



Hazard
(Edition No. 33)
December 1997

**Victorian Injury
Surveillance System
Monash University
Accident Research Centre**



VicHealth

This edition of Hazard provides a profile of unintentional farm injury in Victoria using data from three sources: the Victorian Coroner's Facilitation System, Victorian Inpatient Minimum Dataset and Victorian Emergency Minimum Dataset. Recommendations are made for the prevention of common unintentional farm injuries and a list of useful resources, with a view to preventing unintentional farm injury, is provided.

Unintentional Farm Injury

Lesley Day¹, Karen Ashby and Voula Stathakis¹

Summary

Farm injuries in Victoria during the years 1989-1997 were studied. Each year, an average of 7 people died, 761 people were hospitalised, and approximately 3,074 presented to an emergency department as a result of unintentional farm injury events. Presentations to General Practitioners have not been considered.

There was a broad peak in farm injuries from early spring to late autumn. Males accounted for large proportions of all cases. Without knowing the age profile of those exposed to the risk of farm injury, children under 15 years of age appeared

to be especially vulnerable to fatal farm injury events.

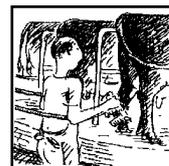
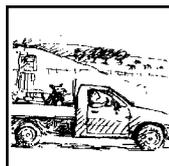
Agricultural machinery, particularly tractors, was a prominent cause of death and serious injury for both adults and children. Drowning in dams was the second leading cause of farm injury death among children. Motorcycle related incidents featured strongly among the serious (including adult deaths) and frequent causes of farm injury for both adults and children. Falls were the leading cause of non-fatal farm injury for adults. Motor vehicle incidents were a leading cause of non-fatal injury among children. Farm animal and horse related incidents were among the top five leading causes of

non-fatal farm injury for both children and adults. Causes of less serious injuries included being struck by, or colliding with, an object or person for both children and adults; and cutting and piercing injuries for adults.

Farm injury hospital admission rates for emergency department presentations among children and adults were higher than that for all injury: 32% compared with 11% for children, and 19% compared with 13% for adults.

The farm is a place of both work and recreation and prevention of farm related injury includes comprehensive approaches, such as training in, and structures, for managing safety on the farm, in addition to specific measures for the major causes of fatal and non-fatal injury.

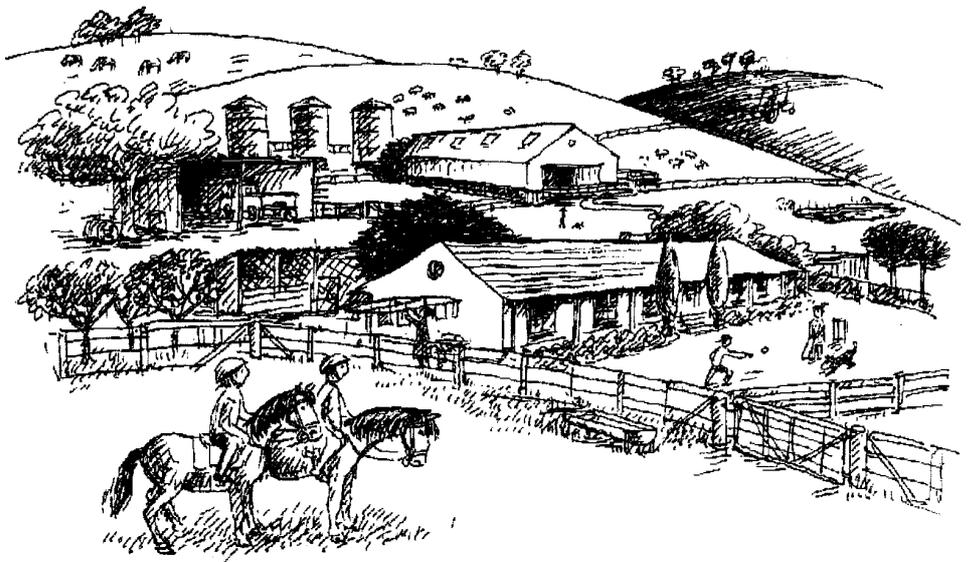
¹ Lesley Day is a National Health and Medical Research Council (NHMRC) funded Public Health Research Fellow, and Voula Stathakis is a research assistant, both at the Monash University Accident Research Centre



Introduction

Farm injury prevention is gathering considerable momentum in Victoria, as an increasing number of organisations and community groups make it a priority. This issue of Hazard focuses on unintentional farm injury in response to the growing number of requests for data on this topic received by VISS over the last 12 months. The expansion of emergency department injury surveillance to Victorian regional hospitals has increased the availability of more comprehensive data on non-fatal farm injury. It means that the increased interest in farm injury patterns can be met more fully than was previously possible. The profile of unintentional farm injury has been produced from three Victorian injury databases covering all deaths (Victorian Coroner's Facilitation System), all hospital admissions (Victorian Inpatient Minimum Dataset - VIMD) and a considerable proportion of emergency department presentations (Victorian Emergency Minimum Dataset - VEMD). General practice injury data is currently available for one regional area of Victoria only, although at least three other general practice collections are underway.

Farm injury cases were identified using the code for the type of location where the injury event occurred. The profile produced therefore reflects only those cases where the location was coded as farm (excluding farmhouse and garden), and includes work related and recreational injuries. The proportion of cases of unintentional injury with a missing or unspecified location code was 11% in the VEMD and 35% in the VIMD, therefore resulting in an underestimate of the total number of farm injuries. There were no cases in the Coronial database with a missing location code. Cases of intentional injury, or where the intent was unknown, were excluded. In the Coroner's database and the VIMD, cases with an external cause of injury code for traffic related incidents were also excluded, since by definition these cannot occur on a farm. Children were defined as those under the age of 15 years. In the VIMD data, adults 80 years and over (n=292) were excluded



due to a coding anomaly which could not be resolved. It is highly likely that a larger proportion of these cases did not actually occur on a farm.

Using these definitions, farm injury accounted for 1.0-1.3% of all unintentional injury. On average, 7 people died, 664 people were hospitalised, and approximately 3,074 presented to an emergency department each year as a result of unintentional farm injury events (Table 1).

Leading causes of farm injury included machinery (particularly tractors), drowning (especially for children), motorcycles,

falls, farm animals and horses (Tables 2 & 3).

Deaths

(Victorian Coronial Data)

There was a total of 36 farm injury fatalities recorded on the Victorian Coroner's Facilitation System during the five year period July 1989-June 1994. The age distribution is shown in Figure 1. Fifteen of the deaths (42%) were under 15 years of age, and 9 (25%) were under 5 years of age. Eighty-nine percent were male and the male: female ratio was 8:1. Of the 4 female deaths, 3 were under 5 years of age.

Average numbers of farm injuries per year in Victoria

Table 1

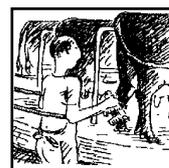
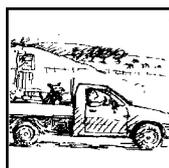
	Average annual frequency	Male : female ratio	Rate per 1000 Victorian farms per year*
Deaths 1989/90 - 1993/94	7	8:1	n/a
Hospitalisations 1993/94 - 1995/96	664 [†]	3:1	18 [†]
Emergency Department Presentations (total) 1996/97	3074 [‡]	3:1	83

* Farm defined as establishment with estimated value of agricultural operations \$5000 or more; death rate not calculated since number of farms meeting this definition was not available for 1991/92 year.

[†] Adults 80 years and over excluded.

