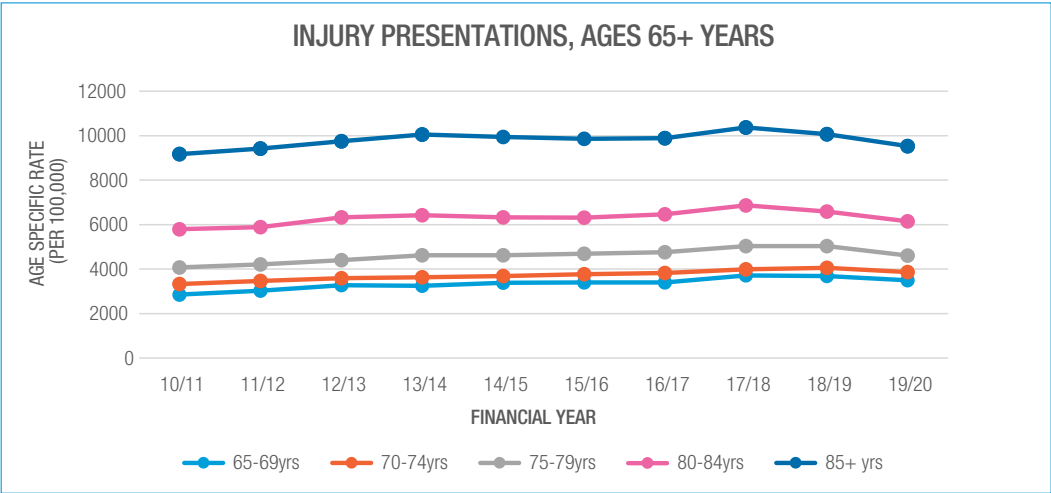


FIGURE 44: TREND IN INJURY ED PRESENTATION RATES PER 100,000 OLDER ADULTS, VICTORIA 2010/11-2019/20



HOSPITAL TREATED INJURY - GENDER AND AGE

- Females were overrepresented in hospital injury data for persons aged 65 years and older. They accounted for 61.4% of hospital admissions (n=26,856) and 56.0% of ED presentations (n=28,686) in 2019/20 (Figure 45 & Figure 46).
- The highest proportion of admissions to hospital occurred among those aged 75-84 and 85-94 years. Persons aged 65-74 years accounted for 41.4% (n=21,191) of the injury ED presentations among older adults. The number of ED presentations declined with increasing age.

FIGURE 45: OLDER ADULT INJURY HOSPITAL ADMISSIONS BY GENDER AND AGE, VICTORIA 2019/20

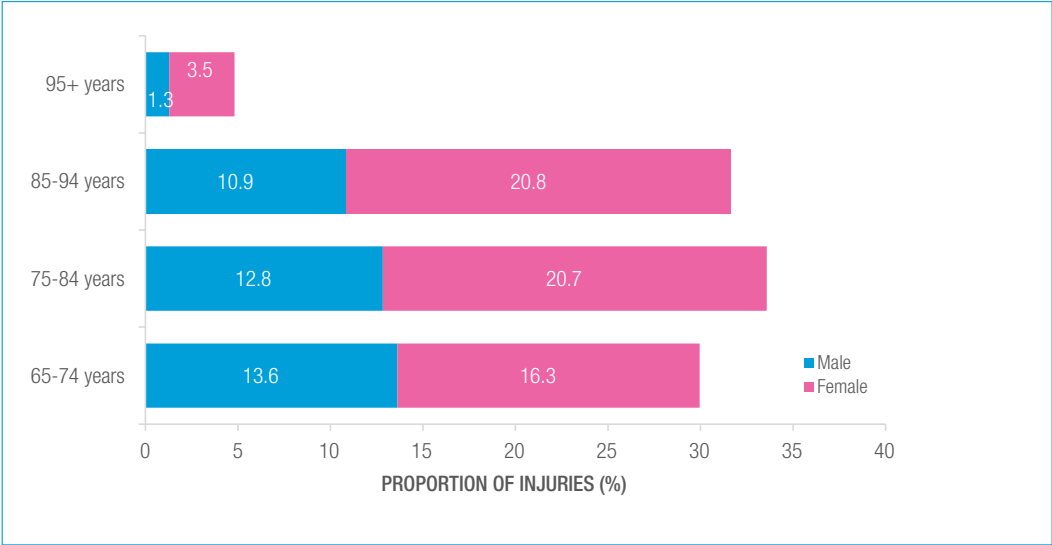
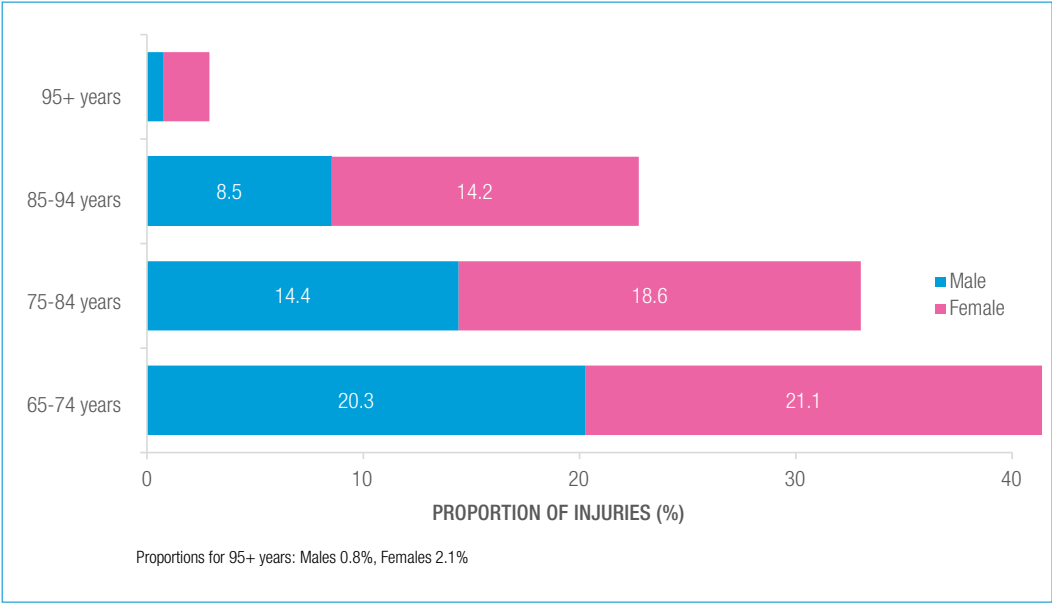


