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Victorian Injury
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This edition of Hazard examines in detail injuries in Victoria to adults 65 years of age and over as they present to hospital emergency departments. Injury hospitalisations and deaths are also briefly examined. Data for emergency department presentations, hospitalisations and deaths are from the Victorian Injury Surveillance System, the Victorian Minimum Inpatient Database, and the Australian Bureau of Statistics respectively.

Injuries among Older People

Lesley Day, Sally Kent and Brian Fildes

Summary

Falls are a major feature of injury among older people, accounting for a large proportion of non fatal and fatal injury among adults 65 years and over. Other significant causes of non fatal injury in this age group include motor vehicle crashes. Significant causes of fatal injury, other than falls, include transport and suicide.

Victorian Injury Surveillance System data showed that the most common location for falls was private homes, where the most common fall hazards were steps and stairs, chairs, floors and flooring materials, beds, and ladders. In residential institutions, the next most common location, common hazards were beds, floors and flooring materials, and chairs. In transport areas, falls on

the footpath were prominent and were most often due to tripping on uneven surfaces. In commercial areas, falls on steps and stairs in restaurants, stores and hotels were common. Fractures and lacerations were the most common types of injury for falls in all locations. The leading fracture sites were the hip and wrist.

Motor vehicle crashes in this age group were more likely to involve pedestrians than among adults in motor vehicle crashes. Burns occurred mostly in the person's own home. Significant hazards included hot water, and flame, fire or smoke. Hot water burns most often occurred when handling hot water, or in the bath or shower.

Forty-two percent of all injury cases in this age group were admitted. This

proportion was the same for falls in commercial areas and for motor vehicle crashes, while it was lower for falls in areas of transport and for burns (34% and 38% respectively). The highest proportion of admitted cases was found for falls in residential institutions and homes (66% and 54%, respectively).

Rates for fall mortality and hospitalisation in Victoria increased dramatically with age, being highest for those 85+ years. Mortality rates were highest for males, while hospitalisation rates were highest for females, especially for fall related hip fracture. Fall injury specific mortality rates are decreasing slightly, while hospitalisation rates are increasing slightly, the most notable being for those 85+ years in both cases. The average length of hospital stay for fall related hip fracture is decreasing.



Introduction

Injury among older people is a significant health problem. Injury, particularly falls, among older people, with the resulting fear, incapacity, disability and mortality, is accepted as a priority area for injury prevention in Australia by authorities at the Federal, State and Local levels.

Injury is potentially more serious among older people than younger adults. Osteoporosis increases with age and greatly increases the probability of injury following an incident. In addition, older people, with their higher risk of frailty and medical conditions, have a greater susceptibility to fatal and non-fatal complications following injury.

In Victoria, approximately 128 per 100,000 older people die from injury each year (Australian Bureau of Statistics, 1986-1992) and 3,400 per 100,000 require hospitalisation for injury (Langlois et al., 1992). One study estimated these injuries to cost \$1206 million per year (Fildes, 1994).

Emergency Department Presentations

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There were 5101 cases of injury to adults 65 years and over who presented to the Emergency Departments of the three Melbourne metropolitan adult hospitals and the one regional hospital in the VISS collection.* Injury among older people was likely to have a more serious outcome than among younger adults, with an admission rate of 42% compared to 17% for all adults. Further, there were 8 deaths in this sample, 23% of adult injury deaths in the data base.

General features

The age and sex distribution is shown in Figure 1. The frequency of presentation for males declined with age, in contrast to that for females, which remained relatively constant. Females outnumbered males in each age group, with an overall male: female ratio of 1:1.8, quite different from the ratio for all adult injury in the data base (1:0.5). The ratio is partly a reflection of the population male: female ratio for this age group (1:1.4), and partly due to the increased risk of injury for females in this age group.

*Western Hospital 1/1/91 - 31/12/92, Latrobe Regional Hospital 1/7/91 - 30/6/93, Royal Melbourne Hospital 1/3/92 - 28/2/94, and Preston and Northcote Community Hospital 1/3/92 - 28/2/93.

The most common location for injury in this age group was the home (56% of those cases where location was known), followed by areas of transport (20%) and residential institutions (14%) (Figure 2).

The predominant activity at the time of injury was leisure or recreation (57%), followed by transport (15%), personal activities (8%), household activities (8%), and maintenance (8%).

There appeared to be little seasonal variation, with a slight peak in December.

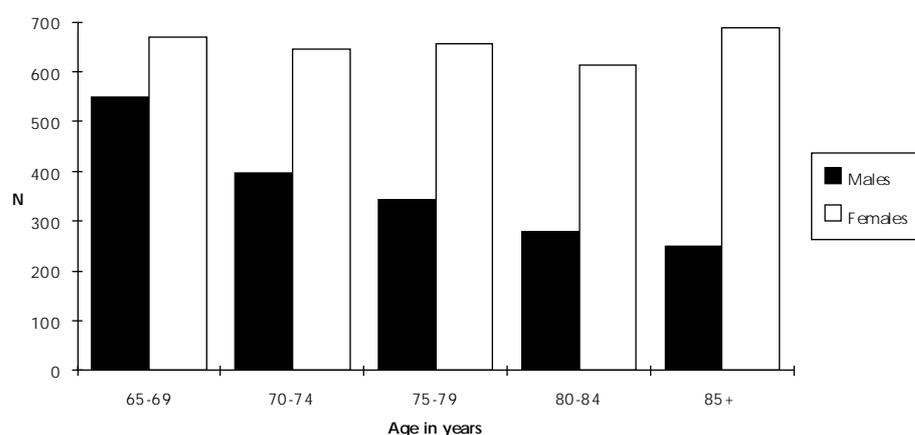
Causes of injury

A fall led to the injury occurring in 66% of cases. A small proportion of cases (7%) were involved in motor vehicle crashes. Poisoning and burns also accounted for a small proportion each (2%, 1% respectively) (Figure 3).

