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In this edition of Hazard we analyse the most recent hospital data on injury to children aged 5-15 years that occurs at school and investigate the pattern of unintentional and intentional injury overall and in specific age groups. We also discuss prevention measures to reduce school-related injuries.

Injury to children aged 5-15 years at school

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Summary

A significant proportion of injuries sustained by children and adolescents happen at school. Unintentional school injury accounts for 25% of hospital admissions for all injury among children aged 5-15 years in Victoria and approximately 20% of emergency department (ED) presentations.

Each year there are approximately 920 hospital admissions and at least 5,000 ED presentations (non-admissions) for unintentional injuries to children and adolescents aged 5-15 years that occur at school. The overall average annual rate for unintentional hospital admissions for school injury in 5-15 year olds is 131/100,000 students/year. The frequency (and rate) of hospital admissions for unintentional school injury peak in both males and females at age 6 years then fall steadily to age 15 years, whereas ED

presentations peak for males at age 13 and females at age 11. Males account for approximately 60% of ED presentations and hospital admissions.

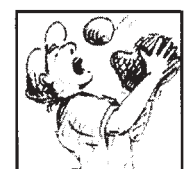
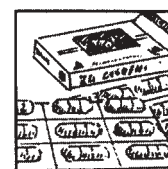
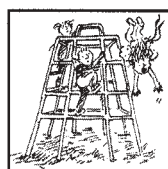
The most common unintentional injuries sustained by both primary and secondary students aged 5-15 years are fracture/dislocations and sprains/strains. Forearm fractures are the most common specific injury accounting for 41% of all hospital admitted injuries. Play equipment falls were the mechanism of more than 50% of these fractures. The most frequent injury cause at both levels of schooling is falls, accounting for 68% of all primary school injury cases and 46% of all secondary school injury cases. Play equipment related fall injuries dominate in younger students whereas sport and active recreation fall injuries are most common in older students.

Intentional injury (assaults and self-harm) is far less common than unintentional injury among children at school. There are on average 33 hospital admissions and 90 ED

presentations (non-admissions) each year for intentional school-related injury.

The patterns and causes of school injuries have received limited attention, and resources to aid school personnel to address this injury problem are sparse. Education authorities should assist and resource schools to systematically analyse local injury data and address the major causes of injury in school communities. We recommend that education authorities develop a planned approach to the reduction of school injury and that each school should establish an injury prevention committee to analyse aggregated injury data for patterns that may indicate problems and to oversee the design, implementation and evaluation of preventive measures. Also, recent analytical studies undertaken by MUARC and the University of Queensland independently suggest that current playground safety standards do not adequately address the problem of play equipment related fall injuries (especially in relation to fall height) and should be reviewed.

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Introduction

School is the environment, outside the home, where children and adolescents spend the majority of their time. They spend approximately 7 to 9 hours 5 days a week for 8 months of the year in school or on school property (Miller & Spicer, 1998). Almost one quarter of all injury related hospital admissions in children aged 5-15 years and 20% of emergency department (ED) presentations (non-admissions) occur in the school environment. The home is the only location where more injuries among this age group occur accounting for 38% of admissions and one-quarter of ED presentations.

There has been little detailed research in Australia on the frequency, injury burden and cost of school injuries. For the purposes of this article, school children were defined as persons aged 5–15 years. Analysis involved two broad groups: primary (defined as students aged 5-11 years) and secondary (defined as students aged 12-15 years). Injury data for those aged 5-9 years, 10-11 years, 12-13 years and 14-15 years were analysed separately because there are some differences in the pattern of injury in each of these age groups.

The aim of this edition of *Hazard* is to provide an overview of the available school-related injury data held by VISAR in order to guide injury prevention efforts in the school environment.

Method

Data for this edition of *Hazard* were extracted from three injury databases held or accessed by VISAR for the latest available period:

- National Coroners Information System (NCIS) - national coronial database that records deaths from external causes in Australia (July 2000-December 2002)
- Victorian Admitted Episodes Dataset (VAED) - Victorian public and private hospital admissions (July 1998-June 2001); and

- Victorian Emergency Minimum Dataset (VEMD) - Victorian public hospital emergency department (ED) presentations (non-admissions) (1999-2001).

Data were selected from the VAED and VEMD utilising the location code 'school, other institution and public administrative area'. This code is not specific to schools and captures other locations such as hospitals, libraries and public halls. To exclude the 'other' locations as far as possible, case selection was further refined to only include children aged 5-15 years and cases that presented to hospital between Monday and Friday during school terms. The methods of extracting data from each dataset and the limitations of the data are detailed in Box 1.

Rate data were only available for hospital admissions because the VEMD does not capture all Victorian ED presentations. Australian Bureau of Statistics (ABS) population data were used to calculate injury rates. Injury rates for 5 and 15 year olds are deflated because not all children at these ages attend school.

Results

Unintentional injury

Deaths

No deaths of children at school were recorded for Victoria on the NCIS for the period July 2000-December 2002.

Hospital-treated injury

Frequency

Recent VISAR data indicate that each year in Victoria there are, on average, more than 920 hospital admissions and 5000 ED presentations (non-admissions) for injuries to children at school (Table 1).

Gender and age

Males account for 56% of injury cases at the primary school level, and almost 70% of cases at the secondary school level (Table 1). Primary school-aged students are over-represented in admissions.

Pattern of injury

The most frequently occurring hospital-treated injuries overall were forearm, wrist and shoulder/upper arm fractures, intracranial injuries and wrist, hand and ankle sprains. Comparing the pattern of injury in ED presentations (non-admissions) to admissions it appears that:

- Falls and struck by/collision with person/object were the most common mechanism of injury for both admissions and ED presentations among both primary and secondary school students
- Upper extremity injury predominated in both hospital admissions and ED presentations
- Almost 70% of admissions were fracture/dislocation cases, whereas these formed only one-third of ED presentations (non-admissions)
- Sprains and strains were much more common in ED presentations than admissions

(Table 1)

Hospital admissions

(n=2,771; annual average frequency n=924)

Frequency

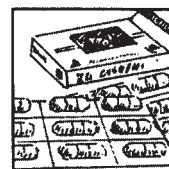
Analysis of the latest three-year period of data on VAED (July 1998-June 2001) indicated that there were, on average, 924 hospital admissions per year for injuries that occurred to students aged 5-15 years at school.

Admission rate

The average annual rate of hospital admission for students aged 5-15 years injured at school was 131/100,00 population. The highest admission rate was in six-year-olds (197/100,000). The injury rate decreased with increasing age from age six (Figure 1). The lower than expected rate among 5-year-olds is probably explained by the fact that not all 5-year-olds attend school.

Age and gender

Figure 1 shows the age and gender breakdown for all school related injury admissions. For all age groups, males



had a higher rate of admission for injury at schools than females. The difference between the sexes is greatest in the older students (ages 11, 12, 13 and 14 years) and least in younger students (ages 5 and 8 years). The lower than expected rate in 15-year-old males is probably explained by the fact that a greater proportion of males, than females, leave school at 15 years (Teese, 2002).

Pattern of injury

The major causes (mechanisms) of admissions, body sites injured and the nature of injuries are shown in Table 1. Falls were by far the most frequent cause of admissions (75%) followed by struck by/collision with person/object (16%). Forty-five per cent of fall hospital admissions were play-equipment related. The most common injuries leading to admission were fractures and dislocations (68%), intracranial injury (12%) and open wounds (10%). The most frequently injured body sites were the upper extremity (61%), head/face/neck (20%) and the lower extremity (10%). Forearm fractures were the major specific injury type accounting for 41% of admissions, followed by intracranial injury (12%) and shoulder/upper arm fractures/dislocations (11%).

Activity when injured

The coding for activity is not very informative. The major specified activities engaged in at the time of injury were sports (13% of primary student admissions and 34% of secondary students admissions) and leisure (29% and 12%). A high proportion of both primary and secondary student admissions were coded to 'other specified activity', 49% and 43% respectively.

Injury severity

Students injured unintentionally at school utilised 3,931 hospital bed days over the three-year period of this study. Injured secondary students tended to stay in hospital longer than primary students (1.8 days average length of stay compared to 1.3 days).

Hospital ED presentations (non-admissions)

(*n*=15,014; annual average frequency *n*=5,005)

Frequency

Over the 3-year period 1999-2001, at least 5,000 students aged 5-15 years presented to hospital EDs each year for injuries that occurred at school. Only non-admitted cases are included in this analysis.

Age and gender

Figure 2 shows the age and gender breakdown for ED school injury presentations. Overall, the frequency of ED presentations increased between ages 5 and 11 then decreased to age 15. In all age groups, males accounted for a higher proportion of presentations than females. The difference is most apparent in older students (aged 13 and 14 years) and least apparent in younger students (aged 6 and 8 years).