FIGURE 46: OLDER ADULT INJURY ED PRESENTATIONS BY GENDER AND AGE, VICTORIA 2019/20





- The overall age-specific rate of injury admission and ED presentation was higher for females than males: 4,824.6 vs. 3,511.4 per 100,000 population (admissions) and 5,153.4 vs. 4,682.4 per 100,000 population (presentations) (Table 9).
- The rate of admissions and ED presentations increased with age among older adults.

**TABLE 9: FREQUENCY AND AGE-SPECIFIC RATE OF INJURY ADMISSIONS AND ED PRESENTATIONS IN OLDER ADULTS BY GENDER AND AGE, VICTORIA 2019/20**

AGE GROUP	GENDER	HOSPITAL ADMISSIONS		ED PRESENTATIONS	
		n	RATE PER 100,000 POPULATION	n	RATE PER 100,000 POPULATION
65-74 years	Male	5,956	2,138.0	10,385	3,727.9
	Female	7,150	2,389.6	10,806	3,611.5
	All	13,106	2,268.3	21,191	3,667.6
75-84 years	Male	5,613	3,757.2	7,382	4,941.3
	Female	9,078	5,249.3	9,518	5,503.7
	All	14,691	4,557.7	16,900	5,243.0
85-94 years	Male	4,762	9,721.9	4,362	8,905.3
	Female	9,084	12,103.4	7,280	9,699.8
	All	13,846	11,163.0	11,642	9,386.1
95+ years	Male	563	13,514.2	399	9,577.5
	Female	1,544	16,350.7	1,082	11,458.2
	All	2,107	15,482.4	1,481	10,882.5
All	Male	16,894	3,511.4	22,528	4,682.4
	Female	26,856	4,824.6	28,686	5,153.4
	All	43,750	4,215.8	51,214	4,935.0

LEADING CAUSES OF INJURY

- The leading cause of injury admissions and ED presentations for older adults was falls. Falls accounted for more than three-quarters of hospital admissions (77.8%, n=34,030) and more than half of ED presentations (59.8%, n=30,627) in this age group (Figure 47 & Figure 48).
- Transport was the second most common cause of hospital admission (5.1%, n=2,247) and the cause of 4.1% of ED presentations (n=2,105). The second most common cause for ED presentations in this age group was hit/struck/crush (5.7%, n=2,914).
- The third leading cause of admissions was hit/struck/crush (2.4%, n=1,058), whereas for ED presentations it was cutting and piercing (4.8%, n=2,466).
- Cutting and piercing and overexertion and/or strenuous movements each accounted for around 2% of admissions (n=966 and 802 respectively), while injuries caused by a foreign body in a natural orifice, e.g. ear, nose, eye, accounted for 2.8% (n=1,415) of ED presentations.

