Hazard
(Edition No. 47)
June 2001
Victorian Injury Surveillance
& Applied Research System (VISAR)
(Formerly VISS)

Monash University
Accident Research Centre

This edition of Hazard examines the effectiveness of regulation in preventing injury in Victoria. Two cases are considered: fireworks and rollover protective structures for tractors. Following from Hazard 46, this edition also reports on the profile of unintentional poisoning in early childhood by broad geographic region.

Effectiveness of Regulation in Injury Prevention

Summaries

Fireworks (pg 2-7)

Controls of sales of fireworks were introduced 25 years ago because of unacceptably high rates of serious injury. Current regulatory control and enforcement is relatively effective in achieving low rates of serious injury in Victoria.

In Australia, there were 5 deaths during 1979-1997. In Victoria, 122 cases of injury presented to public hospitals between October 1995 and December 2000, with 20% of these cases admitted.

The fireworks involved in injuries were overwhelmingly those that are subject to bans. Illegal fireworks are thought to be purchased over the counter, and sometimes in bulk, in other states and also via the internet. National harmonisation of regulation and practice and co-ordinated enforcement are required. Exploding fireworks should not be on direct sale given the severity of injury associated with these products.

Tractor Rollover Protection (pg 8-10)

Tractors are a prominent cause of farm work related death. During the period 1992-96, tractors accounted for 61% of adult farm work related deaths in Victoria, of which one third were rollover events.

The continuing prominence of tractor rollover deaths in Victoria led the Victorian WorkCover Authority to undertake to increase rollover protective structure fitment to tractors. The subsequent strategy included a combination of widespread publicity, a rebate scheme, and regulatory amendment and enforcement.

The 1997/98 rebate scheme reduced the number of unprotected tractors in Victoria from 17,420 to 5,290. The proportion of unprotected tractors in Victoria is now approximately 7%, compared with 24% at the commencement of the scheme.

The cumulative effect of awareness and education campaigns, rebate schemes and regulation has culminated in the achievement and maintenance of the lowest tractor rollover death rate in Victoria's history.

Also in this edition:

Unintentional Childhood Poisoning (pg 11-15)

Unintentional child poisoning hospital admissions for Victoria show a significant upward trend in the 12-years to 1998. Rates of hospitalised cases are highest amongst rural children, especially for paracetamol and agricultural and horticultural preparations.

Rural children are more likely to be hospitalised following a poisoning related presentation to an emergency department compared to metropolitan children.

Research is required to determine whether there are real differences in poisoning rates between regions or if the observed differences in admissions are the result of patient management practices.

Fireworks Now Only Modest Problem*

Ian Scott[1] *, Joan Ozanne-Smith*

Introduction

Fireworks are devices of ancient Chinese origin containing combustible chemicals that cause explosive or spectacular effects (Pearsall and Trumble, 1995).

They have a long history of use in festivities associated with tradition, culture and religion. In Australia they have been associated with Empire Day, Guy Fawkes' Night, Queen's Birthday and New Year celebrations. They are also increasingly associated with cultural festivals within particular Australian communities, such as Tet, the Lunar New Year Festival and Easter celebrations of the Orthodox Churches, as well as sporting events.

Fireworks are a universal source of entertainment and delight. Invented in China they have spread throughout the world and are central parts of celebrations for Deewali in India, New Year in China, Prophet's Day in Libya, Hari Raya in Malaysia and Independence Day in United States (US). Unfortunately, they are also associated with injuries throughout the world (Abdulwadud and Ozanne-Smith, 1998; Clarke and Langley, 1994; Sheller et al., 1995; Isa and Moe, 1991; Smith, Knapp et al., 1996). Twelve thousand people are treated each year in the US for injuries related to fireworks and about 20% of these are eye injuries (Centers for Disease Control, 1995).

Legislation and control of fireworks

Regulation and enforcement of fireworks is a state government responsibility and all Australian states have restrictions on the sale and use of dangerous fireworks. These controls were introduced progressively: Western Australia in 1963, Queensland and Victoria in 1972, Australian Capital Territory (ACT) 1973, South Australia 1974, Tasmania 1976, New South Wales 1978 and Northern Territory (NT)1985.

Summary of 'shopgoods' fireworks restrictions, Australia Table 1

State/Territory	Shopgoods fireworks regulation
Australian Capital Territory	Temporary permit required: available two weeks before Queen's Birthday for organised community displays
New South Wales	Temporary permit required for organised community displays
Northern Territory	Available on June 29, 30 and July 1 between 9 am and 9 pm; fireworks may only be ignited between 6 pm and 11 pm; permit at other times
Queensland	One-year licence available, but firecrackers are banned
South Australia	Temporary permit required for organised community display but specifically excludes firecrackers and rockets
Tasmania	Temporary permit required for organised community display
Victoria	Banned
Western Australia	Banned
Novelty fireworks (eg sparklers, party poppers and gun caps)	Freely available in all States and Territories
Display fireworks	Uniformly restricted to those holding a pyrotechnics licence

Source: MacKenzie, Green and Viglione, 2001.

The regulations were introduced in response to submissions made by the medical profession because of the unacceptably high number and severity of firework related injuries (Clarke 1981; Clarke and Langley, 1994). Of particular concern were injuries to children, the severity of burns and the incidence of eye injury.

In all jurisdictions other than the ACT and the NT, the sale of fireworks to the public is prohibited. In the NT fireworks are available for a limited time period (Table 1). In the ACT a person must be aged over 18 to apply for a license to purchase fireworks (Smith, 2001). Sparklers, party poppers, caps for pop-guns, and Christmas crackers can be sold to the general public in all states and territories.

Controls on fireworks were first introduced in Victoria forty years ago restricting the sale and use of fireworks (Explosives Act 1960). These were amended and extended in 1972 and in the Explosives (Fireworks Prohibition) order of 1982 (Explosives [Fireworks Prohibition] order No 1/1982).

Current restrictions on the sale and use of fireworks in Victoria are made under Section 54 of the Dangerous Goods Act (1985). The use of Chinese firecrackers and display fireworks is limited to license holders who must be at least 21 years of age. Anyone who assists with restricted fireworks must be at least 18 years old. After October 2000 the issuing of one-day licenses in Victoria for use of fireworks was restricted to those having a cultural or religious reason for their use. Prior to this date licences were issued to individuals or groups for displays or community events. Anyone now wishing to put on such a display must use a licensed pyrotechnician.

In the US, under the Federal Hazardous Substances Act, the Consumer Product Safety Commission (CPSC) prohibits the sale of any firecracker with more than 50 milligrams of explosive powder and also bans the sale of mail order kits and components designed to build these fireworks (CPSC, 2001). CPSC conducts fireworks surveillance and enforcement throughout the year. It estimates that, working with US Customs Service, it has seized or detained more than 400 million hazardous fireworks at the docks.

While there is some variation between states, California can be used to illustrate

[1] Ian Scott is a Research Fellow at the Monash University Accident Research Centre (MUARC)

** This article further develops and broadens issues raised by Abduldawud and Ozanne-Smith (1998, 1999 & 2000)*

laws in one US state regarding fireworks. Californian law restricts sale to "safe and sane" fireworks subject to size limitations and those not specifically prohibited. Sales can be made to persons over 16 years of age between noon on June 28 through to noon July 6 - it is this period that accounts for nearly half of fireworks injury. Firecrackers, skyrockets, roman candles and sparklers longer than 10 inches or more than a quarter inch in diameter are on the prohibited list. Display fireworks require a license.

Illegal Sale

Industry sources indicate that there is some market for illegal fireworks in Victoria, especially explosive fireworks. This market is thought to be supplied by products purchased over the counter and in bulk in Adelaide and in Canberra.

The Victorian WorkCover Authority (VWA) prosecutes breaches of the Dangerous Goods Act (1985) in selling restricted goods. For example on 1 May 2001 Daverie Australia Pty Ltd was prosecuted in the Magistrates' Court of Victoria for two breaches of the relevant Act on the sale of fireworks/restricted goods (SR88/272.1202.1) in December 1999. The goods were seized and the Company fined $10,000.

Recent releases by the VWA report: 1) a substantial seizure of fireworks following a routine car search by police; 2) thousands of illegal fireworks seized prior to the Australian Motorcycle Grand Prix in 2000.

Fireworks deaths

Deaths due to fireworks are rare in Australia and do not appear to be numerous in other developed countries. An international comparison in the period from 1991 to 1995, found there were 22 deaths involving fireworks in the US, 5 in the Netherlands and none in Australia or New Zealand (Abdulwadud and Ozanne-Smith, 2000).

However the National Injury Surveillance Unit reports that in the Australian Bureau of Statistics "Cause of Death" data, during the eighteen year period 1979-1997 there were 5 deaths registered under the relevant code (E Code 923.0), 4 males and one female, 3 cases aged 15 to 24 years and 2 cases aged 25-34 years (Kreisfeld, 1999).