Causes and pattern of injury

The major causes (mechanisms) of injury, body site and nature of injury are shown in Table 1. Falls (57%) and struck by/collision with person/object (30%) were the most common causes of injury. Play equipment falls accounted for at least 11% of all ED presentations. The most frequently occurring injuries were fractures and dislocations (32%), sprains and strains (26%) and open wounds (10%). The most commonly injured body sites were the upper extremity (52%), lower extremity (19%) and head/face/neck (18%). The most common specific injuries were forearm/wrist fractures (15%), ankle sprains/strains (6%) and wrist sprains/strains (5%).

Activity at the time of injury

The activity 'leisure' accounted for 58% of ED presentations among primary students and 40% among secondary students, whereas 'sport' accounted for 14% of ED presentations in primary students and 29% in secondary students. The 'leisure' code covers 'hobby and leisure-time activities with an entertainment element'. The quality of case

narrative data varied. Many of the 'leisure' records provided no additional information on the circumstances of the injury (*n*=7,717). Almost 30% of 'leisure' cases indicated that the injured person was involved in some kind of active recreation activity at the time of injury (playing on play equipment 15%, sports 8%, 'playing' 5%). Other injury factors mentioned were falling off logs, running into lockers and fights between students.

Proportion of cases admitted

ED presentation data analysed here are non-admissions only. Each year an additional 1,000 ED presentations are admitted. This represents 14% of all presentations for unintentional injuries to children that occur at school. The proportion of admitted cases among primary school students was almost double that for secondary school students (16.3% versus 8.5%).

Age specific pattern of injury at school

Primary school-aged children

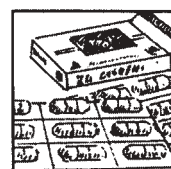
5-9 year-olds

(*n*=1,644 admissions, average annual frequency *n*=548; *n*=6,140 ED presentations, average annual frequency *n*=2,047)

Age and gender

Males comprise 57% of admissions and 55% of ED presentations in the 5-9 year age group. The difference between the sexes with regard to the proportion injured is less pronounced in 5-9 year olds than in the older age groups of students (Figure 3). The population rate of admissions peaked in six-year-olds, for both males and females, and declined thereafter (Figure 1).

ED presentations data generally showed a different pattern with presentations increasing in frequency as age increased (Figure 2). Rate data are not available because not all presentations are captured by VEMD.

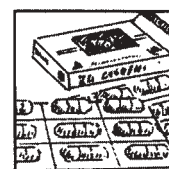


Overview of frequency and pattern of unintentional injury in school children aged 5-15 years, Victoria

Table 1

Characteristic	Primary students (5-11 yrs)				Secondary students (12-15 yrs)				Total students (5-15 years)			
	Presentations (n=9536)		Admissions (n=2120)		Presentations (n=5478)		Admissions (n=651)		Presentations (n=15014)		Admissions (n=2771)	
	n	%	n	%	n	%	n	%	n	%	n	%
Gender												
Male	5277	55	1224	58	3749	68	486	75	9026	60	1710	62
Female	4259	45	896	42	1729	32	165	25	5988	40	1061	38
Age												
5-9	6140	64	1644	78	-	-	-	-	6140	41	1644	59
10 & 11	3396	36	476	22	-	-	-	-	3396	22	476	17
12 & 13	-	-	-	-	3128	57	375	58	3128	21	375	14
14 & 15	-	-	-	-	2350	43	276	42	2350	16	276	10
Cause												
Falls	6162	65	1718	81	2483	45	351	54	8645	57	2069	75
Struck by/collision with person/object	2421	25	287	14	2109	38	155	24	4530	30	442	16
Cutting/piercing	243	3	28	1	256	5	37	6	499	3	65	2
Transport-related	45	-	*	-	33	-	13	2	78	-	15	-
Poisoning	11	-	6	-	17	-	12	2	28	-	18	-
Scald/burn	9	-	*	-	30	-	*	-	39	-	6	-
Other specified	431	5	75	4	399	7	81	12	830	5	156	6
Unspecified	214	2	0	0	151	3	0	0	365	2	0	0
Body site injured												
Upper extremity	5154	54	1407	66	2674	49	287	44	7828	52	1694	61
Head/face/neck (excludes eye)	1927	20	410	19	836	15	153	24	2763	18	563	20
Lower extremity	1452	15	134	6	1387	25	140	22	2839	19	274	10
Trunk	258	3	44	2	130	2	24	4	388	3	68	2
Eye	233	2	25	1	183	3	13	2	416	3	38	1
Multiple body regions	81	-	*	-	37	-	0	0	118	-	*	-
Other specified	260	3	98	5	132	2	34	5	392	3	132	5
Unspecified	171	2	0	0	99	2	0	0	270	2	0	0
Nature of injury												
Fracture and dislocation	3277	34	1496	71	1613	29	384	59	4890	32	1880	68
Sprains/strains	2301	24	12	-	1679	31	13	2	3980	26	25	-
Open wound, excludes eye	1005	11	204	10	485	9	61	9	1490	10	265	10
Superficial, excludes eye	897	9	13	-	442	8	6	1	1339	9	19	-
Intracranial	377	4	236	11	186	3	91	14	563	4	327	12
Muscle/tendon	336	4	0	0	260	5	*	-	596	4	0	0
Foreign body	163	2	13	-	90	2	*	-	253	2	17	-
Other specified	724	7	106	5	468	8	84	13	1192	8	190	7
Unspecified	456	5	40	2	255	5	10	2	711	5	48	2

Source: Victorian Admitted Episodes Dataset (July 1998 – June 2001) and Victorian Emergency Minimum Dataset (January 1999- December 2001). * cell count of 5 or less



The pattern of injury among males and females did not differ substantially with the following exceptions:

- A higher proportion of female admissions and presentations, than male, were associated with leisure activities (admissions: 26% v 22%, ED presentations: 65% v 59%), whereas a higher proportion of male, than female, injury admissions and presentations were associated with sports (admissions: 9% v 6%, ED presentations: 12% v 7%);
- Females were over-represented in hospital admissions and presentations for falls (admissions: 86% v 79%, ED presentations: 74% v 61%), in particular play equipment related falls (admissions: 57% v 40%, ED presentations: 32% v 22%); and
- Males were over-represented in hit/struck/crush injury admissions and presentations (admissions: 14% v 10%, ED presentations: 28% v 17%).

Major causes of injury

Falls (mostly from play equipment) were by far the most common cause of injury to 5-9 year-old students, accounting for 82% of admissions and 67% of presentations for school injury in this age group. Hit/struck/struck by person or object was the next most frequent cause of injury, accounting for 12% of admissions and 23% of presentations.

Falls

(82% of admissions $n=1,354$,
67% of presentations $n=4,122$)

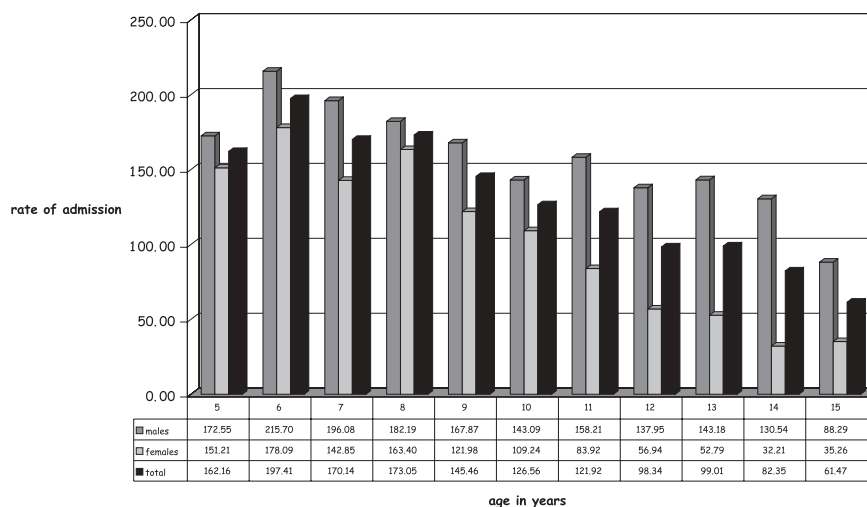
Play equipment falls

Analysis of hospital data indicates that play equipment was associated with 58% of fall-related admissions and 65% of fall-related ED presentations for this age group. The VAED provides no further information on the play equipment involved.

VEMD narrative data for non-admitted cases indicate that the specific pieces of play equipment most involved were monkey bars (63% of play equipment falls), flying foxes (8%) and slides (7%).

