

**Hazard  
(Edition No. 3)  
June 1989**

**Victorian Injury  
Surveillance System**

**Royal Children's Hospital  
Parkville, Victoria  
Australia 3052**



*This third edition of Hazard focuses on three important injury areas - scalds, injuries from dogs, and injuries involving play equipment. These represent problems for which progress can readily be made. This is because some very effective hazard counter-measures are already available (but are not being employed), and because the VISS data suggest directions for the development of new solutions.*

*The analyses presented in this edition of Hazard are based on injured children attending the Royal Children's Hospital between January 1988 and May 1989, and also those presenting to the Preston and Northcote Community Hospital, and to the Western General Hospital between November 1988 and May 1989.*

*Once again, we welcome potential users of VISS data to call or come see us to explore how your ideas can be developed, or questions answered. VISS is a community resource and we like nothing more than to see the data being creatively exploited. Readers of Hazard are cautioned about some of the limitations to interpreting VISS data. Hazard 2 detailed some of these constraints. If you did not receive Hazard 2, please contact us and we will send you a copy.*

## Scalds

Burns represent a relatively small proportion of injury presentations (about 4% of all VISS cases) but the economic and psychosocial implications of these injuries are enormous and highlight the need for greater community action. Four hundred and fifty-one children presented with burns to a VISS hospital in the period between January 1988 and April 1989. Of these, 263 children (61 %) were scalded.

An analysis of the VISS data reaffirms some of the widely held beliefs about injury causation and demographic patterns, but raises questions about others. For example, the incidence of scald injuries peaked in the early evening and on weekends, which reflects the pattern for most injuries. However, there were also peaks in the morning, and on Thursdays, for reasons not yet clear. What is of greater interest, particularly for injury interventionists, is a detailed examination of both the design and behavioural factors which contributed to the sequence of the injury event.

For example, of scalds in the bath, in 4 of the 26 injuries to the under 5 year olds, a sibling was responsible, either by opening the bathroom door, turning on the taps or placing the victim in the bath. Most scalds from hot drinks were the result of small children reaching up to a table or bench and pulling a cup or pot over onto themselves.

Contrary to some theories and popular belief, children knocking over the parent's coffee cup whilst they are sitting in their lap is not a common scenario. This was reported in only 2 of 101 scalds from hot drinks. Similarly, pulling on table cloths which then precipitated spilling a hot drink was uncommon.

In some instances, safety products exist which may have prevented the injury (such as stove guards or curly cords for electric kettles). In many more cases, new approaches are needed.

The broad picture of scalds:

**AGE**

77% of children were under 5 years old. Half of these were between 1 and 2 years.

**SEX**

1.3 to 1 ratio of boys to girls. For all injuries it is usually 1.5 to 1.

**TIME**

There were two peaks: in the morning from 0900 to 1100 and in the early evening between 1700 and 2100.

**DAY**

The weekends and Thursdays were the busier days.

**LOCATION**

Three quarters of the incidents occurred in or around the child's own home, with another 10% happening at someone else's home. Over half of scalds happened in a kitchen, almost a third in the living-room or bedroom, and 14% occurred in the bathroom or laundry. Only 3% happened in the garage or yard.

As 86% of scalds occur in private residential locations, intervention strategies should focus both on these areas, and on target populations - i.e. households with young children.

**DISPOSAL**

This is over twice the average admission rate for all injuries (42% compared with 19%). At least 42 of these children sustained full thickness burns which will usually require grafting.

