



Hazard
(Edition No. 38)
March 1999

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



VicHealth

The purpose of this issue of Hazard is to provide an overview of injury deaths in Victoria based on the Victorian Coroner's Facilitation System. Although these data are not timely, they highlight outstanding causes and identify trends and changes over time to an extent unavailable from other current sources. It updates Hazard 11, June 1992 and provides an insight into the depth of timely data soon to be available from the National Coronial Information System (NCIS). Additionally there is a brief report of the NCIS and developments surrounding its implementation.

Coronial Data: a comprehensive overview

Voula Stathakis¹, Dr Graham Scott²

In the Coroner's Facilitation System (CFS), it was found that the leading overall causes of injury death, over the six-year period, were transport and suicides, both at 34%, followed by poisonings (5%), drownings and falls, each at 4%. However, from mid 1990 onwards, suicides overtook transport deaths as the leading cause of injury death. There were a total of 9,238 cases in the database, 74% being male and 20-24 year olds being the peak affected age group. The all-age injury death rate decreased significantly over the six-year period. Locations of the injury event were mostly residential (41%) and within transport areas (40%).

Adults, aged 15 years and above, comprised 94% (n=8723) of the database of which 75% were male and

44% were aged between 20-39 years of age. The adult injury death rate had decreased significantly over the six-year period. The leading cause of death among adults was suicide (36%), followed by transport deaths (34%), unintentional poisonings (5%), falls (4%), drownings and assaults, each at 3%.

Children under 15 years accounted for 6% (n=515) of all cases in the CFS and the majority were male (67%). Under fives represented 52% of the subset, followed by 10-14 year olds (26%) and 5-9 year olds (22%). Leading causes of death among children were transport related (42%), drowning (23%) and fires/burns/scalds (6%). The under 5 year age-specific drowning death rate decreased over the six-year period but not significantly. Children under 5 years comprised 25% of all drowning deaths and these commonly occurred in the

home swimming pool (47%), dams/ rivers/creeks (21%), bathtubs (15%) and spas (7%).

Factors contributing to the injury death were examined and, as expected, 'vehicle' headed the list followed by 'alcohol', accounting for 16% of all injury deaths. Further description of the leading causes of death is provided and discrepancies within the CFS and other data sources are addressed with particular regard to the undercounting of deaths due to falls.

The NCIS will provide detailed risk and hazard data, which were previously unavailable. Careful implementation and ongoing evaluation from the Monash University National Centre for Coronial Information (MUNCCI) ensures that information will be used to reduce future injury and deaths.

¹Voula Stathakis: Research Associate, MUARC

²Dr Graham Scott: Research Fellow, MUARC



Victorian Injury Deaths: An Overview

Voula Stathakis

Introduction

Reliable and accurate information on deaths by cause is essential for planning, managing and evaluating health policies and strategies (Murray and Lopez, 1996). Such data also provides valuable insight into the overall pattern of injury mortality and the means for identifying specific health priorities. One of the strengths of death data is that “unlike morbidity, it is an unambiguous event, clearly defined and thus is, in principle at least, more reliably assessed and monitored at the population level,” (Murray and Lopez, 1996).

It is estimated that in 1990, approximately 5 million people died of injuries and poisonings worldwide, representing 10% of deaths for that year (Murray and Lopez 1996). The significance of injury deaths as a public health issue is made more apparent by its extremely skewed age distribution, with the majority of cases being comparatively young. Worldwide, it is estimated that 30% of male and 25% of female injury deaths occur at ages 15-29 years (Murray and Lopez 1996). Table 1 lists the leading causes of death for males and females aged 15-44 years of age worldwide for 1990.

In Australia, in 1990, injury deaths were the third leading cause of death for males and the fifth leading cause for women (ABS, 1997). The overall proportion of injury deaths for Australia in 1990 was approximately 7%, slightly lower than the world figure. Australian figures for subsequent years have remained at the 6% level with 5.9% in 1996 and 6.0% in 1997 (ABS, 1999).

Background

The Victorian Coroner’s Facilitation System (CFS) currently held by MUARC spans the period July 1989 to June 1995. Legislation defining reportable deaths came into effect in July 1986, (Coroners Act 1985, Number 10257). They include

Leading causes of death (15-44 yrs) by sex, World, 1990 Table 1

Males			Females		
Cause	N (thousands)	% of all deaths	Cause	N (thousands)	% of all deaths
<i>All Causes</i>	3,691		<i>All Causes</i>	2,734	
Road Traffic Accidents	403	10.9	Tuberculosis	258	9.4
Tuberculosis	333	9.0	Self-inflicted injuries	195	7.1
Violence	325	8.8	War	121	4.4
Self-inflicted injuries	243	6.6	Maternal haemorrhage	108	4.0
War	185	5.0	Road traffic accidents	100	3.7
Ischaemic heart disease	136	3.7	HIV	92	3.4
HIV	108	2.9	Cerebrovascular disease	74	2.7
Cirrhosis of the liver	107	2.9	Ischaemic heart disease	73	2.7
Drownings	103	2.9	Fires	70	2.5
Cerebrovascular disease	102	2.8	Lower respiratory infections	66	2.4

Source: Murray et al, 1996 (ICD-9-CM groupings). NB Injury categories in bold type.

those that were unexpected, unnatural or violent, or which resulted from accident or injury or occurred during anaesthetic procedures. It also includes deaths of persons held in care, (State Coroners Office, 1998). The CFS was enabled by an insightful revision of the Victorian Coroner’s Act in 1985 and the vision of the then Deputy State Coroner, Graeme Johnstone, for the value of a relational database to inform the prevention of deaths from injury causes.

The database is collated and coded by the Casflow Analysis Section of the Courts and Tribunals Division, Department of Justice, Victoria. The CFS held by MUARC contains 9,573 records for the six-year period. This includes individuals living in residential care who died of *natural causes* (n=335). These cases will be excluded from the analysis, as they are not ‘injury’ deaths.

Usefulness of the CFS

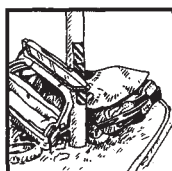
While up-to-date death statistics can be obtained from the Australian Bureau of Statistics (ABS) and the Victorian Institute of Forensic Medicine – State Coroner’s Office Database, the level of coding detail afforded by the CFS is not provided by these databases. The CFS contains several codes describing the injury event such as location, activity, mechanism, intent, breakdown event, factor codes, occupation, Ecodes, manner and most importantly, a three-line text narrative relating the exact circumstances causing death. These

variables, particularly the latter, are a very useful resource in terms of identifying hazardous activities and products and thus assisting with prevention, eg. fibreglass skylights on roofs as a cause of fatal falls, the lack of protective equipment such as rollbars on tractors or car seat belts, a particular brand of fan igniting fires and the need for child resistant cigarette lighters.

The Victorian Injury Surveillance System (VISS) utilises the CFS, along with hospital admission and emergency department databases, to process information requests for MUARC research purposes and for other parties. In 1998, VISS processed 503 information requests of which 91 (18%) involved information extracted from the CFS.

Overview

Males accounted for approximately 74% (n=6810) of unnatural or injury related deaths in the CFS over the six-year period. The peak-affected age groups were 20-24 year olds (13%) followed by 25-29 year olds (11%) and 30-34 year olds (9%) (Figure 1). The all-age injury death rate had a statistically significant downward trend (p<0.00001), as did the age-specific rate for 25-29 year olds (p<0.00001). The trend for the 20-24 year old injury death rate, however, was not statistically significant (p=0.213) (Figure 2). Children under 15 years of age accounted for 6% (n=515) of all injury deaths.



Adult and child injury deaths will be discussed in further detail later. The four broad intent categories based on ICD9 coding were headed by unintentional injury deaths at 60%, suicides 34%, assaultive 4% and 2% were of unknown intent.

The Coroner's definition of suicide is perhaps one of the strictest. He must determine that the person had the intention to commit the act, that they had intended to die by the act and that at the time of committing the act that they understood that it would result in death. The ABS and hospital admissions coders

use the ICD Ecode definition which represents self-inflicted injury leading to death and will include some deaths where the Coroner did not make a formal finding (Moller, 1999). Cross checking this difference with ABS Victorian statistics for suicide over the same six-year period revealed a slight discrepancy of approximately 82 cases (ABS Victoria = 3228 cases, CFS Victoria = 3146 cases).