Rate of unintentional injury admissions per 100,000 population for students aged 5-15 years injured at school, by age and gender (n=2,771)

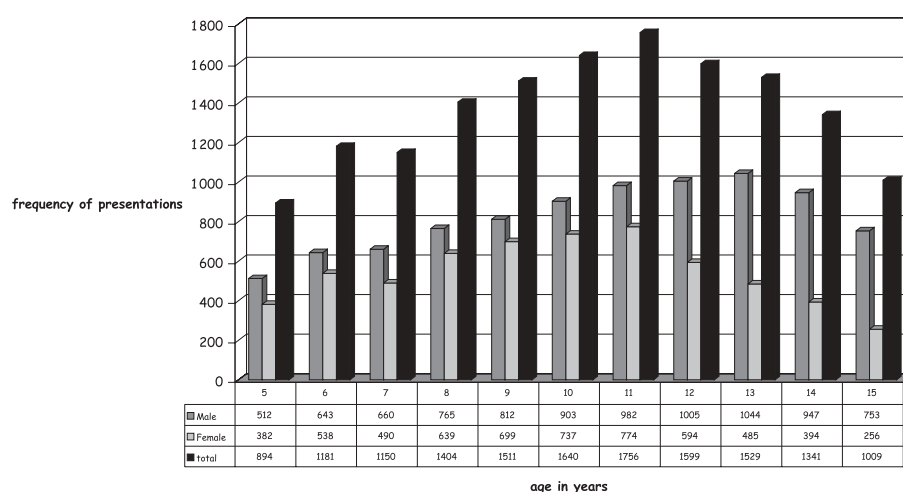
Figure 1



Source: Victorian Admitted Episodes Dataset (VAED) July 1998-June 2001

Frequency of unintentional injury ED presentations for students aged 5-15 years injured at school, by age and gender (n=15,014)

Figure 2

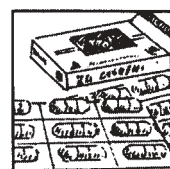


Source: Victorian Emergency Minimum Dataset (VEMD) January 1999-December 2001

Other falls

The main causes of hospital admission for falls, other than from play equipment, were slipping, tripping and stumbling (11% of all falls), and falls from colliding, pushing or shoving by or with another person (5%). In 13% of cases the cause of the fall was unspecified.

Analysis of VEMD narrative data provided some additional information on the circumstances of 'other falls' (Figure 4).



Hit/struck/crush

(12% of admissions $n=204$,
23% of presentations $n=1,406$)

More than a third of hit/struck/crush school injury admissions in 5-9 year-old students were caused by 'striking against or struck by other objects' (36%). Other major causes were 'caught, crushed, jammed or pinched between objects' (27%), 'striking against or bumped into another person' (14%) and 'hit, struck, kicked, twisted, bitten or scratched by another person' (10%). No further information is available on these hit/struck/crush incidents.

Among ED presentations, 58% of cases involved collisions with objects and the remainder were collisions with persons. Case narrative data provided more information. Of the 'collisions with objects' records where the object could be identified from text searches ($n=343$), 58% involved sport and active recreation equipment (mainly balls and bats), 10% involved play equipment, 9% involved trees/branches and sticks and 6% involved rocks and stones. Of the 'collision with person' records with factors mentioned ($n=304$), 24% indicated that the injured person was involved in sport or active recreation at the time of the collision. Most other 'collision with person' records simply mention that the injured person was knocked over, pushed or collided with other students, without providing any further details of the circumstances.

10 & 11-year-olds

($n=476$ admissions, average annual frequency $n=159$; $n=3,396$ presentations, average annual frequency $n=1,132$)

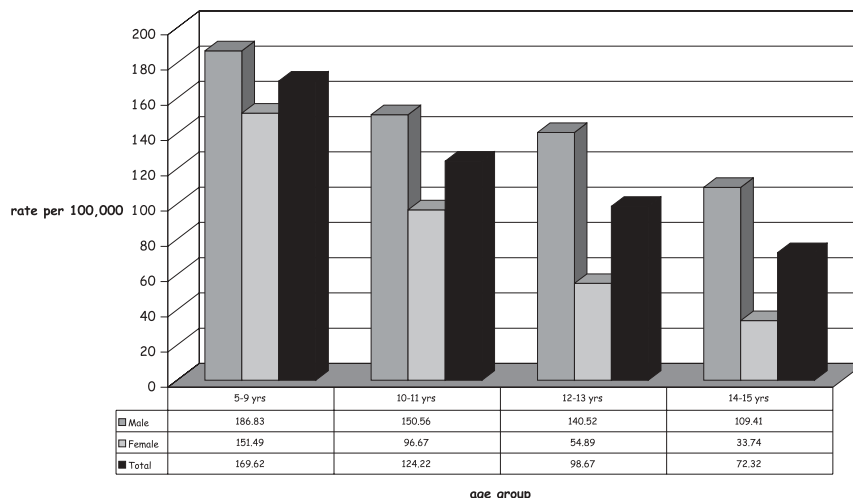
Gender

Males comprised 62% of admissions and 56% of presentations in 10&11-year-olds. The population rate of admission was higher in males, than females, at both ages (figure 1).

The pattern of injury among males and females did not differ substantially with the following exceptions:

Average annual admission rates for unintentional injury to students aged 5-15 years occurring at school, by age group and gender

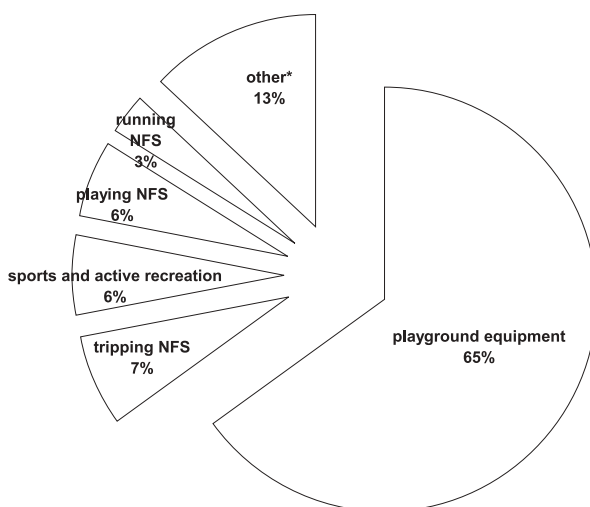
Figure 3



Source: Victorian Admitted Episodes Dataset (VAED) July 1998-June 2001

Factors implicated in fall-related ED presentations among 5-9 year olds injured at school

Figure 4



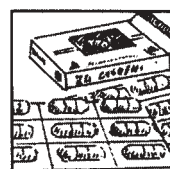
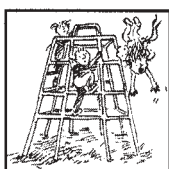
* other includes concrete, pushed, slipping NFS, stair/step, tree/branches, walking, chair/stool

Source: Victorian Emergency Minimum Dataset (VEMD) January 1999-December 2001

Note: only records where a factor could be identified in the text description are included ($n=1,733$)

- A higher proportion of females, than males, were admitted or presented to ED for falls (admissions: 80% v 74%; ED presentations: 68% v 53%), whereas a higher proportion of hit/

struck/crush injury admissions and presentations were males (admissions: 19% v 15%; presentations: 36% v 20%);



- A higher proportion of females, than males, presented to ED with upper extremity injuries (60% v 52%) whereas a higher proportion of males, than females, presented with superficial and open wounds (18% v 11%); and
- Males appear more likely to suffer head injuries. Males were over-represented in intracranial injury admissions (17% v 9%) and admissions and presentations for head/face/neck injuries (admissions: 24% v 18%; presentations: 21% v 10%).

Major causes of injury

As for 5-9 year olds, the vast majority of school-related injury in 10&11-year-old students were falls (77% of admissions, 60% of presentations) followed by hit/struck/crush injuries (17% of admissions, 30% of presentations).

Falls

(77% of admissions $n=364$,
60% of presentations $n=2,040$)

Play equipment falls

Although play equipment falls were still the leading identifiable cause of fall-related hospital admissions and ED presentations in 10&11 year-olds, they were less common in this age group compared to 5-9 year-olds (33% of admissions compared to 58%, and 31% of presentations where a factor could be identified, compared to 65%). Narrative data indicate that monkey bars, flying foxes and swings were most commonly associated with fall injury incidents.

Other falls

Other causes of fall-related hospital admissions were slipping, tripping and stumbling (21%) and falls from colliding, pushing or shoving by or with another person (5%). The cause was unspecified in 18% of cases.

Figure 5 shows factors implicated in fall injury ED presentations from an analysis of VEMD case narrative data. Falls in sport and recreation were frequent in 10&11 year-olds. Football, soccer, basketball, netball and high jump were the sports most frequently mentioned.

Hit/struck/crush

(17% of admissions $n=83$,
30% of presentations $n=1,015$)

Analysis of admissions data indicated that almost one-third of injuries were caused by striking or being struck by other persons (32%). More than one-quarter of injuries were caused by 'striking against or struck by other objects' (27%) and 18% by 'striking against or struck by sports equipment'.

ED presentations for hit/struck/crush injuries were fairly equally divided between 'struck by object' (53%) and 'struck by person' (47%). More than 30% of the 'struck by object' cases occurred when students were playing Australian football, basketball, soccer or cricket and mostly involved being hit by the ball. Other objects mentioned in narrative data were poles, walls and bars. In 28% of 'struck by persons' cases the injury occurred while the student was engaged in sports, most commonly Australian football, soccer and basketball.

