



Hazard
(Edition No. 7)
June 1991

Victorian Injury
Surveillance System

Royal Children's Hospital
Parkville, Victoria
Australia 3052

The seventh edition of Hazard from the Victorian Injury Surveillance System deals with injuries related to horses and the problems of architectural glass injury in the home. It also updates the previous Hazard issues of head injuries to bicyclists and progress towards isolation fencing for all home swimming pools. An outline of recent progress in expansion of the Victorian Injury Surveillance System is also included.

Horse Related Injuries

Karen Sherry

Horse Riding Injuries

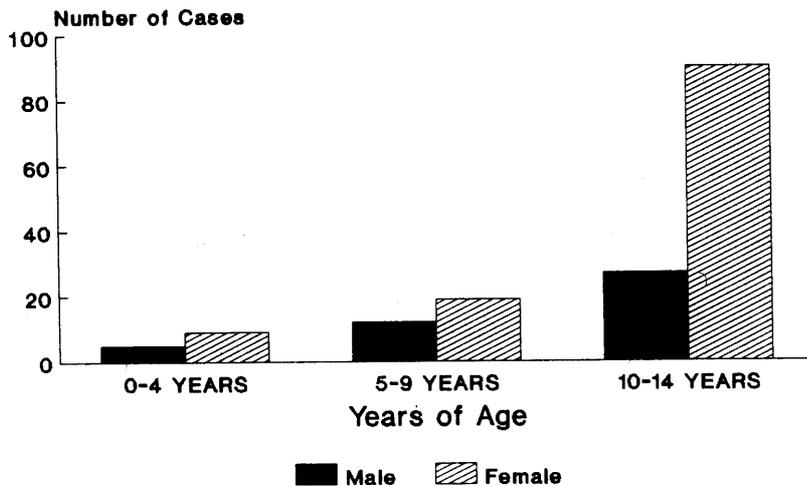
Horse riding in Australia is a widespread and well established sport, drawing enthusiastic support from every age group and walk of life. Because the sport involves animals which are strong willed and occasionally unpredictable, the risks and dangers associated with both competition and recreational riding tend to be difficult to control and therefore hard to minimize.

From January 1st 1988 to January 31st 1991, VISS recorded 216 cases of horse related injuries to children under 15 years. The majority (75%) were engaged in horse-back riding, while in the remaining cases the child was on the ground. Although horse related injuries are not a major part of the VISS collection (under 1%) these children are more likely to be severely injured when compared with the entire VISS database.



Riding Injuries Age and Gender Distribution

Figure 1



VISS ALL 1.1.88 - 31.1.91 UNDER 15 YEARS

Age and Sex Distribution

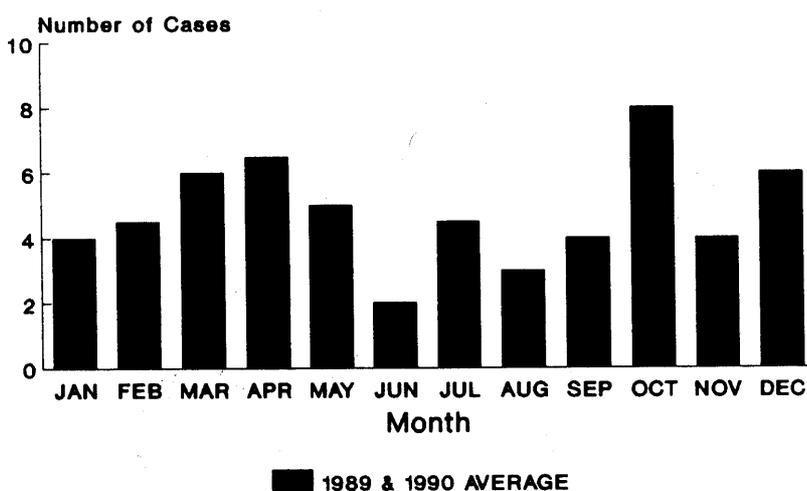
Figure 1 shows the age and sex distribution of the 162 riders. Seventy-two percent of incidents occur in the 10-14 years age group. Girls represent 73% of cases. This is an unusual trend as boys outnumber girls on average for all activities recorded in VISS by a 3:2 ratio. According to the Pony Club Association of Victoria the trend for girls to outnumber boys in Pony Club membership is very similar to the horse riding injury pattern recorded by VISS.

