

Small Arms and Global Health



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Injuries and Violence Prevention Department
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Copies of this document are available from:

Department of Injuries and Violence Prevention
Non-communicable Diseases and Mental Health Cluster
World Health Organization
20 Avenue Appia
1211 Geneva 27
Switzerland

Email: vip@who.int

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It's not like TV

... Regardless of what happens to our heroes on TV, gunshots are rarely neat, clean, predictable and restricted to "flesh wounds". When a bullet enters the body, it's a spinning missile. The amount of damage and relative size of the entrance and exit wounds depends on many factors: the calibre of the bullet, the distance from the victim when fired, and the organs, bone, blood vessels and other structures hit.

Striking bones causes the bullet to become misshapen, flattening out. The bone shatters, creating splinters that themselves can become lethal weapons, and altering the path of the bullet in an unpredictable manner. Sometimes the final resting place of the bullet in the body or the place where it exits is very unexpected. As a general rule, exit wounds are larger than entrance wounds – sometimes inches larger, if the bullet's shape has become distorted by the structures hit....

Suzanne Bickerstaffe, Registered Nurse¹

¹ <http://www.astolat.demon.co.uk/medical/injuries.htm>

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Introduction

The term “small arms and light weapons” is often taken to mean all types of firearms, from handguns to shot guns and assault rifles. More specifically, however, the term refers to “any weapon that can be carried or transported and managed by a single person” and as such also includes hand grenades, land mines and even small surface to air missile launchers.

In the past few years, firearms-related death and injury have been called everything from a “scourge” (1) to an “epidemic” (2), a “disease” (3) and a “preventable global health problem” (4). The biological analogies are not accidental or far-fetched. Among people aged 15–44 years, interpersonal violence and suicide rank third and fourth, respectively among the world’s leading causes of ill-health and premature mortality, while war-related injuries rank sixth (5). A large proportion of these occur through the use of firearms.

A public health response

Violence is not simply a social ill or a social justice problem. It is an important health problem — and one that is largely preventable. Public health approaches have much to contribute to solving it.

Although the public health implications of violence have been known — if not fully understood or measured — for many years, they only received global recognition in 1996, when the Forty-ninth World Health Assembly adopted Resolution 49.25 (6). The Resolution declared violence a global public health problem, emphasizing in particular:

- the serious immediate and future long-term implications for health and psychological and social development that violence represents for individuals, families, communities and countries;
- the growing consequences of violence for health care services everywhere and its detrimental effect on scarce health care resources for countries and communities.

This background, together with the considerable body of research that confirms the burden of death and injury related to firearms, explains why the World Health Organization (WHO), as the directing and coordinating authority on international health is concerned about the illicit trade in small arms².

In this paper, WHO has two aims: firstly, to broaden the definition of the problem beyond the realm of legal, industrial, strategic or tactical considerations by demonstrating its public health importance; and secondly, to introduce to this discussion the public health community’s longstanding emphasis on scientific methodologies and prevention. In doing so, it brings into the arena a large body of scientific work which has been carried out over the past few decades on small arms and violence by a variety of public health institutions, nongovernmental organizations (NGOs) and individual researchers operating at local, national and international levels.

² The objective of WHO is “the attainment by all peoples of the highest possible level of health”. WHO defines health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (7).

1. Death and injury: the numbers

Global data on the impact of small arms on the health of individuals are far from complete. What data are available, however, suggest that hundreds of thousands of people are killed each year by these weapons. Millions more survive their injuries but are left with permanent physical disabilities and mental health problems.

Often, victims of small arms injuries need expensive, time-consuming surgery, followed by weeks and even months of hospital treatment and rehabilitation. In many countries, this is a serious drain on the resources of poor people and already-impooverished health systems. The situation is even more desperate for victims in “gun-rich, resource-poor” areas, where few have ready access to adequate health services.

It is clear that the scale of small arms death and injury, and their concomitant impact on societies, is huge. Moreover, this issue is part of an even larger, and much older, public health problem — that of violence itself.

The burden of violent death

According to information extrapolated from WHO’s World Health Report database, in 1998 an estimated 2.3 million people worldwide died as a result of violence. In global terms, and once adjusted for age, this translates to an overall rate of 38.4 deaths per 100 000 people. Approximately 42% of these 2.3 million deaths were suicides, 32% were homicides, and 26% were war-related. In fact, among persons aged 15–44 years, the categories of interpersonal violence, self-inflicted injuries and war injuries all ranked in the top ten leading causes of death worldwide.

How many violent deaths are due to small arms?

Owing to the lack of reliable global data, it is not yet known how many of the estimated 2.3 million violent deaths worldwide involve small arms. Best estimates indicate that at least several hundred thousand people are killed each year as a result of gun-inflicted homicides, suicides and armed conflict. Of the latter, a large proportion of those killed are believed to be non-combatants, many of which are children and youths.

More reliable data are, however, available for 52 high- and middle-income countries that report information on firearm-related deaths to the WHO. These countries have a combined population of just over 1400 million. Using these data it has been estimated that more than 115 000 people died from firearm injuries in a one-year period in the mid-1990s (see Table 1). As none of the countries included in this survey was engaged in civil conflict, these estimates exclude deaths due to armed conflict.

How many are injured?

For every fatal injury due to small arms, there are many more that result in non-fatal injuries. Current data do not permit exact calculations of the number of people who suffer non-fatal injuries due to violence, but there is every likelihood that it runs into the millions. In the United States, for example, it has been calculated that for every person shot and killed with a firearm, three others are treated for non-fatal firearm injuries (8). In developing countries this ratio is likely to be smaller because of the lack of proper medical care; in the absence of

adequate medical care, a greater proportion of those injured will most probably die as a result of their injuries.

What types of deaths?