The Victorian Coroner's death database was searched for the period July 1989 to June 1995. No cases of fireworks related deaths were found.

Fireworks injury by age and gender, ED presentations, Victoria

Table 2

Age group	Male N	Female N	Total N	% of total %
0-4	8	1	9	7
5-9	5	2	7	6
10-14	11	1	12	10
15-19	20	2	22	18
20-24	17	4	21	17
25-29	14	1	15	12
30 and over	29	7	36	30
Total	**104**	**18**	**122**	**100**

Source: Victorian Emergency Minimum Dataset, October 1995 to December 2000

Fireworks injury by firework type, ED presentations, Victoria

Table 3

Type of Firework	Presentations (including admissions) N	Admission N	% admitted %	% of total admissions %
Firework(s)*	29	5	17	20
Cracker	61	14	23	56
Sparkler	23	6	26	24
Skyrocket	1	-	-	-
Popper	8	-	-	-
Total	**122**	**25**	**20**	**100**

*Note: Case narratives indicate that it is likely most of the "firework" injuries are associated with exploding fireworks.

Source: Victorian Emergency Minimum Dataset, October 1995 to December 2000

Fireworks injury

Data source

Cases treated at hospital emergency departments (EDs) were identified using the original Victorian Injury Surveillance System (VISS) database which operated on a sample of hospital data and the Victorian Emergency Minimum Dataset (VEMD). The VEMD was introduced progressively from October 1995 in 28 Victorian public hospital emergency departments and records details of injuries treated (see page 16).

The method of case selection was to use the text narratives that give brief descriptions of the injury. Searches were made using the terms "firework", "fire work", "cracker", "skyrocket", "sky rocket", "sparkler" and "popper". All cases were read and extraneous cases discarded.

Injuries

The VEMD shows that in the period from October 1995 to December 2000 there were 122 cases of fireworks injury of which 25 cases (20%) were admitted or transferred to another hospital. The frequency of cases recorded in the VEMD has increased annually from 10 in 1996

to 37 in 2000. As identification of fireworks injury on the VEMD is reliant on text searches, care must be taken in interpreting increases as patterns may reflect improved specificity from quality control efforts (Ozanne-Smith et al, 1999)

Those presenting were mostly male (104 cases, 85% of presentations). The most represented age groups were 15-19 years and 20-24 years, cumulatively accounting for one in three presentations. However injury is not just associated with youth, 30% of those injured were aged 30 years or older (36 cases). Among those requiring hospital admission 45% were aged thirty or over and two thirds aged 25 years or more.

One third of cases (n=41, 34%) occurred in December/January, including the Christmas / New Year period.

Noteworthy features of the injuries are the significance of burns (51 cases, 42%), hand injury (51 cases, 42%) and eye injuries (24 cases, 20%). This is consistent with pyrotechnic industry experience where premature explosion in the hand, and injuries to the face/eye inspecting items that had not yet exploded, are the two most common injury incidents.

Two of the 122 Victorian cases involved traumatic amputations. A study of three NSW cases (MacKenzie, 2001) reported that one man had his entire middle finger and the tip of the ring finger amputated by an exploding cracker, another person's hand was permanently disfigured and required three months of therapy following surgery. Each had been holding a firecracker called the Thundering King, which was reported as meeting the residential area.

Details are available for 20 of 25 cases of injury admitted to hospital in the five-year period from 1995, as reported on the VEMD. Ten received facial injuries (including eye injuries) and 10 received hand injuries. By type of firework there were 5 admissions from "firework", 14 from "cracker" and 6 from "sparkler". Nine of the 25 admissions had burns.

Fireworks injury by firework type and major body regions injured, ED presentations, Victoria **Table 4**

Type of firework	Eye N	Face (not eye) N	Hand N	Total cases N
Firework	10	4	4	24
Cracker	10	5	29	47
Sparkler	5	-	11	17
Popper	7	-	1	8
Total	**32**	**9**	**45**	**96**

Note: injuries may be to more than one body part. There was one skyrocket injury.
Source: Victorian Emergency Minimum Dataset, October 1995 to December 2000

Firework burns by firework type, ED presentations, Victoria **Table 5**

Type of firework	Burns N	Total cases N
Firework	6	24
Cracker	12	47
Sparkler	11	17
Popper	-	8
Total	**29**	**96**

Source: Victorian Emergency Minimum Dataset, October 1995 to December 2000

Examples of ED presentations for fireworks injury:

- 16 years walking down street hit by firecracker on leg burned;
- 15 years lighting cigarette for friend somehow lit penny bangers kept in pocket, 1% burn to thigh;
- 20 months, firecracker exploded beside child, flash burn to forehead and eye;
- 8 months, sitting on adults knee, grabbed sparkler;
- 10 years, watching fireworks hot spark from firework went into eye;
- 9 years, at home playing, poked lit sparkler into eye;
- 11 years, watching public fireworks, a boy threw a lighted cracker which hit child in neck;
- 9 years, at home, playing with firecrackers, big brother let one go off near eye, burn to eye;
- 12 years, riding bike, cracker thrown at face, sore eyes;
- 9 years, child playing with sparkler put it into container, petrol lit, clothes alight, burns;
- 12 years, in park, playing with friend with firecracker, cracker burst into flame, burn to leg;
- 2 years, celebrating Vietnamese New Year, hit by firecracker, full thickness burn to back;
- 18 years, public playground, lighting cracker, went off too quickly, burn to fingers.

Source: Original Victorian Injury Surveillance System database (1989 to June 1996)

Legal vs Illegal Fireworks

Although it is not possible to be definitive, owing to the lack of some details, it is clear that a large proportion of injuries are associated with illegal fireworks. Of the 122 VEMD cases in the five years to December 2000 it is probable that 41 cases (34%) were associated with legal fireworks, that is with sparklers, poppers and public firework displays. Of the remaining cases (81, 66%) the majority appear to be associated with fireworks that are not on general sale.

There is a clear separation according to the type of firework and by severity of injury. For "firework" cases about one third are clearly public and legal events. These are all in the less severe, non-admitted injuries. All the 5 admitted "firework" injury cases appear to involve products the legislation is designed to control. For "cracker" injury, only 2 of the 61 cases clearly involve legal events and 12 out of 14 admitted injuries appear to involve controlled products.

Discussion

"All studies have found that the more limited the access to fireworks (especially firecrackers), the lower the incidence of fireworks injury." (MacKenzie, Green and Viglione, 2001). The clearest indication of this association is found in the US experience where 45% of injuries are associated with the Independence Day celebrations (July 4) when temporary licences are granted for use, 16% in the New Year period and the remainder at other times (Centers for Disease Control and Prevention, 1995).

As noted above Victorian pyrotechnics industry sources indicate that access to illegal fireworks across state borders is a factor associated with injury. This is consistent with US analysis which finds that cross border traffic of fireworks is associated with injury – the clearest indication of this being the proportion of injuries associated with "bottle-rockets" (skyrockets) even in those places where they are banned (Centers for Disease Control and Prevention, 1995).

The Centers for Disease Control and Prevention analysis of firework injuries found that misuse and malfunction were the most common factors associated with injury. For skyrockets the most common forms of misuse were "rocket-fights" in which the products are aimed at others and attempts to throw the rockets after it is lit but before ignition, rather than launching them from static positions. The most common malfunction was when the rockets exploded immediately.

Australian data do not permit this level of analysis but the injury presentations indicate that holding exploding fireworks is associated with a large proportion of cases. This is consistent with the US findings of misuse and malfunction as leading causes of injury.

In addition to their other findings MacKenzie and colleagues (MacKenzie, 2001) found that "alcohol played a substantial part in these (fireworks) injuries". They argue for a high association between alcohol and injury and cite a Western Australian study in which consumption of 60g of alcohol in less than six hours led to a threefold increase in the risk of injury (McLeod, Stockwell et al., 1999).

Prevention

On the basis of the injury data, the factors most likely to reduce fireworks injury are enforcement of existing regulation and changes in the understanding of the degree of risk associated with fireworks, especially those that explode.

Two recent interventions, in Italy and Denmark (D'Argenio, 1996; Sheller, 1995), found that legislation and enforcement, combined with education campaigns and cleaning up after major fireworks events were associated with a substantial drop in injury. D'Argenio et al's Naples study showed a drop of one third (32%) in severe injuries, but some of this effect may have been associated with economic factors and rainy weather. Sheller found that injury cases fell from 17 in 1991-92 to 4 and then 3 cases in following years.

In line with the reasons for the introduction of sales controls on fireworks, it appears that efforts to limit exposure are the main avenue to control injury. The "black market" cross-border shipment of illegal fireworks does not appear to be difficult and has become easier with internet sales. The VWA has made a number of seizures of goods sold over the internet and is investigating mechanisms of dealing with this source.

