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 Victorian Injury Surveillance
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This and the previous edition of Hazard highlight groups of consumer products that hospital injury surveillance data indicate make significant contributions to injury. In this edition, we focus on the emerging concern of injury to older persons related to their increasing use of motorised mobility scooters.

Consumer product-related injury (2): Injury related to the use of motorised mobility scooters

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Summary

- There were 6 motorised mobility scooter (MMS) fatalities recorded for Victoria on NCIS and 151 hospital-treated injuries recorded on the VEMD over the five-year period 2000/01 to 2004/5.
- Hospital-treated injuries are probably up to five times higher than indicated, due to shortcomings in current hospital-based injury surveillance systems that make it impossible or difficult to identify emerging injury issues related to consumer products newly introduced in the marketplace.
- MMS-related injuries may be increasing over time - the annual frequency almost doubled between 2000/1 (22 cases) and 2004/5 (41 cases).
- The very old (persons aged 80 years and older) appear to be over-represented among both fatalities and hospital-treated injury cases. This

phenomenon may be related to exposure.

- All the MMS-related fatalities and around half hospital-treated MMS injury cases were caused by falls. Disappointingly, the VEMD case narratives provided little information on the mechanisms of fall injury. The other major causes of hospital-treated injury cases were collisions with objects lining pathways (bushes, trees and fences, walls etc.), collisions with cars, and tipovers on uneven surfaces or kerbs/gutters.
- Half the hospital-treated injuries occurred in the road environment (roads/streets/footpath) and a further third in the home.
- Three of the six deaths were caused by head injuries. Among hospital-treated MMS cases, almost one-third involved the lower extremity (32%). Head/face/neck and intracranial injuries (25%) and injuries to the upper extremity (21%) were also common.

The emerging issue of MMS injury highlights a fundamental weakness in Australia's consumer product safety system. See special commentary page 12

- The most common injuries overall were open wounds to the head, face and leg and hip fractures

There is sparse data and research on MMS injuries. Four broad classes of contributory factors to injury are apparent: engineering (mainly mechanical/frame and electrical/electronic problems), environmental (mainly related to incline/ramp/curbcuts, change in surface and driveways/street/sidewalk issues), occupant (related to a diverse range of user errors caused by knowledge and skills deficiencies) and system (related to repairs, improper recommendation from a distributor, inadequate training of wheelchair user and inadequate prescription).

Safety issues raised in reports include: competency assessment and training for all potential users; use of safety equipment



(e.g. helmet and seatbelt); licensing and registration; clarification of third party insurance arrangements; regulations restricting MMS use in certain road environments; safer design including the ease of use of the braking control system, improved stability when cornering and crossing kerbs and channels; visibility in traffic; and the hazards MMS pose to other pedestrians. Recommendations address injury surveillance and research gaps and the identified safety issues.

Background

This is the second consecutive edition of *Hazard* focused on groups of consumer products that make significant contributions to hospital-treated injury in Victoria. In the previous *Hazard* (Edition 61) we highlighted that at least 4,000 children are treated in Victorian hospitals each year for injuries related to falls and other mishaps involving playground equipment. In this edition we investigate the injury risk to frail and disabled older people due to their increasing use of motorised mobility scooters. The difficulties we encountered in identifying motorised mobility scooter-related injury cases on hospital injury datasets illustrate some of the shortcomings of current hospital-based surveillance systems for identifying emerging injury issues in a timely manner.

As stated in *Hazard* 61, current injury surveillance data collections cannot identify the level of involvement that can be attributed to the product in causing the injury because of the limited amount of data collected on each case. Products may be involved in injury causation at a number of levels: physical failure (design or manufacturing faults and lack of maintenance); inadequate design (for normal use, for use by target age or ability groups, for foreseeable mishandling or misuse and for protection of bystanders); inadequate instructions/safety warnings; and in ways not influenced by any shortcomings of the product due to misuse beyond the influence of the supplier and unforeseen human and environmental factors (ACA, 1989). Further, in-depth analytical

research is required to prove that products or their use actually cause injury.

In *Hazard* 61 we also outlined the options to improve consumer product injury data that were under consideration in the Australian Productivity Commission’s Review of the Australian Consumer Product Safety System. The Commission’s final report was released in February 2006. The future direction for consumer product safety in Victoria and nationally is discussed in a special article starting page 12.

One major recommendation from the Review was that the Ministerial Council on Consumer Affairs initiates the development of a broadly based hazard identification system to aggregate available information and analysis on consumer product incidents (mainly from existing sources including information from hospital emergency departments and admissions) and disseminate it to all jurisdictions. An alternative option—the establishment of a national fully integrated early warning system involving the centralised collection, processing and assessment of raw data on product-related injury—was deemed too costly for the projected benefits.

Introduction

Motorised mobility scooters (MMS), sometimes known as buggies or gophers but also classified with other motorised (usually electric) mobility devices under the generic terms ‘motorised wheelchairs’ or ‘motor chair’ by State road and other authorities, are growing in popularity in Australia as older and disabled people strive to maintain active, independent lifestyles.

New makes and models are proliferating and safety concerns have been raised in a number of forums because MMS are starting to be viewed by older people as an alternative to the motor vehicle rather than only as an aid for those who have trouble walking any distance due to a physical disability or a health condition. Under Australian Road Rules, MMS users are classed as pedestrians and their use is restricted to injured or disabled people.

MMS can be legally ridden on the footpath but must not be capable of travelling more than 10km/hr on level ground. In Victoria, MMS cannot be registered and there is no driver’s licence requirement. MMS users must observe the pedestrian road rules and must not travel on the road except where a footpath or nature strip is not available, is being repaired or is unsafe due to damage.

Over the past few years VISU has received a number of requests for data on MMS-related injuries. The difficulties we faced identifying these injury cases on fatality and hospital injury surveillance databases provide a good illustration of the shortcoming of available hospital-based injury datasets for the identification of emerging injury issues relating to newer consumer products. They also highlight inadequacies in the Australian consumer safety system.

Method

Currently there are no codes to separately identify MMS-related injury cases on ICD-10 for any cause of injury (transport, falls etc.) so fatalities and hospital admissions data cannot be extracted from the ABS-DURF and the VAED. Consequently, we relied on word-searches of Victorian fatality reports on the National Coroners Information System (NCIS) and the narrative (free text) data on VEMD (for both hospital admissions and E.D. presentations - non-admissions) to identify and extract MMS-related injury cases.

Cases recorded on NCIS were identified by the following searches:

- (1) Keyword search of coroners’ findings for the term motorised and scooter
- (2) Object coding for –Personal use item- Other specified personal use item-Wheelchair
- (3) Object coding for Land Vehicle- Other specified vehicles-free text (for reference to a motorised wheelchair, scooter, motorised pushbike).