Using the same 52-country mortality dataset referred to above, researchers have been able to break down the total number of deaths due to firearms by both sex and manner of death. Out of the total of just over 115 000 firearm-related deaths, approximately 79 000 (or 69%) were homicides. Suicide accounted for almost 29 000 deaths, with undetermined causes and accidents accounting for the remaining 5000 and 3000 deaths, respectively (see Table 1). These overall figures mask pronounced differences between countries; in countries such as the United States and Canada, suicides accounted for the majority of deaths, whereas in countries such as Brazil, Mexico, Colombia and Albania, the majority of deaths were due to homicide.

Table 1
Firearm deaths in a one-year period in 52 countries^a, mid-1990s

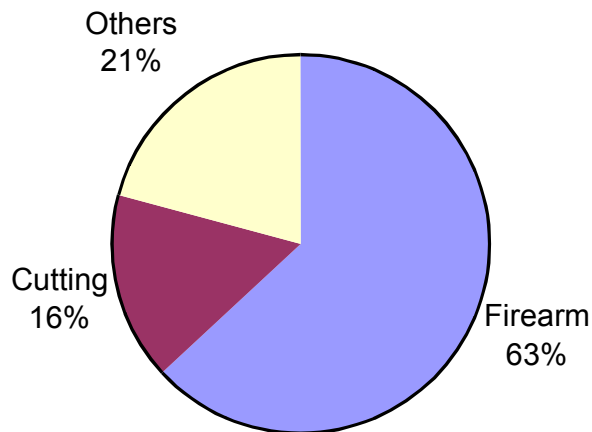
Manner of death	Males	Females	Both sexes
Homicides	72 216	7 104	79 320
Suicides	25 359	3 180	28 539
Undetermined	4 466	538	5 004
Accidental	2 452	278	2 730
Total	104 493	11 100	115 593

^a Countries which contributed data for one year in the early-to-mid 1990s (but not always the same year), were Albania, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Colombia, Croatia, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Estonia, Finland, France, Germany, Greece, Hong Kong Special Administrative Region of China, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Latvia, Lithuania, Luxembourg, Macau, the Former Yugoslav Republic of Macedonia, Malta, Mauritius, Mexico, Mongolia, the Netherlands, New Zealand, Norway, the Philippines, Portugal, the Republic of Moldova, the Republic of Korea, Romania, Singapore, Slovakia, Slovenia, Spain, Sweden, Thailand, the United States, the United Kingdom and Uruguay.

Source: WHO World Health Report database

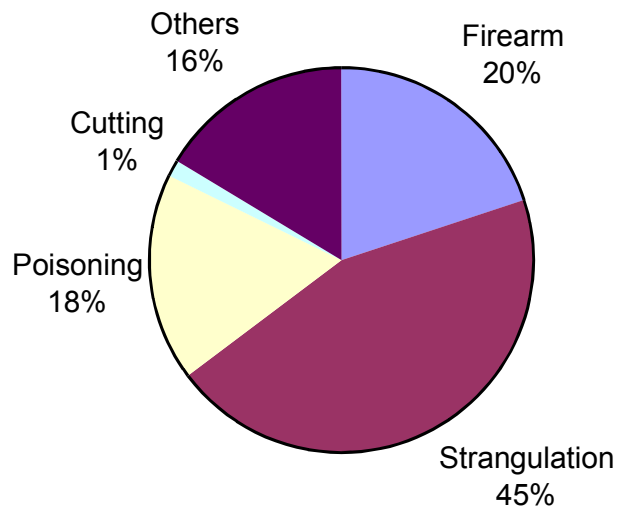
Figures 1 and 2 show the results of a further analysis of this dataset, placing firearms in the context of all methods used in homicides and suicides, respectively. Firearms were implicated in about two-thirds of all homicides, and cutting (i.e. with knives and other sharp objects) in 16%. In contrast, firearms accounted for only one-fifth of all suicides, just ahead of poisoning. According to these data, strangulation i.e. (hanging) was the most frequently used method of suicide.

Figure 1. Proportion of homicide by methods in both sexes for one year period in 52 countries, (N 125,853)



Source: WHO Mortality Database, 2000.

Figure 2. Proportion of suicides by methods in both sexes for one year period in 52 countries, (N 142,434)



Source: WHO Mortality Database, 2000.

Who dies? Who is injured?

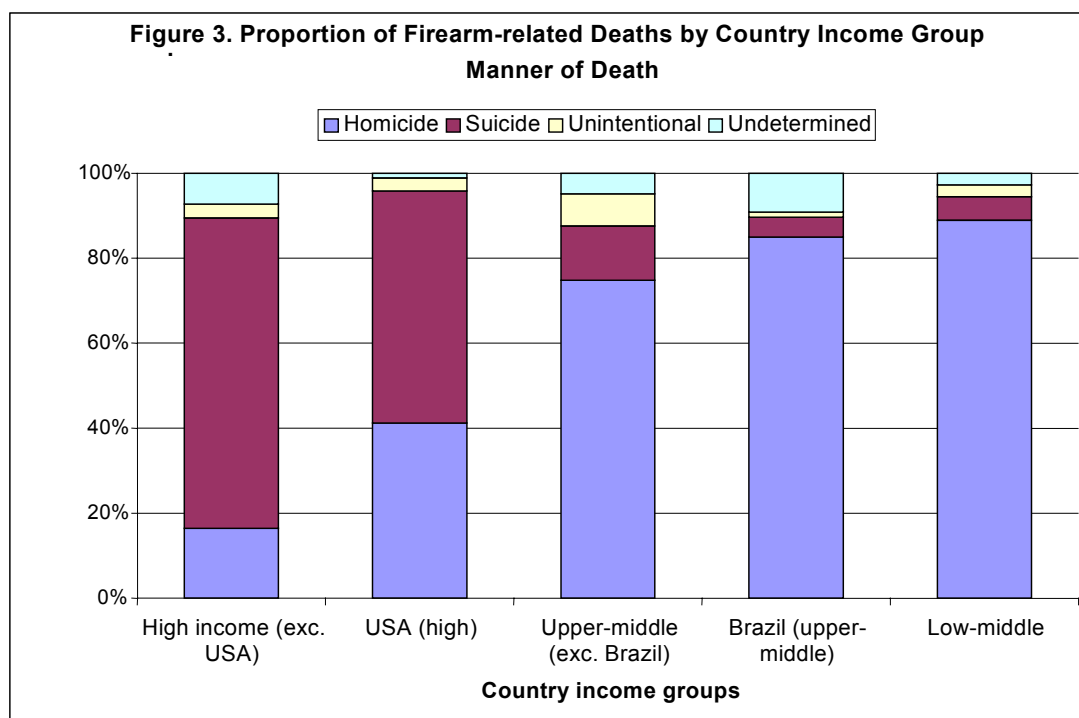
There are wide variations in firearm-related death rates between world regions and between individual countries. According to reports received by the WHO, Japan recorded a homicide rate by firearms of less than 0.1 per 100 000 persons in 1997. In the same year, a firearm homicide rate of 40 per 100 000 persons was reported in Brazil, and a rate of 50 per 100 000 persons in Colombia.