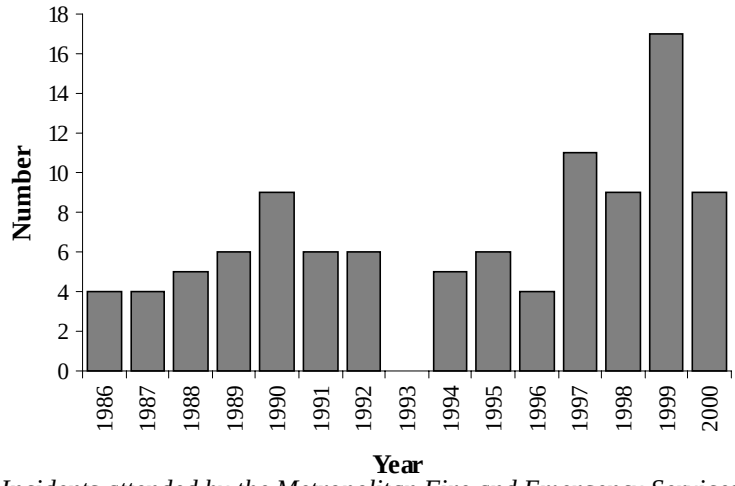
Fireworks related fires

Injuries are not the only cause of concern associated with fireworks. There is also a consistent problem with fires involving fireworks in the period since the restriction of sales in the Dangerous Goods Act of 1985 (Abduldawud & Ozanne –Smith, 1999). The best available data are those from the Victorian Metropolitan Fire and Emergency Services Board (MFSEB), covering greater Melbourne. The data are of incidents to which the MFESB responded. The general categorisation of events is those that identified the *form of heat of ignition* as *fireworks, including sparklers*.

The information was supplied in two series with slight variation in details using the Australian Incident Reporting System (AIRS). For the 73 Melbourne incidents reported in the ten years 1991-2000 about one third (26, 35.6%) were recorded as involving children. This figure is probably an understatement as children are not separately noted within 'deliberate' incidents and it is difficult to ascertain the age of those involved, even where a person is identified. The data available indicate that MFESB is aware of no cases of injury associated with these fires.

No information is available on the types of fireworks involved in these incidents or the number or proportion of cases that are associated with legal events undertaken by licensed users. The absolute number of incidents remains relatively small but the average frequency has increased since 1997 (Fig 1;Table 6)

Fireworks related fires, 1986-2000, Melbourne — Figure 1



Source: Incidents attended by the Metropolitan Fire and Emergency Services Board, data supplied by MFESB in two series, 1986-1990, supplied 1997 and 1991-2000 supplied 2001.

Fireworks related fires, 1986 to 2000 (inclusive), Victoria

Table 6

Features	Outcome
Frequency	
Total fires	101
Mean (SD) fires per year	6.7 (2.7)
Median	6
Range	17 (0 to 17 events)
Incidence by 5 year group	
1986-1990	28 (27.7%)
1991-1995	23 (22.7%)
1996-2000	50 (49.5%)

Source: The Victorian Metropolitan Fire Brigades Board

Acknowledgments

Luke Hooper from Metropolitan Fire and Emergency Services Board for the supply of and assistance in the interpretation of data on fires associated with fireworks. Keith Lewis, Audio Visual FX for detailed briefings on technical matters.

References

- Abdulwadud, O. & Ozanne-Smith, J. "Deaths and hospitalisation from fireworks injuries." *Injury Control and Safety Promotion*, 2000; 7(3): 187-193.
- Abdulwadud, O. & Ozanne-Smith, J. "Fires Involving Fireworks in Victoria". *Fire Australia*, February 1999.
- Abdulwadud, O. & Ozanne-Smith, J. "Injuries associated with fireworks in Victoria: an epidemiological overview." *Injury Prevention*, 1998; 4: 272-275.
- Centers for Disease Control and Prevention. "Serious eye injuries associated with fireworks – United States, 1990-1994." *Morb Mortal Wkly Rep*, 1995; 44: 449-52.
- China News Digest: Weekly Summary, Friday 16 March 2001 (GL01-033).
- Clarke, J.A., Langley, J.D. "Firework related injury in New Zealand." *NZ Med J*, 1994; 107: 423-5.
- Clarke, M. "Childhood Accident Survey". Health Commission of Victoria, 1981.
- Consumer Product Safety Commission. "Oregon Company Ordered to Stop Selling Chemicals Used to Make Illegal Fireworks." Press Release 01-136, April 27, 2001.
- D'Argenio, P., Cafaro, L., Santonastasi, F., et al., "Capodanno Senza Danno: the effects of an intervention program on fireworks injuries in Naples." *Am J PubHealth*, 1996; 86: 84-6.
- Explosives Act 1960 Acts of Parliament 1960. No 6715. Victoria Australia.
- Explosives (Fireworks Prohibition) order No 1/1982. Statutory Rules 1982. Volume 1, No 151. Victoria, Australia.
- Forasterieri, V. *Children at Work: Health and Safety Risks*. Geneva: International Labour Office, 1997.
- http//listerv.cnd.org/CND-Global. May 2001.
- Isa, A.R., & Moe, H. "Fireworks related injuries during Hari Raya festival in hospital universiti Sains Malaysia, 1986-1990." *Med J Malaysia*, 1991;46:333-7
- Kreisfeld, R., personal communication, National Injury Surveillance Unit, Australian Institute of Health and Welfare, Adelaide, 17 February 1999.
- MacKenzie, D.N., Green, J.A., & Viglione, W. "Firecracker Injuries to the Hand." *MJA*, 2001; 174(5): 231-232.
- McLeod, R., Stockwell, T., Stevens, M. & Phillips, M. "The relationship between alcohol consumption patterns and injury." *Addiction*, 1999; 94: 1719-1734.
- Ozanne-Smith, J, Ashby, K, Stathakis, V, and Chesterman C. "A decade of injury surveillance". *Hazard*, 1999; 40:1-17.
- Pearsall, J., Trumble, B., eds. Oxford English reference dictionary. Oxford: Oxford University Press, 1995.
- Save the Children Fund, "Child Labour", http:// www.savethechildrenaustralia.com/. May 2001.
- Sheller, J.P., Muchardt, O., Jonsson, B., et al. "Burn injuries caused by fireworks: effects of prophylaxis." *Burns*, 1995; 21: 5053.
- Smith, G.A., Knapp, J.F., Barnett, T.M., et al. "The rockets' red glare, the bombs bursting in air: fireworks related injuries to children." *Pediatrics*, 1996; 98: 1-9.
- Smith, K., personal communication, Injury Prevention and Control Unit, Commonwealth Department of Health and Aged Care, 27 April 2001.• The Dangerous Goods Act 1985. Acts of Parliament, 1985. No 10189. Victoria, Australia.
- UNICEF. *The State of the Worlds Children 1997*. Oxford University Press, 1997.
- Victorian WorkCover Authority, "WorkCover warning over illegal fireworks", Press Release, April 20, 2001.

Recommendations

- Since injuries are heavily associated with products that are controlled in Victoria the central need is for national harmonisation of regulations regarding sale of fireworks.
- Analysis of the injuries associated with exploding fireworks, including finger amputations, indicates that these products should not be on sale anywhere in Australia.
- Enforcement of regulation is required by state authorities.
- Community awareness of the severity of injury and degree of risk associated with illegal fireworks should be promoted.
- Australia and Australians should actively discourage unsafe work practices and child labour associated with the manufacture of fireworks in any country. Aid Programs and Trade Agreement are possible avenues for such action.

Other Issues - Factory explosions; Health and Safety; Child Labour

End users of fireworks are not the only injury victims. There have been many newspaper reports of deaths and injuries associated with the manufacture of fireworks, particularly in Asia, involving extensive loss of life and including children involved in the workplace.

Save the Children Fund reports that child labour is of substantial importance in reducing the cost of fireworks, noting figures from the Indian fireworks industry that child labour "saved" around 32 million Rupees in 1991-92 (Save the Children Fund, 2001).

UNICEF and International Labour Organisation (ILO) reports list chemical hazards and risk of fire and explosion as risks for child workers in fireworks factories. (UNICEF, 1997; Forasterieri, 1997).

"Firework Deaths Rose to Twenty-five"

Beijing (China) - The death toll from an explosion at a firecracker factory at Hunbei has risen to twenty-five. The massive blast leveled five warehouses, damaged two houses and wounded a farmer's cow nearby with flying bricks. It was the third such reported incident since the beginning of the year. Eleven villagers in Dongchen were killed last week in an explosion. On January 15, an explosion at a cottage factory in Sichuan killed seven people and injured two.

The Star, January 25, 2000.

"More than 60 Chinese children are feared dead…"

More than 60 Chinese schoolchildren are feared dead in an explosion apparently caused by a store of firecrackers that the headmaster had ordered pupils as young as eight to assemble in their classrooms. The blast was in a village school in Wanzai County, in east China's Jiangxi Province, a poor region that has become notorious for firework-related accidents in recent years.