[‡] Total emergency department presentations estimated from hospital admissions and VEMD admission rate for all farm injury (21.6%).

Source: Victorian Coroner's Facilitation System, Victorian Inpatient Minimum Dataset, Victorian Emergency Minimum Dataset.



Rank order of injury cause, nature and body region injured for unintentional farm injury among children (<15 years), Victoria

Table 2

	Deaths	Hospital Admissions*	Emergency Department Presentations
Cause of injury event	<ul style="list-style-type: none"> • Tractor incident • Drowning 	<ul style="list-style-type: none"> • Motorcycle • Agricultural machinery • Motor vehicle (occupant) • Animal being ridden (horses) • Farm animal 	<ul style="list-style-type: none"> • Horse • Motorcycle (driver or passenger) • Falls • Struck by or collision with object or person • Tractor incident
Nature of injury	not applicable	<ul style="list-style-type: none"> • Fracture • Intracranial • Open wound • Bruise • Burn 	<ul style="list-style-type: none"> • Fracture • Open wound • Superficial wound • Sprain or strain • Intracranial
Body part injured	not applicable	<ul style="list-style-type: none"> • Head • Lower extremity† • Forearm,elbow,wrist • Face • Upper arm 	<ul style="list-style-type: none"> • Hand (incl fingers) • Forearm • Head • Face (excl. eye) • Wrist

* To the most specific level of detail available

† Equal frequency to head

Source: Victorian Coroner's Facilitation System, 1989/90 – 1993/94, Victorian Inpatient Minimum Dataset 1993/94-1995/96 and Victorian Emergency Minimum Dataset, 1996/97

Rank order of injury cause, nature and body region injured for unintentional farm injury among adults (15 years +), Victoria

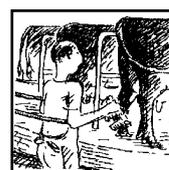
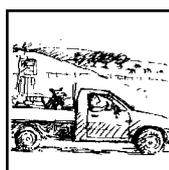
Table 3

	Deaths	Hospital Admissions*	Emergency Department Presentations
Cause of injury event	<ul style="list-style-type: none"> • Tractor incident • Motorcycle • Drowning • Gun related† 	<ul style="list-style-type: none"> • Falls • Farm animal • Agricultural machinery • Motorcycle • Animal being ridden (horses) 	<ul style="list-style-type: none"> • Falls • Cutting/piercing object • Struck by or collision with object or person • Horse related • Motorcycle (driver or passenger)
Nature of injury	not applicable	<ul style="list-style-type: none"> • Fracture • Bruise • Intracranial • Burn • Open wound 	<ul style="list-style-type: none"> • Open wound (excl. eye) • Fracture • Sprain or strain • Superficial (excl. eye) • Foreign body
Body part injured	not applicable	<ul style="list-style-type: none"> • Lower extremity • Hand (incl. fingers) • Head • Abdomen/pelvis • Forearm,elbow,wrist 	<ul style="list-style-type: none"> • Hand (incl. fingers) • Ankle • Lower leg • Foot (incl. toes) • Shoulder

* To the most specific level of detail available, excludes 80 yrs+

† Equal frequency to drowning

Source: Victorian Coroner's Facilitation System, 1989/90 – 1993/94, Victorian Inpatient Minimum Dataset 1993/94-1995/96 and Victorian Emergency Minimum Dataset, 1996/97



Among adults the leading causes of death were tractors (n = 8), and transport (5). Four of the tractor related deaths were rollovers and a further two due to the person becoming caught in or between tractor parts. Among children, the leading causes were drowning (6), tractors (6) and transport (2). Five of the child drownings occurred in dams. Five of the tractor related deaths occurred while the child was a passenger. The most common tractor related event for child deaths was falling from a tractor.

Due to the relatively small numbers and short time period, the Coroner's data were not amenable to trend analysis. However, the annual death rate for adult work related tractor rollover events, calculated from the WorkCover Authority's database, has been decreasing since 1993 (Day, L., unpublished observations). During the same time period the non-tractor related death rate has been increasing steadily. The decrease in tractor rollover deaths is likely to be due to increased use of rollover protection as a result of rebate schemes, legislative changes and increased awareness.

Hospital Admissions

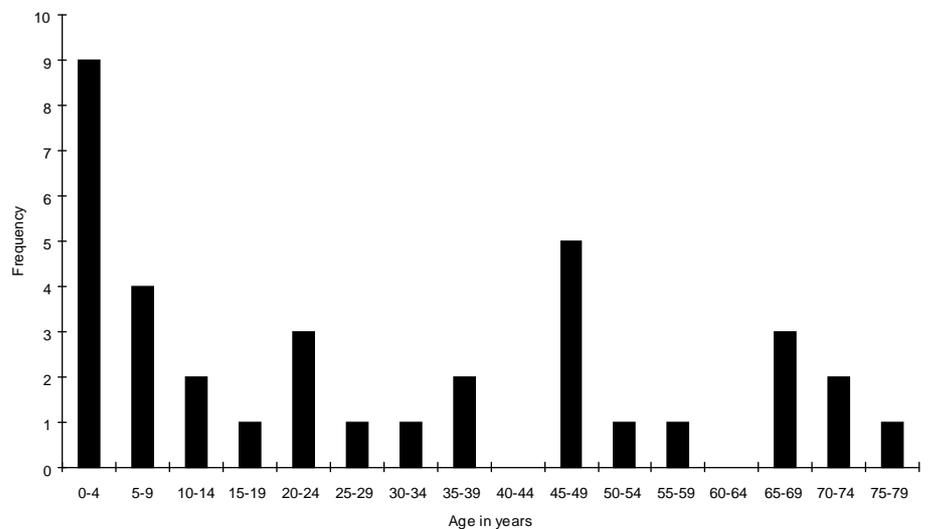
(Victorian Inpatient Minimum Dataset)

There was a total of 1,991 identified cases of farm injury hospitalisation for the three year period from July 1993 to June 1996². There was a seasonal pattern evident, with a broad peak in spring, summer and early autumn (Figure 2) which includes emergency department presentation data for comparison. A decreasing frequency in farm injury hospitalisation was observed over the study period, particularly between the first two years. This decrease occurred in all the major injury cause groups, with the exception of those being coded as "hit, struck or crushed by an object or person". Insufficient population data are available at this stage to determine if this is due to decreased risk, or other factors such as changes in the numbers of farm dwellers and farm workforce, or the amount of time spent

² Public and private hospital admissions, excluding re-admissions, medical injuries and late effects of injury and cases aged 80 years and over.

