Assessment of fatal and non-fatal injury due to boating in Australia

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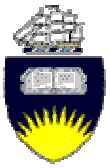

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Executive Summary

This report brings together, for the first time at national level, information from routinely available data on deaths and hospitalisations, sourced from the Australian Bureau of Statistics (ABS) and hospitals. It is a component of a larger study concerned with addressing the lack of information on boating safety, a concern highlighted by the Thompson Clark review of maritime safety arrangements in Australia.

It was found that boating activity, whether recreational or commercial in nature, caused a meaningful level of harm to the Australian community. Over the last five years it caused more deaths and serious injuries than rail accidents and air crashes combined.

On average, there were about 80 deaths, and nearly 1000 people admitted to hospital, each year as a result of boating incidents in Australia. Those admitted to hospital consumed more than 3934 hospital bed days each year.

The fact that fatalities appear to have fallen over the last twenty years is encouraging and may provide some support for the current control measures. Of concern, however, is the fact that the incidence of non-fatal injury, as measured by hospitalisations, does not appear to have declined over recent years.

The report provides an overview of the nature and extent of the problem, and while this analysis should be repeated annually to monitor trends, further information is needed. In order to provide the information needed for the assessment of risk factors and prevention measures, and the development of prevention policy, more detailed data and analysis is required. Information routinely gathered by the Coroners in each State, arising from their investigations into the causes of traumatic deaths provides a readily available means to achieve this. In Phase 2 of the present study, data will be extracted from the Coroners files in a nationally consistent manner according to a defined data standard and extraction protocol.

Background

It has been reported elsewhere that approximately 70 Australians die in boating incidents each year (ATSB, 2000). In addition it has been estimated that about 500-700 are admitted to hospital as a result of injuries (ATSB, 2000; O'Connor 2001) and that many more receive emergency care at hospital (without admission) and by General Practitioners.

However, there has never been a detailed and comprehensive study of recreational boating injury and death in Australia - a problem that was given some attention in the Thompson Clark review of maritime safety arrangements (TCS, 1995). Indeed there have been few studies undertaken anywhere in the world focussing on this topic (MSA, 1999, 2000; OSMB, 1999; US DOT, 1998). While the overall magnitude of the problem is known to some extent from the available studies, the details of the events have not been collated and reported statistically in a nationally comprehensive appraisal. As a consequence, we don't know whether the size of the problem is increasing or decreasing and little is known about risk factors. This hampers prevention efforts. Elsewhere it has been reported that alcohol is a factor in up to half of boating deaths. The contribution of alcohol to boating incidents has not been analysed and reported for Australia as a whole. The factors involved in the injuries (ie. the human, environmental and watercraft factors, safety gear, communications and rescue methods), and the means by which they can be modified, needs to be researched.

Boating safety has not experienced the dramatic improvement that has been achieved in road safety in Australia in response to significant safety initiatives (ATSB, 2000). There is more that can be done in boating safety, but to enable this to occur, more information is required on the causes and prevention of these events.

The Thompson Clark review of maritime safety arrangements in Australia (TCS, 1995) reported that at the time of the review: "measurement of safety outcomes is unsatisfactory as there is no common database nor any agreed approach towards the analysis and interpretation of such data, thus precluding any objective assessment of safety outcomes from particular safety initiatives and effective resource allocation (p. i)." The current study seeks to address this problem in two ways: (1) to report on routinely available national data on boating deaths and hospitalisations, and (2) to develop a project to record more detailed data on fatalities from Coroners records.

In Phase 1 of the study, there is an interest in bringing together in a report, for the first time at national level, information from routinely available data on deaths and hospitalisations, sourced from the Australian Bureau of Statistics (ABS) and hospitals nationally. Although the information contained in these data sets is not as detailed as exists in the Coroner data, they provide an overview of the size and dimensions of the boating problem. Recently, these data sources were utilised in a South Australian study (O'Connor, 2001) which demonstrated that useful information is available that should also be reported nationally. Other components of Phase 1 concern the development and accessing of administrative systems to gain Coroners data.

Coroner's data provide the best available source of information on boating fatalities in Australia. Ongoing routine assessment of this information throughout Australia will

contribute much to an improved understanding of the causes and prevention of these events. Three recent State based studies, using Coroner data (Waterways, 1999; MaST, 2000; O'Connor 2001), demonstrate the rich information that can be gathered from this source. Analysis of this data nationally is planned by Flinders University on behalf of the NMSC. Some effort is involved in accessing and extracting data from this source. Phase 2 of the study is concerned with the extraction, analysis and reporting of that data in a common format and according to national data standards (NMSC, 2000; RCIS, 1998). These standard, provided a framework for the recent collection and reporting of information on boating incidents and injuries in South Australia (O'Connor, 2001), demonstrating the feasibility of the planned national project. A survey schedule has already been developed as a part of that project to record detailed case information from Coroners files

Study aim

The ultimate objective of research into boating injury is to reduce the problem eg. to reduce drowning and other injuries. It was envisaged that the current study would contribute toward this objective by defining the problem better.

The aim of this report is to present readily available information on fatal and non-fatal injury due to boating incidents throughout Australia, on the basis of an analysis of ABS death data over the last twenty years, and hospital admission statistics from 1993/94. This is a component of Phase 1 of a more extensive study.

The first phase of the study will also:

a) use the ABS death data to identify cases for in-depth assessment using Coroner data,

b) gain access to the names of the people killed via the Registrar of Deaths in each State (approval has already been granted by all of the Registrars for this).

c) Crosscheck the names provided by the Registrar for NSW against the list of names already available to NMSC for NSW.

d) assess the Coroners requirements and conditions for the study, and

e) determine whether the Coroners will allow the study team to photocopy their files, for off-site data extraction, or whether they will require on-site data extraction. Off-site extraction will minimise travel costs for the Phase 2 project and we will strongly encourage the Coroners to accept this.

Phase 2 of the study will analyse and report on information extracted from the Coroners files.

Methods

Overview

Step 1: Project clarification

Telephone discussions between Judith Webster (NMSC) and Peter O'Connor (Flinders University) at inception of the project enabled the goals, methods and procedures to be refined in the light of the best available information at the time.

Step 2: Data analysis (ABS deaths data and hospital admissions)

The data was analysed and tabulated using a standard reporting template. The template used was an extended version of that developed for the recent South Australian study (O'Connor, 2001), which was compatible with the reporting format presented in the NSW Waterways (1999) report and the MaST (2000) report.

All data analysis was undertaken with the Statistical Package for the Social Sciences (Norusis, 1998). All output was loaded into Excel for the production of tables and figures. These in turn were loaded into Microsoft Word for report production.

The outcome of these efforts is the present data report, which contains a description of the trends and patterns in boating injury and deaths. However, it was not within the scope of this report to provide an in-depth analysis of the literature or policy issues. These were already addressed to some extent in the South Australian report (O'Connor, 2001), although not necessarily at the level that would be required for a thorough national assessment.

ABS deaths data

Deaths data were from the Australian Bureau of Statistics (ABS) mortality unit record data collection, 1979-98.

The cause of each death registered in Australia was classified by the ABS according to the International Classification of Diseases (ICD). Every disease or morbid condition known to man, including injury, can be coded according to the ICD (World Health Organisation, 1979). The type of injury is classified in Chapter 17 of the ICD. The external cause of the injury, which defines the manner in which an injury came about, is classified in another chapter titled 'Supplementary classification of external cause of injury and poisoning'.

The 9th revision (ICD-9) has been used for death registrations beginning in 1979 (World Health Organisation, 1979). All deaths given an ICD-9 "External Cause" code by the ABS, in the range E30-838 and E910.0 were selected (see Appendix 1).

