

FORM 38

Rule 60(2)

FINDING INTO DEATH WITHOUT INQUEST

Section 67 of the Coroners Act 2008

Court reference: 2223/09

In the Coroners Court of Victoria at Melbourne

I, HEATHER SPOONER, Coroner

having investigated the death of:

Details of deceased:

Surname: KNOX
First name: VALERIE
Address: 1 Eyre Street, Melton South, Victoria 3338

without holding an inquest:

find that the identity of the deceased was VALERIE JOAN KNOX
and death occurred on 30th April, 2009

at Royal Melbourne Hospital, Grattan Street, Parkville Victoria 3052

from
1a. COMPLICATIONS OF A CLOSED HEAD INJURY (OPERATED)
SUSTAINED IN A FALL

Pursuant to Section 67(2) of the **Coroners Act 2008**, an inquest into the death was not held and the deceased was not immediately before the person died, a person placed in custody or care; but there is a public interest to be served in making findings regarding the following circumstances:

1. Mrs Knox was aged 82 when she died. She lived with her husband at 1 Eyre Street in Melton South. Mrs Knox had a past medical history that included aortic valve replacement, coronary artery bypass graft surgery, hypothyroidism and a fractured forearm two years prior to her demise.

2. A police investigation was conducted into the circumstances surrounding the death. It was apparent that on Monday 13 April 2009, Mr and Mrs Knox spent a sunny day visiting the Royal Melbourne Zoo. Mrs Knox occasionally used a wheelchair as she did on this particular day.

3. At about 5.00pm the couple left the zoo to return home. Mr Knox wheeled Mrs Knox outside of the zoo premises to a paved area where he left her in the wheelchair whilst he retrieved their car. Mr Knox recalled applying the wheelchair brake, as was his habit. In the short period whilst Mr Knox was gone, the wheelchair travelled about fifty metres down the pavement on a slight incline. Mrs Knox apparently then fell out of the wheelchair onto the ground, striking her head. She was located by passers-by about two metres from the wheelchair. The exact circumstances surrounding the incident remain unknown.

4. Emergency services were notified and attended. Paramedics treated Mrs Knox at the scene prior to her transfer to the Royal Melbourne Hospital. A CT revealed a haemorrhage. Mrs Knox underwent surgery but deteriorated and was ultimately treated palliatively prior to passing away on 30 April 2009.

5. An inspection and external examination was performed by Dr Noel Woodford, Senior Forensic Pathologist at the Victorian Institute of Forensic Medicine. He formulated the cause of death and in his report noted that the post mortem CT scan was consistent with the clinical history. Furthermore, the external examination revealed a number of injuries (predominantly in the form of bruising and abrasions) consistent with the history of being sustained in a fall.

6. A review of the death was conducted by the Coroners Prevention Unit (CPU)¹. Although it was not apparent that a mechanical inspection of the wheelchair was performed, CPU did obtain the records and photographs taken at the time. They were requested to provide information to assist in the investigation of this death and also another² identical death involving a wheelchair fall. This information is attached and marked with the letter 'A' and included:

- the selection and use of attendant-operated wheelchairs,
- previous deaths in Australia involving wheelchair falls, with an emphasis on deaths occurring in public settings and
- potential engineering solutions relating to attendant-operated manual wheelchairs

7. The review concluded:

- Professional input during the selection process for a manual wheelchair is important to ensure the wheelchair model is appropriate and safe for both the user and carer.

¹ The Coroners Prevention Unit is a specialist service for coroners created to strengthen their prevention role and provide them with professional assistance on issues pertaining to public health and safety.

² Coroners Case No: 2415/08.

- Basic transit-style or attendant-operated wheelchairs are convenient due to their light weight build and folding ability. Hence, they are likely to be favourable among elderly persons who require a simple mode of transport for short periods, together with the capacity to place the wheelchair into a motor vehicle for transportation.
- Wheelchair models with a lockable hand brake may offer an engineering solution by preventing a chair from rolling away, if the brake is in fact activated by the attendant. In the absence of such a lockable brake, vigilance on behalf of the attendant is critical.