The rich and poor die differently

Rates of violent death vary according to country income levels. Generally speaking, violent death rates, and also firearm-related death rates, are higher in the lower-income nations. According to WHO's global burden of disease data for 1998, the rate of violent death in low- and middle-income countries (42.2 per 100 000 persons) is more than double that in high-income countries (17.3 per 100 000 persons).

The proportion of violent deaths that are due to homicide or suicide also appears to vary according to country income levels. In high-income countries, suicide using firearms tends to be more frequent than homicides, whereas in low-to-middle income countries, gun-related homicides are generally more frequent than suicides.

Figure 3 illustrates the relationships between the percentage of firearm-related deaths and manner of death and income level. Brazil and the United States are shown separately because the large number of events that occur in these two countries would otherwise obscure the relationship between manner of death and income in the other countries of their respective groups. These data clearly show that the proportion of homicides is much higher among the low-income countries compared with those with higher incomes.



Source: WHO Mortality Database, 2000.

Firearms deaths in cities

Although there are considerable differences in firearm-related death rates between world regions and individual countries, in most cases firearm injuries affect predominantly the urban population. This is borne out by several studies, including one from South Africa where an investigation on firearm use and distribution found that the majority of events occurred in suburban areas or city streets (9). There are, however, substantial variations in firearm use between cities, as the following examples demonstrate:

- The city of Hong Kong reported a homicide rate due to firearms of less than 0.01 per 100 000 person-years for 1997³.
- The city of Cape Town in South Africa reported a firearm homicide rate of 40.4 per 100 000 person-years for 1999 (10).
- The city of Cali, Colombia reported firearm homicide rates of 105 per 100 000 person-years for 1997 (11).

While small arms include a wide variety of weapons, certain types are more frequently involved in injuries and fatalities than others. Handguns are the predominant weapon of choice for committing homicides and suicides. Data suggest that over 60% of urban shootings are committed with handguns.

Which age groups and gender are most affected?

Like many other health problems, violence is not distributed evenly among sex or age groups.

According to WHO data, in 1998 there were approximately 736 000 homicides due to all methods of death, including firearms. Males accounted for nearly 80% of all homicide victims. The highest rates of death due to homicide amongst males and females were for those aged between 15–44 years. In a few countries, however, high rates of death due to homicide have been observed in females aged between 0–4 years; in some cases death rates in this age group equal or even exceed that of the older age groups.

With the exception of the youngest age group (i.e. 0–14 years), male homicide rates were approximately 3 to 6 times higher than female homicide rates across each of the various age groups. The high rates of male homicide in the 15–44 age group are driven largely by high rates of youth interpersonal violence among males.

Worldwide, suicide claimed the lives of nearly 1 million people in 1998. Approximately 60% of all suicides occurred among males, and over half (53%) of all suicides occurred among persons (male and female) between the ages of 15–44 years. Suicide rates, however, are generally higher among males than females. This is especially true of the older age groups; worldwide, male suicide rates among those aged 60 years or over were almost twice as high as female suicide rates in this age group.

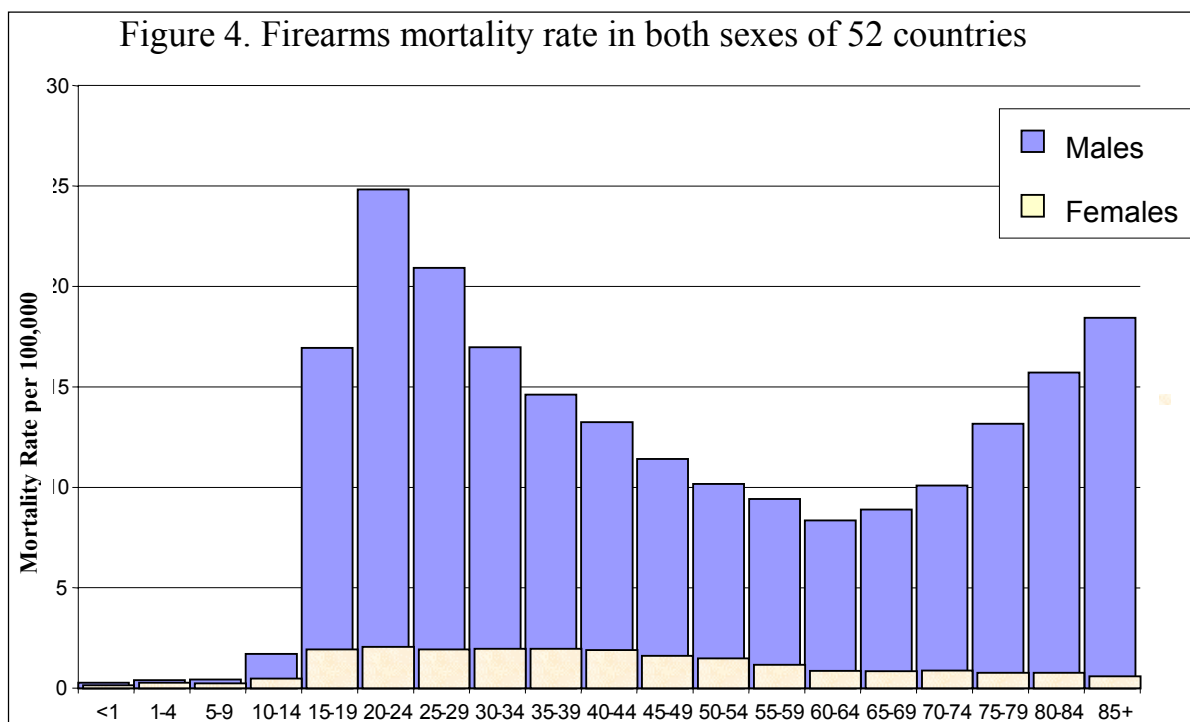
While less data are available about the role of small arms in violent deaths (homicides and suicides, in particular), it has been established that fatal and non-fatal small-arm injuries are concentrated in particular subgroups of the population. For countries for which information is available, data indicate that:

- Over 80% of small arm deaths occur in males.
- 75% of all male homicides are carried out with a firearm.
- 61% of all female homicides are carried out with a firearm.

³ WHO World Health Report database.

- 30% of all male suicides are perpetrated with a firearm.
- 13% of all female suicides are perpetrated with a firearm.

Figure 4 shows the distribution of firearm-related death rates according to age and sex in 48 countries for one year during the 1990s. The first peak largely reflects homicide among younger men, while the second reflects suicide among older men.



Source: WHO Mortality Database, 2000.

Youth and firearms: driving the epidemic

Youth violence, particularly among males, has been described as a global tragedy — and in health terms, as an epidemic within an epidemic. Adolescents and young adults are the primary victims and perpetrators of violence in almost every region of the world.

A further analysis⁴ of WHO mortality data examined changes in youth homicide rates at the regional level over the period, 1985–1995. The following trends were identified:

- **High-income Americas.** Firearm-related homicides in 10–24 year olds increased from around 65% of all youth homicides in 1985 to over 85% in 1993, and then decreased slightly to around 80% in 1995.
- **Low- to middle-income Americas.** In 20–24 year old males, homicide rates increased from just over 60 in 1987 to around 90 per 100 000 persons for the years 1991–1994. Rates in 15–19 year old males followed a similar pattern of increase. The proportion of homicides in which firearms were involved increased from just over 50% in 1985 to 64% in 1995.
- **High-income Europe.** Homicide rates for males aged 20–24 years were relatively low compared with other areas of the world, and quite stable, varying between a 1986 low of 2.0 and a 1992 high of 2.8 per 100 000 persons. Across most years, firearms accounted for less than half of all homicides.
- **Low- to middle-income Europe.** Youth homicide showed a rapid increase in rates following the late 1980s collapse of communism. This coincided with a rise in the proportion of homicides involving firearms.
- **High-income Western Pacific.** As for high-income Europe, the trends for both males and females were distinguished by consistently low rates. The proportion of firearm-related deaths was just under 15% in 1995.

This study thus showed that firearms are the most commonly used weapon for committing homicide in high violence countries and during years of increased violence.

⁴ WHO unpublished document. Countries which returned data were: **Low- to middle-income Americas:** Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guyana, Mexico, Nicaragua, Panama, Peru, Trinidad and Tobago and Venezuela. **High-income Americas:** Bahamas, Canada and the United States. **Low- to middle-income Europe:** Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Malta, Poland, the Republic of Moldova, Romania, the Russian Federation, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan and Yugoslavia. **High-income Europe:** Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Monaco, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. **High-income Western Pacific:** Australia, Japan, New Zealand, the Republic of Korea and Singapore.

2. Longer-term health consequences

Small arms injuries can have a variety of physical consequences, including long-term or even permanent disability. However, the health consequences of small arms go beyond the physical effects of an injury, particularly when it is remembered that the definition of health is "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity". The capacity for working can be destroyed, placing a major burden on families and wider social support systems. When the affected individuals are poor, the costs and tensions resulting from changed economic circumstances can lead to the disintegration of the family or the generation of more violence within it.

Long-term disability

Of the non-fatal consequences small arms, spinal cord injuries, traumatic brain injuries and amputations are usually among the most disabling, often leading to permanent disability in many individuals. Several studies have explored the consequences of traumatic brain injuries in children; others have examined the devastating impact of firearm-related injuries among youth victims.

Firearms have been reported to be one of the most common causes of brain injury in the United States (12). Similarly, in Brazil, a study conducted in seven state capitals found that over a quarter of all spinal cord injuries were caused by firearms (13), and a study in Soweto, South Africa reported a high prevalence of spinal cord injuries due to shootings (14).

Other studies have estimated the average length of a hospital stay for patients with firearm injuries. A Finnish study reported an average of 13 hospitalization days for mild to moderate firearm injuries (15), while a study based in the city of Los Angeles, USA calculated an average of 10 hospitalization days for the same type of injuries (16). According to a separate US study, 96% of patients had the costs of their care covered by the government, because they had no primary insurance coverage. This latter study further concluded that, relative to other weapons such as knives, firearms tend to be associated with greater long-term physical consequences. Primary prevention of firearm injuries, especially those caused by firearms, was thus proposed as the most effective cost-control measure (17).