The two-storey building was split apart by the force of the explosion. Forty-one children and teachers are confirmed dead, with 27 injured, some seriously, but it is feared more than 60 might have perished from among the 200 people believed to be in the school..…the school's headmaster is understood to have turned to the firework trade to pay the bills, despite its lethal track record. Almost one year ago, on 11 March, a firework factory explosion in adjacent Shangli County claimed 21 lives. A similar incident elsewhere in Shangli caused 33 deaths late last August. Yet the fireworks sector generates some 70 percent of income for Shangli County, encouraging local officials to condone the dangers.

…These deaths underscore two major issues that China, and the rest of the world, must address...the first is child labour...the second is under-funded schools...The primary school in Fang Lin brought these two issues together with tragic consequences. By apparently trying to alleviate funding shortfalls through its students' labour, it exposed those children to extremely dangerous work. **The explosion may have been unintended, but this was no accident. The deaths were entirely preventable**.

Child labour news service

http://www.globalmarch.org/clns/clns-15-03-2001.html

" Fireworks factory deaths "

Villagers in Fanglin and nearby areas continue to assemble fireworks at home to make a living after the school explosion last week, the South China Post Reported on Monday.

The home-based assemblers make 10 fen (about AUD 2.5 cents) for assembling a packet of 1000 fireworks with fuses. Villagers say they depend on fireworks assembly for a living "we don't have any choice, we need the money" said Yang Jinfeng.

On average, a villager makes about 100 yuan (about AUD $20) out of the firework assembly work, said the report. However they have to pay 500 to 600 yuan in tuition to have a child go to school.

(China News Digest, 2001).

Tractor Rollover Protective Structures

Lesley Day[1] , George Rechnitzer[1], Karen Ashby, Maria Corbo

Introduction

Tractors are a prominent cause of farm work related deaths in Victoria, as elsewhere in Australia (Day, 1998; Day & McGrath, 1998; Harrison et al., 1989; Davidson, 1994/95). During the period 1992-1996, tractors accounted for 61% of farm work related fatalities among adults in Victoria, of which one third were rollover events (Day, 1998).

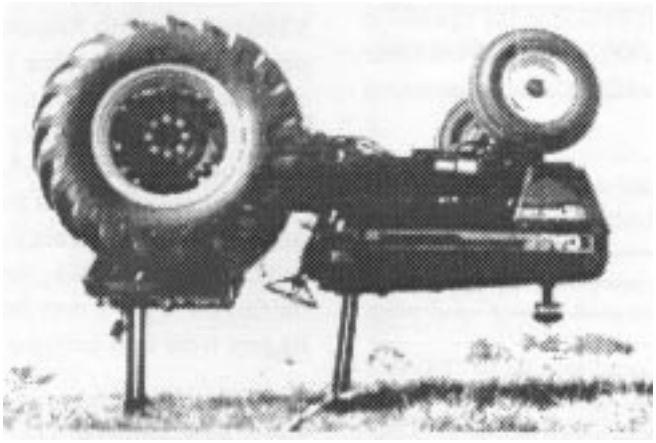
This article considers the impact of regulatory change on tractor rollover death in Victoria, the role of the Victorian Rollover Protective Structure Rebate Scheme 1997/98 and the upcoming Victorian compliance campaign. In addition, tractor rollover death data for adults (15 years of age and over), provided by the Victorian WorkCover Authority (VWA) are examined.

Background

Tractor rollover occurs when a tractor tips sideways or backwards and overturns, potentially crushing the operator. Rollovers are typically considered to occur on sloping terrain, often during a sharp turn at high speed, although data shows they do occur on flat land after hitting obstacles or through the inappropriate use and hitching of chains, implements or ropes (Ashby & Day, 1995). The most effective form of protection in the event of a rollover are Rollover Protective Structures (ROPS) combined with seat belt use. ROPS are structural components, either a rollbar device or crushproof cab, which provide an umbrella of safety in the event of a rollover (Figure 1).

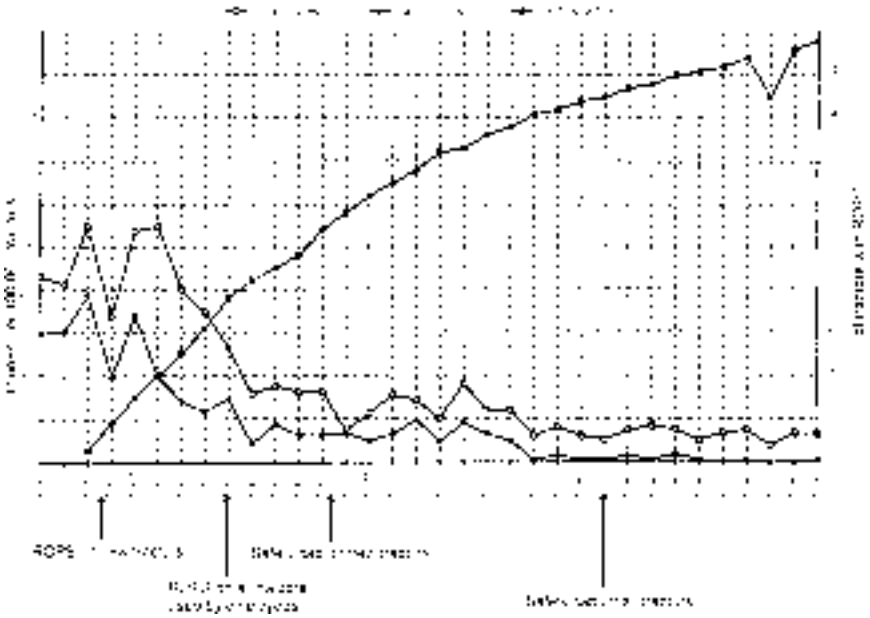
The effectiveness of ROPS in preventing tractor rollover deaths has been demonstrated in Sweden, Great Britain and Norway (Springfeldt, 1993).

Performance of ROPS during a rollover **Figure 1**



Source: Victorian WorkCover Authority

Tractor rollover death trend, Sweden **Figure 2**



Source: Journal of Agriculture Safety and Health,1998; 4(3): 173-180 (reprinted with permission).

For example, in Sweden the tractor rollover fatality rate decreased from 15 per 100,000 tractors to less than 1 per 100,000 tractors as the legal safety requirements moved from ROPS on all new tractors to safety cabins on all new and existing tractors (Springfeldt et al., 1998; Figure 2).

Victorian Regulations

Prior to 1985, there had been a long history of concern and action by government and individuals regarding tractor rollover deaths. Regulation requiring ROPS on tractors manufactured in or imported into Victoria from 1 July 1981 (with limited exemptions such as operation in an orchard) were introduced in 1985.

[1] Lesley Day and George Rechnitzer are Senior Research Fellows at the Monash University Accident Research Centre (MUARC).

However, the continuing prominence of tractor rollover deaths in Victoria, the demonstrated effectiveness of ROPS internationally, and the formal support of the Victorian Farmers Federation (VFF), led the VWA to undertake to increase the level of ROPS fitment to tractors in Victoria. The subsequent strategy included a combination of widespread publicity, a ROPS rebate scheme, and regulatory amendment and enforcement.

The resulting amendment to the Occupational Health and Safety (Plant) Regulation Act became effective from November 1998 making ROPS compulsory on all tractors weighing more than 560kg, including pre-1981 tractors (with limited exemptions for tractors operating in and around orchards and buildings where it is not practicable for ROPS to be used) (Victorian WorkCover Authority, 1998).

Rebate Scheme

To assist tractor owners in complying with the new regulation, a ROPS rebate scheme was funded by the VWA, and administered under contract by the VFF, in 1997/98. A Steering Committee was established to advise on scheme implementation and administration. Membership included the VFF, VWA, and Farm Machinery Dealers Association (FMDA). The ROPS rebate scheme was implemented to facilitate fitment of ROPS to previously unprotected tractors, via a rebate of $150 for each pre-1981 tractor fitted with a ROPS meeting the Australian Standard 1636.

The rebate scheme was supported by: (1) a range of promotional activities including a television advertising campaign mounted by the Public Affairs section of the VWA; (2) a mail out of information and application forms to Victorian farmers; and (3) the provision of information and application forms at farm field days by VWA field officers, and through other organisations including VFF and the FMDA. The total estimated cost to VWA and participating farmers was AUD$7.9 million.

There have been at least three previous Victorian ROPS rebate schemes in 1987, 1990 and 1994. The 1987 scheme, which ran for 2 months, anticipated 2000 responses. However, only 556 applications were received, of which 389 were processed. In contrast, the 1990 scheme goal of 1000 rebates was exceeded when 1436 were actually made in the 10 month period. The 1994 scheme saw a total of 1116 rebates, made over a period of 7 months (VFF and HSO, 1994).

