

A review of child injury in the Illawarra

February 2008

Report prepared by:

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South Eastern Sydney Illawarra Area Health Service
Wollongong, NSW

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Contents

1. Introduction	7
2. Methods	8
3. Child Injury Deaths	9
4. Child Injury Hospitalisations	10
4.1 Primary causes of hospitalisation	11
5.2 External causes of injury	14
5.3 Place of injury	14
5. Emergency Department presentations	17
5.1 Injury presentations	17
5.2 Primary causes of presentation	17
5.3 Summary results	22

List of Tables

Table 1 Injury-related hospital separations by LGA, 2000-2005.	10
Table 2 Top five external causes of injury and poisoning hospitalisations among children aged 0-14 years.	15
Table 3 Place of occurrence for injury hospitalisations among Shellharbour, Shoalhaven, Kiama and Wollongong Local Government Areas children (0-14 years).....	16
Table 4 Causes of hospitalised fall injury among children (0-14 years) living in Shellharbour, Shoalhaven, Kiama and Wollongong Local Government Areas.	16
Table 5 Summary table of Emergency Department injury admissions for Wollongong Hospital, 0-14 year olds, by age group, 2006.	20
Table 6 Summary table of Emergency Department injury admissions for Shellharbour Hospital, 0-14 year olds, by age, 2006.	20
Table 7 Summary table of emergency department injury admissions for Shoalhaven Hospital, 0-14 year olds, by age, 2006.	21

List of Figures

Figure 1 Age-specific admission rates for injury and poisoning among children aged 0-14 years.	10
Figure 2 Leading causes of injury and poisoning hospitalisations in children (0-14 years), NSW, 2000-01 to 2004-05.	11
Figure 3 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Wollongong, 2000-01 to 2004-05.....	12
Figure 4 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Shellharbour, 2000-01 to 2004-05.	12
Figure 5 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Shoalhaven, 2000-01 to 2004-05.....	13
Figure 6 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Kiama, 2000-01 to 2004-05.	13
Figure 7 Injury presentations to Wollongong ED, 0-14 year olds, by age and injury type, 2006.....	19
Figure 8 Injury presentations to Shellharbour ED, 0-14 year olds, by age and injury type, 2006.....	19
Figure 9 Injury presentations to Shoalhaven ED, 0-14 year olds, by age and injury type, 2006.....	19
Figure 10 Injury presentations to Illawarra ED's, 0-14 year olds, by hospital, 2006.....	22

1. Introduction

Child injury is an important public health issue, as a large proportion of incidents are considered preventable. In order to support the implementation of prevention programs and projects it is important to have reliable evidence. The analysis of population health data allows health professionals, planners and funding agencies to realise where policies, programs and activities should be focused. Importantly, evidence should be geographically specific, as state or national data will not necessarily meet the needs of a given community.

This report examines injuries in children aged 0-14 years in Wollongong, Shellharbour, Kiama and Shoalhaven Local Government Areas (LGA's). It details childhood mortality and morbidity in the Illawarra and includes data on children who have presented at Emergency Departments and those who have been admitted to hospital. This report also explores the cause and place of injury, in order to better focus policies, programs and activities. These data are compared between LGA's and against NSW averages where possible.

2. Methods

Mortality data were obtained from the Australian Bureau of Statistics' death register for the five years from 1 January 1999 to 31 December 2004. Hospitalisation data were sourced from the NSW Admitted Patients Data Collection (APDC) for the five years 1 July 2000 to 30 June 2005.

Emergency department data were obtained using the Emergency Department Data Collection (EDDC) for 1 January to 31 December 2006. As Kiama does not have an ED, it was not included in this chapter. The EDDC was not designed as a database for population health monitoring, thus extreme caution should be taken when interpreting this data. Used as denominators, population estimates were also attained from the Australian Bureau of Statistics.

Unfortunately, there were insufficient numbers of Aboriginal children in the study period to produce reliable estimates for the study area.

These data were all accessed via the Health Outcomes and Information Statistical Toolkit (HOIST). The HOIST system refers to a data access, analysis and reporting facility established and operated by the Centre for Epidemiology and Research, Division of Population Health, NSW Health Department.

Data in this report are presented as counts, percentages and age-specific events per 1,000 population. Counts are the number of observed events (i.e. deaths, hospitalisations). So as to preserve the privacy of patients, results are presented in summary form, with numbers less than 5 masked in tables and graphs by "<5" or ".". Percentages are the number of observed events divided by a given population denominator (e.g. total number of child deaths) and multiplied by 100. Age-specific event rates are the number of events per 1,000 children aged 0-14 years and are obtained by dividing the number of observed events for an age group by the total population for that age group and multiplying the result by 1,000.

3. Child Injury Deaths

Between 1 January 1999 and 31 December 2004 there were 26 injury-related deaths among children aged 0-14 years in Shellharbour, Kiama, Shoalhaven and Wollongong Local Government Areas (LGA's). These injury-related childhood deaths represent 13.9% of the total childhood deaths for the area. More than 83% of injury-related deaths occurred in the 0-4 year age group, with 8.8% and 7.7% of deaths in the 10-14 and 5-9 year age groups respectively. Rates of child injury deaths in the study area are similar to the NSW average. The major cause of childhood death in the study area was motor vehicle accidents (46.2%).

4. Child Injury Hospitalisations

Between 1 July 2000 and 30 June 2005 there were 5,743 injury-related hospital separations for separations for children aged 0-14 years living in Shellharbour, Shoalhaven, Kiama and Wollongong Wollongong LGA's (

Table 1). The majority of these separations were in Wollongong LGA, followed by Shoalhaven, Shellharbour and Kiama. However, it is important to remember that these numbers do not consider population density.

Table 1 Injury-related hospital separations by LGA, 2000-2005.

Local Government Area	Number of separations	Percent of total separations
Shellharbour	1127	19.6%
Shoalhaven	1380	24.0%
Kiama	322	5.6%
Wollongong	2914	50.7%
TOTAL	5743	100%

Injury-related hospitalisation represented 9.5% (10.8% male, 7.8% female) of all hospitalisations for children aged 0-14 years (Shellharbour 9.7%, Shoalhaven 9.7%, Kiama 11.84% and Wollongong 9.1%). It was the fourth leading cause of admission behind V-codes (factors influencing health status and contact with health services), respiratory disease and perinatal conditions. Injury-related hospitalisation rates for the study area and local government areas were similar to the NSW average for all age groups (Figure 1).