Data are presented according to the year in which deaths were registered. This is the standard approach to the reporting of deaths used by the Australian Bureau of Statistics. About nine percent of deaths registered in any year occurred in an earlier year, and a similar proportion of deaths, which occurred in any year, will not be registered until a later year. For the analysis of recent trends, reporting on the basis of year of death registration

is preferable to reporting on the basis of year of death, as recent deaths may not yet be registered.

Beginning with 1993 registrations, coding of deaths data has been centralised at the Brisbane office of the ABS providing uniform coding of all State and Territory data.

Hospital data

Data was available on each admission to hospital nationally, including those arising from injury. The case selection was limited to injuries from 'Water transport accidents' defined by the ICD external cause codes E830-838 and 'Accidental drowning and submersion while water skiing' (E910.0). These categories were chosen for their compatibility with boating incidents as defined in the relevant state legislation affecting boating and as recommended in the NMSC data standard (NMSC, 2000).

Data on patients admitted in any one financial year but discharged in another are included for the year in which they were separated. A record is included for each separation, not for each patient, so patients who separated more than once in the year have more than one record in the database. For incidence estimates (which is the main focus of the present report), cases transferred from one hospital to another and statistical discharges are excluded, as both are considered to be re-admissions rather than new incident cases. This is the recommended approach for incidence reporting (DHFS, 1998, p.102). However, for assessment of bed days and average length of stay (ALOS), these cases are included as it is important to assess the total healthcare burden arising from the admission and re-admission of incident cases.

Hospital separations data has a data item for place of residence, coded to the 7 level urban/rural/remote (RRMA) classification (AIHW, 1998). The categories are described in the table below.

RRMA Category	Type
M1	Capital cities
M2	Other metropolitan centre
R1	Large rural centre
R2	Small rural centre
R3	Other rural area
Rem1	Remote centre
Rem2	Other remote area

Results

Boating fatalities - ABS data

Over the period 1979 to 1998 there were 1567 boating deaths registered in Australia, with an annual average of 78 deaths. From the information recorded by the ABS up until 1998 it was not possible to determine whether the deaths were from recreational boating or commercial boating activity. With the introduction of ICD10 from 1999 it may be possible to assess the type of activity that distinguishes recreational from commercial boating events.

Time series trend

Over recent years the number of boating deaths has been relatively low when compared to earlier years (Figure 1). Indeed, the number of deaths registered for 1998 (39) was the lowest recorded over the last 20 years. This decline has occurred while the population of Australia has been increasing.

In 1998 the fatality rate per 100,000 population was 0.2 (ie. the number of deaths divided by the population for that year). A decline in the age-adjusted death rate over time is clearly evident for males, and persons generally (Figure 2). These rates have been standardised to the 1991 population distribution to remove any effects due to changing age structure in the population over time. This is the national standard for reporting of trends in rate data for death and injury (AIHW, 2000, p428).

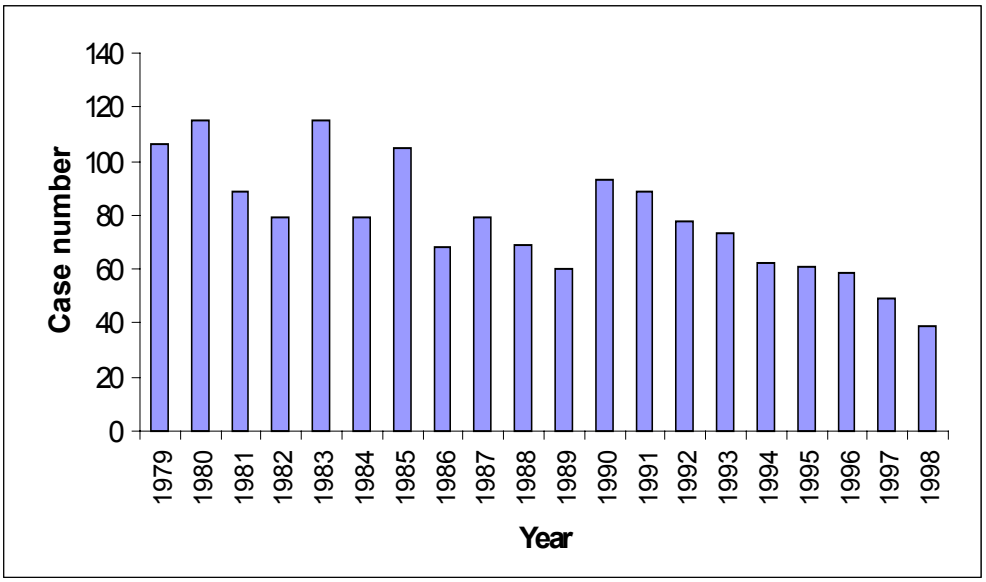


Figure 1 — ABS boating fatalities, case number by year of death registration, Australia 1979 to 1998

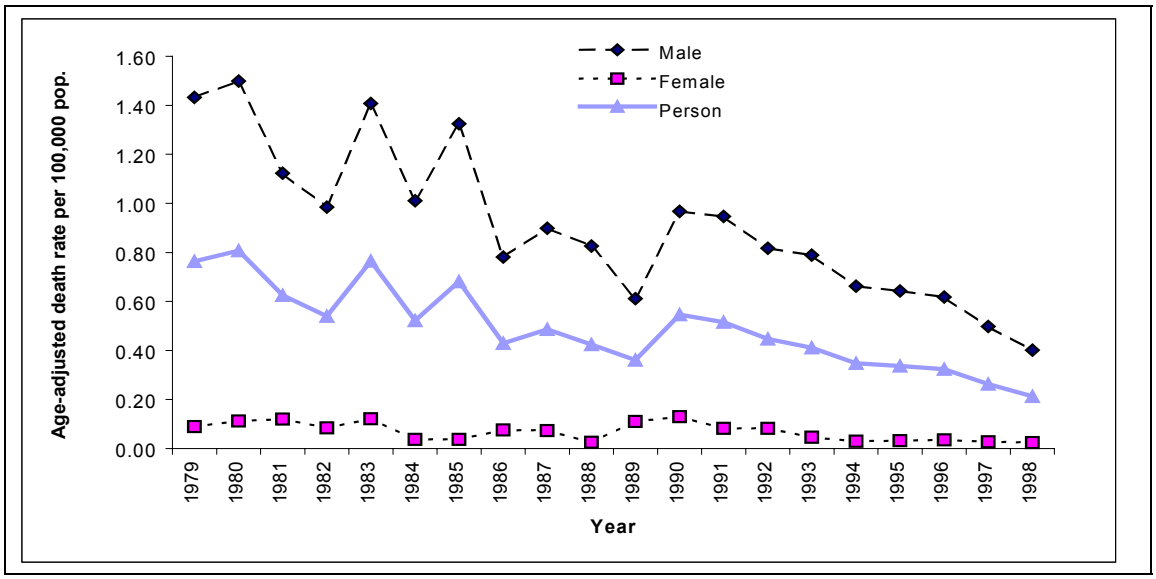


Figure 2 — ABS boating fatalities, age-adjusted rate by year of death registration, Australia 1979 to 1998

Injured person

Forty eight percent of those that died were occupants of small powered boats, defined as those with a passenger capacity of less than ten (Figure 3). Twenty one percent were occupants of small un-powered boats. Three percent of those killed were water skiers.