Thirteen Victorian cases were found and seven were excluded after checking for eligibility, leaving six cases.

Preliminary analysis of VEMD case narratives revealed that MMS were commonly just described as ‘scooters’ in the text, so case record selection involved the following age-based culling ineligible cases:

- (1) A text search for the descriptors ‘scooter’ and ‘gopher’ was conducted on case narrative data for all cases recorded on the VEMD between July 1, 2000 and June 30, 2005.
- (2) All case records that contained the word ‘gopher’ in the narrative were retained.
- (3) If the injured person was aged 60 years and older and the case record contained the word ‘scooter’, the record was retained unless other information in the full text narrative indicated that the scooter was not a motorised

mobility scooter (which occurred in 40 of 149 records).

- (4) If the injured person was aged less than 60 years, the case record was deleted if the narrative contained the word ‘scooter’ but the scooter was not described as ‘motorised’.
- (5) If the injured person was aged between 50 and 59 years, the case record was deleted if the narrative contained the words ‘motorised scooter’ but other information in the full text narrative indicated that the motorised scooter was unlikely to be a mobility scooter.
- (6) If the injured person was aged less than 50 years, the case record was deleted if the narrative contained the words ‘motorised scooter’ without the word ‘mobility’ or other wording that indicated that the scooter was a mobility aid.

Results

Deaths

ICD-10 coding of death data on ABS-DURF is very restricted and there is no code to separately identify motorised mobility scooter-related deaths. A search of the National Coroners Information System (NCIS) found that six MMS-related fatalities were reported to the Victorian Coroners Office over the 5-year period July 1 2000 to June 30, 2005.

Five of the six MMS-related fatalities were aged above 70 years and four were male. All fatal incidents involved a fall from the scooter. All the deceased were in very poor health at the time of the fall incident.

Hospital-treated injury cases (n=151)

The VEMD underestimates the size of the problem due to missing or inadequate case narratives, which are supposed to contain

Details of motorised mobility scooter-related fatalities recorded on the NCIS (n=6)

Table 1

Demographics	Circumstances of motorised mobility scooter-related death
Male aged in his 70s, residing at home	<i>The deceased, who was in poor health, fell when alighting from his motorised mobility scooter in the garage of his home. He suffered a fractured left neck of femur (hip) and died subsequent to the operation to surgically repair the fracture, due to renal failure and severe cardiac impairment.</i>
Female aged in her 90s, residing at home	<i>The deceased, who was in poor health, lost control of her four-wheeled motorised scooter when traveling downhill in a street near where she lived, crashing it at the bottom of the hill. The severe head injuries she suffered, including a fractured skull, caused her death. The scooter was found to be in normal working order.</i>
Female aged in her 50s, residing at home	<i>The deceased, who suffered from diabetes and was in poor health due to recurrent strokes, fell from her motorised scooter near her home. She was transported to hospital for treatment of left hip pain but died two days later. Cause of death was pulmonary thromboembolism.</i>
Male aged in his 80s, residing in a hostel	<i>The deceased was found unconscious in his hostel bed after having a fall from his scooter into the gutter the day before. He had suffered laceration to his head from the fall but went to bed the night of the fall reportedly feeling well. Cause of death was acute subdural haematoma.</i>
Male aged in his 80s	<i>The deceased, who was in poor health due to ischaemic heart disease, had a fall from his mobility scooter. He was assisted, still conscious, back onto his scooter and accompanied to a nearby medical clinic. He became unconscious while at the clinic and was transferred by ambulance to hospital where he died the next day. Cause of death was bilateral acute subdural haematomas.</i>
Male aged in his 90s	<i>The deceased was moving to a new place of residence and complained of breathing difficulties during the move. He was believed to be on his way to keep a doctor’s appointment when he was found unconscious (to the right of his motor scooter) by local shopkeepers. There were no witnesses to the fall incident. He was treated by a passing Ambulance Service unit but stopped breathing and had no pulse. He could not be revived. Cause of death was recorded as ischaemic heart disease.</i>

Source: National Coroners Information System. Cases reported to the Victorian Coroners Office, published with the permission of the VCO.



more detailed information on the mechanism and circumstances of injury. Available data indicate there were at least 151 hospital-treated injury cases in Victoria related to motorised mobility scooters over the 5-year period July 1 2000 to June 30 2005, 66 hospital admissions and 85 E.D. presentations, non-admissions. The number of cases almost doubled over the 5-year period from 22 cases in 2000/1 to 41 cases in 2004/5.

Pattern of injury

Table 2 summarises and compares the frequency, causes and pattern of motorised mobility scooter injury admissions and E.D. presentations (non-admissions).

- Females were over-represented in hospital-treated mobility scooter injury cases (54%), with the gender difference being most pronounced among admissions (females 67%, males 33%).
- The age pattern was fairly consistent for admissions and E.D. presentations (non-admissions). The overall peak age group for injury was 85-89 year olds (23%). The age group 70-74 years was over-represented in admissions compared to E.D. presentations (27% vs. 7%) and vice-versa for 75-79 year-olds (18% vs 7%).
- Falls were the most common cause of both admitted (53%) and non-admitted (61%) injury cases. Transport-related injuries (struck by/collision with car) accounted for 11% of injuries overall, but 17% of hospital admissions.
- Lower extremity injuries accounted for almost half of the hospital admissions (46%). Injuries were more evenly spread across body sites — head/face/neck (29%), upper extremity (27%), and lower extremity (21%)— among E.D. presentations (non-admissions).
- Fractures accounted for half of the hospitalisations (50%). Among E.D. presentations (non-admissions), open wounds (34%) and superficial

injuries (20%) were the most common injury types.

- The most frequently occurring specific injuries overall were open wound to the head (7%), open wound to the lower leg (7%), hip fracture (7%) and open wound to the face (6%).
- The patterns of activity when injured and location of injury were similar. ‘Leisure’ was the most frequently recorded activity at the time of injury (58% of both admitted and non-admitted cases) and the road, street and highway the most common location of injury (53% of admitted cases and 51% of non-admitted cases), followed by the home (29% and 33% respectively).