Causes

The main causes of death were transport at 34% (n=3148) and suicide also at 34% (3146), followed by unintentional

poisonings 5% (409), drownings and falls each at 4% (362 and 357 cases respectively). Table 2 lists frequencies for each available year of data. Although transport deaths and suicides were equivalent in overall frequency, from mid 1990, suicides outnumbered transport related deaths by increasing proportions (Table 2 & Figure 5).

Breakdown events

The breakdown event, or 'what went wrong', is recorded for most cases depending on applicability. Over the six-year period just over 60% of records had a breakdown code assigned. The most common being *lost control of object or movements* (n=1405) followed by *victim/thing moved into dangerous position* (1312). The remaining events included *explosion or gunshot* (627), *collision between* (562), *aggression or fight* (253) and *fire* (233).

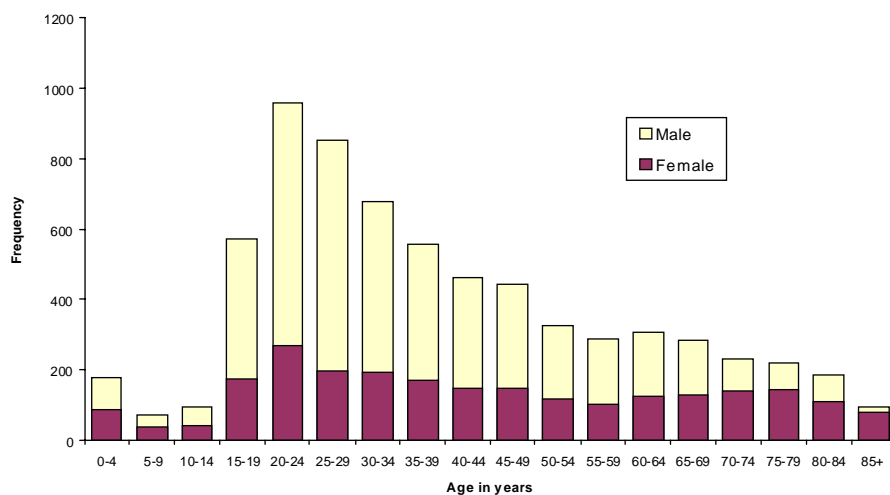
Activity

This code describes the activity being undertaken by the deceased at the time of the injury event. As expected, intended self-harm and transportation accounted for over two thirds of the dataset. Closer scrutiny of the transportation activity revealed that motor vehicle drivers and passengers comprised 20% (n=1887), pedestrians 6% (577) and motorcyclists 4% (324). Other activities included fights/quarrels 3% (315), occupational 2% (173) and outdoor recreational/leisure activities on water 2% (163). Even greater detailed information can be obtained by inspecting the corresponding narrative for each record. If the activity code indicates that the victim was injured while on duty at work, the narrative will usually state the exact nature of that occupation or place of work, i.e., mechanic working in garage, tree logger working in paddock. Figure 3 summarises the overall distribution of recorded activities.

Employment status

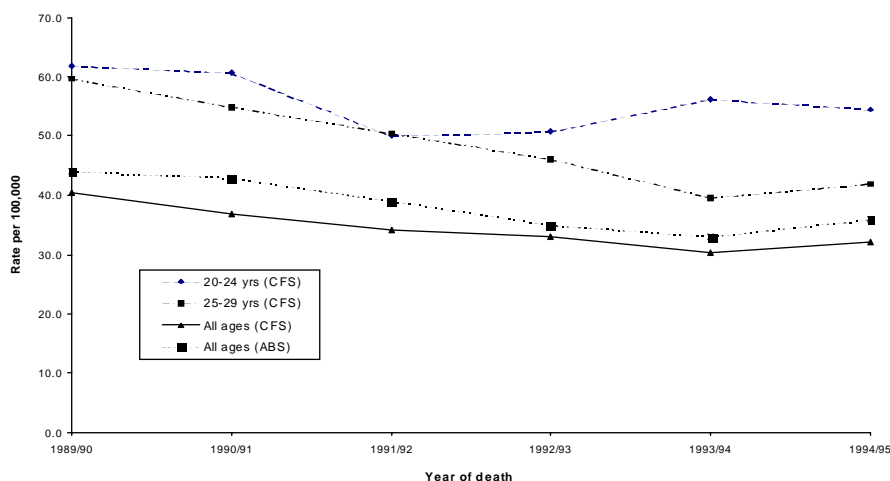
Approximately 35% of cases were coded as *employed*, *occupation not relevant* to their injury death. A further 17% were retired, 13% were unemployed, 10%

Injury death frequencies by age and sex, Victoria **Figure 1**

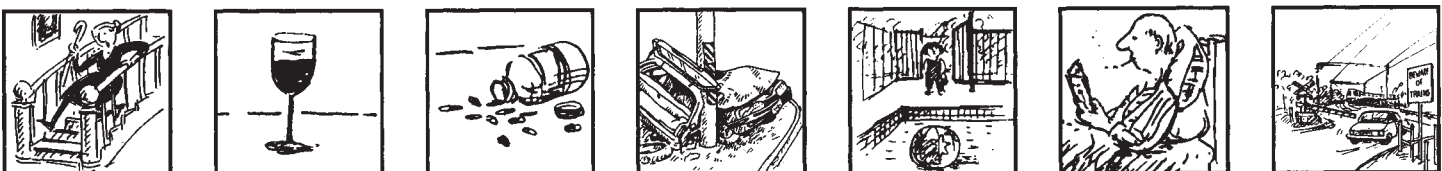


Source: Victorian Coroner's Facilitation System, July 1989 to June 1995. (N = 9238)

Injury death rate trends, Victoria **Figure 2**



Source: Victorian Coroner's Facilitation System, July 1989 to June 1995, ABS (NISU, Flinders University) 1990 to 1995



were children or students, 7% were receiving government benefits, 4% were occupied with home duties, 2% were held in care and the status of the remaining 9% was not specified. In only 3% of cases, occupation contributed to death. This figure is slightly higher than the proportion of occupational deaths recorded by the activity variable (2%). The reason for this difference is that the employment status variable is a summary of the occupation codes recorded for each case. These codes are quite detailed and include occupations in the transport industry. Therefore transport related occupational deaths have probably been falsely coded as transport deaths rather than occupational deaths under the activity variable.

Location

Figure 4 depicts the types of locations at which the injury events took place. Sixty-

five percent of residential injury deaths occurred within the home while 33% were in the garage, garden or yard. Transport locations were mainly coded as public roads (88%) as would be expected, and areas for public transport (8%). Outdoor areas included lakes, rivers or dams (26%), national and public parks (24%), oceans (15%) and fields or paddocks (11%). Hospitals and nursing homes (89%), and prisons (11%) represented injury deaths in institutions.

Manner/mechanism of death

The manner of death is defined as the cause of the accident and the mechanism of death describes the way in which the injury was inflicted. An example would be a two car collision whereby one of the cars bursts into flames; manner of death would be traffic accident and mechanism would be fire/burns, (State Coroner's Office, 1998). For counting purposes,

the cause of death (mechanism) is taken rather than the cause of accident (manner). Causes of death for subsequent sections of this report were identified using ICD9 Ecode groupings to allow for comparisons with ABS data.

Factor codes

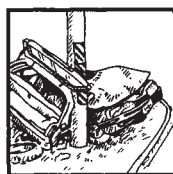
The CFS allows for the recording of up to four factor codes per case. These codes are based on the United States Consumer Product Safety Commission Product Codes. They are extremely useful in identifying particular products involved in injury deaths. They include such items as motor vehicles, swimming pools, alcohol, lawn mowers, animals, pesticides, cigarette lighters, knives, firearms, drugs/medications and carbon monoxide. Appendix 1 lists commonly recorded factor items by age group. Aside from the better known factors involved