The most recent scheme was launched in April 1997 and the uptake was higher than all of the previous schemes combined with a total of 12,129 rebates. An average of 146 rebate applications were received by the VFF each week for the 20-month period, with the peak being 170 per week. The rate of uptake during the 1997/98 scheme (606 per month) was some 4 times higher than that of the previous 1994 scheme (159 per month).

Prior to the scheme in Victoria, an estimated 17,420 tractors were without ROPS (Day et al., 1999). A total of 12,129 tractors were retrofitted with ROPS by the end of the scheme, leaving an estimated 5,290 tractors unprotected by ROPS. It was estimated that this large scale retrofit would prevent 2 deaths per year for at least 10 years (Day and Rechnitzer, 1999). The full impact of any reductions would have been expected to become apparent in the first year after the completion of the scheme ie. 1999.

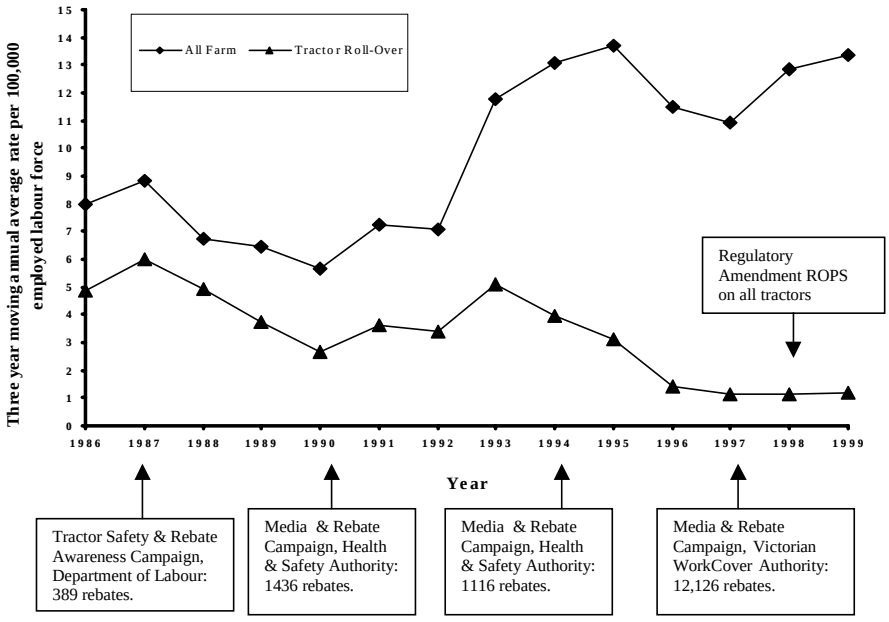
Enforcement

From June 2001, the VWA will begin a compliance campaign targeting the remaining estimated 5,290 tractors in Victoria without ROPS. It is estimated that some 20 VWA officers will visit at least 1,000 farms in a six-month period. Failure to comply with the regulations can result in prosecution and fines of up to $40,000 (Victorian WorkCover Authority, 2001)

Trends in tractor rollover deaths

In Victoria, from 1985 to 2000, there have been 47 work related tractor rollover deaths among adults recorded by the VWA. All deaths involved males ranging in age from 17 to 74 years. Prior to the 1997/98 ROPS rebate scheme, the average number of deaths was 3.6 per

Tractor rollover compared with all farm work fatalities, rates and trends, Victoria **Figure 3**



Source: Victorian WorkCover Authority

annum, ranging from a low of 1 death in 1996 to 7 deaths in 1987. During this pre-1997/98 rebate period, where information on ROPS fitment was available, over 85% of tractor rollover deaths involved tractors not fitted with ROPS. From 1997 to 2000, the average number of deaths resulting from tractor rollovers fell to 1 death per annum. Figure 3 shows the decrease in the work related tractor rollover death rate based on a three year moving average over a period of 16 years.

Discussion

The 1997/98 scheme was successful when measured against a number of criteria. The scheme reduced the number of unprotected tractors in Victoria by 70% from an estimated 17,420 to 5,290. The proportion of unprotected tractors in Victoria is now approximately 7%, compared with an estimated 24% at the commencement of the scheme. Also, the demand for ROPS rebates was substantially higher than in any previous scheme.

The success of the scheme appears to be founded on a number of equally important and inter-related factors. The combination of regulatory amendments, publicity, and the rebate clearly provided the impetus to action required to increase ROPS fitment. While the regulations themselves, and the perceived threat of subsequent enforcement were significant factors, the effect may not have been as dramatic had these strategies been used in isolation. There had been considerable development of the necessary partnerships over previous years, and the scheme was implemented at a time of increasing impetus in farm safety in Victoria. Previous schemes had familiarised the community with the principle of rebate schemes, and had in effect served as pilots for this largest effort. Further, the scheme, and especially the regulatory amendments, was implemented at a time when the proportion of tractors fitted with ROPS was already more than 50%. Most importantly, there had been a change in the acceptance of the need for compulsory ROPS fitment among the members of the VFF, prior to the move made by the VWA towards regulatory change. This approach to tractor rollover prevention was unique to Victoria at that time.

The cumulative effect of awareness and education campaigns, rebate schemes and regulation has culminated in the achievement and maintenance of the lowest tractor rollover death rate in Victoria's history. Due to the success of the Victorian experience of tractor rollover regulation, New South Wales is currently implementing a similar strategy.

Acknowledgments

The authors acknowledge the contributions of Eric Young and Elizabeth Stephenson of the Victorian WorkCover Authority for their valuable advice and background information and Sandy Rutter from the American Society of Agricultural Engineers for permission to reproduce Figure 2.

References

- Ashby, K., & Day, L. "Tractor Injuries." Hazard, Edition 24 (September 1995), Victorian Injury Surveillance and Applied Research System (VISAR), Monash University Accident Research Centre, pp.2- 8.
- Coleman, R., Fragar, L. & Morton, C. "The Profile of the Health and Safety of NSW Farmers, Farm Families and Farm Workers." Australian Agricultural Health Unit, 1996.
- Davidson, A. "National tractor safety project final report." Moree: Australian Agricultural Health Unit, 1994/95.
- Day, L. "Farm work related fatalities among adults in Victoria, Australia: the human cost of agriculture." Accident Analysis and Prevention, 1999; 31: 153-159.
- Day, L., Boutler, J., McGrath, A. "Hazard exposure among farmers in Victoria, Australia." Journal of Occupational Health and Safety - Aust and NZ, 1999; 15(1).
- Day, L. & Rechnitzer, G. "Evaluation of the Tractor Rollover Protective Structure rebate Scheme 1997/98." Monash University Accident Research Centre, Report No. 155.
- Day, L. & McGrath, A. "Unintentional machinery injury on farms in Victoria. Melbourne". Monash University Accident Research Centre, Report No. 148.
- Farmsafe Victoria Notice of Meeting 6 September, 1996. Victorian Farmers Federation.
- Harrison, J.E., Frommer, M.S., Ruck, E.A. & Blyth, F.M. "Deaths as a result of work related injury in Australia 1982-84." Medical Journal of Australia, 1989; 150(6): 118-125.
- Myers, J.R., Snyder, K.A., Hard, D.L., et al. "Statistics and Epidemiology of Tractor Fatalities – A Historical Perspective." Journal of Agricultural Safety and Health, 1998; 4(2): 95-109.
- Springfeldt, B. "Effects of occupational safety rules and measures with special regard to injuries [dissertation]." Stockholm: Royal Institute of Technology, 1993.
- Springfeldt, B., Thorson, J. & Lee, B.C. "Sweden's thirty-year experience with tractor rollovers." Journal of Agricultural Safety and Health, 1998; 4(3): 173-180.
- Victorian Farmers Federation and Occupational Health and Safety Authority (1994). "Roll Over Protective Structure (R.O.P.S) Rebate Scheme."
- Victorian WorkCover Authority. "Regulatory Impact Statement: Occupational Health and Safety (Plant) (Amendment) Regulations 1998."
- Victorian WorkCover Authority. "How many more deaths? Rollover tractor blitz to save lives." Press Release, May 18, 2001.

Unintentional poisoning in early childhood by broad geographic region

Virginia Routley[1], Samantha Chai[2], Justin Lam[2], Joan Ozanne-Smith

Context

Child poisoning, 0-4 years, remains the second ranked cause for injury hospitalisation in Victoria (Stathakis, 1999). There were 8,257 admitted poisonings in this age group over the twelve years 1987/88 to 1998/99.

Figure 1 shows a statistically significant upward trend ($p<0.0001$) in unintentional child poisoning admissions over 12 years from 196.0 per 100,000 in 1987/88 to 248.0 per 100,000 in 1998/99.