Injuries

Fractures accounted for 37% of the injuries. The most common fracture sites were the hip (14%)†, wrist (4%), humerus (3%), and ribs (2%). Lacerations accounted for 18% of

Age and sex distribution, injuries among older people



(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr

N = 5091, where age and sex were recorded

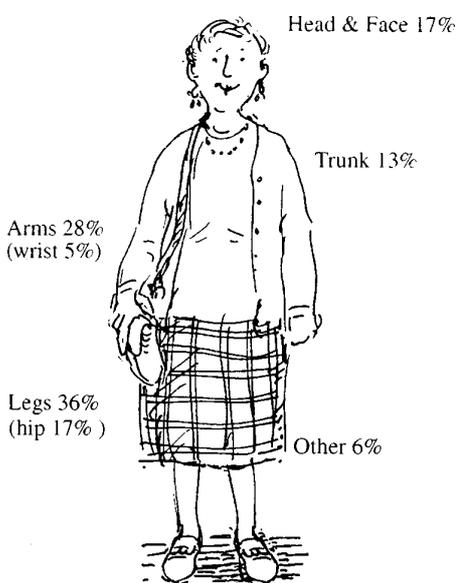


injuries, and bruising and inflammation another 11% each.

Body parts most frequently injured included the hip (17%), face and scalp (9%), and wrist (5%) (Figure 4). The most common injury overall was a fractured hip (14%). Forty-two percent of all presentations were admitted to hospital and a further 34% received major treatment.

Figure 4

Body parts injured, injuries among older people



(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr.
Up to 3 injuries may be recorded per case. N of injuries=6298

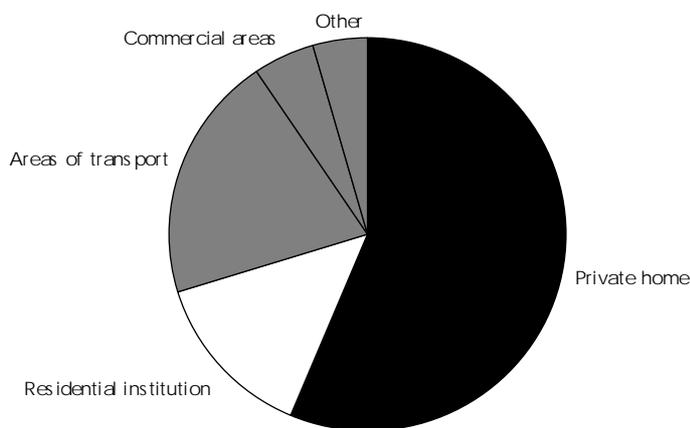
Falls (N=3382)

Falls have been well documented as the major cause of injury among older people. In the VISS data base, 66% of injury cases aged 65 years of age and over, were the result of a fall. In this injury category, there was a higher

† A small proportion of these will be fractured shaft of femur which cannot be distinguished in the VISS data base. All VISS data on hip injuries in this issue of Hazard include this small proportion of shaft of femur injuries.

Location of injury, injuries among older people

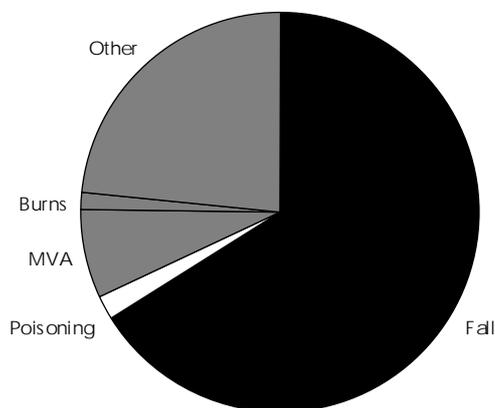
Figure 2



(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr N = 4132, where location recorded

Type of injury, injuries among older people

Figure 3



(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr N = 5101

proportion of those over 80 yrs, and of women, than for all injury among those 65 yrs and over.

The pattern of injuries for falls is very similar to that described above for all injury in this age group. As noted above, the single most common injury was a fractured hip, and falls accounted for 94% of these. The proportion of falls admitted was slightly higher than that

for all injury in this age group (48% compared to 42%).

Ninety-six percent of the falls occurred in a private home, a residential institution, an area of transport, or a commercial area. Falls were the cause of 69% of incidents occurring in the home, 87% of incidents occurring in residential institutions, 47% of incidents in areas of transport, and 73% of



incidents in commercial areas. Falls in each of these locations will be examined in more detail.

Falls in private homes

(N=1618)

Forty-eight percent of the falls occurred in a private home, with 94% of these occurring in the person's own home. The distribution of falls within the home probably reflects the amount of time spent in the various areas (Figure 5). Most of the falls were on the same level, with 14% of cases being due to falls from another level.

The most common activity at the time was leisure or recreation (excl sport) (70%), followed by miscellaneous household activities (9%), maintenance (8%), personal hygiene (7%), and sleeping/resting (4%).

There was a peak in falls between 11am and 12md, and a broad peak between 3pm and 7pm (Figure 6).

Fractures accounted for 51% of the injuries, with 45% of fractures being to the hip, 10% to the wrist, and 8% to the humerus. Fifty-four percent of falls in private homes were admitted compared with 48% for all falls.

A wide range of factors (other than persons) were specifically reported to have been associated with the fall itself (Table 1). A more detailed analysis of the leading five factors follows.