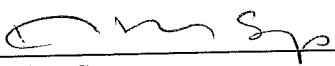
8. I find that Mrs Knox unfortunately died from complications of an intracerebral haemorrhage that she sustained in a fall from her wheelchair.

COMMENT:

Pursuant to section 67(3) of the **Coroners Act 2008**, I make the following comment connected with the death:

1. Although it is not known by what means Mrs Knox's wheelchair was obtained, this death has highlighted how important it is that prospective users of manual wheelchairs be encouraged to seek advice from a health professional to ensure selection of an appropriate wheelchair that will safely meet both their individual needs and the needs of their carer.

Signature:


 Heather Spooner
 Coroner



20th June, 2011

Distribution:

Victorian Disability Advisory Council
 Disability Services Division, Department of Human Services
 Aged Care Branch, Department of Health
 Carers Victoria
 Disability Professionals Victoria
 Council of the Aging Victoria
 People and Community Advocacy, Department of Planning and Community Development

ATTACHMENT 'A'

Manual wheelchair types and use in Australia

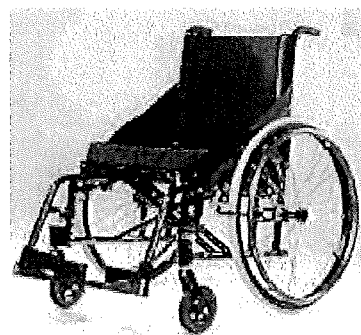
Manual wheelchair types

There are two main manual wheelchair types: transit (transport) wheelchairs and self-propel wheelchairs (see below images). Transit wheelchairs are attendant-propelled and typically have four small wheels, primarily designed for short travel distances. Self-propel wheelchairs allow the occupant to control their own chair, and also have provision for an attendant.

Wheelchairs can be custom-made and fitted with additional accessories to meet the user's needs (University of Queensland, 2006).



Transit wheelchair



Self-propel wheelchair

Image source: Independent Living Centres Australia product search website.

Prevalence of manual wheelchair use in Australia

The 2003 Australian Bureau of Statistics (ABS) Survey of Disability, Ageing and Carers, found that just over 115,000 persons with a disability in Australia use a manual wheelchair as a mobility aid (ABS, 2003) (Table 1).

Table 1: Use of manual wheelchairs as a mobility aid by persons with a disability, Australia 2003 (ABS, 2003)

Living arrangement	No. ('000)
Lives alone in a private dwelling	6.7
Lives with others in a private dwelling	36.5
Lives in a non-private dwelling	72.1
Total	115.3

The disability rate by age group increases significantly with age. The 2003 survey revealed that 74% of those aged 90+ years had a severe core-activity limitation due to disability, compared to just 3% for those aged 0-4 years.

Over 15% of older people (aged 60+ years) with a reported disability in 2003 required carer assistance. Family and friends were the main providers of such assistance. Of those receiving this assistance, 452,900 (47%) were assisted by partners who were likely to be older themselves. Of those providing primary care for their partner, 48% were aged 65 years and older (ABS, 2003).

Wheelchair selection

The selection of a wheelchair may be influenced by the primary use of the chair, cost restrictions, user and carer requirements (including limitations related to age, size, fitness level, motivation etc) personal preference and environment (Gavin-Dreschnack *et al.*, 2005).

Individual factors regarding intended use of the wheelchair should take into account:

- Level of wheelchair dependence;
- Anticipated frequency of use;
- Ability to safely propel a manual wheelchair; and
- Environment (indoor or outdoor; terrain [hilly or flat]).

Wheelchair characteristics to consider may include:

- Wheelchair size;
- Manoeuvrability;
- Weight
- Durability; and
- Cost.

It is generally recommended that prospective users seek advice from an occupational therapist or physiotherapist to determine the most suitable wheelchair type for their needs (LifeTec, 2009).