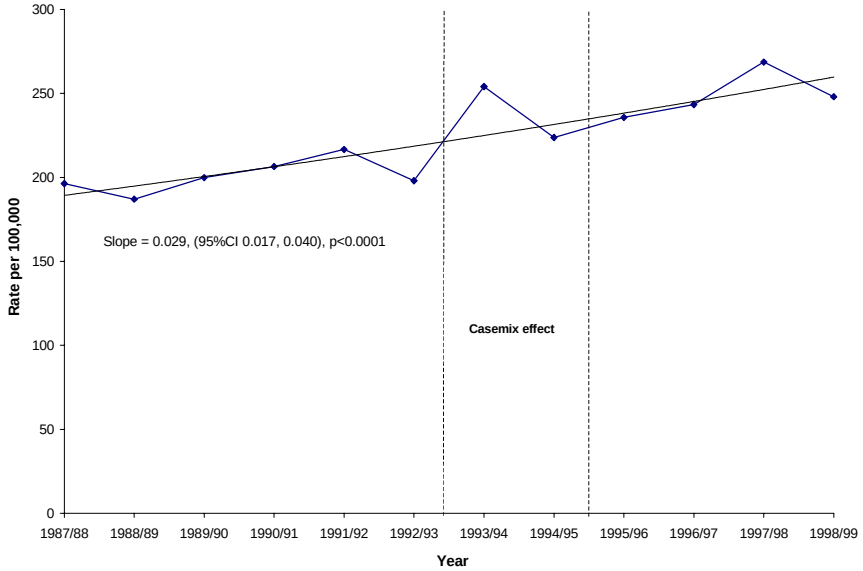
This article explores regional differences in hospital admission and emergency department (ED) rates and management of child poisoning cases. These differences were first described for Victoria in 1999 (Scott and Ozanne-Smith, 1999; 2000). Subsequent Queensland (Hockey et al, 2000) and national data analysis (O'Connor, 2001) have shown similar relationships.

The regional definitions used in this and *Hazard* 46 (Ashby et al., 2001) are Metropolitan centres (Melbourne and Geelong; total population over 100,000); Large and small rural centres (10,000 to 99,000) and Other rural and remote areas (under 10,000). Ashby et al. (2001) reported that unintentional poisoning hospitalisation rates (all-age) were highest among residents of rural centres, followed by other rural and remote areas.

Aims and objectives

The Victorian Admitted Episodes Database (VAED) and the Victorian Emergency Minimum Dataset (VEMD) were explored to further define this problem for children aged under 5 years. The specific objectives were to:

Trend in unintentional poisoning rates for children aged under 5 years, Victoria **Figure 1**



Source: Victorian Admitted Episodes Dataset, 1987/88-1996/97. Update of figure in Stathakis,1999.

- Describe broad regional differences
- Identify any differences in poisoning rates by individual agent
- To determine, to the extent possible with existing data, whether patient management practices differed in the three broad geographical regions

Method

Poisoning admissions and ED data were extracted by individual agent, or agent groupings, to the extent allowed by the available specificity of data. Frequencies and rates were compared between regions for total poisoning for individual agent groupings. Length of stay for admitted cases and departure status for ED presentations were also compared across the geographic regions.

Results

Hospital admissions

The VAED records statewide public hospital admissions for Victoria. In the 12-year period 1987/88 to 1998/99 there were 8,257 young Victorian children hospitalised as the result of an unintentional poisoning (Table 1). Table 1 shows that although 74.1% of young Victorian children reside in metropolitan areas, they only represent 61.5% of poisoning admissions and have the lowest poisoning rate. In contrast, 11.5% of Victorian children reside in rural centres and 14.4% in other rural and remote areas, yet the areas represented 19.6% and 18.9% of poisoning admissions respectively.

For all Victorian regions children aged 1 and 2 years were most likely to incur unintentional poisoning.

Admitted cases stayed longer in the Melbourne metropolitan region. The shortest stays were for residents of rural/ remote areas (Table 2). Table 2 suggests that the rural areas admit cases of lower severity on average.

The distribution of admitted poisoning cases by specific agents and groups of agents is shown for the three geographic regions in Table 3.

[1] Virginia Routley is a Research Fellow at the Monash University Accident Research Centre (MUARC).

[2] Samantha Chai and Justin Lam are 3rd Year Bachelor of Pharmacy students from the Victorian College of Pharmacy on placement at MUARC. They were supervised by Virginia Routley and Karen Ashby.

Unintentional child poisoning, average annual hospital admission frequency and rate by geographic region, Victoria **Table 1**

Region	Admissions (1987/88-1998/99)	Average annual admissions (1996/97 - 1998/99)	Admissions (1996/97 - 1998/99)	Average Vic. ERP* (1997-1999)	Vic. ERP	Average annual rate**
	N	N	%	N	%	per 100,000
Melbourne metropolitan centres (incl. Geelong)	4,917	477	61.5	230,509	74.1	206.9
Rural centres (large and small)	1,570	152	19.6	35,846	11.5	424.0
Other rural/remote areas	1,770	146	18.9	44,923	14.4	325.0
Total	**8,257**	**775**	**100**	**311,278**	**100**	**249.1**

* Estimated Resident Population (ERP) from the Australian Bureau Statistics (ABS), average of 3 years.
** Rates were based on the average age-specific ERP for 1997-99 and average annual hospital admissions for 1996/97-1998/99.
Source: Victorian Admitted Episodes Dataset, 1987/88-1996/97, ABS ERP 1997-1999.

Unintentional child poisoning by length of hospital stay and geographic region, Victoria **Table 2**

Length of stay in	Metropolitan		Rural Centres		Rural/Remote		Total	
Days	N	%	N	%	N	%	N	%
<2	4467	90.9	1454	92.6	1669	94.3	**7590**	**91.9**
2-7	429	8.7	111	7.1	99	5.6	**639**	**7.7**
8-30	18	0.37	4	0.25	2	0.11	**24**	**0.29**
31+	3	0.06	1	0.06	0	0	**4**	**0.05**
Total	**4917**	**100**	**1570**	**100**	**1770**	**100**	**8257**	**100**

Source: Victorian Admitted Episodes Dataset 1987/88-1998/99

After other drugs, common agent groups were analgesics, antipyretics and anti-rheumatics (ie mostly paracetamol) and drugs acting on the central and autonomic nervous system ie Adrenergics/ Parasympathomimetics

For each individual group, the majority of admissions occurred to residents of Melbourne metropolitan areas. However, in almost all cases, the admission rate was greater for residents of both rural centres and rural/remote areas.

Almost one third of agents over-represented in rural areas were aggregated in the other drugs group and these warrant further investigation. The rural rate was also much higher for analgesics, antipyretics and anti-rheumatics (Table 3).

Emergency Department Presentations

The VEMD records presentations of injuries to EDs in 80% of Victorian public hospitals. A total of 5,429 cases of unintentional young child poisoning were reported from January 1996 to December 2000. Almost three-quarters (74.1%) of young children reside in metropolitan areas, and similarly represented 71.8% of poisoning presentations to EDs. In contrast, the 11.5% of Victorian child residents of rural centres accounted for 20.9% of poisoning presentations. The remaining 14.4% of Victorian children who reside in rural and remote areas represented only 7.3% of poisoning presentations (Table 4).

As reflected in the rate of unintentional child poisoning, there is an over-representation of poisoning presentations among child residents of rural centres compared to children living in metropolitan areas. However, there is an under-representation of child residents of remote/rural areas. The latter reflects the differing patterns of health care utilisation across Victoria with residents in rural/remote areas having reduced access to hospital emergency departments (Ashby et al., 2001). Also, minor injuries in rural/remote areas are more likely to be treated by a general practitioner (Day et al., 1997) or to be untreated.