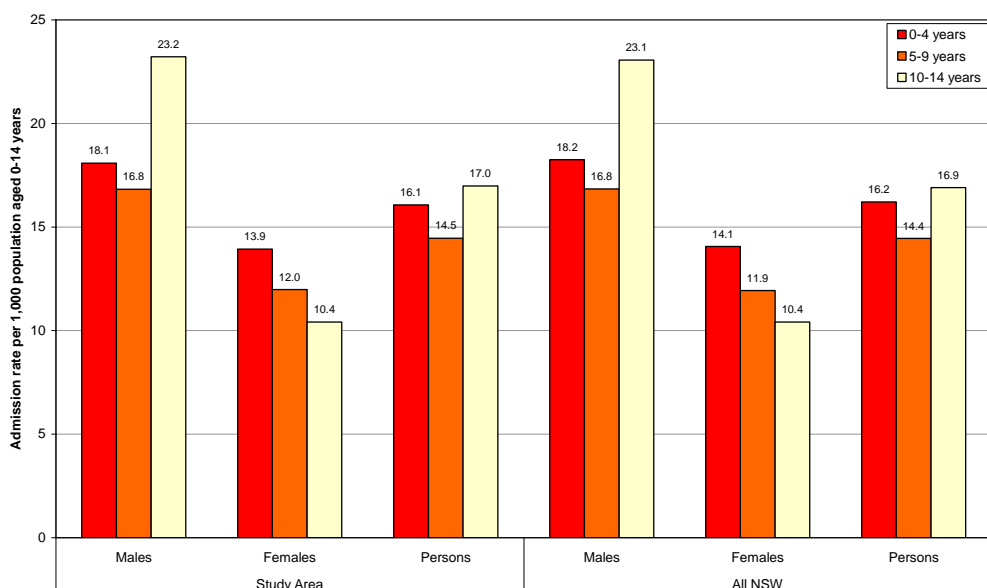


Figure 1 Age-specific admission rates for injury and poisoning among children aged 0-14 years.

4.1 Primary causes of hospitalisation

The principal cause of childhood injury morbidity for the study area between 2000/01 – 2004/05 was falls, accounting for 42.6% of male and 49.2% of female injury hospitalisations (Figures 2-Figure 6).

Other major causes of injury admissions in the study area for male children include: struck by or against an object (9.0%), pedestrian and pedal cycle accidents (9.0%), unspecified factors (8.9%) and motor vehicle accidents (8.0%). For female children, unspecified factors (6.1%), struck by or against an object (5.7%), motor vehicle (4.0%) and other transport accidents (4.7%) were the other primary cases of injury admissions.

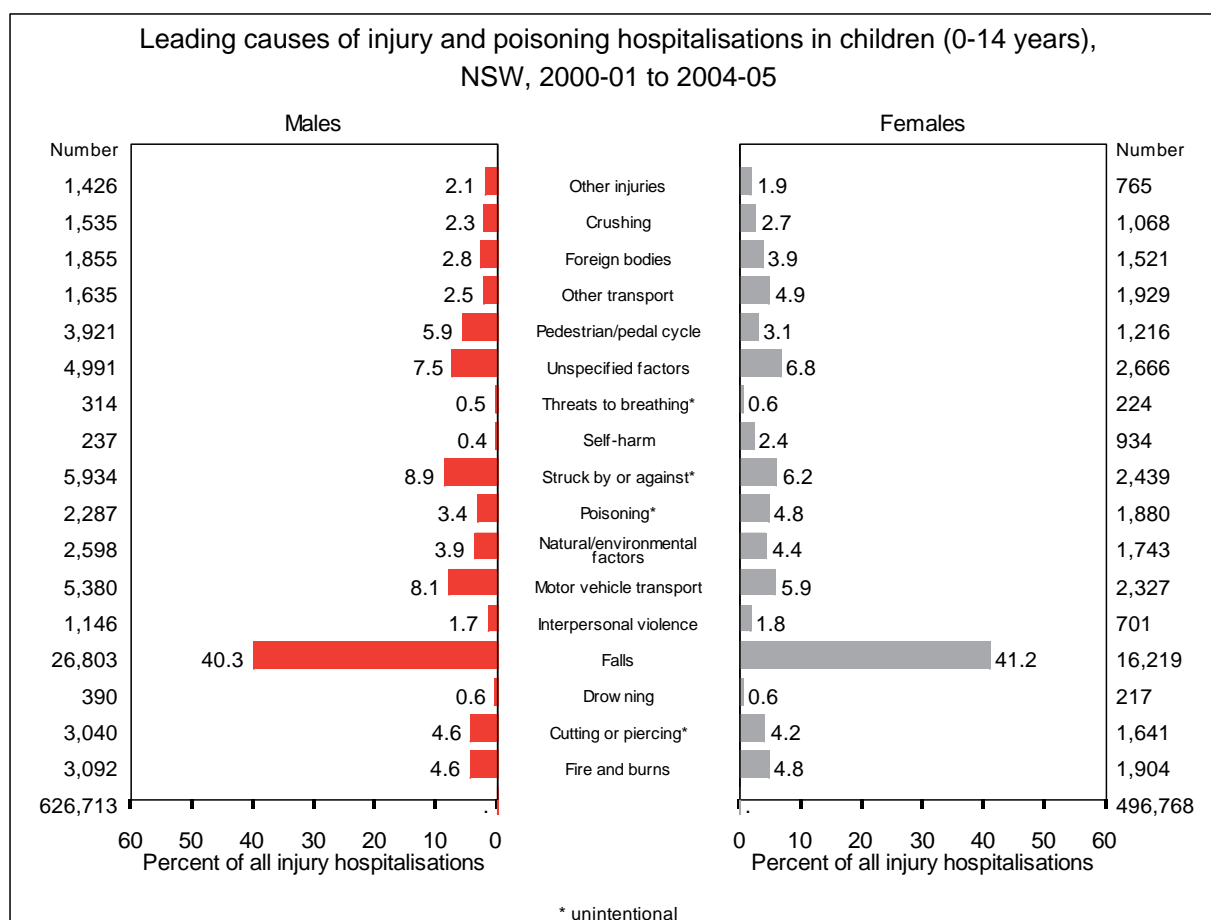


Figure 2 Leading causes of injury and poisoning hospitalisations in children (0-14 years), NSW, 2000-01 to 2004-05.