Secondary school-aged students

12 & 13 year-olds

($n=375$ admissions, average annual frequency $n=125$; $n=3,128$ presentations, average annual frequency $n=1,043$)

Gender

Almost three-quarters (73%) of hospital admissions and two-thirds of presentations for school-related injury in 12 and 13 year-olds were males. The population rate of admissions in this age group overall, and particularly for females, is much lower than for primary school-aged children (Figure 3).

The pattern of injury in male and female 12 & 13 year-olds was fairly similar with the following exceptions:

- Females were over-represented in both hospital admissions and presentations for lower extremity injury (admissions: 33% v 20%, presentations: 30% v 18%) whereas males were more likely to be admitted or present with upper

extremity injury (admissions: 48% v 34%, presentations: 54% v 46%) and

- A higher proportion of injuries to females, than males, were fall injuries (admissions: 60% v 54%, presentations: 55% v 44%), particularly falls from stairs/steps (admissions: 7% v 1%), whereas males were over-represented in hit/struck/crush injury admissions and presentations (admissions: 28% v 18%, presentations: 41% v 30%).

Major causes of injury

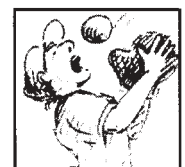
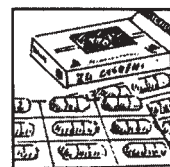
Falls

(57% of admissions $n=215$,
48% of presentations $n=1,499$)

As for primary school-aged children, falls were the major cause of injury at school among 12 and 13 year-olds. However, falls accounted for a lower proportion of admissions than in the younger age groups, mainly because of a decrease in prominence of play equipment falls.

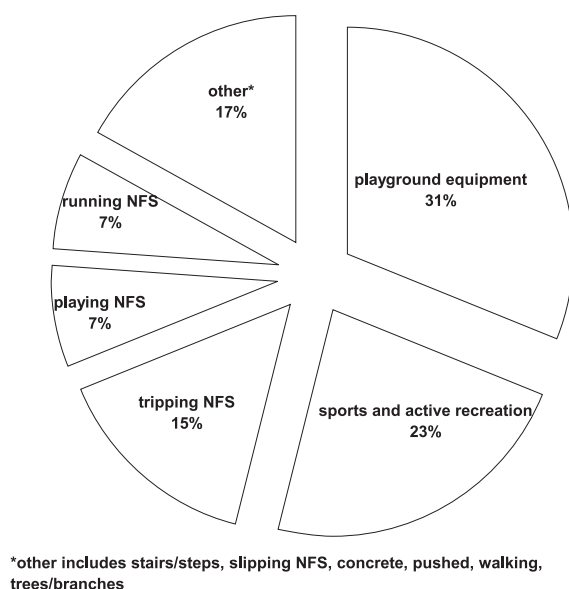
The major causes of fall injury admissions were 'fall on same level from slipping, tripping and stumbling' (27%), 'unspecified falls' (24%), and 'fall on same level from colliding, pushing or shoving by or with another person' (11%). No further information is given on the circumstances of falls in the VAED.

Figure 6 shows the main factors identified in ED presentations narrative data for fall injury. Although data are not complete it appears that falls in sports and recreation activities were the major identifiable cause of falls in 12&13 year-olds (41% of fall ED presentations where more information was provided). The specific sport and recreation activities that were most frequently mentioned were Australian football (23% of falls in sport and recreational activities), soccer (18%), basketball (12%), netball (8%) and gymnastics (7%). Tripping (no further information on the circumstances) was the cause of a further 12% of falls and play equipment was implicated in 11%.



Factors implicated in fall-related ED presentations among 10-11 year-olds injured at school

Figure 5



Source: Victorian Emergency Minimum Dataset (VEMD) January 1999-December 2001

Note: only records where a factor was identified in the text description are included (n=749)

Hit/struck/crush

(25% of admissions n=93,

37% of presentations n=1,158)

The main causes of hit/struck/crush injury admissions were 'striking against or struck by other persons' (43%), by objects (26%) or struck by sports equipment' (12%).

The two major causes of ED presentations for these injuries were 'struck by object' (52%) and 'struck by person' (48%). Analysis of case narrative data revealed that one-third of 'struck by object' cases involved equipment used in sports and recreation activities, most commonly balls used in Australian football (24% of cases involving sports equipment), soccer (13%), basketball (13%) and cricket (11%). Other objects accounted for 19% of cases including walls, poles, doors, chairs, lockers and desks/tables. One-quarter of 'struck by persons' cases occurred in sport and recreation activities, most commonly Australian football, soccer and basketball. Most other 'struck by person' injury narratives mentioned that the student was knocked over,

pushed, or collided with other students but gave no more information on the circumstances of the injury.

14 & 15 year olds

(n=276 admissions, average annual frequency 92; n=2,350 presentations, average annual frequency 783)

Gender

Males comprise 77% of admissions and 72% of presentations in students aged 14 and 15. The comparatively low frequency of admissions and presentations for injury among females in this age group is most likely a reflection of their decreased participation in sport and active recreation as they grow older.

The gender-related pattern of injury for this age group does not differ substantially with the following exceptions:

- A higher proportion of males, than females, were admitted to hospital for fall injury, whereas a higher proportion of females, than males, were admitted for hit/struck/crush injury (29% v 21%);

- A higher proportion of females, than males, were admitted to hospital for head/neck/face injuries (19% v 12%) and for intracranial injuries (18% v 10%), and presented to EDs with lower extremity injury (49% v 38%). Conversely, a higher proportion of male presentations and admissions, compared to female, were for fractures (admissions: 58% v 38%, presentations: 28% v 14%) and open wounds (admissions: 12% v 5%, presentations: 12% v 6%) and
- A higher proportion of males than females required 2-7 days in hospital (24% v 16%), whereas females were over-represented in cases requiring a very long stay, more than 8 days, in hospital (6% v 2%).

Major causes of injury

Falls

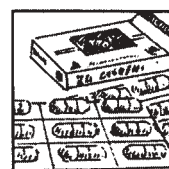
(49% of admissions n=136,

42% of presentations n=984)

As for all other age groups of students injured at school, falls were the major cause of injury in 14 and 15-year-old students. However, they accounted for a lesser proportion of school injuries than in the younger age groups.

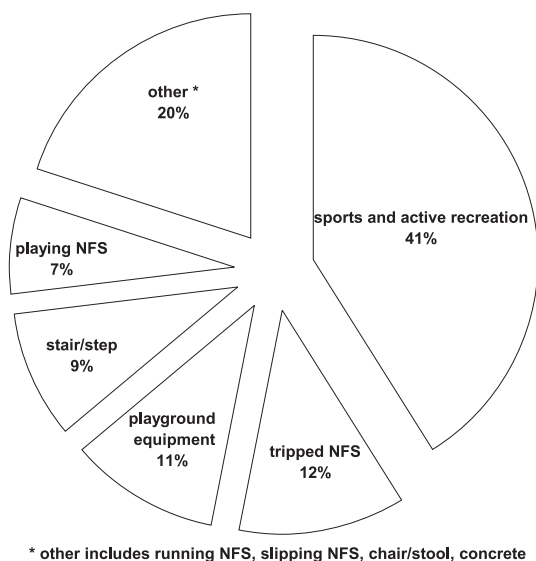
The major causes of fall-related hospital admissions for injuries at school among 14 and 15 year olds were falls from slipping, tripping and stumbling (27%), other falls on the same level (18%), unspecified falls (17%) and falls from colliding, pushing or shoving by or with another person (13%).

VEMD narrative data provided some more detail of the circumstances of the fall injury cases presenting to ED (Figure 7). Of fall injury cases with additional narrative information (33% n=325), nearly half (48%) occurred during sport and recreation activities, most commonly in Australian football (27% of sport and recreation cases), basketball (19%), soccer (16%), skateboarding (6%), netball (6%) and gymnastics (5%).



Factors implicated in fall-related ED presentations among 12-13 year olds injured at school

Figure 6



Source: Victorian Emergency Minimum Dataset (VEMD) January 1999-December 2001

Note: Only records where a factor could be identified in the text description are included (n=503)

Hit/struck/crush

(22% of admissions n=62,
40% of presentations n=951)

The major causes of hospital admission for hit/struck/crush injuries at school among 14 and 15 year old students were 'striking against or struck by other objects' (30%) 'hit, struck, kicked, twisted, bitten or scratched by another person' (24%), 'striking against or struck by sports equipment (12%) and 'caught, crushed, jammed or pinched in or between objects (12%).

ED presentations for hit/struck/crush injuries were divided between 'struck by person' (54%) and 'struck by object' (46%). Analysis of 'struck by person' case narrative data (n=518) revealed that almost 30% of cases occurred in sports and active recreation, most commonly Australian football (34% of sport and active recreation cases), soccer (20%), basketball (17%) and rugby (5%). The remainder gave sparse or no information on the circumstances of the injury except to indicate that the injured person was knocked over, pushed, or collided with another student.

One third of 'struck by object' cases involved equipment, mostly the ball, used in sport and active recreation, predominantly in Australian football (23% of 'struck by object' cases), soccer (19%), hockey (10%) and basketball (10%). A range of objects was identified in a further 17% of cases, mostly doors (22% of these cases), walls (21%) and lockers (10%). The remainder provided no additional information on the circumstances of the injuries.