Causes and circumstances of injury

Falls (n=87)

Most injuries were caused by falls (n=87, 58% of all hospital-treated injuries). With the exception of the following records the case narratives do not provide useful additional information on the circumstances of the fall:

- *Injury to the head/scalp following a fall off motorised scooter, had been drinking heavily*
- *Fell off mobile scooter, laceration to forehead, had been drinking*
- *Ejected and fell from scooter when accelerator was inadvertently pushed*
- *Fell from upright position when trying to get on electric scooter*
- *Fell out of scooter whilst bending over to pick something from footpath*
- *Fell off scooter on foot path*
- *Fell from scooter in church*
- *Absconded from seniors’ village on a motor scooter and had a fall.*

Collisions with other objects (n=17)

Injuries also occurred as a result of a collision with objects (n=17, 11%), often objects lining pathways:

- *De-gloving of finger as a result of crashing gofer/scooter into a bush*
- *Lacerated right leg injury sustained when electric scooter ran into bush*

- *Driving motor scooter at 8km/hr. collision with fence, foot became entangled, scooter kept going leaving patient behind, externally rotating right ankle and knee*
- *Hit by automatic door whilst shopping-riding in motorised scooter, sustained a fracture of the right tibia and fibula*
- *On scooter at home when front wheel got caught in garden bed, patient attempted to release scooter but accidentally reversed, she was thrown off and hit cement wall*
- *Back pain, low lumbar - was pushed by motor scooter against wall*
- *Riding scooter, ran into tree*
- *Riding motorised scooter down hill when hit head on guardrail*
- *Patient was shopping, had collision with a pram and was knocked off her motorised scooter*
- *Driving electric scooter, hit curb fell out of scooter*
- *Fell off motorised scooter when hit curb*

Collisions with motor vehicle (n=16)

Eleven percent of injuries were caused by collisions with cars (n=16). Most narratives simply stated that the scooter and a car collided with no further details of the circumstances. The following records provided some additional information:

- *Painful right foot, post collision with car, was on scooter crossing road, right foot bruised*
- *Crossing road on motorised scooter when hit by car at low speed, damage to scooter*
- *Riding motorised scooter on footpath, hit by a car backing out, patient has fractured neck of femur*
- *Driving a motorised scooter, hit from behind by car*

Roll/tip overs (n=7)

Rolling the scooter or being tipped from it accounted for an additional 5% of MMS injuries (n=7).

- *Scooter incident, overbalanced and rolled to gutter from footpath*
- *Using battery scooter chair on uneven ground and it rolled, pain to right shoulder unable to raise arm*



Pattern of hospital-treated motorised mobility scooter related injury, July 2000-June 2005 Table 2

	<i>Motorised mobility scooter hospital admissions</i>		<i>Motorised mobility scooter E.D. presentations, non-admissions</i>		All hospital-treated motorised mobility scooter injury cases	
	(n=66) Frequency	Proportion	(n=85) Frequency	Proportion	(n=151) Frequency	Proportion
Year of presentation						
2000/1	9	13.6	13	15.3	22	14.6
2001/2	12	18.2	10	11.8	21	13.9
2002/3	13	19.7	18	21.2	31	20.5
2003/4	18	27.3	18	21.2	36	23.8
2004/5	15	22.7	26	30.6	41	27.2
Gender						
Male	22	33.3	47	55.3	69	45.7
Female	44	66.7	38	44.7	82	54.3
Age						
50-54 years	2	3.0	0	0	2	1.3
55-59 years	0	0	0	0	0	0
60-64 years	1	1.5	9	10.6	10	6.6
65-69 years	7	10.6	10	11.8	17	11.3
70-74 years	5	7.6	15	17.6	20	13.2
75-79 years	18	27.3	6	7.1	24	15.9
80-84 years	10	15.2	14	16.5	24	15.9
85-89 years	15	22.7	20	23.5	35	23.2
90+ years	8	12.1	11	12.9	19	12.6
Cause						
Falls	35	53.0	52	61.2	87	57.6
Struck by/collision with other object	9	13.6	8	9.4	17	11.3
Transport: struck by/collision with car	11	16.7	5	5.9	16	10.6
Unspecified external causes	7	10.6	17	20.0	24	15.9
Body site injured						
Head/face/neck	9	13.6	25	29.4	34	22.5
Trunk	8	12.1	8	9.4	16	10.6
Upper extremity	9	13.6	23	27.1	32	21.2
Lower extremity	30	45.5	18	21.2	48	31.8
Multiple body regions	7	10.6	9	10.6	16	10.6
Other specified body region	2	3.0	2	2.4	4	2.6
Unspecified body region	1	1.5	0	0	1	0
Nature of injury						
Fracture	33	50.0	11	12.9	44	29.1
Dislocation, sprain & strain	7	10.6	14	16.5	21	13.9
Open wound	9	13.6	29	34.1	38	25.2
Superficial injury	3	4.5	17	20.0	20	13.2
Multiple injuries	4	6.1	3	3.5	7	4.6
Other specified injury	8	12.1	8	9.4	16	10.6
Unspecified injury	2	3.0	3	3.5	5	3.3
Activity						
Leisure	38	57.6	49	57.6	87	57.6
Vital activity, resting, sleeping, eating	6	9.1	8	9.4	14	9.3
Other specified	12	18.2	21	24.7	33	21.9
Unspecified activity	10	15.2	7	8.2	17	11.3
Location						
Road, street or highway	35	53.0	43	50.6	78	51.7
Home	19	28.8	28	32.9	47	31.1
Place for recreation	1	1.5	4	4.7	5	3.3
Residential institution	2	3.0	2	2.4	4	2.6
Other specified places	7	10.6	5	5.9	12	7.9
Unspecified places	2	3.0	3	3.5	5	3.3

Source: VEMD July 2000-June 2005, admissions and non-admissions included



- *Riding scooter, tipped over when getting out of it*
- *Scooter accident, overbalanced and rolled to gutter from footpath*

Other cases

The remaining case records (n=24,16%) did not provide any further details on the circumstances of the injury event

Discussion

There were 6 motorised mobility scooter (MMS) fatalities (recorded on NCIS) and 151 hospital-treated injuries (recorded on the VEMD) over the five-year period 2000/01 to 2004/5. Hospital-treated injuries are probably up to five times higher than found, due to data coding and quality issues that make it impossible or difficult to identify emerging injury issues related to newly introduced consumer products in current hospital-based injury surveillance systems.

The only comprehensive data on the number of MMS in use in Victoria is sourced from the 1998 and 2003 ABS Survey of Disability Ageing and Carers. Unfortunately, scooter use data by persons with a disability were reported differently from each survey. The 1998 survey found that 11,700 adult Australians with a disability were using mobility scooters, 0.4% of the total number of adults with a disability living in households in 1998. The term 'household' excludes persons living in special accommodation. Fifty-three per cent of adult scooter users were aged 64 years and over. Extrapolating from these data, the estimated figure for Victoria in 1998 is approximately 2,500 adult mobility scooter users. The 2003 survey found that a total of 24,000 Australian adults and children with a disability living in private and non-private dwellings (which includes those living in special accommodation) used a mobility scooter. The Victorian figure for adults only was 8,700 scooter users (personal communication, Ken Black, Australian Bureau of Statistics), indicating a more than 3-fold increase in the use of the mobility scooters by adult Victorians over the 5-year period between surveys. No comprehensive Victorian sales data are available including sales to government agencies and direct sales to

members of the public. Data supplied by the Victorian Department of Human Services (DHS) Aids and Equipment Program (A&EP), the largest government scheme supplying mobility aids in Victoria, show that a total of 1,500 mobility scooters were purchased and supplied to Victorians persons with a disability through this scheme since July 1, 1997 (Department of Infrastructure, 2002).