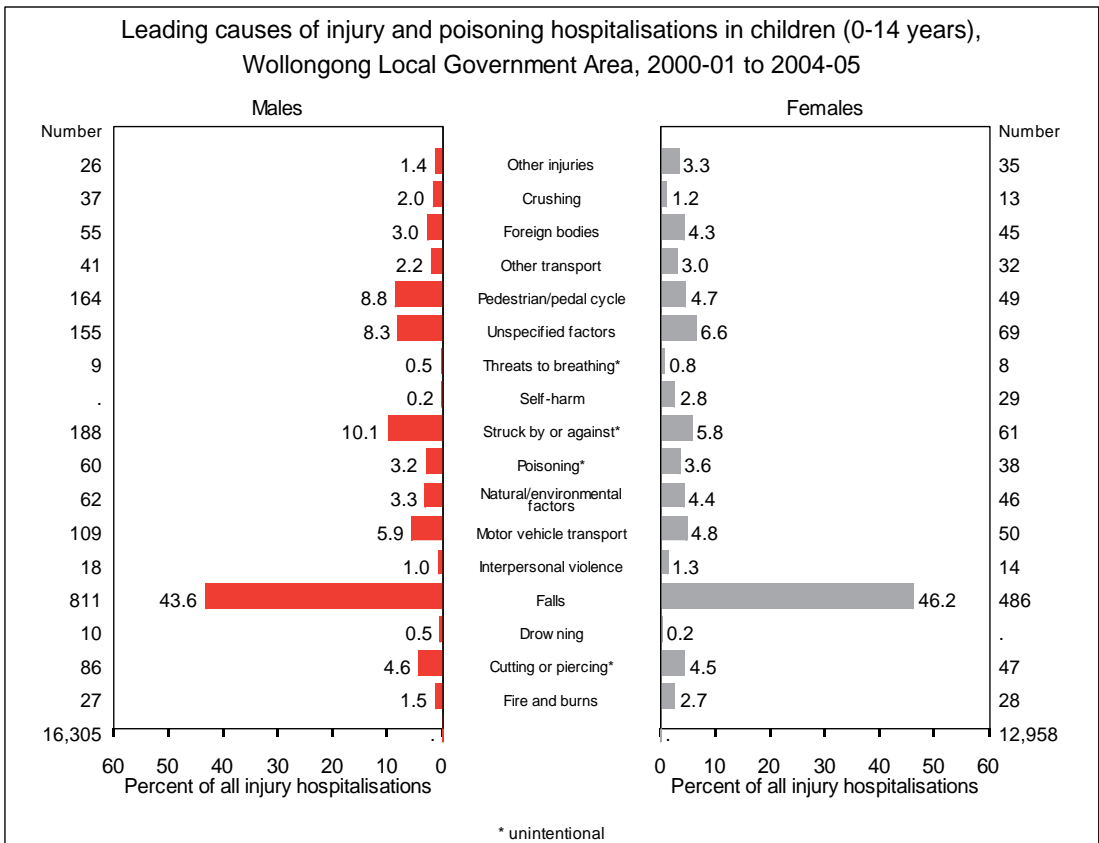


Figure 3 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Wollongong, 2000-01 to 2004-05.

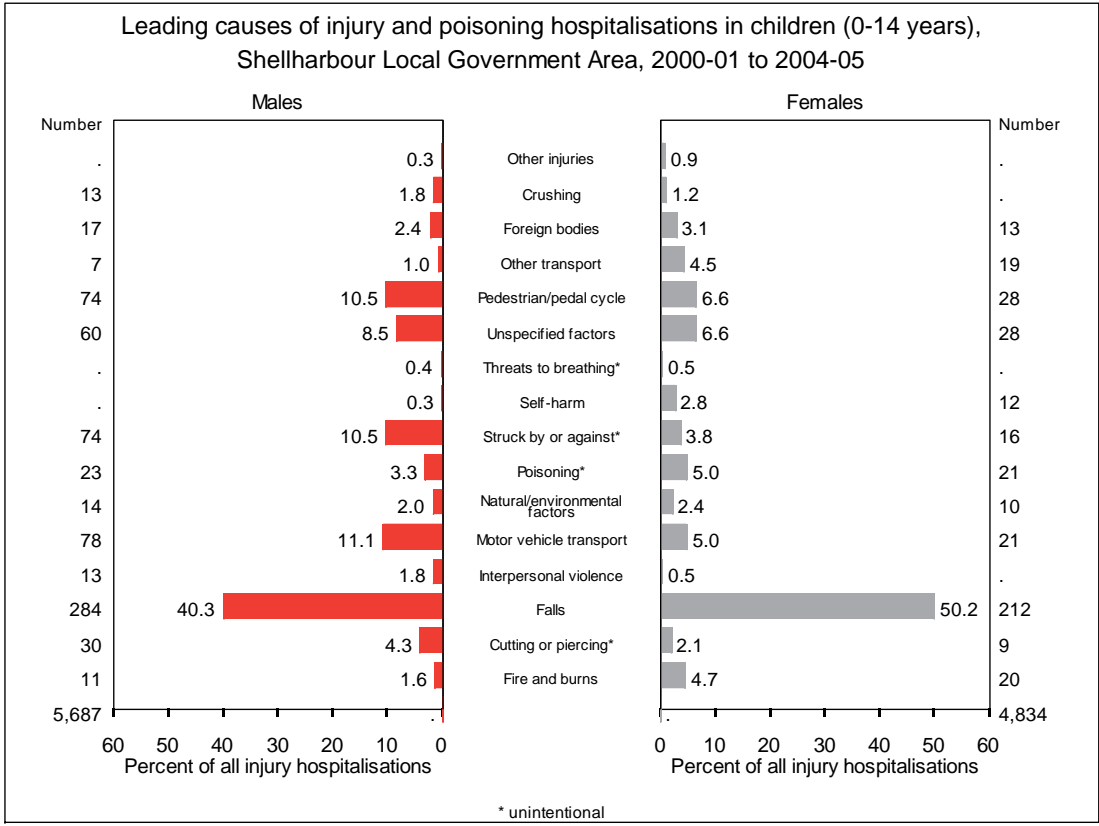


Figure 4 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Shellharbour, 2000-01 to 2004-05.