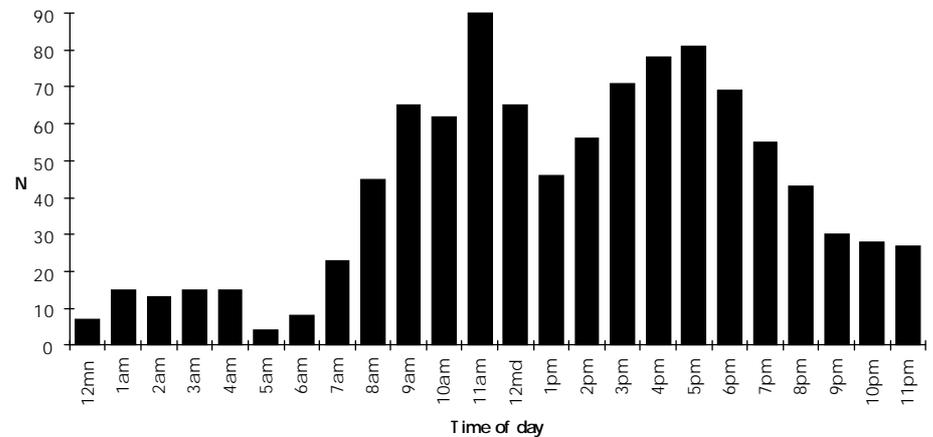
1. Steps and stairs (N=143)

More than half (62%) of these falls occurred on steps and stairs in the garden or garage. Many of the falls associated with steps and stairs were reported to involve either a slip (61), or a trip (40).

Of those cases where it was reported whether the person was going up or down the steps or stairs at the time of injury (N=62), the majority (48) were

Time of fall in private homes, injuries among older people

Figure 6



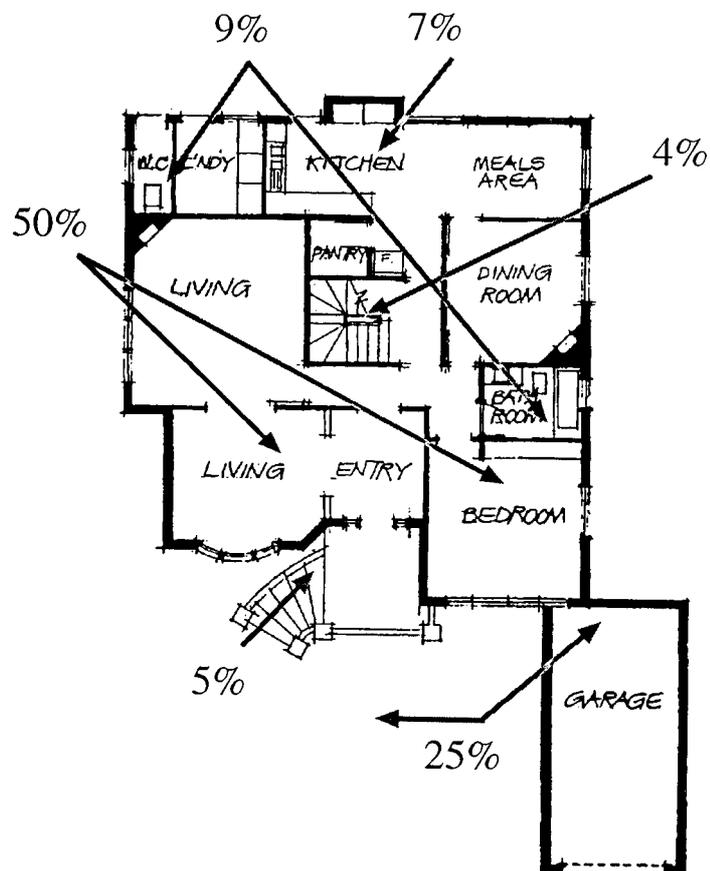
(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr.

Each bar represents a one hour time period, eg., 1am = 1-2am

N = 1011

Location of falls in private homes, injuries among older people

Figure 5



(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr

N=1618



Factors associated with falls in private homes, injuries among older people

Table 1

Factor	Cases N=1618*
stairs or steps	143
chairs	92
floors or flooring materials	85
beds	72
ladders	64
concrete and other man-made outdoor surfaces	43
ground and other natural surfaces	42
water	36
baths or showers	34
crutches, canes or walkers	29
runners, throw-rugs, door-mats	24
rugs or carpets	21

(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr

* Up to 4 factors may be recorded per case

going down the steps or stairs. Almost none of these cases reported that they were carrying an item (2), or that the steps or stairs were wet or icy (2).

Fifty-six percent of the injuries were fractures, with the most common fracture sites being the hip, humerus and radius/ulna. The most common

injury was a fractured hip (22% of injuries for this group).

2. Chairs (N=92)

The injured person fell off a chair in 40 cases. Approximately equal numbers were either sitting on the chair and fell off (15), or standing on the chair and fell off (16). Three of those sitting in the

chair fell asleep. Of those standing on a chair, 6 were adjusting curtains or blinds, 3 were retrieving an item from a cupboard, and 2 were cleaning.

A further 28 cases were either getting up out of a chair (21) or sitting down onto a chair (7). Twelve cases tripped over a chair.

Fifty-two percent of the injuries were fractures, most commonly the hip and wrist. The most common injury was a fractured hip (18% of injuries overall for this group).

Prevention of falls associated with chairs

Maintenance of blinds and curtains, including cleaning and washing, could be part of home help services (local government). Alternatively, older people may be able to seek the assistance of a friend or relative for these tasks. Storage of frequently used items in readily accessible places and the use where necessary of a sturdy step ladder with an extended handle grip, rather than a chair, is recommended.