FIGURE 47: OLDER ADULT INJURY HOSPITAL ADMISSIONS BY CAUSE, VICTORIA 2019/20

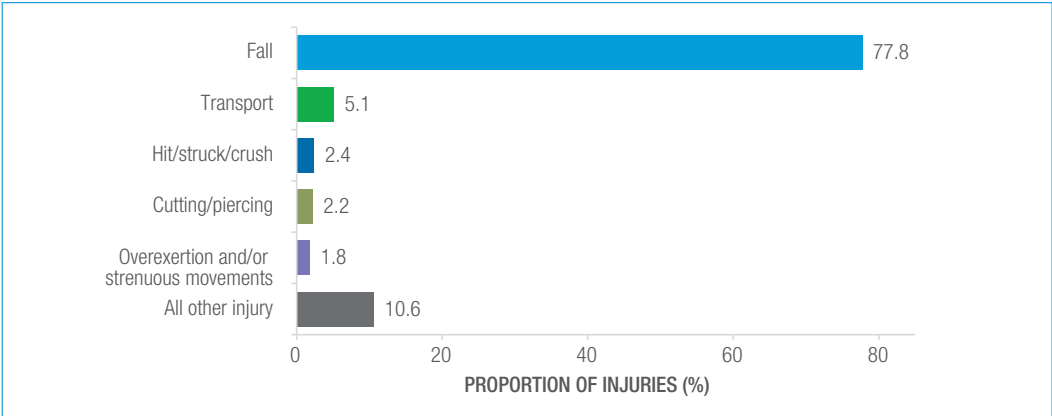
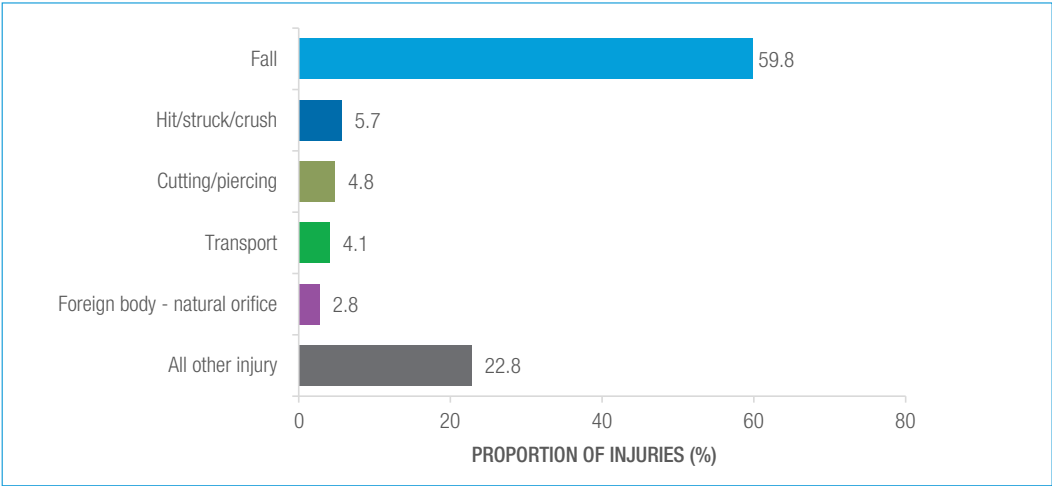


FIGURE 48: OLDER ADULT INJURY ED PRESENTATIONS BY CAUSE, VICTORIA 2019/20



Note: 'Other specified' and 'unspecified' cases were included in the 'All other injury' category regardless of their ranking

MAJOR INJURY TYPE (BODY SITE AND NATURE OF INJURY)

Figure 49 & Figure 50 show the five most common injury types for older adult hospital admissions and ED presentations.

- Fracture to the lower limb accounted for 18.0% of injury hospital admissions (n=7,881) and 12.0% (n=6,129) of ED presentations.
- Fractures to the trunk accounted for 12.6% of hospital admissions (n=5,500) and 5.2% of ED presentations (n=2,670).
- Fracture to the upper limb accounted for 12.4% (n=5,432) of hospital admissions and 10.4% (n=5,349) of ED presentations.
- Open wounds to the head/face/neck accounted for 7.6% (n=3,323) of hospital admissions.
- Superficial injuries to the head/face/neck accounted for 4.8% (n=2,116) of hospital admissions and 5.2% (n=2,869) of ED presentations.
- Dislocations, sprains and strains to the lower limb (5.2%, n=2,685) were also common among ED presentations.

FIGURE 49: MAJOR INJURY TYPE, OLDER ADULT HOSPITAL ADMISSIONS, VICTORIA 2019/20

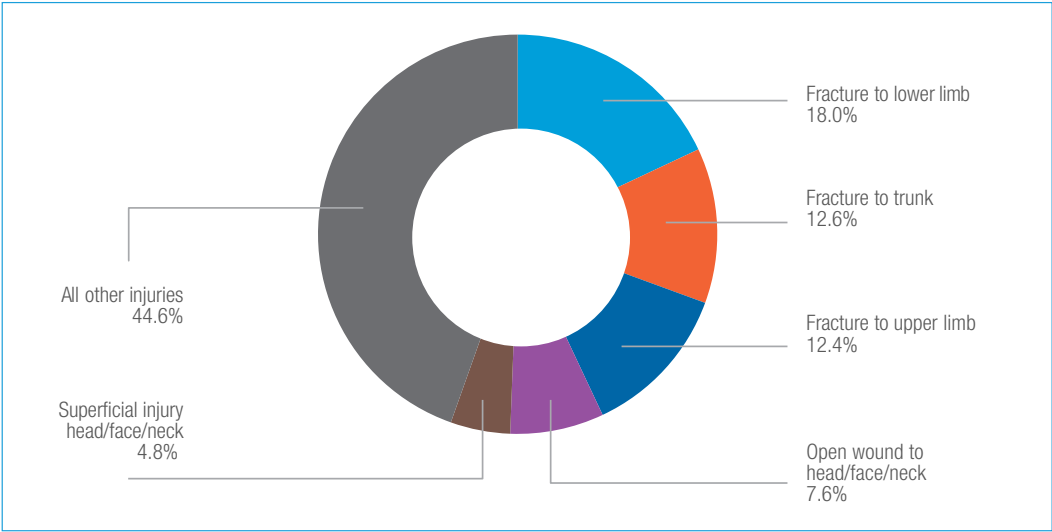
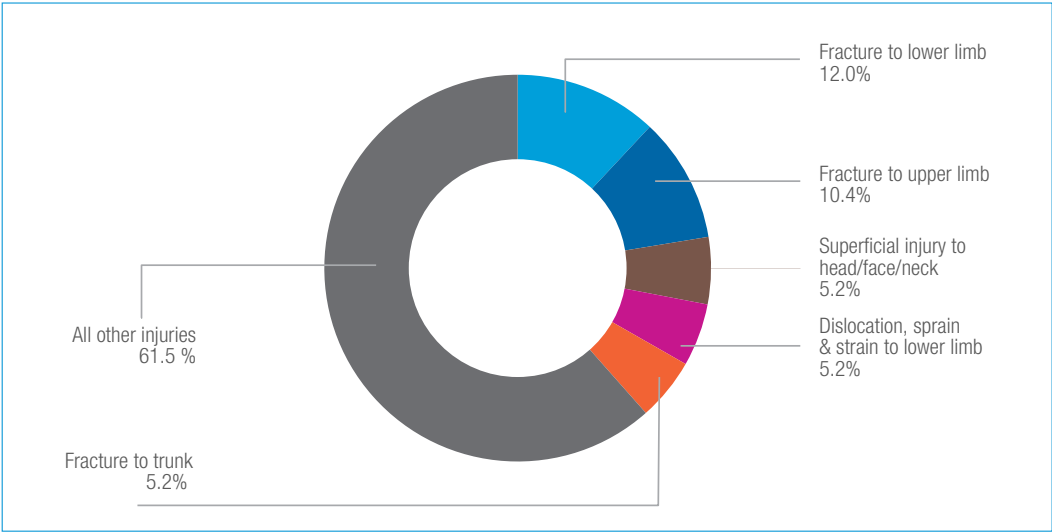