Seasonal Variation

Figure 2 shows the seasonal variation of horse riding injuries. Most injuries tend to occur in the October to April period. Although horse riding incidents are less frequent during the winter months, there is a rise in July which coincides with school holidays. Most incidents occur on the weekend (59%), with Sunday having the highest rate (32%).

Horse Riders - Seasonal Variation

Figure 2



VISS ALL UNDER 15 YEARS 1989 AND 1990

Injury Severity

Treatment upon First Presentation to Emergency Departments Table 1

	Horse riders (n=162) %	VISS database (n=41834) %
Admission or Short stay ward	31	18
Significant Treatment	44	37
Minor Treatment	25	45
Total	100	100

VISS All: Horse riders under 15 years
1.1.88 - 31.1.91

Table 1 shows that injured horse riders are more likely to be admitted or receive significant treatment when compared to the rates for the entire VISS data base. For example .200/0 of injured cyclists are admitted to overnight or short stay wards. (Hazard 6 Bicycle related injuries) and approximately 21% of injured skateboarders were admitted in 1990.

Injuries Suffered by Horse Riders

Up to three injuries may be recorded for each child. Table 2 shows the proportion of injuries suffered by all horse riders compared with those horse riders admitted to hospital.

Type of Injury Recorded Table 2

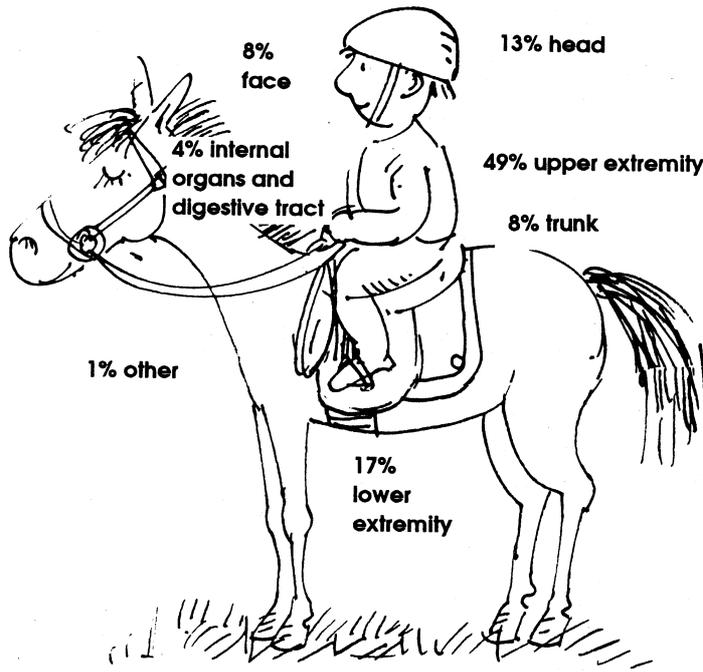
Injury type	All horse riders (n=197) %	Admitted horse riders ONLY (n=73) %
Fractures	44	44
Haematoma/Bruising	18	14
Concussion	10	19
Sprain/Strains	9	nil
Cuts and Lacerations	6	12
Inflammation	5	1
Superficial Abrasions	5	4
Haemorrhage	1	4
Crushing injury	1	nil
Other	1	2
Total	100	100

VISS All: Horse riders under 15 years
1.1.88 - 31.1.91



Body parts injured as a result of horse riding incidents

Figure 3



VISS ALL: Horse riders under 15 years 1.1.88 - 31.1.91

Fractures to horse riders tend to occur to the radius/ulna (forearm), humerus (upper arm), clavicle (collarbone) and wrist. In the total VISS database, the rate of fractures is 18% and 4% for concussion. Table 2 indicates that horse riders are more likely to receive these types of injury. In most cases, injury was sustained when the victim fell from the horse, but in 19 cases the horse further injured the child by kicking, standing on or dragging the child along.

Figure 3 above shows the body parts injured as a result of horse riding incidents.

This pattern changes for admitted cases. For the 50 horse riders who were admitted the proportion of injuries by body part are shown in Table 3.