Month of death

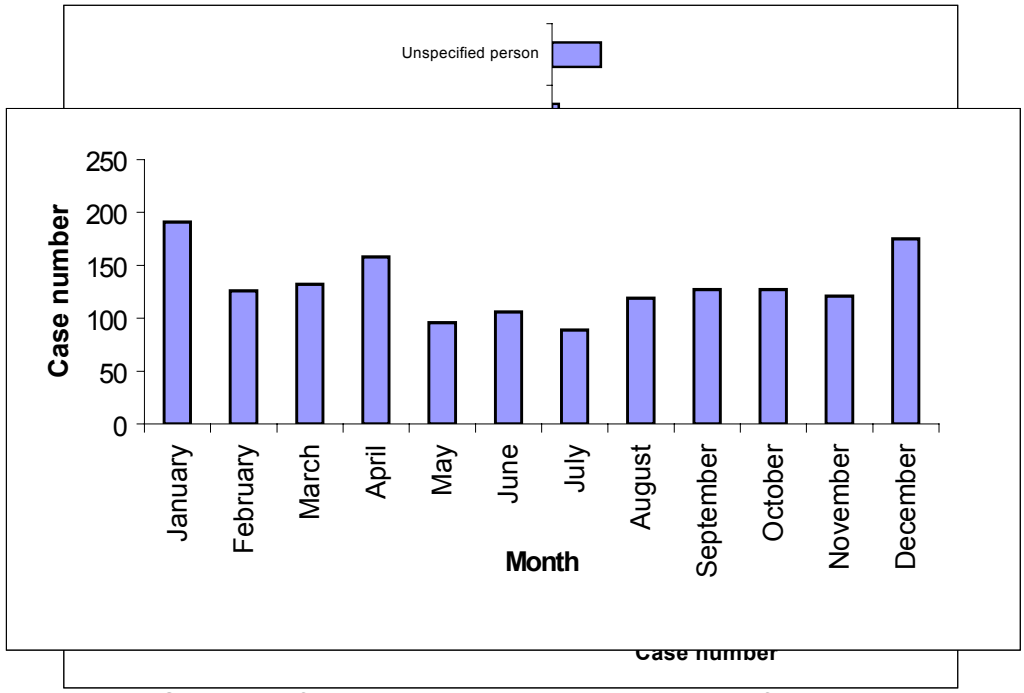


Figure 4 — ABS boating fatalities, case number by month of death, Australia 1979 to 1998

Figure 3 — ABS boating fatalities, case number by injured person, Australia 1979 to 1998

The number of boating deaths was highest in January, December and April (Figure 4). This may reflect levels of boating activity.

Day of week

The peak days for boating deaths were Saturday (24%) and Sunday (21%; Figure 5).

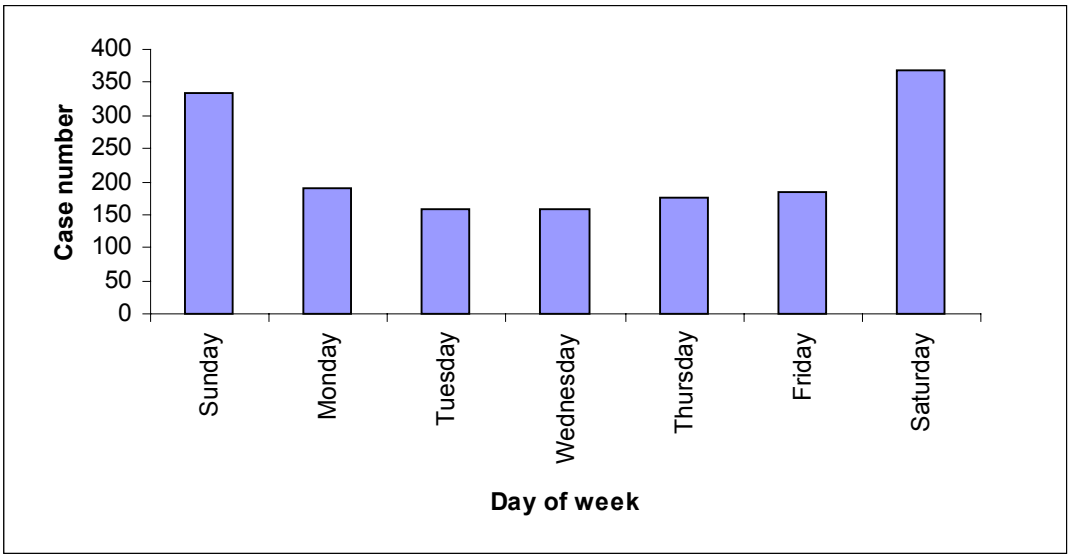


Figure 5 — ABS boating fatalities, case number by day of death, Australia 1979 to 1998.

Age and sex

The age group 20-54 years made up the largest proportion of boating fatalities (68%; Figure 6). Deaths peaked in the age group 25-29 years. Ninety three percent of those who died were male.

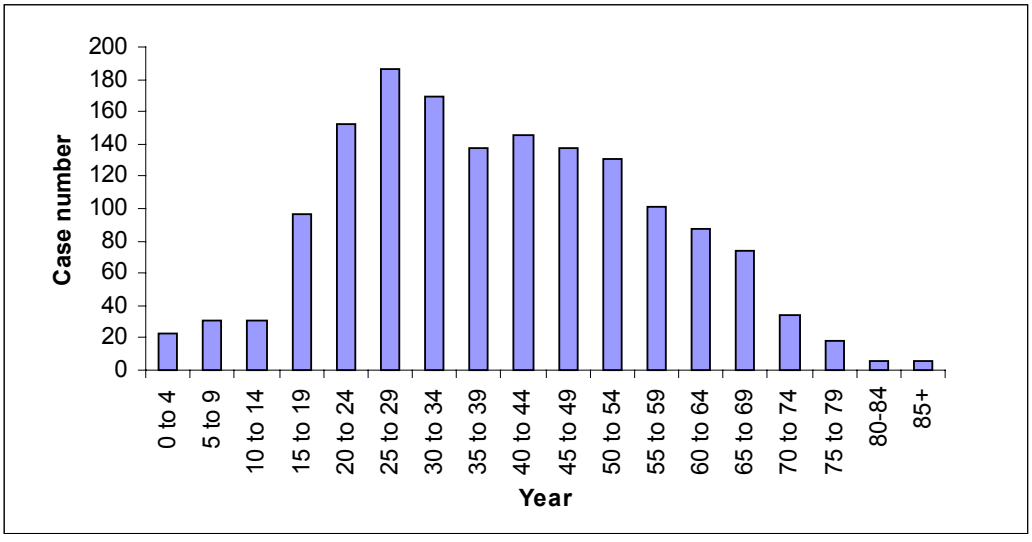


Figure 6 — ABS boating fatalities, case number by age group, Australia 1979 to 1998

Marital status

Half of those killed were married at the time of death (Figure 7). Thirty-five percent were never married.

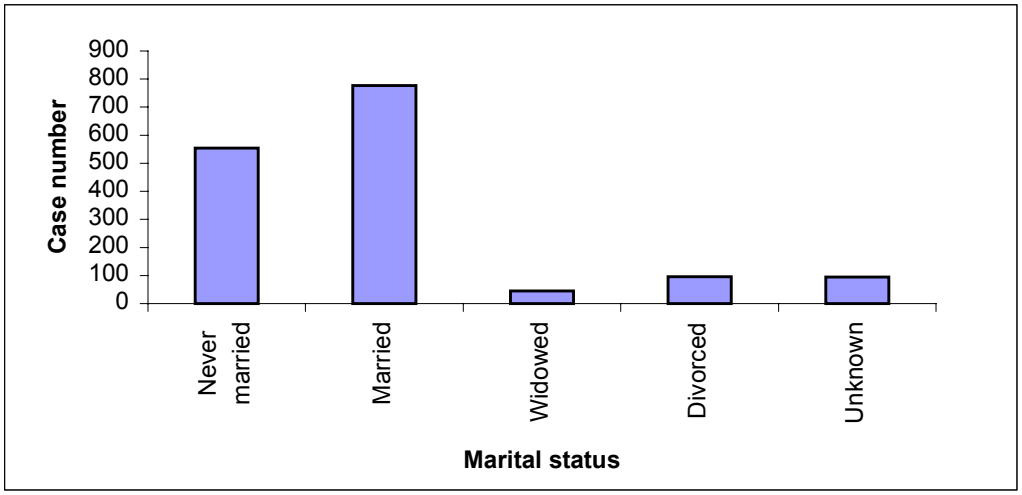


Figure 7 — ABS boating fatalities, case number by marital status, Australia 1988 to 1998

Place of residence

In the ABS death data for 1988 to 1998, cases were coded on the basis of place of usual residence (Statistical Division) enabling categorisation to distinguish urban residents from rural residents. Over this period, the largest proportion of those killed were residents of capital cities (43%; Figure 8). However, when population was considered (averaged 1988-98), it was apparent that the death rates were substantially higher for residents of most rural and remote areas (Figure 9).