Mental health

Whereas there are numerous studies that refer to suicide as a consequence of mental health problems, to date, few studies have linked the development of specific mental health consequences to small arms injuries. Nevertheless, studies focusing on the consequences of violence more generally, have suggested that mental health conditions (such as increased depression and symptoms of stress) increase in populations where violence is predominant. Family relationships and interpersonal relationships at school, at work or in the community are all affected.

Social consequences

The consequences of violence perpetrated with small arms go beyond the individual physical or psychological effects. The threat of attack or violence alters social relationships in communities, and changes social behaviours as people are forced to adapt to increased risks as part of their daily lives. This leads, in some cases, to further arming of the population. In the case of armed conflict, additional consequences may include major problems such as the displacement of entire communities, famine, disruption of immunization programmes and the development of epidemics such as cholera. Little research has been done on quantifying such linkages, but there is little doubt that such associations exist.

3. Risk factors

One of the important contributions of the public health approach to the study of violence and its impacts is the scientific analysis of risk factors. A variety of such factors have been identified as being associated with firearms-related violence, and with violence more generally.

Risk factors that influence injuries due to small arms can be separated into four general categories (18):

- factors that influence the use of small arms over other possible choices of weapon
- factors that influence interpersonal violence
- factors that influence self-directed violence (i.e. suicide)
- factors that influence collective violence.

These categories are not mutually exclusive, and in fact, most incidents of violent firearm use result from a complex mix of these factors.

Factors that influence the use of small arms

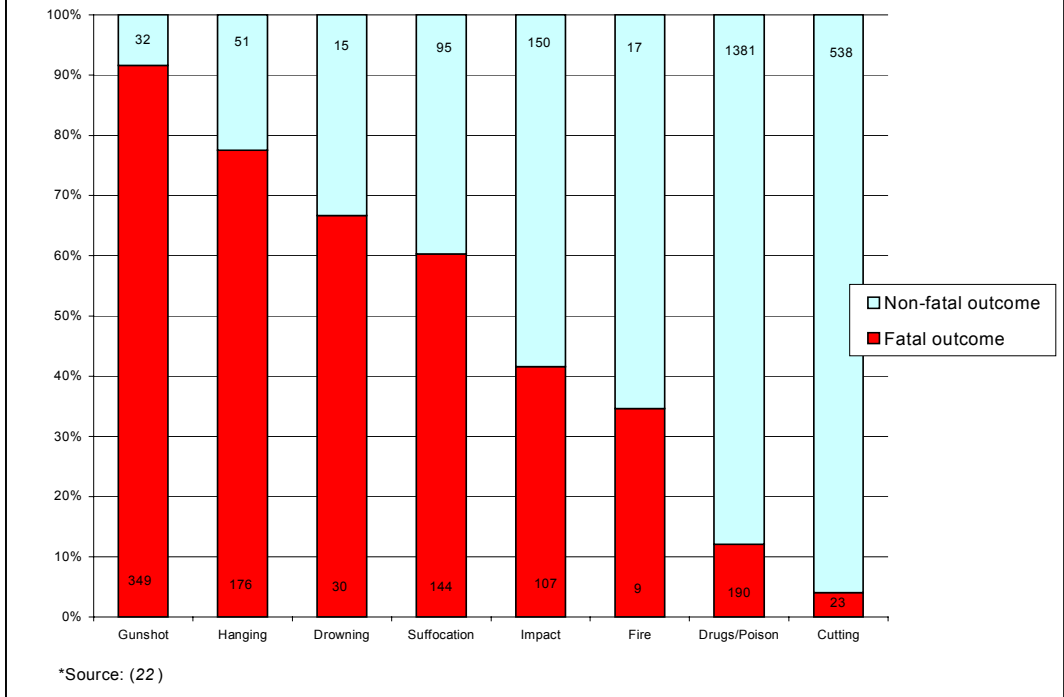
Factors that appear to influence the use of small arms include the availability of these weapons, the social norms concerning the acceptability of using them and the types of small arms that people choose to use.

Firearm availability varies greatly among nations. For example, in Japan less than 1% of households possess a firearm while surveys have shown that up to 48% of US households possess at least one firearm. The easy availability of firearms has been associated with higher firearm mortality rates. It has been shown that the presence of a gun in the home is associated with a higher risk of becoming a victim of suicide or homicide (19, 20).

If firearms are available, social norms may dictate whether or not the weapons are actually used. In other words, in some societies it may be more socially acceptable to use firearms than in others, and this factor may explain why in some societies guns are available but are used less than in others.

Relative to other weapons, firearms tend to be the more lethal (see Figure 5). Their effectiveness in achieving an outcome is thus an additional factor that might influence the choice of weapon. Given that some models of firearm are more likely to be lethal than others, the types of firearm available may also have a bearing on the health consequences. For instance, a US study showed that the proportion of patients admitted for treatment of gunshot wounds who had more than one entrance wound rose from 25% in the early 1980s to 45% by 1990. This upwards trend was accompanied by an increase in hospital mortality. A factor that may have contributed to this change in pattern is the shift away from the use of revolvers in favour of high-calibre pistols (21).

Figure 5. Outcome of Suicide Incidents by Method Used, Allegheny County Pennsylvania, USA, 1966-70*



Factors that influence interpersonal violence

Firearm mortality rates can also be influenced by the underlying social factors that contribute to interpersonal violence. No single factor explains why some individuals behave violently toward others or why violence is more prevalent in some communities and not others.

Violence can be explained as the product of factors at several levels of influence: the individual level, the level of proximal relationships, the community context and the larger societal factors. Individual level factors which increase violence include impulsivity, low educational attainment and alcohol abuse. Other factors, such as media exposure to violence, may also contribute to interpersonal violence. Factors related to relationships with peers or family members include for example, peer pressure; this is a particularly important risk factor in the case of youth interpersonal violence.

