

Injury Issues Monitor

Deaths and hospitalisations due to drowning

During the five-year period 1999–00 to 2003–04 an annual average of 370 people died in Australia as the result of drowning, and an annual average of 618 were hospitalised as a result of drowning.

Deaths

For persons, the highest age-specific rate was found in the 0–4 year age range. Males had consistently higher age-specific rates of drowning across all age groups than did females. The highest rates for males were in the age groups 0–4 and 85 years and over (4.8 and 5.3 per 100,000 population, respectively).

There was a statistically significant downward trend in drowning deaths over the reporting period. From a rate of 2.08 deaths per 100,000 population at the beginning of the period, deaths decreased by 4.6% per annum nationally.

Age-adjusted rates of drowning were highest in the Northern Territory (4.3 deaths per 100,000 population) and lowest in South Australia (1.3 per 100,000).

Age-adjusted rates rose according to the remoteness of the person's residence. The rate for the very remote zone was three times that for major cities.

Most drowning deaths occurred during the warmer months of the year.

The most commonly identified activities being undertaken at the time of the drowning were sports or leisure. Most drownings occurred at home. A significant proportion occurred in a sporting venue.

Hospitalisations

By far the highest age-specific rates of hospitalisation were found in the 0–4 year age group, where the rate for persons was 18.0 separations per 100,000 population. The next highest rate was 3.0 per 100,000

among those aged 15–24 years.

As was the case for deaths, male rates of hospitalisation due to drowning were consistently higher than female rates across all age groups. The ratio between male and female rates was greatest in the 25–29 year age group.

The Northern Territory had the highest age-adjusted rate of hospitalisation due to drowning (4.3 separations per 100,000 population).

Age-adjusted rates of hospitalisation rose with the remoteness of the person's residence. The rate for the very remote zone was close to 2.5 times as high as that for major cities.

Differences between average monthly frequencies of drowning-related hospitalisation were quite pronounced. January, the month with the highest number

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of hospitalisations, had 3.8 times the number of cases than did June, which had the lowest number.

Specific types of drowning

The highest proportion of drowning deaths occurred in natural bodies of water, accounting for an annual average proportion of 33%. The next most frequent categories were intentional self-harm (15%), swimming pool drownings (10%) and watercraft-related drownings (10%). The largest proportion of hospitalisations were due to drowning in swimming pools (29%), followed by drowning in natural bodies of water (27%) and watercraft-related drowning (10%).

Natural bodies of water

This section includes beaches, lakes, the open sea, rivers and streams.

There was an annual average number of 122 deaths and 173 hospitalisations due to drowning in this category.

The age-adjusted rates for this category of drowning were 0.6 deaths per 100,000 population and 0.9 separations per 100,000.

The highest age-specific rates of death for persons were found in the age ranges 75–79 years (1.0 deaths per 100,000 population) and, for hospitalisations, in the 0–4 year age group (2.0 separations per 100,000).

Male age-specific rates were consistently higher than female rates in all age groups for both deaths and hospitalisations.

Rates of both deaths and hospitalisations showed statistically significant downward trends.

Rates of drowning death rose according to the remoteness of the person's residence. The rate for the very remote zone was 3.8 times that for major cities. Rates of hospitalisation due to drowning were fairly similar for the major cities and inner regional zones (0.7 and 0.8 separations per 100,000 population, respectively) and were also fairly similar for the outer regional and remote zones (1.0 and 1.1 per 100,000 respectively). The very remote area had the highest rate of 1.8 per 100,000. The rate for the very remote zone was 2.6 times that for major cities.

Across all ages, the length of stay in hospital following admission after a drowning incident ranged from 1 day to

134 days. The mean length of stay was 3.5 days.

Swimming pools

There was an annual average of 36 deaths and 182 hospitalisations during the reporting period.

The highest age-specific rate of death was found in the 0–4 year age group (1.4 deaths per 100,000 population). Males had higher age-specific rates of hospitalisation than did females in almost all age groups.

Males in the 0–4 year age group had the highest age-specific rate of hospitalisation (11.5 separations per 100,000 population). The comparative female rate was 7.7 per 100,000 population.

Residents of the very remote zone had the highest rate of deaths and hospitalisations (0.35 deaths per 100,000 and 1.4 separations per 100,000).

Of the total of 36 swimming-pool related drowning deaths, 16 took place while the deceased was in the pool, and the remaining 20 after they had fallen into the pool.

Ninety-seven of the 182 persons who were admitted to hospital experienced a drowning episode while already in the swimming pool. 85 came close to drowning after they fell into the pool.

The length of stay in hospital ranged from 1 day to 242 days. The mean length of stay was 3.0 days.

A total of 46 cases of children aged between 0–9 years having drowned in a swimming pool during the period 2001–02 to 2003–04 were identified in the National Coroners Information System (NCIS) coronial data. Analysis showed that children are at their most vulnerable to drowning in a swimming pool during the first few years of life. The number of cases declined with age. By far the most important factor identified for young children was the lack of adequate supervision. Various aspects of pool fencing and gates were also commonly identified as contributing factors.

Fifty-three cases of swimming pool drownings among persons aged 10 years and over were identified in NCIS data. In close to one-third of cases, the person who drowned had fallen into the pool. In around half of the cases, mention was made of the presence of a significant morbidity(ies) such as ischaemic heart

disease. Cleaning the pool was the activity being engaged in by several people when they fell into the pool and drowned. Among the contributing factors noted were such things as epilepsy, coronary artery disease, chronic airflow limitation, and the deceased falling into the pool, hitting their head and losing consciousness. The sudden onset of a medical event such as a heart attack occurred in numerous cases.

Bathtubs

There was an annual average of 20 drowning deaths and 47 hospitalisations.

The age-adjusted rates of drowning and hospitalisation were 0.1 deaths per 100,000 population and 0.2 separations per 100,000 population.

The highest rates of death and hospitalisation were found in the 0–4 year age group (0.5 person deaths per 100,000 population and 3.2 separations per 100,000).