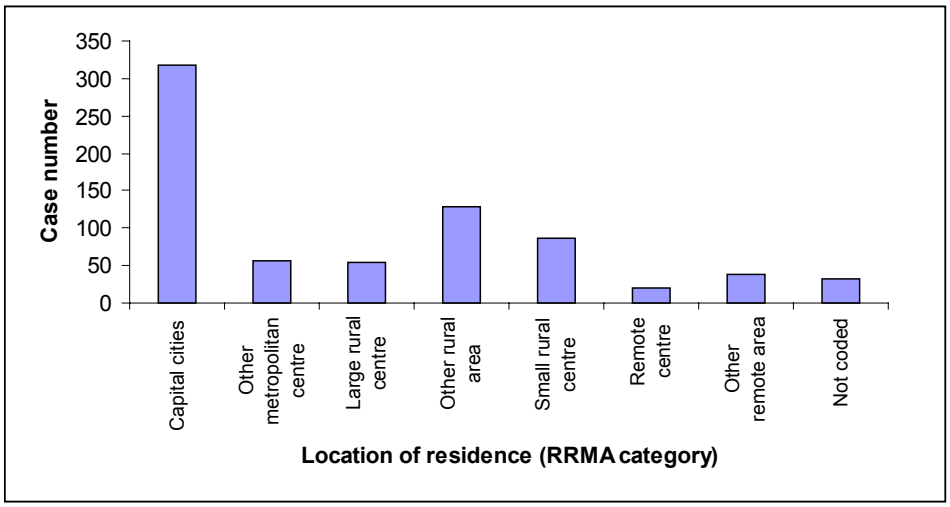


Figure 8 — ABS boating fatalities, case number by place of residence, Australia 1988 to 1998

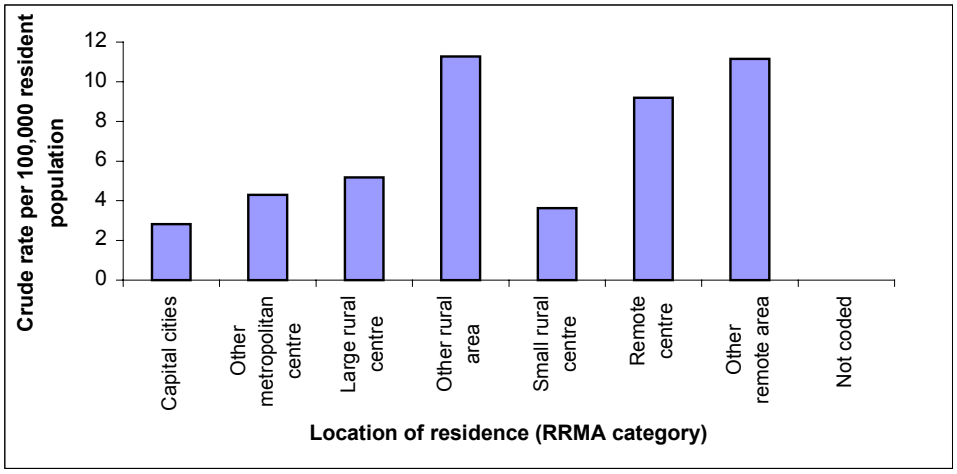


Figure 9 — ABS boating fatalities, crude rate by place of residence, Australia 1988 to 1998

Hospital admissions due to boating injury

Over the period 1993/94 to 1997/98 there were 4724 estimated new incident cases of injury due to boating, with an average of 2-3 new cases per week over the period.

Time series trend

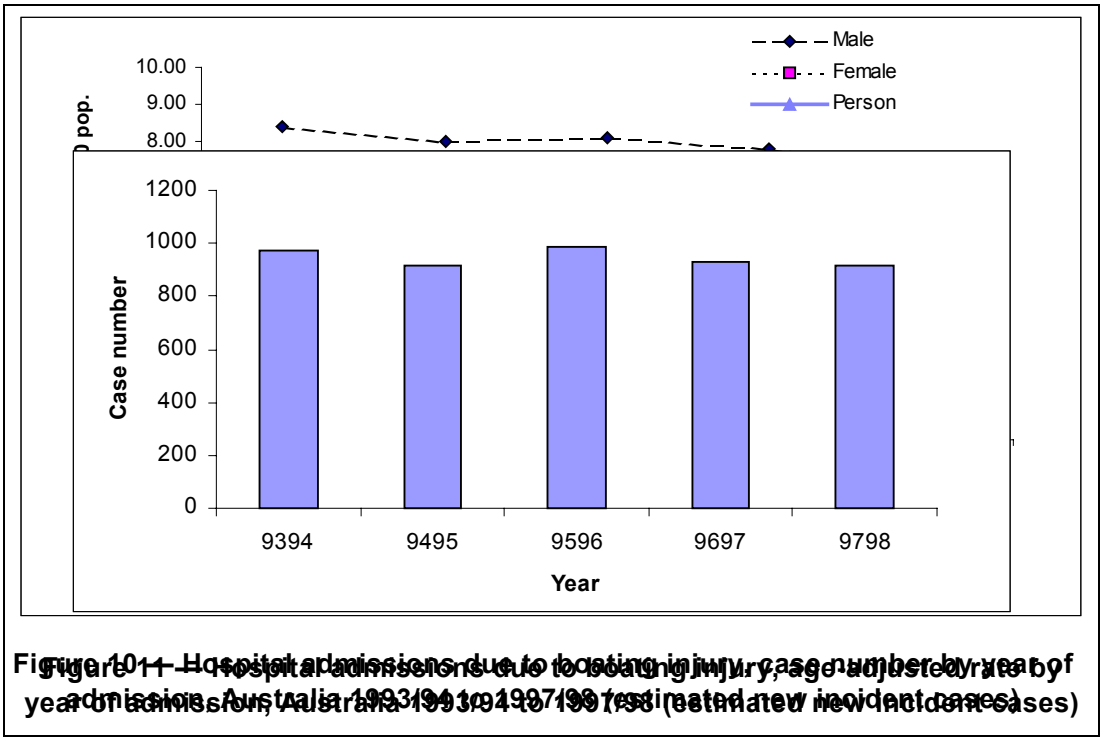


Figure 10 — Hospital admissions due to boating injury, age-adjusted rate by year of admission, Australia 1993/94 to 1997/98 (estimated new incident cases)

Figure 11 — Hospital admissions due to boating injury, case number by year of admission, Australia 1993/94 to 1997/98 (estimated new incident cases)

Over recent years the number of estimated new incident cases of hospital admission due to boating injury has fluctuated in the range of 913 to 989 cases per annum (Figure 10). There has been no decline in the case number or age-adjusted rate over the period (Figures 10 and 11). This contrasts with the trend for deaths (Figures 1 and 2).

Injured person

Twenty three percent of those admitted to hospital were water skiers (Figure 12). The high proportion of water skiers amongst those with non-fatal injury contrasts with the low proportion amongst those killed (Figure 3).