Factors related to the community context include low community cohesion and deterioration of infrastructure. Larger societal factors include income and gender inequality and social acceptance of violence. The traffic of illicit drugs is an additional factor that has been shown to drive epidemics of violence. Examples include the outbreaks of violence associated with crack cocaine that were observed in the United States between 1980 and 1990.

Factors that influence suicidal behaviour

Factors that may influence suicide rates include economic instability, unemployment, breakdown of the family group structure, intergenerational pressures and competition, secularization, and substance use and misuse. Predisposing factors can include special dates or events, emotional losses, impaired health status, economic loss, depression and low self esteem. The most important predisposing factors are mental health and depression.

Factors that influence collective violence

Armed conflict, by definition, puts human life at risk. Here again, however, it is important to understand that risk factors such as firearms availability have an influence on who dies or who is injured. For instance, experience suggests that the presence of cheap and plentiful small arms and light weapons can prolong combat, and encourage governments and extra-governmental groups to risk military “adventures” rather than peaceful resolution of differences. Similarly, cheap prices on the black market make it easier for guns to be acquired by those who intend to use them against others.

A 1998 study by the International Committee of the Red Cross (ICRC) serves to illustrate the role of arms availability as a risk factor in conflict situations (2). The study identified three ominous trends:

- A growing number of civilian deaths and injuries in modern conflicts. These can, and often do, reach 60 to 80% of total casualties, and often include a high proportion of women and children. Contributing to this trend is the involvement of untrained and undisciplined young men equipped with rapid-fire automatic weapons. Knowing nothing of the Geneva Conventions on human rights, there is an increasing tendency for these fighters to either specifically target civilians or fire indiscriminately into crowds.
- International relief operations are being suspended more frequently because the aid workers themselves have become targets of attack. This results in further pain and deprivation for people injured in, or by, the fighting.
- The proliferation of weapons seems to encourage a culture of violence, particularly among young ex-combatants who have known little else besides war. For many of them, as indicated most recently in studies from El Salvador and Guatemala, their handgun or automatic weapon is both a status symbol and their entry into a criminal way of life.

In many post-conflict situations, large numbers of people (including ex-combatants, but also many civilians) remain in possession of firearms, often automatic weapons such as assault rifles. In one study of weapons injuries after a period of conflict, the continued availability of weapons was associated with increased mortality and a level of weapon-related injuries only marginally less than that observed during conflict (23).

4. Calculating the cost

Given the wide-scale prevalence of injuries caused by small arms, the total cost of treatment is enormous. The burden of these costs falls on all parts of society, from individuals and communities to national health systems.

Health economics have long been used to estimate the direct economic impacts of various threats to health, whether it be tobacco, acquired immunodeficiency syndrome (AIDS), motor vehicle injuries or bullets. Some studies of this type have focused on tallying the economic burden for public institutions (e.g. to hospitals, clinics and policing institutions), while others have considered the indirect costs, such as the value of lost life in terms of earning power.

Costs to individuals and families

For individuals and their families, the costs associated with small arms injuries may include treatment, medication, physiotherapy and counselling. The actual financial outlay and the social consequences for the family depend on the status of their country's health systems, and on the economic resources of the individual or family. Additionally, there are the costs associated with lost time from work to consider for both the victim and for the victim's family.

Costs to health systems

Some of the most comprehensive work on estimating the direct financial costs of firearm-related injuries to health systems has been done in the United States and Canada. In Canada, the costs of firearm mortality and morbidity have been estimated to exceed the equivalent of US\$ 4700 million per year. This aggregate figure includes an estimated US\$ 54 million in medical and police costs and an estimated US\$ 1100 million in lost work opportunities. The consequences of gunshot wounds thus costs each Canadian the equivalent of US\$ 170 per year (24).

A similar study conducted in the United States has suggested that in 1992 the provision of medical care for premature disability and death, firearms injuries, and fatalities cost the health system approximately US\$ 126 000 million (25). A follow-up study suggested that these costs were closer to US\$ 100 000 million per year in the late 1990s (26). This latter study reported a mean medical cost per injury of about US\$ 17 000. It was also estimated that over 80% of the economic costs of treatment and care were borne by US taxpayers.

Although less research is available from developing countries, the indications are similar. In Colombia, public spending on security and criminal justice amounted to 5% of the country's gross domestic product (GDP). In Brazil, approximately 10% of annual GDP is consumed by treating victims of violence and increased policing. In Colombia, the figure rises to 25%. In both countries over 80% of all violent events are committed with firearms (27).

Studies conducted at a more localized level have provided additional information about likely costs to health systems. A 1997 study put the cost of treating nearly 1000 patients with severe firearm injuries in one South African hospital at 3.8 million Rand (US\$ 1 million) per annum (28). Costs to hospitals and clinics in parts of Central America are reported to be similarly high (29).

Costs to the wider community

It is very difficult to calculate the costs of long-term, often permanent, psychological trauma and social marginalization caused by small arms injuries. Nonetheless, these indirect effects on community health, while not captured in the statistics, may be inferred from the diminished quality of life among individuals.

Apart from the burden to families and health care systems, the costs associated with small arms injuries affect the well-being and productivity of societies; the potential range of such secondary effects is huge. For example, dealing with the injuries resulting from armed violence has a draining effect on basic health care and diverts much needed resources from other health and social services. Armed violence may also jeopardise the quality of blood supplies; given that emergency health systems are not often in a position to perform thorough AIDS testing, tragic side effects, including increased risk of HIV infection, may result.

5. Roles for the public health sector

Violence has traditionally been seen as the domain of law enforcement or criminal justice systems. For this reason, societies have primarily responded to the problem of violence with strategies of repression or containment. The role of the health sector has generally been limited to treatment and disability prevention — or in other words to “damage control”.

Today, however, it is increasingly clear that the health sector has an important role to play in the prevention, treatment and reduction of the impact of violence, including that resulting from the use of small arms.

