

Analysis of available data on unintentional shootings 2004 – 2015

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Introduction

News media attention to incidents involving firearms have for nearly a year provided ‘feed’ for the press. An apparent spate of unintentional shootings has prompted calls for stricter controls on the private ownership of firearms, and some have even argued that full firearm registration would help to reduce this casualty toll. A factor which is notably absent from these calls has been any attempt to place the unintentional shooting casualty rate into perspective, by comparing their comparative frequency with those of the past, or comparing these with casualties arising from other causes. This paper attempts to perform that simple task. It relies entirely upon official data, sources for which are given at the end.

Factors in unintentional shootings

Key factors are best identified by asking where, when, what, how, and to whom did these shootings take place? Using the same classifications as the present author did in his “New Zealand Firearms” (2013) ensures a link with older data. These classifications are also in accord with those used by the data collecting agencies, principally the New Zealand Police and the New Zealand Mountain Safety Council (Inc). It is only since 2004 that some analysis has been attempted on its reports, those before then were so brief as to preclude any but the most basic.

Conventions followed by this investigation

Conventions followed by the present author in the preparation of this paper include:

1. Generally, shootings by a human perpetrator which caused a human casualty are used in this analysis. An exception was a shot fired by a dog which discharged a rifle left on the back seat of a motor vehicle, in 2010.
2. Included in this casualty analysis is an incident which featured the misuse of explosives, but no firearm.
3. Firearm malfunctions, as for example where a shot lead to the destruction of the firearm or an accessory attached to it, causing injury, are classified under “other”.
4. Near misses, not having caused injury to humans, are excluded from this analysis.
5. The prime focus of this analysis is upon the shooter. This is because in the view of this student, the shooter is the causative agent in these incidents.
6. Analysis of victim factors is provided.

7. More than one basic firearm safety rule has been breached in these incidents.

Total casualties

This analysis involves a total of 110 incidents, of which 27 had a fatal outcome. The remaining 82 were non-fatal. For this period, the average casualty rate per 100,000 population was 0.21, and the average fatality rate per 100,000 was 0.05. The rate for road traffic accident casualties is 266 per 100,000, vastly higher than from unintentional shooting (Forsyth, 2015), although the base from which the unintentional shooting rate is derived might arguably not be the mean population.

Table 1: Unintentional shooting casualty numbers and derived casualty rates per 100,000 population, 2004 – 2015.

Unintentional firearm casualties						
Year	total casualties	deaths	injuries	Mean population	Casualty rate per 100,000 population	fatality rate per 100,000 population
2004	6	1	5	4088700	0.15	0.02
2005	9	1	8	4136000	0.22	0.02
2006	11	1	10	4185300	0.26	0.02
2007	7	1	6	4226200	0.17	0.02
2008	10	3	7	4262000	0.23	0.07
2009	12	4	7	4304000	0.28	0.09
2010	12	1	11	4353000	0.28	0.02
2011	11	4	7	4386300	0.25	0.09
2012	9	3	6	4410700	0.20	0.06
2013	5	1	4	4446700	0.11	0.02
2014	5	1	4	4513100	0.11	0.02
2015	13	6	7	4608150	0.28	0.13
Total	110	27	82			
Average	9	2	7		0.21	0.05
Sources: NZMSC (Inc) and NZ Police data 2004 - 2015						

A question of whether unintentional shootings by firearm have increased over the past five years is met by providing the five-year totals for two periods, 2006 to 2010, and 2011 to 2015, from Table 1. These totals are 52, and 43 incidents respectively, a steady downward trend. Figure 1 illustrates this for total casualties and for fatalities from 2000 onward.