Injury death frequencies, Victoria

Table 2

ICD9 Ecode Groups	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	Total	Annual Average
Transport (total)	728	575	534	442	444	425	3148	524
<i>Motor Vehicle Traffic</i>	696	535	481	403	415	379	2909	484
<i>Motor Vehicle Non-Traffic</i>	10	10	13	15	10	20	78	13
<i>Other Vehicle</i>	22	30	40	24	19	26	161	26
Drowning	75	76	50	66	49	46	362	60
Poisoning (total)	65	68	56	64	69	87	409	68
<i>Drugs, medicinal substances, biologicals</i>	38	43	35	44	57	55	272	45
<i>Other solids, liquids, gases & vapours</i>	27	25	21	20	12	32	137	22
Falls (total)	56	58	51	80	57	55	357	59
<i>Falls, different level</i>	35	33	31	46	35	32	212	35
<i>Falls, same level,</i>	21	25	20	34	22	23	145	24
<i>Fires/ burns/ scalds</i>	38	36	36	47	29	27	213	35
<i>Natural/ environmental</i>	5	6	3	5	2	4	25	4
<i>Choking/ suffocation/ foreign body</i>	22	17	24	21	12	16	112	18
<i>Hit/ struck/ crush</i>	19	16	17	24	12	24	112	18
<i>Machinery</i>	4	11	9	9	12	11	56	9
<i>Cutting/ piercing</i>	2	1	0	1	2	0	6	1
<i>Other unintentional</i>	14	11	10	11	8	11	65	10
Suicide	451	588	573	499	518	517	3146	524
<i>Inflicted by other</i>	71	68	40	46	26	59	310	51
<i>Undetermined/ other intent</i>	60	34	34	37	13	31	209	34
Medical misadventure* (total)	94	49	66	100	84	112	505	84
<i>Heroin overdose (unintentional)</i>	64	38	48	31	58	87	326	54
<i>Heroin overdose (unknown intent)</i>	3	1	2	50	18	10	84	14
<i>Medical misadventures (true)</i>	27	10	16	19	8	15	95	15
<i>Late effects</i>	49	10	8	3	5	5	80	13
<i>Missing</i>	21	15	11	27	23	26	123	20
Total	1774	1639	1522	1482	1365	1456	9238	1539

* Overall 81% of ICD9 codings for medical misadventure were inappropriately coded in the CFS as opiate (heroin) overdoses/poisonings.
Source: Victorian Coroner's Facilitation System, July 1989 to June 1995



in injury deaths, i.e., cars, drugs and medications and firearms, several other factors were identified in the dataset that required further examination. Overall *rankings* based on multiple response frequencies are represented in brackets and include alcohol (*rank*=2), trains and trams(12), poles(13), knives(16), electrical wire/cord(19), gravel/small rocks(21), bridges(22), boats(23), plastic bags(25), buildings(26), cigarettes(30), petrol(34), bathtubs(36) and clothing accessories(37). They are discussed below.

The frequencies in the following headings refer to factors that contributed to the injury death, as there can be up to four factor codes recorded for each case.

Alcohol (n=1468)

Alcohol was a contributing factor in 16% of all cases over the six-year period. Most (40%) were transport related deaths, followed by suicide (25%), poisoning or overdose (22%), falls (4%) and drowning (2%). The 25-39 year age group dominated this factor representing 38%, followed closely by 15-24 year olds (27%) and 40-59 year olds (25%).

A review of the corresponding narratives for non-transport and non-suicide deaths revealed several distinctive injury patterns. A large proportion of poisonings was typically drug overdoses such as heroin combined with excessive amounts of alcohol. Similar combinations included other drugs such as benzodiazepines, codeine and other prescription drugs. Alcohol toxicity accounted for several deaths among 25-39 year olds. Blood alcohol content (BAC) levels were provided for most cases and this figure typically ranged between the 0.2% level up to 0.77%. Cases either had long histories of alcohol abuse or were binge drinkers.

Deaths due to falls while under the influence of alcohol were most common among individuals aged 60 years and above. A head injury from falls on stairs was a common pattern, along with falls on the same level. Falls among younger age groups were typically the result of acts of

bravado or daring, i.e., climbing trees and 'clowning around', or falls on the same level, i.e. stumbling or tripping and sustaining head injuries causing death. Several drowning deaths recorded in the CFS indicated the presence of alcohol. Typical scenarios included falling off jetties, boats or rocks into bodies of water, swimming or fishing while intoxicated and drowning in bathtubs.

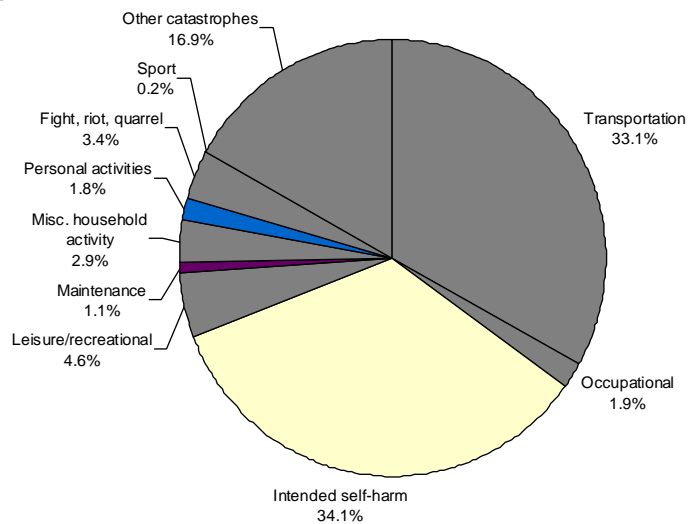
Trains and trams (n=274)

Trains and trams represented 3% of injury deaths overall. Fifty-five percent of train

related deaths were traffic related and 44% were suicides. Adults aged 15 years and above accounted for 94% of cases. Children attempted to cross train tracks and failed to observe trains coming from the opposite direction (n=4) while others simply defied warning bells and flashing lights (4). Train 'surfing' or carriage hopping was the cause of death for 5 cases aged between 15-24 years. Suicides accounted for 36 deaths among 15-24 year olds and 42 deaths among the 25-39 year age group. A total of 83 pedestrian deaths involving trains were

Activity at time of death, Victoria

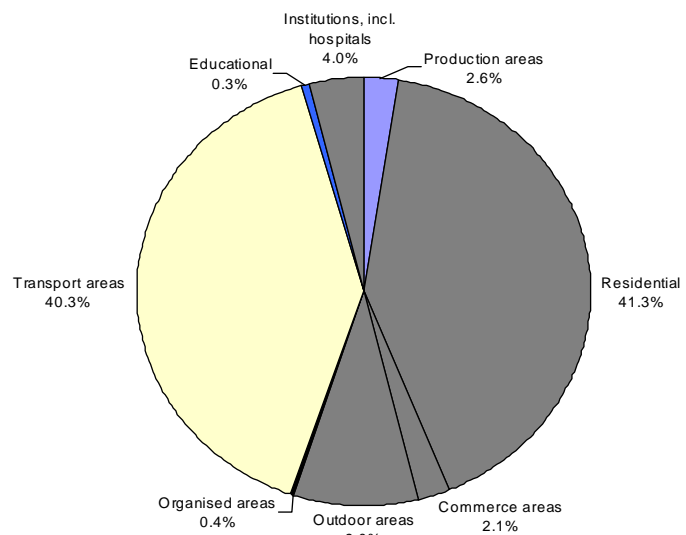
Figure 3



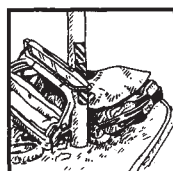
Source: Victorian Coroner's Facilitation System, July 1989 to June 1995 (N=9,238)

Location of injury event, Victoria

Figure 4



Source: Victorian Coroner's Facilitation System, July 1989 to June 1995 (N=9,238)



identified in the CFS. Cases walking along the train tracks or crossing while warning lights were sounding made up 75% of pedestrian deaths. A smaller proportion fell between carriages or between the platform and carriage (16%) while an even smaller group were lying on or had fallen asleep on the train tracks (10%). Excessive levels of alcohol were reported for 25% of cases injured by trains.

Vehicle collisions with trains, including passenger cars, motorcycles and trucks, were recorded for 41 cases. Ten deaths occurred at railway crossings with lights and bells operating and 9 deaths occurred at crossings without warning lights or alarms. Train collisions at level crossings comprised 4 cases and the remaining 17 collisions did not specify the presence or absence of a railway crossing warning system.

All deaths involving trams (26) were unintentional traffic and pedestrian incidents. Vehicle collisions with trams accounted for 11 deaths and 15 deaths involved pedestrians being struck by trams, eleven of which were aged 60 years and above. Pedestrian injury deaths were often followed on from the victims not hearing or seeing the tram's approach.

Poles (n=256)

Poles were recorded as a factor for 3% of injury deaths. The majority were transport deaths (97%). Almost all poles were identified as "S.E.C." or power poles. The 15-24 year age group were the peak-affected group representing 52% of injury deaths involving poles. Motor vehicle accidents accounted for the majority of deaths (n=207) and 68% of these were motor vehicle drivers. A total of 66 cases were recorded as motor vehicle passengers. Losing control of the vehicle was the major event leading to injury. Most records (104) did not list the reason for losing control. However, those that did included speeding (50), failing to complete a turn or negotiate a bend (25), gravel surfaces (10), wet surfaces (5), falling asleep at the wheel (5) and vehicle unroadworthiness (2).