Intentional Injury

Hospital-treated intentional injury among students at school is far less common than unintentional injury. There were 99 school related injury admissions and 276 ED presentations (non-admissions) for intentional injury in 5-15 year-olds over the latest available three-year period of Victorian hospital data (admissions July 1998-June 2001, presentations January 1999-December 2001). Assaultive injuries were more common than self-inflicted injuries in both datasets. Cases of intentional injury at school increased

with age, most occurring in 15 year olds. This is in contrast to unintentional injuries where injury admissions and presentations were more common in the youngest age group.

Assaultive injury

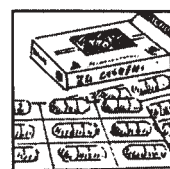
(n=62 admissions, average annual frequency 21; n=249 ED presentations, average annual frequency 83)

Hospital admissions (n=62)

Males accounted for ninety-four percent of all hospital admissions for assaultive injuries that occurred at school, more than three-quarters of whom were of secondary school age. Figure 8 shows the increase in the average annual rate of assaultive injury admissions for males as age increases. Most assaultive injury admissions were for injuries that occurred in unarmed fights and brawls. The most frequently injured body sites were the head (32%), face (32%) and hand/wrist/fingers (15%). The most common body site fractured was the face (26% of all assaultive injury), followed by the hand/wrist/fingers (13%). Eighty-two percent of admissions for assaultive injuries required a length of stay of less than two days.

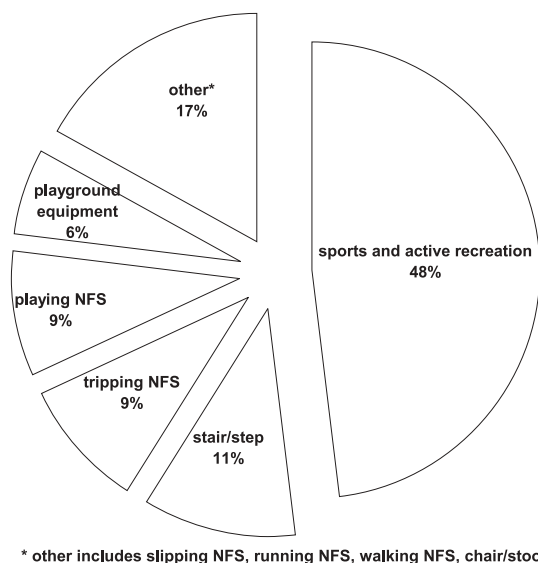
ED presentations, non-admissions (n=249)

As for hospitalisations, most of assaultive injury ED presentations were male (80%) and of secondary school age (75%). The major cause of presentations was struck by/collisions with a person or object (85%). The most frequently injured body sites were the face (25%), head (18%) and hand/wrist/fingers (14%). The most frequently occurring injury diagnoses were superficial and open wounds (33%), fractures (19%) and sprains and strains (14%). The most common specific injuries were superficial and open wounds to the face (17%), fractures of the hands and fingers (8%), and facial fractures (5%).



Factors implicated in fall-related ED presentations among 14-15 year olds injured at school

Figure 7



Source: Victorian Emergency Minimum Dataset (VEMD) January 1999- December 2001

Note: only records where a factor could be identified in the text description are included (n=325)

Self-inflicted injury

(n=37 admissions, average annual frequency 12; n=27 ED presentations, average annual frequency 9)

Hospital admissions (n=37)

In contrast to assaultive injury, 81% of self-inflicted injury admissions were females all of whom were aged 12-15 years (Figure 8). The rate of admissions for self-inflicted injury at school among 15-year-old females is almost the same as the rate of school-related assaultive injury admissions among their male counterparts (Figure 8). Over two-thirds of self-inflicted injury cases were self-poisoning. Other major causes were hanging, strangulation and suffocation (16%) and cutting and piercing (14%). Half of admissions for self-inflicted injury required a length of stay less than two days.

ED presentations, non-admissions (n=27)

Case numbers are small. Injuries almost exclusively involved secondary school aged students. Females accounted for 55% of self-inflicted injury ED presenta-

tions and were mostly poisonings by medications (most commonly analgesics). Male cases were mostly caused by deliberate collisions with objects when students punched walls or lockers.

Discussion

Unintentional injury

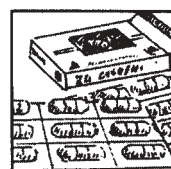
Unintentional school injuries are clearly a health problem, particularly among 5-9 year-olds. On average each year in Victoria there are at least 6000 hospital-treated unintentional injuries in 5-15 year-old students that occur at school. This study does not extend to injuries among senior secondary students, injuries that occur in school sports, camps and other activities that are held on weekends and in school holidays, and injuries treated by GPs, other health practitioners, school nurses and school personnel. Also, the frequency of sports injuries that occurred on weekdays may have been underestimated in our study because some cases could have been classified under other location codes e.g. 'sports and athletics areas'.

Several studies have found that a major proportion of non-fatal unintentional childhood injury is sustained at school (Langley et al, 1990; Scheidt et al, 1995; Miller & Spicer, 1998; Vorko & Jovic, 2000; Laflamme & Menckel, 2001). Our study found that almost one quarter of all injury hospital admissions and 20% of injury ED presentations among children aged 5-15 years occur at school. Similar findings have been reported in New Zealand and the US (Langley et al., 1990; Scheidt et al., 1995).

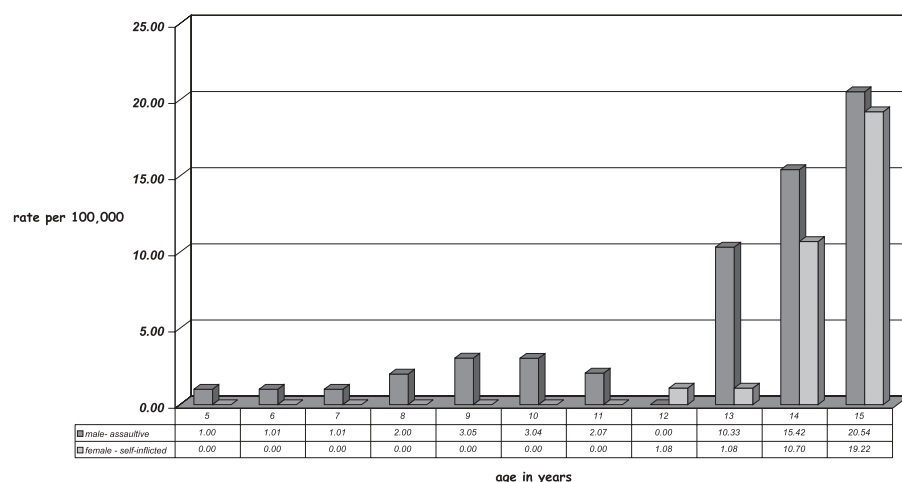
We found that the overall average annual rate for hospital admissions for school injury was 131/100,000 students/year. An earlier New Zealand study of unintentional injuries to students at school that utilised 1986 hospital morbidity data reported a higher injury incidence rate, 152/100,000 students/year (Langley et al, 1990). As for our study, the New Zealand study reported that the school injury admission rate declined with increasing age, the peak occurring among children aged six years.

Victorian ED presentation data for injury at school follow a different pattern than admissions data. The frequency of injury cases peaks in upper primary students, rather than in junior primary students. This over-representation of younger students in hospital admissions is possibly explained by their greater physical susceptibility to injury, a more conservative admission policy for young injured children in hospitals and/or the fact that they are more frequently involved in play equipment falls from heights.

In our study, male students comprised 56% of hospital-treated unintentional injury cases at the primary school level and almost 70% at the secondary school level (despite males only comprising 51% of the general population aged 5-15 years). This finding has been reported from studies utilising hospital data conducted elsewhere (Langley et al., 1990; Scheidt et al., 1995), and also from studies that have investigated school injuries at a less severe level utilising data on visits to sick bay, school nurses etc. (Allen et al, 1998; Peterson, 2002).



Average annual admission rate for school related male assaultive injury (n=58) and female self-inflicted injury (n=30) **Figure 8**



Source: Victorian Admitted Episodes Dataset (VAED) July 1998-June 2001

Differential exposure to particular high-risk activities for injury during school hours may account for some of the gender difference reported.

The major cause of hospital admissions and ED presentations (non-admissions) for injury that occurred at school was falls. Falls accounted for three-quarters of admissions for school related injuries and more than half of ED presentations (non-admissions). Forty-five per cent of fall hospital admissions and at least eleven per cent of all ED presentations (non-admissions) were play equipment related. Falls from monkey bars accounted for two-thirds of play equipment related hospital admissions. Play equipment falls were the major mechanism of injury for the youngest students in Victorian schools but as age increased, falls in sport and active recreation activities became more common. Several other studies have noted the dominance of playground fall injuries in younger students (Laflamme & Eilert-Petersson, 1998; Langley et al, 1990; Maitra, 1997) and sports injuries (falls and collisions) as age increases (Laflamme & Eilert-Petersson, 1998; Maitra, 1997).