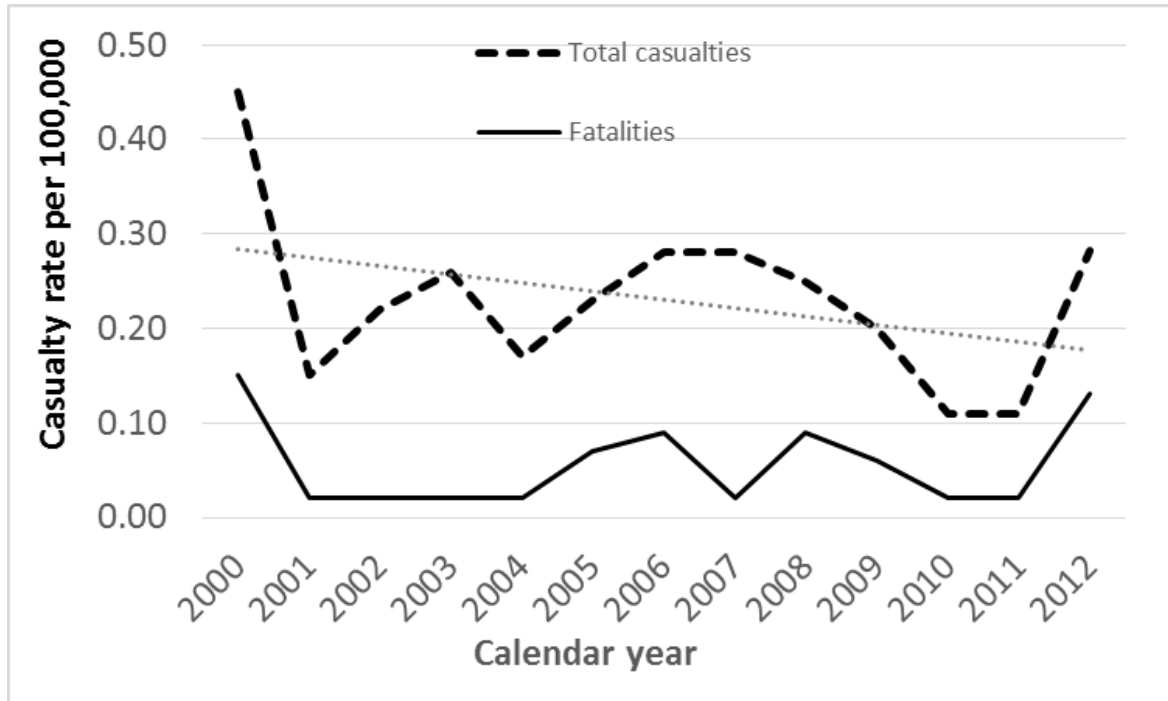


Figure 1: Unintentional shooting casualty rates 2000 – 2015, showing linear trend line for overall casualties.

Where did the unintentional shootings take place?

The locations of unintentional shooting incidents is shown by Table 2. “Other” includes incidents which took place on ranges. It is not always clear exactly where an incident took place, for example a “work” incident may have taken place in a street when a police officer unintentionally shot a handcuffed offender. Unless the shooter was on or in a motor vehicle, when it was included in the “vehicle” space, the incident was recorded elsewhere as appropriate. Table 2 gives these broad locations.

Table 2: location of unintentional shootings 2004 – 2015.

Home	Field	Street	Vehicle	Work	Other	Total
19	71	0	8	6	8	112

When did they take place?

In other analyses of unintentional shootings, the timing of these has been attempted. In fact, the records do not indicate times, and even subdivision into daylight, dusk or darkness is only made by inferring, for example when spotlighting is mentioned. The seasonal distribution of unintentional shootings merely reflects when people cause unintentional shootings, as Figure 2 shows. This is because there is little distinction made between work and recreational unintentional shootings.

From Table 2, only 7% of unintentional shootings occur in the workplace, so it is possible to accept that most unintentional shootings involve recreational activities. The peaks in April and May strongly suggest the roar and the onset of game bird and water fowl hunting seasons which see more firearm use than other months. These peaks are in accord with earlier findings in research undertaken by the present author (Forsyth 1977; 1985; 2013).