FIGURE 50: MAJOR INJURY TYPE, OLDER ADULT ED PRESENTATIONS, VICTORIA 2019/20



SETTING

- Setting where the injury occurred was unspecified in 25.4% of older adult injury admissions and 21.3% of older adult injury ED presentations.
- Around 43% of older adult injuries requiring hospital admission (n=18,781) and more than half of ED presentations (54.0%, n=27,634) occurred in the home (Figure 51 & Figure 52).
- Other settings where injuries to older adults commonly occurred were:
  - Residential institutions (16.9% of admissions (n=7,399) and 7.1% of ED presentations (n=3,643)
  - Roads, streets and highways (7.3% of admissions (n=3,199) and 5.8% of ED presentations (n=2,955))
  - Trade and service areas (2.7% of admissions, n=1,186) and health service areas (1.2% of ED presentations (n=592))

FIGURE 51: OLDER ADULT INJURY HOSPITAL ADMISSIONS BY SETTING, VICTORIA 2019/20

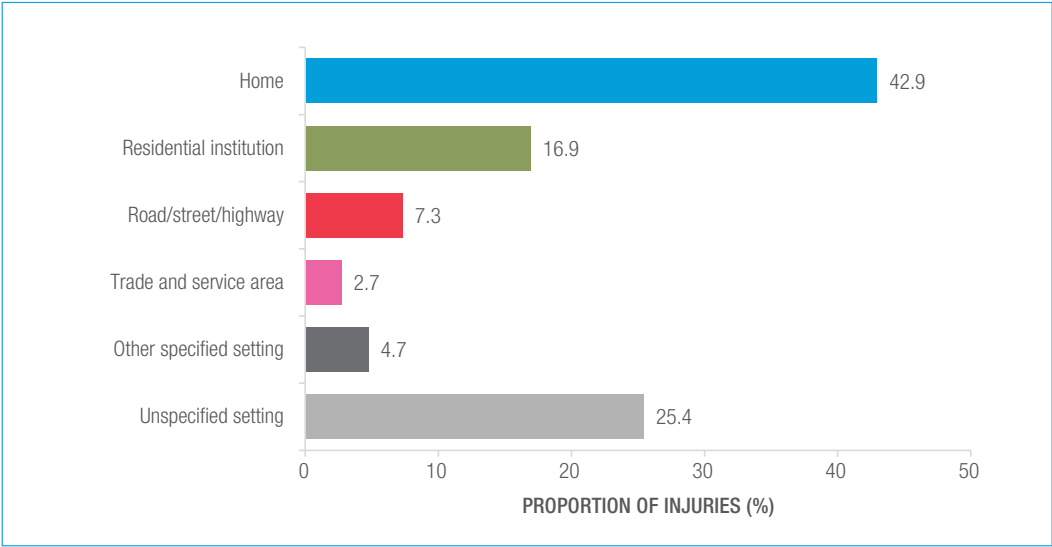
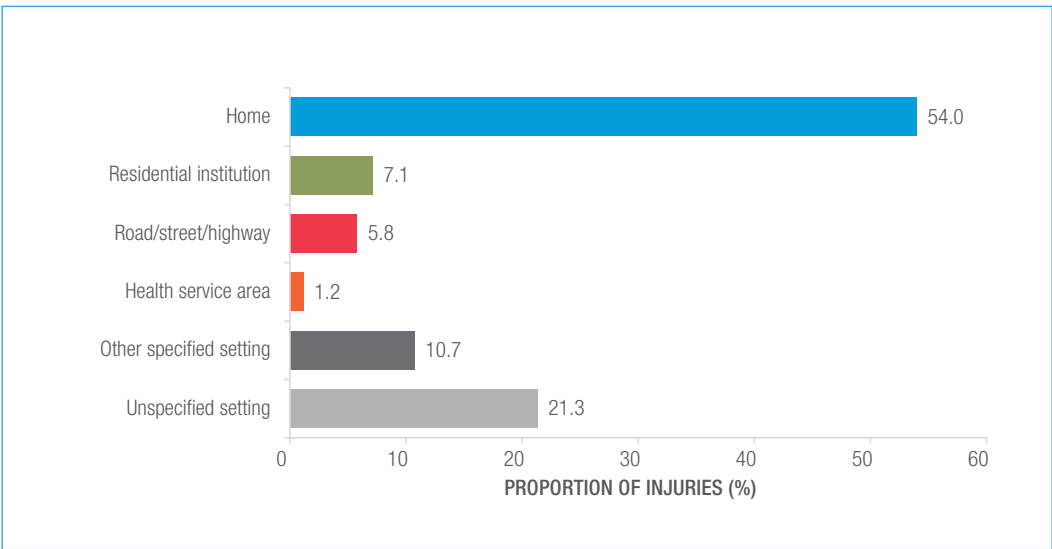