The inner regional zone had the highest rate of death due to drowning in a bathtub and the very remote zone had the highest rate of hospitalisation.

The length of stay in hospital for admissions related to drowning in a bathtub ranged from 1 day to 82 days. The mean length of stay was 2.6 days.

A search of coronial data found 15 cases of children in the 0–5 year age range who had drowned in a bathtub during the period 2001–02 to 2003–04. The majority of these were aged one year or under. Analysis of these cases showed the most important area for concern was inadequate or non-existent supervision which was identified in relation to all cases. A commonly mentioned practice was shared bathing with a sibling.

Thirty-five cases of bathtub-related drowning were found in NCIS for people aged 6 years and over. The most commonly identified issue was epilepsy or some other form of seizure disorder. Other factors mentioned frequently in case documents were alcohol intoxication and the presence of significant morbidities such as ischaemic heart disease.

Watercraft

There was an annual average of 37 drowning deaths and 65 hospitalisations associated with watercraft. The age-adjusted rates of watercraft-related drowning and hospitalisation were 0.2 deaths per

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100,000 population and 0.3 separations per 100,000 population.

Age-specific rates of death fluctuated considerably, but were highest overall between the ages of 30–64 years. The majority of deaths involved males.

With the exception of the 5–9 year age group, rates of hospitalisation were higher for males than females, often substantially so. Male rates were highest across a broad age band, from 15–69 years of age.

The inner regional and outer regional zones had the highest age-adjusted rates of death (0.31 and 0.34 deaths per 100,000 population respectively). Age-adjusted rates of hospitalisation rose according to the remoteness of the injured person's residence.

58% of deaths and 22% of hospitalisations occurred as the result of incidents in which the vessel was damaged (e.g. overturning or sinking, a person jumping from a burning ship, etc.). The remaining 42% of deaths and 78% of hospitalisations occurred as the result of incidents in which the vessel did not sustain damage (e.g. fall from gangplank, ship or overboard, or being thrown or washed overboard).

Where the type of activity being undertaken was specified, the majority of watercraft-related drowning deaths occurred while the person was engaged in a leisure activity.

For those cases of hospitalisation where the body region was specified, the hip and lower limb were the most common site of injury (17%), followed by the head (16%), trunk (16%) and shoulder and upper limb (14%). 37% of injuries were not specified according to body region.

The length of stay in hospital ranged between 1 and 149 days. The average length of stay was 4.2 days.

Self-harm

There was an annual average of 56 drowning deaths and 39 hospitalisations due to intentional self-harm.

The age-adjusted rates of death and hospitalisation were 0.3 deaths per 100,000 population and 0.2 separations per 100,000 population.

Rates of death tended to rise with age from 15 years onward, especially for males. Males had higher age-specific rates of death in most age groups and similar rates to females in the remaining ones.

Age-specific rates of hospitalisation followed a different pattern to that for drowning deaths in that females had higher age-specific rates of hospitalisation in several age groups. The highest age-specific rate was for males aged 85 years and over (0.72 separations per 100,000 population).

Death rates were the same for all remoteness zones (0.3 deaths per 100,000 population). Age-adjusted rates of hospitalisation were similar for major cities, inner regional and outer regional zones. Age-adjusted rates for the remote and very remote zones were 0.0.

The length of stay in hospital ranged from 1 day to 149 days. The mean length of stay was 8.0 days.

This report can be viewed or downloaded from the RCIS website: <www.nisu.flinders.edu.au>

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Football Injuries

The various codes of football are very popular in Australia. Table 1 shows estimates from the Australian Sports Commission for participation in these sports by those aged 15 years and over during 2005.

Table 1: Football participation numbers and rates by code, Australia 2005, 15 years and over

Football code	Estimated no. of participants	Participation rate
Outdoor soccer	614,300	3.8%
Indoor soccer	264,100	1.7%
Australian rules football	536,200	3.4%
Rugby league	195,900	1.2%
Rugby union	165,900	1.0%
Touch football	367,200	2.3%

There were strong regional differences in terms of the number of participants for each code across the different states and territories. For example, just over half of all participants in Australian rules football resided in Victoria, while over half of all participation in rugby occurred in New South Wales.

Unfortunately, injuries are an all too common outcome for those playing these sports.

A briefing prepared by Geoff Henley of the Research Centre for Injury Studies has focused on the subject of hospitalised football injuries that occurred in Australia during 2004–05.

Over the one-year period, there was a total of 14,147 hospitalisations resulting from all football codes. Football accounted for 31% of all sports and leisure-related hospitalisations during the reporting period. Australian rules football was responsible for 9% of all sports and leisure-related hospitalisations despite only accounting for 4% of all sports and leisure participation. Similarly, Rugby was responsible for 6% of hospitalisations despite only accounting for 3% of participation.

Australian rules experienced the highest rate of hospitalisation with 21.2 cases per 100,000 population, and Touch football had by far the lowest rate (3.0 per 100,000).

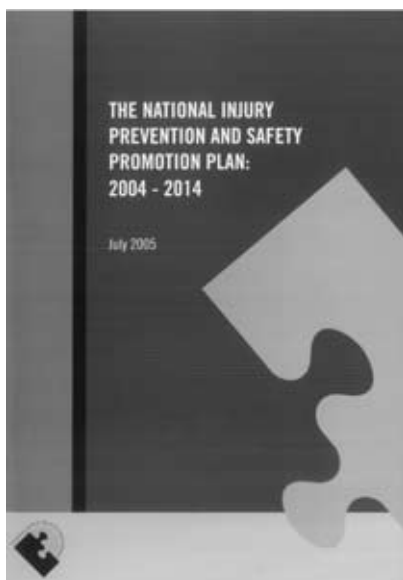
In terms of participation rates, Australian rules had the highest rate of hospitalisation per 100,000 participants with 634.7. This was followed by rugby with 606.4, although this rate was not significantly lower than that of Australian rules football. Both rugby and Australian rules football had a peak rate of over 950 hospitalisations per 100,000 participants in the 25–34 year age group.