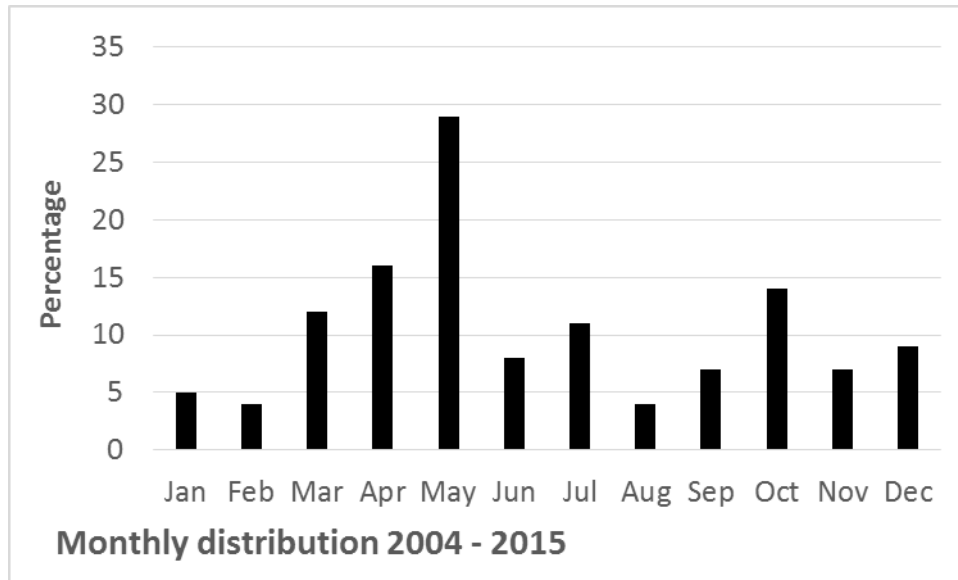


Figure 2: Monthly distribution of unintentional shooting incidents.

What happened?

The nature of unintentional shootings is shown by the breakdown shown in Table 3. In an analysis of this nature, it is difficult to avoid introducing subjectivity to the interpretation of an incident report. An incident which involved a firearm that was for the time being, loaded, (rule 1 breach), and was also demonstrably not pointed in a safe direction, (rule 2 breach). However, the resting the muzzle of a loaded firearm on the shooter's foot, then firing it, makes the primary failure in the view of the present author, of failing to observe rule 1.

“Other” relates to failures not covered by the safety rules, for example, mechanical failure of the firearm, and the unwise handling of explosives.

Table 3: Incidents attributed to violation of basis firearm safety rules.

	Rule 1	Rule 2	Rule 3	Rule 4	Rule 5	Rule 6	Rule 7	Other	Total
Percentage	19	24	14	12	12	9	3	8	100

The seven basic rules of firearm safety are:

1. Treat every firearm as loaded;
2. Always point firearms in a safe direction;
3. Load a firearm only when ready to fire;

4. Identify your target beyond all doubt;
5. Check your firing zone;
6. Store firearms and ammunition safely;
7. Avoid alcohol or drugs when handling firearms. (NZ Police, 2013)(p. 4).

What firearms are involved?

The type of firearm involved in an unintentional shooting is arguably peripheral to the firearm safety debate, and the fact that a firearm has been discharged wrongly and the circumstances behind that are of more importance than the type of firearm involved. The predominance of shoulder arms in recreational firearm use in New Zealand has a bearing in the outcomes of unintentional shootings. The unintentional shooting incidents for the most recent 12 year period are in Figure 3.