The presence of alcohol was reported for 70 cases and drugs such as cannabis and amphetamines were detected in 11 cases. Motorcyclists and their pillion passengers accounted for 36 deaths involving poles and 75% were aged between 15-24 years of age. Loss of control was the main event leading to injury due mainly to speeding (11), failing to complete turns or overtake safely (10) and other unspecified reasons (15). Elevated levels of alcohol were found in 13 cases while drugs were only detected in one case. Three of the motorcycle victims were unlicensed and five were not wearing helmets at the time.

Knives (n=159)

Knives were recorded for 2% of injury deaths. They were primarily used in assaults/homicides (67%) and suicides (30%). Three victims were under the age of 15 years and murdered by a parent. Stabbing homicides were mainly to the neck area followed by the chest and abdomen. Fights and arguments quite often precipitated the stabbings and knife injuries arising from domestic disputes were mainly perpetrated by males rather than females with a ratio of 4 to 1. Four incidents were home intrusions or robberies while the victim was home. Confronting police with a knife was recorded in the database for two cases in which the victims were subsequently shot. The type of knife used was rarely mentioned, however, a meat cleaver and machete were recorded for two cases.

Electrical wire/cord (n=107)

Electrical wire or cord was reported for 1% of all cases. Over half (56%) were suicides and 7% were unintentional burn deaths. The manners of death regardless of intent were mostly electrocution (51%), hanging (with electrical cord) (36%) and fires (7%). Unintentional electrocutions were usually the result of people coming into contact with faulty or live wiring or cutting through electrical leads. Others came into contact with high voltage power lines while on ladders lopping trees or whilst operating machinery such as cranes.

Others included tradesmen attempting to repair faulty appliances or install electrical equipment such as heaters, submersible pumps, lights, powerpoints. Some were using faulty tools such as drills and welders with exposed wiring. Deaths caused by tripping over electrical cords and sustaining head injuries were recorded for 2 cases.

Gravel/small rocks (n=91)

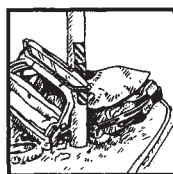
These affected 1% of all deaths, with most of those being transport (86%) or fall (6%) related. Losing control of a vehicle and sliding on gravel and then either colliding with a tree or pole, another vehicle or rolling the vehicle several times were the most common events causing death. Narratives for some cases reported that victims were not wearing seatbelts (6%) and some motorcyclists were not wearing their helmets (25%). Fall incidents involved the victim falling onto rocks from cliffs (n=2), while rock-fishing (1), off a tractor (1) and in the garden (1).

Bridges (n=87)

Suicides accounted for 70% of deaths involving bridges, while transport, unintentional falls and machinery represented 25%, 4% and 1% respectively. The peak affected age groups were 25-39 year olds (38%) followed by 15-24 year olds (31%). Almost all suicides involved cases jumping off bridges (n=60). Motor vehicle accidents (22) were mostly due to the driver losing control of the vehicle and subsequently colliding with bridge railing, pillars and concrete supports. Several victims (7) had BAC levels above 0.05%. Very few reasons for loss of control of their vehicles were mentioned, however, where specified, they included failing to negotiate a right hand turn (3) and veering onto the incorrect side of the road (2). Two of the three falls occurred because the deceased slipped and fell off the bridge.

Boats (n=82)

The majority of the victims of boating associated deaths were adults (94%), with the most common group being 40-



59 years of age. The predominant craft involved was an unspecified boat (n=55) followed by dinghies (11), canoes or kayaks (6), yachts (4), houseboats (3) and 2 involved ships or ferries. The most common event was a boat being swamped or capsized by a wave (21 deaths). An additional 17 deaths occurred when a boat was overturned in other circumstances. Fourteen deaths followed a fall from a boat.

An error of judgement was apparent in 12 of the 82 boating deaths, including an over-loaded boat (3), erratic behaviour (3), going against a strong tide or current (3), and a non-swimmer not wearing a life jacket (2). A total of 8 cases had elevated blood alcohol. Four of these incidents included an error of judgement. Unfavourable weather conditions were specified in 12 of the deaths. Sixteen cases involved more than one person drowning. The major activity specified was fishing (25). Seventeen of these deaths involved a capsize and 7 involved unfavourable weather conditions.

Plastic bags (n=73)

Of the 73 cases involving plastic bags 95% (n=69) were suicides, of which, almost one quarter involved a secondary cause of death eg. drugs, gassing. Three cases were unintentional suffocations, of which one was a child.

Buildings (n=73)

Building structures were implicated in 73 deaths. Almost 60% (n=43) of cases were found to be intentional jumps from buildings. A further 23% of cases were unintentional falls from roofs of residential locations, car parks and public buildings, 29% of which occurred when the person was working on the roof. Of the remaining cases, 7% were falls from windows, 6% falls through roofs or skylights, 6% motor vehicle accidents when the vehicle collided with the building.

Cigarettes (n=55)

The majority of cigarette related deaths (62%) were from residential fires ignited by a cigarette, almost a quarter of which

were a consequence of the deceased smoking in bed. A further 8% of deaths occurred when a cigarette ignited the clothing of the deceased.

Petrol (n=36)

Petrol was associated with 36 deaths. More than 60% (n=22) of these were suicides and 14% were homicides. Intended self-immolation (39% of petrol related cases), involvement in petrol related house and vehicle fires (25% and 14% respectively) and other accidental ignitions (14%) were the most common scenarios for petrol related deaths. Eight percent of petrol related deaths were from fumes/smoke inhalation.

Bathtubs (n=34)

Almost three-quarters (n=25) of the 34 deaths involving bathtubs were drownings. Of the 25 drowning cases, 6 were children left unsupervised or were under the supervision of a young sibling, 4 had a history of epilepsy and were found to have fitted prior to drowning, 3 were suicides and 2 were adults in continuing care who were bathing unsupervised. Alcohol was a factor in two of the accidental drownings. Of the remaining cases 5 sustained scald injuries, 3 fell striking their head whilst bathing.

Clothing accessories (n=34)

Clothing accessories were linked to 34 deaths. Almost three-quarters of deaths were suicide and 9% strangulation homicides. Of the remaining accidental deaths two (6%) were associated with machinery.

Leading causes of death overview

Transport deaths

There was a total of 3148 transport injury deaths recorded in the CFS for the period July 1989 to June 1995. Transport deaths were selected using ICD9 Ecodes 800 to 848. It was found that 92% were motor vehicle traffic accidents, 5% involved other road vehicles and 3% were motor vehicle non-traffic accidents. A large proportion were male

(70%) and almost 40% of cases were aged 15-29 years of age.

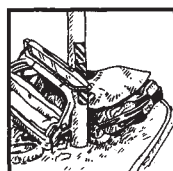
Stringent and intensive advertising campaigns, stricter speed and drink-driving laws and penalties, better roads and cars have seen a dramatic reduction in transport deaths (Vulcan, 1995), as illustrated by the significant reduction in the transport injury death rate over the six-year period of available data. Figure 5 displays the statistically significant (p=0.0001) downward trend. Further analysis of transport injuries including deaths can be found in *Hazard 36*, September 1998.

Prevention Recommendations (VicRoads 1997)

- * Drink-driving (booze bus enforcement, random breath testing, publicity)
- * Speeding (speed detection using radar/laser devices, red light cameras, general enforcement, publicity)
- * Fatigue (publicity/awareness)
- * Restraint wearing (enforcement)
- * Road quality (identify and treat 'black spots', safety audits)
- * Drivers in high risk age groups (older drivers publicity and awareness, novice drivers management)
- * Motorcycle, bicycle and pedestrian safety (safety advice and education programs)
- * Occupant protection and anti-lock braking systems

Suicide

Almost equalling transport as the highest overall cause of unnatural death over the six year period was suicide, representing a total of 3146 self-inflicted injuries causing death. Seventy-nine percent (n=2491) were male. Persons aged between 20-24 years represented the highest proportion (14%), followed by 25-29 year olds (12%) and 30-34 year olds at (11%). The all-age and 15-19, and 25-29 year suicide rates appeared to be decreasing over the six-year period but not significantly. Increasing trends were observed for the 20-24, 30-34 and 50-59 year age specific suicide rates with the 50-59 year age group being statistically significant (p=0.0001). Figure 5 demonstrates the overtaking of transport related deaths by suicide as a major cause of injury death from mid 1990.