Farm injury deaths by age, Victoria

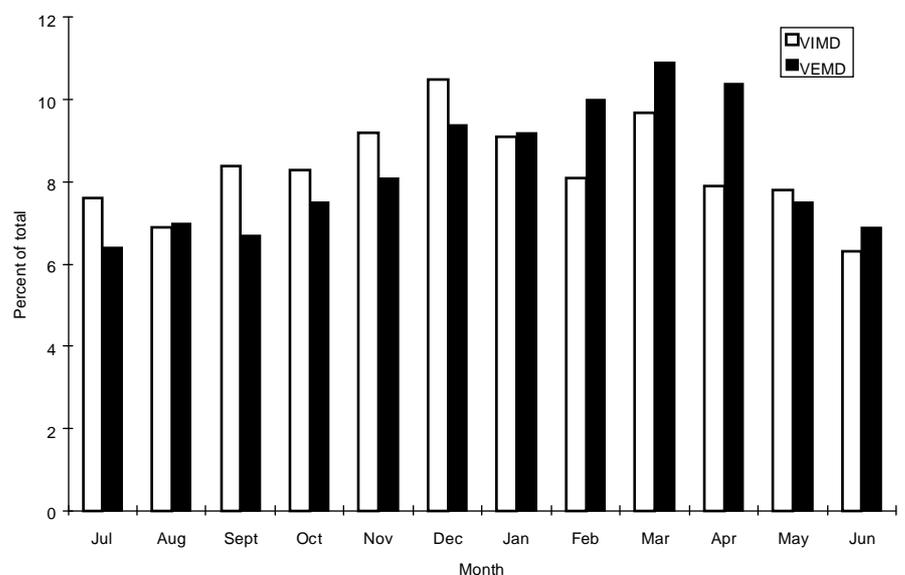
Figure 1



Source: Victorian Coroner's Facilitation System, 1989/90-1993/94

Month of presentation for farm injury hospitalisations and emergency department presentations, Victoria

Figure 2



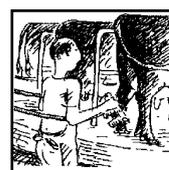
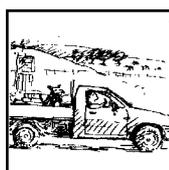
Source: Victorian Inpatient Minimum Dataset 1993/94-1995/96 n=1991 and Victorian Emergency Minimum Dataset 1996/9, n=1556

on the farm. Seventy-three percent were male. The male:female ratio was 2.7:1, ranging from 1:1 in the 75-79 year group to 4:1 in the 35-39 year age group. The age and sex distribution was unusual in

that there was no clear peak age group for males (Figure 4).

Injuries sustained

Fractures, bruises/crushing, intracranial injuries and burns were the most common injuries requiring hospital admission



Farm injuries by body part, Victoria

Figure 3

Injury causes

Transport related events and falls were the major causes of injury (Table 6). The five leading injury causes were the same for adults and children.

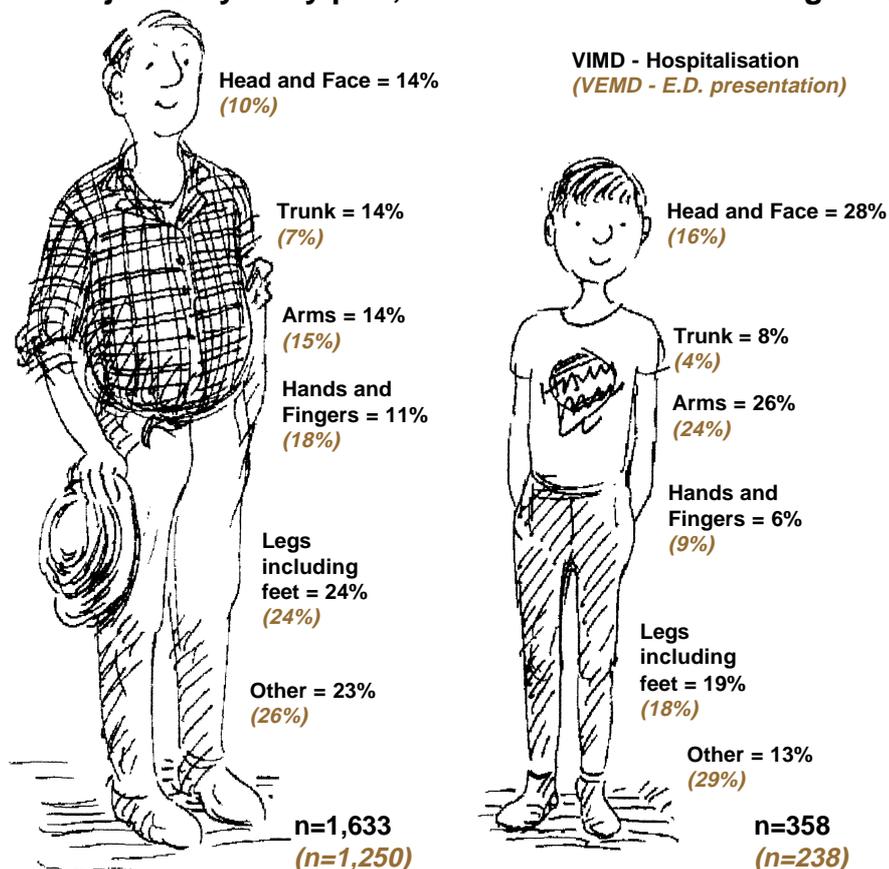
Transport

(n = 395 adult, 172 child)

Among adults the largest on-farm transport injury category was motor cycle drivers and passengers (n = 167), followed by "animal being ridden" (mostly horses) (91), and motor vehicle occupants (68). Among children the rank order was motor cycle drivers and passengers (81), motor vehicle occupants (29) and "animals being ridden" (22).

Falls (n = 377 adult, 60 child)

A more detailed breakdown of falls is complicated by the fact that 42% of falls were coded as due to an "unspecified cause". The most frequent specified cause for adults was falls on the "same level" (n = 106), followed by falls "from one level to another" (61). Fifty-three percent of adult falls were among those 65 years and over, a similar pattern to that seen for all unintentional injury (Watt, 1995). The most frequent specified cause for children was falls "from one level to another" (29).



Source: Victorian Inpatient Minimum Dataset 1993/94 to 1995/96, Victorian Emergency Minimum Dataset 1996/97

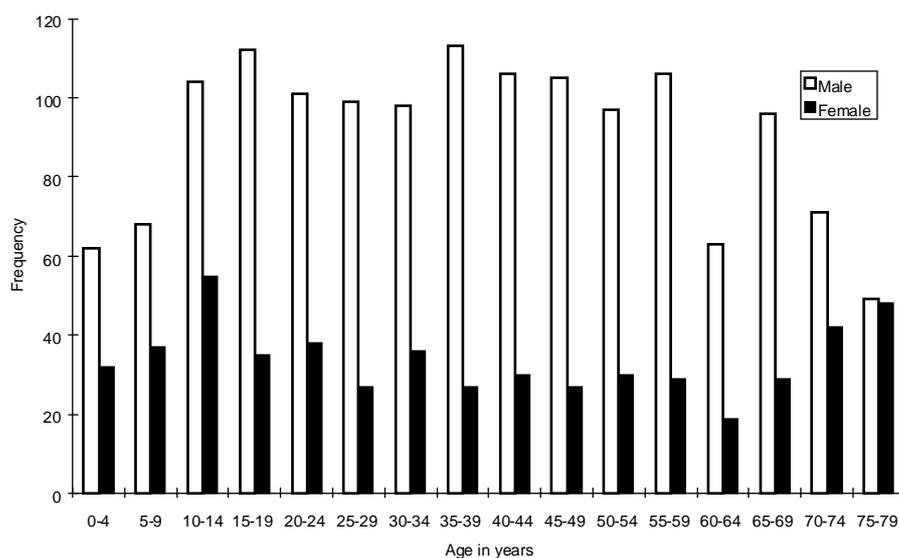
(Table 4 & 5) which include emergency department presentation data for comparison. Fractures were most frequently to the lower (n = 204 adults, 43 children) and upper limbs (198, 92); bruises were most frequently to the upper limbs (191, 19); and burns were most frequently to the lower limbs (77, 19). Figure 3 shows the most commonly injured body parts.

Length of stay

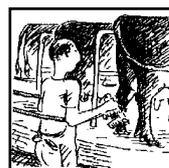
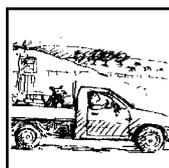
The length of hospital stay was less than two days for 59% of adults and 82% of children. Among adults, falls accounted for 35% of cases where length of stay exceeded 2 days and for 81% of cases where length of stay exceeded 31 days. Among children, transport accounted for 64% of cases where length of stay exceeded 2 days.