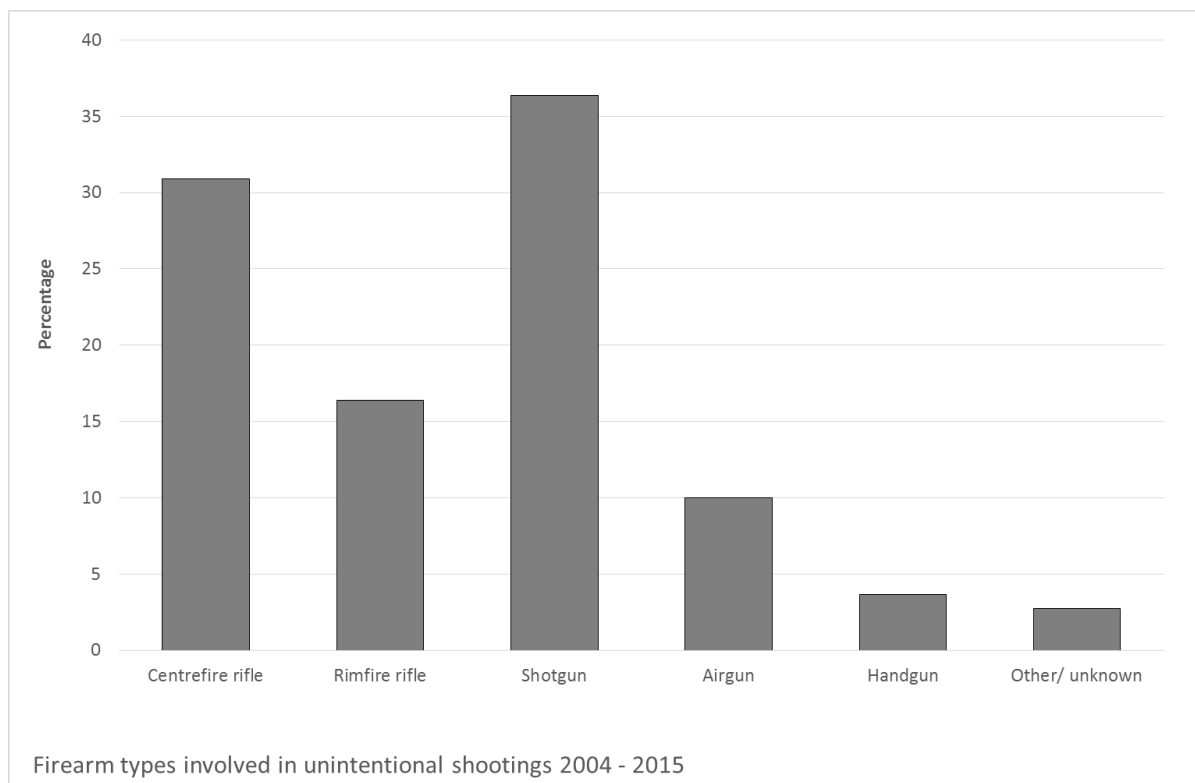


Figure 3: Firearm types featuring in unintentional shootings.

How did the incidents happen?

How these incidents occurred has been determined by identifying failures to follow some of the seven basic rules of firearm safety. As might be expected, Figure 4 shows little change from that shown in Forsyth (2013), when incidents for two periods, 1988 to 2000, and 2004 to 2009, were analysed. The breakdown of underlying causes for the period 2004 to 2015 is shown in Figure 4.