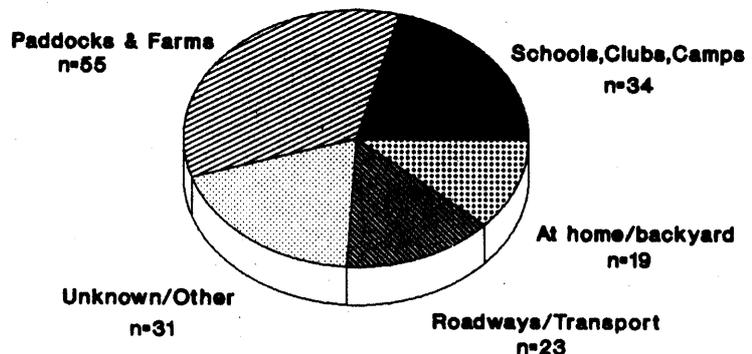
Table 3
Proportion of injuries by body part to horse riders admitted to hospital

	(n=73)
	%
Upper Extremity	32
Head	25
Lower Extremity	14
Facial Injuries	12
Internal organs and Digestive Tract	11
Trunk	5
Respiratory System	1
Total	100

Horse riders under 15 years
1.1.88 - 31.1.91

Location - Horse riding injuries

Figure 4



1.1.88 - 31.1.91 VISS all under 15 years

Location of Incidents

Figure 4 shows the location of the horse riding incident. Fifty-five riders were in paddocks, while thirty-four were at riding schools, pony or hunt clubs or at school camps. Twenty-three were on the roads. Nineteen riders were at a private home.

Contributing factors to horse-riding injuries

In 36 cases, the horse's action was identified as the cause of injury, i.e., the horse bolted, bucked, reared, slipped or stumbled. However the reason why this occurred is not known (eg. external factors, difficult temperament, experience with horse etc.). In 35 cases, it was stated that the victim's action caused the injury i.e. the child either lost control or balance, or was careless i.e., riding bareback, dismounting the horse incorrectly, thus putting themselves in danger. In 25 instances, it was mentioned that an outside cause was responsible for the incident i.e., that the horse was spooked or frightened. For the remaining 66, the cause of the incident was not stated.

The relevance of experience and practical knowledge to safe horse riding is obvious, and has much to do with safe riding practices, both in the paddock and on the road. Sensible road use, such as avoiding busy roads, ensuring that motorists can see horse and rider clearly, and always riding at a slow controllable pace is a matter of commonsense.



Experience

A horse unsuitable for an inexperienced rider will take advantage of the lack of expertise whenever possible; most horses learn quickly that the fastest way back to the stable is at a full gallop. Grol, Bouter and de Geus (1989) in a case control study of 741 girl horse riders, concluded that riding lessons appear to have a preventive effect on injury, riding on different horses each time results in an increased risk of injury and injury risk decreases with increased experience.

In only one case in the VISS database was inexperience specifically stated as being instrumental in the incident. It is not possible to determine from the database without personal follow up if the horse belonged to the rider or how long the rider had been acquainted with the horse involved in the incident. However, nine riders were riding with a pony club at the time of injury, which implies they were either riding their own or a friend's horse.

Supervision

Supervision of the inexperienced rider is important in minimising the risk of injury. An experienced adult can instruct the rider before he or she mounts, can foresee trouble in the actions and demeanour of the horse and can aid the rider in potentially dangerous situations. If a rider is sufficiently prepared and confident, the horse is less likely to be disobedient. However, the knowledge and awareness of the adult is also important. In three cases, a child on horseback was being led by an adult and two were in lessons when the incident occurred.

Head injuries

VISS classifies head injuries as those occurring to the skull and brain, including concussion.

Head injuries are more common to horse riders (15% of cases) than among the entire VISS database (8% of cases). This head injury rate is higher than for cyclists (10%) and skateboarders (7%).

Twenty-four horseback riders suffered head injury between January 1st 1988 and January 31st 1990. Of these, sixteen were admitted to hospital. The admission

rate of 67% for head injured riders is higher than for other head injury cases (42%), although, beyond requiring admission, the severity is not known.

Helmets

Of the 162 horse riders in the database, only 63 stated that they were wearing head gear. There are many sub-standard helmets on the market and after a significant fall a new helmet should be purchased. The following information regarding helmets has been provided by Dr. Patricia Ellis of the Victorian Horse Council.