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National leadership in injury prevention

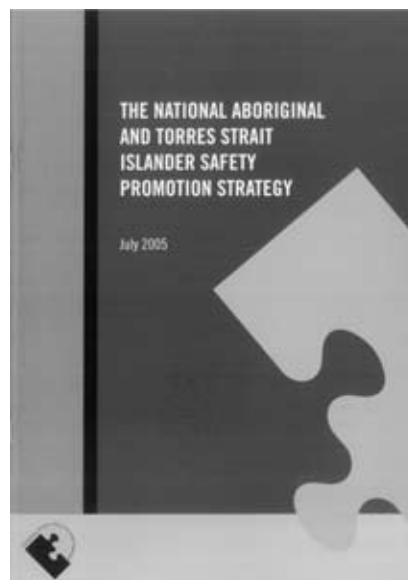
Guidance for practitioners, researchers and policy makers on injury prevention in Australia is provided by a set of three injury prevention and safety promotion plans developed under the auspices of the National Public Health Partnership (NPHP) in July 2005. The Australian Health Ministers Advisory Committee (AHMAC) has invested responsibility for the carriage of the three plans with the Australian Population Health Development Principal Committee (APHDPC) following the disbandment of the NPHP. In 2006, the APHDPC formed a time-limited body, the National Injury Prevention Working Group (NIPWG), to support this aspect of its work. Attention of the working group has, to date, been focused on implementation of the National Falls Prevention for Older People Plan.

The plans, and a brief description of each, are as follows:



The National Injury Prevention and Safety Promotion Plan: 2004-2014

The vision for the National Injury Prevention and Safety Promotion Plan (2004–2014) is for governments, private sector and communities to work together to ensure that people in Australia have the greatest opportunity to live in a safe environment free from the impact of injuries. The Plan establishes a framework for the injury prevention and safety promotion activities of government agencies, local government, the private sector, non-government organisations, communities and individuals.



The National Aboriginal and Torres Strait Islander Safety Promotion Strategy

The National Aboriginal and Torres Strait Islander Safety Promotion Strategy builds on, and is integrated with, the National Injury Prevention and Safety Promotion Plan: 2004–2014. Injury is a major problem for Aboriginal and Torres Strait Islander peoples with a number of underlying factors such as cultural fragmentation, alienation and poverty contributing. The Aboriginal and Torres Strait Islander Injury Prevention Action Committee (ATSIIPAC) developed the National Aboriginal and Torres Strait Islander Safety Promotion Strategy to address, in part, injury among Aboriginal and Torres Strait Islanders.



National Falls Prevention for Older People Plan: 2004 Onwards

The National Falls Prevention Plan for Older People (the Plan) complements the National Injury Prevention and Safety Promotion Plan: 2004 Onwards and links with the National Aboriginal and Torres Strait Islander Safety Promotion Strategy. The purpose of the Plan is to provide a strategic framework for collaborative action across jurisdictions, local government and organisations, to prevent falls and minimise fall related injuries in older people throughout Australia.

The Australian Injury Prevention Network

Who are the AIPN?

The Australian Injury Prevention Network (AIPN) is a self funded national body representing all-age, all-cause injury prevention and control in Australia. The AIPN is Australia's key professional body for practitioners, researchers, academics and allied professionals. It has a broad-based membership from all sectors of the injury prevention community, including health, transport, emergency services, crime prevention, education, planning and industry. The AIPN represents the interests of its constituents, encourages best practice in injury prevention and control as well as research and surveillance. The AIPN strives to promote knowledge of the causes of injury and safety promotion in order to minimise injury-related harm throughout Australia. In its most recent Strategic Plan (2007–2010) the AIPN has identified four broad strategic objectives and a range of goals. The five objectives are:

1. Strengthening the AIPN's role as a key advocacy body.
2. Identifying emerging injury issues.
3. Provision of a forum for collaboration and knowledge sharing between injury researchers, practitioners and policymakers.
4. Strengthening the capacity for the provision of professional workforce development.
5. The AIPN has a new website: <<http://aipn.bravehost.com>> where copies of the current strategic plan can be downloaded.

Membership

The AIPN is a non-government organisation with a written constitution, an elected Executive Committee, supplemented by co-opted members, and a partially funded Secretariat. The AIPN Executive has recently announced a revamping of its membership structure and the list of benefits available to members.

The new membership structure provides more flexibility for individuals and institutions to enable more choice in selecting a membership type to suit. From 30th June 2008 there will be two choices of individual membership and three choices for Institutional membership. For individuals the AIPN is offering both a professional and concessional membership option. Employed individuals can select the professional membership option while volunteer workers, part-time employed (employed for 2 days a week or less) or full time students can select the concessional membership option (evidence of eligibility for concessional membership is required. Contact the AIPN for details).

For institutions, the AIPN is offering increased choice of memberships to better reflect the diversity of organisations with an interest in the injury area. A new, not-for-profit institutional category has been created alongside two institutional memberships. All types are defined as an organisation or company paying for discounted multiple membership where only one individual has voting rights. One individual can be named as the primary member for eligibility to vote. As with the concessional individual membership applicants for the

not-for-profit institutional membership will need to demonstrate their eligibility (contact the AIPN for details).

The changes to the membership structure are accompanied by an increase in the number of benefits available. From June 30th 2008 the following benefits will be provided to members:

- Being part of a coordinated voice on injury prevention research, policy and practice issues to government;
- Substantial discounts on registration fees for AIPN conferences;
- Discounts on selected injury-related journals;
- The quarterly AIPN Injury Incidence newsletter;
- Eligibility to join an e-mail discussion list to facilitate communication among members on topics of interest;
- Eligibility to apply for AIPN seeding grant; and
- Eligibility for students to enter an article writing competition with publication of articles in *Injury Incidence* and a small cash prize.