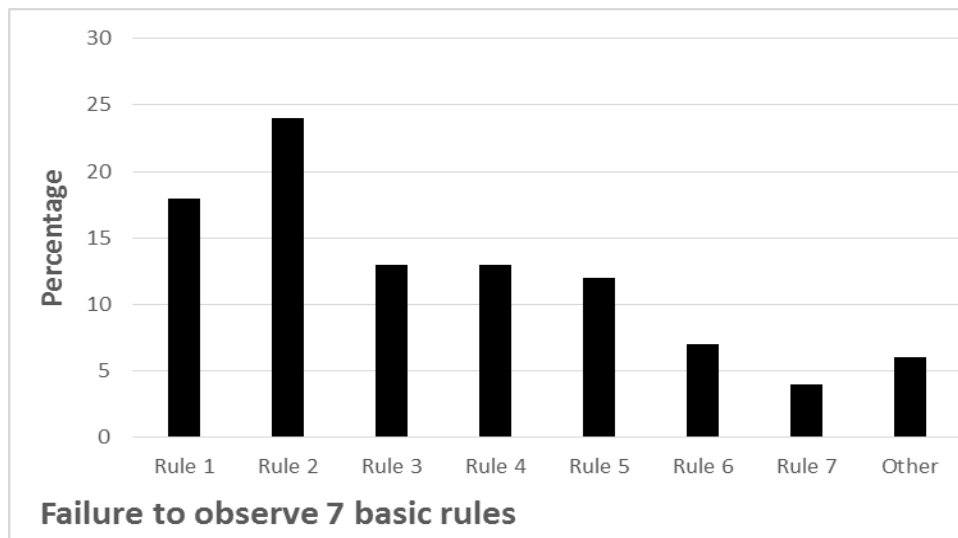


Figure 4: Failures to observe the basic rules of firearm safety.

Examining the number of self-inflicted unintentional shootings reveals parallels with the observations for all such incidents. Almost 36% of the 101 unintentional shooting victims were self-inflicted, which implies that 64% were inflicted by another firearm user. Again, the dominance of shoulder arms in sporting use in New Zealand helps reduce the incidence of unintentional self-shootings for ergonomic reasons – the requirement for two handed use, and the fact of the muzzle being farther from the shooter militates against self-injury, placing the burden of responsibility upon the person holding the firearm for ensuring their shooting partner's safety.

Who?

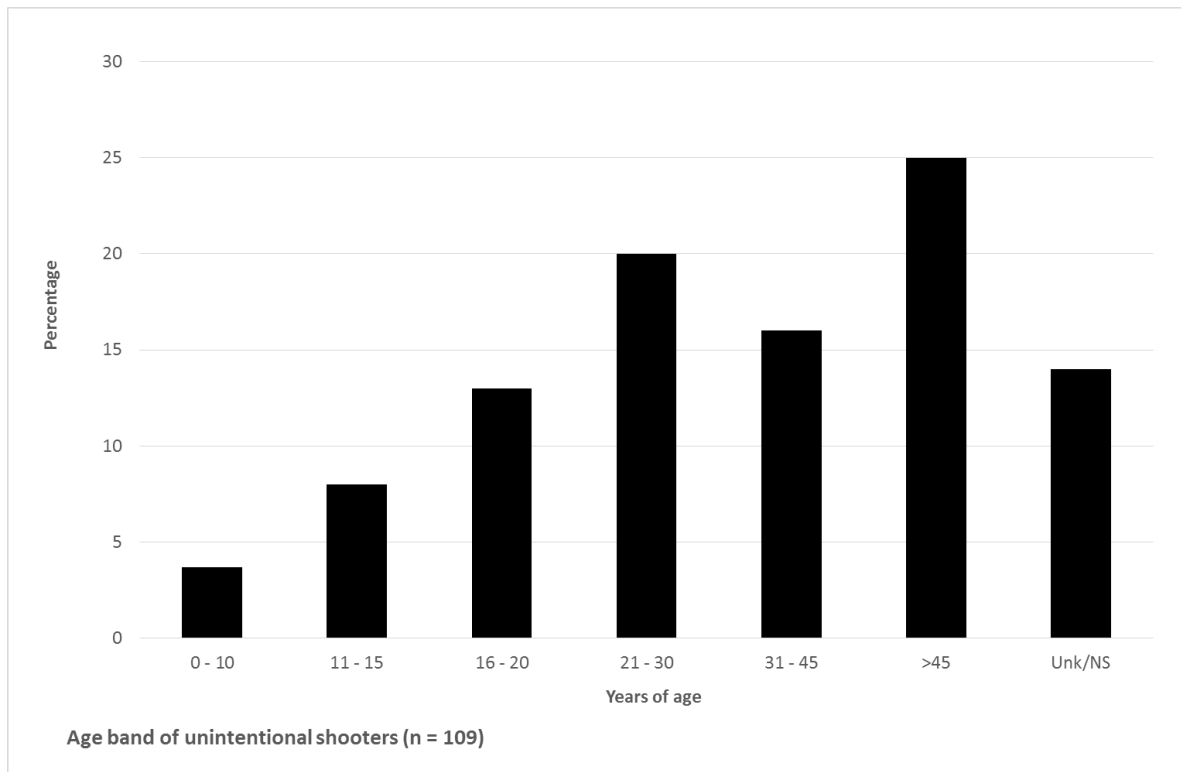
The shooters in unintentional shootings are overwhelmingly male. For the 110 incidents involving injury in 2004 to 2015, 103 were male, 3 were unknown or not stated, and 4 were female. In self-inflicted unintentional incidents, again, the majority involved males, with 49 involved. Just two females experienced self-inflicted unintentional shooting.