Farm injury hospitalisations by age and sex, Victoria

Figure 4



Source: Victorian Inpatient Minimum Dataset 1993/94-1995/96



Nature of child (<15 yrs) farm injury, Victoria Table 4

Nature of injury	Hospitalisations	Emergency Department Presentations
	(N = 358) %	(N = 238) %
Fractures	44	28
Intracranial (excl. skull fracture)	13	5
Open wounds	9	19
Bruising/crushing	8	2
Burns	7	1
Superficial wounds	3	9
Sprains/strains	1	8
Other	15	28
Total	100	100

Source: Victorian Inpatient Minimum Dataset 1993/94-1995/96, Victorian Emergency Minimum Dataset 1996/97

Nature of adult (15 - 79 yrs) farm injury, Victoria Table 5

Nature of injury	Hospitalisations	Emergency Department Presentations
	(N = 1633) %	(N = 1250) %
Fractures	35	16
Bruises/crushing	17	3
Intracranial (excl. skull fracture)	7	2
Burns	7	2
Open wounds	5	19
Sprains/strains	4	16
Superficial	1	7
Other	24	35
Total	100	100

Source: Victorian Inpatient Minimum Dataset 1993/94-1995/96, Victorian Emergency Minimum Dataset 1996/97

Major cause of farm injury hospitalisations, Victoria Table 6

Injury cause	Adults (15-79 yrs)	Children (<15 yrs)	Total	% of Total
Transport	395	172	567	29
Falls	377	60	437	22
Natural/environmental	224	34	258	13
Machinery	204	31	235	12
Hit/struck/crush	145	18	163	8
Cutting/piercing	130	11	141	7
Fires/burns/scalds	36	11	47	2
Other non-intentional	122	21	143	7
Total	1633	358	1991	100

Source: Victorian Inpatient Minimum Dataset 1993/94-1995/96

Natural/environmental
(n = 224 adult, 34 child)

Among both adults and children, the largest natural cause category was “other specified animal”, to which 76% (n = 170) and 56% (19) of cases respectively were assigned. This category excludes venomous and non-venomous snakes, lizards, spiders and insects, dog and rat bites and therefore includes most farm animals (cattle, sheep, horses not being ridden, etc.).

Machinery
(n = 204 adult, 31 child)

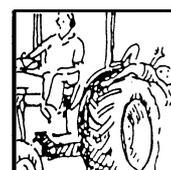
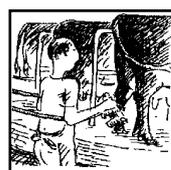
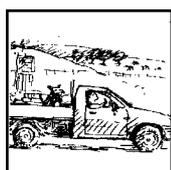
Among both adults and children, the largest category was agricultural machines (n = 166 adult, 31 child) which includes tractors, harvesters, combines etc. but excludes woodworking and metalworking machinery and powered or un-powered hand tools.

Hit/struck/crush
(n = 145 adult, 18 child)

Among both adults and children, the largest categories were “caught in or between objects” (n = 65 adult, 8 child), and “striking against or struck accidentally by objects or persons” (54, 7).

Cutting/piercing
(n = 130 adult, 11 child)

A more detailed breakdown of this category is complicated by the fact that 48% were coded as due to “other specified cause”, which does not provide any further details. Among adults, the remainder were fairly equally distributed between powered hand tools (n = 22), knives (21), other hand tools (21). Among children 10 of the 11 cases were not assigned to a particular code.



Emergency Department Presentations

(Victorian Emergency Minimum Dataset)³

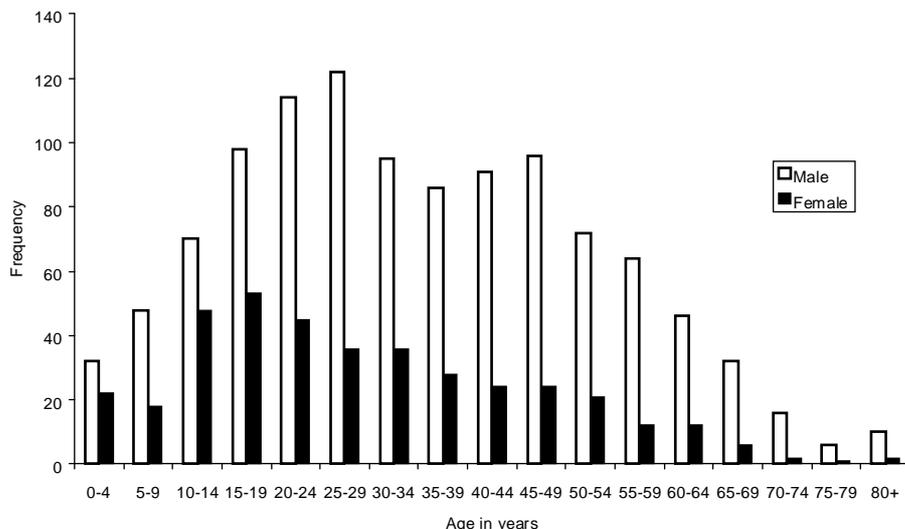
The VEMD currently includes nine rural hospitals, 14 Melbourne metropolitan hospitals and one other metropolitan hospital. There were a total of 1556 cases of farm injury emergency department presentations recorded for the 12 month period 1996/97⁴. Seventy-eight percent presented to rural hospitals and 22% to metropolitan hospitals. A seasonal pattern was evident. There was a gradual increase from late spring to a peak in late autumn (Figure 2). Presentations were more frequent on Saturdays (17%), Sundays (18%) and Mondays (17%). The age and sex distribution is shown in Figure 5. Seventy-four percent of cases were males. The male: female ratio was 3:1 and ranged from 1.5:1 among 0-4 and 10-14 year olds to 8:1 among 70-74 year olds.

Unlike all VEMD injuries (Victoria), males predominate in every age group (Figure 5). In statewide data, females present more frequently to emergency departments from 65 years of age.

There were 238 cases of farm injury to children. The majority of these occurred during a leisure activity (81%). There were 1250 cases of farm injury among adults, the majority of which occurred during work (Table 7). Among adults, 16% of all cases, or 24% of work related cases (including paid and other work),

Farm injury emergency department presentations by age and sex, Victoria

Figure 5



Source: Victorian Emergency Minimum Dataset, 1996/97

Activity at the time of injury, adult (15 yrs+) emergency department presentations, Victoria

Table 7

	Frequency	Percent
Working for income	634	51
Other work	190	15
Leisure	319	26
Sports	16	1
Other specified	52	4
Unspecified/invalid/missing	39	3
Total	1250	100

Source: Victorian Emergency Minimum Dataset, 1996/97

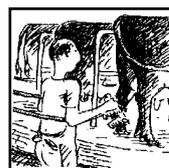
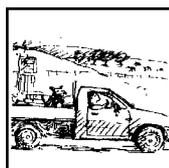
were recorded as compensable under WorkCover. There were 68 cases where the age was unspecified.

Injuries sustained

Open wounds, fractures, sprains/strains, and superficial wounds were the most frequent injuries (Tables 4 & 5). Among adults, open wounds were most frequently to the hands (n = 105), lower leg (27), head (15) and face (11). Fractures were most frequently to the ankle (27), lower leg (21) and hand (20); sprains were most frequently to the ankle (35), knee (22), and back (22). Among children, open wounds were most frequently to the hands and face (10 each) and fractures were most frequently to the wrist and forearm (12,11).