Injury sites (showing %'s for major body parts)

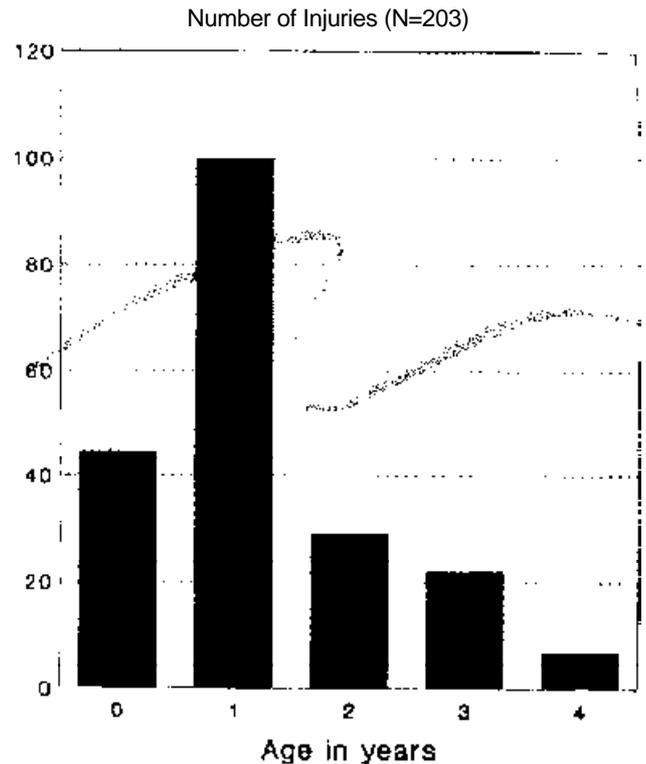
**Mechanism Factors - All liquid burns**

	N	%
Hot water	125	47
Tea, coffee	101	38
Cooking oil	13	5
Gravy, soup	11	4
Other, N/S	13	5
<b>Total</b>	<b>263</b>	

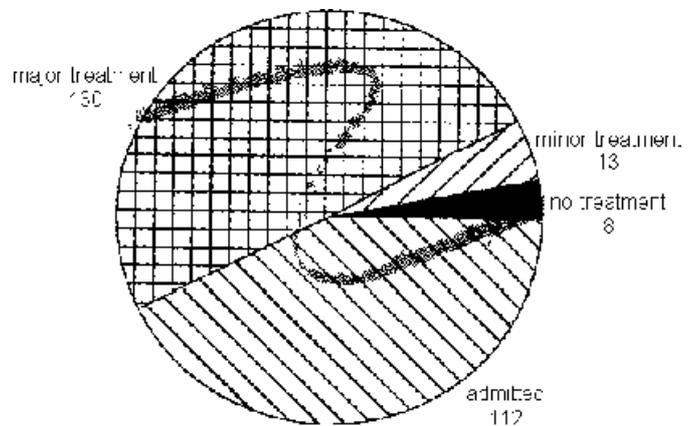
\* from all sources, including kitchen ware, taps, baths.

Hot water and beverages have been examined in detail because they are the most prevalent agent in scald injuries. For each of these factors, the ways in which objects or human behaviours contributed are relevant as they may shed light on current prevention strategies or suggest the need for others to be developed. I