Manual wheelchairs however, can be purchased or hired without obtaining professional advice, and there are numerous retailers across Victoria. Second hand wheelchairs are also available through private sellers.

The Victorian Aids and Equipment Program

The Victorian Aids and Equipment Program (A&EP) of the Department of Human Services Disability Services Division provides subsidised aids and equipment to eligible people needing assistance to live safely and independently in their own home (DHS, 2009).

A health professional assessment is required to determine the most appropriate and cost effective type of aid or equipment needed.

An A&EP Wheelchairs and Scooters Report and Prescription Form is available on the DHS website for the issuing of aids and equipment, and is completed by a health professional. The assessment establishes whether the user or carer will have the capacity to safely and effectively use the equipment.

Incidence of serious and fatal injury

Hospitalisations

Hospitalisation data concerning falls in older persons was sourced from the National Injury Surveillance Unit (NISU).

The 2009 NISU report examined falls among Australians aged 65 years and over. The report utilised hospital separations data from the National Hospital Morbidity Database (NHMD) for the financial year 2005–06 (Bradley & Pointer, 2009)

Falls involving wheelchairs accounted for 1% (n=468) of all hospitalised falls among older persons in 2005-06 (below).

Table 4: Causes of hospitalised falls: first external cause code for males, females and persons aged 65+ years, Australia 2005–06

External cause	Males	Females	Persons
Fall on same level involving ice & snow (W00)	* (0%)	7 (0%)	8 (0%)
Fall on same level from slipping, tripping & stumbling (W01)	5,873 (30%)	16,929 (36%)	22,801 (34%)
Fall involving ice-skates, skis, roller-skates or skateboard (W02)	17 (0%)	13 (0%)	30 (0%)
Other fall on same level due to collision with, or pushing by, another person (W03)	35 (0%)	196 (0%)	221(0%)
Fall while being carried or supported by other persons (W04)	* (0%)	* (0%)	14 (0%)
Fall involving wheelchair (W05)	173 (1%)	296 (1%)	468 (1%)
Fall involving bed (W06)	891 (5%)	2,183 (5%)	3,054 (5%)
Fall involving chair (W07)	625 (3%)	1,333 (3%)	1,958 (3%)
Fall involving other furniture (W08)	67 (0%)	129 (0%)	196 (0%)
Fall involving playground equipment (W09)	* (0%)	* (0%)	* (0%)
Fall on & from stairs & steps (W10)	1,262 (6%)	2,851 (6%)	4,103 (6%)
Fall on & from ladder (W11)	907 (5%)	257 (1%)	1,164 (2%)
Fall on & from scaffolding (W12)	30 (0%)	* (0%)	* (0%)
Fall from, out of or through building or structure (W13)	221 (1%)	76 (0%)	297 (0%)
Fall from tree (W14)	54 (0%)	5 (0%)	59 (0%)
Fall from cliff (W15)	24 (0%)	14 (0%)	38 (0%)
Diving or jumping into water causing injury other than drowning or submersion (W16)	* (0%)	* (0%)	7 (0%)
Other fall from one level to another (W17)	348 (2%)	433 (1%)	781 (1%)
Other fall on same level (W18)	3,772 (19%)	9,410 (20%)	13,182 (20%)
Unspecified fall (W19)	5,188 (27%)	13,180 (28%)	18,368 (28%)
Total fall cases	19,486	47,299	66,784

* Small case numbers have been suppressed to prevent patient identification.

Source: Bradley, C., Pointer, S. (2009). Hospitalisations due to falls by older people, Australia 2005-0, AIHW Injury Research and Statistics Series: Australian Institute of Health and Welfare.

Similar deaths in Australia

A search for similar deaths in Australia was performed using both the National Coroners Information System (NCIS) and a Victoria-specific database administered by the CPU.

Results

The combined search identified 30 coronial investigations involving a fall from a wheelchair since 1 January 2000.