³ From October 1995: Austin and 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, Preston and Northcote Community Hospital, Royal Children's Hospital, St Vincent's Public Hospital, Wangaratta Base Hospital, Warrnambool and District Base Hospital, Western Hospital, The Williamstown Hospital and Wimmera Base Hospital. From November 1995: Dandenong Hospital. From December 1995: Royal Victorian Eye & Ear Hospital and Mornington Peninsula Hospital. From January 1996: Latrobe Regional Hospital. From September 1996: The Angliss Hospital. From July 1996: Alfred Hospital and Monash Medical Centre.

⁴ Includes transfers between VEMD hospitals, resulting in a slight over-representation of the more severe farm injuries.



Among both adults and children, the hand was the most often injured body part. The most frequent cause of hand injuries was cutting/piercing which accounted for 42% of hand injuries. Figure 3 shows the most commonly injured body parts.

Injury causes

An overview of the injury causes is shown in Table 8. Farm injury admission rates were higher than for injury overall, especially for children among whom 32% were admitted, compared with 11% for all children in VEMD. Among adults, 19% of farm injury presentations were admitted compared to 13%. Among adults, the following injury causes had a higher admission rate than adult farm injury overall: falls, horses, motor cycles, machinery, transport, firearms and electricity. Among children, injury causes with a higher admission rate were: falls, cutting/piercing, motor cycles, other animal, machinery and transport (Table 8).

The major causes are discussed in more detail below. Demographics and injuries sustained are noted where there are marked differences from the overall profile. Circumstances of the injurious event are only discussed where detailed information was provided in the narratives for 70% or more of the cases in each category.

Falls (n = 195 adults, 46 child)

This category excludes falls from motor vehicles in motion (including motor-bikes), horses, other animals and farm machinery. Forty-four adult and 13 child falls were from a height in excess of 1 metre.

Cutting and piercing (n = 190 adults, 11 child)

Children under 5 years were over represented in cutting and piercing injuries (45%) compared with the overall age distribution for children (23%). The admission rate for children was three times that for adults.

Major causes of farm injury emergency department presentations, Victoria **Table 8**

Injury cause	Adult (15 yrs+)		Child (<15 yrs)	
	Presentations	% Admitted	Presentations	% Admitted
Falls	195	27	46	35
Cutting/piercing object	190	11	11	36
Struck by or collision with object or person	160	15	19	31
Horse related	148	22	65	31
Motorcycle (driver or passenger)	127	27	49	33
Other animal (not horse)	127	17	13	38
Other specified	119	3	10	30
Machinery	79	35	10	60
Transport	35	34	9	44
Bums	22	9	2	0
Poisoning	13	15	4	0
Firearm	7	71	NA	NA
Electrical	4	25	NA	NA
Unspecified	24	12	NA	NA
Total	1250	19	238	32

Source: Victorian Emergency Minimum Dataset, 1996/97

Struck by or collision with object or person (n = 160 adult, 19 child)

Among both adults and children, the head and face appeared to be more vulnerable to these kinds of injuries than for all farm injuries (16% compared with 6% for adults; 37% compared with 14% for children). Higher proportions of both adults and children were referred to a general practitioner for follow up or return to the emergency department for review of their injuries compared with farm injury overall. The admission rate for children was twice that of adults.

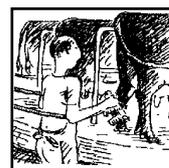
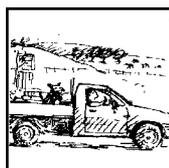
Horse related injury (n = 148 adult, 65 child)

Unlike the other main causes of farm injury, females dominated horse related injuries, (72% adult, 66% child). Adults between the ages of 15 and 29 years were over represented when compared with all farm injury (56% compared with 38%). Children in the 10-14 years age group were also over represented (62% compared with 50%). Adult horse related injuries occurred most frequently during

leisure activities (n = 88) and paid work (35), unlike all adult farm injury.

Falls from a horse were the most common event leading to injury (65 adult, 42 child), e.g. "Awkward fall from a bucking horse, fell on head and neck with feet in the air, no helmet worn". Other common scenarios included being kicked by a horse (16, 4), e.g. "Walked behind a horse which kicked patient in the chest", being trodden on by a horse (10, 2) or being knocked or crushed by a horse (7, 1).

Among both adults and children, intracranial injuries were more commonly associated with horse related injuries compared with all farm injuries (10% compared with 2% for adults, 11% compared with 6% for children). The pattern for other body parts injured differed from farm injuries overall. Among adults, injuries were most often to the shoulders (n = 16), hands and fingers (14) and feet and toes (12). Among children, injuries were mostly to the upper limbs, particularly the wrist (n=7), elbow (6) and forearm (5).



Motorcycle (driver or passenger) (n = 127 adult, 49 child)

Adults aged 15-19 years and 25-29 years were over represented among motorcycle injuries compared with farm injury overall (31% compared with 12%, 19% compared with 12%). Children aged 10-14 years were also over represented (77% compared with 50%).

Adult motorcycle injuries mostly occurred during leisure activities (n = 78), paid work (28) or unpaid work (10). Of those injured most were recorded as the driver (102 adult, 38 child) or passenger (7, 7), the remainder were unspecified (18, 4). Motorcycle related injury was most often to the lower leg (13 adult, 6 child), knee (13, 2), ankle (12, 2) or face (5 child).

Other animal (not horse) (n = 127 adult, 13 child)

Adults aged 40-54 years were over represented among animal related injuries (36% compared to 26% of farm injury overall). Children 0-4 years of age were also over represented (54% compared with 23%). The admission rate for children was twice that of adults.

Cattle (51 adult, 1 child), insects (11, 1), snakes (7, 3), spiders (5, 2), dogs (5, 2) and sheep (4, 1) were most often associated with these cases of injury. The most common mechanisms of animal related injuries were bites and stings (36, 9). Cattle related injuries were most often the result of kicks (n = 23), e.g. "Sorting cattle in yard, kicked by steer in ankle", being struck (9), crushed (7), trodden on (5), lacerated by the horn (3) or attacked (3) by the animal.

Adult injuries were most often to the hands (34), lower leg (11), face (8) and forearm (8). Child injuries were mostly to the feet (3), head (2) and hands including fingers (2).

Machinery (n = 79 adult, 10 child)

Adults aged 20-24 years were over represented among machinery related (20% compared with 13% of adult farm injury). Children aged 5-9 years were also over represented (60% compared with 28%). The admission rate for children was 1.7 times that for adults.

Mobile farm machinery/plant accounted for most machinery related injuries (32 adult, 6 child). Tractors were the single most common item of machinery associated with injury (24, 4). Further specified agents included fixed plant equipment (3, 1), workshop equipment (2 adult), farm structures (1 adult), jacks (1 adult) and unspecified agents (49, 3).

The most common child machinery related events included falls from a tractor (n = 3), being caught in a power take off (2) or being caught in the tractor hydraulics (1). Machinery related events are not reported for adults since less than 70% of adult narratives contained sufficient detail.

Adult machinery related injuries most often resulted in open wounds (n = 18), crushing injuries (13) and sprains/strains (11). Child machinery related injuries most often resulted in fractures (n = 3) or multiple injuries (2). Machinery injuries

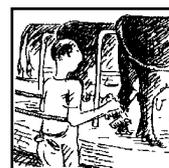
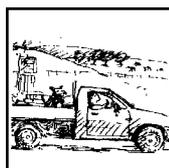
had the highest and second highest admission rates for children and adults (60% and 35% respectively).