Chairs should be of a sturdy and stable design, and have arms which may be used to provide balance when standing up or sitting down. Ideally the chair height should be 20-22", depending on a person's height. Adjustable chairs are available, or alternatively, a favourite chair could be raised, if necessary, by securing it on a wooden platform.

Prevention of falls on steps and stairs

In both private homes (particularly outside steps and stairs), and commercial areas:

- provide adequate lighting with light switches at the top and bottom of the stairs or with a movement sensitive light
- mark the step edges with a slip resistant nosing in a contrasting colour
- ensure that the step surface has an adequate slip resistant tread
- provide secure, graspable hand rails within reach
- small changes in level could be replaced with a gradual gradient which could be introduced under the floor covering
- stairs or steps could be replaced with a ramp which meets the required standards with respect to gradient

In addition, current materials research may result in the development of impact absorbing materials suitable for use on steps and stairs (Hanagud et al., 1989). These materials reduce the frequency and severity of injury in the event of a fall.

3. Floors and flooring material (N=85)

There were 62 cases where some information was reported regarding the nature of the association of flooring with the fall. In 33 cases the floor was slippery, in a further 21 the floor was reported to be wet, and in 8 cases the



floor surface was associated with a trip (lino in 2 of these and carpet in 6).

Wet floors were most often slipped on in the laundry and bathroom/toilet. Five cases slipped and fell on a wet laundry floor, 4 of which were due to overflowing washing machines, 4 slipped while showering/bathing, and 3 slipped in the toilet.

Shoes for the prevention of slips

Design features which increase the safety of shoes and reduce the likelihood of slipping include:

- soft sole made from nitrile rubber or polyurethane
- patterned sole with flat cleat surfaces having no enclosures which could trap contaminants
- rounded heel
- lace up or velcro fastenings

(M.Stevenson, personal communication)

Most running shoes have these kinds of features. However, it should be noted that even the best designed safety shoe may not function optimally in the presence of contaminants on the floor or the shoe itself (Stevenson et al., 1988). A future standard on the selection of footwear for slip resistance is planned by Standards Australia.

Prevention of slips

There is minimal risk of slipping on a dry surface. However, the presence of water or contaminants, such as food, oil or detergent, greatly increases the risk of slipping. The most effective way to prevent slipping hazards is to either keep floors dry and prevent contamination, or remove the water or contaminants immediately (Lloyd and Stevenson, 1992). Recommendations for the home include:

- mop up spills immediately
- clean floors regularly according to manufacturers instructions
- do not polish floors which are likely to get wet eg., kitchen, bathroom, laundry, entrances
- place secured water absorbent mats at entrances
- do not place loose rugs on polished floors
- consider choosing floor surfaces which meet the current Australian and New Zealand Standard for Slip Resistance of Pedestrian Surfaces (1994) when building a new home or replacing floor coverings in an established home.
- generally, textured surfaces are better than smooth ones, depending on the size and spacing of the texture; a granulated effect of raised areas 1-2mm in diameter and a similar distance apart is the most effective
- products and treatment process designed to improve the slip resistance of existing floors may not increase the surface friction sufficiently to bring the floor surface up to the minimum level specified in the Standard; the effect of a treatment may also diminish with time, necessitating re-application
- use slip-resistant mats or tapes in the bath and shower and replace when showing signs of wear or loss of adhesion
- keep paths and patios free of leaves, mud, clippings, moss and paper

The reader is referred to Standard for Slip Resistance of Pedestrian Surfaces, Part 2 (1994) for more information on reducing slip hazards. A copy of the standard (Part 2) can be obtained from Standards Australia, Ph (03) 693 3500, for \$15.50.

4. Beds (N=72)

Almost half of those whose fall was associated with a bed, fell out of bed while resting or sleeping (35). A further 19 fell when getting out of bed, and 3 fell when getting into bed. Only one person reported falling when getting out of bed to go to the toilet.

There were 43 cases where the time of the fall was recorded: 16 fell during the night between 9pm and 5 am, 9 during

the rising period of between 6am and 9am, and 18 fell during the day between 10am and 8pm.

More than half (43) of the injuries were fractures, with the most common fracture site being the hip. The most common injury was a fractured hip (25). The proportion of admissions for falls associated with beds was 66%

compared to 48% for all falls in this age group, and perhaps partly reflects the frailty of those older people most likely to fall out of bed. Certainly, this group had a higher proportion over 80 yrs compared to all fallers (57% compared with 42%), and a higher proportion of females (78% compared with 70%).



5. Ladders (N=64)

This group had a much higher proportion of males than home fallers in general (76% compared with 28%).

Most cases gave little information other than that they fell off a ladder (52). Nine of these fell while climbing up or down the ladder. In a further 12 cases, the ladder moved causing the fall, and in 2 cases a ladder rung broke.

The activity engaged in was reported to be maintenance (17), pruning trees (13), picking fruit (3) and cleaning (3). Maintenance activities included painting (7), and repairs to the house structure (5).

Fifty-seven percent of the injuries were fractures, with the most common fracture site being the ribs. The most common injury was fractured ribs (10% of injuries for this group). Falls involving ladders have the potential to be more serious due to the fall being from a height. However, the proportion of admissions for falls involving ladders (48%) was only slightly higher than that for all falls in this age group (42%).

Prevention of falls from ladders

This has been covered in Hazard 14 (Routley and Valuri, 1993). Briefly, the recommendations include to consider one's ability to use a ladder safely, follow instructions regarding ladder load limit, lean the ladder against a solid structure and ensure the base will not slip, and restrict use to those rungs below the top two. In addition, best practice includes frequent repositioning of the ladder, rather than stretching while working from the ladder.

6. Other factors

Anecdotal evidence suggests that dizziness, and hurrying to the toilet and telephone, are associated with falls among older people.