FIGURE 52: OLDER ADULT INJURY ED PRESENTATIONS BY SETTING, VICTORIA 2019/20



# APPENDIX 1

## VISU DEFINITIONS

**'Injury':** Injury is commonly defined as: 'any unintentional or intentional damage to the body ... caused by acute exposure to physical agents such as mechanical energy, heat, electricity, chemicals, and ionizing radiation interacting with the body in amounts or at rates that exceed the threshold of human tolerance'.

**'Unintentional injury':** Injuries that are unintended, often described as 'accidents'. We try to avoid using the term 'accidents' as it implies that injuries are random events due to chance.

**'Intentional injury':** Injuries that are the result of intended acts by people i.e., harm of one person by another (assault, homicide, neglect) or self-harm.

An injury **'death'** is defined as an injury or poisoning by an external cause (transport crash, fall, suicide, drowning etc.) that results in a person dying either in or out of hospital. In Victoria (and in other Australian States and Territories) all deaths by external causes must be reported to the State Coroner.

An injury **'hospital admission'** is defined as an injury or poisoning that results in the person being admitted to an inpatient bed (a ward, short stay observation unit, emergency medical unit, medical assessment and planning unit, intensive care bed, mental health bed or coronary care unit) and subsequently discharged alive either on the same day (after at least 4 hours from the time patient management commences) or after one or more nights' stay in a hospital bed. Prior to July 2012 this definition included patients who had their entire care within the ED. From July 2012 if the patient's entire care was provided within a designated emergency department or urgent care centre then the patient is no longer classified as an admission.

An injury **'emergency department (ED) presentation'** is defined as an injury or poisoning that results in a person presenting to a hospital emergency department for treatment who is triaged (assessed for urgency), including those patients who leave before treatment commences.

*For the purposes of this E-bulletin, age groups are defined as follows to match those in the National Injury Prevention and Safety Promotion Plan. A child is defined as a person aged 0-14 years, an adolescent and young adult is a person aged 15-24 years, an adult is a person aged 25-64 years and an older adult is a person aged 65 years and above.*

## BOX 1: DEFINITION OF SETTINGS AND INJURY SEVERITY

### SETTINGS DEFINITIONS

The settings are mutually exclusive. For hospital admissions all settings are defined exclusively by location. For ED presentations text descriptions were also used to identify some settings that were not covered by existing location or activity coding (i.e., area of still water/ stream of water/ large area of water/ beach & forest/ desert/ other specified countryside).

- (1) 'Home' includes injuries occurring in homes, drive-ways, apartments, boarding houses, caravans, farmhouses, swimming pools/tennis courts in private residences.
- (2) 'Sports setting' includes injuries occurring at any sports and athletics area.
- (3) 'Road/street/highway' includes injuries occurring on roadways, sidewalks and cycle-ways next to roads.
- (4) 'Residential institution' includes injuries occurring in prisons, juvenile detention centres, military camps, orphanages, aged care facilities (nursing home/old people's home/retirement village). Most hospital admissions for this setting were for injury occurring in aged care facilities (95%).
- (5) 'Health service area' includes injuries occurring to any person (i.e., patient, visitor) in hospitals, health centres, day procedure centres, hospices, outpatient clinics. Data presented here exclude 'medical injuries' as is normal practice for VISU injury reports.
- (6) 'Trade and service area' includes injuries occurring in shops/stores, commercial garages, office buildings, cafes/hotels/restaurants, airports, bus/radio/railway/television stations
- (7) 'School & other educational institution' includes injuries occurring in boarding/residential schools, colleges, day nurseries, institutes for higher education/universities, kindergartens.
- (8) "Other institution & public administrative area' includes injuries occurring in buildings (including adjacent grounds) used by the general public such as assembly hall, church, cinema, clubhouse, court house, dancehall, gallery, library, movie house, museum, music hall, opera house, public hall, theatre, youth centre.
- (9) "Area of still water/ stream of water/ large area of water/ beach" includes injuries occurring at a dam, fen, marsh/swamp, pond, pool, reservoir, brook, canal, creek, river, stream, bay, lake, ocean, sea, foreshore, sand dunes.
- (10) 'Farm' includes injuries occurring in farm buildings/ranches or on land under cultivation, excluding the farm home.
- (11) "Forest/ desert/ other specified countryside" includes injuries occurring in a forest, desert, cave, gorge, mountain, outback, prairie, and wilderness. Note that within this report categories 9, 10, and 11 are included in 'other specified location'.
- (12) 'Other specified location' includes injuries occurring in campsites, public place NOS, park NOS, railway line, zoo, parking lot, town camps.
- (13) 'Unspecified setting' includes injuries occurring in an unspecified place of occurrence.