Farm injury prevention

Prevention of injuries on the farm occurs in the context of a highly valued way of life, in which the farm is a place of both work and recreation. It also occurs in a context of considerable variation in production processes, social and economic conditions. A systematic and industry wide approach to farm injury prevention is highly likely to yield benefits, as in many other areas of injury prevention. Farmsafe Australia, an alliance of government and non-government farmer and worker organisations, is generating such an approach through its state committees (Fragar, 1996). An important feature of this approach is the involvement of farmers and farm families. A wide range of material on farm injury prevention is available through the Farmsafe network and through other relevant organisations. This section highlights aspects of farm injury prevention, but is not intended to be a comprehensive summary, which is beyond the scope of this publication. Specific priorities for farm injury prevention in Victoria should include machinery (particularly tractors), drowning, motorcycles, falls, farm animals, and horses. "Cutting" injuries and injuries due to "being struck by or colliding with an object or person" should also be priorities, although the circumstances of these events are not always detailed.

General principles of farm injury prevention

- regularly check the farm environment and work procedures for injury hazards
- assess the risk associated with each identified hazard
- eliminate, modify or manage each hazard according to the level of risk
- record prevention strategies and evaluate their effectiveness
- obtain farm safety checklists from Farmsafe Victoria and Kidsafe Victoria
- obtain resource material from the Victorian Farmers Federation, Victorian WorkCover Authority, Royal Children's Hospital Child Safety Centre, Kidsafe Victoria, and the Australian Agricultural Health Unit to assist in the selection of prevention strategies for different farm hazards
- obtain training in the management of farm safety and in specific operations and activities (see **Resources**)
- create barriers between bystanders and industrial workplaces
- give higher priority to farms with young children and older farmers who are at particular risk
- include hobby farmers, as well as professional farmers, in farm safety campaigns



Tractor rollover injury prevention

- use only tractors fitted with rollover protective structures (ROPS), preferably a full cab
- retrofit ROPS to unprotected tractors, taking advantage of the rebate scheme currently available through the Victorian Farmers Federation until March 1998
- retrofit seat belts where mechanically feasible, in accordance with the Australian Standard AS2664 1983

Tractor design recommendations

- provide passenger facilities including seats, seat belt and protection by ROPS
- provide an automatic engine cut out which operates when the operator seat is vacated, as in some forklifts
- provide an ignition switch which starts only when the tractor is in neutral
- improve ergonomics of seat design
- provide safe access platforms with hand holds to prevent falling under the rear wheels while mounting and dismounting (see following **Resources** section for do it yourself brochure)
- provide power take-off (PTO) guards with hinges to give easier access when attaching implements without requiring removal of the shield
- provide PTO guards which are interchangeable with any implement to be attached
- install reversing “beepers” to alert bystanders
- install rear marking plates and flashing yellow lights to improve conspicuity, especially if travelling on public roads
- reduce engine noise
- evaluate the adequacy of current designs

Tractor injury prevention general recommendations

- develop a licence system for tractor operation
- consider replacing tractor parts with newer, safer parts where possible e.g., replacement of starter motors with rust proof solenoids, replacement of PTO guards with those made from ultra violet resistant material
- wear personal protective equipment including boots, ear plugs and muffs
- do not mount or dismount a moving tractor
- ensure that the tractor is always started from the drivers seat, never from the ground

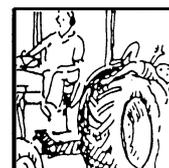
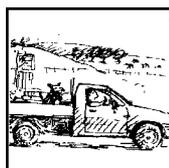
Child farm injury prevention

- advocate for accessible, affordable and flexible child care in rural areas
- fence the area around the farm home and secure with self locking gate
- enclose play areas for young children in key locations on the farm e.g., in the dairy
- do not permit children under 5 years of age to play in farm work areas
- involve older children in farming activities which are appropriate to their age, size and ability and provide constant adult supervision until proficient
- do not allow children to ride on tractors, until tractor designs provide ROPS passenger protection (inc. seatbelts) equivalent to that provided for tractor drivers; current tractor designs which include passenger seats do not place the seat within the full protective sphere of the ROPS
- do not allow children to be passengers on motorcycles, utility trays, or trailers or other attached implements; child passengers in farm motor vehicles should be properly restrained
- ensure that young children are physically separated from farm animals and horses
- obtain further information on child farm safety from Farmsafe Victoria, Kidsafe Victoria, the Australian Agricultural Health Unit and the Child Safety Centre at the Royal Children’s Hospital, Melbourne

Preventing injuries from farm animals

(adapted from Animal Handling, Australian Agricultural Health Unit)

- understand characteristics of the animal type and breed, characteristics and experience of the handler, handling procedures, and the farm environment, and their interaction
- understand principles of behaviour for all animal types and breeds kept on the farm and use this knowledge to guide preventive measures
- consider the effect of gender on animal behaviour
- use artificial insemination, where possible, to reduce the numbers of potentially aggressive male stock
- substitute with more docile breeds or gradually select against those individual animals which are consistently difficult to handle
- select efficient and safe yard and pen design



- use mechanical lifting devices where feasible
- use handling procedures appropriate to the animal type and breed
- wear leather gloves, where the task allows, to provide a level of hand protection
- wear sturdy boots with non slip soles and reinforced toes
- wear snug fitting clothing
- obtain specific guidelines for cattle, sheep and pig handling, and yard design in the Animal Handling Guidance Note, Australian Agricultural Health Unit

Farm motorcycle injury prevention

(adapted from *Farm Motorcycles*, Australian Agricultural Health Unit)

- ensure the driver is of an appropriate size for the motorcycle so that they are readily able to reach and maintain control of the motorcycle
- ensure maintenance of the brakes, tyres, throttle, suspension and seat is regularly undertaken
- wear a helmet, long trousers, long-sleeved shirt, long boots, gloves and sunscreen for the best protection
- ensure that loads are well secured and do not exceed the recommended limits, especially for 4 wheeled motorcycles
- consider the terrain and environmental hazards which may be encountered whilst operating a motorcycle, particularly 4 wheeled motorbikes
- maintain caution when riding over unfamiliar areas of the farm
- keep a safe distance from animals if mustering
- isolate the motorcycle from children when not in use, never leave keys in the ignition
- do not carry passengers on 4 wheeled motorcycles, they are not designed for that purpose and a passenger may alter the weight distribution enough to contribute to a rollover

Preventing horse related injury on farms

(adapted from *Hazard Edition 23 and Horses on Farms*, Australian Agricultural Health Unit)

- undertake an assessment of horse related safety which takes into account the rider/handler (age, experience and training), the horse (age, breed, temperament and training), the environment in which it is used and the interaction between each
- take into consideration the nature and condition of the terrain upon which the horse is being ridden
- choose a horse of the appropriate size, temperament, character and age for the riders age, size and skill level, take extra caution when riding an unfamiliar horse
- design yards and stables to avoid narrow gateways or doorways which increase the risk of being crushed when moving a horse through such openings
- undertake routine checks of equipment for signs of fatigue and correct adjustment of fit
- avoid wrapping the lead rope around hands and fingers when leading a horse
- avoid, if possible, walking behind a horse. If the need arises walk close to the hind legs to reduce the force of potential kicks
- avoid frightening the horse by avoiding blind spots and keeping a hand on the horses rump while moving behind it
- wear a helmet which complies with the Australian Standard AS 2063.3 to afford protection in the event of a fall
- wear boots with a smooth sole to reduce the chances of boots catching in the stirrup
- exercise caution when riding in the presence of objects or animals that could frighten the horse