When comparing the rates of total hospital admissions between tables 1 and 4 it is

Unintentional child poisoning, average annual hospital admission frequency and rates per 100,000, Victoria* **Table 3**

Agent E-code group	Metropolitan		Rural Centres		Rural/Remote		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Other drugs	174	75.5	51	143.1	55	121.8	**280**	**90.0**
- *Other specified*							***102***	***32.8***
- *Agents for smooth & skeletal muscles*							***54***	***17.3***
- *Agents for CV system*							***29***	***9.4***
- *Systemic agents*							***29***	***9.3***
Analgesics, antipyretics and anti-rheumatics	78	34.0	25	69.7	19	42.3	**122**	**39.3**
- *Paracetamol*							***69***	***22.2***
- *Other specified*							***39***	***12.5***
Drugs acting on the central and autonomic nervous system	44	19.4	7	20.4	14	31.8	**65**	**21.3**
- *Adrenergics*							***18***	***5.6***
- *Parasympathomimetics*							***17***	***5.6***
Other unspecified solid and liquid substances	36	15.7	13	37.1	12	27.4	**61**	**19.9**
Barbiturates	23	9.8	9	25.9	8	17.1	**40**	**12.8**
Tranquillisers	21	9.0	6	17.6	8	17.1	**35**	**11.1**
- *Benzodiazepines*							***22***	***7.1***
- *Phenothiazine-based tranquilizers*							***8***	***2.7***
Foodstuffs and poisonous plants	22	9.4	6	17.6	5	10.5	**33**	**10.5**
- *Berries & seeds*							***13***	***3.4***
Agricultural and horticultural chemical and pharmaceutical preparations (other than plant foods and fertilisers)	15	6.4	7	20.4	8	18.5	**30**	**9.7**
- *Rodenticides*							***9***	***3.0***
Other psychotropic agents	14	6.1	5	14.8	4	8.2	**23**	**7.4**
- *Antidepressants*							***18***	***5.6***
Petroleum products	9	3.8	7	19.5	5	11.1	**21**	**6.6**
Corrosives and caustics	15	6.5	3	9.2	1	2.9	**19**	**6.3**
Cleansing and polishing agents, disinfectants, paints and varnishes	9	3.9	4	11.2	2	3.8	**15**	**4.7**
Other	17	7.4	9	25.9	6	13.4	32	10.3
Total	**477**	**206.9**	**152**	**424.0**	**147**	**327.2**	**776**	**249.3**

* Frequencies are an average of annual hospital admissions from 1996/7-1998/99. The rates were determined using the average annual population from 1997-99. Any discrepancies in totals are due to rounding off.

Source: Victorian Admitted Episodes Dataset, 1987/88-1998/99, Australian Bureau Statistics Estimated Resident Population 1997-99

clear that there is low capture of VEMD poisoning cases, even allowing for the 80% adjustment. With a total VEMD adjusted presentation rate of 381.1 per 100,000 (Table 4) of whom 24.4% are admitted (including transfers; Table 5) the admission rate is 93 per 100,000. However the admission rate from the VAED is actually 249.1 per 100,000 ie 2.7 times that represented by the VEMD. This under-representation in the VEMD appears to arise from hospital ED staff not recognising that poisonings are injuries and should be classified accordingly. Additionally, a sample of case narratives, from which the agent can be identified found the names of agents missing in 31% of narratives.

Young patients presenting to hospital with poisoning who reside in rural areas, particularly in other rural and remote areas, were more likely to be admitted, albeit for short periods of time, than poisoning cases residing in the Melbourne metropolitan regions (Tables 2 & 5). Summing admissions to a ward, admissions within the ED and transfers, the proportions of young child poisoning presentations admitted were 39% (rural/remote residents), 32.4% (rural centres) and 20.9% (metro) compared with non-poisoning injury admission proportions of 22.6%, 8.3% and 13.1% respectively.

The total proportions admitted for poisoning were therefore higher than for non-poisoning injury in the under 5 age group in all regions, though the difference

Unintentional child poisoning, frequency of ED presentations and rate per 100,000 by geographic region, Victoria **Table 4**

Region	Presentations (1996-2000)	Annual average presentations (1997-1999)		Vic. ERP* (1997-1999)		Average annual rate**
	N	N	%	N	%	per 100,000
Melbourne metropolitan centres (inc. Geelong)	3,978	681	71.8	230,509	74	369.1
Rural centres (large and small)	1,059	198	20.9	35,846	11.5	690.5
Other rural/remote areas	392	70	7.3	44,923	14.4	194.8
Total	**5,429**	**949**	**100**	**311,278**	**100**	**381.1**

* Annual average Estimated Resident Population (ERP) from the Australian Bureau Statistics (ABS)
**Rates were based on the average age-specific ERP for 1997-99 and average annual emergency department presentations for that period. VEMD represents 80% of statewide ED presentations; the rate has been scaled up to represent a Victorian statewide rate.
Source: Victorian Emergency Minimum Dataset, 1996-00, Australian Bureau Statistics Estimated Resident Population 1997-99.

Unintentional child poisoning, departure status from ED by geographic region, Victoria **Table 5**

Departure status	Metropolitan		Rural Centres		Rural/Remote		Total	
	N	%	N	%	N	%	N	%
Discharge home	3088	77.6	699	66.0	235	59.9	**4022**	**74.1**
Admission to ward	608	15.3	317	29.9	142	36.2	**1067**	**19.6**
Admission within ED /short stay obs. unit	117	2.9	20	1.9	6	1.5	**143**	**2.6**
Transfer	107	2.7	6	0.6	5	1.3	**118**	**2.2**
Other	58	1.5	17	1.6	4	1.0	**79**	**1.5**
Total	**3978**	**100**	**1059**	**100**	**392**	**100**	**5429**	**100**

Source: Victorian Emergency Minimum Dataset, 1996-2000.

varied by region. Given that rural centre residents mostly attend their local hospital (92.3%), rural centre hospitals, in particular, appeared much more likely to admit young children presenting with poisoning than non-poisoning injuries.

For most agent groups, residents of rural centres had the highest ED presentation rates, followed by metropolitan centres and rural/remote areas (Table 6).

Rural centres and rural/remote area residents had similarly high proportions of presentations admitted, compared with metropolitan areas, for all agent groups which had sufficiently high numbers to investigate proportions admitted ie for paracetamol, cold and flu preparations, oils and essences, household chemicals and psychoactive agents. The greater likelihood of young child poisoning cases in rural areas being admitted has cost implications for the health care system. This difference may be partially explained by less access to 24 hour medical facilities, greater distance to be travelled if follow-up medical treatment is required and reduced availability of rural emergency and paediatric specialists.

Data recommendations

Victorian public hospital EDs should include all cases of poisoning in the VEMD injury surveillance fields and always specify the agent in a descriptive text narrative.

Research recommendations

Research is required to determine whether there are real differences in serious poisoning rates between regions or if the observed differences in admission rates are the result of patient management practices. The current barriers to the achievement of comparable low rates of admission for urban and regional residents need to be identified and addressed. If rural hospitals have adequate access to toxicology data systems and appropriate biochemical testing facilities, it seems that this issue could be addressed by the development and utilization of protocols for patient management based on best practice models in major paediatric teaching hospitals.

Unintentional child poisoning by major agent, ED presentations, annual average frequency and rate per 100,000 population by regional classification, Victoria* **Table 6**

Major Agents	Metropolitan		Rural centres		Rural/Remote		Total	
	N	Rate	N	Rate	N	Rate	N	Rate
Paracetamol	76.7	41.6	22.0	76.7	7.3	20.4	**106.0**	**42.6**
Cold and Flu preparations	64.6	35.1	13.3	46.5	6.3	17.6	**84.3**	**33.9**
Oils and Essences	54.7	29.6	14.7	51.1	7.3	20.4	**76.7**	**30.8**
Rodenticides	25.3	13.7	10.0	34.9	5.0	13.9	**40.3**	**16.2**
Anti-inflammatories	22.0	12.0	3.3	11.6	3.7	10.2	**29.0**	**11.7**
Benzodiazepines	16.3	8.9	4.7	16.3	2.0	5.6	**23.0**	**9.2**
Cardiovascular	14.7	8.0	4.0	13.9	3.7	10.2	**22.3**	**9.0**
Anti-histamines	13.6	7.4	3.7	12.8	1.3	3.7	**18.7**	**7.5**
Plants	11.0	6.0	4.0	13.9	1.7	4.6	**16.7**	**6.7**
Anti-convulsants	9.7	5.2	3.7	12.8	1.3	3.7	**14.7**	**5.9**
Soaps and Detergents	9.3	5.1	3.3	11.6	1.0	2.8	**13.6**	**5.5**
Turpentine	10.7	5.8	2.7	9.3	0.0	0.0	**13.3**	**5.4**
Anti-depressants	10.3	5.6	2.3	9.3	1.0	2.8	**13.6**	**5.5**

* Annual average rates based on 3 year annual averages for both population and presentations.

Source: Victorian Emergency Minimum Dataset, 1997-1999, Australian Bureau Statistics Estimated Resident Population 1997-1999.

Unintentional child poisoning, ED presentation frequencies and % admitted for major agent groups, Victoria **Table 7**

Major agent groups	Metropolitan		Rural Centres		Rural/Remote		Total	
	N	% adm	N	% adm	N	% adm	N	% adm
Paracetamol	230	14.8	66	24.2	22	27.3	**318**	**17.6**
Household chemicals	211	15.6	73	24.7	28	21.4	**312**	**18.3**
Cold and Flu preparations	194	19.6	40	40	19	36.8	**253**	**24.1**
Oils and Essences	164	26.8	44	45.5	22	45.5	**230**	**32.2**
Psychoactive agents	83	36.1	24	62.5	12	66.7	**119**	**44.5**

Source: Victorian Emergency Minimum Dataset, 1997-1999.