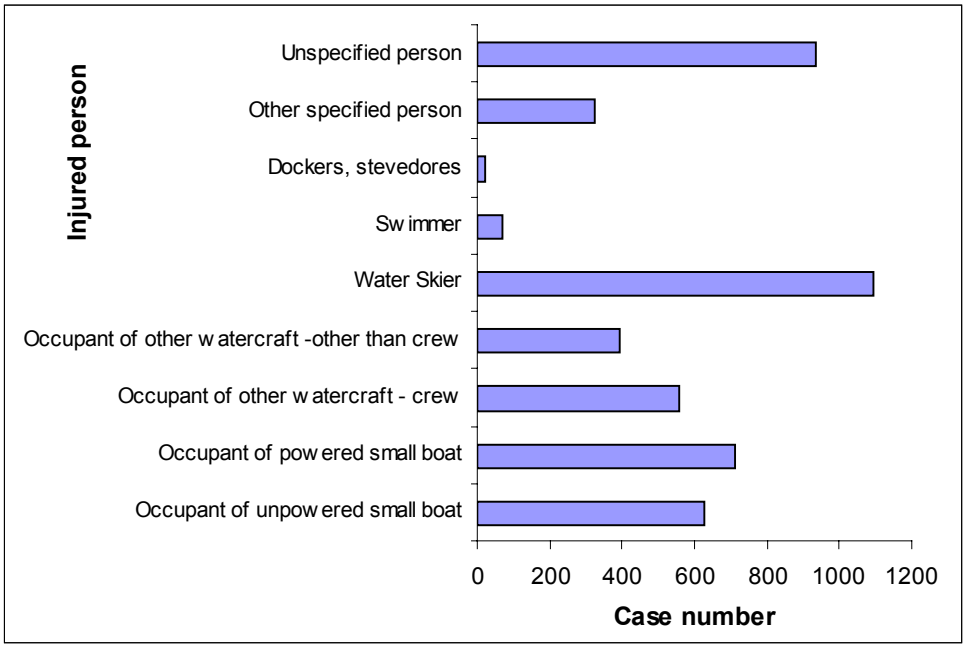


Figure 12 — Hospital admissions due to boating injury, case number by injured person, Australia 1993/94 to 1997/98 (estimated new incident cases)

Month of admission

The number of hospital admissions as a result of boating injuries was highest in December and January (Figure 13), as was evident for boating deaths (Figure 4).

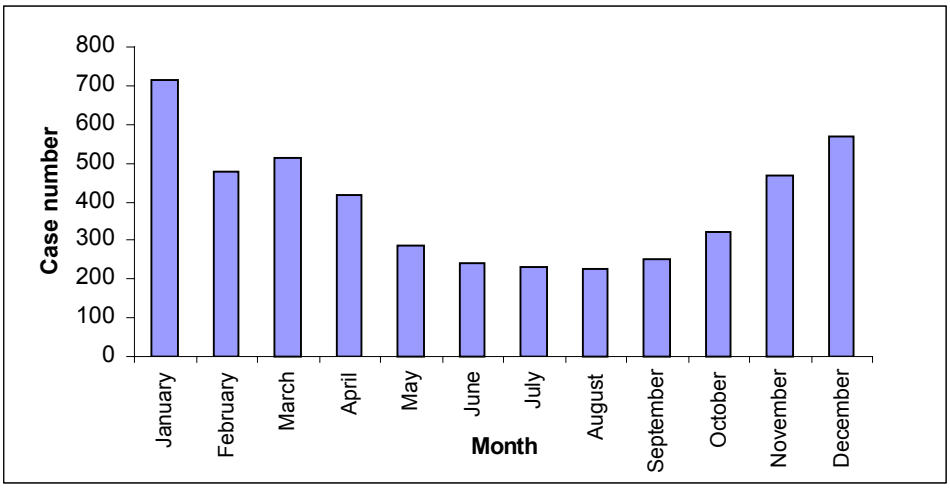


Figure 13 — Hospital admissions due to boating injury, case number by month of admission, Australia 1993/94 to 1997/98 (estimated new incident cases).

Day of week

The peak days for boating admissions were Saturday (17%) and Sunday (21%; Figure 14), as evident for boating deaths (Figure 5).

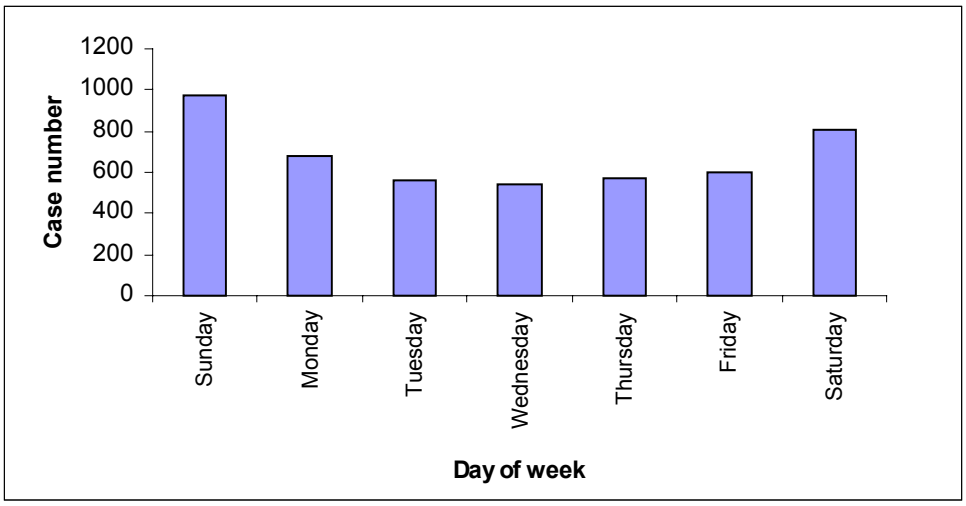


Figure 14 — Hospital admissions due to boating injury, case number by day of admission, Australia 1993/94 to 1997/98 (estimated new incident cases)

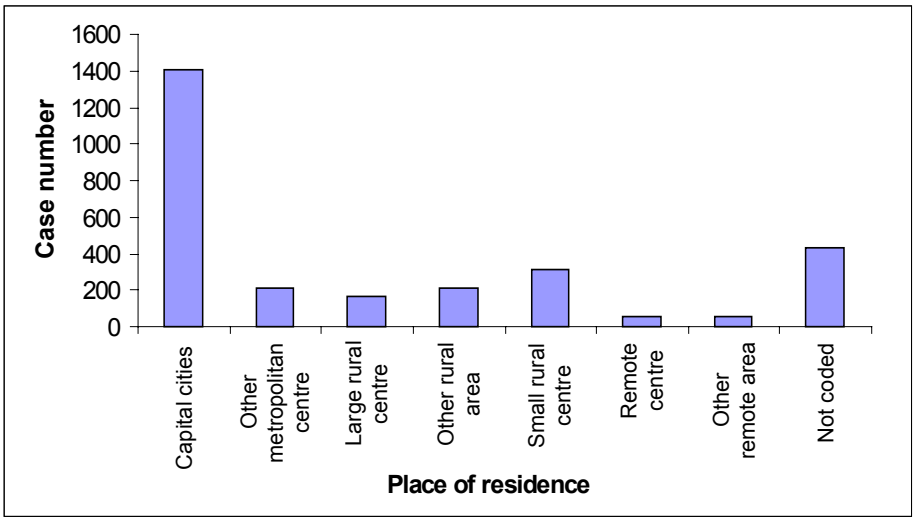
Age and sex

The age group 20-24 years made up the largest proportion of hospital admissions due to boating injury (16%; Figure 15). Seventy six percent of all hospital admissions due to boating injury were male. There has been no statistically significant change in the age or sex distribution of cases over time (Chi $_{age}$=40.8, df=32, Sig. 0.14; Chi $_{sex}$=6.1, df=4, Sig. 0.19).