**Scalds by Age**

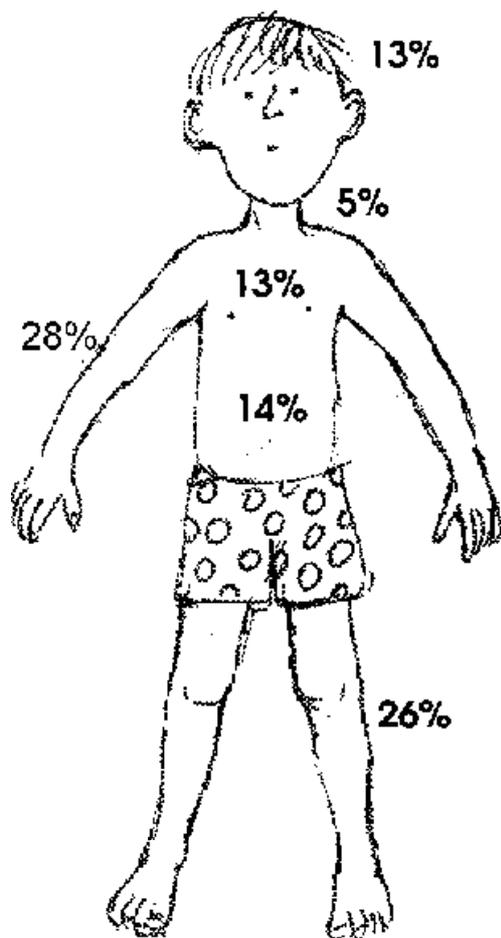


**Disposal from Emergency**



A differentiation has been made between the act of knocking a drink over, which indicates proximity to danger, and pulling the drink over, which implies that the child actively sought the object in question. More detailed analyses of scalds in children under 5 years were done as they are the group most at risk.

## Injury sites (showing %s for major body parts)



## Hot Drinks

### Behavioural factors

#### Objects pulled over by child:

In half of the scald cases, access to hot drinks was a factor in the 48 cases where children (usually toddlers) reached for and actively pulled a cup (42) or pot (6) of tea or coffee onto themselves in half of the scald cases. The position of these objects were on a bench (18) or tables of various heights (17). Of these, the child pulled the table-cloth (3 - one of these toddlers was in a baby walker); pulled a place-mat (2); climbed up to a table or bench; (7- using a stool, chair or the bottom drawer).

The age range in these incidents was 7 months to 6.5 years (average age 1.6 years). An 8 month old child pulled a cup of coffee onto himself and sustained an inhalation burn in addition to scalds to 12% of his body.

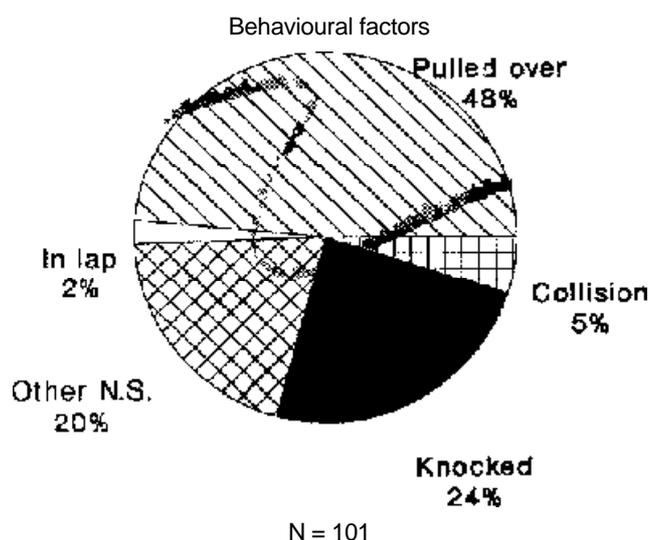
#### Knocking hot drinks over:

A quarter of the children knocked over cups that were usually within reach, either because the child was: eating next to a hot drink (3); drinking a hot drink (4); passing by (5); playing nearby (7); spilt by other (person or thing) (9). Items were knocked off the kitchen bench in only three of the 25 cases, which one would expect, as young children are not tall enough to get close enough to bump things at that height. In 10 other instances, a drink was knocked over onto the child, either by another person, or because an object such as a coffee maker fell over.

#### In adult's lap:

Two of the 101 respondents reported that the child was in their lap whilst they were drinking a hot drink.