Our analyses of available VEMD injury data indicated that MMS-related injuries have increased concomitantly and that females and the very old (persons aged over 85 years) are over-represented among injury cases. These findings probably relate to higher exposure to MMS in these groups. Around half the MMS hospital-treated injury cases were caused by falls but, disappointingly, the VEMD case narratives provided little information on the mechanisms of fall injury, other than indicating alcohol involvement in some cases. The other major causes were collisions with objects lining pathways (bushes, trees, fences, walls etc.), collisions with cars, and tipovers on uneven surfaces or kerbs/gutters. Half the injuries occurred in the road environment (roads/streets/paths) and a further third in the home. The most common injuries overall were open wounds to the head, face and leg and hip fractures. Head /face/neck and intracranial injuries accounted for 25% of all injuries.

These findings suggest that human factors (user incompetence related to lack of training or lack of prerequisite competencies for safe operation, alcohol misuse, non-wear of safety equipment such as seat belt and helmet), design and engineering factors (MMS steering and braking systems, device instability) and environmental factors (uneven terrain/pathway surface, poor engineering of kerbs and gutters) play some role in injury causation.

Our literature search found no published studies exclusively focussed on MMS injury and only one study that separately reported injuries related to MMS use from powered and manual wheelchair-related injuries. Kirby et al. (1995) extracted adverse reports on injuries related to wheelchairs from the United States Food and Drug Administration (FDA) databases for the period 1975 to 1993. The FDA is the equivalent to Australia's Therapeutic Goods

Administration (TGA). There were 368 wheelchair-related injuries recorded on the FDA database, 53% of which were related to the use of scooters, 25% to powered wheelchairs and 23% to manual wheelchairs. The authors comment that the number of incidents recorded on the FDA database was 'surprisingly small' (an average of 58.2 per year) given that an average of 51.3 wheelchair-related deaths were reported per year from the U.S. deaths certificate database and more than 36,000 E.D. presentations were reported annually from the National Electronic Injury Surveillance System (NEISS) database in the same period.

Four broad classes of contributory factors (n=1276 factors in 651 records) were implicated in FDA-reported injury cases: engineering (61%, mainly mechanical/frame and electrical/electronic problems), environmental (25%, mainly related to incline/ramp/curbscuts, change in surface and driveways/street/sidewalk issues), occupant (10%, related to a diverse range of occupant errors) and system (5%, related to repairs, improper recommendation from a distributor, inadequate training of wheelchair user and inadequate prescription). Environment (~30%) and occupant (~24%) factors formed a comparatively higher proportion of contributory factors in mobility scooter injury incidents than wheelchair injury incidents, and engineering factors (~53%) a comparatively lower proportion.

There was a high frequency of tip/falls injury cases (n=328) in the U.S. series mainly due to environmental factor (75%); uncontrolled movement of vehicle (11%), collision (5%), executing a turn (5%); leaning/reaching (4%) and slipping out (1%). This pattern underlines the importance of controlling environmental hazards and improving MMS design especially in relation to stability. Compared to wheelchair tip/falls, which were most commonly forward falls, scooter tip/falls were more likely to be in the lateral and rear direction, which the authors attributed to the narrow triangular footprint of 3-wheeled scooters. The most common injuries were fracture (46%) and lacerations, contusions and abrasions (42%). The most frequently injured body site was the lower extremity (39%, evenly spread across hip and thigh, knee and leg, ankle and foot) followed



by the head and neck (26%) and the upper extremity (26%, mostly wrist and hand injuries).

The safety concerns around MMS use raised by our study, the FDA research study reported above, in published Australian reports on scooter safety (Brownsdon & Marcar, 2002; Brownsdon, 2002; Muir 2004) and overseas studies on motorised wheelchair injury were all raised in State Parliamentary Inquiries in Western Australia (Missikos & James, 1997) and Victoria (Parliament of Victoria, 2003). Victoria's Parliamentary Road Safety Committee undertook an inquiry into issues affecting the safety of older road users in 2003 that included the safety implication of pedestrian mobility devices. MMS safety issues raised included: competency assessment and training for all potential users; use of safety equipment when used on-road (e.g. helmet and seatbelt); licensing and registration; clarification of third party insurance arrangements; regulations restricting MMS use in certain road environments; safer design including the ease of use of the braking control system, improved stability when cornering and crossing kerbs and channels; visibility in traffic; and the hazards MMS pose to other pedestrians.

The Parliamentary Road Safety Committee expressed concern that no government agency was taking a lead in determining whether or not MMS should be regulated, licensed or registered and recommended that VicRoads develop safety standards for MMS; regulate their use on public roadways and pathways; investigate third party insurance aspects of their use; and conduct an awareness campaign focussing on the rights and responsibilities of users, for both the user and the general public.

These recommendations were only supported in part by the government in its written response to the Committee (VicRoads, 2004). The government accepted the recommendation that a MMS safety awareness raising/education campaign was needed. In response, VicRoads has produced a booklet "Guide for choosing and using a mobility scooter" that will be released around mid-year 2006 for broad distribution (Personal communication, Tricia Williams, VicRoads). Some other useful online or print educational material aimed at

the consumer and covering selection, suitability and safe use of MMS has been produced by Choice magazine (www.choice.com.au), Council of the Ageing (COTA) in the ACT (www.cota-act.org.au), Bass Coast Shire Council, Gippsland (www.basscoast.vic.gov.au), the Australian Government Department of Veterans' Affairs (www.dva.gov.au), the Independent Living Centre of South Australia (www.ilc.asn.au), and Department of Main Roads Western Australia (www.mrwa.gov.au).

With reference to registration and insurance, the government response was that MMS cannot be registered as a motor vehicle in Victoria so Third Party Insurance is not applicable. This position contrasts with registration and Third Party Insurance arrangements in other Australian States. For example, in New South Wales, South Australia and Queensland, MMS are covered by Third Party Bodily Injury Insurance when used on public roadways/footpaths.

