

Firearm Injuries: Epidemic Then, Endemic Now

There has been a transition in US firearm injuries from an epidemic phase (mid-1980s to early 1990s) to an endemic one (since the mid-1990s). Endemic US firearm injuries merit public health attention because they exact an ongoing toll, may give rise to new epidemic outbreaks, and can foster firearm injuries in other parts of the world.

The endemic period is a good time for the development of ongoing prevention approaches, including assessment and monitoring of local risk factors over time and application of proven measures to reduce these risk factors, development of means to address changing circumstances, and ongoing professional and public education designed to weave firearm injury prevention into the fabric of public health work and everyday life. (*Am J Public Health*. 2007;97:626–629. doi:10.2105/AJPH.2005.085340)

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IN THE UNITED STATES,

firearm injuries are off the front pages, just a few years after they were identified as one of the leading problems facing the nation.¹ Within the firearm injury prevention community, discussions about why have focused on the early-21st-century US political landscape. The factors discussed have included a shift in the focus of violence prevention to terrorism since September 11, 2001, and opposition by the Republican presidential administration to firearm regulation. Although these factors are surely relevant, it is necessary to consider whether the epidemiology of firearm injuries may have changed in ways that have promoted the shift in public attention.

I propose that there has been such a transition: firearm injury data in the United States has indicated a change from an epidemic phase (from the mid-1980s to the early 1990s) to an endemic one (since the mid- to late 1990s). My aim is not to prove a hypothesis but to begin a discussion about whether such a transition has occurred and its potential significance for efforts to prevent firearm injuries. To that end, I (1) present evidence suggesting that firearm injuries in the United States have passed from an epidemic to an endemic and (2) review what is known about links between endemic and epidemic conditions—including models of endemic disease management—and consider how this information might be applied to firearm injuries. I conclude with a call to open a wide-ranging conversation about endemic conditions.

For the purposes of this discussion, *endemic* conditions are ones that are always present in an area, and *epidemic* conditions are ones that are rising and are well above historic levels. Both condition counts and rates are relevant (the former perhaps more for public awareness, the latter for public health reckoning).

HOW US FIREARM INJURY PATTERNS HAVE CHANGED

There has been substantial stability in US firearm deaths since 1999 (range=27 700–29 200 annually; rate=9.8–10.2 per 100 000 population).² As seen in Figure 1, which shows firearm death counts from 1910 to 2002, this stability is in sharp contrast to the rising tolls that were seen in epidemic periods (i.e., the 1920s–1930s, 1960s–1970s, and 1980s–1990s). The peak year of the most recent firearm injury epidemic was 1993, with a record 39 595 gun deaths (15.4 per 100 000). There was then a more than 25% decline in deaths to 28 663 in 2000 (with a 34% fall in rates to 10.2 per 100 000). Whereas gun deaths increased after 2000, reaching 30 242 (10.5 per 100 000) in 2002, the average 1% rise in rates from 1999 to 2002 was less than half the average 2.2% rise from 1987 to 1993; the largest single yearly rise was almost 7%, from 1989 to 1990. The death toll in 2003 was 30 136 (10.3 per 100 000).³

Data on nonfatal firearm injuries are much less available than are data on fatalities.

Figure 2 shows the available data for the period 2000 to 2004. After 2000, the annual number of medically attended injuries was 58 000–64 000 (20.4–21.9 per 100 000).² This pattern is consistent with the recent pattern for deaths.

These flat trends mean that the current level of US firearm injuries has become routine to the general population, most of whom are not victims of gun violence. In this context, reduced public attention to firearm injuries is not difficult to understand.

In the 1990s, when US public health efforts to prevent firearm injuries began in earnest, the situation was different: US gun deaths and injuries had been rising for close to a decade,⁴ and young people were dying at unprecedented rates.⁵ Although this was especially true in inner cities, suburban areas were also beginning to feel the lap of the rising tide of injuries.

Prevention strategies were dictated by the understanding that public health and government officials were dealing with an emergency. The factors guiding prevention work were therefore those that were most salient under epidemic conditions: meeting the immediate burden on the health system related to recent and looming deaths and injuries, dealing with the near-term social consequences of this burden (e.g., fear, grief, anger, short-term lost income), and creating opportunities for immediate benefits (even ones that might not be long lasting).