### INJURY SEVERITY: DEFINITION OF 'SERIOUS' INJURY

Each hospital admission record was given an International Classification of Disease (ICD)-based Injury Severity Score (ICISS) (Osler et al, 1996). The ICISS is a score between 0 and 1 and involves estimating probability of death for ICD injury diagnosis codes in a patient's hospital record (Osler et al., 1996). Determining an ICISS score involves calculating a Diagnosis-specific Survival Probability (DSP) for each individual injury diagnosis, using a large sample of injured people. A DSP is the proportion of cases with a certain injury diagnosis in which the patient does not die, or in other words, a given DSP represents the likelihood that a patient will survive a particular injury. Each patient's final ICISS score can be calculated by multiplying the probabilities of surviving each of their injuries individually or by using only the probability of surviving the 'worst' injury. A severity threshold can then be used to classify hospitalisations as either 'serious' or 'non-serious'. VISU considers an injury to be 'serious' if the ICISS is less than or equal to 0.941, this is equivalent to a survival probability of 94.1% or worse – meaning the injured person has a probability of death (when admitted) of at least 5.9% (Davie & Cryer, 2007). For this edition the severity scores have been calculated using DSPs derived using Victorian data. In addition, only the injury with the highest 'threat-to-life' and has been used and the ICISS score has also been adjusted for age (Clapperton et.al, 2014).

Davie G, Cryer C & Langley J. (2007). Improving the predictive ability of ICD-based injury severity score. *Injury Prevention*. 14:250-5.

Osler T, Rutledge R, Deis J & Bedrick E. (1996). ICISS: An International Classification of Disease-9 based Injury Severity Score. *Journal of Trauma: Injury, Infection and Critical Care*. 41:380–388.

Stephenson S, Langley J, Henley G & Harrison J. (2003). Diagnosis-based injury severity scaling: a method using Australian and New Zealand hospital data coded to ICD-10-AM. *Injury research and statistics series*, no. 20, Australian Institute of Health and Welfare, Adelaide.

Clapperton A, D'Elia A & Day L. SERIOUS INJURY IN VICTORIA: PART 1: Development and validation of a severity of injury measure using Victorian administrative data; PART 2: Trends in serious road traffic injury hospitalisations, Victoria, 2000-2012/13. Report to VicRoads, April 2014. Monash Injury Research Institute.

## BOX 2: COMMUNITY INJURY

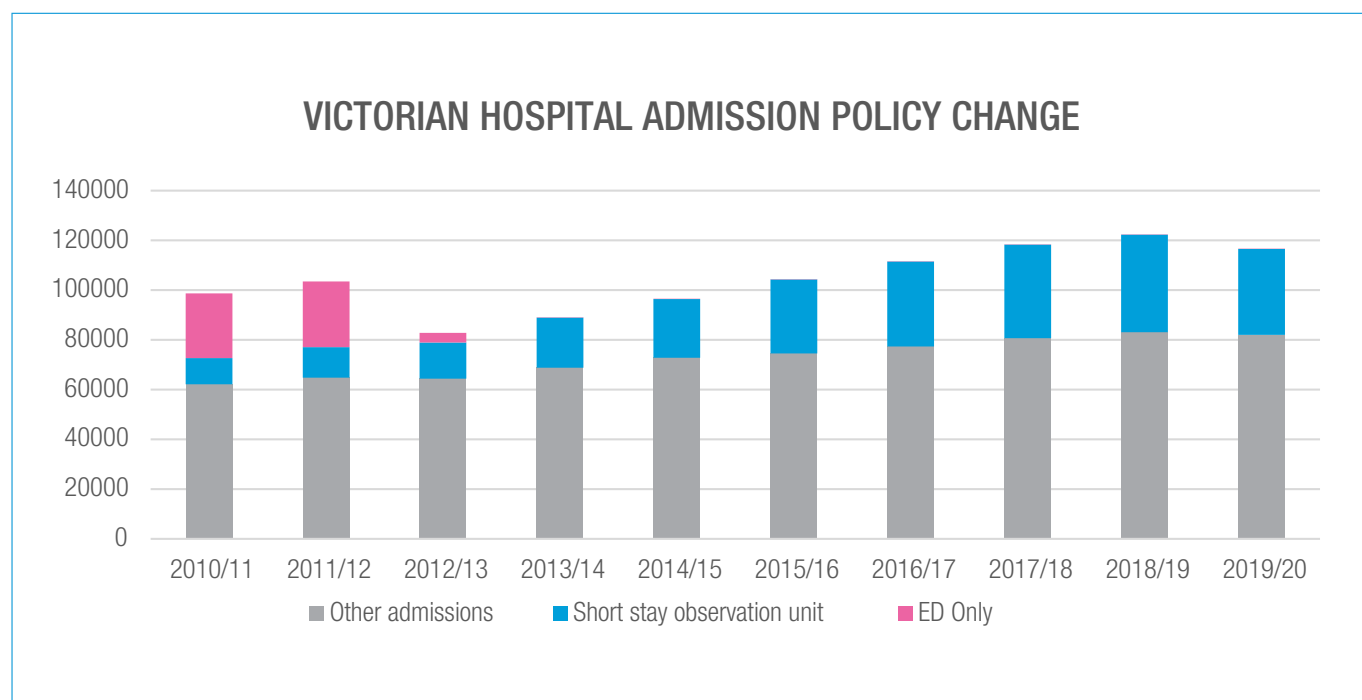
Most injuries occur in settings such as car crashes, inter-personal violence, sporting and recreational activities and work and these can be referred to as 'community injury' (Australian Institute of Health and Welfare, 2012). Community injuries are the main subject of this report so cases selected are specific to those with a community injury in the principal diagnosis code (i.e., ICD-10-AM codes S00-T75 or T79).