Over the longer term, ABS figures demonstrate a substantial and concerning increase in young (15-24 years) male suicide rates despite very little change in the equivalent female group. Rates increased from 5.6 per 100,000 in 1964 to 22.9 per 100,000 in 1994 (Victorian Suicide Task Force, July 1997). The phenomenon has also been experienced by other states and western countries and has achieved much attention from the media and government in recent years eg. \$31 million funding for the Commonwealth Government National Youth Suicide Prevention Strategy.

Availability and culturally acceptability influence the method of suicide chosen. The most common method was hanging (27%), followed by vehicle exhaust gassings (21%), shooting/firearms (17%), drug and alcohol overdoses (14%), walking or lying in front of moving trains or motor vehicles (5%), drowning (4%), falls or jumps from bridges and other structures (4%) and other specified methods (6%). Sixty-four percent of suicides were reported to have taken place in the home, transport areas (16%), outdoor areas (11%), in institutions such as prisons (4%) and other areas (5%). Information such as BAC level, previous attempts at suicide, mental disorders, disabilities or illnesses

was also provided in the corresponding narratives. For further reading, Routley (1998) provides an in-depth description and analysis of suicides in Australia, with a particular focus on motor vehicle exhaust gassing suicides.

Several reports in recent years have focused on suicide prevention, particularly youth suicide eg. *Suicide Prevention, Victorian Task Force Report, July 1997; A Prospective Study of Completed and attempted Youth Suicides in Victoria*, Tiller et al; A report from the Coroner's Working Party on Suicide, March 1997; various reports from the Commonwealth Dept. of Health & Family Services Youth Suicide Prevention Advisory Group. These reports together list numerous recommendations (86 in the first listed report alone) that cover a combination of primary prevention, early intervention, intervention services, post-intervention services and implementation strategies. Complex social, economic and psychological reasons underlie the causes of suicides and these therefore require a multi-faceted longer term approach. Reducing access to the means of suicide does have a part to play. Reducing access where the method is both relatively lethal and frequent has been shown to reduce overall suicides e.g. barbiturates in Australia, coal gas in the UK.

Prevention Recommendations*

* Address the complex social, economic and psychological factors which underlie the causes of suicide.

In respect to the means of suicide:

* Mandatory regulations should be introduced for new vehicles which will make exhaust gas suicide virtually impossible, by ensuring that life threatening levels of CO, O₂ and possibly CO₂ cannot be reached by passing a hose from the exhaust into the vehicle with sealed ventilation. A sensor is preferred because it would cater for deterioration in catalytic converter and engine performance over time.

* Regulations should be introduced for in-service vehicles requiring replacement exhaust pipes to be of new safety designs to make it substantially more difficult to attach a hose.

* Individual state firearm restrictions which were strengthened following the resolutions made at the Australian Police Ministers Council in May 1996 should not be weakened.

Further research should be undertaken into the reasons for the major rise in hanging.

* The list is by no means exhaustive.

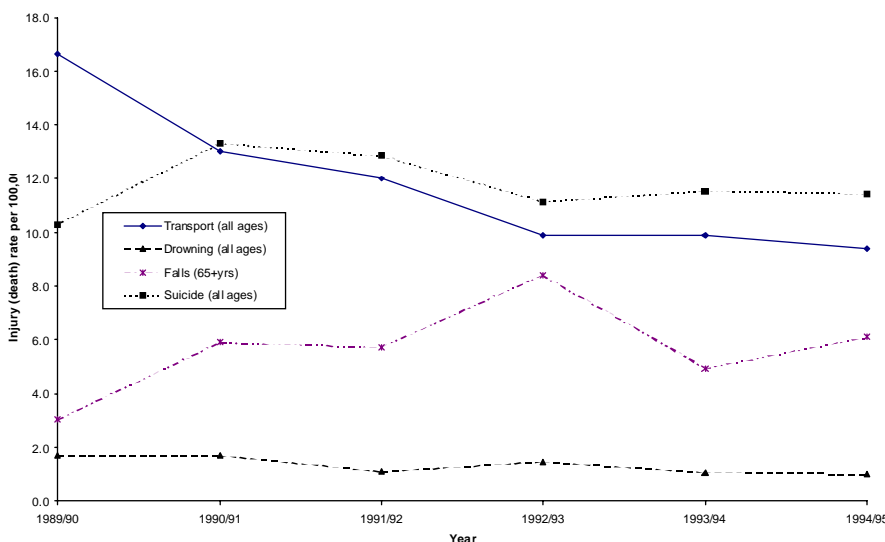
Unintentional poisoning

Unintentional poisoning deaths were the third leading cause of injury death, with 409 cases recorded for the six-year period. Just over two-thirds were male (n=275). The age distribution was similar to that of other unintentional injury deaths, 30-34 year olds being the peak affected age group (13%) followed closely by the 25-29 and the 45-49 year age groups at 12% and 11% respectively. The age distribution by sex differs slightly for females in that the peak age group was 45-49 year olds (15%) followed by 40-44 year olds (10%) and 35-39 year olds (10%). The poisoning rate has remained constant over the six-year period at 2 deaths per 100,000 of the Victorian population. A large proportion (81%) of unintentional poisoning deaths occurred in the home with smaller numbers occurring in transport areas (6%) and institutions (5%).

Unintentional heroin overdoses were coded inconsistently with other databases used by MUARC¹. They were found under the medical misadventure category with an ICD9-CM Ecode of

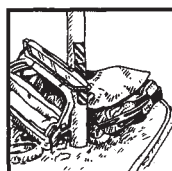
Injury death rates for leading causes*, Victoria.

Figure 5



Source: Victorian Coroner's Facilitation System, July 1989 to June 1995

* Note that older persons falls are under-estimated.



E935.0 instead of E850.0. This anomaly in coding was consistent throughout the entire six-year collection. A total of 326 heroin overdoses were recorded in the dataset, 81% of which were males. Almost three-quarters were in the 20-34 year age group and all cases were adults (15 years and above). The average adult death rate from heroin overdose for the six-year period was 2 per 100,000 of the adult Victorian population. Forty-four percent of cases were unemployed, 35% were employed and 9% were receiving benefits. The location of death was mainly the home (74%) and transport areas (10%). A large proportion (29%) of cases involved a combination of heroin and several other drugs such as amphetamines, cannabis and benzodiazepines and 19% involved a combination of heroin and alcohol.

More recent data on heroin deaths from the State Coroner indicates a continued increase beyond the time period of this report, with a particularly dramatic and concerning increase from early 1998 (1998 figures 56% higher than 1997). Early 1999 indications are that heroin related deaths are continuing to rise. This increase, confirmed by ambulance reports and other data sources, has given rise to much recent media attention.

Poisoning by pharmaceuticals will be analysed and discussed further in the next edition of Hazard (June 1999).

Drowning

A total of 362 drowning deaths were identified in the CFS, 83% of which were male. Almost a quarter of cases was aged under 5 years (n=86) and approximately 14% were in the 15-24 year age group. Most cases (65%) were

involved in leisure or recreational activities when the event occurred. As expected drownings occurred more often during the summer season, peaking in January (15%) and February (12%). The all age injury rate (Figure 5) and 0-4 year age specific rate for drowning deaths decreased over the six-year period with both rates exhibiting trends with borderline significance, (p=0.06 and 0.05 respectively). Two-thirds of drownings (230) were reported to have occurred in outdoor areas (excluding residential), namely rivers, dams, beaches and oceans and one-third occurred in the home (111). Residential drownings included home swimming pools (54) bathtubs (33), spas (6) and dams (14). Locations of drownings for under 5 year olds were overwhelmingly recorded to be the home swimming pool (47%), dams/rivers/creeks (21%), bathtubs (15%) and spas (7%).

Detailed analysis of the text descriptions for drowning deaths occurring in outdoor areas, excluding residential areas, exposed several injury patterns. Most of these cases drowned in lakes, rivers and dams (126), followed by oceans (65), beaches (29) and public pools (10).

Boating activities dominated drownings in lakes\rivers\dams and the 40-49 year age group had the highest frequency of drownings in this location. Boating incidents were mostly capsizes (24). Other causes of drowning included having difficulties while swimming (47), falling or slipping into lakes\rivers\dams (29), drowning while attempting to save someone else (4) and while fishing (4).