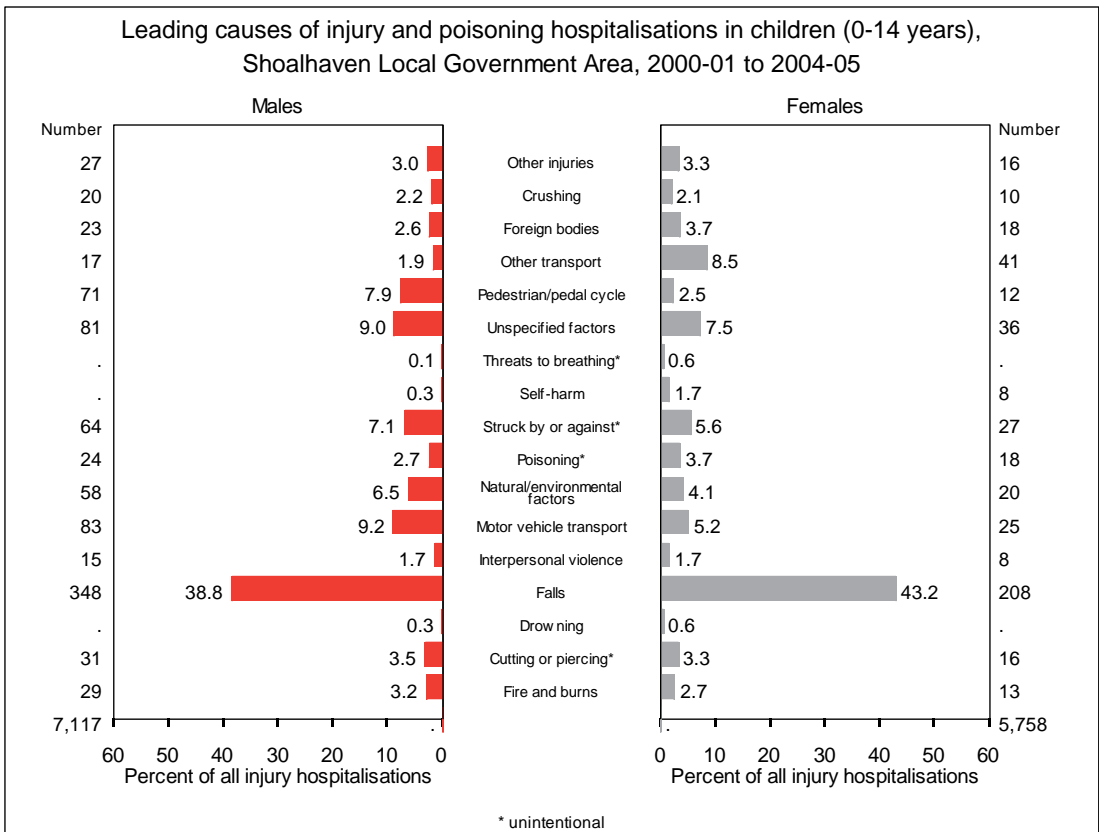


Figure 5 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Shoalhaven, 2000-01 to 2004-05.

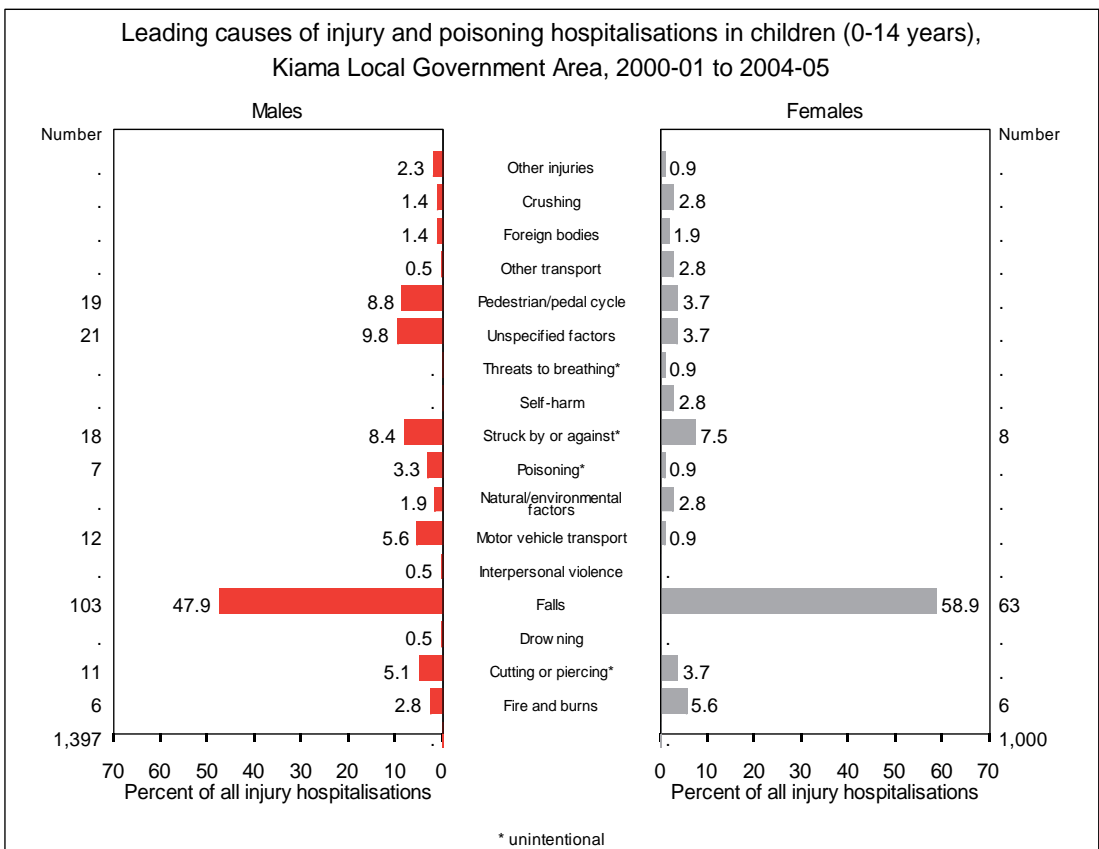


Figure 6 Leading causes of injury and poisoning hospitalisations in children (0-14 years), Kiama, 2000-01 to 2004-05.

4.2 External causes of injury

The top five external causes of injury and poisoning hospitalisations among children aged 0-14 years in the study area are similar through age groups, between sexes and when compared to NSW averages (Table 2). While poisonings and foreign objects occur more frequently in younger age groups, pedestrian/pedal cycle, motor transport and struck by or against injuries are more common in older age groups.