The age groupings of the perpetrators of unintentional shootings is shown in Table 5.

Table 5: Ages of the shooters in unintentional shooting incidents, 2004 – 2015.

Age of shooter	No of shooters	%	Incidents per year of age band
0 - 10	4	4.1	0.8
11 - 15	8	8.2	1.6
16 - 20	14	14.4	3.2
21 - 30	19	19.6	1.9
31 - 45	18	18.6	1.2
>45	24	24.8	1.2
Unk/NS	10	10.3	1.2
TOTAL	97	100.0	

(NS = Not stated).

**Figure 5:** Age distribution of shooters in unintentional shootings 2004 – 2015. Note that the age- covering ten years, two five years, one a fifteen year period.

Victims of unintentional shooting

Victims for all unintentional shootings for the period 2004 to 2015, (including self-inflicted unintentional shootings) totalled 110. Again, as for the shooters, humans tend to work and recreate with their peers, so people of similar ages to their own are involved (Figure 6). As mentioned before, the vast preponderance of shoulder arms ensures that victims of self-inflicted unintentional shootings are a distinct minority.

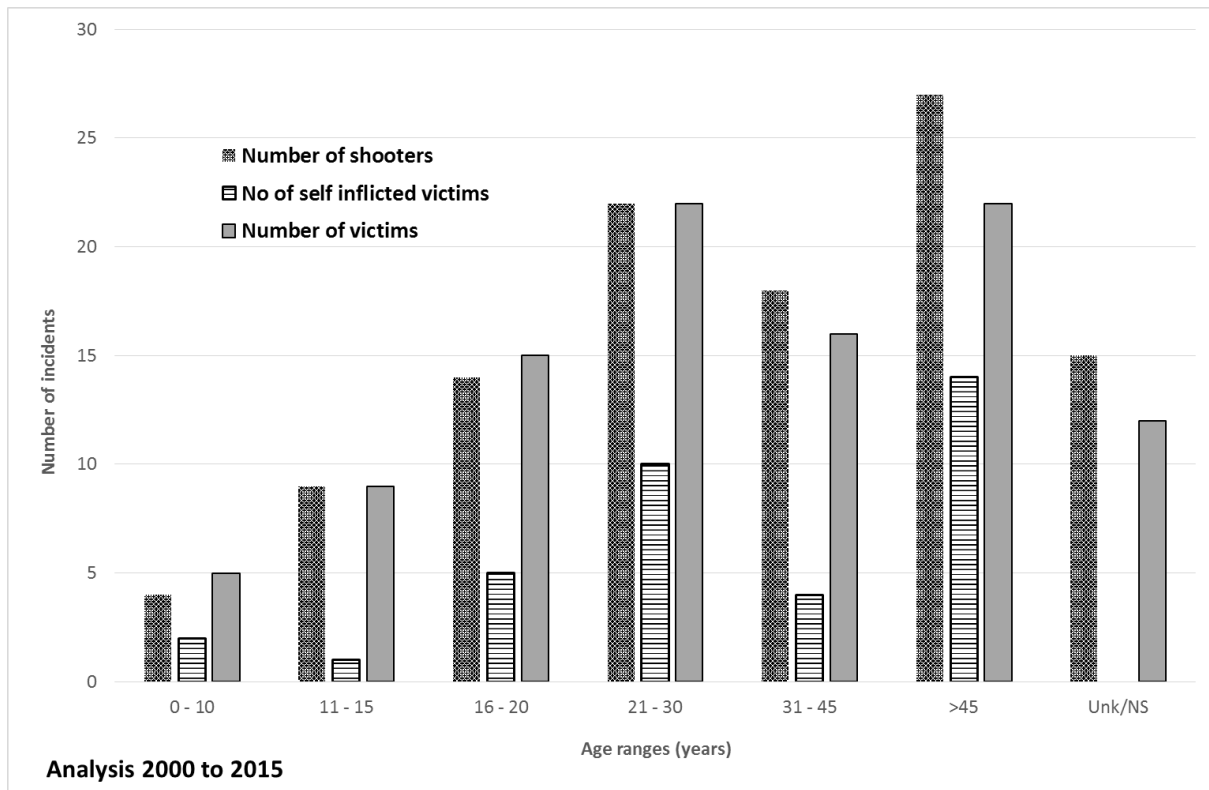


Figure 6: Pattern of those involved in unintentional shootings.

Discussion

Analysis is intended to provide a basis for discussion about minimising the incidence of unintentional shootings. Analysis of the untoward incidents involving firearms inevitably arouses interest as the socio-political debates about firearms wax and wane. Yet the statistics provided about unintentional shootings show little change from those first assembled by the present author nearly four decades ago (Forsyth, 1977): they remain very low, well below casualties for drownings and falls.

From Figure 1, the long-term fatality rate from unintentional shootings is 25% of the total number of incidents. This rate is high when comparing shooter fatality rates with other countries, but the preponderance of shoulder arms, with their greater power, sharply reduces the likelihood of survival when compared to rates for unintentional shootings in countries where more handgun use is permitted. Handguns develop less power than rifles do, tending to make injuries from these more survivable, with lower fatality rates. However, in these countries (including the USA), unintentional shooting frequency is higher than in New Zealand (Krug, Powell and Dahlberg, 1998, in Forsyth, 2013).