Deaths occurring at sea or in the ocean were most commonly related to boating activities (35), diving incidents (9),

swimming (8), swept by waves off cliffs/rocks (3), falling off piers (3) and saving other individuals in trouble (2). Boats were most often capsized (18) or struck by large waves during rough weather (15). Diving deaths involved problems with oxygen supplies and regulators. Cases ran into problems such as suffering asthma attacks, cardiac arrests and getting caught in rips while swimming. The 12 beach deaths included 3 cases swept away by large waves and 3 cases caught in rips.

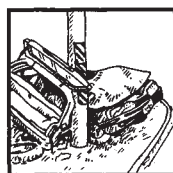
Prevention Recommendations (Hazard 30, March 1997)

- * Ensure all backyard pools and spas are fenced in accordance with AS1926. Isolation fencing is best including a self-closing and latching gate.
- * Children should always be attentively supervised by an adult when near water. Children on farms should be provided with a safe play area, fenced, away from water including sump holes, irrigation channels, dams water tanks and troughs.
- * Young children must never be unattended in the bath or be under the supervision of another child.
- * Improve water safety knowledge and skills among children.
- * Water safety media campaigns.

Falls

Falls were the fifth leading cause of death over the six-year period totaling 357 cases. Most of these were male (74%) and aged 65 years and above (51%). The age distribution differs when gender is taken into account. Males 65 years and over accounted for 43% of falls while females 65 years and over accounted for 72% of all female fall deaths. Activities undertaken at the time of death ranged from miscellaneous household activities (36%) to leisure/recreation (13%), maintenance, personal activities and occupational, each at 7% and other specified (27%). The all age injury rate displayed an increasing trend overall with a slight peak in the 1992/93 financial year as did the 65+yr fall rate (Figure 5), however, neither are statistically significant. Forty-four percent of these injuries occurred in the home

¹ Medical misadventure is included within the definition of injury in the International Classification of Diseases. The issue of medical misadventure and adverse drug reactions is confounded by definitional variation, and by the problem of co-existing morbidity. Medical misadventure needs to be identified as the primary cause of death for inclusion within an ICD classification. Within the CFS these were a commonly miscoded cause of death. Over the six-year period there were 410 cases assigned an ICD9-CM Ecode of 935.0, which is defined as the code for "Drugs, medicinal and biological substances causing adverse effects in therapeutic use". Heroin is not legally available in Victoria and so these drugs are not being taken in therapeutic use, instead, representing opiate (heroin) overdoses (poisonings) that were miscoded (see Table 2). The mechanism of death code for medical misadventure, however, has been correctly applied. This means that deaths due to medical misadventure represented 1% of injury deaths in the CFS rather than 6%. Intent codes revealed that 326 of the 410 heroin overdose cases were unintentional, thus doubling the unintentional poisoning category.



while 20% took place in institutions such as hospitals and nursing homes and 11% represented outdoor areas. Falls can be divided into two types, falls from one level to another of which there were 212 cases (59%) and 145 falls which occurred at the same level (41%).

It has long been noted that falls causing death are under-recorded in the CFS and by other injury data collections (Watson & Ozanne-Smith 1997, Fife 1987). Individuals sustaining injuries from falls are usually elderly people who require long hospitalisation. While hospitalised they become prone to complications, such as developing pneumonia due to immobilisation, they may develop deep vein thrombosis or pulmonary embolisms and consequently may die as a result. This is a well documented sequence of events (Sattin 1992, Tideiksaar & Kay 1986, Mendlein et al, 1990). These deaths are considered to be the result of natural causes and not investigated by the Coroner and therefore not included in the data collection even though a fall was the initial event leading to death.

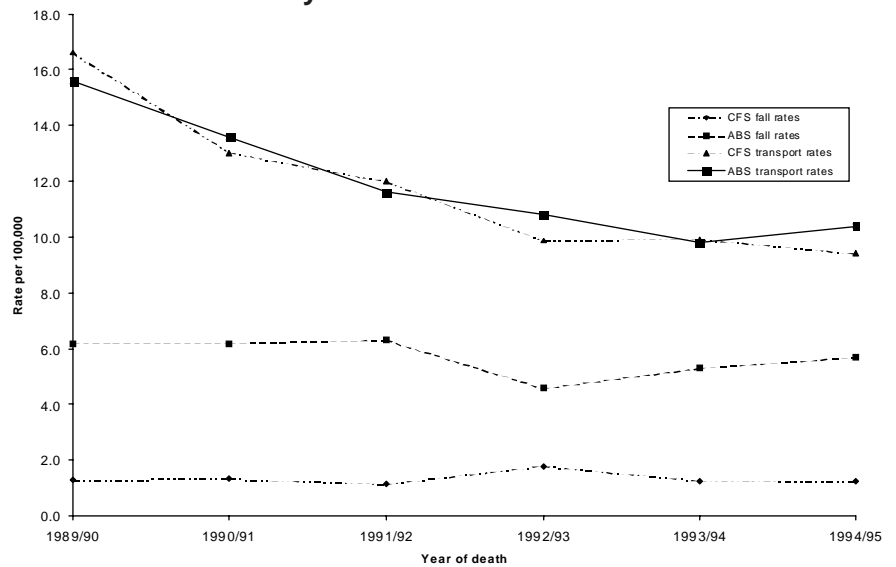
The difference in 'fall' reporting is very clearly demonstrated in Figure 6. In this graph, two comparisons are made, fall death rates in the CFS compared with fall death rates supplied by the Australian Bureau of Statistics (ABS) and transport deaths rates in the CFS and the ABS. Transport death rates obtained from the CFS and ABS appear to be consistent whereas falls differ considerably. ABS obtains its data from information listed on death certificates provided by the Registry for Births, Deaths and Marriages and is therefore a more reliable source for fall death statistics.

Prevention Recommendations (older people)

- * Multi-component interventions such as gentle balance control exercises, hip protectors, health behaviour changes, home modifications to remove hazards and add aids such as handrails, nursing home performance agreements
- * Vision assessment and correction, medication review and management
- * Preventing or managing dizziness
- * Education on fall prevention

Comparison of fall and transport death rates, Coroners Facilitation System vs ABS statistics

Figure 6



Source: Victorian Coroner's Facilitation System, July 1989 to June 1995, ABS (NISU, Flinders University) 1990 to 1995.

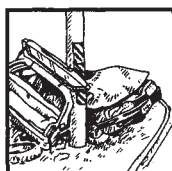
Burns and Scalds

There was a total of 213 burn and scald deaths recorded in the CFS representing 2% of all deaths. Examination of the text descriptions revealed several distinctive injury patterns. Children aged under 15 years accounted for 32 of these deaths, including 23 victims of house fires, 3 in caravan fires, 4 car fires and 2 bathtub scalds. House fires were largely the result of children playing with matches (7) and cigarette lighters (5). Other causes included faulty fuses and electrical appliances (4) and burning candles (2).

Out of a total of 181 adult fire/scald related deaths, 137 occurred in the home with 118 of these being house fires. A large number of these house fires were started by lit cigarettes (42). Several victims had fallen asleep (9) or were in bed smoking (11) or had dropped their cigarettes on or amongst couches (8). A small proportion of house fire victims had elevated levels of alcohol (17%). Electrical appliances accounted for 13 deaths and these were typically the result of electrical faults or the result of the appliance coming into contact with flammable material and igniting. Twelve deaths implicated heaters either shorting

out or coming into contact with flammable material and causing ignition. Stoves and ovens comprised 11 cases and were characterised by either the victim or flammable materials coming into contact with naked flames while cooking. Out of control backyard incineration of rubbish or gardening materials caused 4 deaths. Work related fires were associated with 10 cases. Caravan fires (12) were started by lit cigarettes (5), gas leaks (3) and faulty heaters (2).

Eight fire related deaths occurred while cases were in residential care, with 7 of these being caused by a lit cigarette. Scald injury deaths in the home all occurred while the deceased was bathing (13). Epileptic fits while showering causing severe scalding was associated with 5 cases. Lastly, contact burns consisted of cases falling onto radiators or heaters (4) or falling asleep near them (3).



Prevention Recommendations

- * Mains powered smoke detectors, with battery backup and emergency lights, should be fitted throughout the home, particularly outside adult bedrooms, living areas, hallways, and on additional storeys.
- * As of March 1998, all new hot water installations must deliver hot water not exceeding 50 degrees celsius at the bathroom tap. It is recommended that all current hot water also meets these requirements.