## Hot Drink Scalds



## Hot Water

Hot water was the most frequent mechanism factor in scalds (48% compared with 38% for hot drinks), but the pattern for these was less clear. There was a greater variety of circumstances or objects which precipitated a scald from hot water. The main ones are grouped and described:

Number	Description
27	Children spilt water from objects or pulled objects over onto themselves, including electric kettles (12), usually via the cord.
23	In the bath, there was often a combination of events. The commonest of these was a parent filling up the bath with hot water first. A child then got in (4), fell in (3), or reached in (2). Twice in these cases a child was reaching for a toy. In addition, the door was opened by someone else, allowing access to the hot bath - by a sibling (2) or left open by a parent (1). Siblings contributed directly to 2 more incidents - once by turning on a tap, and once by running a hot bath and sticking the baby in the bath. The victim turned on the tap in 2 cases.
14	Children were involved with cooking (including 4 toddlers who pulled a pot off the stove, 3 children over 12 years of age were making tea and 4 who were either watching or helping parent make jelly, when the bowl broke, tipped over or hot water from a jug or kettle spilt).
9	Other immersions - (fell, stood or reached into a tub, bucket, jug or nappy bucket).
8	Turned on tap (not in bath).
7	Knocked over or stepped into a domestic object used for medical inhalations (e.g. usually a bowl or once, an electric fry pan). The mixture was often a combination of water and inhalants containing eucalyptus oil.
6	Collided with someone carrying hot water.
5	Playing with thermos.

Other incidents included having hot water dropped on them by someone else (4), kicking over a vessel used for warming a baby's bottle (3), and standing near the overflow pipe from the hot water service (1).

Only 4 of the scalds sustained in the bathroom were to children over five. In 2 cases, the hose attachment of a hand-held shower popped off the tap under pressure. Another child got into a hot bath and the other was scalded by turning on the tap in the bath. “

## Prevention

The common factor in all of these cases was the temperature of the liquid - had it not been so hot, the severity of the burn would have been reduced, or the scald prevented.

The causes of hot drink scalds are a combination of behavioural factors, such as the child's curiosity, or the parents' lack of awareness, and design elements which might suggest areas for further research. These could include the high centre of gravity in the design of cups or mugs, and some electric kettles and coffee makers, plus the lightweight construction materials used for some of these.

For domestic hot water services, water temperature must be reduced. Although there is some debate about what the optimum temperature should be, most experts say that the water temperature should be about 40C as it comes from the tap to minimise the scald risk. Further temperature controls can be implemented at specific high-risk sites in the house by using a mixing valve or child-resistant tap.

For information on products which might reduce the risk of scald injuries, or for additional safety advice, visit the Child Safety Centre at the Royal Children's Hospital or call them on (03) 345 5085.

# Dogs

A recent poll on pet ownership found that there are dogs in 41% of Australian homes, and a further 16% had both a cat and a dog (Saulwick Age Poll, The Age, 13 May 1989). Learning to play safely with animals is a desirable skill for children, but serious consideration must be given to the risks involved. It is interesting to note that little reference, if any, is made to this hazard in the standard child safety literature.

Up to May 1989 there have been 266 presentations to VISS hospitals (2% of the database) by children who were injured by a dog. Dogs account for at least 80% of the incidents in which animals were a factor in the injury event. In 202 cases (76%) the child was bitten. Dog bites can leave physical scars and possible long-term psychological problems with the victim. They also pose a dilemma for dog owners in whether or not to have the dog destroyed.

Dog-related incidents (excluding bites) included tripping over or colliding with a dog, losing control of bike (either chased by a dog, or avoiding a collision), and being pushed over by a dog.

## Age and Sex

Sex - 1.2 to 1 (male:female).

	N	%
Age:		
< 5 years *	78	39
5-9	63	31
10-14	50	28
>=15 years	11	5

\*Over half of the under 5's were 1 & 2 year olds, clearly a high risk group.

## Time

The incidence of dog bite peaks in the late afternoon (from 3 to 6 p.m.)

## Day

Peaks on weekends, especially on Sunday.

## Month

During 1988 at RCH there was a drop in the number of dog-bite incidents in the winter months.

This is likely to reflect children's exposure to risk, that is, when they spend more time with dogs - on weekends, after school or in the warmer months when they are playing outside more often.

## Location

The figures suggest that children are mostly bitten by their own dog, or by a dog known to them in at least two thirds of cases. One child was in day care, and another was at her baby-sitter's home.