4.3 Place of injury

There is a clear shift in the place of occurrence of injuries from younger ages (<5 years) to older ages (5-14 years), with injuries in the home reported 3-4 times more frequently for younger children (Table 3). However, it is important to note that injury in the home may be under-reported for older age groups, with unspecified place of occurrence increasing with age.

Importantly, over 49% of falls in children under one year of age occur from one level to another and 34.4% from furniture (Table 4). The frequency of same level fall increases with age, while falls from furniture decreases with increasing age. Falls from play ground equipment peaks in children aged 5-9 years before falling sharply in children aged 10-14 years.

Table 2 Top five external causes of injury and poisoning hospitalisations among children aged 0-14 years.

Area	Sex	<1 year (n, %)	1-4 years (n, %)	5-9 years (n, %)	10-14 years (n, %)
Study Area	Male	Falls (41, 44.1)	Falls (313, 39.5)	Falls (528, 49.3)	Falls (664, 38.5)
		Unspecified factors (13, 13.4)	Poisoning (82, 10.3)	Pedestrian/pedal cycle (96, 9.0)	Pedestrian/pedal cycle (208, 12.1)
		Foreign bodies (7, 7.5)	Struck by or against (64, 8.1)	Motor vehicle transport (77, 7.2)	Struck by or against (205, 11.9)
		Interpersonal violence (5, 5.4)	Natural/environmental (46, 5.8)	Struck by or against (72, 6.7)	Unspecified factors (191, 11.9)
		Fire and burns (5, 5.4)	Foreign bodies (45, 5.7)	Unspecified factors (69, 6.4)	Motor vehicle transport (177, 10.3)
	Female	Falls (20, 26.7)	Falls (250, 44.5)	Falls (451, 57.7)	Falls (248, 38.5)
		Poisoning (10, 13.3)	Poisoning (54, 9.6)	Unspecified factors (57, 7.3)	Unspecified factors (55, 8.5)
		Threats to breathing (7, 9.3)	Fire and burns (53, 9.4)	Pedestrian/pedal cycle (39, 5.0)	Self harm (52, 8.1)
		Natural/ environmental (6, 8.0)	Foreign bodies (38, 6.8)	Motor vehicle transport (37, 4.7)	Other transport (51, 7.9)
		Foreign bodies (6, 8.0)	Struck by or against (33, 5.9)	Other transport (36, 4.6)	Pedestrian/pedal cycle (49, 7.6)
	Persons	Falls (61, 36.3)	Falls (563, 41.6)	Falls (979, 52.9)	Falls (912, 38.5)
		Unspecified factors (15, 8.9)	Poisoning (136, 10.1)	Pedestrian/pedal cycle (135, 7.3)	Pedestrian/pedal cycle (257, 10.8)
		Poisoning (13, 7.7)	Fire and burns (97, 7.2)	Unspecified factors (126, 6.8)	Struck by or against (250, 10.8)
		Foreign bodies (13, 7.7)	Struck by or against (97, 7.2)	Motor vehicle transport (114, 6.2)	Unspecified factors (246, 10.4)
		Threats to breathing (10, 7.7)	Foreign bodies (83, 6.1)	Struck by or against (102, 5.5)	Motor vehicle transport (216, 9.1)
All NSW	Male	Falls (827, 34.8)	Falls (6461, 36.1)	Falls (9103, 47.0)	Falls (10412, 38.7)
		Fire and burns (355, 14.9)	Fire and burns (1838, 10.3)	Struck by or against (1636, 8.5)	Motor vehicle accident (3000, 11.1)
		Unspecified factors (218, 9.2)	Poisoning (1683, 9.4)	Motor vehicle accident (1609, 8.3)	Struck by or against (2892, 10.7)
		Interpersonal violence (184, 7.7)	Struck by or against (1308, 7.3)	Pedestrian/pedal cycle (1223, 6.3)	Unspecified factors (2634, 9.8)
		Poisoning (144, 6.1)	Unspecified factors (1034, 5.8)	Unspecified factors (1105, 5.7)	Pedestrian/pedal cycle (2391, 8.9)
	Female	Falls (736, 37.9)	Falls (4836, 37.6)	Falls (6793, 52.1)	Falls (3854, 33.4)
		Fire and burns (211, 10.9)	Poisoning (1346, 10.5)	Motor vehicle accident (837, 6.4)	Other transport (1165, 10.1)
		Unspecified factors (167, 8.6)	Fire and burns (1175, 9.1)	Unspecified factors (788, 6.0)	Unspecified factors (1017, 8.8)
		Interpersonal violence (156, 8.0)	Foreign bodies (855, 6.7)	Struck by or against (732, 5.6)	Self harm (925, 8.0)
		Poisoning (135, 7.0)	Struck by or against (819, 6.4)	Cutting or piercing (576, 4.4)	Motor vehicle transport (920, 8.0)
	Persons	Falls (1563, 36.2)	Falls (11297, 36.7)	Falls (15896, 49.0)	Falls (14266, 37.1)
		Fire and burns (566, 13.1)	Poisoning (3029, 9.8)	Motor vehicle accident (2446, 7.5)	Motor vehicle accident (3920, 10.2)
		Unspecified factors (385, 8.9)	Fire and burns (3013, 9.8)	Struck by or against (2368, 7.3)	Struck by or against (3701, 9.6)
		Interpersonal violence (340, 7.9)	Struck by or against (2127, 6.9)	Unspecified factors (1893, 5.8)	Unspecified factors (3651, 9.5)
		Poisoning (279, 6.5)	Unspecified factors (1728, 5.6)	Cutting or piercing (1595, 4.2)	Cutting or piercing (1678, 4.4)

Table 3 Place of occurrence for injury hospitalisations among Shellharbour, Shoalhaven, Kiama and Wollongong Local Government Areas children (0-14 years).

Place	<1 year N (%)	1-4 years N (%)	5-9 years N (%)	10-14 years N (%)	0-14 years N (%)
Home	113 (68.9)	741 (55.6)	394 (21.6)	309 (13.1)	1557 (27.4)
School or other public institution	14 (8.5)	41 (3.1)	210 (11.5)	224 (9.5)	489 (8.6)
Sports or athletic area	<5	14 (1.1)	74 (4.1)	292 (12.4)	381 (6.7)
Street or highway	<5	31 (2.3)	87 (4.8)	141 (6.0)	262 (4.6)
Farm	<5	<5	<5	8 (0.3)	11 (0.2)
Other specified place	<5	37 (2.8)	72 (3.9)	156 (6.6)	269 (4.7)
Unspecified place	29 (17.7)	468 (35.1)	986 (54.0)	1223 (52.0)	2706 (47.7)

Table 4 Causes of hospitalised fall injury among children (0-14 years) living in Shellharbour, Shoalhaven, Kiama and Wollongong Local Government Areas.