Intentional injury

Intentional injuries are far less frequent than unintentional injuries in Victorian schools representing only 2% of hospital-treated school injuries. Each year in Victoria there are, on average, only 33 admissions and 90 ED presentations for assaultive and self-inflicted school injury. ED presentations are underestimated because the VEMD does not capture all cases. Also, self-harm and assault cases that are triggered by school-related conflict that occur in other locations are not able to be identified, for example overdoses due to bullying at schools or assaults related to conflict at school. The frequency of admissions and presentations for both assaultive and self-inflicted injury increased with age. Males were more likely than females to be admitted or present to hospital for assaultive injury, whereas females were more likely to be admitted or present to hospital for self-inflicted injury (mostly self-poisoning by analgesics).

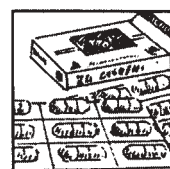
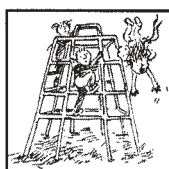
What can be done?

The findings presented here indicate that increased attention needs to be given to reducing unintentional injury in our schools, particularly playground equipment falls, and falls and other injuries in

sports activities. This will require a co-ordinated strategy at the systems-wide, regional, cluster and local school levels. Two recent US guides on preventing school injuries offer pertinent and comprehensive advice on reducing injuries that occur in schools.

The Centres for Disease Control and Prevention (CDC) in the US released a set of guidelines in 2001: 'School health guidelines to prevent unintentional injuries and violence'. The guidelines were based on an in-depth review of research, theory and current practice by a panel of specialists, and broad consultation. The document (accessed on-line at: www.cdc.gov/nccdphp/dash/healthtopics/injury/guidelines/index.htm) includes recommendations on eight aspects of school health efforts to prevent unintentional injury, violence and suicide:

- Establish a social environment that promotes safety and prevents unintentional injuries, violence and suicide
 - ensure high academic standards and provide faculty, staff members and students with the support and administrative leadership to promote the academic success, health and safety of students
 - encourage students' feelings of connectedness to school
 - designate a person with responsibility for co-ordinating safety activities
 - establish a climate that demonstrates respect, support and caring that does not tolerate harassment or bullying
 - develop and implement written policies regarding unintentional injury, violence and suicide prevention
 - infuse unintentional injury, violence and suicide prevention into multiple school activities and classes
 - establish unambiguous disciplinary policies
 - assess unintentional injury, violence and suicide prevention strategies and policies at regular intervals



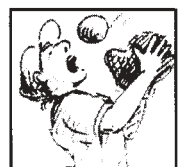
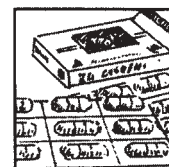
- Provide a physical environment that promotes safety and prevents unintentional injury and violence
 - conduct regular safety and hazard assessments
 - maintain structures, playground and other equipment, vehicles and physical grounds, make repairs immediately
 - actively supervise all student activities to promote safety
 - ensure that the school environment is free from weapons
- Implement health and safety education curricula and instruction
 - choose prevention programs and curricula that are grounded in theory or have an evidence base for effectiveness
 - implement unintentional injury and violence prevention curricula consistent with national and state standards for health education
 - encourage student involvement in learning about unintentional injury, violence prevention
 - provide adequate staffing and resources to provide unintentional injury and violence prevention education for all students
- Provide safe physical education and extracurricular physical activity programs
 - develop, teach, implement and enforce safety rules
 - promote unintentional injury prevention and non-violence through physical education and physical activity program participation
 - ensure that spaces and facilities for physical activity meet or exceed recommended safety standards
 - hire physical education teachers, coaches, athletic trainers etc who are trained in injury prevention, first aid and CPR and provide them with ongoing staff development
- Provide health, counselling and social services for students
 - coordinate school-based counselling, psychological, social and health services and the educational curriculum
 - establish strong links with community resources and identify providers to bring services into schools
 - identify and provide assistance to students who have been seriously injured and those who have witnessed or been the victims of violence, victimization or harassment
 - assess the extent to which injuries occur on school property
 - develop and implement emergency plans for assessing, managing, and referring injured students and staff members to appropriate levels of care
- Establish mechanisms for short and long term responses to crises, disasters and injuries
 - establish a written plan for responding to crises, disasters and associated injuries
 - prepare to implement the school's plan in the event of a crisis
 - have short-term and long-term responses and services established after a crisis
- Integrate schools, family and community efforts to prevent unintentional injuries, violence and suicide
 - involve parents, students and other family members in all aspects of school life, including planning and implementing unintentional injury, violence and suicide prevention programs and policies
 - educate, support and involve family members in child and adolescent unintentional injury, violence and suicide prevention
 - coordinate school and community services
- Provide regular staff development opportunities that impart the knowledge, skills and confidence to effectively promote safety and prevent injury
 - ensure staff are knowledgeable about, and have the skills needed to prevent, unintentional injury and violence at school, at home and in the community
 - train and support all personnel to be positive role models for a healthy and safe lifestyle.

In each section of the report there is a comprehensive discussion covering the specific strategies on how schools can address the recommendations. The authors advise that schools should prioritise recommendations and strategies based on local needs and available resources.

The second useful guide, written by Marc Posner, was published in book form in the US in 2000: *'Preventing school injuries: A comprehensive guide for school administrators, teachers and staff'* (more information: on www2.edc.org/hhd/news3.asp). Although the content is not always relevant to Victorian schools, the guide provides practical information on the composition and establishment of school injury prevention committees, the use of injury data to prevent injury, and measures to prevent injury in specific school settings (such as playgrounds, physical education classes and school sports activities) and emergency preparedness and crisis management.

Government schools in Victoria already record student and staff injury on a computerised database in a standardised format for insurance purposes. Injury data are forwarded to the Department of Education in quarterly reports. Preliminary data from pre-invention interviews conducted in a current MUARC evaluation of a schools (staff) falls prevention project in one region indicate that the ten schools involved are generally conscientious about recording serious injuries to staff (and students) on the database but only four of the ten schools reported that they routinely aggregate and interrogate local data for prevention purposes.

The authors of the above guides support a data-driven approach to school injury



prevention. The cornerstone of this approach is the establishment of an injury prevention committee in each school with representation and responsibility for the reduction of school injury given to key constituencies such as staff, students, parents and the community. The main tasks of a School Injury Prevention Committee would be to analyse aggregated injury data for patterns that may indicate problems and to oversee the design, implementation and evaluation of preventive measures. The Committee should also be active in investigating serious incidents and the planning of new buildings and renovations to ensure that injury prevention features are integrated at the design stage.

Recommendations

- Education authorities should support and resource schools to take action to reduce school injuries within a coordinated strategy.
- Each school should establish an Injury Prevention Committee (composed of teachers, parents, students and community members) with responsibility to reduce school injuries at the local level utilising local data for planning and evaluation purposes.

Preventing play equipment falls

The prevention of play equipment fall injuries should be a high priority in primary schools. Annually, twenty-eight percent of all school-related hospital admissions are arm fractures associated with play equipment falls. Analytic studies have shown strong associations between playground fall injuries and the height of the fall (Chalmers et al., 1996; MacArthur et al., 2000; Laforest et al., 2001); the use of inappropriate (non-impact absorbing) surface material (Chalmers et al., Mowatt et al., 1998 Laforest, 2001); appropriate surface material of insufficient depth (Mowat et al., 1998); and inadequate guardrails (Mowat et al., 1998).

The critical fall height for arm fracture would appear to be a height in excess of 150 cm (Chalmers et al., 1996; Macarthur et al., 2000) yet the current Australian

Standard permits a maximum fall height of 250 cm. Data from an NHMRC-funded MUARC case control study addressing the specific risk and protective factors for arm fractures in playground falls are being analysed. Findings, which may provide guidance for the revision of the current Standard, will be available later this year.

A component of this study involved the assessment of school playgrounds in which forearm fracture cases had occurred for conformity to the Australian Standard. Non-published results indicate that the vast majority of the school playgrounds studied met the requirements of the Standard on height, head impact criteria (HIC) and resilience of surface material (mostly tan bark), but not for depth of loose fill surface material (personal communication, Shauna Sherker).

There are few published studies of effective interventions to reduce playground injury. Sibert et al (1999) reported a significant reduction in injury rate per observed child before and after an intervention in five playgrounds in Cardiff, Wales compared to the injury rate in 14 playgrounds (in two other areas in Cardiff) in which no changes were made. In the intervention playgrounds the depth of tan bark was increased from 30cm to 60cm and monkey bars were replaced in one playground with rope climbing frames. Available evidence indicated that children's use of both the intervention and comparison playgrounds remained unchanged.