## BOX 3: VICTORIAN HOSPITAL ADMISSION POLICY

In July 2012 the Victorian Hospital Admission Policy changed significantly so that episodes of care delivered entirely within a designated emergency department or urgent care centre could no longer be categorised as an admission regardless of the amount of time spent in the hospital. Previously, these types of episodes could be categorised as an admission if the length of time in the hospital was four hours or more. This has had the effect of reducing the number of admissions recorded on the VAED post 2012/13 financial year.

In order to minimise the influence of the hospital admission policy change on trends in the admissions data, VAED cases recorded as spending the entire episode in the ED have been removed from the entire time period. This method, however, may result in an overestimation of the increase in admissions over time. Short Stay Observation Unit only admissions have increased substantially before, during and following the admission policy change in 2012, as shown in Figure A1.

**FIGURE A1. NUMBER OF INJURY ADMISSIONS TO VICTORIAN HOSPITALS IN 2010/11 TO 2019/20. ADMISSIONS THAT WERE LIMITED TO STAY IN THE ED AND ADMISSIONS THAT WERE LIMITED TO STAY IN SHORT STAY OBSERVATION UNITS ARE SHOWN SEPARATELY.**



## APPENDIX 2

### VISU DATA SOURCES AND CASE SELECTION

#### 1. HOSPITAL ADMISSIONS

##### 1.1 Source: Victorian Admitted Episodes Dataset (VAED)

Hospital admission unit record data are annually supplied to VISU by the Victorian Department of Health (DH). Injury records are identified by VISU as those with an ICD-10-AM injury code (S00-T98) or external cause code (U50-Y98) in any one of the 40 diagnosis codes. The resultant file is cleaned, checked and merged with the VISU-held VAED injury surveillance dataset.

From July 1998, cases recorded on the VAED are coded to **ICD-10-AM**, the WHO International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification. ICD-10-AM has been developed by the National Centre for Classification in Health in Queensland with assistance from clinicians and clinical coders to ensure that the classification is current and appropriate for Australian clinical practice. The Australian Modifications of ICD-10 are generally updated every two years. The external causes chapters of ICD-10-AM describe the causes of injury, poisoning and adverse events (complications of medical and surgical care). Adverse events and sequelae (late effects) of external causes of morbidity and mortality are usually not included in VISU reports.

The VAED data items held by VISU include:

##### 1.1.1 Demographic/Administrative Items

- **Age, gender, postcode, suburb and local government area of residence**
- **Country of birth**
- **Date of admission, date of separation (discharge) and length of hospital stay** (in days)
- **Separation type (patient destination on discharge from hospital):** separation and transfer to acute hospital/extended care, death, separation to private residence/accommodation, separation and transfer to aged care residential facility, separation and transfer to mental health residential facility etc.

##### 1.1.2 Injury Surveillance Items

Up to 40 ICD-10-AM codes from any or all of the chapters of the ICD-10-AM manual can currently be assigned to each record. These codes are then used to derive the following injury surveillance variables that are added to the VISU-VAED dataset.

- **Cause of injury** – transport, fall, poisoning etc.  
[Coded to ICD-10-AM Chapter XX: External Causes of Morbidity and Mortality (V00-Y34)]
- **Place of occurrence** i.e. location of injury - home, road, street or highway etc. [Coded to ICD-10-AM Chapter XX: External Causes of Morbidity and Mortality (Y92.0-Y92.9)]
- **Activity when injured** - sports, leisure, work etc.  
[Coded to ICD-10-AM Chapter XX: External Causes of Morbidity and Mortality (U50-U73)]
- **Human intent** – unintentional; intentional-assault, neglect, self-harm; undetermined intent. Intent information is derived from the external cause of injury code.
- **Injury diagnosis** i.e. exact injury code – superficial injury of scalp, fracture of neck or femur etc. [Coded to ICD-10-AM Chapter 19 Injury, Poisoning and Consequences of External Cause (S00-T98)].

- **Body region injured** – head, thorax, shoulder, upper arm etc. Body region information is derived from the injury diagnosis variables.
- **Nature of main injury** - open wound, fracture, dislocation/sprain/strain etc. Nature of main injury is derived from the injury diagnosis variables.
- **Comorbidities** – co-occurrence of injury with other diseases and conditions that can happen by chance or because there is some association between them (for example, suicide and mental disorders, drowning or hot water scalds and epilepsy). Co-morbidities are derived from the diagnosis variables (Coded to ICD-10-AM Chapters 1-17).

#### 1.2. CASE SELECTION (FOR THIS REPORT):

##### Case Selection for Incidents

- Victorian hospital admissions recorded on the VAED occurring 1 July 2019 to 30 June 2020, coded according to the 11<sup>th</sup> edition of ICD-10-AM (NCCH, July 2019).
- Cases with a gender coded as 'Indeterminate' or 'Other' have been removed from this report due to data confidentiality concerns related to small numbers.
- Cases with an external cause of morbidity in ICD-10-AM range V00-X59 (i.e. unintentional section of Chapter XX *External causes of morbidity and mortality*).
- Cases with a community injury (in ICD 10 AM range S00-T75 or T79) in the first diagnosis code (see Box 2 in Appendix 1).
- Mode of admission has any value except those indicating that transfer from another hospital has occurred or that the record is a 'statistical separation'- a change of care type within a hospital. The aim of these omissions is to reduce over-counting of cases and to provide an estimated incidence of admission.
- Patients admitted for day-treatments for the same injury within a course of 30 days, with an admission type indicating it was a "planned" admission were removed. These included, for example, procedures such as hyperbaric oxygen therapy and removal of catheters etc.
- VAED cases recorded as not having spent the entire episode in the ED (see Box 3 in Appendix 1).