The new benefits will apply to all new members joining from 30th June 2008 and will commence for existing members when they renew their current membership. The new pricing structure reflects the increased choice in membership type and benefits available to members and along with membership application forms is available on the website: <<http://aipn.bravehost.com>>

New on the RCIS website

- Geoff Henley, Hospitalised football injuries 2004-05
- Renate Kreisfeld, Deaths and hospitalisations due to drowning and immersion, Australia 1999–00 to 2003–04
- Renate Kreisfeld and James Harrison, Use of multiple causes of death data for identifying and reporting injury mortality
- James Harrison and Jesia Berry, Serious injury due to transport accidents, Australia, 2003–04
- Louise Flood, Jesia Berry and James Harrison, Serious injury due to transport accidents involving a railway train, Australia, 1999–00 to 2003–04.

Serious transport-related injury in Australia

Two recently published reports explore the issue of serious transport injuries in Australia.

The first of these, prepared by RCIS staff James Harrison and Jesia Berry, looks at Serious injury due to transport accidents, over the 12-month period 2003–04.

Serious injury due to transport accidents

For the purposes of the report, 'serious injury' is taken to include cases where a person was hospitalised for any period of time as the result of a crash and is discharged alive—deaths are not included.

During the reporting period, 48,160 people were seriously injured in crashes. Around two-thirds of these cases were male. This represented an age-adjusted rate of 242 admissions to hospital per 100,000 population.

Hospital admissions resulting from serious transport injury totalled 220,170 days—11.9% of all injury-related patient days. The mean length of stay in hospital was 4.6 days.

More than one-third of people seriously injured in a transport accident were car occupants. 88% of these were injured on public roads.

Over a fifth of the cases were motorcyclists, about half of whom were injured on public roads and close to half were injured off-road.

Another 16.5% of people seriously injured in a transport accident were pedal cyclists. Half of this group were injured off-road and close to half were injured on public roads.

7.7% of serious injury cases were pedestrians and 6.3% were animal riders or occupants of animal-drawn vehicles.

Over half of the cases were people aged less than 30 years. Young people aged 15–24 years represented over a quarter of all transport-related serious injury cases.

Serious injury due to transport accidents involving a railway train

The second report, written by Louise Flood, Jesia Berry and James Harrison, focuses on serious injury due to transport accidents involving a railway train. The report encompasses the five-year time period 1999–00 to 2003–04.

During the five-year period, 1,032 people (an average of 206 people per year) were seriously injured in transport accidents involving a train. The age-standardised rate of serious injury due to a transport accident involving a train was 1.03 per 100,000 population. Males had 1.6 times the rate of serious injury of females.

The most common circumstances for these types of events are shown in Table 2.

Over three-quarters of hospitalisation due to a transport accident involving a train were in New South Wales and Victoria. In New South Wales, a rail user was injured in the majority of cases, most commonly while boarding or alighting, or by falling while in the train or falling from the train. In Victoria, rail users made up only about half of the cases and 41.4% were pedestrians or motor vehicle occupants injured in a collision with a train.

60% of people seriously injured in transport accidents involving a railway train were male.

Serious injury rates were highest among youth and young

Table 2: Most common circumstances for transport accidents involving a railway train

Type of event	No	Percentage
Injury while boarding or alighting	271	26.3%
Car occupant injured in collision with a train	176	17.1%
Pedestrian injured in collision with a train	164	15.9%
Occupant of train injured by fall in train	119	11.5%
Occupant of train injured by fall from train	111	10.8%
Other circumstances	191	18.5%
Total	1,032	100.0%

adults in the 15–24 year age group and among older people aged 75 years and over.

Rail related hospitalised injury at ages 15–44 years was mostly likely to involve a pedestrian injured in a collision with a train, closely followed by a motor vehicle occupant injured in a collision with a train. Combined, these two circumstances resulted in close to half of all injuries.

The mean length of stay in hospital for people serious injured in a transport accident involving a train was 8.8 days, which was longer than the mean length of stay for all external causes of injury and poisoning (4.1 days). These incidents resulted in 9,090 patient days in hospital.

Copies of both reports can be viewed at or downloaded from the RCIS website. Serious injury due to transport accidents, Australia, 2003–04:

www.nisu.flinders.edu.au/pubs/reports/2007/injcat101.php Serious injury due to transport accidents involving a railway train, Australia, 1999–00 to 2003–04: www.nisu.flinders.edu.au/pubs/reports/2007/injcat104.php

Enquiries about the reports can be directed to Jesia Berry or Louise Flood, respectively.



Editor's Note

The *Injury Issues Monitor* is the journal of the Research Centre for Injury Studies at the Flinders University of South Australia.

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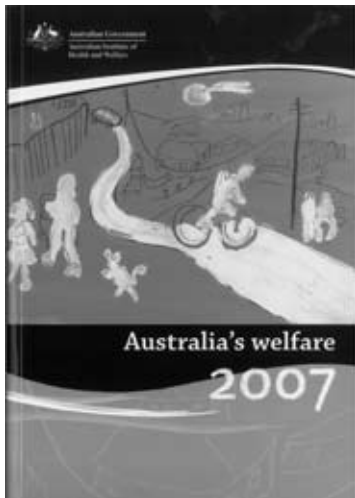
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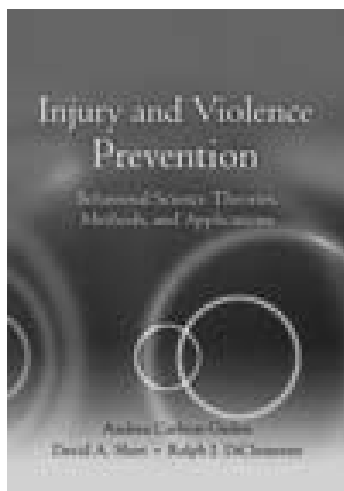
Something to read ...?



Australia's welfare 2007

Australia's welfare 2007 is the eighth biennial welfare report of the Australian Institute of Health and Welfare. It is the most comprehensive and authoritative source of national information on welfare services in Australia. Topics include children, youth and families; ageing and aged care; disability and disability services; housing for health and welfare; dynamics of homelessness; welfare services resources; and indicators of Australia's welfare.