Another study conducted in Cardiff (Mott et al., 1997), reported that the risk of injury due to falls from monkey bars was twice that for climbing frames and seven times that for swings and slides. The authors recommended removing monkey bars from playgrounds. This proposal has met with strong opposition from some child play specialists in Australia and elsewhere on child development grounds. In an attempt to resolve this dilemma, VISAR is currently planning a study to investigate the efficacy of wristguards in active recreation activities requiring grip

and dexterity that have high arm fracture risk, such as scooter and bike riding and play on monkey bars.

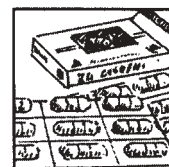
Recommendations

Recommended actions to decrease the risk of fall injury in school playgrounds, based on available evidence, include:

- All playground equipment should conform to the current Australian Standard (AS/NZS 422: 1996) with consideration given to reducing the fall height of any new equipment to 150cm. Innovative landscaping (mounding and excavation) can be used to reduce the fall height of slides and climbing apparatus.
- All equipment should be inspected regularly for wear and tear. Faults should be repaired promptly and unsafe equipment removed.
- Loose-fill surfacing should be maintained to at least 20cm depth in the entire fall zones around and under play equipment by raking each day, and loose-fill in playgrounds should be replenished twice a term (a depth marker at 20cm should be painted onto leg supports of equipment and used, along with a marked probe, as a guide).
- Children using equipment should be closely supervised at all times to prevent overcrowding and unsafe practices.
- Primary school students should not be permitted to wear clothing with hood and neck drawstrings. Waist and leg bottom drawstrings should be trimmed at the end and sewn in the middle so that drawstrings cannot be pulled more than 5cm from the garment.

Preventing sports related falls and hit struck and crush injuries

Sports related falls and collisions are a major cause of injury to students at school. These occur in organised and unorganised games. As age increases the proportion of students injured while participating in sport and active recreation activities increases indicating that



interventions should be targeted to upper primary and secondary students. A recent edition of *Hazard* (edition 51, 2002) focused on the prevention of sport and recreation injury. It included a summary review of the current research evidence base for sports injury prevention strategies and measures and a guide to a systematic approach to injury prevention at the community club level using soccer as an example. The recommended approach is readily transferred to the school setting and the injury prevention measures included are mostly covered in the recommendations below.

Recommendations

As recommended by Posner (2002) and others, sports injury prevention programs in schools should address the following issues:

- **Student health and medical record-keeping:** including the maintenance of up-to-date information on medical conditions, student health and injury histories and the treatment of injuries that do occur
- **Emergency preparedness:** including preparation for injuries that occur in non-competition and competition games and practices and the presence of teachers or parents with first aid knowledge, the availability of appropriate first aid equipment (including icepacks) and the ability to summon emergency medical assistance at all times
- **Return-to-play:** clear guidelines on return to play after an injury including a nominated decision maker, along with explicit guidelines for any student who has lost consciousness or has sustained a possible head or spinal cord injury
- **Equipment:** guidelines governing the use and regular inspection and maintenance of sports equipment (including basketball rings and backboards and moveable soccer goal posts) and rules enforcing the use of personal protective equipment appropriate to the sport

BOX 1

Process for extracting school injury cases from death and hospital databases

Selection

Data were extracted from the National Coroners Information System (NCIS) the Victorian Admitted Episodes Dataset (VAED) and the Victorian Emergency Minimum Dataset (VEMD).

Death data:

The NCIS database records information on deaths from external causes in Australia and was established in July 2000. It is designed to include a record for every death reported to a participating Coroner's office in Australia. All jurisdictions except Queensland have participated since 1 July 2000. The database was searched for child deaths (aged 5-15 years) using the specific location codes of 'primary school' and 'secondary school'.

Hospital data:

Admissions:

The VAED records hospital admissions for all Victorian hospitals, both public and private. VAED data are coded using the International Classification of Diseases Australian Modifications (ICD-AM) coding system. For the purposes of this report data were selected based on the location code: 'school, other institution and public administrative area'. This code is broad and captures such places as cinemas, hospitals, libraries, public hall, nurseries etc. Record selection was further refined to isolate cases of children injured in schools by restricting case selection as follows: only children aged 5-15 years were included, day of presentation was restricted to between Monday and Friday and date of admissions must have been within term dates. Using this method we identified 2,771 unintentional admissions and 99 intentional admissions for the three-year period July 1998-June 2001.

Emergency Department Presentations:

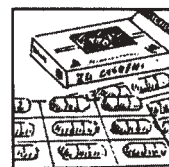
The VEMD records public hospital presentations to 28 EDs, representing approximately 80% of statewide ED presentations. As the location code covers the same places as the VAED code the same selection process was used. Using this method we identified 15,014 unintentional and 309 intentional school ED presentations for the three-year period January 1999 to December 2001. Only non-admissions were included in this dataset.

Limitations

As stated above, the code used to extract school-related injury cases from the VAED and VEMD was not exclusive. A specific location code for schools was introduced in the latest year of hospital admissions (2000/01) and made it possible to check the validity of our selection processes. When cases were selected on the basis of the more specific code, there was only a difference of 12 admissions in that year ($n=1,140$ compared with $n=1,128$). Therefore the process used to extract data for this study provides a fairly accurate estimate of the frequency of hospital admissions for injuries to children at school.

Some study limitations result from the selection process. We may have underestimated the frequency of sports related injuries occurring in schools because only records that were coded to 'school, other institution and public administrative area' were selected. Sports related injuries occurring in school athletics areas would not have been included if they were coded under 'sports and athletics areas' (while this code excludes swimming pools or tennis courts in private homes or gardens it does not exclude school athletics areas). Injuries associated with schooling that occurred outside school grounds would also not be captured (for example on school buses, and during school camps and excursions). Cases of students injured while engaged in school sports that presented on weekends were also not captured.

- **Facilities:** systematic inspection and maintenance of all indoor and outdoor sports areas, with special attention to protective features (wall or floor mats, padding of goal posts), replacing or discarding worn or broken equipment and the development of protocols for equipment use
- **Fair play:** expectation and enforcement of game rules and fair



play, modified games for juniors and novice players, players matched on physical development not age group and the provision of training for teachers/coaches and umpires/referees (and the development of codes of fair play for players, officials and supporters)

- **Education:** sports injury prevention education for staff, parents and students

Additional useful resources are detailed in Box 2.

Conclusion

Injury prevention in schools requires a systematic approach and should target the most common causes of injury, particularly serious injury, with special attention to age- and gender- specific patterns. Unintentional injury prevention initiatives should aim to reduce injuries caused by play equipment falls in the younger primary students and sport and recreation falls and collisions in older students. Intentional injury prevention interventions should specifically target secondary students with attention to violence prevention in males and self-inflicted injury prevention in females.

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BOX 2

Additional useful resources

Unintentional injury prevention

www.cdc.gov/safeUSA

A comprehensive site of resources and links (to US sites) in all areas of youth injury prevention including playground, sports, violence and self-inflicted injury.

www.depts.washington.edu/hiprc/childinjury/

The Harbourview Injury Prevention and Research Center (HIPRC) site provides systematic reviews of the evidence base for childhood injury prevention interventions (including play equipment and sports).

www.safetylit.org

The Centre for Injury Prevention Policy and Practice, San Diego State University, provides a useful on-line summary of published injury prevention research literature (weekly updates of injury abstracts are free of charge) and useful links by topic.

www.sportsmart.org.nz/resources

A New Zealand site that includes an education tutorial on preventing and managing sports injury and leaflets for coaches and players on strategies to prevent injury.

www.smartplay.com.au

Local information and fact sheets on sports injury prevention.

www.general.monash.edu.au/muarc/pubid.htm

Access to published literature reviews on the prevention of injury in specific sports – soccer, netball, cricket, snow sports, running, tennis, baseball and softball, volleyball and hockey.

Scott, I & Champion, B. "Playing it safe", Recent presentation at Safety in Action 2003 Conference held in Melbourne 8-10 April, which covers playground safety with particular emphasis on playgrounds in Victorian schools. To access conference proceedings CD contact Safety Institute of Australia, phone (03) 9499 9366.

Intentional injury (assaultive)

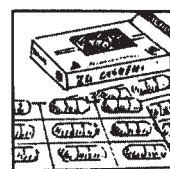
www.eduweb.vic.gov.au/bullying/index.htm

This website produced by the Department of Education and Training (DET) provides resources such as a guide for addressing bullying behaviour, resource booklets to prevent bullying in schools, videos aimed at raising students awareness of bullying, examples of successful school programs (including the 'Buddy Bear' program for primary schools: www.buddybear.com.au), a section for parents to gain information and links to other related sites.

Reports:

A meta-evaluation of methods and approaches to reducing bullying in pre-schools and early primary school in Australia. This National Crime Prevention report evaluates actions and plans to prevent or reduce bullying among children in Australian pre-schools, in kindergartens and in early primary school. Can be accessed or ordered at www.crimeprevention.gov.au.

