

# **Analysis finds US female gun violence victims less likely to die than male victims, despite same injury severity**

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Female victims of gun violence in the US are less likely to die than their male counterparts, despite having similar injury severity, finds a seven-

year analysis of a US national injury database, published in the open access journal *Trauma Surgery & Acute Care Open*.

They are also likely to have better outcomes, with fewer complications after [hospital admission](#), the analysis shows.

The US has the highest number of firearm deaths of all developed countries, and firearms injuries and deaths have been rising year on year, point out the researchers.

And women are 21 times more likely to die from [firearm injuries](#) than their peers in any other developed nation. But it's not clear if injury patterns and outcomes differ between the sexes, or whether there are discernible differences in background factors, say the researchers.

In a bid to find out, they reviewed details entered into the US National Trauma Database for every adult victim of gun violence between 2013 and 2019.

They matched men and women by background, co-existing health conditions, injury patterns and severity, and health insurance to see if there were any differences in the rates of death and health outcomes between the sexes.

During the study period, 196,696 people were admitted to hospital for a firearms injury. Most (173,317; 88%) were men. Of the 23,379 women, 23,378 were successfully matched to a male counterpart.

In general, the women tended to be older, with an average age of 32 compared with an average age of 29 for the men. They were also more likely to be white—45% vs. 33%—to have private [health insurance](#)—26% compared with just over 20%—and less likely to be uninsured—24% compared with 33.5%

But the prevalence of co-existing [health conditions](#), such as [high blood pressure](#), diabetes, and [chronic obstructive pulmonary disease](#) (COPD) were either greater or similar to that of the men.

Direct comparison after matching showed that women were less likely to die while being treated in hospital for their injuries than were men (18.5% vs. 20.0%).

And they were also less likely to experience complications, including [deep vein thrombosis](#) (just over 1% vs. 1.5%), drug or alcohol withdrawal syndrome (0.2% vs. 0.5%), and to require assisted breathing (30.5% vs. 32.5%).

When the analysis was restricted to those with more severe firearms injuries or those below the age of 50, similar gender discrepancies in death rates and outcomes were observed. This suggests that women have "a statistically significant survival advantage after firearms-related injury compared with [men], despite exhibiting a similar overall injury burden after matching," say the researchers.

There are several plausible explanations for this, they suggest. Women's blood tends to clot more quickly, and the [female hormone estrogen](#) is thought to boost the body's immune response, while the male hormone testosterone seems to dampen it down.

But the beneficial effects of estrogen in relation to wound healing are stronger in women who haven't yet gone through menopause, indicating that the quantity of available hormone may be an important factor, note the researchers.

This is an observational study and the researchers acknowledge that it relied entirely on historical medical records, which are subject to human error.

The matching criteria may have excluded potentially relevant factors, they add, and they had no information on those who died before hospital admission or the exact cause of death in those who were admitted.

But they nevertheless conclude, "Despite the limitations, the present study highlights that females admitted to a hospital with firearms-related injury suffer less mortality and experience more favorable outcomes than males in the U.S."

**More information:** Firearms-related injury and sex: a comparative National Trauma Database (NTDB) Study, *Trauma Surgery & Acute Care Open* (2023). [DOI: 10.1136/tsaco-2023-001181](https://doi.org/10.1136/tsaco-2023-001181)

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