Queensland, however, is the only State in Australia that requires registration for MMS and other motorised wheelchairs used by a person with a disability on a road or footpath (Queensland Transport, 2006). In Queensland, motorised wheelchairs including scooters may be registered to an individual or to organisations like nursing homes, shopping centres, educational institutions and hire companies. There are no fees payable for registration or Compulsory Third Party (CTP) Insurance for motorised wheelchairs, however free CTP is provided by the nominal defendant if the MMS is registered. At the time of registration by an individual, the applicant must produce a doctor's certificate confirming that due to severe movement impairment they have need to use the device for assisted travel, and make a statement that they will abide by the road rules. Similarly, at the time of registration an organisation is required to provide a statement certifying that the device for assisted travel will only be used by persons producing a doctor's certificate qualifying them for use, and only by those who also make a statement that they will abide by the road rules.

Party Insurance in Victoria, the alternative source of public liability insurance for MMS

Given that MMS cannot be covered by Third owners is home (building) contents insurance or separate public liability insurance. A scooter interest group formed in NSW (the NRMA Scooter Group) enlisted the aid of the Insurance Council of Australia to canvass its members on public liability coverage for MMS (Brownsdon & Marcar, 2002). Only one insurance group (IAG) gave a clear response, indicating that the client would be covered for theft, damage and public liability if the driver had listed their scooter as a 'specified and mobile item' on their home contents insurance policy.

Enquiries made for this report to RACV (aligned with but not owned by the IAG insurance group) National Seniors Insurance (through Allianz) and the Australian Pensioners Insurance Agency elicited the information that their household contents (personal effects) insurance policies cover MMS, provided the client specified the item as a personal effect/portable valuable and the MMS is not a registered vehicle and covered by Third Party Insurance (personal communication, RACV, NSI & APIA memberline consultants). Lundie Insurance Brokers provide 'Electric Shuttle Insurance' which includes coverage for legal liability (property damage and bodily injury to \$10,000,000) and death by accident (to \$10,000) (www.lundie.com). There may be other providers.

The public liability insurance situation for MMS in Victoria needs to be communicated to MMS owners as it differs from that operating in other states of Australia. It is crucial that MMS owners take out household contents (personal effects) or discrete mobility scooter insurance with an insurance company that covers them for public liability in the event of a scooter mishap causing injury to a third party or damage to property outside the client's home and on the footpath and road (if a footpath is not available). They need to make specific enquiries and read the fine print on the policy to check on coverage. A related issue is the availability of roadside assistance for MMS users in the event of breakdown. Enquiries revealed that it is available from motoring organisations such as the RACV.



MMS purchase is not regulated and competency assessment, training and licensing are not mandatory in any Australian State. However, both competency assessment and training are prerequisites for people with disabilities applying for MMS through Federal and State funded Disability Services assistance programs such as the Commonwealth Department of Veterans' Affairs (DVA) Rehabilitation Appliance Program (RAP) and the Victorian Department of Human Services Aids and Equipment Program (A&EP), and for persons covered by Transport Accident Commission (TAC) and WorkCover insurance. The process for applying for an MMS through DHS A&EP (open to all Victorians) and DVA RAP (open to war veterans or their dependents) involves a competency assessment by a qualified therapist (usually a physiotherapist or occupational therapist employed by a Community Health Service but may be a private practitioner) who applies on behalf of the patient and then takes responsibility for the training of the patient in the use of the device if supplied (personal communication, Claire Bingham Department of Human Services).

Any Victorian interested in purchasing a scooter can access advice from a qualified therapist (an occupational therapist or a physiotherapist) through the Independent Living Centre (Victoria) located at Yooralla's Brooklyn address (personal communication, Cath Williams, Manager, ILC). The ILC provides a telephone advisory service or, for a small fee of \$15 for pensioners and \$30 for non-pensioners, provides a 90-minute appointment with a therapist that includes trial driving of different scooters in indoor and outdoor environments. The therapist will match the scooter to the person's skills and abilities and provides written advice on the most appropriate model/s. This service is not regarded as a full assessment because it does not include a home visit. The ILC also runs scooter education workshops for therapists.

There is no systematic and comprehensive provision of scooter training in Victoria, although an internet search and anecdotal information indicated that a few local councils and health and disability services have provided training on an adhoc basis. The ILC does not provide training as most of its clients are referred by community health services or other

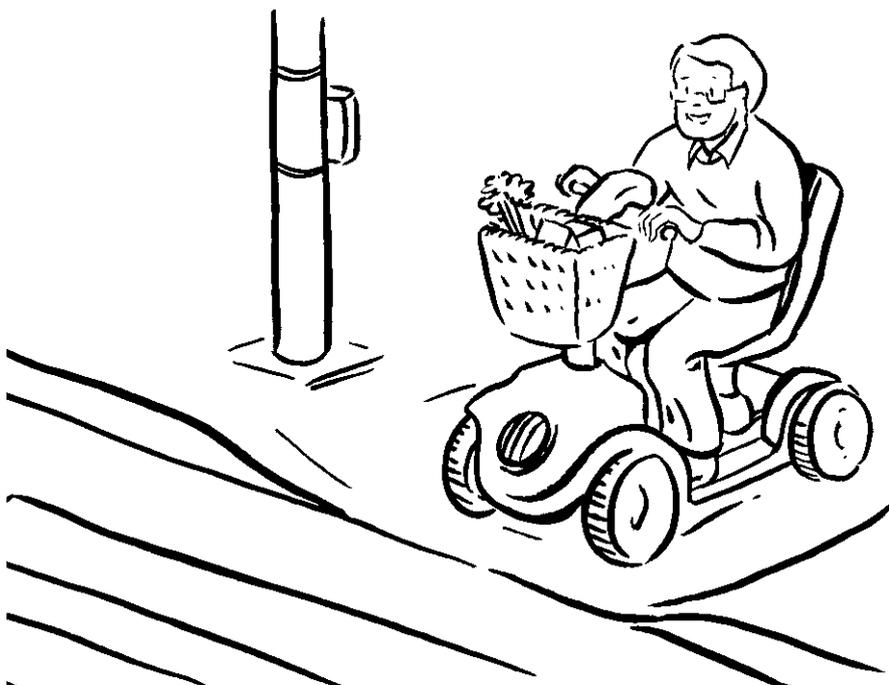
agencies servicing people with disabilities and these services usually provide some individual training when the MMS is delivered. Some of these services also run scooter training days, but again provision is not systematic and many MMS users probably receive inadequate or no formal training.