Australia's Welfare can be downloaded from the AIHW website: www.aihw.gov.au/publications/index.cfm/title/10527 Printed copies can be purchased for \$60.00 from CanPrint, Tel: 1300 889 873, Fax: 02 6293 8333, E-mail: sales@infoservices.com.au



Injury and Violence Prevention: Behavioral Sciences Theories, Methods, and Applications

This book provides a comprehensive understanding of injury and violence preven-

tion by drawing on the breadth and depth of many scientific disciplines and public health practice experiences. Written by internationally renowned experts in the field, *Injury and Violence Prevention* emphasizes the specific theories, methods, and applications that make behavioural science approaches relevant and central to reducing injury-related harm. The book covers a wide range of topics, including the most frequently used behavior change theories and models and shows how they have been, or could be, applied to injury problems, the most commonly used research methods for understanding and influencing behavior change, behavior change issues for specific injury topic areas, and a variety of cross-cutting issues important to the field.

The book can be purchased in Australia. The following on-line bookshops include the title among their listings: www.booktopia.com.au • <http://seekau.seekbooks.com.au> • www.shearersbookshop.com.au/



Older Australia at a glance

The Australian Institute of Health and Welfare recently published the 4th edition in its series *Older Australia at a glance*. The publication provides insights into the diversity of the older population of Australia, where they are living, what they are doing, how healthy they are and the services they are using. It also includes sections on special population groups including older Aboriginal and Torres Strait Islander peoples, people from non-English speaking countries, Older people in regional and remote communities and older veterans.

The report can be downloaded from the AIHW website: www.aihw.gov.au/publications/index.cfm/title/10402 Printed copies can be purchased for \$45 from CanPrint, Tel: 1300 889 873, Fax: 02 6293 8333, E-mail: sales@infoservices.com.au

Rural, regional and remote health: a study on mortality

Death rates are a useful indicator of the underlying health status of a population. In general, people living in regional and remote Australia have higher death rates than those living in major cities. This report, the eighth in the Australian Institute of Health and Welfare's rural health series, describes the patterns of death in regional and remote areas and quantifies the difference in death rates amongst people living in major cities and those living outside them.

This report can be downloaded from the AIHW website: www.aihw.gov.au/publications/index.cfm/title/10527 Printed copies can be purchased for \$60.00 from CanPrint, Tel: 1300 889 873, Fax: 02 6293 8333, E-mail: sales@infoservices.com.au

Learning more about injury

The George Institute for International Health at Sydney University will be offering the following injury courses during 2008:

- **Two-day workshop in Injury Prevention** (Friday 8 and Monday 11 August, 2008)
- **One-semester online course in Injury Epidemiology, Prevention and Control** (Semester commences Monday 28 July, 2008)
- **One-semester online course in Falls Prevention and the Older Person** (Semester commences Monday 28 July, 2008)

For more information on the courses above, go to www.thegeorgeinstitute.org or E-mail injurycourses@george.org.au or phone (02) 9657 0300.

Multiple causes of death

A recent publication prepared by Renate Kreisfeld and James Harrison of the Research Centre for Injury Studies reports on the potential for using the Multiple Causes of Death (MCoDs) recorded in mortality data from the Australian Bureau of Statistics (ABS) to contribute to the improved surveillance of injury mortality.

Prior to 1997, Australian deaths data were assigned a single Underlying Cause of Death (UCoD). This took the form of an external cause code indicating what had caused an injury to occur. From 1997 onward, up to 13, and later up to 20, MCoDs could be allocated to any death record. These codes represent all of the information about cause of death that appeared on the death certificate.

The availability of MCoDs has far reaching public health significance. It offers the potential to describe patterns of physiological damage which could support the development of protective interventions. Available evidence suggests that previously inaccessible information about injury diagnoses could enable the development of superior methods of defining injury cases, leading to more accurate estimates of injury incidence. MCoD information also provides access to greater detail about some types of injury (e.g. the specific types of drugs involved in unintentional poisoning). Many deaths that are currently attributed to natural causes have MCoDs that indicate an injury contributed to the death. It is likely that at least some of these could legitimately find a place within routine injury reports, thus providing a more realistic picture of the burden of injury mortality. Finally, injury mortality data is the basis for indicators of some topics given prominence in the *National Injury Prevention and Safety Promotion Plan: 2004–2014*.¹ More complete identification of injury death offers the potential for improving the validity of these indicators.

2002 ABS mortality data were analysed using the MCoD information.

Two terms are used extensively throughout the report: *Conventional injury deaths* and *Additional injury deaths*. *Conventional injury deaths* are those for which the Underlying cause falls within the range of codes from the International Classification of Diseases that refer to External Causes (ICD-10 V01–Y98). The *Conventional* definition has commonly been used by NISU and other agencies in producing reports.

Additional injury deaths are those that have been attributed to natural causes (i.e. their Underlying cause code does not signify an External cause of death), but ICD codes for injury diagnoses or external causes of injury are present among the MCoDs. *Additional injury deaths* are the focus of the report.

Overview of major findings

2,535 *Additional injury deaths* were identified for 2002 in ABS mortality data. These cases differed from *Conventional injury deaths* during 2002 in that they were more highly concentrated among the oldest age groups. There was also a greater similarity between male and female rates among the *Additional injury* cases. Some differences were observed in rates of *Additional injury* deaths by jurisdiction of death registration: rates were low for South Australia and high for the Northern Territory. 80% of the *Additional injury* cases had been certified by a medical practitioner. This contrasted with *Conventional injury deaths*, of which (in 2002) about 80% had been certified by coroners. Very few of the *Additional injury deaths* had been the subject of an autopsy.