A total of 47 people (3% of falls in a private home) reported feeling dizzy before the fall, 11 reported that they "blacked out", 4 fainted and 1 reported a loss of consciousness preceding the fall. Of those who reported dizziness, 10 were walking around the house at the time and a further 9 were either standing up from a sitting or lying position.

In 110 cases (7% of falls in private homes) the fall was associated with going to the toilet. Only one person reported being in a hurry. However, 85 of the falls occurred on the way to the toilet, while 17 occurred in the toilet and 8 occurred while leaving the toilet. There were 68 cases for which the time of fall was recorded. Half (35) occurred during the night between 9pm and 5am, 10 during the rising hours of 6am-9am,

and 23 during the day and early evening between 10am and 8pm. This would suggest that older people are at higher risk when on their way to the toilet, consistent with the theory that this activity is associated with some degree of urgency, particularly during the night.

Prevention of falls associated with trips to the toilet

Falls associated with going to the toilet may be reduced or prevented by the correct timing of diuretic medications to ensure peak effect during the day, night lights in the bedroom, hallways and toilet, a clear route and access to the toilet, a handrail in the toilet, raised toilet seats if necessary, and the use of commodes or urinals in bedrooms at night.

Eight people reported being on the way to answer the telephone at the time of the fall, and 2 of these specifically stated being in a hurry.

Prevention of falls from dizziness

Although not evident in the data presented here, dizziness is quite prevalent among older people, with a number of studies reporting that 30-50% of older people experience dizziness (Downton, 1993). Dizziness may have a number of causes. Older people should be encouraged to report dizziness to their general practitioner who may be able to provide some relief. For those older people who have a chronic dizziness problem, strategies for living with dizziness (eg., moving slowly from a lying to standing position), and the strategic placement of grab rails within the home may reduce the risk of falling.



Falls in residential institutions (N= 503)



The *residential institutions* location includes hospitals, nursing homes, hostels, and other special accommodation. The group of people who fell in residential institutions were older than fallers in general (71% over 80 yrs compared with 42%) and had a slightly higher proportion of females (75% compared with 70%). Most of the falls were on the same level (57%), with 16% of the falls being from another level up to 1 metre. A higher proportion of the cases were engaged in personal hygiene and sleeping/resting (11% each) than were those who fell in a private home.

Fractures accounted for 57% of the injuries, and 65% of these were to the hip, 6% to the pelvis, and 5% to the wrist. Sixty-six percent of falls in

residential institutions were admitted to hospital compared with 48% for all falls among older people.

Factors other than persons associated with the fall are shown in Table 2.

1. Beds (N=65)

Thirty of those whose fall was associated with a bed, fell out of bed while resting or sleeping. An additional 22 fell while getting out of bed, while 2 climbed over bed rails and fell.

There were 34 cases where the time of the fall was recorded. Nineteen fell during the night between 9pm and 5 am, 6 during the rising period of between 6am and 9am, and 9 fell during the day between 10am and 8pm.

Twenty-seven percent (44) of the

injuries were fractures, with the most common injury being fractured hip (32 cases). There was an average of 2.6 injuries per case, compared with 1.2 for all falls in residential institutions.

Prevention of falls from beds

- provide advice to older people living in the community on dizziness management through general practitioners, community health centres, and relevant care providers
- bed sticks are a more attractive alternative to bed rails for use in the home; these are a short C shaped rail which fits under the mattress, preventing a fall and providing some support when getting out of bed
- selective use of bed rails in hospitals and nursing homes.

Prevention of injuries due to falls from beds

A padded under-garment has been shown to be effective in a nursing home setting in reducing injuries among residents who sustained a fall (Lauritzen, 1993). Such garments could be worn at all times by nursing home residents and would protect from all types of fall injury while being worn. Similar under-garments could be used by community dwelling older people, particularly when resting or sleeping in bed. Similarly, impact absorbing flooring materials could be utilised in bedrooms of private homes, nursing homes and other residential institutions, particularly around the bed, to reduce the frequency and severity of injuries which occur during a fall out of bed. Lowering the height of beds could also reduce the severity of fall injuries.

Factors associated with falls in residential institutions, injuries among older people

Table 2

Factor	Cases N=503*
beds	65
floors and flooring materials	44
chairs	24
crutches, canes, walkers	17
stairs and steps	11
wheelchairs	9
toilets	8

(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr

* Up to 4 factors may be recorded per case



2. Floors and flooring materials (N=44)

There were 29 cases where some information was reported regarding the association of the flooring with the fall. In 23 cases the floor was slippery, and in a further 5 the floor was reported to be wet (2 of which were in the bath/shower).

3. Chairs (N=24)

The injured person was sitting on a chair and fell off in half the cases (12). A further 7 fell while getting up from a chair, 3 tripped on a chair and fell, and 2 fell while going to sit down on a chair.

More than half of the injuries were fractures (19), with the single most common injury being a fractured hip (11).

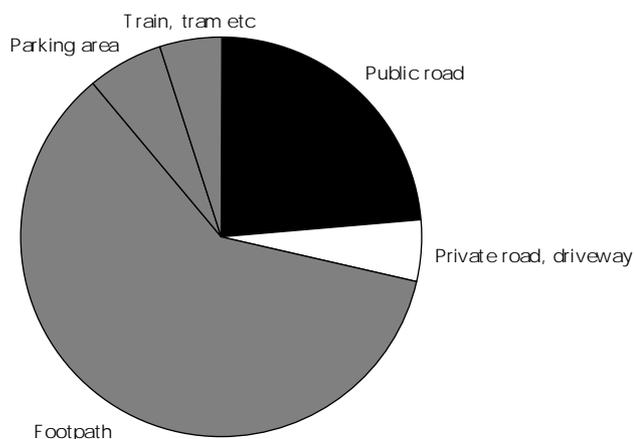
Falls in areas of transport (N = 401)

The group of older people who fell in areas of transport were younger than fallers in general (74% less than 80 yrs compared with 42%).