Half of the identified cases concerned elderly persons at home or in care (hospital/aged care facility) (Table 1). There was insufficient information regarding the mechanism of fall for a large number of deaths, particularly interstate cases.

No recommendations made by coroners were identified.

Table 2: Falls from wheelchairs, Australia 1 Jul 2000-present

Location	Activity at time of incident	No.
<i>Home</i>	Getting into / out of bed	1
	Tip-over	1
	Caught in gutter of ramp	1
	Unspecified / unwitnessed fall	3
	<i>Sub-total</i>	<i>6</i>
<i>Hospital/care facility</i>	Getting into / out of bed	2
	Loss of control on incline	1
	Tip-over	1
	Attempting to stand	1
	Unspecified / unwitnessed fall	11
	<i>Sub-total</i>	<i>16</i>
<i>Public place</i>	Loss of control on incline	3
	Tip-over	3
	Unspecified / unwitnessed fall	2
	<i>Sub-total</i>	<i>8</i>
Total		30

Coronial case examples

Four coronial investigations that involved a wheelchair that rolled away/lost control on an incline causing injury were identified.

In three of the four incidents the wheelchair was in control of the older persons' elderly partner at the time. Incident locations ranged from a home residence, hospital, aged care facility, shopping centre, and park grounds.

Case 1

The deceased, a 64 year old female, attended a shopping centre and was being pushed in a wheelchair by her husband. While travelling down the escalator, her husband lost grip of the wheelchair, causing it to roll down the escalator uncontrolled. The wheelchair subsequently collided with a car.

Case 2

The deceased, a 53 year old male hospital patient, was witnessed leaving the hospital entrance being pushed in his wheelchair by an unknown young male. Witnesses indicated that the young male pushed the deceased in his wheelchair to the top of the ramp which led to the entrance of the hospital, let go of the wheelchair and walked away from the hospital in the opposite direction.

Upon being let go, the wheelchair travelled down the concrete ramp where it hit uneven ground causing the deceased to be projected onto the ground; it believed his head came into contact with the same.

The deceased was immediately assisted by hospital staff and returned to his bed. He was assessed to be seriously ill and was transferred to another hospital. A CT scan revealed he had an acute subdural haematoma to the right side of his head. Following family consultation, support was discontinued.

Case 3

The deceased, a 68 year old female, went on a picnic at a park with her husband. Her husband was pushing her in her wheelchair.

At some stage, her wheelchair rolled away from her husband and proceeded down a slope along a footpath for 3-5 metres before reaching a grassed area. The deceased then fell forward out of the chair, striking her head on the grass.

Her husband called an ambulance who attended shortly after. Her condition was not considered serious and she was allowed to go home. However, her condition deteriorated that evening and she was conveyed to hospital. She passed away seven days after the initial incident.

Case 4

The deceased, an 87 year old female, was a permanent resident of a care facility.

The deceased was waiting in her wheelchair in the facility's bus loading bay to board the bus as part of a planned excursion.

While the bus driver lowered the wheelchair hoist from the side of the vehicle, the deceased's wheelchair rolled down the loading bay driveway. Neither the nurse or bus driver observed this occur. The wheelchair crossed the street and hit the gutter at an intersection, causing the deceased to fall from her wheelchair, striking her head on the footpath.

The deceased suffered a broken hip and shoulder and was transported to hospital. The bus location to the point of impact was described as a consistent, slight slope falling away from the loading bay.

The deceased underwent numerous surgeries over a two-week period but never recovered from the fall and died twelve days after the fall.