The 2,535 *Additional injury deaths* fell into five main categories: unintentional falls; poisoning by drugs; poisoning by other substances; inhalation of gastric contents, food, or some other object; and sequelae of external causes. Unintentional falls

were the most frequent category of *Additional injury deaths* and the findings in relation to this group of cases are summarised below.

Unintentional falls

Three sources of data were used in investigating this category of *Additional injury deaths*: ABS mortality data; the National Coroners Information System (NCIS); and linked hospitalisation and deaths data from Western Australia.

1,518 *Additional* fall-related cases were identified in the ABS data in which a fall had been coded as having contributed to the death. This group of cases includes those that had the presence of the ICD-10 code X59 Exposure to unspecified factor PLUS a code indicating that a fracture had occurred. Previous work undertaken by NISU has provided evidence that most deaths coded to a combination of X59 plus a fracture were the result of a fall.² The deaths were mainly among the very old. 90% had been certified by a medical practitioner. 73% involved an injury to the hip or thigh—in all but one case the nature of the injury was a fracture of the femur.

136 cases of fall-related deaths from the NCIS were analysed. 71% of these had been designated in NCIS as being due to natural causes. In a high proportion of the cases, a serious injury had been sustained. For example, 40% involved a femoral fracture, and 30% a head injury. However, in 58% of the 136 cases, the UCoD was ascribed to a disease of the circulatory or respiratory systems.

The most common scenarios for the fall-related deaths in the NCIS were post-operative deterioration in the patient's condition, deterioration without prior surgical intervention, or being found dead in circumstances that indicated a fall had taken place.

A third source of data used in this report was linked hospitalisation and death records from Western Australia for people who died whilst in hospital. 129 fall related cases were identified from these records. 86.8% of these had been certified by a medical practitioner and, for 70.5% of the records, the death had been attributed to natural causes.

The Western Australian data showed poor correlation between the hospital discharge and death records for cases involving falls by elderly people. In particular, the data shed light on two characteristic practices: Death records tended to contain codes for fewer conditions than did hospital discharge records, and codes in death records tended to be less specific (e.g. the appearance of a code in the death record indicating an unspecified head injury, despite more specific information about the injury being available in the hospital discharge record). These characteristics were also evident in a Swedish study which found that adding all of the conditions that appeared in the hospital discharge record to the death certificate, resulted in an increase of 58% in the number of cases that had an accidental fall as the Underlying cause of death.³

Certification of fall deaths and selection of UCoD

Mortality data are derived from death certificates. Accurate coding of the data is heavily dependent on the information supplied and the language used by the certifying doctor or coroner. The quality of death certificates, and hence of the data, could be affected by a number of factors including:

- Inexperience and lack of familiarity with guidelines for completing death certificates on the part of the certifier. Available literature suggests that this issue is particularly relevant in relation to medical practitioners.^{4–6} Around 80% of the *Additional deaths* were certified by medical practitioners

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Multiple causes of death

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suggesting a disproportionate susceptibility to defects in certification when compared with the *Conventional* group.

- A lack of clarity on the part of the certifier about how the causal chain is constructed.⁷
- A tendency for a natural cause to be chosen over an external cause as the UCoD.⁸⁻¹¹

Routine cause of death coding focuses on deriving a single 'Underlying cause' for each death. This simplification is useful for summary reporting, but does not capture the reality that most deaths have multiple causes. The addition of MCoD codes provides a way to begin to take account of more of the factors contributing to deaths.

ICD-10 defines the UCoD as 'the disease or injury which initiated the train of morbid events leading directly to death' and provides rules for its determination.¹² The objective of pinpointing a precipitating cause is to identify diseases or circumstances that could, or should, be the focus for prevention. 'Underlying cause' coded according to the internationally agreed rules for summarisation and reporting of causes of death has important strengths: It provides a way to assign a single cause to each death, and to do so in a way that should result in internationally comparable data. As shown in this report, these rules are, however, an imperfect way to identify deaths in which injury was involved.

At the heart of this study has been a comparison of *Conventional* and *Additional injury deaths* in order to explore the relationship between the two groups. As part of this exploration, the study looked at the UCoDs assigned to *Additional injury* cases and at possible reasons why this group of cases had not received external cause UCoDs. In addition to the factors already mentioned above, likely reasons include:

- A tendency towards non-specific coding of causes of death at older ages. Deaths at young ages tend to be seen as untimely, and in need of specific explanation.
- Most of the cases of *Additional fall deaths* were of older people with multiple co-morbidities. The Underlying causes that have been assigned to the *Additional* deaths tend to relate to the diseases that are common in old age. Goldacre's study has argued that there is a convergence, in the certification of deaths towards diseases of the circulatory and respiratory systems, an observation also made in the analyses undertaken for this report.⁷

The issue of co-morbidities, in particular, has strong implications for the selection of a UCoD. Despite having chronic conditions, older people can have a relatively high life expectancy. For example, in 2001-02, the life expectancy for Australians at 75 years of age was 13 years for females and 11 years for males. However, the experience of a serious injury such as a fractured femur considerably raises an older person's risk of dying. For example, the likely life span of a 75 year old suffering from Ischaemic heart disease may be several years. If, however, they fall and fracture a femur, the attendant trauma and its treatment can precipitate an acute event associated with the chronic condition (e.g. a myocardial infarction). This type of scenario poses a theoretical problem for the completion of a death certificate and determination of an Underlying cause of death. Which condition precipitated the train of events that lead to the death? Commonly, the myocardial infarction rather than the fall which caused the fractured femur will be chosen

as the UCoD, despite the likelihood that the person could have experienced several additional years of life were it not for the occurrence of the fracture.

This study has also shown that the quality of mortality data is impaired through a lack of account being taken of discharge records for those who died while in hospital. (The advanced age of many of the cases of *Additional* injury deaths in this study suggests that many of these deaths would have occurred in hospital.) Analysis of linked hospital and death records from Western Australia showed that information contained in hospital discharge records often does not find its way onto the death certificate at all, or it loses its specificity with respect to the nature of the injury sustained. This finding is consistent with studies undertaken by Goldacre and Johansson.^{7,3} Johansson also found that it is common for the occurrence of a fall not to be included on the death certificate. This possibility indicates that the underestimation of fall-related deaths could extend even beyond the scope of the *Additional* injury deaths that were identified for this study.