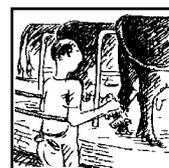
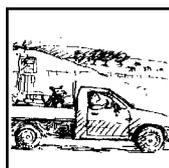
Prevention of falls on farms

- provide non slip surfaces (e.g., roughened concrete, grooved passages) in animal pens, yards and wet areas
- remove contaminants such as organic matter etc. as quickly as possible, since these greatly increase risk of slipping
- wear sturdy shoes with non slip soles
- provide adequate lighting in farm buildings such as workshops, dairies and shearing sheds
- mark any step edges with slip resistant nosing in a contrasting colour
- provide secure, easily grasped hand rails within reach on steps into buildings and other structures
- older farmers may be well advised to seek regular falls risk assessments from their general practitioner, and to check and modify the physical environment on the farm, since falls risk greatly increases with age

Prevention of falls from ladders and heights

(adapted mainly from *Hazard Edition 18*)

- stand no higher than the third rung from the top; marking these rungs a different colour would assist in reinforcing this practice



- make ladder rungs slip resistant and clean muddy or slippery boots before mounting the ladder
- place the ladder with the foot 1/4 of its working length away from the base of the structure
- re-position the ladder frequently so that stretching is not required i.e., the centre of the body should be kept within the side rails
- locate the ladder on a firm footing using slip-resistant feet, secure blocking or steel spikes; have someone hold the ladder if possible
- follow instructions on the ladder in regard to load limit and maintenance
- assign ladder work and other work at a height to younger adult workers where possible
- secure a safety belt to a secure structure for work at a height, particularly on windy days
- maintain silo ladders and ensure adequate railings on silo tops
- ensure silo ladders are out of reach of children or have a safety device to prevent access
- take care around overhead power lines

Prevention of cutting and piercing injuries on farms

- check farm buildings, structures and machinery for protrusions or hand/finger entrapment risks and either remove or cover them
- select the correct powered and unpowered hand tool for the job and ensure its correct use
- ensure guards on power tools are in place
- keep hand tools well maintained
- use clamps and vices to hold work, where appropriate
- wear leather gloves or chain mail gloves to provide a level of protection where the task allows their use
- ensure all farm workers have adequate tetanus immunisation
- keep protective equipment readily available next to cutting and piercing equipment, e.g., mesh gloves

First aid on farms

- train all farm workers in first aid due to distance from medical assistance, and ensure it is regularly updated
- ensure well stocked first aid kits are available at key locations e.g., in the workshop, on tractors
- establish systems for regular communication between the farmhouse and field workers, e.g., mobile phone calls
- ensure the farm has an emergency response plan including systems for obtaining immediate help

Farm safety action groups

- coalitions of farmers, community health workers, general practitioners, rural retailers, machinery dealers and others can develop and implement appropriate modifications to farming practice and equipment at the local/regional level
- some suggested activities include: organising Managing Farm Safety, or other, training days; group farm safety checks; safe tractor access platform workshops; ensuring local availability of personal protective equipment and other farm safety products; and advocating for farm safety issues at local government level and within the Victorian Farmers Federation
- guidelines for the formation of farm safety action groups are available from the Victorian Farmers Federation (see following **Resources** section)

Farm injury issues not included in this edition of *Hazard* but important nonetheless include:

- Electrical Safety (contact local power supplier)
- Firearm Safety*
- Hearing protection*
- Correct lifting techniques*

*Contact Australian Agricultural Health Unit, ph. 02 67 528 210

References

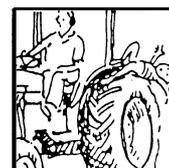
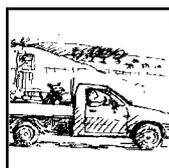
- Ashby, K. and Day, L., September 1995, Tractor Injuries, *Hazard* Edition 24, Victorian Injury Surveillance System, pp2-8.
- Australian Agricultural Health Unit. Horse on Farms Guidance Note No 8. March 1997
- Australian Agricultural Health Unit. Farm Motorcycles Guidance Note No 9. June 1997
- Australian Agricultural Health Unit. Animal Handling Guidance Note No 10. June 1997
- Australian and New Zealand Standard for Slip Resistance of Pedestrian Surfaces. Part 2: Guidelines to the reduction of slip hazards AS/

- NZS 3661.2: 1994. Standards Australia
- Farmsafe Australia, 1995, Managing Farm Safety Manual, December.
- Fragar, L., 1996, Agricultural Health and Safety in Australia, *Australian Journal of Rural Health*, 4:200-206.
- Kidsafe Victoria, 1997, A Parents Guide to Kidsafe Farms.
- Routley, V. and Valuri, J., March 1994, Work Related Injury, *Hazard* Edition 18, Victorian Injury Surveillance System, pp1-10.
- Watt, G., 1995, Hospitalised Injuries Victoria, July 1987 - June 1993, Monash University Accident Research Centre, Report No. 67.

- Williams, F. and Ashby, K., June 1995, Horse Related Injuries, *Hazard* Edition 23, Victorian Injury Surveillance System, pp1-13.

Acknowledgments

VISS would like to acknowledge the contributions of the following people for their valuable comment: David Rich, Victorian Farmers Federation; Alicia McGrath, MUARC



Resources

Australian Agricultural Health Unit Ph: 02 67 528 210

- Safe Tractor Access Platform Guidelines
- Guidance Notes:
 1. Tractor Rollovers
 2. Tractor Runovers
 3. Tractor Power Take-Offs
 4. Noise on Farms
 5. Farm Machinery
 6. Ergonomics and Manual Handling on Farms
 7. Children on Farms
 8. Horses on Farms
 9. Farm Motorcycles
 10. Animal Handling
 11. Workshop Safety on the Farm
 12. Organic Farm Dusts
 13. Farm Chemicals
 19. Heat Stress on the Farm
 20. Sun Safety on the Farm
 22. Woolshed Safety
- Safe tractor operative training course currently being developed by the Australian Agricultural Health Unit.

Farmsafe Victoria, Industrial and Legal Dept., Victorian Farmers Federation

Ph: 03 9207 5512

- Primary school curriculum materials: Rural Injury Prevention Primary Education Resource (RIPPER)
- Guidance notes:
 1. Farmers Guide to Occupational Health and Safety Legislation Part 1
 2. Farmers Guide to Occupational Health and Safety Legislation Part 2
 3. Tractor Safety: The Hazard
 4. Farm Chemical Safety: The Hazard
 5. How to Reduce Manual Handling Injuries
- General Occupational Health and Safety information
- Guidelines for the Formation of Farm Safety Action Groups
- Courses available:
 - Managing Farm Safety

Victorian WorkCover Authority Ph: 03 52 438 866 (contact Ron Ruff)

- Guidance notes on regulations, codes and standards available

Kidsafe Victoria Ph: 03 9836 4070

- A Parents Guide to Kidsafe Farms
- Farmsafe Kids checklist

Child Safety Centre, Royal Children's Hospital Ph: 03 9345 5085

- Safety on the Farm – Fact Sheet
- Video for hire to be released next year incorporating child farm safety issues

Courses available through the TAFE system, contact McMillan College,

Ph: 03 5624 0200

- Chain saw operation
- Farm chemical safety
- Front end loader operation

ATV and Agbike operation training available through Stay Upright,

Ph: 1800 676 462

Standard for Slip Resistance of Pedestrian Surfaces, Part 2 (1994) for more information on the selection, installation, care and maintenance of flooring and other surfaces in domestic, public and commercial areas for the purposes of reducing slip hazards. A copy of the standard (Part 2) can be obtained from Standards Australia, Ph (03) 9693 3500.