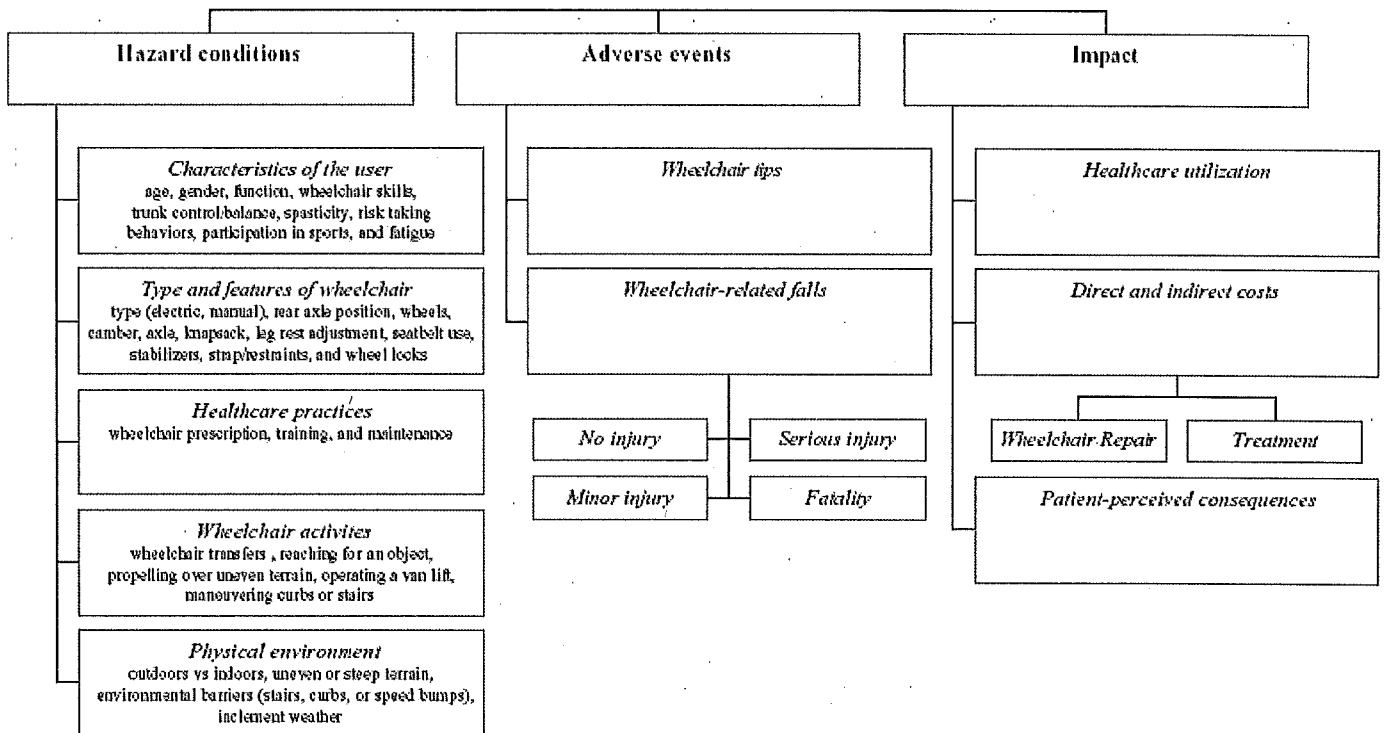
Wheel-chair related injury risk factors

Overview

Previous studies have described the incidence of wheelchair-related injury, the characteristics of individuals involved and the circumstances of injury occurrence. Most of the literature identified however was based in the United States and focused on wheelchair use in health care settings (rehabilitation, hospitals and care facilities) and the implications on the provision of quality care.

The most common identified mechanisms leading to this type of injury are 'tips' and 'falls' (Xiang *et al.*, 2006).

Gavin-Dreschnack *et al.* (2005) provided the following conceptual model for wheelchair-related injury:



Injury risk factors

Risk factors for wheelchair-related injury have been grouped into the following key areas (Xiang *et al.*, 2006):

- Characteristics of wheelchair users (age, sex, types of disabling conditions);
- Engineering factors (manual/powered wheelchairs, occupant restraint systems, anti-tips and wheel locks);
- Physical environment (uneven terrain, room modifications); and
- Social environment (activities undertaken, prescription of wheelchair by healthcare professional, maintenance of wheelchair).