Adult deaths

Adults, aged 15 years and above, comprised 94% (n=8723) of the six-year collection. Three quarters were male and most persons were aged between 20 to 39 years (44%). The adult injury death rate was decreasing over the period, as was the 20-39 year rate, both statistically significant with corresponding p-values of 0.0001 each. The leading cause of death among adults was suicide (36%), followed by transport deaths (34%), unintentional poisonings (5%), falls (4%), drowning and assaults, each at 3%. Fifty-nine percent of deaths were coded as unintentional with 36% being suicide, 3% assaults and 2% of unknown intent. Public roads were the predominant location of injury death (35%) followed closely by the home at 27%, home garage/garden/yard at 13%, institutions (4%), bodies of water (4%) and public transport (3%).

Child deaths

Child deaths comprised a relatively small proportion of the CFS (6%, n=515) but injury is the leading cause of death in childhood, after 1 year of age. Children are defined as persons aged less than 15

years. Sixty-seven percent of child injury deaths were male and 33% female. Under 5's represented 52% of the subset followed by 10-14 year olds at 26% and 5-9 year olds at 22%. Leading causes of death were identified as transport deaths (42%), drowning (23%), fires/burns/scalds (6%), choking/suffocation/foreign body (5%), assaults (4%) and unintentional hit/struck/crush also at 4% (Table 3). Trend analysis for the child death rate and age specific rates indicated highly statistically significant decreasing trends over the six-year period, (0-14yrs, p=0.0032, 0-4yrs, p=0.0011 and 5-9yrs, p=0.0043). The rate for 10-14 year olds was decreasing but not significantly.

The activities that children were involved in included playing (22%), car passengers (12%), pedestrians (12%), cycling (6%) and various other activities. Injury events were mostly reported to be unintentional (92%) and assaults (4%) with 3% and 1% representing self-inflicted and unknown intent deaths respectively. Location of the injury event was mainly public roads (34%), home (23%), home garden/yard/garage (15%), home swimming pool (6%), lake/river/dam/beach/ocean (6%) and farms (4%).

National Coroners Information System

Dr Graham Scott

Origins

Injury prevention research has often been limited by a lack of readily available quality data. Until recently, there has been no national systematic electronic collection of death injury data in Australia. Without adequate information, systematically related patterns and

recurring hazards that contribute to injury or a spate of preventable deaths may not be identified because time and distance separate them. A diffuse epidemic may continue because neither the problem, nor the causes are identified.

The Australian Institute of Health and Welfare- National Injury Surveillance Unit completed a feasibility study in 1994 (Moller, 1994). Jurisdictions used a paper-based system, and there was no efficient method for national data retrieval. Major external data users were expending large sums to gather information. It was considered that reallocation of these resources in establishing the NCIS would be offset by savings from data retrieval. Additionally, a national electronic system would aid injury research and prevention strategies, with the potential to produce significant savings. Moller (1994) identified a high level of organisational commitment to the NCIS from the coroners, and the Australian Coronial Society and consequently the recommendation for the establishment of a national coroners' database was adopted by the ACS.

Monash University National Centre for Coronial Information (MUNCCI)

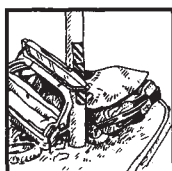
The Victorian Institute of Forensic Medicine, The Department of Epidemiology and Preventive Medicine, and the Monash University Accident Research Centre, formed the body that oversees the NCIS-MUNCCI. The sponsor of the NCIS is the Commonwealth Department of Health and Aged Care. Ownership of the data held within the NCIS remains clearly with the ACS.

The database should assist coroners in the management of case information, and a pilot case management system is being developed. It is envisaged that external organisations (such as toxicologists) would have access to facilitate electronic reporting. Additionally, external stakeholders will

Child injury death rankings by age group, Victoria Table 3

0 - 4 YEARS (N=269)	5 - 9 YEARS (N=111)	10 - 14 YEARS (N=135)
Drowning (32%)	Transport (59%)	Transport (57%)
Transport (28%)	Drowning (15%)	Drowning (12%)
Fires/burns/scalds (8%)	Inflicted by other (7%)	Self-inflicted (11%)
Choking/suffocation/foreign body (7%)	Fires/burns/scalds (6%)	Hit/struck/crush (3%)
Hit/struck/crush (5%)	Choking/suffocation/foreign body (5%)	Falls (3%)

Source: Victorian Coroner's Facilitation System, July 1989 to June 1995



have access to timely death related data for research, policy development and program assessment.

The dataset

The dataset has two potential component types - a core or minimum dataset, and additional "add on" modules for areas of specialised interest. Moller (1994) noted, the information being retained is too complex for coding alone. Consequently, the dataset was designed with the capacity for text storage and retrieval. Sources of information are the coroners, police, and agencies providing additional information.

To date no specialist modules have been defined, although the drug and suicide modules are proceeding. It is anticipated that the first modules developed, such as the drug module, will serve as prototypes for the development of later modules. Future modules may relate to motor vehicles, firearms or drowning.

The system is the most advanced national electronic death database in the world and anticipated to provide hazard or risk information, which has been previously unavailable, and can be used to reduce the future numbers of injuries and deaths. The data are stored in a central computer, and information is accessed via an Internet connection. The data available on line are current, and the jurisdictions retain responsibility for the data. For the core dataset, it is envisaged that the jurisdictions will complete the bulk of the data entry procedures. With the development of additional modules, one issue will be the extent to which additional coding will be completed within the jurisdictions, as well as centrally.

The implementation of the NCIS will be staggered, by State. New South Wales and Victoria were brought on line during early 1999.

Several issues have required ongoing attention during the implementation phase. The National Coordination Committee for Coronial Information has engaged specialised working groups to

examine issues such as funding, privacy, intellectual property and data quality. The issue of privacy has been comprehensively reviewed, and the "balancing of competing interests" approach was recommended (MUNCCI talk 5, 1999). It is anticipated that the NCIS will achieve a goal of self-funding over the next three years, while fulfilling its function as a cost effective, easy to use system of coronial data (NCIS Commercialisation Study, 1998).

The Monash University Accident Research Centre, as a MUNCCI partner, has been actively involved in the development and implementation of the NCIS. The supervisor of the Injury Prevention Research Group, Professor Joan Ozanne-Smith, sits on the MUNCCI board of management and chairs the Quality Assurance sub-committee. The Accident Research Centre has conducted the initial stakeholder analysis for the drug module of the NCIS, and is refining the coding system and manual. This ongoing evaluation and improvement will ensure that the NCIS evolves into a benchmark data collection system.

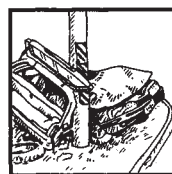
References

- Murray CJL, Lopez AD (1996). Estimating causes of death: methods and global and regional applications for 1990. In: Murray CJL, Lopez AD, eds. *The global burden of diseases, injuries and risk factors in 1990 and projected to 2020*. Cambridge, Harvard University Press.
- State Coroner's Office (1998). *Unnatural Deaths: Collated from the findings of the State Coroner, 1994/95*. Victoria, State Coroner's Office.
- Australian Bureau of Statistics, (1997). *Deaths, Australia 1995*. Canberra, ABS Catalogue No. 3302.0.
- Australian Bureau of Statistics, (1999). *Causes of Death, Australia 1997*. Canberra, ABS Catalogue No. 3303.0.
- Moller J (1999). Personal communication.
- Commission on Professional and Hospital Activities (1986). *Annotated International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), Volume III*. Ann Arbor, Michigan; Fourth Printing.

- Victorian Suicide Prevention Task Force, Suicide Prevention, July 1997.
- Vulcan P (1995). Road Trauma Prevention. In: Ozanne-Smith J, Williams F, eds. *Injury Research and Prevention: A Text*. Victoria, Australia, Monash University Accident Research Centre.
- VicRoads and Transport Accident Commission (TAC), (1997). *Road Safety in Victoria: trends and developments during 1997*.
- Routley V (1998). *Motor vehicle exhaust gassing suicides in Australia: epidemiology and prevention*. Monash University Accident Research Centre, Report No. 139.
- Watson WL, Ozanne-Smith J (1997). *The Cost of Injury to Victoria*. Monash University Accident Research Centre, Report No. 124.
- Fife D (1987). *Injuries and deaths among elderly persons*. Am J Epidemiology Vol 126, pp. 936-941.
- Sattin RW (1992). *Falls among older persons: A public health perspective*. Annu. Rev. Publ. Health Vol 13, pp. 489-508.
- Tideiksaar R, Kay AD (1986). *What causes falls? A logical diagnostic procedure*. Geriatrics Vol 41, No 12, pp. 32-50.
- Mendlein JM, Sattin RW, Waxweiler RJ, Lui KJ, McGee DL (1990). *Fall mortality and related medical conditions in the elderly: the association with pulmonary embolism*. J Aging Health Vol 2, pp. 326-340.
- Moller, J (1994). *Coronial information systems: needs and feasibility study*. National Injury Surveillance Unit, Adelaide.
- MUNCCI talk, 5, (1999). Newsletter for the Monash University National Centre for Coronial Information, Southbank.
- Dennison, T (1998). *National Coroners Information System Commercialisation Study*. Monash University National Centre for Coronial Information, Southbank.