Previous studies of equestrian injuries in Australia (Pounder, 1984) and overseas (Barone and Rodgers, 1989) have identified serious head trauma as a major cause of injury and death. In the series of fatalities studied by Pounder (1984), nine of 13 riders who died as a result of head injury after a fall were not wearing protective headgear.

The use of protective helmets has been shown to reduce the incidence of head injuries in children in the United States of America (Bixby-Hammet, 1985). All riders should wear a correctly fitted equestrian helmet, approved by Standards Australia, to not only protect the head from damage by foreign bodies such as rocks and branches but also, more importantly, to decrease the probability of brain injury.

Only helmets complying with the Australian Standard AS 2063.3 can be marketed as equestrian helmets. Approved helmets have to undergo and satisfy rigorous testing for shock absorption, penetration resistance, vision clearance, strength of retention systems, peak flexibility and other design requirements. Approved helmets display the red and silver Standards Mark and must cite compliance with AS 2063.3 on the manufacturer's label inside the helmet.

In 1983 the Victorian Horse Council adopted as a policy that Standards Australia approved helmets be worn by all horse riders when outside their own properties and on public roads, and encouraged a policy of self regulation by riders. In more recent years heightened community safety consciousness, insurance considera-

tions and an increase in legal actions involving personal injury have led to the requirement for compulsory use of helmets at many events conducted by Council member bodies.

In the United Kingdom a Horses (Protective Headgear for Young Riders) Bill has recently been introduced making it an offence for an adult to allow a child under the age of 14 years to ride on a public road without an approved safety helmet.

Other Horse Related Injuries

Fifty-four children were involved in incidents with horses where they were not riding, 33% of whom were admitted to hospital. The most common locations for these incidents were as follows: residential (37%), paddocks, parks or fields (31%), public roads or footpaths (9%), other locations (9%) and in 14% the location was not stated. Children injured on the ground tend to be much younger than those injured while riding. 41% of non-riders were under five years of age.

Up to 3 types of injury and body parts can be recorded per child. The types of injury most common among these children were bruising (28%), followed by fractures (24%), cuts and lacerations (20%) and concussion (7%). The body parts most likely to be injured were the head (34%), face (28%), lower extremity (23%), upper extremity (16%), trunk (7%) and the internal organs and digestive tract (2%).

Horse kicks were a major problem amongst children who were not riding at the time of injury. Horse kick injuries particularly to the face and head may be severe and debilitating because of the force of impact. Of the 24 who were kicked, 46% suffered head injury and 75% were admitted. Supervision of children not riding, particularly when under five years of age, is very important because of their susceptibility to sustaining serious injury from kicks. Sixteen of the twenty-four kicked (67%) were under five years of age.

Of the remaining 30 children who were not riding at the time of injury and were not kicked, ten were trodden on, 17 were



other incidents (eg. passenger in horse and cart when it capsized, a finger getting caught in the horse's rope, the horse bumping the child) and three were bitten.

Child deaths from horse related injuries are uncommon in Victoria. Two such deaths have occurred in the past six years, both to children under 5 years of age.

Further Information

The Pony Club Association of Victoria provides education for riders under 21 years, including basic safety techniques. For further information contact:

Miss Frances Corry, PO Box 2025, North Brighton, 3186. Telephone 596 4778.

The Victorian Horse Council is an advisory service on courses, horse care and equipment. It provides information, brochures and publications to promote safe riding and participation in activities with horses. The Council would be happy to advise on any horse related matters, welcomes contact from people, particularly health professionals, who are interested in health related issues specific to equestrian activities. For further information please contact:

Secretary: Miss K. O'Hagen, PO Box 38, Narre Warren North. 3804 Telephone AH 796 8627.

Dr. Patricia Ellis, PO Box 236, Yarra Glen, 3775. Telephone AH (059) 652216.

The Child Safety Centre at the Royal Children's Hospital Melbourne has an excellent range of helmets on display and can advise which helmets are suitable for equestrian use. Telephone (03) 345-5085.

References

Barone, G.W. and Rodgers. B.M. "Pediatric Equestrian Injuries: A 14-year Review." *Journal of Trauma* Vol 29 Number 2 1989 p:245-247.

Bixby-Hammet (1985). D.M. "Youth Accidents with Horses" *Phys. Sportsmed.* Volume 13 1985 p:105-108

Grol E, Bouter L and de Geus G. (1989) "Etiology of horse riding injuries among girls, a case control study." First World Conference on Accident and Injury Prevention, Stockholm 1989.

