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Firearm-Related Morbidity in Australia, 1994–95 to 1998–99

Jenny Mouzos

In recent years there has been a significant drop in firearm-related deaths, and this paper now demonstrates a decline in hospital separations as a result of firearm-related injuries. Using hospital separation data in the five years to 1999, firearm-related injuries in Australia fell from 616 to 473—a reduction of 30 per cent. The rate of firearm-related hospital separations per 100,000 population fell from 3.44 to 2.51.

There is limited published information available on the number and types of firearms injuries recorded in Australia. The need for such information has become increasingly important, especially since the introduction of firearms regulations limiting access to firearms.

This report provides a statistical overview of trends and patterns in firearm-related hospital separations in Australia and each of its eight States and Territories for the period 1994–95 to 1998–99.

Adam Graycar
Director

The data analysed in this report are derived from the National Hospital Morbidity Database held at the Australian Institute of Health and Welfare (AIHW). Data are supplied by State and Territory health authorities and consist of a collection of electronic confidentialised records for admitted patients separated in public and private hospitals in Australia.

Separation is the term used to refer to an episode of care, which can be a total hospital stay (from admission to discharge, transfer or death), or a portion of a hospital stay ending in a change of type of care (for example, from acute to rehabilitation).

For each separation, patients are assigned a *principal diagnosis* which is defined as the diagnosis chiefly responsible for occasioning the patient's episode of admitted patient care (AIHW 1998). For principal diagnoses of injury and poisoning, data are also recorded on the relevant "external cause". For the purposes of this report, the external cause recorded for each separation relates to one of the following International Classification of Diseases (ICD–9–CM) major categories:

- E922—accident caused by firearm missile;
- E955—suicide and self-inflicted injury by firearms;
- E965—assault by firearms;
- E970—injury due to legal interventions by firearms; and
- E985—injury by firearms and explosives, undetermined whether accidentally or purposefully inflicted.

(Data for 1998–99 were originally provided in ICD–10–AM and mapped back to ICD–9–CM by the AIHW; therefore, 1998–99 data may not be completely comparable with data for earlier years.)

A record is included for each separation but not necessarily for each patient, so patients who separate more than once will have more than one record. It is therefore possible that there are records of multiple episodes (separations) arising from the same incident.

Although this report provides trends in firearm-related injuries in the community over time, it does not necessarily provide a measure of the incidence of firearm-related injuries in Australia. This is because not all ill or injured persons are treated in hospital. Persons attending accident and emergency departments who are not subsequently

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admitted are not included in the National Hospital Morbidity Database either. Moreover, the number and pattern of hospitalisations can be affected by:

- differing admission practices;
- differing levels and patterns of service provision; and
- differing patterns of morbidity in the population (AIHW 2000).

The National Crime Victimization Survey conducted in the United States indicates that about 20 per cent of all victims of non-fatal gunshot wounds do not seek treatment in hospitals (Zawitz & Strom 2000). There are no similar data available in Australia.

Number and Morbidity Rates

In Australia between 1994–95 and 1998–99, there were, on average, 560 hospital separations per year resulting from firearm-related injuries (Table 1). The latest year (1998–99) recorded 473 firearm-related hospital separations in Australia. During the period examined in this report (1994–95 to 1998–99), there has been a decline each year in the total number and rate of firearm-related hospital separations in Australia. For example, in 1994–95 there were 616 firearm-related hospital separations (rate of 3.44 per 100,000 population) compared to 473 in 1998–99 (rate of 2.51 per 100,000 population).

In sharp contrast to firearm-related deaths, of which suicides account for almost three-quarters (71.6% in 1998—Mouzos 2000a), about half of firearm incidents giving rise to hospital separations in Australia are unintentional (Figure 1). Hospital separations due to self-inflicted firearms injuries accounted for about 16 to 21 per cent during the five-year period. Just under one-quarter of all firearm-related hospital separations were due to assault. Legal intervention (injuries as a result of law enforcement officers performing their legal duties) accounted for just one to two per cent of all recorded firearm-related hospital separations in Australia.