The number of unintentional shootings has changed considerably over the decades. Data for 1970 to 1972 shows 230 such incidents for the three year period, equating to more than 76 incidents per annum. The 2004 to 2015 period of 12 years, shows 110 incidents, 9.2 incidents per year, far less than the frequency for the earlier period of 76 per year (Forsyth, 1985).

It might have appeared to some that a discernible swing to semi-automatic firearms, which self-load after each shot, might contribute to a higher unintentional shooting rate, but this does not appear to be so. These designs, although appearing to be intrinsically more hazardous, are ergonomically easier to use. Their safety mechanism is engaged by using an operating mechanical 'safety catch', supplemental of course to safe firearm handling practices, and may in practice be no more hazardous than manually operated firearms. Litigation in the major firearm manufacturing countries, often to meet the stringent requirements of their major markets, has resulted in firearms of all kinds tending to be safer to use. Inescapable too is the fact of more structured firearm safety education, which, forming part of the requirements for the New Zealand firearm licensing process, ensure the fundamentals of firearm safety are introduced to all licensed users.

New Zealand is the only country in the world to advocate the use of the half open bolt in its official firearm safety practice literature, for manually operated bolt action rifles. This is a legacy of a safety catch on war-surplus .303 Lee-Enfield rifles which was prone to mechanical failure, a type which is avoided on modern designs. Modern firearm designs have almost completely replaced the Lee-Enfield rifles in the game fields of New Zealand. Manufacturers' literature, including the operating handbooks for firearms, without exception, urge the pointing of a firearm in a safe direction, and then the use of the safety mechanism, when in the field.

The amount of firearm training undergone by the shooters is shown by somewhat uneven information in the records. The arms licensing status of those involved in unintentional shootings has been supplied more reliably since 2004. For 105 records for which the arms licence status is provided, 54 possessed an arms licence, 31 did not, and 20 were unknown or not stated. If it is accepted that the possession of an arms licence implies exposure to some safety training, then information about the experience of those involved in unintentional shootings may be placed into better context.