## Contributing Factors

The child's activity at the time was described as:

*Playing with dog:* of these, one fifth (mostly toddlers) took food from the dog, or were present while it was eating. Another third, usually older children, were teasing or engaged in rough play with the dog.

*Innocent bystander:* These children were mostly on public roads, footpaths or at shops, and were mainly cyclists or pedestrians. Two small infants were bitten, one of whom was asleep in his cot, and the other was being nursed by her mother.

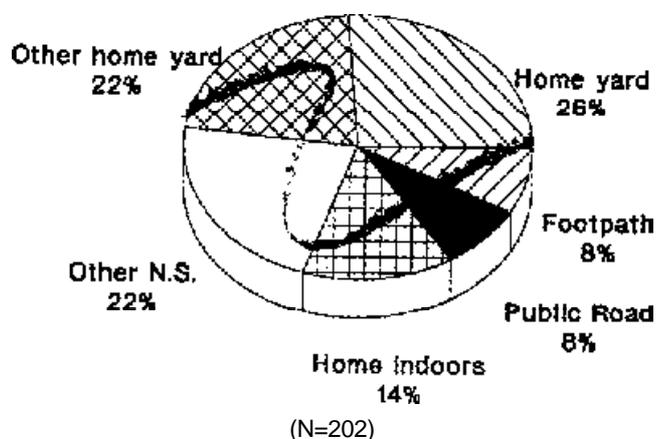
*Playing near the dog:* the respondents story didn't state what the child's level of involvement was with the dog.

## Ownership and Breed

Unfortunately we rarely are told who owned the dog concerned, and only 24% of parents supplied details on the breed of dog. Of those reported, one-third were German Shepherds.

None of four local councils we asked were able to supply a breakdown of ownership rates by breed of dog. Studies conducted overseas have shown that German Shepherds were the most common breed reported in dog bite injuries. It may be that they are also the most popular and hence frequently owned dog, but in Baltimore, Alsatians caused 44% of dog bites whilst only 22% of licensed dogs were Alsatians (in Thomas and Buntine, Man's Best friend?: a review of the Austin Hospital's experience with dog bites. Medical Journal of Australia 147:538).

## Where the Bite Happened

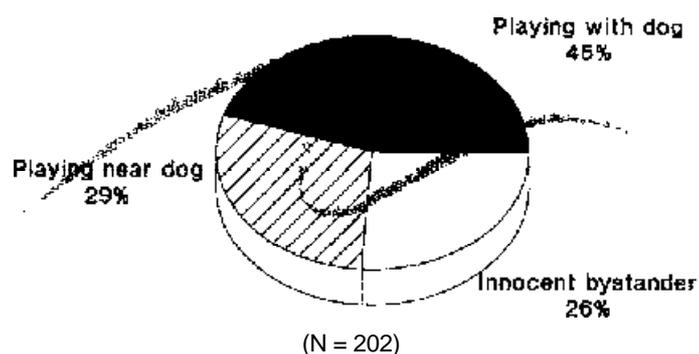


Injury sites (N=241)*	
	%
Face and head	51
Upper limb	21
Lower limb	23
Trunk	5

\* Some of the 202 children sustained more than one injury. Almost one third of the facial injuries were to the child's mouth, and 11% of the bites were directly around or to the eye. Injuries to the face and head usually account for 30% of all injuries in the database.

Disposal		
	N	%
No treatment	11	5
Minor treatment	79	39
Major treatment	62	31
Admissions	50	25

## Child's Activity



## Conclusions

The children most at risk for dog bite injuries are those under 5 years old, usually in and around their own home. Over half of the children were probably bitten by the family dog. Therefore, dog owners need increased awareness of the hazards. Specialist dog clubs and associations should also make their members aware of the dangers. Families should: avoid owning dogs when their children are very young; or keep youngsters separated from dogs, particularly when dogs are eating; and teach older children how to play more safely with dogs. Enforcement of dog-control regulations by local councils is an issue for the 25% of dog bites that occurred in public areas.