Jurisdictional Comparisons

Of the 2,801 hospital separations due to firearms injuries recorded in Australia over the five-year period, 29.7 per cent occurred in New South Wales, with a further 28.2 per cent recorded in Queensland (Table 2).

Queensland consistently recorded one of the highest rates per 100,000 residents of firearm-related hospital separations across the five-year period, although the Northern Territory and Tasmania figured erratically and sometimes exceeded Queensland. The number and rate per 100,000 population of firearm-related injuries in the Northern Territory has also declined over this five-year period.

Note the substantial increase in firearm-related hospital separations in Tasmania between 1994–95 and 1995–96 (from a rate of 5.7 to 12.3). This increase was a result of the Port Arthur incident where 18 persons were wounded.

Figures 2 to 4 allow comparisons between jurisdictions to be made on the number of yearly firearm-related hospital separations by specific type of external injury.

For unintentional firearm-related injuries, New South Wales and Queensland recorded the highest number of yearly hospital separations compared to other jurisdictions. The Australian Capital Territory recorded the lowest number of firearm-related hospital separations during the five-year period (Figure 2).

A different pattern emerges when the number of yearly hospital separations due to self-inflicted firearms injuries are examined (Figure 3). For example, Queensland accounted for about one-third (33.6%) of all recorded firearm-related hospital separations during the five-year period. New South Wales accounted for a

further 27.1 per cent, followed by Victoria (13.8%), Western Australia (8.6%) and South Australia (8.2%). The Australian Capital Territory recorded only two hospital separations as a result of self-inflicted firearms injuries between 1994–95 and 1998–99.

Intentional firearms injuries (other than those self-inflicted) may involve other crimes like robbery and burglary, but are usually referred to as assaults. During the five-year period, hospital separations as a result of injuries inflicted with a firearm during an assault were the second most common type of firearm-related injury in Australia (21.9%). The jurisdictional distribution of firearms injuries that were purposively inflicted appears to follow similar trends as firearm-related homicides (that is, fatal firearms injuries due to assaults). For example, in the most recent year (1999–2000), New South Wales accounted for about one-third of all firearm-related *homicides* in Australia, followed by Queensland (22.3%), Victoria (18.7%), Western Australia (13.1%), South Australia (2.7%), Tasmania (1.8%) and the two Territories (NT 1.8%; ACT 0.9%) (Mouzos 2001).

However, across the five-year period, New South Wales accounted for almost half of all *hospital separations* due to firearm-related assaults (42.5%) (Figure 4). Queensland accounted for a further 21.5 per cent, followed by Victoria, which accounted for 15.5 per cent of firearms injuries. Note the significant peak in the numbers for

Table 1: Australia, 1994–95 to 1998–99—firearm-related hospital separations, number and rates per 100,000 population

Type of firearm injury	1994–95		1995–96		1996–97		1997–98		1998–99	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Accident	317	1.77	289	1.59	278	1.50	273	1.47	227	1.20
Self-inflicted	102	0.57	97	0.53	104	0.56	88	0.47	100	0.53
Assault	100	0.56	133	0.73	135	0.73	132	0.71	113	0.60
Legal intervention	7	0.04	7	0.04	12	0.07	11	0.06	6	0.03
Undetermined	90	0.50	70	0.39	41	0.22	42	0.23	27	0.14
Total	616	3.44	596	3.28	570	3.09	546	2.93	473	2.51

Source: AIHW National Hospital Morbidity Database

Table 2: Australia, States and Territories, 1994–95 to 1998–99—number and rate per 100,000 population* of firearm-related hospital separations