With these priorities in mind, the largest coalition of medical

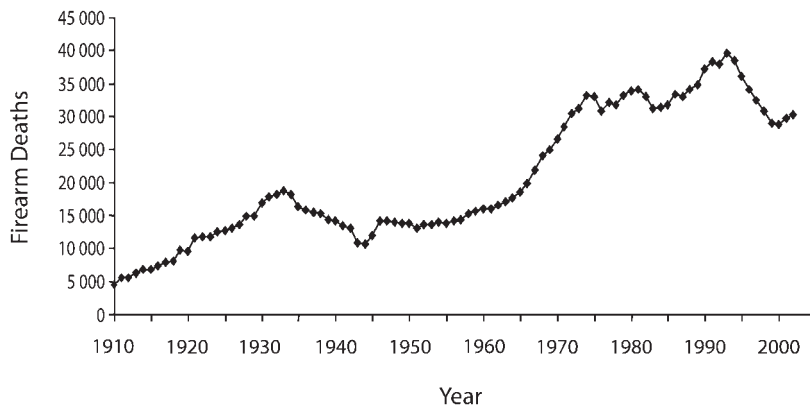


FIGURE 1—Firearm deaths in the United States from 1910 to 2002.

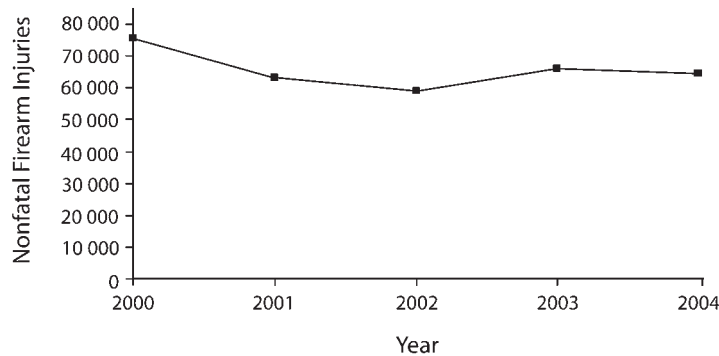


FIGURE 2—Nonfatal firearm injuries in the United States from 2000 to 2004.

and allied groups working to prevent gun deaths and injuries, the HELP Network (1993–2006), originally named the Handgun Epidemic Lowering Plan, was formed. Prevention work focused on death counts, public and clinical education aimed at immediate change,^{6–13} experiments with removing guns quickly from communities through buy-back programs,^{14,15} and policy initiatives designed to bring quick and measurable changes (e.g., reducing rogue gun dealing by stiffening requirements for gun dealer licenses and taking tougher criminal justice approaches to areas with outbreaks of gun crime^{16–18}). These efforts presumably contributed to falling

rates of gun ownership,¹⁹ more focus on safe gun storage,^{20–24} and the development of improved approaches to collecting data on gun deaths.^{25–28}

If it is true that firearm injuries have entered an endemic phase, prevention work may need to adapt to this altered situation. Experience with endemic health problems of other types may offer useful information about the differences between endemic and epidemic contexts.

ENDEMIC VERSUS EPIDEMIC CONDITIONS

Public health work is characterized by adaptation to ever-changing conditions—for example,

the changing antibiotic resistance of pathogens, lifestyle changes that alter disease and injury patterns, and natural and man-made disasters. How public health work adapts depends, in part, on whether the target condition is in an epidemic or endemic phase. The following are 3 salient dangers associated with endemic conditions.

First, a disease may be imported from an endemic area into an area where the disease is unknown, resulting in an epidemic. This is illustrated by the iconic introduction of smallpox into native populations in North America.

Second, endemic diseases always pose a risk of “epidemic flare”—that is, a sudden epidemic

outbreak of the disease. Such concerns were evident after the 2004 tsunami and 2005 hurricane disasters. The immediate concern of disaster relief organizations is always rescue, followed by the establishment of vital services (food, water, and shelter). Quickly thereafter comes suppression of endemic disease to prevent epidemic outbreaks.

Third, endemic conditions exact an ongoing toll. Over years, total deaths in a region from endemic disease may well exceed those seen during an epidemic outbreak.²⁹ The public health community therefore focuses resources on endemic diseases through immunization and other health promotion efforts intended to maintain low rates and to lower rates over time. Examples of noninfectious endemic conditions addressed in this way in the United States include adolescent pregnancy and injury from motor vehicles.

There is an extensive body of public health literature on the burdens associated with and management of epidemic and endemic conditions, and on the relationships between the two.^{30–41} The best-developed approaches for handling endemic and epidemic phases in an integrated way relate to influenza.