Pounder. D. "The grave yawns for the horseman. Equestrian deaths in South Australia 1973-1983." *Medical Journal of Australia* Vol 141 November 1984 p:632-635.

Acknowledgements

Dr Patricia Ellis and Julia Coffey



Update on Pool Drownings and Isolation Fences

Dr Terry Nolan
Ian Scott (CAPFA)

On April 8, 1991, the Victorian Government adopted the building code of Australia for domestic swimming pools. The provision of the Act for domestic swimming pools reads as follows;

“a swimming pool ... with a depth of water more than 300 mms must have suitable barriers or safety fencing in accordance with AS 2818 and AS 1926 to restrict access by young children to the immediate pool surrounds.”

The provisions of the above Act will apply to new domestic swimming pools only; therefore existing ones will not be affected. It appears that both interpretation of the Act and enforcement will be at the discretion of local governments, which could lead to considerable variation between local government areas.

Here is a summary of the situation around the rest of Australia at this time with respect to statewide requirements:

NSW

State law, Australian Standard isolation fence for all new pools, and for existing pools by August 1992.

QLD

State law, Australian Standard isolation fence for all new pools. Existing pools are permitted incomplete isolation fencing providing doors opening onto the pool area from the house meet the Australian Standard for self-closing and self-latching doors required by January 1992.

SA

State law, perimeter fence only is required for all pools. Green paper proposes mandatory isolation fencing from January 1992 for new pools with a range of options for existing pools.

WA

Building code of Australia requires perimeter fencing for new pools and existing pools by June 1992.

ACT

Isolation fencing required for new pools, perimeter fences for existing pools.

NT

Darwin City Council requires perimeter fencing for all pools.

TAS

No laws.

The May 1990 edition of *Hazard* drew attention to the numbers of Victorian children drowning or nearly drowning in domestic pools. Between March 2, 1990 and February 28, 1991, a further nine children were rescued and treated at VISS hospitals. All nine children were aged from fifteen months to three years.

Community Opinion

A random telephone survey of 447 households in two Melbourne municipalities (approximately two percent of households), conducted in December 1990, included the following question “Do you think home swimming pools should be fenced separately (with their own fence)?”

Ninety-four percent of the 445 respondents answered “yes” to this question and six per cent answered “no”, thus indicating strong support for isolation fencing. The margin of error was between 91% and 96%. The survey was conducted by the Monash University Accident Research Centre in relation to a community injury prevention project in the Shire of Bulla.

VISS urges the Victorian Government to follow the lead shown by QLD and NSW to immediately introduce retrospective legislation.

Acknowledgement

Child Accident Prevention Foundation of Australia.



Update of Head Injuries to Bicyclists

Following the introduction of compulsory bicycle helmet wearing legislation on July 1, 1990, VISS has monitored the effects on head injuries to bicyclists presenting to VISS hospitals. Table 1 is an update of the corresponding table which appeared in Hazard 6 (December 1990) and contains an additional 6 months of injury data for bicyclists.

From Table 1, it is clear that the number of cyclists presenting to VISS hospitals is decreasing and that the proportion with head injury has also decreased. Statistical tests have shown this to be a significant reduction in head injuries.

Allowing for seasonal variation, the downward trend in head injuries reported

in *Hazard 6* has continued. The quarter with the lowest percentage for head injury (5%) was January-March 1991.

From July 1 1989 to March 31 1990, there were 66 head injuries recorded. During the post-law period, (July 1990 to March 1991), there were only 38 head injuries recorded. This means that

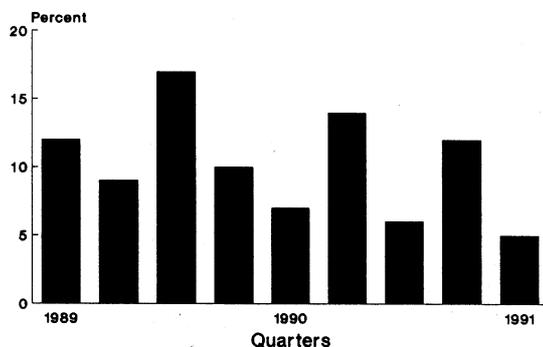
Frequency of VISS presentations: all cyclists and cyclists with a head injury, including quarterly totals