Year of separation	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	Australia
1994–95	2.9 (174)	2.5 (114)	5.0 (161)	2.7 (47)	4.1 (60)	5.7 (27)	1.3 (4)	16.9 (29)	3.4 (616)
1995–96	2.5 (156)	1.8 (81)	5.4 (180)	2.1 (37)	2.7 (40)	12.3 (58)	1.3 (4)	22.6 (40)	3.3 (596)
1996–97	2.7 (167)	1.9 (88)	4.7 (159)	3.1 (55)	3.3 (49)	6.5 (31)	1.0 (3)	9.7 (18)	3.1 (570)
1997–98	2.6 (166)	1.8 (84)	4.9 (167)	2.2 (40)	3.4 (51)	3.8 (18)	1.6 (5)	7.9 (15)	2.9 (546)
1998–99	2.7 (170)	1.9 (87)	3.6 (124)	2.1 (39)	2.5 (37)	2.8 (13)	0.6 (2)	0.5 (1)	2.5 (473)

* Mid-year population at 31 December was used to calculate rates (ABS 1994–2000)

Note: Number in parentheses.

Source: AIHW National Hospital Morbidity Database

Tasmania during 1995–96. This relates to the 18 persons injured during the Port Arthur incident in Tasmania in 1996.

Type of Firearm Used

Firearms are classified in the National Hospital Morbidity Database according to the following types:

- handgun;
- shotgun;
- hunting rifle;
- military firearms; and
- other and unspecified firearms.

The “other and unspecified” category includes those firearms where insufficient information was provided to determine a specific type.

Of firearm-related hospital separations due to accidental injuries, assaults and self-inflicted injuries recorded for the period 1994–95 to 1998–99, in just under half of these cases (n=1,093; 47.1%, excluding legal intervention and undetermined injuries) the type of firearm involved was recorded as “other and unspecified”.

Based, therefore, only on available information where the type of firearm was recorded (n=1,226), most firearm-related injuries were committed with a shotgun (36.1%), followed by a hunting rifle (32.6%) and a handgun (28.5%). About three per cent of firearm-related injuries were committed with a military firearm (Figure 5).

However, there are a number of differences depending on whether the firearm injury was accidental or purposively inflicted. For both accidental and self-inflicted firearms injuries, a hunting rifle was the most common type of firearm used (40.7% and 45.0% respectively). On the other hand, assaults committed with a firearm were equally likely to be committed with a shotgun (42.1%) as with a handgun (41.5%). This finding corresponds with research on the types of firearms most commonly used to commit homicide in Australia (see Mouzos 2000a, 2000b, 2001).

Gender Variation

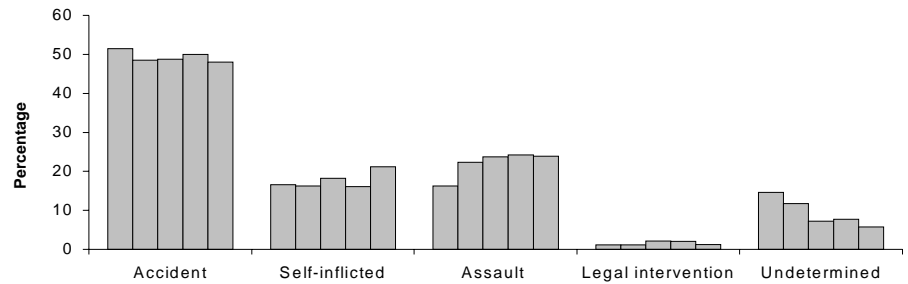
Research has consistently demonstrated that males outnumber females in firearm-related mortality statistics (see Mouzos 2000a; ABS 1997). About nine out of 10 firearm-related hospital separations during the five-year period involved males (Figure 6). Of all firearm-related

hospital separations involving males, accidental injuries accounted for the largest proportion (50.2%). Similar to males, the largest proportion of hospital separations involving females was for accidental injuries (43.4%), followed by assaults (32.3%). Of the 43 firearm-related injuries due to legal intervention, only two hospital separations involved a female.