Place of residence

In the hospital morbidity data collection, admissions from 1995/96 were coded on the basis of place of usual residence (SLA) to a category of the Rural and Remote Areas (RRMA; AIHW, 1998) classification.

Figure 16 shows that most of the people admitted to hospital due to boating injury over the period 1995/96 to 1997/98 were residents of capital cities (50%). However, when population was considered (averaged 1996-98), the rate of hospitalisation was highest for those residing in remote centres, and was lowest for the capital cities (Figure 17).



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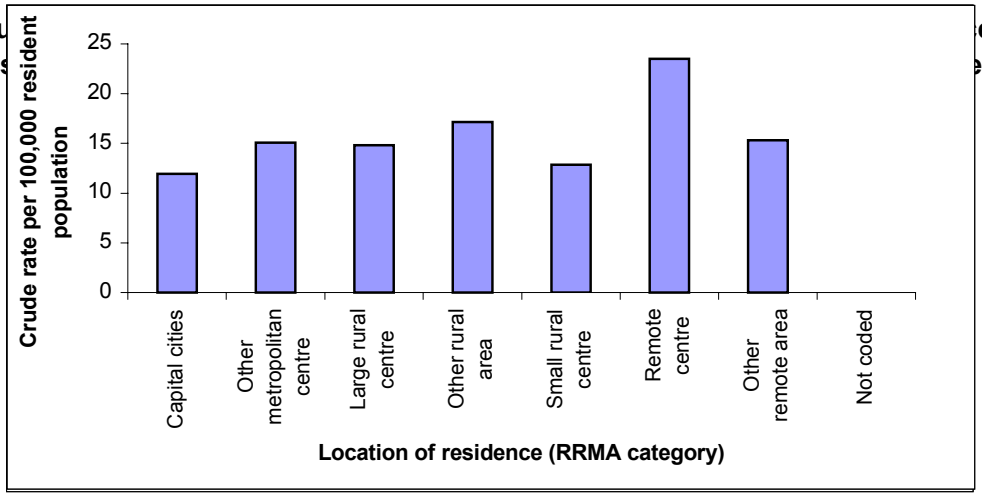

Figure 15 Hospital admissions due to boating injury, crude rate by age group, Australia, 1993/94-1997/98 (estimated incidence cases)
Figure 17 Hospital admissions due to boating injury, crude rate by place of residence, Australia, 1995/96-1997/98 (estimated incidence cases)

Type of injury

The most frequent types of injury (based on principal diagnosis) were: fracture of lower limb (14%), fracture of upper limb (12%), fracture of neck and trunk (9%; Figure 18). A somewhat different pattern of injuries was evident for water skiers, with sprains, strains and dislocations being more prominent (Figure 19).

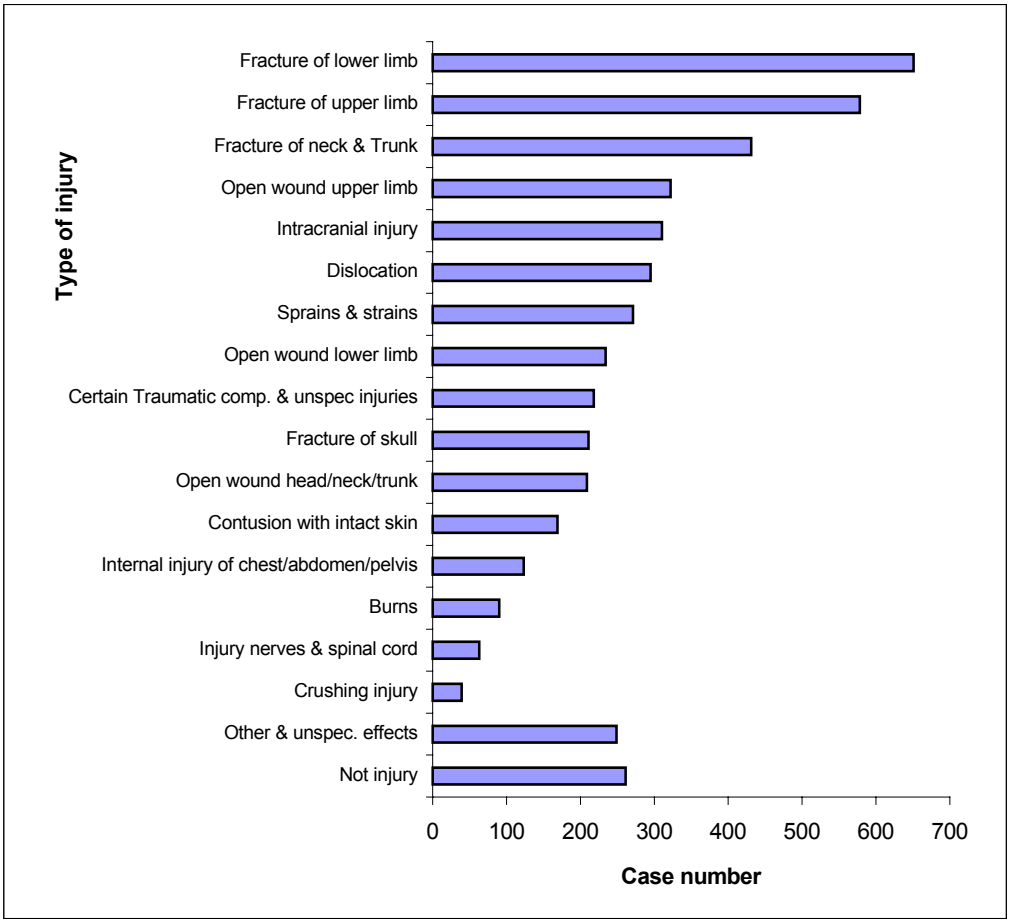

Figure 18 — Hospital admissions due to boating injury, case number by type of injury, Australia 1993/94 to 1997/98 (estimated new incident cases).

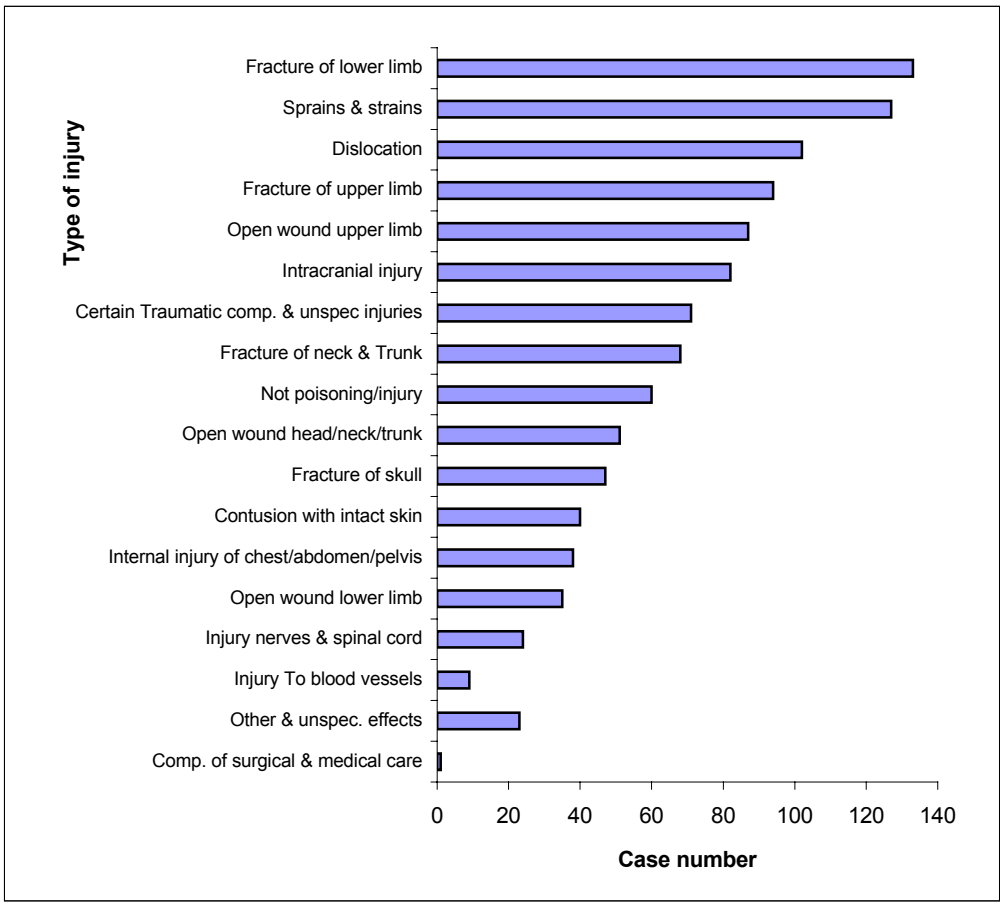

Figure 19 — Hospital admissions of water skiers due to boating injury, case number by type of injury, Australia 1993/94 to 1997/98 (estimated new incident cases)