# Playground Equipment

It is useful to view any particular hazard in its context to determine priorities for intervention work. Playground equipment injuries accounted for 6% of injury presentations to VISS hospitals. Between January 1988 and April 1989, 815 children attended with injuries which occurred whilst they were playing on playground equipment. Sport and recreation were precipitating factors in an injury event in 28% of all injuries in the system, and ranks second only to people.

The most common sport and recreation factors (as a percentage of all factors) are:

Bikes	7.5%
Play equipment	7.2%
Skateboards	1.7%
Football	1.5%
Trampolines	1.1%

NOTE: Other includes whizzies, tyres, sand pit edges, poles, logs, flying foxes. The category for climbing frame includes monkey bars, so for brevity, only climbing (frame) will be used throughout for charts and tables.

It must be remembered when drawing conclusions about the relative risks associated with a particular object or activity that we still do not know what the exposures to risk are. In this example, we need to know the prevalence of different types of play equipment in the community, and how much time children spend on each type, what the child's age and sex is, and specific details about the equipment itself, such as its design, age, state of repair and the material used for undersurfacing.

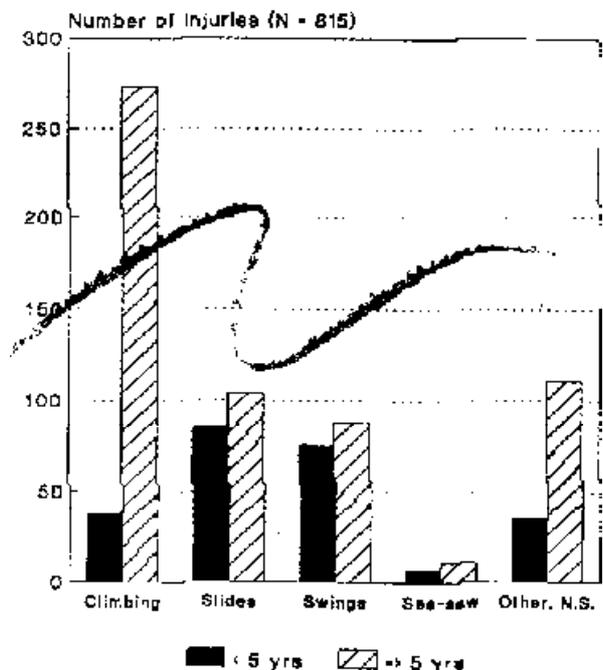
## Locations

Different locations stand out for specific types of play equipment as potential areas for injury prevention work. These include monkey bars and climbing frames in school grounds, slides in public parks or playgrounds, swings in back yards, and the other and unspecified play equipment which was mostly in a school yard or public playground.

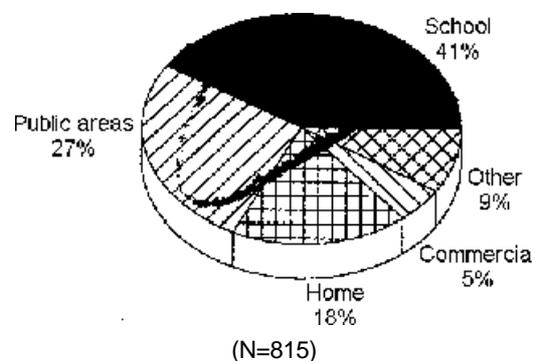
## Injuries

Equipment % for each row	N	Fracture	Cuts & Sprains	Bruises	Concussion
1. Climbing	311	65	7	17	6
2. Slides	189	44	16	21	12
3. Swings	163	34	24	26	4
4. SeeSaw	18	22	56	17	6
5. Other	146	47	10	30	8
<b>All</b>	<b>815</b>	<b>50</b>	<b>14</b>	<b>22</b>	<b>7</b>

## Play Equipment Injuries



## Location



## Breakdown Events

Falls were (by far) the most frequent precipitating cause of injury - 70% of all cases. Falls accounted for 84% of precipitating events on monkey bars and climbing frames, and of these falls, 78% were over a metre.