In terms of trends over the five-year period, it seems that the

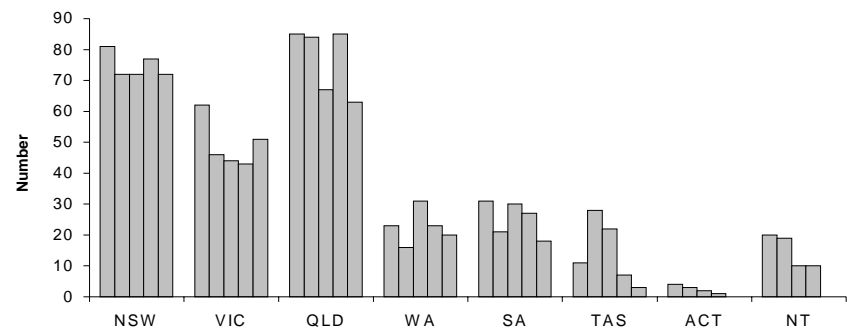
overall decline in the number of firearm-related hospital separations is being driven primarily by a decline in *accidental* firearms injuries involving males (Figure 6). For example, in 1994–95 there were 281 hospital separations due to accidental firearms injuries involving males in Australia. This declined to 204 in 1998–99. The other types of external causes of firearm-related injuries remained stable over the same period, with

Figure 1: Australia, 1994–95 to 1998–99—proportion of firearm-related separations, by type of external cause



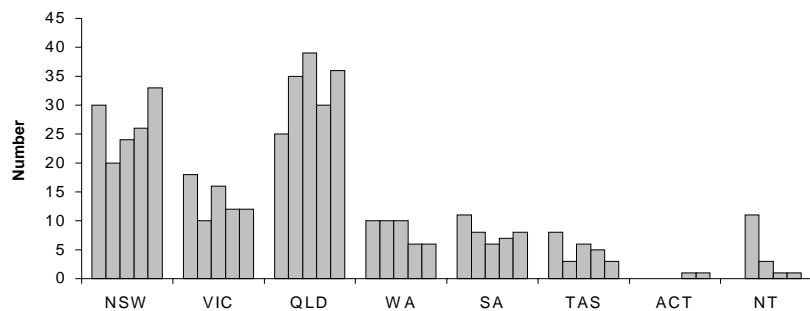
Source: AIHW National Hospital Morbidity Database

Figure 2: Australia, States and Territories, firearm-related accident separations, 1994–95 to 1998–99



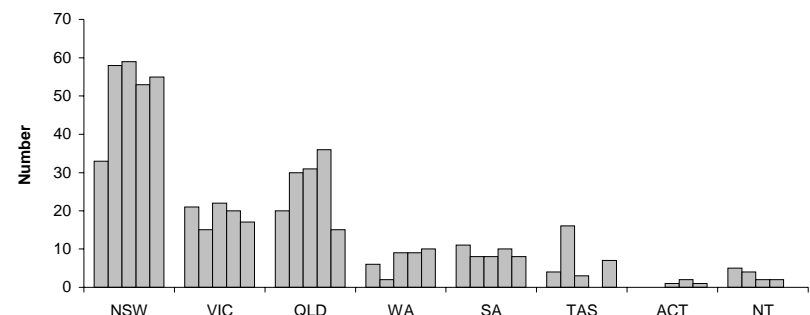
Source: AIHW National Hospital Morbidity Database

Figure 3: Australia, States and Territories, firearm-related self-inflicted injury separations, 1994–95 to 1998–99



Source: AIHW National Hospital Morbidity Database

Figure 4: Australia, States and Territories, firearm-related assault separations, 1994–95 to 1998–99



Source: AIHW National Hospital Morbidity Database

the exception of the “undetermined” category, which also declined (77 in 1994–95 to 24 in 1998–99).