Table 1

Year & Month	Cyclist Total	Quarter Total	Cyclist Head Injury	Quarter Total	Quarter Percent	Year & Month	Cyclist Total	Quarter Total	Cyclist Head Injury	Quarter Total	Quarter Percent
1989						1990					
JAN	116		15			JAN	125		8		
FEB	120		16			FEB	75		3		
MAR	118	354	13	44	12	MAR	97	297	11	22	7
APR	105		9			APR	91		13		
MAY	60		8			MAY	39		4		
JUNE	28	193	1	18	9	JUNE	17	147	4	21	14
JULY	34		9			JULY	20		1		
AUG	23		2			AUG	25		2		
SEP	49	106	7	18	17	SEP	40	85	2	5	6
OCT	60		7			OCT	53		5		
NOV	85		9			NOV	59		8		
DEC	118	263	10	26	10	DEC	72	184	9	22	12
						1991					
						JAN	62		2		
						FEB	84		6		
						MAR	63	209	3	11	5

Proportion of Cyclists who presented with a head injury

Figure 1



there has been a 42% reduction in cyclist head injuries if the two corresponding time periods are compared. Table 1 also demonstrates that the number of cyclists presenting to hospital has decreased by 28% if the two nine month periods mentioned above are compared.

VISS Under 15 years 1.1.89 - 31.3.91



Domestic Architectural Glass Injuries

Dr Joan Ozanne-Smith

Domestic glass in residential windows, doors, and shower and bath screens was associated with 178 cases of laceration injuries to children under 15 years of age in the total VISS database (37,785 cases to December 31, 1990). These cases presented to the Emergency

Departments of five Melbourne hospitals participating in VISS: Preston and Northcote Community Hospital, Royal Children's Hospital, Western Hospital at Footscray and Sunshine and the Royal Victorian Eye and Ear Hospital. Twenty-six percent of these injuries were sufficiently severe to require admission to hospital.

Adult injuries resulting from architectural glass are not included in this review because these data are not yet comprehensively collected in VISS hospitals. However it is important to note from a New Zealand study that of 50 1 cases of unintentional injuries associated with architectural glass and admitted to hospital in 1986, the highest rate of 60 per 100,000 persons per year occurred in the age group 15-24 years (Johnston, Langley and Chalmers, 1990).

Domestic Glass Laceration Injuries

Table 1

AGE years	MALE		FEMALE		TOTAL N
	N	%	N	%	
0-4	48	72	19	28	67
5-9	35	71	14	29	49
10-14	38	61	24	39	62
TOTAL	121		57		178

VISS All: Children under 15 years

Location of Residential Domestic Glass Injuries

Table 2

LOCATION	N	%
Living or sleeping area	132	74
Garage or house exterior	37	21
Kitchen	7	4
Bathroom, laundry or toilet	2	1
TOTAL	178	100

VISS All: Children under 15 years

Laceration injuries from Architectural Glass by Body Part

Table 3

BODY PART	PRESENTATIONS		ADMISSIONS	
	N	%	N	%
Head and face	52	25	14	22
Upper limb	116	55	36	58
Lower limb	36	17	11	18
Trunk	6	3	1	2
TOTAL	210	100	62	100

VISS All: Children under 15 years

Age and sex

The age and sex distribution of the 178 injured children is shown in Table 1. As for most injury causes, males were over-represented; 121 males to 57 females.

Location of glass

Table 2 shows the location in and around the home where the injuries occurred.

Body part injured

For each child injured, up to three injuries may have been recorded. However, only laceration injuries are included in this report. Table 3 shows the distribution of laceration injuries by body part. The upper limb is the most common site of injuries, for admissions as well as presentations.

Australian Standard

Recent interest in the issue of architectural glass injuries has been focussed by the publication of the 1989 revision of the Australian Standard (AS 1288) on "Glass in Buildings - Selection and Installation", and the fact that Victoria's building code currently fails to recognise this Standard in favour of the 1979 Standard. According to the Standards Association, all other states and territories have either adopted the 1989 Standard or will adopt it shortly.