Place	<1 year N (%)	1-4 years N (%)	5-9 years N (%)	10-14 years N (%)	0-14 years N (%)
Slips, trips, stumbles and collisions	6 (9.8)	131 (23.3)	240 (24.5)	380 (41.6)	757 (30.1)
Other falls on the same level	<5	<5	112 (11.4)	206 (22.6)	321 (12.8)
Falls involving furniture	21 (34.4)	118 (20.1)	66 (6.7)	37 (4.1)	242 (9.6)
Falls involving playground equipment	<5	116 (20.1)	287 (29.3)	83 (9.1)	486 (19.3)
Other falls from one level to another	30 (49.2)	153 (27.2)	178 (18.2)	147 (16.1)	508 (20.2)
Unspecified falls	<5	42 (7.5)	96 (9.8)	59 (6.5)	201 (8.0)

5. Emergency Department presentations

The EDDC was not developed for population health monitoring; therefore results presented here may be unreliable.

5.1 Injury presentations

Of the people who presented at Wollongong ED in 2006, more than 23% (1911) were children aged 0-14 years of age. Similarly, children aged 0-14 years accounted for 29.5% (1237) and 27.4% (1710) of all admissions to Shellharbour and Shoalhaven ED's respectively. The age groups 0-4, 5-9 and 10-14 years had among the highest presentation rates of all age groups at Wollongong, Shellharbour and Shoalhaven ED's.

Children aged 0-4 years (38.55%) had the highest percentage of injury presentations at Wollongong ED for 0-14 year olds in 2006, compared with those aged 10-14 years (34.22%) and 5-9 years (27.78%). Conversely, children aged 10-14 years (38.22%) had the highest percentage of injury presentations at Shellharbour ED for 0-14 year olds in 2006, with those aged 0-4 years and 5-9 years representing 34.76% and 25.39% respectively. This trend continued at Shoalhaven ED, where children aged 10-14 years (43.62%) had the highest percentage of injury presentations for 0-14 year olds in 2006, compared with those aged 0-4 years (28.71%) and 5-9 years (26.35%).

5.2 Primary causes of presentation

Open wounds were the most common diagnoses for injuries in children aged 0-14 years at Wollongong, Shellharbour and Shoalhaven ED's in 2006, with 26.63%, 33.60% and 28.17% of all injury diagnoses respectively (Figure 7-Figure 9, Table 5-Table 7). Within this disease category, "other open wound of the head – face, no complications" was the most common diagnosis. The 0-4 year age group had a higher percentage of these diagnoses compared with the 5-9 and 10-14 year age groups.

The second most common diagnosis for Wollongong and Shellharbour ED's was 'fracture of a body part'. More than 25% of the total injury separations for 0-14 year olds at Wollongong ED and 16.10% at Shellharbour ED were attributed to this diagnosis in 2006. This diagnosis was more prominent in the 10-14 year age group when compared to the 0-4 and 5-9 year age groups. The most common fracture was to the radius or ulna.

For Shoalhaven ED, the second most common diagnosis for 0-14 year olds was 'superficial injury, contusion or crushing injury of body part' (19.15%). Presentations for 0-4, 5-9 and 10-14 year olds were 4.61%, 6.50% and 8.04% respectively. Here, 'contusion of face, scalp and neck (not eyes)' was the most common diagnosis.

Dislocations, strains and sprains of body parts were also a considerable component of injury presentations at Wollongong and Shellharbour ED's for 0-14 year olds in 2006: 12.15% and 14.52% respectively. This was highest in the 10-14 year age group, with a presentation rate among those aged 0-4 years and 5-9 year olds fairly similar. Within this category, ankle and foot sprains were the most common ED presentations.

The third most common diagnosis group for Shoalhaven ED was 'fracture of a body part', with 17.95% of the total injury separations for 0-14 year olds attributed to this diagnosis. This diagnosis is more prominent in the 10-14 year age group (10.32%) when compared to the 0-4 and 5-9 year age groups (5.50% and 2.13% respectively). The most common fracture was to the radius or ulna.

Following this, head injuries (with or without concussion) accounted for approximately 11.97% of ED injury presentations for 0-14 year olds in Wollongong in 2006. This was most common in 0-4 year olds (6.59%), compared with 5-9 and 10-14 year olds (2.74% and 2.64% respectively). The most common ED presentation within this diagnosis was 'intercranial injury, no wound, no loss of consciousness'.

However, at Shellharbour ED, the fourth most common diagnosis group for 0-14 year olds with an injury was 'superficial injury, contusion or crushing injury of body part' (10.36%). Presentations for this group of injuries were consistent between the age groups, with 2.97%, 2.08%, and 5.31% of presentations for 0-4, 5-9 and 10-14 year olds respectively. Here, 'contusion of face, scalp and neck (not eyes)' was the most common diagnosis.

Dislocations, strains and sprains of body parts are also a considerable component of ED injury presentations at Shoalhaven for 0-14 year olds (16.25%). This is highest in the 10-14 year age group (10.02%), with a presentation rate among those aged 0-4 years (3.46%) and 5-9 year olds (2.77%) fairly similar. Within this group, ankle and foot sprains were the most common ED presentations.

Remaining injury presentations make up only a small percentage of presentations to ED's.