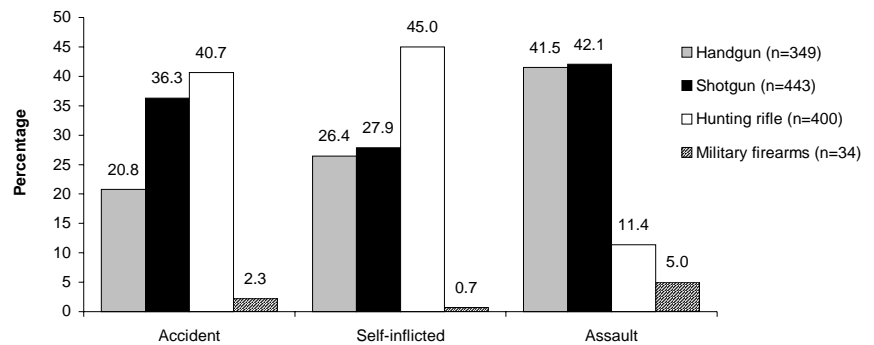
The only other noticeable gender-related, firearm-related hospital separations trend is that the number of hospital separations involving females that were due to assaults with a firearm has also declined in recent years (Figure 6). For example, in 1995–96 there were 33 firearm-related assaults against females; in 1998–99 there were only 12 recorded hospital separations due to intentional gunshot injuries.

Age Variation

Previous research indicates that firearm-related mortality varies greatly with age (Mouzos 2000a). This is also reflected in the distribution of non-fatal firearm injuries. Between 1994–95 and 1998–99, there were few firearm-related hospital separations involving children under the age of 10 (n=47) (Figure 7). Persons aged between 20 and 24 years of age had the highest number of firearm-related hospital separations across the five-year period (n=487; 17.4%). Persons at either end of the age group distribution experienced the lowest frequency of firearm-related hospital separations. In other words, persons aged less than one and persons aged 85 years and over had the lowest number of firearm-related hospital separations between 1994–95 and 1998–99 (n=2 and n=13 respectively).

When gender is examined separately, just over half of the firearm-related hospital separations involved males aged between 15 and 34 years, with the highest proportion of firearm-related injuries involving males aged 20 to 24 years (n=439; 17.8%) (Figure 8). However, it is this same age group that has experienced a dramatic decline in firearm-related hospital separations over the five-year

Figure 5: Australia, type of firearm-related hospital separation, by type of firearm involved, 1994–95 to 1998–99



Source: AIHW National Hospital Morbidity Database

period. For example, in 1994–95 there were 119 hospital separations involving males aged 20 to 24 years, in 1995–96 there were a further 106 hospital separations, whereas in 1996–97 the number of firearm-related hospital separations involving males aged 20 to 24 years declined to 76, with similar numbers in subsequent years.

For females, the highest proportion of firearm-related hospital separations involved persons aged between 15 and 29 years (n=148; 44.3%), with the 25 to 29 year age group contributing the highest number of firearm-related hospital separations involving females (Figure 9).

An examination of five-year trends of firearm-related hospital separations by gender and age group indicates that for females aged between 15 and 19 years, and between 35 and 39 years, there has been a yearly decline in the number of hospital separations. Although the total number of separations for females in these age groups is relatively small, the observed decline over the five-year period is still worth noting.