Length of stay in hospital

One measure of the health care burden of boating injury is the total hospital bed days consumed. However, estimation of this quantity is not straightforward.

The first episode of care of a new incident case will commence with admission to a hospital. Prior to discharge, the case may be transferred to another hospital. Each hospital only records the number of days that the case spent in their care. To determine the total bed days for an episode of care requires these to be added across hospitals. In addition, as some cases may be readmitted for further episodes of care related to the injury, these must also be added in order to calculate the total burden that arises from the newly incident cases. As there is no case linkage across hospitals in national data, the length of stay cannot be calculated for individual cases. Rather it can only be estimated in aggregate. An estimate of the total burden can be made by adding the length of stay for all separations having the relevant poisoning E-code, which will include separations of newly incident cases as well as readmissions and transfers.

In total over the five-year period 1993/94 to 1997/98, 19,669 hospital bed days were consumed as a result of boating injuries (3934 bed days per year). Considering only the cases that were newly incident over the five-year period (4724 cases), these acute

admissions mostly had a short stay in hospital (Figure 20). Sixty-nine percent were admitted for 1-2 days. The average length of stay was 4.2 days per new incident case (ie. 19669 bed days/4724 new cases).

The types of injuries that consumed the greatest number of bed days were: fractures of lower limb (21%) and fractures of neck and trunk (19%; Figure 21). Fractures of the neck and trunk, injury to the nerves and spinal cord, and burns had the longest average length of stay (8.7, 7.9 and 7.8 days respectively, compared with 4.2 days for all cases).

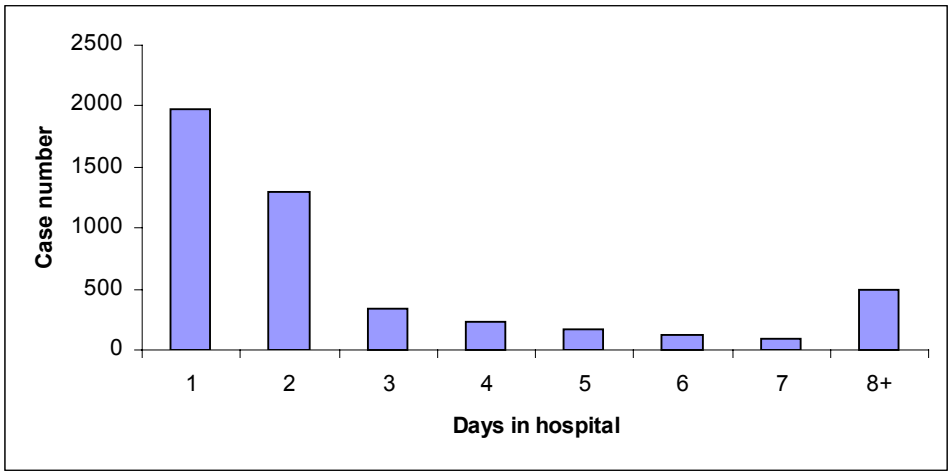

Figure 20 — Hospital admissions due to boating injury, case number by length of stay, Australia 1993/94 to 1997/98 (estimated new incident cases)

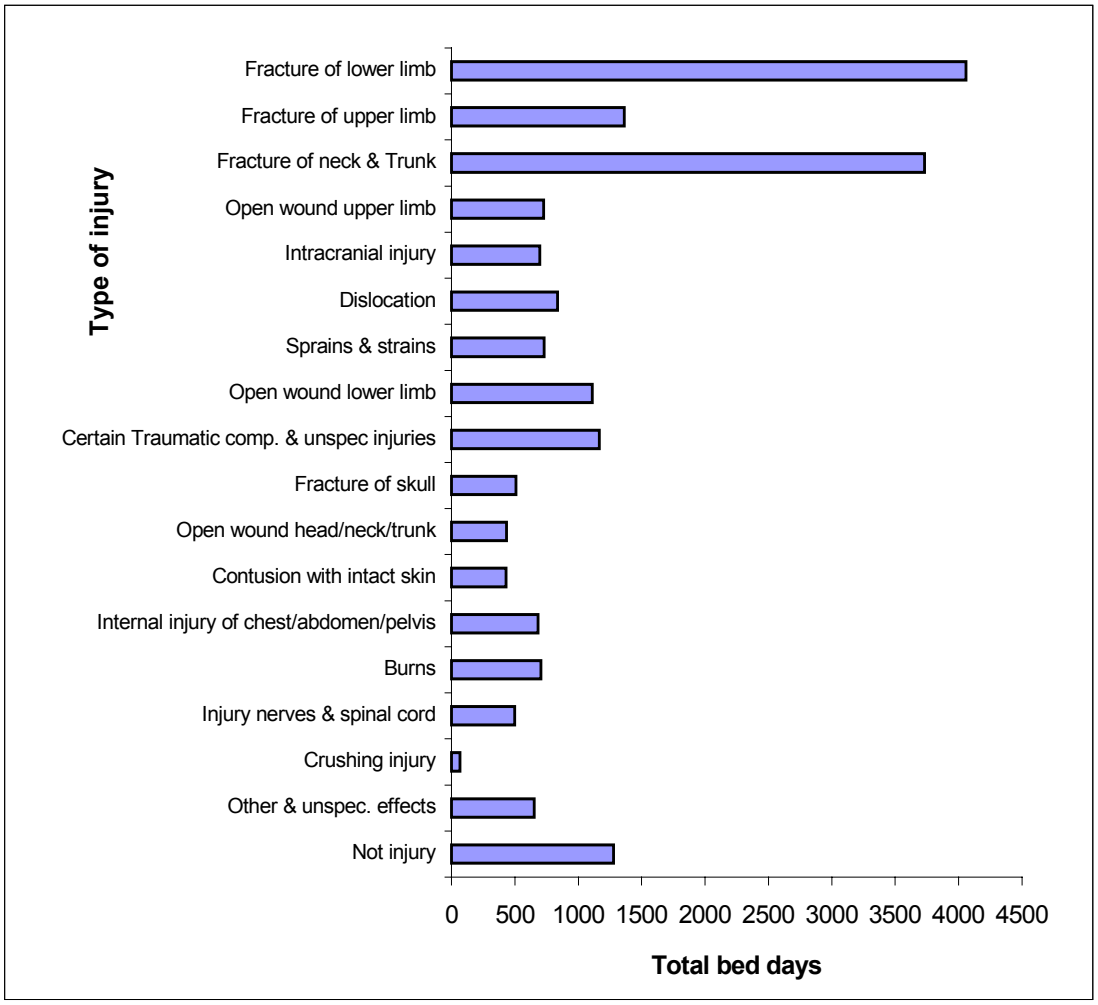

Figure 21 — Hospital admissions due to boating injury, type of injury by total bed days, Australia 1993/94 to 1997/98 (all admissions).