Providing care

The health sector’s traditional and most immediate responsibility is the provision of care and support for victims and their families. Victims often need emergency treatment techniques, orthopaedic and plastic surgery, as well as more long-term treatment for their injuries such as physical rehabilitation and social reintegration. This progress must continue.

Unfortunately, in many countries where small arms proliferation is high, health care resources are low. In some cases, the surfeit of small arms contributes indirectly to economic decline and a reduction in the resources available for health care. In others, human and material resources for hospital and surgical care or rehabilitation are lacking. A major role for the international public health community, and for wealthier nations in general, is to bolster health systems in the neediest regions.

Surveillance

Effective policy formulation and correct decision-making require information. Many different types of information and analysis activities involving small arms, their users and their victims must be undertaken if progress is to be made in reducing their impact. The importance of such activities has already been proven: recent efforts by the medical community (notably through humanitarian NGOs, research institutions and international agencies) to recast the problem as a “measurable” public health issue have greatly contributed to sensitising international public opinion and bringing about practical changes to legislation and government practices. This type of work has also revealed regional, ethnic and gender differences in the incidence, prevalence and magnitude of small arms injuries which have helped to establish risk factors and design more effective preventive measures.

Surveillance: data collection at point of treatment

Most firearm injuries are of such severity that the victim must seek emergency medical care. It is at this point of treatment that the “who, what, when, where and how” of the incident can be recorded, and — through sustained registration over time — the area-specific profile of injuries due to small arms can be established. This process is known as epidemiological surveillance, and it is the front line of the public health response to small arms injuries.

This is also an area where the benefits of data collection through the health services can be seen most vividly. Although statistics collected by police forces and law enforcement agencies are valuable for describing and analysing violence in societies, they do not always capture the complete picture. Recent studies have shown that a significant number of violent

incidents that receive a medical response are not reported to the police. In the USA, for example, 46% of victims who sought emergency treatment did not make a report to the police (30). In South Africa, a household survey showed that between 50 and 80% of victims of violence received medical treatment without reporting the incident to the police (31). In the UK, around one half to three quarters of the victims of violence treated in hospital emergency rooms did not report to the police (32). On the other hand, however, police activities can help to identify the source of the weapon involved in an event, while mortuaries or Medical Examiner's Offices can provide valuable assistance in tracing bullets to specific weapons.

Clearly, the data collection activities of both the public health and law enforcement systems complement each other. Furthermore, as the above examples illustrate, there is much to be gained from using multisectoral approaches to tackle the overall problem of violence.

Risk factor analysis

As described earlier in this paper (see Chapter 4), a variety of behavioural and environmental factors affect different populations' risk of falling victim to firearms. Even in times of war, when an entire population might reasonably be assumed to be at equal risk of being hurt by a hand grenade, land mine or machine gun bullet, some sectors of the population and certain groups of individuals will be more likely to sustain injuries due to a particular type of small arm than others. The science of identifying the factors driving such differences is known as risk factor research. A risk factor approach is useful for targeting preventive actions for specific population groups, thereby optimizing frequently limited resources.

Evaluation

The public health sector's capacity to scientifically evaluate available information provides a more systematic and better informed standpoint from which to improve policy and prevention programming regarding small arms prevention and control. This is especially important given the emotionally and ideologically charged debates about issues such as gun ownership and curbing the arms trade.

Policy and programme design

Another role of the health sector is to participate in the design, implementation and evaluation of interventions to prevent interpersonal, self-inflicted and gun violence in general. (Prevention is discussed at greater length in the next chapter.) Equally important is the participation in health promotion activities, in school health and in general advocacy.

Advocacy

Political commitment at global, national and local levels is necessary if effective responses are to be developed. At each of these levels, decision-makers must understand that it is possible to reduce the risk of violence, to increase societies' responsiveness to it, and to minimize its costs and impacts.

In the same way as it does for physically communicable diseases such as HIV/AIDS, tuberculosis or malaria, the health sector is in a strong position to focus increased attention on this "socially communicable" health issue. It should provide decision-makers with information on the human and financial costs of firearms-related injuries and demonstrate that, in certain countries and age groups, small arms are a leading cause of death. This

information can then be linked to demands for more effective measures to counteract the public health danger.

In many places, the poor are at greatest risk. This may be one of the reasons for the limited response to violence as a public health and public policy issue in the past. This neglect requires redress through vigorous advocacy at many levels.

6. Prevention: public health *par excellence*

The public health approach is characterized by its emphasis on prevention. Rather than simply accepting or reacting to violence, it proceeds from the strong conviction that violent behaviour and its consequences can be prevented.

The wide variation in firearm death rates between nations and within nations over time suggests that violence is the product of complex, yet modifiable social and environmental factors. Public health both challenges and seeks to empower people, communities and nation states to see violence as a problem that can be understood and solved (33).

Prevention strategies for specific groups

In dealing with certain types of violence, particularly among youths who are known to be high-risk for both violent perpetration and victimisation in almost every part of the world, prevention strategies must clearly specify the developmental stage of their target group. Prevention approaches for this age group can be carried out at an early stage (i.e. in child development programmes before adolescence), at the age when they are making the transition to adulthood, and also through programmes directed at young adults, such as those aimed at mitigating the negative effects of low employment opportunities for those living in poor neighbourhoods.

Multiple component prevention programmes

Prevention can also be achieved at a wider, community level. At this level municipal government can play a significant role in organising a comprehensive response to the problems of crime and violence.

