



# Correcting Misinformation on Firearms Injuries

Philip J. Cook, PhD; Susan T. Parker, MPP, MS

Accurate data on the nature of firearm injuries are essential for crafting effective policies for prevention but are currently lacking. It has been established that medical record coders often misclassify assault cases as "unintentional," with the result that publicly available statistics on nonfatal firearms injuries are heavily biased with respect to the distribution of intents. The study by Miller et al<sup>1</sup> investigates causes of misclassification, using patient case-level data from 3 level I US trauma centers. The authors found that 28% of assaults (234 of 837) were misclassified as accidents by medical record coders. Almost half (114) of these errors involved cases in which the medical record included a description of the circumstances that unmistakably indicated an assault; in the other cases, "assault" was the only reasonable supposition (eg, if the patient sustained multiple gunshot injuries).

Although it is now normal for medical records coding to include an external cause of injury, it remains true that the primary purpose of coding is for billing and that payments are not affected by the choice of external-cause code. Hence, there is no financial incentive for providers to code the external cause accurately. In the 3 trauma centers in the study by Miller et al,<sup>1</sup> the trauma registrars, using the same medical-record information as the medical-record coders, accurately coded intent of firearms injuries, with no bias against assault. It appears, then, that medical record coders could do much better.

Since 2010, more than 800 journal articles have examined firearm injuries using hospital data sources according to a Google Scholar search performed on October 25, 2022, using the following terms: *National Emergency Department Sample* or *emergency department data* or *State Emergency Department Data* or *emergency department database* or *ER data* or *trauma center* or *National Emergency Department Database* and *firearm injury*. The systematic error in intent classification is not widely known or acknowledged by researchers in this field.<sup>2</sup> The national scope of the problem is indicated by a recent analysis of data in the National Emergency Department Sample (NEDS), which is constructed by the Healthcare Cost and Utilization Project from a representative sample of 990 hospitals in 37 US states.<sup>3</sup> The NEDS firearm injury estimates for 2016 indicated that 50% of all firearm injuries nationwide were unintentional. Other more reliable estimates place that proportion at 16% or less.<sup>3</sup>

What can be done to improve the accuracy of intent coding? Solutions depend on the sources of the miscoded injury intent. Miller et al<sup>1</sup> suggest that coders need to be incentivized, which could be accomplished if their supervisors (and their organizations) believe it is important. Biased conceptions about the nature of firearm injuries may be another source of inaccurate intent coding. Miller et al document that misclassification increases the number of Black individuals with unintentional injuries by a factor of 6 compared with an increase of just 1.6 for White individuals with unintentional injuries. This result is an especially distorted picture of the mix of firearm injuries among Black individuals.

Miller et al<sup>1</sup> also suggest that it would be helpful for *International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10)* coding instructions to be changed. Currently, the suggested default in an ambiguous case is "unintentional" and it arguably should be "assault," given that the overwhelming majority of nonfatal injuries are assaults. While it has not been conclusively demonstrated that this coding instruction plays a large role in the observed classification bias, the contrast with the coding mix under the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9)*, in which the default was "undetermined" rather than "unintentional," suggests the possibility of a large effect.<sup>4</sup> In 2014, unintentional injuries constituted 38% (31 508 of 82 092) of

## + Related article

Author affiliations and article information are listed at the end of this article.

**Open Access.** This is an open access article distributed under the terms of the CC-BY License.

nonfatal firearm injuries in NEDS.<sup>5</sup> In 2016 after the *ICD-10* transition, the proportion of unintentional firearm injuries rose to 50%.<sup>3</sup> (Both calculations exclude injuries from BB guns and airsoft guns.) We believe that the case for changing the *ICD-10* default to either "assault" or, better yet, "undetermined" is strong and would redress the part of the problem that is not simply due to carelessness or poor training of medical coders.

Misinformation with respect to the mix of intents has the effect of distorting the scientific understanding of the problem of gun violence. Firearms accidents are far less numerous than suggested by NEDS data. The bulk of all shootings, nonfatal and fatal together, are assaults, which is to say the result of one person intentionally shooting another. An accurate statistical portrait thus suggests that gun violence is predominantly a crime problem.<sup>3</sup> (While the majority of all fatal shootings are suicides, the case-fatality rate is much higher in intentionally self-inflicted firearms injury than in assault. For nonfatal firearms injuries, as we have seen, most are assaults.) Priorities for gun violence prevention should be based on this reality.

---

#### ARTICLE INFORMATION

**Published:** December 13, 2022. doi:[10.1001/jamanetworkopen.2022.46434](https://doi.org/10.1001/jamanetworkopen.2022.46434)

**Open Access:** This is an open access article distributed under the terms of the [CC-BY License](https://creativecommons.org/licenses/by/4.0/). © 2022 Cook PJ et al. *JAMA Network Open*.

**Corresponding Author:** Philip J. Cook, PhD, Sanford School of Public Policy, Duke University, Box 90239, Durham, NC 27708-0245 ([pcook@duke.edu](mailto:pcook@duke.edu)).

**Author Affiliations:** Sanford School of Public Policy, Duke University, Durham, North Carolina (Cook); School of Public Health, University of Michigan, Ann Arbor (Parker).

**Conflict of Interest Disclosures:** None reported.

#### REFERENCES

1. Miller M, Azrael A, Yenduri R, et al. Assessment of the accuracy of firearm injury intent coding at 3 US hospitals. *JAMA Netw Open*. 2022;5(12):e2246429. doi:[10.1001/jamanetworkopen.2022.46429](https://doi.org/10.1001/jamanetworkopen.2022.46429)
2. Kaufman EJ, Wiebe DJ, Xiong RA, Morrison CN, Seamon MJ, Delgado MK. Epidemiologic trends in fatal and nonfatal firearm injuries in the US, 2009-2017. *JAMA Intern Med*. 2021;181(2):237-244. doi:[10.1001/jamainternmed.2020.6696](https://doi.org/10.1001/jamainternmed.2020.6696)
3. Barber C, Cook PJ, Parker ST. The emerging infrastructure of US firearms injury data. *Prev Med*. 2022;107129. Published online July 5, 2022. doi:[10.1016/j.ypmed.2022.107129](https://doi.org/10.1016/j.ypmed.2022.107129)
4. Kaufman EJ, Wiebe DJ, Delgado MK. The problem with ICD-coded firearm injuries—reply. *JAMA Intern Med*. 2021;181(8):1133-1134. doi:[10.1001/jamainternmed.2021.0385](https://doi.org/10.1001/jamainternmed.2021.0385)
5. Agency for Healthcare Research and Quality. Healthcare Cost and Utilization Project: HCUPnet. 2022. Accessed October 25, 2022. <https://hcupnet.ahrq.gov/>