## Case Selection for Bed-Days

Each record in the VAED refers to a single episode of care in a hospital and some injuries result in more than one episode in hospital and therefore more than one VAED record. The VAED does not include information designed to enable the set of records belonging to one injury case to be recognised as such. Hence, there is potential for some incident injury cases to be counted more than once. Therefore, for incident estimates, transfers within and between hospitals, as well as rehabilitation cases and those admitted for planned day-treatments, were excluded. The episodes omitted to reduce overestimation of incident cases were, however, included when providing estimates of bed-days.

- Cases with a principal diagnosis as an injury in the ICD-10-AM code range S00-T75.9, T79-T79.9, T89-T98.99 (these codes exclude medical injury) or was one of two relevant rehabilitation codes - Z094 (follow-up examination after treatment of a fracture) or Z509 (care involving use of rehabilitation procedure, unspecified). Cases with rehabilitation codes in the principal diagnosis codes were only included if one of the above injury diagnosis codes was also recorded in the patient's hospital record.

## 2. EMERGENCY DEPARTMENT PRESENTATIONS

### 2.1 Source: Victorian Emergency Minimum Dataset (VEMD)

The Victorian Injury Surveillance System began in the Royal Children's Hospital in 1988. It expanded to adult hospitals over time with a large boost in 1995 when the Department of Human Services absorbed the injury surveillance minimum dataset into the Victorian Emergency Minimum Dataset (VEMD) that collects demographic, administrative and clinical data from public hospitals. From January 2004, VEMD data are collected by all Victorian public hospitals that provide a 24-hour ED service. In July 2011 Bass Coast Regional Health began contributing to the VEMD taking the total contributing hospitals to 38.

Emergency Department presentations for injury are extracted from the VEMD by the Victorian DH and are supplied annually in unit record format to VISU. Data for this edition of the E-bulletin were coded to the Victorian Emergency Minimum Dataset (VEMD) User Manual 23rd Edition, published by the DH. Prior to the hospital admission policy change in 2012/13, the VEMD contained cases that were treated and discharged from the ED within 4 hours from the time patient management commenced (i.e. 'non-admissions') and cases that were defined as 'admissions' according to the Victorian hospital admission policy at the time (cases physically transferred to another unit in the same hospital and those treated entirely within the ED for longer than 4 hours). Post 2012/13 cases that are treated entirely within the ED for longer than 4 hours are not considered as admissions (see Box 3 in Appendix 1).

When the data file is received by VISU, it is cleaned, checked and merged with the VISU-held injury surveillance dataset.

The VEMD data items held by VISU include:

### 2.1.1 Demographic/Administrative Items

- **Age, gender, postcode, suburb and local government area of residence**
- **Country of birth and preferred language spoken at home**
- **Time and date of presentation to ED**
- **Departure status** (patient destination on discharge from ED i.e. admitted to ward, died within ED, discharged home, discharged to residential care etc.)
- **Referred to on departure** (outpatients, local medical officer i.e. GP, home nursing service, scheduled review in ED etc.)

### 2.1.2 Injury Surveillance Items

- **Human intent** (unintentional, assault, self-harm etc.)
- **Cause of injury** (fall, poisoning etc.)
- **Place where injury occurred** i.e. location of injury (home, road, street or highway etc.)
- **Activity when injured** (sports, leisure, work etc.)
- **Nature of main injury**
- **Body region injured**
- **Description of injury event** ('narrative')

### 2.2 Case Selection (for this Report)

- Victorian hospital ED presentations recorded on the VEMD occurring 1 July 2019 to 30 June 2020 coded according to the Victorian Emergency Minimum Dataset (VEMD) User Manual 24<sup>th</sup> edition.
- Cases with a gender coded as 'Indeterminate' or 'Other' have been removed from this report due to data confidentiality concerns related to small numbers.
- Cases coded as unintentional injury (VEMD human intent=1).
- Incident cases (excludes return visits and pre-arranged visits).

## How to access VISU data

VISU collects and analyses information on injury problems to underpin the development of prevention strategies and their implementation. VISU analyses are publicly available for teaching, research and prevention purposes. Requests for information can be lodged via the data request form on the VISU website ([www.monash.edu/muarc/visu](http://www.monash.edu/muarc/visu)) or by contacting the VISU office by phone (03 9905 1805).

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Other information regarding VISU, all E-bulletins and other VISU publications can be found on our internet home page:

[monash.edu/muarc/visu](http://monash.edu/muarc/visu)

The Victorian Injury Surveillance Unit (VISU) is a research unit within the Monash University Accident Research Centre (MUARC). VISU is supported by the Victorian Government.



VISU has developed three injury atlases:

- Hospital-treated unintentional injury in Victoria 2008/09-2018/19, available at: [vicinjuryatlas.org.au/unintentional/](http://vicinjuryatlas.org.au/unintentional/)
- Hospital-treated transport injury in Victoria 2008/09-2018/19, available at [vicinjuryatlas.org.au/transport/](http://vicinjuryatlas.org.au/transport/)
- Hospital-treated sport injury in Victoria 2008/09-2018/19, available at [vicinjuryatlas.org.au/sport/](http://vicinjuryatlas.org.au/sport/)