References

- Ashby, K., Stathakis, V., & Day, L. "A Profile of Injuries to Victorian Residents by Broad Geographical Region." Hazard, Edition 46 (March 2001), Victorian Injury Surveillance and Applied Research System (VISAR), Monash University Accident Research Centre, pp.1- 20.
- Day, L., Ashby, K., & Stathakis, V. "Unintentional Farm Injury." Hazard, Edition 33 (December 1997), Victorian Injury Surveillance and Applied Research System (VISAR), Monash University Accident Research Centre, pp.1- 16.
- Hockey, R., Reith, D., & Miles, E. "Childhood poisoning & Ingestion." Injury Bulletin, No. 60 (July 2000), Queensland Injury Surveillance Unit.
- O'Connor, P. "Accidental poisoning of preschool children from non-medicinal substances." Injury Issues Monitor, No. 21 (April 2001).
- Scott,G, Ozanne-Smith,J.1999, Childhood poisoning research recommendations to Department of Health & Aged Care: Victorian Department of Human Services.
- Scott,G, Ozanne-Smith,J. "Barriers to childhood poisoning presentation" paper presented to the 5th World Conference on Injury Prevention and Control, New Delhi, March 2000.
- Stathakis, V. 1999, "Hospitalised injuries Victoria, July 1992-June 1998." Monash University Accident Research Centre, Report No. 160.

Database descriptions

Victorian Admitted Episodes Dataset (VAED)
The VAED contains information on admissions to Victorian hospitals over a 12 year period – July 1987 to June 1999. For most of the period covered, the data was collected by Health Computing Services Victoria under the direction of Human Services Victoria. Detailed information on hospital admissions, from admission to discharge, is collected. The information on the nature of injury is based on the diagnosis by physicians. MUARC has access to all records involving injury and poisoning.

Victorian Emergency Minimum Dataset (VEMD)
The electronic VEMD database records details of injuries treated at the emergency departments of 28 major public hospitals, 26 of which cover a general adult community (see page 19). The total number of cases on the database to April 2001 was approximately 991,779. For most hospitals the period January 1996 to March 2001 is covered. The injury variables collected include injury cause, location, activity, nature of main injury, body region, human intent and a narrative describing the injury event. VEMD hospitals represent approximately 80% of statewide emergency department presentations. The data provided to MUARC does not include all ED presentations, only injury specific cases. Hence it is not possible to analyse any VEMD data which may have been re-categorised to a non-injury grouping. A MUARC study found that the VEMD captured 82% of VEMD injury presentations.

Victorian Injury Surveillance System (VISS)
The original VISS database collected detailed injury data from the emergency departments of 7 campuses of 5 Victorian public hospitals between 1988 and 1996. Data is based on information provided by the injured person (or proxy) and the attending doctor. Collection periods were as follows: Royal Children's Hospital 1988 to 1983; Western Hospital and the former Preston and Northcote Community Hospital 1989 to 1993; Royal Melbourne Hospital March 1992 to February 1994; and Latrobe Regional Hospital July 1991 to June 1996.

Electronic Up-dates

Do you want to receive up-to-date injury information, be advised when the next issue of ***Hazard*** is about to be released, or learn of the latest news and up-dates at VISAR? We are establishing an email list of persons who will receive electronic notification of our latest news. If you wish to be included in this new service respond via e-mail to: christine.chesterman@general.monash.edu.au

**** STOP PRESS ****

VISAR homepage is now up and running

www.general.monash.edu.au/muarc/visar

Hazard 46 Erratum

Table 4, "Profile of injured residents of Metropolitan Centres, Victoria by rank order of injury varibles", page 15 of Hazard 46 (March 2001);

Table 5, "Profile of injured residents of Rural Centres, Victoria by rank order of injury varibles", page 16 of Hazard 46 (March 2001); and

Table 6, "Profile of injured residents of Other Rural and Remote areas, Victoria by rank order of injury varibles", page 17 of Hazard 46 (March 2001).

Magazine formating of tables resulted in the misalignment of various categories for each database. For corrected tables, please refer to the website: www.general.monash.edu.au/muarc/hazard/hazidx.htm. Alternatively, please contact the VISAR office on (03) 9905 1805 for fax copies or email: visar.enquire@general.monash.edu.au.

VISS name change

The Victorian Injury Surveillance and Applied Research System (VISAR) is now the new name for the Victorian Injury Surveillance System (VISS). "VISAR" now completely and more accurately reflects the activities undertaken by the group which include injury surveillance and applied research. Please note that the email address for VISAR has also changed: visar.enquire@general.monash.edu.au . The old email address for VISS; viss.enquire@general.monash.edu.au will remain in operation until further notice.

Hazard Back issues

Are you missing copies of editions of ***Hazard***? Most editions from 1 – 46 are still available singularly or in bound volumes. There is no charge for the single copies and the bound volumes are reasonably priced:

Volume 1 (Editions 1-10) $5.50; Volume 2 (Editions 11-20) $15.00; Volume 3 (Editions 21-30) $22.00; and Volume 4 (Editions 31-40) $33.00. All prices are inclusive of P&H and GST.

Alternatively we have several package offers.

♦ PACKAGE OFFERS ♦	
Volumes 1, 2, 3 & 4	**$66.00**
Volumes 2, 3 & 4	**$55.00**
Volumes 1, 2, & 3	**$38.50**
Volumes 2 & 3	**$33.00**
Volumes 1 & 4	**$36.30**
Volumes 3 & 4	**$45.00**

** *SUPER SPECIALS* **	
Volume 4 x 2 copies	**$55.00**
Volume 3 x 2 copies	**$33.00**
Volume 2 x 2 copies	**$20.00**

Contact Christine Chesterman on 03 9905 1881 or by Fax 03 9905 1809 or email christine.chesterman@general.monash.edu.au to place your order.

Monash University Accident Research Centre (MUARC) home page

Access to up-to-date information on MUARC staff, activities, research and publications are available on the Centre's home page:

www.general.monash.edu.au/muarc

The site is regularly updated with new information on Centre activities. The number of "hits" to the whole site was 222,300 and the estimated number of visitors has grown steadily with more than 88,000 during 2000. The most used information relates to the role of the Centre, its projects, publications and staff, the Centre's car policy, as well as the index to ***Hazard***, research on mass media publicity, international road fatality information and sport fact sheets. VISAR now has its own web page.

www.general.monash.edu.au/muarc/visar

Victorian Injury Surveillance and Applied Research System (VISAR) information service

VISAR offers an information service available to everyone. Information is available for all injury epidemiology for Victoria including deaths, hospital admissions and emergency presentation. Most information requests are completed to within a week depending on current demand, others may take a little longer. Those of a more complex nature may incur a small fee.
Requests can be made by contacting:
Karen Ashby or Maria Corbo on 03 9905 1805 or by
email karen.ashby@general.monash.edu.au and maria.corbo@general.monash.edu.au

- INDEX -

VISAR Executive/Editorial Board

VISAR Staff

Director:	Dr Mark Sinclair Stokes
Co-ordinator:	Ms Karen Ashby
Research Assistants:	Ms Maria Corbo
	Ms Voula Stathakis
Medico/Clerical Support Officer:	Ms Christine Chesterman

General Acknowledgements

Participating Hospitals

From October 1995
Austin & Repatriation Medical Centre
Ballarat Base Hospital
The Bendigo Hospital Campus
Box Hill Hospital
Echuca Base Hospital
The Geelong Hospital
Goulburn Valley Base Hospital
Maroondah Hospital
Mildura Base Hospital
The Northern Hospital
Royal Children's Hospital
St Vincents Public Hospital
Wangaratta Base Hospital
Warrnambool & District Base Hospital
Western Hospital - Footscray
Western Hospital - Sunshine
Williamstown Hospital
Wimmera Base Hospital

From November 1995
Dandenong Hospital

From December 1995
Royal Victorian Eye & Ear Hospital
Frankston Hospital

From January 1996
Latrobe Regional Hospital

From July 1996
Alfred Hospital
Monash Medical Centre

From September 1996
Angliss Hospital

From January 1997
Royal Melbourne Hospital

From January 1999
Werribee Mercy Hospital

From December 2000
Rosebud Hospital

Coronial Services

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

National Injury Surveillance Unit

The advice & technical back-up provided by NISU is of fundamental importance to VISAR.

How to Access VISAR Data:

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

Contact VISAR at:

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

Phone:

Enquiries	(03) 9905 1805
Co-ordinator	(03) 9905 1805
Director	(03) 9905 1815
Fax	(03) 9905 1809

Email:
visar.enquire@general.monash.edu.au

All 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/visar

Project Funded by
Victorian Health Promotion Foundation

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

Hazard was produced by the Victorian Injury Surveillance and Applied Research System (VISAR) with the layout assistance of Ruth Zupo, Monash University Accident Research Centre. Illustrations by Jocelyn Bell.*

ISSN-1320-0593

Printed by Work & Turner Pty Ltd, Tullamarine