Acknowledgements

We gratefully acknowledge the written contributions of Virginia Routley, Karen Ashby, Lesley Day and Christine Chesterman for assistance with data analysis. Additionally we acknowledge Simon Jolley for provision of data and George Rechnitzer for valuable comment.



Products and other agents associated with injury deaths

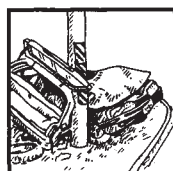
Appendix 1

Factors	Age Groups (yrs)					TOTAL
	0-14	15-24	25-39	40-59	60+	
Vehicles – Registered air or land	257	1241	1259	895	945	4597
<i>Passenger car or station wagon</i>	178	846	852	665	712	3253
<i>Heavy truck utility or van >3 tonnes</i>	29	96	156	106	102	489
<i>Motorcycle</i>	10	173	117	29	15	344
<i>Train, tram</i>	17	73	78	48	58	274
<i>Light truck utility or van <3 tonnes</i>	7	35	27	23	32	124
<i>Other vehicles</i>	16	18	29	24	26	113
Drugs, medications & biological factors	16	700	1251	713	338	3018
<i>Alcohol (beverage)</i>	10	390	554	363	151	1468
<i>Cigarettes, cigars, pipes or tobacco</i>	1	8	8	15	23	55
<i>Other drugs & medications</i>	5	302	689	335	164	1495
Naturally occurring environmental factors	217	447	405	391	432	1892
<i>Tree, stick, branch</i>	18	225	125	102	87	557
<i>Water, not hot</i>	102	69	89	103	105	468
<i>Flame, fire, smoke</i>	42	40	64	63	113	322
<i>River, creek, stream</i>	14	40	41	40	45	180
<i>Sea, ocean</i>	6	23	37	53	42	161
<i>Small rocks & stones</i>	6	30	28	13	14	91
<i>Dam, pond</i>	22	3	6	3	10	44
<i>Other natural factors</i>	7	17	15	14	16	69
Sports & recreation (incl. activity, apparel & equipment)	97	211	243	246	166	963
<i>Guns or firearms, rifles**</i>	6	143	176	188	119	632
<i>Bicycles or accessories</i>	31	21	21	18	15	106
<i>Boats, boat motors & accessories, incl. sail boats & boards</i>	5	14	20	27	19	85
<i>Built-in swimming pools</i>	39	5	5	4	10	63
<i>Other sports and recreation</i>	16	28	21	9	3	77
Packaging materials	23	181	243	192	181	820
<i>Rope</i>	19	171	217	176	143	726
<i>Plastic bags</i>	2	7	17	11	36	73
<i>Other packaging materials</i>	2	3	9	5	2	21
Chemicals & compounds (incl. cleaning/ maintenance)	6	123	300	243	116	788
<i>Carbon monoxide</i>	0	115	266	217	86	684
<i>Petrol</i>	3	2	15	10	6	36
<i>Other chemicals & compounds</i>	3	6	19	16	24	68
Structures & parts thereof	15	119	122	99	189	544
<i>Bridges</i>	0	27	33	19	8	87
<i>Concrete/ man-made outdoor surfaces</i>	1	8	14	21	30	74
<i>Buildings, office, plant, residential, etc.</i>	3	17	30	15	8	73
<i>Floors or flooring material</i>	1	1	5	6	56	69
<i>Stairs or steps</i>	2	1	3	9	38	53
<i>Roofs</i>	0	2	6	2	12	22
<i>Other structures or parts thereof</i>	8	63	31	27	37	166
Furniture & non-structural fittings	33	10	15	21	57	136
<i>Bathtubs, showers, incl. fixtures & accessories</i>	9	4	6	6	9	34
<i>Bathtub or shower enclosures, not specified</i>	9	0	4	3	6	21
<i>Other furniture & non-structural fittings</i>	15	6	5	12	42	81
Food & drink	10	2	8	20	46	86
Industrial/retail plant /equipment	1	4	24	29	9	67
<i>Fork lifts or lift trucks</i>	0	1	5	11	0	17
<i>Earthmoving & highway construction machines, NEC</i>	0	1	2	1	4	8
<i>Other industrial or plant equipment</i>	1	2	17	17	5	42
Fabrics, drapery & soft furnishings (excl furniture)	7	14	6	4	6	37
Child nursery equipment & consumables	10	1	4	0	0	15
Other specified factors	86	284	296	228	246	1140
<i>Poles (excl. fence posts, fishing, pole vaults)</i>	8	133	64	29	22	256
<i>Knives, NEC</i>	3	30	59	40	27	159
<i>Electrical wire, wiring system</i>	4	16	40	26	21	107
<i>Other personal use items</i>	17	11	16	9	18	71
<i>Farm tractors</i>	12	5	8	22	14	61
<i>Other general utility appliances</i>	1	15	7	8	5	36
<i>Clothing accessories</i>	2	11	12	5	4	34
<i>Horse</i>	3	4	8	6	9	30
<i>Other animal</i>	3	6	4	6	6	25
<i>Other yard and garden equipment</i>	6	22	25	29	35	117
<i>Other specified factors</i>	27	31	53	48	85	244
Misc. & otherwise unclassifiable factors	5	16	15	31	59	126
TOTAL	783	3353	4191	3112	2790	14229

*The frequencies above are based on multiple responses as up to 4 factor codes relating to a single injury event can be recorded for each case

** While firearms are frequently owned as "sports and recreational equipment", they are also owned for other purposes and could perhaps be more appropriately placed under "other". The classifications used in the above table are based on a U.S. Consumer Product Safety Commission coding system.

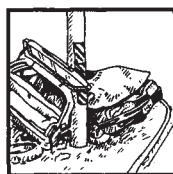
Source: Victorian Coroner's Facilitation System, July 1989 to June 1995.



- INDEX -

Subject	Edition	Pages
Babywalkers, update	16,20,25,34	1-4,12-13,7-8,7-8
Baseball	30	10-12
Bunkbeds	11	12
Bicycles - Bicycle related injuries	6,34	1-8,8-12
- 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	12,25,26,34	12,13,7-13,2-5
Domestic architectural glass	7,22,25	9-10,1-5,12
Domestic Violence	21,30	1-9,3-4
Drowning/near drowning, including updates	2,5,7,30,34	3,1-4,7,6-9,5-7
Escalator injuries	24	9-13
Exercise bicycles, update	59	6,13-14
Farm injury	30,33	4,1-13
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
Trends in road traffic fatality and injury in Victoria	36	1-13
Venomous bites and stings	35	1-13
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 Claes Tingvall, Monash University Accident Research Centre
Professor Joan Ozanne-Smith, Monash University Accident Research Centre
Professor Terry Nolan, Dept. of Paediatrics, Melbourne University
Mr. Jerry Moller

VISS Staff

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

General Acknowledgements

Participating Hospitals

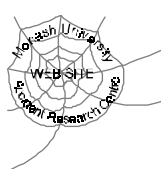
Alfred Hospital	
Angliss Hospital	
Austin and Repatriation Medical Centre	The Northern Hospital
Ballarat Base Hospital	Royal Children's Hospital
The Bendigo Hospital Campus	Royal Melbourne Hospital
Box Hill Hospital	Royal Victorian Eye and Ear Hospital
Dandenong Hospital	St Vincent's Hospital
Echuca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

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:

<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.

VISS is located at:

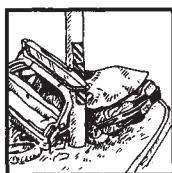
Building 70
Accident Research Centre
Monash University
Wellington Road
Clayton, Victoria, 3168

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



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 Ruth Zupo, Monash University Accident Research Centre.
Illustrations by Jocelyn Bell, Education Resource Centre, Royal Children's Hospital.*

ISSN-1320-0593

Printed by Sands Print Group Ltd., Brunswick