Conclusions

The findings of this report provide strong evidence that many deaths in which a fall was involved, often crucially, are recorded in ways that either do not mention its involvement, or record its involvement in a way that puts the case outside conventional definitions of a 'fall death'.

There are compelling reasons for including most of the *Additional fall deaths* in routine mortality reports.

Available literature suggests that deaths resulting from falls are grossly underestimated. Injury research, prevention and policy development require the most realistic picture of the burden that fall deaths present and the greatest level of information for framing interventions. This study suggests that there is a strong element of chance involved in whether a fall-related death joins the *Conventional* category or the *Additional* one. For this reason, in particular, the case for including the *Additional fall deaths* for purposes of routine reporting is a compelling one.

Based on this study, there are good grounds for addressing some of the shortcomings and uncertainties associated with the death certification process. Some specific options include interventions to upgrade the certification skills of medical practitioners and research into the extent to which the current practice of treating the certification of cases of deaths associated with fractured femurs differently from other injury deaths can lead to an underestimation of fall-related mortality.

This study represents an early attempt to explore the usefulness of MCoDs for the purpose of reporting injury mortality. Further studies could build on this work. The NCIS offers the potential for more in-depth exploration of the most frequent classes of *Additional* deaths identified in this study, particularly if case-level linkage between the NCIS and ABS mortality data can be achieved. Further work using linked datasets from Western Australia (or elsewhere, if available) could also be of benefit in exploring this question.

A copy of the full report can be viewed or downloaded at the RCIS website: www.nisu.flinders.edu.au/pubs/reports/2007/injcat98.php Any enquiries can be directed to Renate Kreisfeld, Tel: 08 8201 7624, E-mail: renate.kreisfeld@flinders.edu.au

Injury—The Essential Glossary

Term	Description	Further Information
Injury	In public health practice, injury usually means physical harm to a person's body. Common types of physical injury are broken bones, cuts, brain damage, poisoning and burns. Physical injury results from harmful contact between people and objects, substances, or other things in their surroundings. Examples are being struck by a car, cut by a knife, bitten by a dog, or poisoned by inhaled petrol. Some physical injuries are the intended result of acts by people: harm of one person by another (assault, homicide etc.) or self-harm. Most injuries are not intended and these are often described as accidental.	WHO Department of Injuries and Violence Prevention < www.who.int/violence_injury_prevention/en/ >
External cause of injury	The circumstances in which an injury, poisoning or other adverse effect has occurred.	
ICD-10	The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) is a classification of diseases and signs, symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases, as classified by the World Health Organization (WHO).	WHO Family of International Classifications < www.who.int/classifications/en/ > see also NCCH
ICD-10-AM	ICD-10-AM is the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification. ICD-10-AM has been developed by the National Centre for Classification in Health with assistance from clinicians and clinical coders to ensure that the classification is current and appropriate for Australian clinical practice.	National Centre for Classification in Health < www.ncch.com.au >
NCCH	The National Centre for Classification in Health (NCCH) improves health through developing and supporting classifications and terminologies and undertaking related research. The NCCH is responsible for producing and updating ICD-10-AM in Australia under contract from The Australian Department of Health and Ageing, holder of the WHO licence to create an Australian version of ICD-10.	< www.ncch.com.au >
NIPP	The work of the Australian Government's National Injury Prevention Program (NIPP) is guided by three national plans: The National Injury Prevention and Safety Promotion Plan: 2004–2014, the National Falls Prevention for Older People Plan: 2004 Onwards and the National Aboriginal and Torres Strait Islander Safety Promotion Strategy.	Commonwealth Department of Health & Ageing < www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-injury-index.htm >
APHDPC	The Australian Population Health Development Principal Committee (APHDPC), among other things, is responsible for advising and making recommendations to The Australian Health Ministers Advisory Council (AHMAC) on development, implementation and evaluation of national policies, programs and priorities, in relation to population health outcomes. The APHDPC is the federal organisation charged with the carriage of the National Injury Prevention plans.	APHDPC Secretariat Department of Health & Ageing (Australian Government) Chronic Disease & Palliative Care Branch, Population Health Division Email: < aphdpc@health.gov.au >
NIPWG	The National Injury Prevention Working Group (NIPWG) is a time-limited working group established by the APHDPC in order to implement the three national injury prevention plans.	APHDPC Secretariat Department of Health & Ageing (Australian Government) Chronic Disease & Palliative Care Branch, Population Health Division Email: < aphdpc@health.gov.au >

Injury—The Essential Glossary

Term	Description	Further information
ABS	Australian Bureau of Statistics (ABS) is an excellent source of information on injury from their recurring National surveys (e.g. National Health Survey) and deaths data holdings.	www.abs.gov.au
AIHW	The Australian Institute of Health and Welfare (AIHW) is Australia's national agency for health and welfare statistics and information. The AIHW produces a range of reports relevant to injury and maintains a collaborating centre, National Injury Surveillance Unit, dedicated to injury surveillance.	www.aihw.gov.au
AIPN	The Australian Injury Prevention Network (AIPN) is the peak national body advocating for injury prevention and control in Australia. The AIPN was formed in 1996 in order to establish a framework for collaboration between injury researchers, policymakers and practitioners and provides a coordinated voice among injury prevention professionals.	www.aipn.bravehost.com/index.html
NCIS	The National Coroners Information System (NCIS) is a national internet based data storage and retrieval system for Australian coronial cases. Approved research and government agencies can utilise the NCIS to obtain valuable information concerning the circumstances of reported fatalities, to assist in the development of community health and safety strategies.	National Coroners Information System www.ncis.org.au

Football injuries

Continued from page 3

Age and sex

Football is played predominantly among younger age groups. Overall, 44.3% (n=6,274) of all those hospitalised for football-related injuries were aged 15–24 years, while 90.3% (n=12,780) of those hospitalised were aged 34 years or younger.