## Mechanism Factors

The way in which children were injured also suggests targets for intervention strategies. Not surprisingly, the ground was given as the most common injury factor - 56% of all cases - particularly with monkey bars and climbing frames. An average of 4% of injuries occurred because the child fell onto concrete (9% for swings). Unfortunately, ground is often the only description given by parents for the landing surface. It could be anything from concrete to mulch. Only 5% of respondents reported the use of a safety device (e.g. tan bark). This figure could be higher, as parents might not perceive tan bark to be a safety precaution.

The fact that in an average of 22% of cases children were injured by direct contact against the play equipment itself raises questions about their design, construction and maintenance. This was highest for swings and slides (37% & 38% respectively).

## Disposal

Of those injured on climbing equipment, 72% required hospital admission or other major treatment. The figures were similar for injuries on the other types of equipment. This is a very high admission and major treatment rate in comparison to other sources of injury.

## Prevention

As 41% of these injuries occurred in school playgrounds, and a further 27% in public playgrounds or parks, this suggests two key target groups to mobilise for intervention activities. Similarly, there are design factors that could be addressed in the equipment itself. These include the height of equipment, safety rails, distance between bars, size of the bars themselves, and the layout of equipment in relation to each other, and to pathways.

Three Australian Standards relate to playgrounds (equipment, design and management in parks, schools and for domestic use): AS 1924, Parts 1 & 2 (1981), AS2155 (1982), and AS 2555 (1982). They are currently being revised. Further information can be obtained from the Standards Association of Australia, and the Playground and Recreation Association of Victoria.

Finally, a key safety factor is the ability of the undersurfacing in playgrounds to absorb the impact of a child's fall. Tests on a range of surface materials have been carried out by the University of Adelaide, Department of Mechanical Engineering (in collaboration with health, safety and recreation bodies in South Australia). Scientific instruments recorded the ability of different materials to cushion the impact of a simulated fall of 3 metres by a model of human head. Recommendations were then developed on the most effective impact-absorbing materials, the appropriate depth for each type, and advice about the need for continuous maintenance. The minimum recommended depth of impact-absorbing materials varies, depending on the type used - usually it is 300mm or more.

For further information on the recommended playground safety surface, contact: Mr. Chris Snook, Department of Mechanical Engineering, University of Adelaide, GPO Box 498, Adelaide, 5001. Phone (08) 2285946 or 2285460.

Local testing facilities are also available at Technisearch, Royal Melbourne Institute of Technology, Collingwood Division, 37 Langridge St, Collingwood, Phone (03) 4192911 or Toll free (008) 013350. Contact Martin Williams or Ken Daly.

# VISS Activities

**PRAV video:** The Playground and Recreation Association of Victoria (PRAV) has produced an educational video to be used primarily by Local Government officers, schools and playground designers. Dr Nolan contributed a segment on injury patterns in relation to, amongst other things, the types of equipment involved.

**Choking hazard:** VISS was alerted by a concerned viewer to a prime time television programme on Channel 9. An advertised segment could have had a potentially harmful affect on children if they copied the activities of an entertainer, Stevie Starr. Starr appears to be inhaling or swallowing large objects, such as light bulbs, coins and billiard balls. In response to actions by VISS and the Royal Children's Hospital, the program included an appropriate warning to children against copying this behaviour.

# VISS Users

The Shire of Bulla is participating in the 'Healthy Localities Project' funded by the Victorian Health Promotion Foundation. The Health Surveyor hopes to determine the causes of injuries to children in the home within his Local Government Area in order to develop some intervention strategies.