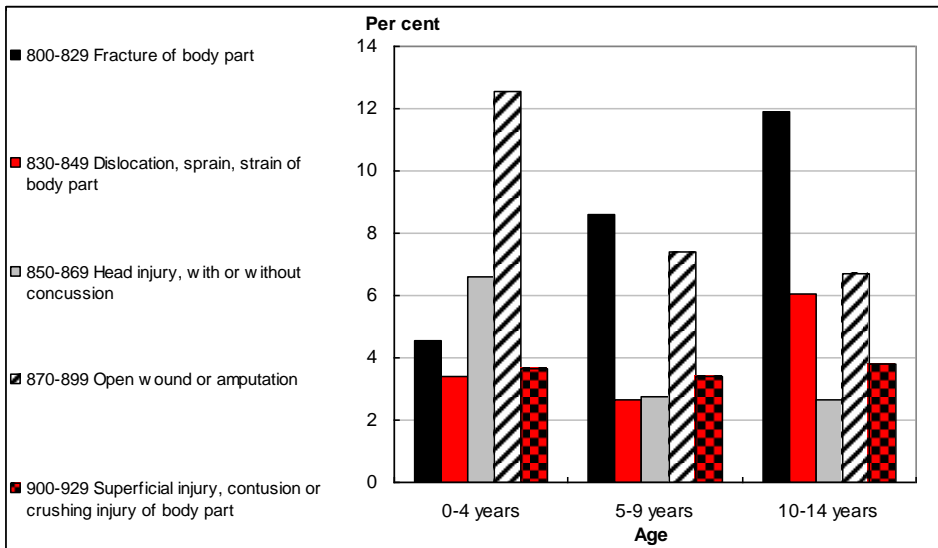


Figure 7 Top 5 injury presentations to Wollongong ED, 0-14 year olds, by age and injury type, 2006.

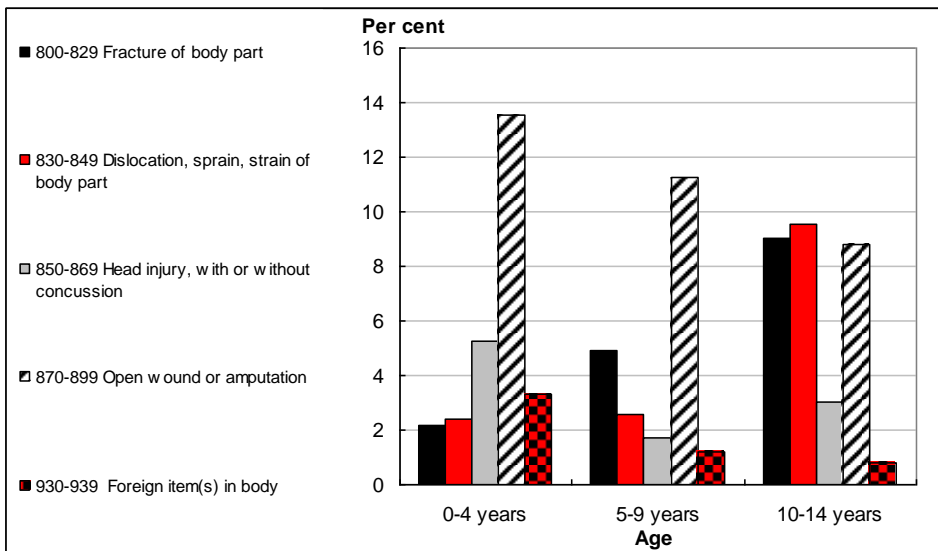


Figure 8 Top 5 injury presentations to Shellharbour ED, 0-14 year olds, by age and injury type, 2006.

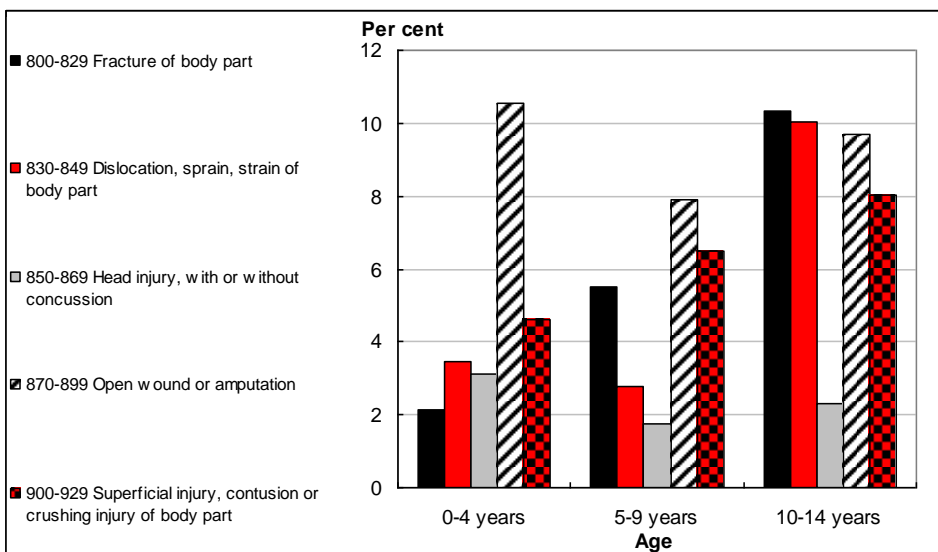


Figure 9 Top 5 injury presentations to Shoalhaven ED, 0-14 year olds, by age and injury type, 2006.

Table 5 Summary table of Emergency Department injury admissions for Wollongong Hospital, 0-14 year olds, by age group, 2006.

ICD-9 code	0-4 years N (%)	5-9 years N (%)	10-14 years N (%)
800-829 Fracture of body part	87 (4.6%)	157 (8.6%)	234 (11.9%)
830-849 Dislocation, sprain, strain of body part	64 (3.4%)	50 (2.7%)	117 (6.1%)
850-869 Head injury, with or without concussion	111 (6.6%)	51 (2.7%)	55 (2.65%)
870-899 Open wound (including amputation)	245 (12.5%)	142 (7.4%)	128 (6.7%)
900-929 Superficial injury, contusion or crushing injury of body part	70 (3.6%)	69 (3.4%)	77 (3.8%)
930-939 Foreign item(s) in body	62 (3.2%)	29 (1.5%)	11 (0.6%)
940-949 Burn(s) to body	36 (1.9%)	10 (0.5%)	9 (0.5%)
950-959 Injuries	9 (0.7%)	8 (0.3%)	19 (1.0%)
960-979 Poisoning	26 (1.4%)	<5 (NA)	6 (0.3%)
980-989 Toxic effect from petroleum, venom or soaps and detergents	5 (0.3%)	6 (0.3%)	5 (0.3%)
990-995 Other adverse effects	8 (0.5%)	6 (0.3%)	10 (0.52%)

Table 6 Summary table of Emergency Department injury admissions for Shellharbour Hospital, 0-14 year olds, by age, 2006.