The 1989 Standard requires that safety glazing materials, either toughened glass, laminated glass or organic coated glass be used in some residential situations, where annealed glass was previously acceptable. The major differences between annealed glass and toughened



glass are the lower impact required to break annealed glass, and the fact that it breaks into sharp shards, whereas if toughened glass breaks, it does not break into sharp pieces. Laminated glass (generally two thin sheets of annealed glass with a plastics film anchored between thin sheets) and organic coated glass (generally one piece of annealed glass with a plastics film adhered to one side) when fractured, behave like annealed glass, however the sharp shards are prevented from scattering by their attachment to the plastics film or interlayer. These characteristics are a particularly important consideration for windows in high rise buildings.

Research

In order to further investigate the nature of architectural glass laceration injuries and the circumstances under which they occur. Dr Andrew Court and Dr Terry Nolan of the Royal Children's Hospital are undertaking a follow-up study of a sample of children from consenting families who were injured in this way.

In addition, the CSIRO, at the request of the glass committee of Standards Australia, is attempting to determine the nature of the glass involved in these injuries by conducting measurements on the glass involved or companion sheets in other windows or doors.

This study is expected to serve as a pilot to determine whether this investigation could determine the extent to which injury involved glass conforms with the superceded 1979 Standard, and whether some of these injuries could be avoided if the new Australian Standard (1989) were adopted in Victoria (or further amended if necessary).

Prevention

The use of toughened glass for domestic glazing would be expected to reduce the incidence of laceration in two ways. Firstly, a greater force would be required to break the glass. Secondly, toughened glass does not break into sharp pieces as does annealed (ordinary) glass.

There is a small increase in the cost for toughened glass.

Options for improving the safety of existing glass are the application of

appropriate plastics film to the glass surface to reduce the potential for injury if the glass is shattered, bars or rails across the glass, or, at least, identification of the presence of glass by the application of stickers.

Postscript

It is understood that the Technical Advisory Council of the Department of Planning and Housing of the Victoria Government has subsequently agreed to amend its reference to AS 1288-1979 in the Building Code of Australia (B.C.A.) and endorse the 1989 edition of AS 1288 in the next amendment to the B.C.A. expected in September, 1991.

References

Australian Standard AS 1288-1989 "Glass in Buildings - Selection and installation", Standards Australia. 1989.

Building Code of Australia: Victoria BCA Appendix, July 1990, p6.

Johnston .S. Langley .J. Chalmers, D. 'Serious unintentional injuries associated with architectural glass', *New Zealand Medical Journal*. March 1990, pp 117-119.

Acknowledgement

Australian Standards Association: Glass Committee

VISS Progress

VISS has commenced its expansion to the collection of adult injury information at Western Hospital Footscray, with the cooperation of the Emergency Department and hospital Administration c. Approximately 2,000 adult cases have been entered into the database.

Several other hospitals have agreed to participate in VISS. Their participation is expected to consolidate the epidemiological base of the urban collection and also provide a rural collection in the Latrobe Valley.

An eighteen month trial of a Victorian statistical database for deaths based on Coronial data has been strongly supported by VISS and is nearing completion.



General Acknowledgements

Participating Hospitals

Royal Children's Hospital
Western Hospital
(Footscray and Sunshine)
Preston and Northcote
Community Hospital
Royal Victorian Eye and Ear Hospital

The contributions to the collection of VISS data by the directors and staff of the Emergency Departments of these hospitals, other participating clinicians, Medical Records Departments, and ward staff are all gratefully acknowledged. The surveillance system could not exist without their help and co-operation.

Coronial Services

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

National Injury Surveillance Unit

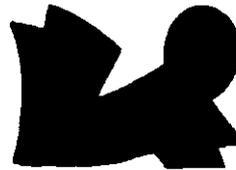
The advice and technical back-up provided by NISU is of fundamental importance to VISS.

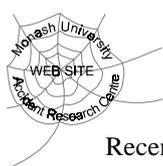
Hewlett-Packard

Hewlett-Packard Australia have continued to support us and we wish to thank them for their prompt service.

How to Access VISS Data:

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





Recent issues of *Hazard*, along with 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>

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National Better Health Program
VISS is funded by the National Better Health Program

Hazard was produced by the Victorian Injury Surveillance System with the artistic and graphics assistance of Anne Esposito and Jocelyn Bell, Education Resources Centre, Royal Children's Hospital.

This .pdf issue of Hazard reconstructed by Glenda Cairns