Representatives from various State Government departments and agencies have sought data plus an explanation of what VISS has to offer in terms of further research and policy development for their respective units. These include the Victorian Women's Consultative Council, Drug & Poisons Section (HDV), and the State Bicycle Committee.

Hinch at Seven sought comparative data on informal and organised sporting injuries, as they believed that organised sport was more dangerous, particularly for contact sports. VISS data did not support this view. The program was dropped for this and other reasons.

The Child Accident Prevention Foundation of Australia (CAPFA) uses the data for on-going projects and for publicity campaigns. For example, comparative data of injuries to children in motor vehicle accidents who were or were not wearing an approved restraint was used to promote recent legislative changes.

Continuous use is made of the data within the VISS hospitals: through seminars in Emergency; by nurses, tutors, medical officers and medical students: and through regular liaison and discussions with the Child Safety Centre. The Early Childhood Injury Prevention Project (ECIPP) is making extensive use of VISS data for their in-service teaching program for Maternal and Child Health Nurses.

# VISS and Research

The Policy & Planning Section of Health Department Victoria is looking at morbidity data on head injuries (which result) in brain damage to determine the long term need for support services for this particular group of people in the community.

A plastic surgeon at the Royal Children's Hospital is conducting a study officer injuries which have resulted from children coming into contact with exercise bicycles. Children have sustained partial or total amputation of their finger by sticking it into either the chain, sprocket or spokes - allot which should have a protective guard if such injuries are to be prevented.

Monash University Accident Research Centre has received a research grant from the Victorian Health Promotion Foundation. They have a mandate to review Victorian and other Australian data to identify patterns of injury in order to determine priorities and opportunities for the introduction of community-based counter measures. They will also compare this with overseas experience to see which successful programs might be applicable in Australia. The emphasis will be on non traffic related incidents.

## VISS has moved

VISS has moved to larger premises in the University of Melbourne Department of Paediatrics, RCH South East Building (formerly the nurses' home). We are now on the first floor, Rooms 126 and 129. The mailing address and phone numbers are unchanged.

HAZARD is produced by VISS staff. If you have any questions, or know of someone who would like to be on the mailing list, please contact Marga Penny on 03 345 5087 or by fax on 03 345 5789.

## VISS Staff:

### Director

Dr. Terry Nolan

### Operations Co-ordinator

Marga Penny

### Data Processors

Bea Giemsa and Grace Volpe (Royal Children's)

Janice Grothe (Maribyrnong Medical Centre)

Wendy Murgia (Preston & Northcote Community Hospital)

## Acknowledgements

VISS is funded by the Victorian Health Promotion Foundation, and supported by the Child Accident Prevention Foundation of Australia, National Injury Surveillance and Prevention Project. The University of Melbourne (Department of Paediatrics), and the Royal Children's Hospital.

Computers were donated by Hewlett-Packard Australia, and software and support was provided by Alcatel Datakey Ltd. Rotary (Fawkner Branch) provided a donation to purchase software through the Royal Children's Hospital Burns Centre.

Thanks again to the Child Safety Centre for their support and the accommodation they provided during the past 16 months, and to the clerks, nurses and doctors of the three Emergency Departments of the VISS network.

Layout, graphic design, and artwork by Anne Esposito

Illustration by Jocelyn Bell Education Resource Centre, Royal Children's Hospital.

*This .pdf issue of Hazard was reconstructed by Glenda Cairns*



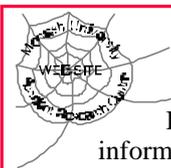
## VISS is located at:

Accident Research Centre  
Monash University  
PO Box 70A  
Monash University, Victoria, 3800 Australia

### Phone:

Reception ..... (03) 9905 1808  
Co-ordinator ..... (03) 9905 1805  
Director ..... (03) 9905 1810  
Fax ..... (03) 9905 1809

**Email:** Karen.Ashby@general.monash.edu.au  
Virginia.Routley@general.monash.edu.au



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>

## 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.