A comprehensive training resource, *Scooter Safe*, is available through the National Roads and Motorists' Association (NRMA), accessed on-line at

(http://www.mynrma.com.au/safety_scooter_safe.asp) and COTA (ACT) (<http://www.cota-act.org.au>). COTA (ACT) and Able Access prepared this resource in 2002 for use by occupational therapists and community health professionals who prescribe MMS as a mobility aid, suppliers of MMS and equipment services. It is not designed as a tool for assessing a person's potential for safe MMS use. The resource includes: *The Training Handbook*; an IBM compatible disk containing a Power Point presentation of the 5 training modules; templates for overhead transparencies; the *Scooter Safe User Guide* (for participants); a training video: *There's something about scooters*; and a resource list for further information. The training, which may be done in one workshop or spread over several sessions, covers five modules: (1) Rights and responsibilities of motorised wheelchair users; (2) Safe motorised wheelchair driving practices; (3) Australian Road Rules; (4) Maintenance of motorised wheelchairs; and (5) Practical session (conducted outdoors on an obstacle course).

The development of this resource involved piloting the training with groups of MMS users. Some participants exhibited limited knowledge of road and pedestrian safety rules and the limitations of their scooter and many had skills deficiencies especially in ramp use, manoeuvring in a tight space and reversing (Brownsdon & Marcar, 2002).

Suppliers may also provide training in scooter use, but the length of training reportedly varies from a quick 'how-to' to a 1-hour instruction session by a specialist supplier (Brownsdon & Marcar, 2002). The Manager of the ILC in Victoria



commented that good suppliers recognise they are not trainers and refer customers to the ILC or other disability service organisations with trained therapists for assessment and training (Personal communication, Cath Williams, ILC). Brownsdon and Macar (2002) concluded from their investigations in the ACT that key suppliers of MMS appear to be operating responsibly. However, they found that matching of the user's personal characteristics and abilities (and projected MMS usage) to the most appropriate MMS was not always performed adequately by all suppliers and that introductory training by suppliers varied in quality. MMS are also available on the second-hand market and purchasers may not access any expert advice on the suitability of the device, or any training.

Brownsdon & Macar recommended that the ACT government, in partnership with interest groups, develop a compulsory Code of Conduct for suppliers. No action has been taken on this recommendation (Personal communication, Allan Brownsdon, COTA- ACT). However, the Department of Main Roads, Western Australia has produced a set of guidelines for suppliers in response to key recommendations in the report 'Mobility with Safety' prepared for the Ministerial Review Committee on Wheelchair Safety (1997). The published Guidelines cover best practice in standards of service provision, information and training and customer focus and provide a good blueprint for the development of a 'Code of Practice' for suppliers in Victoria (www.mrwa.gov.au).

With respect to safe design, the respective role of government bodies that have some responsibility under federal and state legislation for the safety of MMS requires clarification. Responsibility is divided between the Therapeutic Goods Administration (TGA), Consumer Affairs bodies (state and federal) and State Road Authorities.

The Therapeutic Goods Act is only relevant if the sponsor/manufacture of the MMS

makes a therapeutic claim for the device, but most manufacturers of MMS sold in Australia would not make such a claim. If the manufacturer claims that the device is therapeutic then, under the *Therapeutic Goods (Medical Devices) Regulations 2002*, the mobility scooter would have to be registered on the Australian Register of Therapeutic Goods (ARTG). MMS are grouped with wheelchairs and classified as a Class 1 medical device, the lowest of four risk classifications (TGA, 2003). As such, they undergo a less stringent form of conformity assessment than higher-class devices and are not required to be certified by the TGA or an overseas-notified body.

The responsibility of conformity assessment of safety and performance (against the essential principles detailed in the regulations) rests with the manufacturer. Inclusion of the medical device on the ARTG by the TGA denotes approval for supply in Australia. Advertisements for devices included on ARTG must comply with the Therapeutic Goods Advertising Code and the manufacturer of the device is responsible for post market surveillance (information gathering about device performance in the market including the conduct of customer surveys and investigation of customer complaints) and vigilance (mandatory reporting of adverse events to the TGA). The authors understand that there are TGA regulatory requirements for advertising and labelling that must be met for all medical devices.

The ILC (Victoria) has organised workshops for Victorian wheelchair (including MMS) suppliers to ensure they are aware of their responsibilities under TG regulations. The TGA is responsible for post-market monitoring of compliance including product reviews, manufacturing site audits and product testing.

Given that most MMS on the market would not fall under the umbrella of the TGA because manufacturers would not register them on the ARTG, buyers of MMS have to rely for protection on the general consumer product safety and fair trading

provisions of the *Federal Trade Practices Act 1974* and the *Victorian Fair Trading Act 1999*. Unsatisfied consumers can register complaints about faulty products or unfair trading practices to the Australian Competition and Consumer Commission (ACCC) or Consumer Affairs, Victoria or seek redress through the VCAT Small Claims Tribunal. While there are Australian Standards that guide the design and manufacture of wheelchairs (including MMS) they are not mandatory or performance based and individual manufacturers may use them at their discretion.

There are currently 19 separate but related Australian Standards (AS) on manual and electric wheelchairs, including motorised scooters (see list in references) which are based on three International Standards (ISO 6440 *Wheelchairs – Nomenclature, terms and definitions*; ISO 7176: 1998 – *Wheelchairs; Parts 1-14* (a series of methods of test and measurement of wheelchairs) and ISO 7930 – *Wheelchairs type classification based on appearance*). Because MMS are very different vehicles to wheelchairs, there have been calls for Standards Australia to develop separate standards for MMS (Brownsdon & Marcar, 2002; Brownsdon, 2002; Muir 2004). The Wheelchair Safety at Rail Level Crossings Taskforce also raised several concerns about the adequacy of the current Standards and recommended further research into aspects of wheelchair design (mainly related to safe negotiation of railways tracks and stability) and consideration of mandatory standards for wheelchairs (Department of Infrastructure, 2002).

The Australian Standards for wheelchairs are currently under review by the relevant Committee of Standards Australia at the behest of the TGA. It is a major revision. The new Australian Standards will follow the requirements of the European Standards (EN 12183:1999 – Part 1 *Manual wheelchairs* and EN 12184 – Part 2 *Electrically powered wheelchairs scooters and their chargers*) as these are viewed as vastly superior to the ISO standards and are performance based (personal communication, Diana Mead, Standards Australia). The development of the new Standards, even though they are based on



existing international standards, requires a great deal of work and it is anticipated that they will not be put out for public comment until the end of 2006, with a projected release date in mid-2007. Unfortunately, Standards are unlikely to deal sufficiently with the user-device interface issues identified by our research. A co-ordinated national approach is needed and a lead authority needs to be identified urgently to take control of what may be an impending epidemic of deaths and injuries associated with MMS.