The locations of falls in areas of transport is shown in Figure 7, with the footpath as the most common location (60%), and therefore will be examined in more detail.

Location of falls in areas of transport, injuries among older people

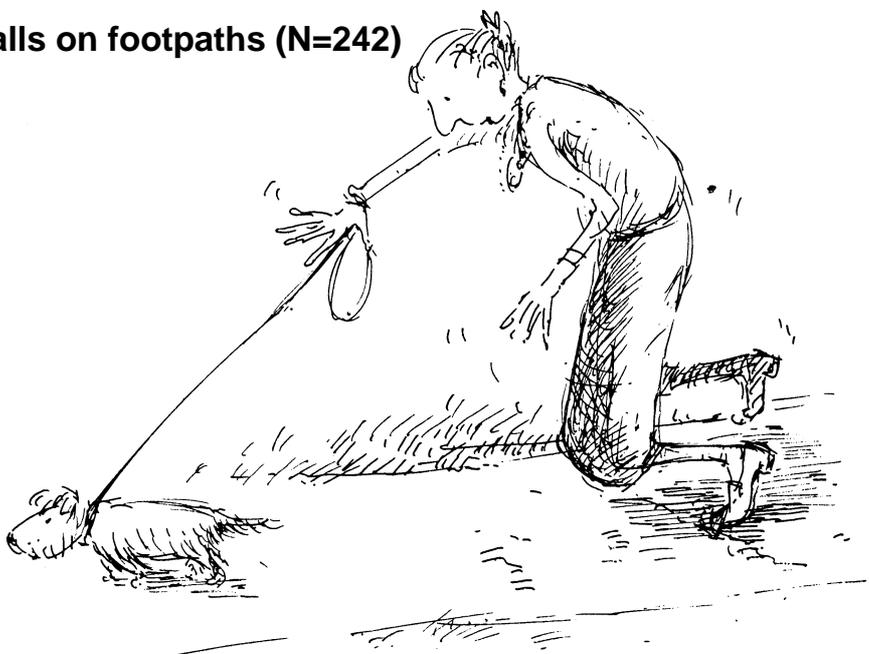
Figure 7



(≥65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr

N=401

Falls on footpaths (N=242)



Prevention of falls due to slips and trips

Flooring materials in existing hospitals and nursing homes could be upgraded where possible to meet the Australian and New Zealand Standard for the Prevention of Slip Hazards (1994), while new residential institutions should be built to meet the Standard. In addition, spills and contaminants should be isolated and removed quickly and uncarpeted floors should not be polished. Carpet should be kept in good repair and be replaced when becoming worn.

In addition to reducing slip hazards, flooring in residential institutions should be, wherever possible, a good impact absorber, in order to reduce the severity of injury in the event of a fall.

There was a total of 174 factors (other than persons) identified to be associated with falls, of which 48% (84) were concrete and other man-made surfaces, 10% (18) were gutters and kerbing, 5% (8) were ground and other natural surfaces, and 5% (8) were stairs and steps.

Thirty-eight percent (93) of cases reported that the fall was caused by tripping. More than half of these cases



Prevention of injuries to older pedestrians

Walk with Care is a pedestrian education and advocacy program designed by Vic Roads. Its purpose is to reduce the incidence and severity of injuries involving older pedestrians by identifying the dangers and environmental hazards affecting them and developing solutions to minimise risk. This is achieved through the integration of education, advocacy and, if required, local area traffic management treatments. The implementation of Walk With Care, especially in municipalities with a higher than average proportion of older people, is potentially an effective way to address pedestrian injuries, due to falls and traffic, for this age group.

The upgrading of current, and the construction of new, footpaths to meet the Australian and New Zealand Standard for the Prevention of Slip Hazards (1994) is also recommended.

(54) reported tripping over uneven or broken footpaths, and an additional 3 tripped on the joins in the footpath.

Ten percent (23) of cases reported slipping, and 7 of these slipped on a wet footpath.

Of those cases involving gutters and kerbing (18), 8 were trips on guttering or kerbing.

Forty-six percent of injuries were fractures, with the most common sites being the hip (20% of fractures), wrist (16%), and humerus (16%). The most common injury was a fractured hip. The proportion of cases admitted was 34%, compared with 48% for all falls in this age group.

Falls in commercial areas (N=151)

The majority of falls in commercial areas occurred in a private enterprise area (83%), as distinct from government or public utilities (17%).

Forty percent of the injuries were fractures, with the most common sites being the hip, wrist and humerus. The most common injury was a fractured hip (13% of injuries). The proportion of admissions was 42% compared to 48% for all falls in this age group.



There were 120 factors (other than persons) identified to be associated with the falls (Table 3).

1. Steps and stairs (N=49)

Many cases involved either a trip (20) or a slip (13). Six cases fell from another level up to one metre.

The most common locations for falls from steps and stairs in commercial areas included restaurants (10), stores (8, 3 of which were supermarkets), hotels (7), shopping complexes (6), and cinemas or theatres (4).

Nineteen cases reported that the fall occurred while going down the steps or stairs. Overall, 6 cases reported that a step was missed, 3 misjudged the step, and 2 reported not seeing the step.

Fractures were the leading injury category (24), with the most common sites being the hip (7), and wrist (4).

2. Floors and flooring materials (N=31)

More than half (17) of the cases involved a slip, while 6 involved a trip.