ICD-9 code	0-4 years N (%)	5-9 years N (%)	10-14 years N (%)
800-829 Fracture of body part	26 (2.2%)	61 (4.9%)	109 (9.0%)
830-849 Dislocation, sprain, strain of body part	29 (2.4%)	31 (2.6%)	120 (9.5%)
850-869 Head injury, with or without concussion	65 (5.3%)	21 (1.7%)	39 (3.1)
870-899 Open wound (including amputation)	170 (13.6%)	139 (11.2%)	100 (8.8%)
900-929 Superficial injury, contusion or crushing injury of body part	37 (3.0%)	27 (2.1%)	68 (5.3%)
930-939 Foreign item(s) in body	41 (3.3%)	15 (1.2%)	10 (0.8%)
940-949 Burn(s) to body	25 (2.1%)	8 (0.6%)	7 (0.6%)
950-959 Injuries	10 (0.8%)	13 (1.1%)	14 (1.1%)
960-979 Poisoning	23 (1.9%)	<5 (NA)	<5 (NA)
980-989 Toxic effect from petroleum, venom or soaps and detergents	5 (0.4%)	<5 (NA)	<5 (NA)
990-995 Other adverse effects	<5 (NA)	<5 (NA)	<5 (NA)

Table 7 Summary table of emergency department injury admissions for Shoalhaven Hospital, 0-14 year olds, by age, 2006.

ICD-9 code	0-4 years N (%)	5-9 years N (%)	10-14 years N (%)
800-829 Fracture of body part	36 (2.1%)	94 (5.5%)	176 (10.3%)
830-849 Dislocation, sprain, strain of body part	59 (3.5%)	65 (2.8%)	172 (10.0%)
850-869 Head injury, with or without concussion	50 (3.1%)	29 (1.8%)	40 (2.3%)
870-899 Open wound (including amputation)	180 (10.6%)	135 (7.9%)	167 (9.7%)
900-929 Superficial injury, contusion or crushing injury of body part	132 (4.6%)	110 (6.5%)	79 (8.0%)
930-939 Foreign item(s) in body	26 (1.5%)	16 (1.0%)	10 (0.6%)
940-949 Burn(s) to body	29 (1.7%)	7 (0.4%)	11 (0.7%)
950-959 Injuries	9 (0.5%)	4 (0.4%)	29 (1.8%)
960-979 Poisoning	11 (0.7%)	<5 (NA)	<5 (NA)
980-989 Toxic effect from petroleum, venom or soaps and detergents	9 (0.5%)	<5 (NA)	<5 (NA)
990-995 Other adverse effects	<5 (NA)	<5 (NA)	<5 (NA)

5.3 Summary results

The differences in presentations to Wollongong, Shellharbour and Shoalhaven ED's are demonstrated in Figure 10:

- 'Open wound (including amputation)' is the most common presentation at all ED's for 0-14 year olds and peaks at Shellharbour with 33.60%.
- Conversely, 'fracture of body part(s)' is least common at Shellharbour and most common at Wollongong ED.
- 'Dislocation, strain, strain of body part' is least common at Wollongong and most common at Shoalhaven.
- 'Superficial injury, contusion or crushing injury' is highest at Shoalhaven, responsible for 19.15% of all injury-related ED presentations for 0-14 year olds in that LGA. Both Wollongong and Shellharbour are almost 9% less than Shoalhaven.
- 'Head injury with or without contusion' is most common at Wollongong and least common at Shoalhaven ED.
- The remaining diagnosis groups ('foreign items in body', 'burns to body', 'injuries', 'toxic effect' and 'other adverse effect') were all quite small proportions and were fairly similarly spread across the three Emergency Departments.

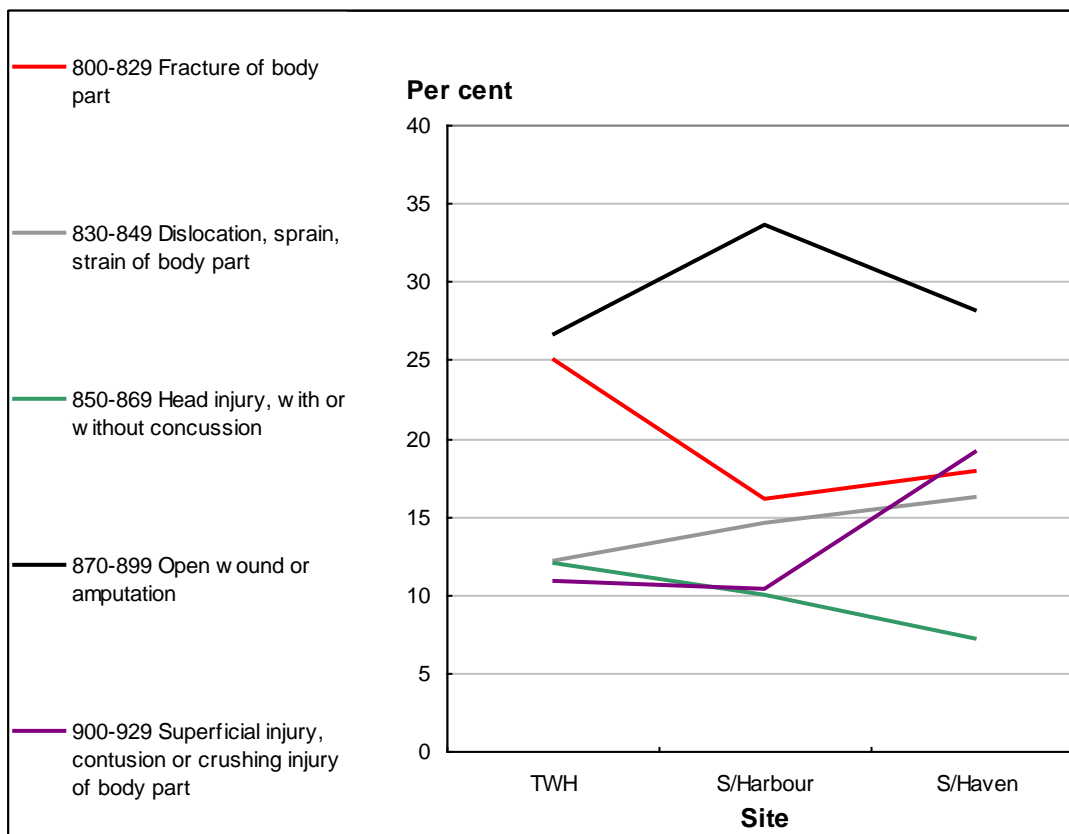


Figure 10 Top 5 injury presentations to Illawarra ED's, 0-14 year olds, by hospital, 2006.