Individual characteristics

Injury patterns greatly differ across age groups and ability level. Key user characteristics associated with increased risk of injury have included: younger age; males; and daily wheelchair use (Gavin-Dreschnack *et al.*, 2005).

It is evident that older persons (>65 years) are the largest user group of wheelchairs and are at risk of experiencing injury - females represent the greater proportion of these individuals (Gavin-Dreschnack *et al.*, 2005). Homes, hospitals and other care facilities are the most common settings, accounting for over 95% of incidents for older persons. Incidents often involve attempts to stand from the chair.

In comparison to the injury profile of older persons, the majority of injuries among younger age groups involve males and occur in outside settings (Xiang *et al.*, 2006). This has been largely attributed to involvement in outside recreational activities such as sports.

Wheelchair users with the capacity to control their body positions can profoundly affect the stability of wheelchairs.

Individual characteristics associated with decreased risk include those with multiple sclerosis, stroke or arthritis as the reason for wheelchair use, and attendant propulsion (Gavin-Dreschnack *et al.*, 2005).

Wheelchair design

The use of smaller, harder front wheels improves manoeuvrability but can contribute to tips and falls by being more susceptible to being stopped on uneven terrain. The negative camber of wheels may also increase risk of instability.

Physical environment

Overall, more than twice as many incidents occurred outdoors as opposed to indoors. Of wheelchair-related deaths in the United States, stairs were implicated in over half of the incidents (Gavin-Dreschnack *et al.*, 2005). Common outdoor obstacles include: curbs; ramps; uneven terrain; stairs; and wet or icy surfaces.

Social environment

Inadequate prescription of wheelchairs, such as lack of professional input, and lack of proper training have been cited as contributing factors to wheelchair-related injury.

Mobility characteristics may also influence injury patterns. For example, those engaged in more active lifestyles and thus more frequently use their wheelchair may be at increased likelihood of injury. Employment status also impacts mobility characteristics.

Engineering solutions

Relevant engineering solutions examined, focussed on the prevention of wheelchairs from 'rolling away' on an incline, in line with the circumstances of the deaths currently under investigation.

The *Independent Living Centre Australia* retail website was accessed to review the range of manual wheelchair models currently available.

An extensive range of wheelchair models was evident. Attendant hand brakes with a locking capacity are a common feature present for certain models. These hand brakes however are an active control measure, requiring the attendant to physically engage them.

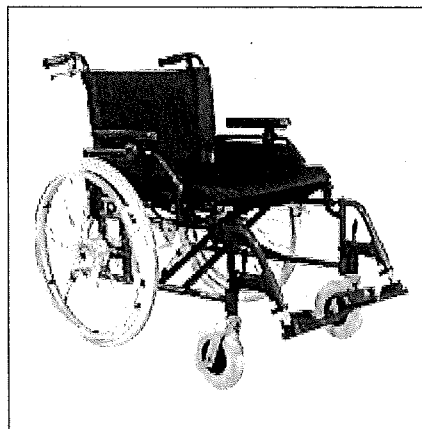
Example 1: Transit model

The below image depicts a lightweight manual transit wheelchair with a folding steel frame. Attendant hand brakes are provided.



Example 2: Self-propel model

The below wheelchair is an aluminium, self propelled manual wheelchair with attendant operated drum brakes, designed for bariatric use. According to the website, drum brakes may ease pushing downhill for attendants.



Comparisons with prams and strollers

Revised mandatory safety standards for prams and strollers were introduced by the Australian Competition and Consumer Commission on 1 July 2008 following the deaths of two babies in Adelaide after their pram rolled into a river and several near-misses across Australia (ACCC, 2009).

The revised standard for prams and strollers highlighted the need for parents and carers to be in control of the product at all times. For all products for sale, the mandatory standard requires:

- A tether strap to help consumers maintain control over the pram or stroller
- A parking brake (red in colour) to restrict the pram or strollers movement
- A warning to promote the safe use of the product
- A restraint harness for strollers to prevent falls from the product

Carers are urged to use the tether strap when the parking brake is not engaged.

References

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