Discussion

Boating activity, whether recreational or commercial in nature, causes a meaningful level of harm to the Australian community, measured in terms of mortality and hospital morbidity. While the extent of harm caused by that activity may not be as great as for road transport, over the last five years it has caused more deaths and serious injuries than rail accidents and air crashes combined (ATSB, 2000, Tables 1 and 2).

On average, there are about 80 deaths and nearly 1000 people admitted to hospital each year as a result of boating incidents in Australia. Many more receive minor injuries that do not require admission to hospital. Of those that are admitted to hospital, a number suffer serious and potentially life threatening injuries. Some injuries are debilitating and require lengthy periods of hospital stay; particularly those with lower limb fractures and fractures of the neck and trunk. Those admitted to hospital consume more than 3934 hospital bed days each year. Boating injury is clearly both a transport and a health sector concern. Arguably, there is more that can be done in boating safety.

There have been difficulties in establishing a national incident monitoring system based on State marine authority data. The same problems do not exist with the routinely available ABS death data and hospital data. Routine reporting of these data sources is recommended. The compilation and analysis of these data sources provides a cost effective and efficient approach to the national monitoring of boating safety. The type of analysis reported herein could be used to support the development of indicators and targets for prevention.

This report highlights the patterns and trends in mortality and morbidity. It provides an overview of the nature and extent of the problem. A brief synopsis of the pattern of the results follows:

- The fact that fatalities appear to have fallen over the last twenty years is encouraging and may provide some support for the current control measures. Of concern, however, is the fact that the incidence of non-fatal injury, as measured by hospitalisations, does not appear to have declined over recent years.
- Young people were the primary risk groups for boating death and hospitalisation. The male excess was more dominant among deaths than hospitalisations.
- Small power boats gave rise to most fatalities. However, water skiers were a much higher proportion of those hospitalised than killed.
- Deaths and hospitalisations were most common in summer and on weekends. However, this could just reflect boating exposure (eg. total number of boats on the water), and this should be further assessed.
- Rates of death and hospitalisation per head of population were higher for some rural and remote area residents than capital city residents, although the actual numbers were higher in the cities. The rate differences should be further assessed. They may reflect risk differences arising from differentials in alcohol usage and other factors.

- Fractures of the limbs were common among hospitalised cases. Cases of severe injury, defined by length of stay, were identified. The patterns of injury need to be further assessed in relation to mechanisms so that preventative aspects can be determined.

The information provided in this report provides a general overview but must be extended with a more detailed level of analysis in order to contribute to the assessment of risk factors and prevention measures, and the development of prevention policy. Coroner's data provides one means to achieve this and is the focus on Phase 2 of the current study.

Among the factors that can be assessed using Coroner data, is the role of alcohol and drugs. Other analyses have pointed to the importance of alcohol and drugs in contributing to boating deaths (O'Connor, 2001; Waterways, 1999; MaST, 2000). However, there has been no truly national analysis of this problem and it is not known where the risk is greatest and how it might be modified. O'Connor (2001) found that 39% of fatalities and 38% of fatal incidents in South Australia involved alcohol. In order to underline the significance of alcohol in boating deaths, O'Connor (2001) reports similar proportions of intoxicated victims for boating fatalities and drivers killed on the roads in the South Australia.

Other causal and preventative factor should also be assessed using Coroner data, including the role of life jackets, environmental conditions, mechanical and other material factors, individual co-morbidities, and communications and rescue failures. The recent South Australian analysis of Coroner data points to the nature and extent of the information that is available and the type of analysis that is required (O'Connor, 2001). It is critical that Coroner data be assessed in a nationally consistent manner and according to a defined data standard and extraction protocol. The South Australian study provides a model for this and should be adapted to the national data collection task.

The outcomes of the Phase 2 analysis of Coroner data will be separately reported.

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Appendix 1 – ICD 9 vessel injury categories

Water transport accidents

Note: For definitions of water transport accident and related terms see definitions (a), (s), and (t).

Includes: watercraft accidents in the course of recreational activities

Excludes: accidents involving both aircraft, including objects set in motion by aircraft, and watercraft (E840.0-E845.9)

The following fourth-digit subdivisions are for use with categories E830-E838 to identify the injured person:

- .0 Occupant of small boat, unpowered
- .1 Occupant of small boat, powered
  - See definition (t)
  - Excludes: water skier (.4)
- .2 Occupant of other watercraft -- crew
  - Persons:
    - engaged in operation of watercraft
    - providing passenger services [cabin attendants, ship's physician, catering personnel]
    - working on ship during voyage in other capacity [musician in band, operators of shops and beauty parlours]
- .3 Occupant of other watercraft -- other than crew
  - Passenger
  - Occupant of lifeboat, other than crew, after abandoning ship
- .4 Water skier
- .5 Swimmer
- .6 Dockers, stevedores
  - Longshoreman employed on the dock in loading and unloading ships
- .8 Other specified person
  - Immigration and custom officials on board ship
  - Person:
    - accompanying passenger or member of crew
    - visiting boat
    - Pilot (guiding ship into port)
- .9 Unspecified person

E830 Accident to watercraft causing submersion

- Includes: submersion and drowning due to:
  - boat overturning
  - boat submerging
  - falling or jumping from burning ship
  - falling or jumping from crushed watercraft
  - ship sinking
  - other accident to watercraft

E831 Accident to watercraft causing other injury

- Includes: any injury, except submersion and drowning, as a result of an accident to watercraft
    - burned while ship on fire
    - crushed between ships in collision
    - crushed by lifeboat after abandoning ship
    - fall due to collision or other accident to watercraft
    - hit by falling object due to accident to watercraft
    - injured in watercraft accident involving collision
    - struck by boat or part thereof after fall or jump from damaged boat
- Excludes: burns from localised fire or explosion on board ship (E837.0-E837.9)

E832 Other accidental submersion or drowning in water transport accident

- Includes: submersion or drowning as a result of an accident other than accident to the watercraft, such as:
    - fall:
        - from gangplank
        - from ship
        - overboard
    - thrown overboard by motion of ship
    - washed overboard
- Excludes: submersion or drowning of swimmer or diver who voluntarily jumps from boat not involved in an accident (E910.0-E910.9)

E833 Fall on stairs or ladders in water transport

- Excludes: fall due to accident to watercraft (E831.0-E831.9)

E834 Other fall from one level to another in water transport

- Excludes: fall due to accident to watercraft (E831.0-E831.9)

E835 Other and unspecified fall in water transport

- Excludes: fall due to accident to watercraft (E831.0-E831.9)

E836 Machinery accident in water transport

- Includes: injuries in water transport caused by:
    - deck machinery
    - engine room machinery
    - galley machinery
    - laundry machinery
    - loading machinery

E837 Explosion, fire, or burning in watercraft

- Includes: explosion of boiler on steamship
    - localised fire on ship
- Excludes: burning ship (due to collision or explosion) resulting in:
    - submersion or drowning (E830.0-E830.9)
    - other injury (E831.0-E831.9)

E838 Other and unspecified water transport accident

- Includes: accidental poisoning by gases or fumes on ship
    - atomic power plant malfunction in watercraft
    - crushed between ship and stationary object [wharf]
    - crushed between ships without accident to watercraft
    - crushed by falling object on ship or while loading or unloading
    - excessive heat in boiler room, engine room, evaporator room or fire room
    - hit by boat while water skiing
    - struck by boat or part thereof (after fall from boat)
    - watercraft accident NOS

Accidental drowning and submersion

E910.0 While water-skiing

- Fall from water skis with submersion or drowning
- Excludes: accident to water-skier involving a watercraft and resulting in submersion or other injury (E830.4, E831.4)