Evidence-based interventions for promoting adolescent health. This Centre for Adolescent Health (www.rch.unimelb.edu.au/adolescent/) report reviews the effectiveness of interventions addressing six indices of adolescent health- depression, suicidal behaviour, alcohol and drug use, tobacco use, antisocial behaviour and sexual risk-taking behaviour. A summary report can be obtained through the Victorian Department of Human Services: Evidence-based health promotion: Resources for Planning. No 2 Adolescent Health. Health Development Section, Public Health Division, Department of Human Services.



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Report on the use of VISAR's data and information request service

VISAR offers an injury data and information request service for research and prevention purposes that can be accessed by telephone or email. Victorian datasets that can be accessed through the service include Australian Bureau of Statistics deaths data for Victoria, the Victorian Admitted Episodes Dataset (hospital admissions to all Victorian public and private hospitals) and the Victorian Emergency Minimum Dataset (Emergency Department presentations to 28 Victorian hospitals).

In the 3-year period 2000-2, VISAR responded to 1,532 information requests (2000:430; 2001:592; 2002:515). Regular VISAR clients include education bodies (undergraduate and post-graduate students and schools), organisations and individuals from the public health sector, government bodies (national, state and local), research groups (MUARC and external), media, industry/business and the community (Figure 1).

The most frequently requested topics over the triennium were: fall injury, playground and play equipment injury, DIY home maintenance injury, home injury, dog bite, sports injury and local

community injury profiles (by Local Government Area).

Two examples of data requests that have led to the development of new or revised safety regulations, standards or guidelines are featured on the following page- the development of safety guidelines for basketball rings and backboards and the restriction of the availability of temazepam in capsule form.

• Who can access VISAR injury data?

The VISAR data and information request service is open to government and non-government organisations, the higher education and schools sector, industry and business and community members. We are not able to provide a direct service to primary and secondary school students.

• How do I make a request?

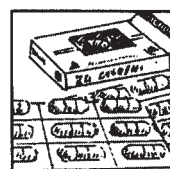
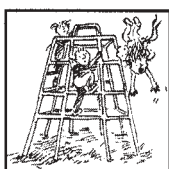
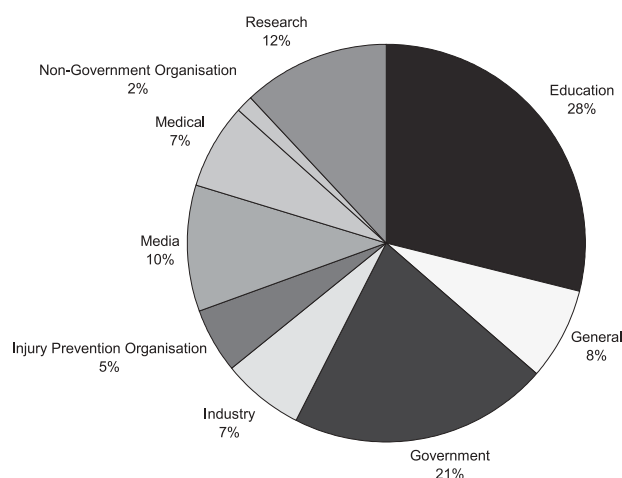
Data and information requests can be made by telephone (9905 1805) or email: visar.enquire@general.monash.edu.au

• Any charges?

A standard format response is free-of-charge. Additional analysis may be purchased for a cost-recovery fee of \$66 per hour.

Data & information requests 2000-02

Figure 1



Injuries associated with collapsing of basketball rings and backboards

A special report was prepared for the Building Commission (BC) in 2002 following the death of a child when a basketball backboard and the brick wall to which it was attached collapsed when he attempted to 'slam-dunk' the ball. Data were extracted from the available Victorian databases and requests for additional data were sent nationally and internationally. Data from the Victorian Emergency Minimum Dataset (VEMD) identified 11 hospital presentations between October 1995 and December 2001 for injuries associated with the collapse of basketball rings (Table 1).

There were no reports from international or national sources although this appears to be related to data issues rather than the

absence of these incidents. A review of the research literature on basketball ring-related injuries was also conducted and no relevant articles found. It appears that this type of event is rare but potentially catastrophic. A regulation was introduced in Victoria in July 2002 mandating all basketball backboards sold must carry a warning label about the hazards associated with improperly installed rings and persons swinging from them. The basketball ring installation guidelines can be accessed at the Building Commission website:

www.buildingcommission.com.au/publications/publications.asp#community

Temazepam capsules – stricter prescribing regulation

The Victorian Department of Human Services (DHS) approached VISAR to provide information on cases of injury from the injection of the contents of temazepam capsules. It was believed that injected temazepam was being used as a substitute for heroin in the recent heroin 'drought'.

Analysis of hospital emergency department data revealed a sudden increase in cases of serious harm resulting from the injection of temazepam in the 1st quarter of 2001. Seventeen cases were reported in this quarter compared with an average of 9 per year for the previous 5 years.

Case summaries for records where it was identified that the basketball ring collapsed

Table 1

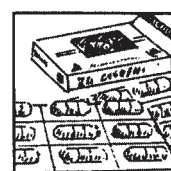
Year	Gender	Age	Body region	Nature of injury	Departure status	Place	Description of injury event
1995	Male	14	Unspecified	Open wound	Discharge	Home	Hit by basketball ring
1996	Male	11	Lower back	Sprain or strain	Admission	Place for recreation	Playing b'ball ring broke bricks fell on patient
1996	Male	8	Head	Superficial	Discharge	Place for recreation	Playing basketball and ring broke - bricks fell on patient
1996	Male	7	Head	Superficial	Discharge	Home	Hit by falling basketball ring
1997	Male	9	Head	Superficial	Discharge	Public building	Struck by portable basketball ring to head and back
1997	Female	5	Head	Intracranial	Discharge	Public building	Mobile b'ball ring fell on top of her in school yard
1998	Female	5	Head	Superficial	Discharge	Public building	Hit by basketball ring
1998	Male	17	Face	Fracture	Admission	Place for recreation	Hit in face by basketball ring
1999	Male	23	Head	Open wound	Discharge	Athletics and sports area	Slam dunking, ring fell weight estimated 200kg hit to top of head
2001	Male	15	Head	Intracranial	Admission	Home	Hit by basketball ring and brick wall
2001	Female	7	Head	Open wound	Discharge	Home	Went to slam dunk basketball when ring fell down on her

Source: VEMD Oct 1995-December 2001

The data supplied by VISAR was utilised by DHS in a discussion paper that led to the DHS-sponsored 'Temazepam Injection Prevention Initiative'. This initiative included the development of information and education materials that were distributed to all Victorian GPs and pharmacists, and to injecting drug users.

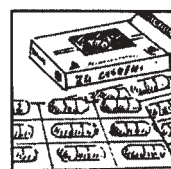
At the national level the matter was referred to the Australian Health Ministers Council and subsequently to the Australian Pharmaceutical Advisory Conference (APAC). A subcommittee of APAC advised the Pharmaceutical Benefits Advisory Committee (PBAC) to recommend that temazepam capsules be classified as an authority-only prescription drug. The Commonwealth Government accepted this recommendation and the capsules became 'authority-only' on the PBS benefit schedule on May 1, 2002. The prescription of temazepam tablets is unrestricted.

Information on the risks of injecting temazepam is on the DHS website (www.drugs.vic.gov.au/temazepam)



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General Acknowledgements

Participating Hospitals

From October 1995

Austin & Repatriation Medical Centre

Ballarat Base Hospital

The Bendigo Hospital Campus

Box Hill Hospital

Echuca Base Hospital

The Geelong Hospital

Goulburn Valley Base Hospital

MaroonDAH Hospital

Mildura Base Hospital

The Northern Hospital

Royal Children's Hospital

St Vincents Public Hospital

Wangaratta Base Hospital

Warrnambool & District Base Hospital

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Williamstown Hospital

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From November 1995

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From December 1995

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Frankston Hospital

From January 1996

Latrobe Regional Hospital

From July 1996

Alfred Hospital

Monash Medical Centre

From September 1996

Angliss Hospital

From January 1997

Royal Melbourne Hospital

From January 1999

Werribee Mercy Hospital

From December 2000

Rosebud Hospital

Coronial Services

Access to coronial data and links with the development of the Coronial's Services statistical database are valued by VISAR.

National Injury Surveillance Unit

The advice & technical support provided by NISU is of fundamental importance to VISAR.

How to Access

VISAR Data:

VISAR collects and analyses information on injury problems to underpin the development of prevention strategies and their implementation. VISAR analyses are publicly available for teaching, research and prevention purposes. Requests for information should be directed to the VISAR Co-ordinator or the Director by contacting them at the VISAR office.

Contact VISAR at:

MUARC - Accident Research Centre
Building 70
Monash University
Victoria, 3800

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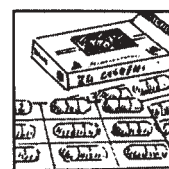
Email:

visar.enquire@general.monash.edu.au



All issues of *Hazard* and other information and publications of the Monash University Accident Research Centre can be found on our internet home page:

<http://www.general.monash.edu.au/muarc/visar>



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