In terms of firearm handling and user experience, the pattern is different. Some of those involved in unintentional shootings lacked training, when it is found that ten of the 73 had none. For another 33 of those involved the training level was unknown or not stated. Two indicated “limited” training, and 28 had gained experience. Information about this is spotty, but is improving for the more recent years of data collection. It may reasonably be argued that a majority of those involved in unintentional shootings had undergone some training, but the fact remains that for many shooters, there was a dearth of practical firearm user experience. (This differs from the compulsory requirement for knowledge of the fundamentals of firearm safety before the issue of an arms licence). That a third of those were not licensed for firearm use reveals a deficiency here.

The data used in the present research relies upon an uneven record of training received, with gaps where the question has not been put to those involved in unintentional shootings, often leading to “unknown”. This response features in more than half of the data provided about firearm training and experience, and a quarter of those for whom the possession of a firearm licence was relevant. The collection of data such as this in the aftermath of an incident must always pose difficulties for the responders to an incident scene, such scenes often being in areas where delays in the arrival of even first responders are to be expected.

The news media has made much the failures to identify the target, a breach of basic safety rule 4. Sixteen incidents occurring over 16 years averages 1 such incident per year, a frequency which in comparison to motor vehicle incidents is very low.

Some concern has been expressed about the possibility of older shooters being more likely to cause unintentional shootings. Incident rates are not able to be quantified across individual years, but the ten-year periodicity for firearm licence renewal has, since its implementation in 1994, offered opportunity for refresher training which has been exercised by the authorities.

The location of most of the unintentional shootings, in the loosely defined “field”, reflects the outdoor nature of most activities involving firearms. The skills implied by hunting, including the disciplines of bushcraft, fieldcraft, and safe firearm handling, an amalgam of skills, from the basic ones of moving quietly and slowly, or even waiting for periods of time, yet remaining aware of back country hazards such as uneven ground, rapid changes of wind and

weather, and of course the opportunities which being in the back country provides. These are all part of the outdoor experience, but it must be asked if people less experienced in firearm handling might not be overwhelmed by meeting the demands of safe firearm handling as well as those required for safe practice in the hunting field.

Conclusions

The declining trend of unintentional shootings reflects many factors –enhanced exposure to firearm safety basics, greater social awareness of basic first aid skills, and more attentive reporting of incidents. Prospects of treatment within the ‘golden two hours’ of an incident, thanks to the advent of more reliable communication and rapid aerial transport facilities, have combined to reduce the death rate and to promote fuller recovery from such events. Yet many of the incidents examined in the compilation of this report reflect carelessness, when one or more basic rules are overlooked, forgotten, or are ignored.

The long term trend in unintentional shootings is downward. The continued location for most remains in the field, where rapid help is more difficult to obtain than elsewhere. It might be concluded that deficiencies in the practical aspects of firearm use are factors in these incidents. The seasonal nature of incidents to some extent confirms the fact that people less familiar with firearms than they should be, fall foul of the need for constant care and attention when using them recreationally. Even professionals get caught out, when finding casualties from HM defence forces and the Police, feature in the incidents.

The seven basic rules of the firearm safety code, remain of cardinal importance. The number of incidents when game bird, waterfowl and deer mating seasons occupy the months of March, April and May, are reflected in a peaking in the incidents with firearms used for hunting these species.

The youth of the shooter, once thought to be a major factor in unintentional incidents with firearms, may no longer be so. The prospect of older, more experienced shooters, whose vision may be impaired, whose reflexes may be slower, and whose ability to be operating with perceptual biases leading to mis-identification of targets, cannot be ignored (Wilson and Bridges, 2015).

It behoves all firearm users to take care when handling, and using firearms. The outdoors provides many elements which conspire to divert attention from the needs of safe firearm handling, and the records consulted show that many allowed environmental conditions to overcome any sensible firearm handling measures.

[2876 words]

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