The US Department of Health and Human Services has an extensive program of influenza surveillance,⁴² as does the Communicable Disease Surveillance and Response program of the World Health Organization (WHO).⁴³ These programs include designated preparedness phases and phase levels, which are based on objectively defined conditions and warrant specified actions. WHO’s plan recommends that national pandemic planning committees generate and implement

control strategies, strengthen surveillance systems, engage scientific and medical experts, ensure the availability of needed supplies, address legal issues that may arise, and ensure effective communications with health professionals and the general public. The planning explicitly takes into account resource allocation based on pressing health needs and long-term, potentially disastrous health problems (e.g., for pandemic flu).⁴⁴

FIREARM INJURIES AS AN ENDEMIC CONDITION

All 3 of the major risks associated with endemic conditions apply to firearm injuries.

- *Endemic conditions are mobile.* As the world's leading gun producer and exporter, the United States needs to consider its role in preventing the adverse health consequences of gun injury from spreading. The spread of gun deaths and injuries to countries that have low rates of both—such as England (0.3 deaths per 100 000 population in 1999) and Japan (0.1 deaths per 100 000 population in 1995)—should be prevented.⁴⁵
- *Endemic conditions can flare up as epidemics.* We have learned much over the past 20 years about the factors that promote gun injury. These include easy access to guns (especially handguns),^{46,47} the introduction of new weapon models,⁴⁸ gang and drug turf wars,^{49,50} domestic violence without escape options,^{51,52} and depression in adolescents⁵³ and elderly men.^{54,55} It is likely that if several of these factors again surge, rates of gun injury will again rise. In addition, there are probably “unknown”

factors that could drive a rise in gun injuries (such as the introduction of semiautomatic pistols, which was a wild card in the last epidemic outbreak). Development of a repertoire to monitor and respond to known risk factors is all the more important given the likelihood of such an unknown factor.

- *Endemic conditions cause much suffering.* Gun deaths and injuries continue to afflict families and communities in the United States, where there were 147 488 shooting deaths from 1999 to 2003. The burden is particularly heavy for families that suffer from depression, communities wracked by drugs and gangs, and states and rural areas with high gun ownership rates.^{56,57}

To further reduce ongoing firearm deaths and prevent or mitigate the next epidemic outbreak, an approach similar to that used for influenza might be considered. The approach would entail assessment and monitoring of local risk factors over time and the application of proven measures to reduce these factors. The approach would include the development of new means to address changing circumstances and ongoing professional and public education designed to weave firearm injury prevention into the fabric of public health work and everyday lives.

During the current endemic period, a challenging agenda could be undertaken without the visibility and sense of urgency present in an epidemic context. Such an agenda could include the creation of structures to establish firearm injury management phases predetermined and tied to local risk factors and conditions (such as gang violence;

many isolated, elderly farmers; and high adolescent drug use), changing incidence rates (fluctuations in shootings per time interval or per population group), and similar activities to foster the creation of prevention planning committees (national, regional, and local). During the peak of the last epidemic outbreak of firearm injuries, those structures and procedures were needed but were not available. The evolving National Violent Death Reporting System⁵⁸ can facilitate the needed work by providing data at state levels.

Over the next few years, efforts to prevent US firearm injuries might include the following initiatives.

- Health departments could strengthen their monitoring of deaths and nonfatal injuries to guide prevention planning and ensure that an outbreak is recognized.
- Health departments could begin to monitor risk factors that are likely to contribute to future epidemic outbreaks of firearm injuries and to develop response repertoires for those factors to prevent outbreaks from occurring.
- Public health and medicine could begin to institutionalize firearm injury prevention methods, including initiating processes to act on changes in injury patterns and educating health professionals on how to include gun injury prevention in routine history-taking and health-promotion counseling. This would be a change from epidemic-born prioritization of assessing and reducing immediate danger.
- US injury prevention professionals could become more involved in international public health work aimed at reducing

violence from small arms. This work is led by the International Action Network on Small Arms⁵⁹ and International Physicians for Prevention of Nuclear War (through its Aiming for Prevention campaign, which addresses small arms by fostering public education, medical education, and health-sector advocacy).⁶⁰ This move would be a change from the exclusively domestic focus on US public health work related to firearm injuries.

APPLICATIONS BEYOND FIREARM INJURIES

The notion of addressing public health problems in both epidemic and endemic phases is applicable to many conditions, both infectious (e.g., HIV infection⁶¹) and noninfectious (e.g., motor vehicle injuries, obesity). Lessons from influenza control can be applied broadly. Although they would not translate directly to noninfectious conditions, it would not be hard to adapt them to firearm injuries. ■

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