Separation Mode

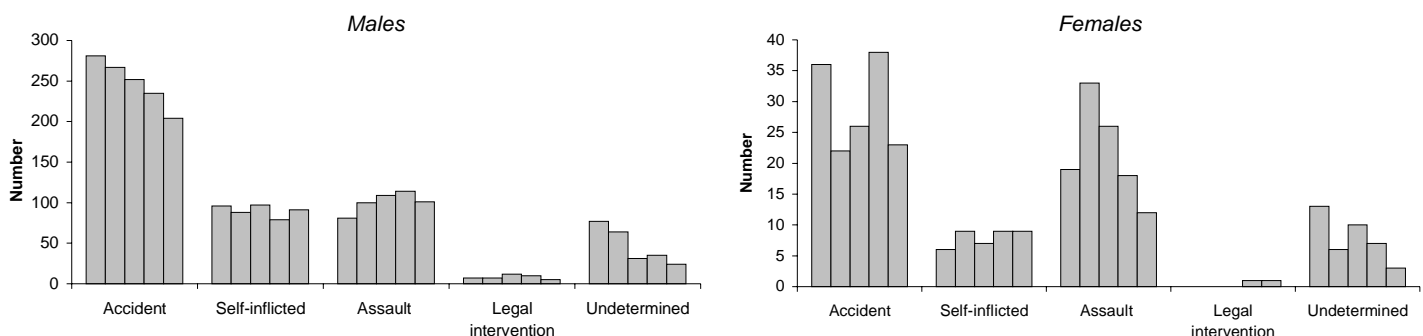
Separation mode refers to the status at separation of the person (discharge/transfer/death) and the

place to which the person is released (where applicable) (AIHW 2000).

Across the five-year period under review, the distribution of firearm-related hospital separations by mode of separation has remained relatively stable (Figure 10). Less than 10 per cent of hospitalised cases due to firearm-related injury die in hospital (for these cases there could be overlap between the hospitalisation and deaths data), with an additional 18 per cent transferred or discharged to another acute hospital, nursing home, psychiatric facility or other health care accommodation.

The examination of separation mode by type of firearm-related injury indicates that the majority of hospitalised cases (70.9%) are discharged to their usual address (Figure 11). However, a greater proportion of hospitalisations due to firearm-related self-inflicted injuries resulted in the person's death (18.9%) compared with the average for all firearm injury-related hospitalisations. Across all the types of firearm-related injury, very few persons separate from hospital on the basis that they discharged themselves against medical advice (2.5%). Interestingly, persons hospitalised as a result of a firearm-related assault were more likely to discharge themselves against medical advice (3.3%).

Figure 6: Australia, type of firearm-related hospital separation, by gender, 1994–95 to 1998–99



Source: AIHW National Hospital Morbidity Database

Policy Implications—Reducing the Risk of Injury

While this report presents findings from the analysis of firearm-related hospital separations during a five-year period in Australia, it does not purport to measure the incidence of firearm-related injuries in Australia, as not all persons who suffer firearm-related injuries seek medical attention at a hospital and are admitted.

In terms of yearly trends, there has been an observed decline in the rate of hospital separations due to firearm-related injuries between 1994–95 and 1998–99. This decline has been driven primarily by a decline in accidental firearms injuries involving males; a decline that began prior to the implementation of firearms reforms in Australia following the Port Arthur incident. Across this five-year period, just under half of all firearm-related hospital separations were a result of unintentional firearms injuries, with males aged between 15 and 34 years accounting for about half of all firearm-related hospital separations. These findings have significant implications for policy in devising strategies to limit the risk of injury from firearms, especially for young males.

In Australia, a number of prevention strategies have evolved over recent years that may assist in reducing the risk of firearm injury, especially where user “...incompetence is at the root of the problem” (Harding 1981, p. 108). These include firearms safety courses, laws mandating safe storage of firearms, and restrictions on who may *legitimately* purchase or own firearms (see Mouzos 2000b for an overview of storage requirements etc.). For instance, firearms regulations introduced as part of the Nationwide Agreement on Firearms (also known as the “National Firearms Agreement”) in 1996 have the potential for minimising the *legal* acquisition of firearms by persons not suitable. Through the application procedure, persons deemed not “fit and proper” might be refused a firearms licence or have their licence cancelled. Another ground for licence refusal or cancellation is “mental or physical fitness”. This requires evidence of a mental or physical condition which would render the