The other major area that requires attention is improvements to injury surveillance data systems to ensure that MMS injury cases (and other emerging consumer product-related injury cases) presenting to hospitals are captured on the datasets in a timely way. The National Coroners Information System (NCIS) is a good source of data on emerging injury issues in relation to injury fatalities because the database has a function to word-search all text reports on the database to identify cases related to the consumer product of interest (NCIS, www.ncis.org.au). Full Coroners' Reports provide reliable information, where it is available, on the contribution of the consumer product to the fatal injury.

By contrast, current hospital-based injury surveillance systems are not adequately geared to provide early warning of consumer product involvement in injury and also do not supply complete and reliable data. All hospital admissions data on the VAED are coded and the current study on MMS injuries provides a good example of the shortcomings of a coded system for the timely identification of emerging injury issues. The VAED classification system (International Classification of Diseases, 10th Revision with Australian Modifications—ICD-10-AM) currently contains no specific codes to disaggregate MMS admissions from the dataset for any cause of injury (transport-related, falls etc.). Powered wheelchairs (and presumably powered mobility scooters) are defined as pedestrian conveyances and are currently grouped with pedestrians on foot under the transport accident cause of injury codes (V01-V09). The falls coding (W00-19) includes a specific code for fall involving wheelchair (W05), that presumably covers MMS, but there are currently no sub-codes to

disaggregate MMS falls cases from powered and manual wheelchair falls cases.

Every two years the National Centre for Classification in Health (NCCH) reviews the adequacy of ICD-10-AM (used to code admissions in the VAED), providing the opportunity to add further Australian Modifications. This process is reactive rather than anticipatory and changes, after acceptance, take two years to come into effect. A submission to add a fifth character (digit) to the pedestrian coding in the transport-related cause of injury classification (V01-V09 Pedestrian injured in transport accident) to separately identify wheelchair and motorised mobility scooter cases (and other cases involving pedestrian conveyances) has already been accepted for the 5th edition and will come into effect on July 1, 2006. The first year of VAED hospital admissions data with this coding (2006/7 data) will be available in early 2008.

As a result of the current study VISU will make a submission to NCCH, to be considered at their 2006 review, to add a fourth character (digit) to code W05 *Falls involving wheelchairs* to separately identify manual wheelchair, motorised wheelchair and MMS falls cases. Changes to other causes of injury codes to identify MMS cases are not currently feasible. Of course, the vital first step in injury surveillance data collection is that information on the mechanism (including consumer product involved if any) and injury circumstances are noted on the paper/computerised patient records by hospital staff.

The VEMD has more potential to identify emerging injury issues in a timely fashion. From 2005, all 37 Victorian public hospitals with a 24-hour E.D. service contribute injury data to the VEMD, so the system has the capacity to capture most injury cases presenting to emergency departments in Victoria (including admissions). There is also the capacity on the VEMD to record details of the consumer product involved in the injury event in the case narrative (free text) field. However, motorised mobility scooter data cases are not reliably reported or identified because of nomenclature issues and missing, incomplete and poor quality narratives. The most recent

quality check of VEMD case narrative data submitted to VISU for the period July-December 2004, identified that on average only 34% of current narratives provided by hospitals are graded 'good to excellent' in terms of the additional information they give on consumer product involvement and mechanism and circumstances of injury.

The collection of complete and reliable data on consumer product involvement in injury would require injury surveillance systems upgrades (to introduce factor codes), data quality incentives at the participating hospital level (perhaps confined to a representative or sentinel group of hospitals), and ongoing in-house training of the E.D. staff entering data. The possibility of payments to hospitals for injury data collection, contingent on data quality, should be considered.

Recommendations

- (The Victorian government should) clarify which government department/agency should take the lead on motorised mobility scooter safety and also define the respective roles of the Therapeutic Goods Administration (TGA), federal and state consumer affairs departments and VicRoads with regard to safe design and monitoring of product defects as well as user-device interface safety issues.
- Conduct a comprehensive consumer survey to better understand current motorised mobility scooter usage and safety issues including: user demographics; reasons for obtaining scooter; benefits (new activities), source and selection of scooter and the assessment processes involved; access to and adequacy of training; usage patterns and maintenance schedule; reliability (mechanical and component failures) and after-sales service; and data on the nature, location and mechanism (including trigger factor/s) of scooter mishaps and associated injuries (including the site and type of injury, cost of treatment and long-term sequelae).
- Conduct laboratory research into the stability of motorised mobility scooters, turning, negotiating bevelled door





thresholds and other bumps, ramps, kerbs and gutters and on different riding surfaces, and the effectiveness of seat belt use in low speed crashes.

- Expand assessment and training opportunities so that all potential mobility scooter users are assessed by a trained therapist and undergo competency-based training.
- Investigate the potential benefits of added safety features such as rollover protection, seat belts and personal protective equipment including helmets and gloves.
- Expand the falls cause coding in the ICD-10-AM to disaggregate scooter falls cases from other wheelchair falls cases
- Upgrade VEMD to collect reliable data on consumer product involvement in injury (by the introduction of factor codes) and implement data quality incentives at the participating hospital level (perhaps confined to a representative or sentinel group of hospitals), and ongoing in-house training of the ED staff entering data.

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Commentary: Review of the Australian Consumer Product Safety System: Productivity Commission Research Report (February 2006)

Joan Ozanne-Smith

Introduction

The Productivity Commission, an independent agency, is the Australian Government's principal review and advisory body on microeconomic policy and regulation. It conducts a broad range of public enquiries and research on economic and social issues affecting the welfare of Australians. In 2005 the Australian government asked the Productivity Commission to undertake a research study to examine the social and economic impact of options for reforming Australia's general consumer product safety system. The primary purpose of the study was to inform the review of the Australian consumer product safety system being conducted by the Ministerial Council on Consumer Affairs (MCCA). The full 453-page study report entitled 'Review of the Australian Consumer Product Safety System' was released on 7 February 2006 and is available at www.pc.gov.au, including the detailed terms of reference.

Key points made by the Productivity Commission in the report are as follows:

- The current regulatory system plays a necessary and important role in identifying and removing unsafe products through recalls, bans and standards. Overall, the regulatory system in combination with other mechanisms — the market, the product liability regime, media scrutiny and consumer advocacy — deliver a reasonable level of product safety, as expected by Australian consumers.
- There is, however, considerable scope to make the regulation of consumer product safety more efficient, effective and responsive.
- A strong case exists for national uniformity in the regulation of consumer product safety. Current differences in state regulations create inefficiencies in

a resource-constrained environment, including duplication of effort and inconsistent approaches to similar risks and hazards. The preferred model is one national law, the *Trade Practices Act*, and a single regulator, the Australian Competition and Consumer Commission (ACCC).