The most common locations for falls where the floors or flooring materials were involved included stores (13, 10 of which were supermarkets), shopping complexes (6), and cinemas or theatres (3).

Factors associated with falls in commercial areas, injuries among older people

Table 3

Factor	Cases N=151*
stairs or steps	49
floors and flooring materials	8
fruit and vegetables	7
concrete and other man-made outdoor surfaces	6
elevators or other lifts	6
alcohol	5

(≥ 65 yrs), VISS: WH, LRH, RMH 2 yrs each, PANCH 1yr

* Up to 4 factors may be recorded per case



Prevention of slips in supermarkets

Since five of the six slips associated with food on the floor occurred in supermarkets, frequent cleaning of food particles from floor is recommended, especially in fruit and vegetable sections. Floor surfaces in stores, shopping complexes and other public areas could be upgraded to meet the new Australian and New Zealand Standard for the Prevention of Slip Hazards (1994).

Six of those who slipped reported that food, most commonly fruit or vegetables, on the floor was associated with the fall.

Motor Vehicle and Road Traffic Crashes (N=372)

Road traffic crashes accounted for 7% of emergency department presentations for those 65 years and over, compared with 10% for all adults in the VISS data base.

More than half (65%) of the adults over 65 yrs were car passengers or other

victims. Among those where seating position was recorded (79%), 61% were drivers, compared with 70% for all adults. Thirty percent of those involved in road traffic crashes were pedestrians, compared with 11% for all adults. Clearly, pedestrian injury is an issue for people over 65 yrs.

Fractures, especially of the ribs, accounted for 26% of the injuries, and bruising accounted for a further 22%. Body parts most frequently injured included face/scalp (13%), chest (11%), and ribs (10%). The most common injuries were lacerations of the face and scalp (8%) and fractured ribs (7%). There were only 6 cases where it was reported that the seat belt was associated with the injury. Forty-two percent of cases were admitted.

Pedestrians (N=111)

Seventy-nine percent (88) of pedestrians were hit by a car. Thirty-three of these reported that they were crossing the road at the time, 2 of which were crossing to a tram. An additional 9 were hit by a car reversing out of a driveway.

Other falls prevention issues

There are a number of intrinsic risk factors which have been strongly associated with falls among older people. These include: difficulties in performing activities of daily living, reduced knee, hip, ankle and grip strength, impaired visual acuity, gait abnormalities, impaired balance, and the use of certain medications (sedatives, hypnotics and anxiolytics) (Nevitt, 1990). Interventions which address these risk factors include: occupational therapy to assist older people in performing activities of daily living with relative ease, exercise to increase muscle strength and improve balance, regular ophthalmological checks, and medication review and management. In addition, osteoporosis is a risk factor for fall injury, although not a risk factor for falling itself. Osteoporosis may be prevented or reduced by regular weight bearing exercise, calcium supplementation, and hormone replacement therapy where appropriate.

The impact of falls prevention programs may be strengthened by directing interventions towards those older people at higher risk of falls. Characteristics which have been strongly associated with a higher risk of falling among older people include: female sex, male sex over 80 years, impaired mobility, past history of falls, Parkinson's disease, and dementia (Nevitt, 1990). Such characteristics could readily be used to select those at higher risk. In addition, more sophisticated clinical examinations have been devised for this purpose (Clark et al, 1993).

Injury Hospitalisations and Deaths

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Injury Hospitalisations

Falls are the leading cause of injury hospitalisations among older people, accounting for 69% of the cases. Other causes of injury hospitalisation for this age group include motor vehicle traffic (8%), self inflicted intentional (2%), poisoning (1.4%), and burns (1%) (Langlois et al., 1992).

Fall injury hospitalisation

Figure 8 illustrates that hospitalisation rates for fall-related injuries increase markedly with each decade after 65 years but show a dramatic increase for persons over 85 years. Furthermore, fall hospitalisation among older people appears to



have been rising marginally from 1986 to 1992, especially among the very old (85+ years). There is no apparent explanation for the outlying data point in 1989 for the 85+ age group.

The predominant injury to older fall patients is fractures (the principal injury in 79% of cases). The majority of these fractures are to the neck of femur (hip). Nearly half (47%) of the annual admissions for fall-related hip fracture among older persons (65+) are due to slipping, tripping or stumbling. There was no noticeable change in these proportions over the 7-year period examined here.

The hospitalisation rates of fall-related hip fracture among older people increase with age, with the very old (85+ years) being particularly over-represented (Table 3). Furthermore, at all ages over 65 years, the fall-related hip fracture hospitalisation rate for females is twice that for males. The hospitalisation rate for fall-related hip fracture among older people has shown a slight upward trend over the period 1986-1993 (Victorian Inpatient Minimum Database).

Older fall patients spend, on average, 23 days in hospital for a hip fracture, with little age related variation. The average length of stay for fall-induced hip fractures has decreased in recent years for those aged 65-74 years, 75-84 years and 85+ years (Victorian Inpatient Minimum Database, July, 1986-June, 1993).

Injury Mortality

Table 4 shows the average proportions of injury deaths due to various causes among older people in Victoria between the years 1986 -1992 (ABS, 1986-1992). The most notable cause is falls (47%), while other major causes are transport accidents (25%) and suicide/

homicide (17%). Moreover, the proportions of deaths due to falls increases dramatically with age (from 21% for 65-74 year olds to 77% for those aged over 85 years).

