RESEARCH LETTER

FIREARM VIOLENCE


The response to firearm injuries and gun violence in the United States is constrained by a lack of scientific knowledge. According to a 2013 report from the Institute of Medicine, “the scarcity of research on firearm-related violence limits policymakers’ ability to propose evidence-based policies that reduce injuries and deaths and maximize safety.” In the 1980s, the Centers for Disease Control and Prevention initiated research on firearm injuries, but, in 1996, Congress forbid the agency from spending funds to “advocate or promote gun control.” Its spending on firearm injury research fell 96% by 2012, and the agency retreated from the subject.

To assess trends in scientific research on the association between guns, crimes, and violence, this study examined changes over time in the number of published articles and the number of researchers writing them. As publications are a major means for the dissemination of scientific knowledge, their volume can serve as a measure of scientific attention.

Methods | This study examined trends in gun violence research published between 1960 and 2014 and indexed in the SciVerse SCOPUS database (Elsevier), a large abstract and citation database.

Articles were identified that contained in their title, abstract, or keywords both a firearm-related term (gun, handgun, firearm, rifle, shotgun) and a term related to violence, crime, or safety (violence, murder, homicide, assault, crime, criminal, felon, death, suicide, lethal, risk, safe, defense, shooting, ownership).

To exclude articles that did not address the association between firearms and violence, crime, or safety in the United States, 2 research assistants reviewed each abstract independently. The author reconciled disagreements. Only abstracts were reviewed, not full publications.

The analysis controlled for the number of articles indexed in SCOPUS annually, which increased by about 5.5% annually from 135,431 in 1960 to 2,521,448 in 2014.

Within the included publications, individuals who were the first author of 5 or more articles were identified.

Institutional review board approval was not sought as no human participants were involved in this study.

Results | Of 10347 citations identified through the word search, 1706 were excluded owing to absence of an abstract. Of the remaining 8641 articles, research assistants agreed on including 952 articles, excluded 5880 articles because their content was not relevant, and disagreed or raised questions about 1809 articles, which were examined by the author. Of these, 554 were excluded, leaving 2207 articles.

Figure 1. Annual Publications About Gun Violence, 1960 to 2014

Controlling for the exponential growth of scientific literature as a whole, publications about gun violence fell 64% between 1998 and 2012.
Between 1985 and 1999, the annual number of publications about gun violence increased markedly, but then plateaued through 2012 at about 90 articles annually (Figure 1). Controlling for the total number of indexed articles, publications related to gun violence increased from about 10 per million citations in the early 1980s to about 90 per million citations in 1998. Subsequently, publications declined 64% to about 32 per million citations by 2012. It is encouraging that by 2014, the annual volume had risen by 64 publications, but there are still few active career researchers.

Forty-two researchers were the first author of 5 or more identified articles (13 were the first author of 10 or more articles, and 1 was the first author of 29 articles), together accounting for 369 articles (16.7% of the total). Figure 2 shows the number of these 42 researchers who were the first author of an article published in the prior 2 to 5 years. Between 2000 and 2014, a total of 7 to 16 of these authors were the first author of an article in a given year.

Discussion | Like all bibliometric studies, this analysis is subject to the limitations of the underlying database. The SCOPUS database was selected due to its size, but no single database provides a complete account of the scientific literature. Articles without abstracts were not assessed. As new journals are added to the database, the pool of indexed articles shifts over time. In addition, neither the quality nor scientific significance of individual studies was assessed.

The findings are nevertheless consistent with historical accounts of the emergence of scientific interest in the prevention of firearm injuries in the United States and subsequent attempts to suppress that research. Although this analysis shows that thousands of studies have been published about firearm violence, the annual number of publications on the subject did not grow between 1998 and 2012. It is encouraging that the number increased in 2013 and 2014, but there are few active career researchers.

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Variability in Retail Pricing of Generic Drugs for Heart Failure

Generic medications may lessen patients’ financial burden and improve adherence.¹ Recent increases in generic drug costs² raise concerns about the effect on uninsured and underinsured patients whose options may be restricted to retail pharmacies within a limited geographic area. An estimated 7.3 million Americans with cardiovascular disease are in the uninsured group.³ Therefore, we evaluated US retail pharmacy pricing for generic guideline-directed heart failure (HF) drugs in a metropolitan area as a function of dose, supply, pharmacy type and zip code, and zip code median annual income.

Methods | Pharmacies were identified across 55 zip codes in a 2-state region using a government website.⁴ In zip codes with more than 4 pharmacies, the nonrandomized convenience sample included at least half of these stores. Pharmacies were queried by phone during a 3-week period in May 2016 regarding cost, without insurance, of digoxin (0.125 mg/d and 0.25 mg/d), lisinopril (10 mg/d and 40 mg/d), and carvedilol (6.25 mg and 25 mg twice daily) for 30- and 90-day supplies. Median annual income by zip code was determined from US Census Bureau data. Pricing between groups was compared using Kruskal-Wallis and Mann-Whitney tests; associations were assessed with Spearman ρ correlations. Cluster analysis was used to create groups based on zip code and zip code-based median annual income. The TwoStep cluster procedure (SPSS-22) was used to determine the optimal number of natural groupings based on a set of variables such that similarity of cases within a cluster and differences between clusters were maximized.

Figure. Map Showing Locations of Retail Pharmacies in the Study

Color coding corresponds to retail prices of the combination of digoxin, 0.25 mg/d; lisinopril, 40 mg/d; and carvedilol, 25 mg twice daily.