- If national uniformity is not achievable, state and territory jurisdictions should harmonise core legislative provisions including the adoption of product bans and mandatory standards on a national basis.
- The Commission found merit in the following legal reforms:
 - including 'reasonably foreseeable use' in the definition of 'unsafe';
 - ensuring that services related to the supply, installation and maintenance of consumer products are covered by all jurisdictions; and
 - requiring suppliers to report products that are associated with serious injury or death.
- The Commission proposed a number of administrative reforms including:
 - consistently making hazard identification and risk management more central to policy making, standard setting and enforcement;
 - improving the focus and timelines for the development of mandatory standards;
 - providing better regulatory information to consumers and businesses through a 'one-stop shop' internet portal; and
 - establishing a national clearinghouse for gathering information and analysis from existing sources to provide an

improved hazard identification system.

- The Commission recommended that efforts to improve the safety of consumer products would also benefit from:
 - a comprehensive baseline study of consumer product-related accidents and
 - a review of product recall guidelines

MUARC's response to the report

In Victoria alone there were an estimated 40 deaths and almost 20,000 hospital admissions from product-related injuries in 2002 (VISU, 2004). In light of these figures, we cannot agree with the statement in the Productivity Commission's report that "*the current system as a whole, seems to be generating reasonable safety outcomes...*" (p. xxvii). The total lifetime cost of only the hospital admitted cases that occurred in Victoria in 2002 is at least \$46 million.

The Productivity Commission's report was informed by a U.K. Department of Trade and Industry study of home 'accidents'. We agree with the finding in the U.K. study, and its extrapolation to Australia by the Productivity Commission, that few deaths and injuries are caused by actual product failure. However, we disagree with the assertion in the UK report that consumer behaviour and the physical environment cause at least 90% of home injuries, given that examples to support this estimate include "leaving product in reach of children" (behavioural cause) and "slippery surfaces" (physical environmental cause) which ignore any contribution of the product to these home injuries.

The alternative approach to the prevention of home and other injuries with consumer product



involvement proposed by MUARC is as follows:

- Most injuries are preventable if a systematic, scientific approach is taken, driven by injury surveillance and research data. This approach has been highly successful in road safety.
- Blaming the victim (the consumer/injured person) is an outmoded concept and should not shape policy responses to consumer safety issues.
- Design solutions can eliminate or reduce injuries where user behaviour and the physical environment are major contributory factors to injury. Examples of these solutions include rollover protection on tractors, domestic swimming pool fences, child resistant closures on medications, padding of trampoline frames and springs, impact absorbing under-surfacing in playgrounds, safety glass in furniture.

While there are clear advances in the Productivity Commission's recommendations, it is our opinion that they do not go far enough. We believe that new concepts need to underpin product safety initiatives in Australia and propose the following:

- A proactive product safety system is instituted.
- The community should no longer be treated as the 'guinea pigs' for testing new products. The current system is too reliant on identifying hazards and risks through retrospective investigations of fatal and serious injury incidents.
- There should be laboratory or simulated testing of new or re-designed products rather than community testing.
- An improved data system is required that not only identifies product-related injuries, but also has the capacity to identify product involvement in the mechanism of injury.
- New information tool-kits need to be developed to underpin a proactive approach. For example, the Infant and Nursery Products Association of Australia (INPAA) has established a 'tool-kit' in the form of a hazard database relevant to nursery products, to inform new industry based horizontal standards (see p. 289 of the Productivity Commission Report).

The article on motorised mobility scooters in this edition of *Hazard* illustrates an important shortcoming of both the current and reformed

Australian Consumer Product Safety System, as proposed. The uptake of this relatively new product by vulnerable population groups (particularly the very old) has been rapid and there is a substantial emerging upward trend in serious injuries related to scooter use — an estimated 200 hospital-treated injuries were associated with mobility scooters in Victoria alone in the financial year 2004/2005 and this increasing rising trend has continued beyond the study period. As with most product-related injuries, the major problem appears to be at the user-machine interface.

The existing product safety system has shown itself to be incapable of responding to, or even adequately recognising, the existence of this and other emerging problems associated with new products. By comparison, the public health system has shown some capacity to identify and describe the epidemiology of these injuries, including the high-risk age group, common mechanisms, injury types and body region injured. Moreover, steps have been taken to introduce Australian modifications to the International Classification of Diseases (ICD10-AM) coding system to specifically identify motorised mobility scooter-related injury cases on state and national hospital admissions databases.

As a result, the public health sector has sourced information on responsible government jurisdiction and injury prevention stakeholder groups and identified potential prevention methods. Furthermore, the issue has been placed into the government and public domain by recent representations to the Therapeutic Goods Administration, consumer product safety authorities and the media by means of press releases.

Notwithstanding our criticisms of the Productivity Commission's report, MUARC acknowledges and welcomes the advances that will be made in consumer product safety by the uptake of these recommendations:

- Commissioning of product-related injury data studies
- Mandatory reporting by manufacturers of defects and injuries to the relevant regulatory authority
- Inclusion of 'reasonably foreseeable use' in the definition of unsafe in bans,

recalls and mandatory standards (*Note: apparently not recommended for inclusion in voluntary standards*)

- Extension of regulations to cover the installation/service/maintenance of products
- An immediate review of the standards-making process
- Linkage of hazard identification with policy making and enforcement of regulations
- A funded research agenda

However, substantial shortcomings remain. There is likely to be a long lag time before changes happen and the residual injury problem is likely to remain large, even after all of the proposed reforms are in place. This should be monitored. Also, the reformed system, as proposed, does not adequately address new products, such as motorised mobility scooters. Finally, an ongoing comprehensive data system (not merely the proposed one-off study) is needed to monitor injury trends, estimate the cost of product related injuries and assist the development of cost effective solutions.

Conclusion

A paradigm shift is needed in Australia's consumer product safety system. The proposal to include a General Product Safety Provision (GSP) in consumer legislation, as exists in the UK and Europe, was rejected by the Productivity Commission. A GSP places an explicit legal obligation on businesses to supply only safe consumer products and its inclusion would have stimulated the adoption of a proactive approach by industry and regulators and heightened community awareness and demand for safer products. Non-inclusion of a GSP represents a missed opportunity in this chapter of Australia's product safety history.



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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

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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

From January 2004

Bairnsdale Hospital

Central Gippsland Health Service

(Sale)

Hamilton Base Hospital

Royal Women's Hospital

Sandringham & District Hospital

Swan Hill Hospital

West Gippsland Hospital (Warragul)

Wodonga Regional Health Group

From April 2005

Casey Hospital

National Injury Surveillance Unit

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

How to access VISU

data:

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

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All issues of *Hazard* and other information and publications of the Monash University Accident Research Centre can be found on our internet home page: <http://www.monash.edu.au/muarc/visu>

Coronial Services

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





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