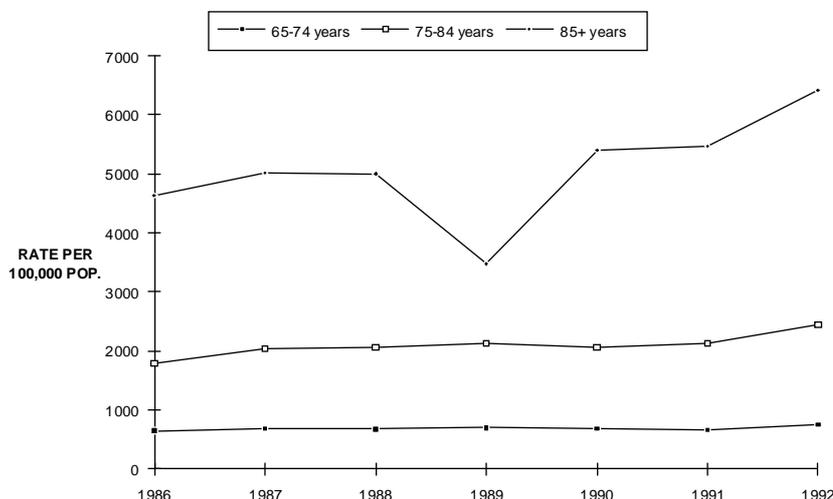
It is worth noting that falls rank only 6th among the leading causes of injury death for younger adults (18-54 years), well behind transport accidents, which is the leading cause of injury death for this age group (Fildes, 1994).

On average, 248 older people (65+) die from a fall each year in Victoria (ABS, 1986-1992). Over half (54%) of those fall deaths occur within the 65-84 year age group and the remainder in the 85+

age group. The proportion of all injury deaths due to falls is higher for adult males than adult females at all ages up to 75 years, after which the pattern is reversed (Fildes, 1994). At age 85 years and over the proportion of fall deaths for females is approximately double that for males.

However, Figure 9 reveals that the age-specific rates of deaths per 100,000 population for males and females are very similar. These rates suggest that the risk of dying from a fall increases dramatically after age 85 and is actually slightly higher for males than females at all ages over 65 years. However, the fall related fractured hip hospitalisation

Fall injury hospitalisation rates for older people **Figure 8**



(≥65 yrs), Victoria (Victorian Inpatient Minimum Database, July, 1986-June, 1993). Labels indicate the first half of each financial year.

Fall-related hip fracture hospitalisation rates for older people **Table 3**

Fall-related hip fracture average annual hospitalisation rate per 100,000 population

Sex	65-74 years	75-84 years	85+ years
Male	36	158	419
Female	91	373	786

Source: Victorian Inpatient Minimum Database, July, 1986-June, 1992 (≥65 yrs), Victoria



rate is greater for females than males (Table 3).

The rate of injury deaths due to falls across the period 1986-1993 has remained fairly static for older persons aged 65-84 years, but there is a slight downward trend for those aged over 85 years (ABS, 1986-1992).

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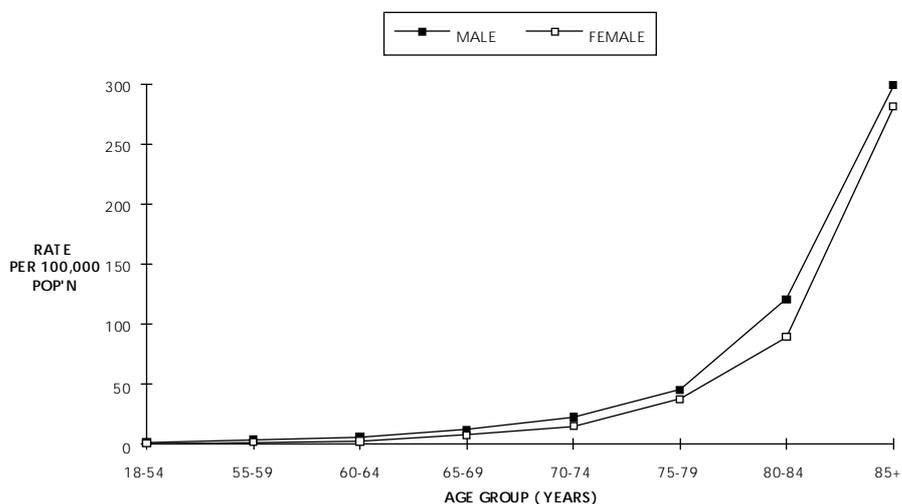
Distribution of average annual proportions of injury deaths among older people (≥65 yrs) in Victoria Table 4

Injury Category	Age Group							
	Total ≥65		65-74		75-84		85+	
	Number	%	Number	%	Number	%	Number	%
Falls	1733	45.0	248	19.5	680	44.9	805	76.7
Transport	921	23.9	396	31.2	427	28.2	98	9.3
Suicide	574	14.9	311	24.5	212	14.0	51	4.9
Drowning & Suffocation	147	3.8	71	5.6	46	3.0	30	2.9
Fire & Flames	113	2.9	47	3.7	47	3.1	19	1.8
Homicide	46	1.2	34	2.7	9	0.6	3	0.3
Poisons	9	0.2	4	0.3	4	0.3	1	0.1
Other	291	7.6	159	12.5	89	5.9	43	4.1
Total	3834	100	1270	100	1514	100	1050	100

Source: ABS, 1986-1992.

(Note: Excludes deaths due to indirect causes such as surgical misadventure, abnormal reactions, adverse effects and late effects)

Average annual rate of deaths due to falls in Victoria by age group and sex (ABS, 1986-1992). Figure 9



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* *Special edition*



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How to Access VISS Data:

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

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Participating Hospitals

Royal Children's Hospital Latrobe Regional Hospital
(Traralgon and Moe)

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Coronial Services

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

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

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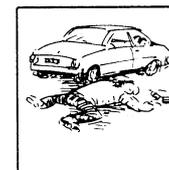
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