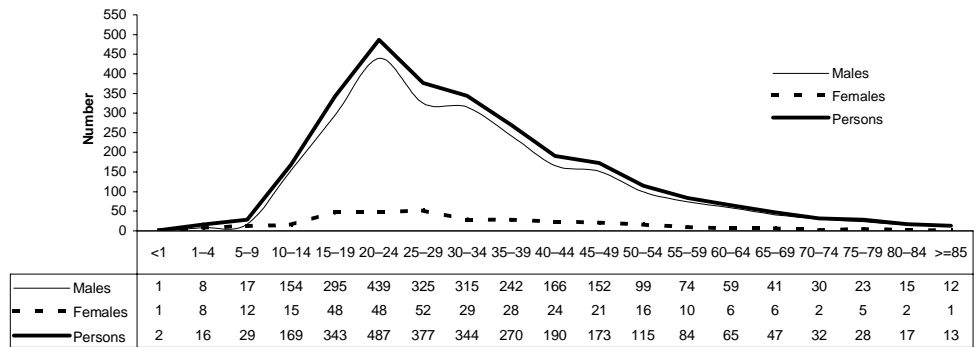
applicant unsuitable for owning, possessing or using a firearm.

In addition, legislation requires that all first-time licence applicants undergo and complete an accredited course in safety training for firearms. Such a course focuses on firearms law, firearms safety and competency.

Research also suggests that properly trained shooters—that is,

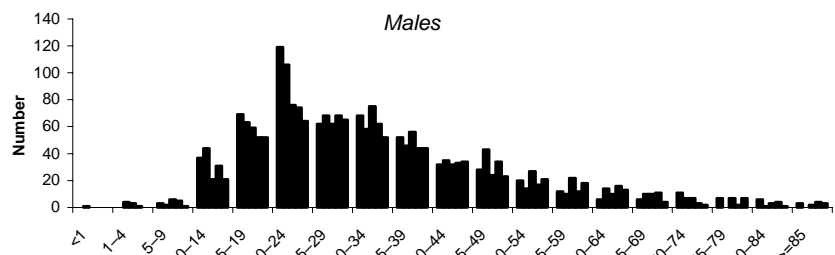
shooters trained in the safe handling and storage of firearms—not only have lower accident rates but may also be somewhat less likely to use firearms as a first resort in crime (Harding 1981, p. 98–111). This is further supported by the fact that few firearms used to commit homicide in Australia are actually legally held (see Mouzos 2000b).

Figure 7: Australia, firearm-related hospital separations, by gender and age group, 1994–95 to 1998–99



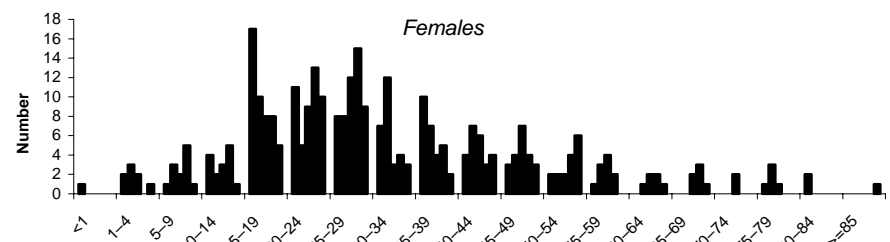
Source: AIHW National Hospital Morbidity Database

Figure 8: Australia, firearm-related hospital separations involving males, by age group, 1994–95 to 1998–99



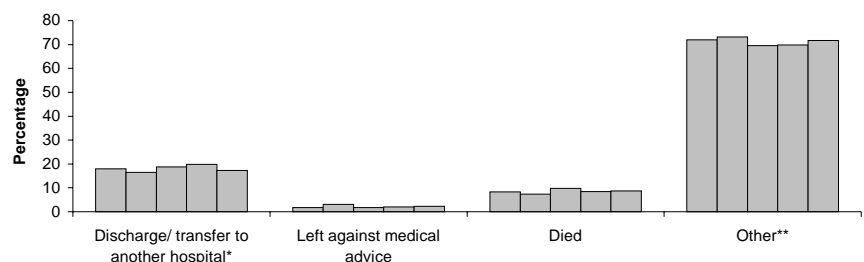
Source: AIHW National Hospital Morbidity Database