The DESEPAZ programme in Cali, Colombia provides a useful model of what can be achieved (34). As an initial step, the Municipal Security Council gathered government officials on a weekly basis to study the epidemiology of violence in selected neighbourhoods of the city and to develop plans of action. Appropriate actions in the areas of epidemiological analysis, social communication, institutional strengthening of the legal sector, community mobilization and infrastructure development were then taken based on the information provided by the surveillance system and the community-based consultation process. These included restrictions on the sale of alcohol and the banning of permits to carry hand guns on weekends and other special occasions. It was subsequently noted that public opinion moved from a passive attitude towards violence to an active demand for more prevention and that the homicide rate declined from 124 per 100 000 persons in 1994 to 86 per 100 000 persons in 1997, a 30% reduction in a period of three years.

Tackling the underlying social causes

Another level at which prevention must be undertaken is at the level of entire societies — ideally, in view of the increasing influence of globalisation — through regional and international action. Important interventions should be multisectoral and include:

- Controlling and limiting the international arms trade. Efforts to do so through the United Nations should be supported. Within countries, efforts to reduce the promotion and use and availability of firearms should be encouraged, with increased industry regulation to prevent criminals accessing weapons and to protect children from the ill-effects of firearms availability.
- Developing more effective means of tackling the global drugs trade.
- Reducing poverty and, in particular, inequalities within societies. The increasing gaps between the haves and have-nots within countries, in part a reflection of pressures consequent upon globalization, need to be addressed and calls for a more humane globalization should be supported.
- Controlling the glorification and commodification of violence, especially through the media.
- Promoting a culture of tolerance and dealing with conflict on a non-violent basis.
- Promoting gender equity.
- Human rights education.
- Programmes to improve systems of governance.

Documenting effective practices

Documenting “best practice” can be undertaken at international, national and local levels. In all societies and at all levels, some responses to violence have been developed and implemented. These may be at individual, family or system level. Identifying these responses and identifying those that have made a positive impact, is valuable for all others seeking to determine how best to respond.

Bringing together available experience is an extremely valuable part of advocacy, for it assures decision-makers that not only *can* something be done, but something *is* being done — even if there is still much more that *could* be done.

7. Some current projects

A variety of gaps in data collection and research must be filled in order to support and improve prevention programming. The following are some projects that are currently underway, which WHO hopes will contribute to the understanding, and therefore the prevention, of future small arms injuries.

Multinational study of small arms and health

In view of the growing threat to public health posed by small arms and the lack of reliable data on this topic, the WHO has initiated planning for a multinational study. This study will assess the impact of small arms on health, providing data that will inform policy-making. Planning and fund-raising are being carried out in 2001, and the study will be conducted from 2002 to 2005.

Project activities will include compiling and analysing available data on small arms/light weapons injuries and death, and carrying out surveys in at least 10 countries for which data are currently unavailable. Among other products, this will provide:

- Data describing the impact of small arms/light weapons on health worldwide by region, country and level of income.
- Reports describing the global, regional and national burden of injuries, including the types of injuries, the circumstances and demographic characteristics of their occurrence, and their social and economic impact on society.
- National and regional seminars using the accumulated research as a basis for planning interventions.
- Improved research capacity of local collaborators and researchers in the low-income countries surveyed.

Partners will include a variety of government departments, academic institutions and NGOs.

Improving surveillance

Among all of the sources of data related to violence, mortality data are the most widely collected and available. Most countries maintain birth and death registries and keep basic counts of homicides and suicides, but many do not collate or analyse these data in ways that are suitable for international comparisons. This is especially true in areas where populations are in flux (e.g. in areas experiencing conflict or continuous movements among population groups) or where populations are more difficult to count (e.g. in densely populated or very remote areas).

The more serious lack of data, however, is that dealing with non-fatal injuries. Some efforts aimed at improving the situation have been initiated in several countries, including the United States where the States of Massachusetts and Washington have created firearm surveillance systems. Efforts to develop similar systems for collecting such data in other countries are currently underway. In late 2001, for example, WHO will publish its *Injury Surveillance Guidelines for Less-Resourced Environments*, a manual for the collection of relevant data by public health authorities and other institutions, particularly in areas where

resources are limited. WHO will work with countries in the implementation of these guidelines.

Pre-hospital care

Access to care, particularly emergency care, has a great influence on the outcome of firearm injuries. In the United States, for example, about 30% of all firearm injuries result in death. Since the United States is well served with emergency health services (characterized both by rapid attendance and excellent medical care once a victim is taken in hand), it is reasonable to assume that in less wealthy parts of the world, the percentage of firearm injuries resulting in death is considerably higher. Although 50–80% of trauma deaths occur before arrival at hospital in both developed and developing countries, rapid and effective trauma care can substantially reduce death and disability following injury (35). A comparative study of three hospitals in Ghana, Mexico and the USA found that the proportion of trauma deaths before arrival at hospital were 81%, 72% and 59%, respectively (36).

Currently WHO is conducting training activities on pre-hospital care responses in Maputo, Mozambique. Ongoing training of trainers will be expanded to other regions.

A major advocacy tool

In an effort to raise awareness worldwide about the public health aspects of violence, and to aid decision-makers and researchers to tackle the problem, WHO will publish the first *World Report on Violence and Health* in 2002. Nearly one hundred authors and peer reviewers from around the world have contributed to the first draft of this report.

The report will cover topics such as child maltreatment, youth violence, violence against women by intimate partners, sexual violence, elderly abuse, self-directed violence and collective violence. In addition to topic-specific chapters, the report will include a statistical annex listing country and regional data derived from the WHO Mortality and Morbidity database and an annex containing a listing of websites, violence prevention agencies and other useful sources of information. The report has received financial support from the governments of Belgium, Finland and Japan, the Rockefeller Foundation, and the US Centers for Disease Control and Prevention.

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For further information, please contact:

Department of Injuries and Violence Prevention

Noncommunicable Diseases and Mental Health

World Health Organization

20 Avenue Appia

1211 Geneva 27, Switzerland

Fax: (41 22) 791-4332

e-mail: pvi@who.int

www.who.int/violence_injury_prevention/