OBITUARY

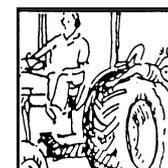
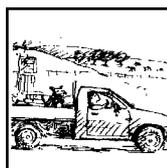
Marga Penny

Marga Penny, the original VISS co-ordinator, passed away in December 1997, after a courageous battle with cancer. Following nursing and university studies, Marga helped establish VISS with Dr Terry Nolan in 1988 at the Royal Children's Hospital, soon expanding to other hospitals. She was principally involved in the first four editions of *Hazard* and journal articles identifying hazards such as finger entrapments from exercise bikes and scalds from the Kambrook urn. Countermeasures followed and almost eliminated such injuries. In 1990 she left to have her first child.

Marga returned in 1991 to share the co-ordinating position at VISS now collecting all-age injury data. She continued to manage the data system, played a major role in starting up further collections, responded to information requests and wrote articles for *Hazard*. A major interest was burns prevention (*Hazard* 12). The spill-resistant mug, to prevent the most frequent cause of burns, tea and coffee scalds, was her idea. At the end of 1992 she left to have her second daughter.

In addition to her substantial contribution to injury prevention Marga is remembered for her generosity, energy, competence and administrative and organisational skills. She extended her injury prevention activities beyond her immediate role being substantially involved in the Victorian Branch of the PHA and introducing injury prevention measures wherever she had influence.

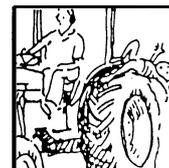
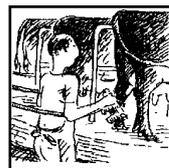
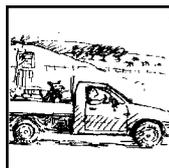
We extend our sympathies to her husband Ian Proctor, daughters Elizabeth and Claire, mother Janet and brother Robert. She will be sadly missed.



- INDEX -

Subject	Edition	Pages
Babywalkers, update	16,20,25	1-4,12-13,7-8
Baseball	30	10-12
Bunkbeds	11	12
Bicycles - Bicycle related injuries	6	1-8
- BMX bikes	31	9-11
- Cyclist head injury study	2	2
- Cyclist head injury study updates	7,8,10	8,13,9
Burns - Scalds	3,25	1-4,4-6
- Burns prevention	12	1-11
Car exhaust gassings	11,20,25	5-6,2-4,3-4
Chainsaws	22	13-17
Child care settings	16	5-11
Client survey results	28	13
Data base use, interpretation & example of form	2	2-5
Deaths from injury (Victoria)	11	1-11
Dishwasher machine detergents - Update	18	11
Dogs - Dog related injuries	3	5-6
- Dog bite injuries	12,25,26	12,13
Domestic architectural glass	7,22,25	9-10,1-5,12
Domestic Violence	21,30	1-9,3-4
Drowning/near drowning, including updates	2,5,7,30	3,1-4,7,6-9
Escalator injuries	24	9-13
Exercise bicycles, update	5,9	6,13-14
Farm injury	30	4
Finger jam injuries	10,14,16,25	5,5-6,9-10,9-10
Home injuries	14,32	1-16, 1-13
Horse related injuries	7,23	1-6,1-13
Infants - injuries in the first year of life	8	7-12
Injury surveillance developments	30	1-5
Intentional injuries	13	6-11
Latrobe Valley - The first three months	9	9-13
- Latrobe Valley injuries	* March 1992	1-8
- Injury surveillance & prevention in the L. V.	*Feb 1994	1-14
Lawn mowers	22	5-9
Martial arts	11	12
Motor vehicle related injuries, non-traffic	20	1-9
Needlestick injuries	11,17,25	12,8,10-11
Older people, injuries among	19	1-13
Off-street parking areas	20	10-11
Playground equipment	3,10,14,16,25,29	7-9,4,8,8-9,13,1-12
Poisons - Child resistant closures	2	3
- Domestic chemical and plant poisoning	28	1-7
- Drug safety and poisons control	4	1-9
- Dishwasher detergent, update	10,6	9-10,9
Power saws	28	8-13
Roller Blades	15,25,31	11-13,12,12
School injuries	10	1-8
Shopping trolleys	22,25	10-12,8-9
Skateboard injuries	2,31	1-2,3-7
Smoking Related injuries	21,25,29	10-12,6-7
Sports - Sports related injuries	8	1-6
- The 5 most common sports	9	1-8
- Adult sports injury	15	1-10
Tractor injuries	24	1-8
Trail bikes	31	7-9
Trampolines	13	1-5
VISS: early overview	1	1-5
VISS: goes electronic	26	1-5
VISS: how it works	1	6-8
Work Related Injuries	17,18	1-13,1-10

* Special edition



Editorial Board

Professor Peter Vulcan, Monash University Accident Research Centre
Professor Joan Ozanne-Smith, Monash University Accident Research Centre
Assoc. Professor Terry Nolan, Department of Paediatrics, Melbourne University
Mr. Jerry Moller

VISS Staff

Director: Professor Joan Ozanne-Smith
Co-ordinator: Virginia Routley
Database Administrator: Mark Sinclair Stokes
Research Assistant: Karen Ashby
Administrative Assistant: Christine Chesterman
Associate Director: Assoc. Prof. Terry Nolan
(Child Injuries)

General Acknowledgements

Participating Hospitals

Alfred Hospital	Royal Children's Hospital
Angliss Hospital	Royal Melbourne Hospital
Austin and Repatriation Medical Centre	Royal Victorian Eye and Ear Hospital
Ballarat Base Hospital	St Vincent's Hospital
The Bendigo Hospital Campus	Wangaratta Base Hospital
Box Hill Hospital	Warrnambool and District Base Hospital
Dandenong Hospital	Western Hospital
Echuca Base Hospital	The Williamstown Hospital
The Geelong Hospital	Wimmera Base Hospital
Goulburn Valley Base Hospital	
Latrobe Regional Hospital	
Maroondah Hospital	
Mildura Base Hospital	
Monash Medical Centre	
Mornington Peninsula Hospital	
Preston and Northcote Community Hospital	

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.



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:

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.

VISS is located at:

Building 70
Accident Research Centre
Monash University
Wellington Road
Clayton, Victoria, 3168

Postal address:

As above

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

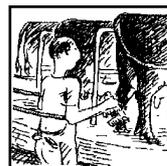
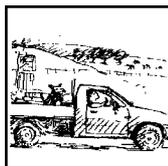
New Report #123:

Injuries Associated with Nursery Furniture & Bunk Beds

W. Watson, J. Ozanne-Smith, S. Begg, A. Imberger, K. Ashby & V. Stathakis

This publication reports on research undertaken into the safety of nursery furniture to underpin a proposed injury reduction program for these products. It contains a review of recent Australian and international literature on nursery furniture and bunk bed safety providing an overview of the injury issues involved and a review of the relevant standards. Major sources of Australian and international data relevant to this area were identified and the available data summarised. An in-depth analysis of Victorian data was undertaken to identify the relevant nursery furniture products, the nature and severity of injuries sustained and any patterns or trends including age profiles.

\$15 per copy from Monash University Accident Research Centre (address above)



Project Funded by Victorian Health Promotion Foundation

VISS is a project of the Monash University Accident Research Centre.



*Hazard was produced by the Victorian Injury Surveillance System
with the layout assistance of Glenda Cairns, Monash University Accident Research Centre.
Illustrations by Jocelyn Bell, Education Resource Centre, Royal Children's Hospital.*

ISSN-1320-0593

Printed by Sands and McDougall Printing Pty. Ltd., Brunswick