Figure 9: Australia, firearm-related hospital separations involving females, by age group, 1994–95 to 1998–99



Source: AIHW National Hospital Morbidity Database

Figure 10: Australia, firearm-related hospital separations, by mode of separation, 1994–95 to 1998–99

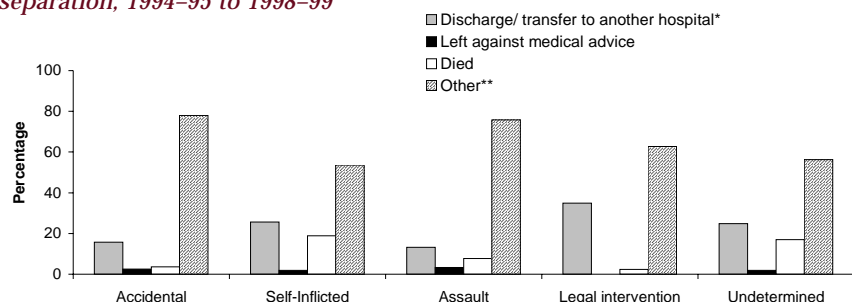


* Includes discharge or transfer to an acute hospital, a nursing home, a psychiatric hospital or other health care accommodation.

** Includes statistical discharge—type change, statistical discharge from leave and other (includes discharge to usual residence/own accommodation/welfare institution).

Source: AIHW National Hospital Morbidity Database

Figure 11: Australia, type of firearm-related hospital separation, by mode of separation, 1994–95 to 1998–99



* Includes discharge or transfer to an acute hospital, a nursing home, a psychiatric hospital or other health care accommodation.

** Includes statistical discharge—type change, statistical discharge from leave and other (includes discharge to usual residence/own accommodation/welfare institution).

Source: AIHW National Hospital Morbidity Database

Therefore, while these provisions may assist in reducing the number of injuries due to mishandling of a firearm, they do little to prevent persons who slip through the screening net (Graycar 2000) and those who disregard regulations of safe storage.

One approach that may have an “all-encompassing” effect is that associated with technological improvements to the safety of firearms. It has been noted that self-inflicted accidental injuries can be related to faulty firearm design and poor maintenance (Chapdeleine et al. 1991). However, others point to the importance of providing protection that is not dependent on users’ behaviour (Sinauer, Annest & Mercey 1996):

...the existing evidence [in Canada] suggested that although reckless individuals may be more likely than others to be involved in accidents, the majority of cases involve product design shortcomings or ordinary people—often young people—who had access to a firearm and made an error in judgment or were the victims of misfortune. (Gabor 1994, p. 58)

There are a number of features that could be added to firearms in order to reduce the probability of injury or death. Under the umbrella of “safety devices” these include transfer bars, grip safeties, manual thumb safeties, trigger locks, combination locks, electromagnetic locks, other personalised devices (such as an electronic sensing device that recognises a fingerprint or an iris), loaded-chamber indicators and magazine safeties (see Karlson & Hargarten 1997, pp. 130–3). Other innovations include anti-tampering devices that, if tampered with, will render

the gun “dead” instead of “live”, as well as the so-called “smart gun” that operates via radio or ultrasonic waves (Taylor 2000). While some of these technological advances have been made, they are not widespread and their effectiveness has yet to be evaluated in any systematic way (Dandurand 1998).

While there has been a declining trend in firearm-related hospital separations in Australia, this does not imply that we should reduce our efforts towards minimising the mishandling of firearms in our community. There are still too many Australians who are injured and require hospitalisation as a result of the misuse of a firearm. The yearly monitoring of both firearm morbidity and mortality rates in Australia by the Australian Institute of Criminology is essential to gauge the level of firearm-related injuries and the possible effect of strategies incorporated into the Australian regulatory regime.

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