All football codes are played much more commonly by males than females. There was less disparity of males to females for soccer (3.4:1) and touch football (1.9:1) than for Australian football (10.2:1) and rugby (13.5:1). The vast majority (93.2%) of hospitalised players were males, ranging from 97.7% for Australian football down to 70.1% for touch football.

This briefing can be downloaded from the RCIS website: www.nisu.flinders.edu.au/pubs/reports/2007/injcat103.pdf

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Australia's Health Conference 2008

24 June 2008

Canberra

Contact: Alison Diamond, Australian Institute of Health and Welfare, Tel: (02) 6244 1000, E-mail: alison.diamond@aihw.gov.au Website: www.aihw.gov.au

2008 International Conference: Healthy people for the healthy world

25–27 June 2008

Thailand

Contact: E-mail: info@healthyconf2008.com Website: www.healthyconf2008.com

Healthcare systems, ergonomics and patient safety

25–28 June 2008

Strasbourg, France

Contact: Tel: +39 055 3361333, E-mail: heps2008@newtours.it Website: www.heps2008.org

2nd World Congress on Sports Injury Prevention

26 Jun 2008 to 28 June 2008

Tromso, Norway

Contact: Oslo Sports Trauma Research Centre, Tel: +47 23 26 20 00, E-mail: ostrc@nih.no Website: www.ostrc.no/en/First-page-Congress/

XVIII World Congress on Safety and Health at Work

29 June to 2 July 2008

Seoul, Korea

Contact: Congress Secretariat, Tel: +82 32 5100 740, Fax: +82 32 512 8482, E-mail: safety2008@kosha.net Website: www.safety2008korea.org/eng/index.jsp

14th Biennial Conference of the Australian Population Association

30 June to 3 July 2008

Alice Springs, Northern Territory

Contact: Tel: (08) 8947 5544, E-mail: apa2008@eventuate.com.au Website: www.nt.gov.au/nit/apa2008/index.html

Population Health Congress 2008

7–9 July 2008

Brisbane

Contact: Conference Coordinators, Tel: +61 2 6269 9000, E-mail: congress2008@confco.com.au Website: www.phaa.net.au/pophealthCongress2008.php

One-semester online course in Injury Epidemiology, Prevention and Control

28 July 2008

Contact: The George Institute, Tel: 02 9657 0300, E-mail: injury.courses@george.org.au Website: www.thegeorgeinstitute.org

One-semester online course in Falls Prevention and the Older Person

28 July 2008

Contact: The George Institute, Tel: 02 9657 0300, E-mail: injury.courses@george.org.au Website: www.thegeorgeinstitute.org

23rd Australian Road Research Board Conference

30 Jul 2008 to 1 August 2008

Adelaide

Contact: Website: www.arrb.com.au/23Conf/

Third International Symposium of Transport Simulation 2008

6–8 August 2008

Queensland

Contact: Website: <http://civil.eng.monash.edu.au/conferences/ists08>

Two-day workshop in Injury Prevention

8 and 11 August 2008

Contact: The George Institute, Tel: 02 9657 0300, E-mail: injury.courses@george.org.au Website: www.thegeorgeinstitute.org

9th International Mental Health Conference

14–16 August 2008

Surfer's Paradise, Queensland

Contact: Tel: +61 7 5528 2501, Website: www.gcimh.com.au/conference

XVIIth ISPCAN International Congress on Child Abuse and Neglect

7–10 September 2008

Hong Kong, China

Contact: Conference secretariat, Tel: +1 630 876 6913, Fax: +1 630 876 6917, E-mail: congress2008@ispcan.org Website: www.ispcan.org/congress2008/contact_us.html

Fifth World Conference to Promote Mental Health

10–12 September 2008

Melbourne

Contact: Vic Health, Tel: 03 9667 1333, E-mail: melbourne2008world@vichealth.vic.gov.au Website: www.vichealth.vic.gov.au/conference2008

Open Access and Research Conference 2008

24–25 September 2008

Brisbane

Contact: Tel: 07 3138 9358, E-mail: oar2008@qut.edu.au Website: www.oar2008.qut.edu.au

3rd Australian and New Zealand Falls Prevention (ANZFP) Conference

12–14 October 2008

Melbourne

DEADLINE FOR ABSTRACTS: 30 June 2008

Contact: East Coast Conferences, Tel: +61 2 6650 9800, E-mail: falls@eastcoastconferences.com.au Website: www.anzfpconference.com/

17th International Safe Communities Conference

20–23 October 2008

Christchurch, New Zealand

Contact: Tel: +64 3 379 0360, E-mail: lizzie@conference.co.nz Website: www.conference.co.nz/index.cfm/lsc08/Welcom/

Health Care Priorities 2008

28–31 October 2008

Newcastle-Gateshead, United Kingdom

Contact: Tel: +44 0 191 222 8813, E-mail: eileen.coope@ncl.ac.uk Website: www.healthcarepriorities.co.uk

National Forum on Safety and Quality in Health Care

29–31 October 2008

Adelaide

Contact: Tel: +61 8 8274 6050, E-mail: forumsqhc08@sapmea.asn.au Website: www.sapmea.asn.au/conventions/forumsqhc2008/index.html

2008 Australasian Road Safety Research, Policing and Education Conference

10–12 November 2008

Adelaide

Contact: Website: www.roadsafetyconference2008.com.au/welcome.htm

21st annual Conference of the Australian and New Zealand Society of Criminology

25–28 November 2008

Canberra

Contact: Russell Smith, Tel: +61 3 9467 6110, E-mail: russell.smith@aic.gov.au Website: www.anszoc.org/conferences/

World Indigenous Peoples Conference: Education (WIPC:E)

7–11 December 2008

Melbourne

Contact: Tel: +61 3 9486 1599, E-mail: veronicaw@wipce2008.com Website: www.wipce2008.com