



# Our Limited Knowledge of Youth Suicide Risk and Firearm Access

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Every year, more than 1000 high school-age youth die by suicide using a firearm.<sup>1</sup> The statistics of youth firearm suicide are sobering. From 2010 to 2019, the rate of teenage firearm suicides increased 59%, while the rate of nonfirearm suicides increased 29%. By 2019, teenage males used a firearm 51% of the time and teenage females used a firearm 25% of the time when they die by suicide.<sup>1</sup>

Two decades of research have unequivocally shown that access to lethal means matters when it comes to suicide. Simply put, when a firearm is used in a suicide attempt, 91% of individuals attempting suicide will die; when an overdose is the mechanism, 2% die.<sup>2</sup> Furthermore, a direct association exists between state-level household firearm ownership rates and suicide rates.

Unfortunately, the capacity for targeted interventions that reduce youths' suicide risk, especially related to firearms, is severely limited, as virtually no data exist about where firearms are accessible across the US. The study by Spark et al<sup>3</sup> begins to fill in the gap. Spark et al<sup>3</sup> use data from the 2019 Health Kids Colorado Survey, an anonymous survey of nearly 60 000 students across 256 high schools. Among the key measures were perceived easy access to a handgun and varying levels of self-reported mental health distress, including sadness, suicidal ideation, suicide plans, and attempted suicide.

Spark et al<sup>3</sup> evaluated these data at the level of individual high schools, with a goal of identifying the geospatial associations of these risk factors (ie, do schools with higher easy handgun access cluster near other schools with higher easy handgun access?) as well as the associations among handgun access, suicidality, and urbanicity. Moving beyond research, Spark et al<sup>3</sup> provided a potential public health intervention through the identification of specific high schools with high rates of easy handgun access as well as high levels of suicide risk. This type of work could provide a guide for other states looking to focus resources to reduce suicide risk among high school students.

Regarding firearms, the findings by Spark et al<sup>3</sup> superficially mirror what has been shown in smaller nationwide samples: rural areas had 2-fold the rate of handgun access (36%) compared with urban areas (18%). On a deeper level, the data demonstrate areas of easy handgun access, with rates as low as 4.9% but as high as 72.7%. These data are in powerful contrast to the best estimates of Colorado household firearm prevalence, estimated by Schell et al<sup>4</sup> as 37.9% in 2016. Currently, we only have state-level estimates of firearm ownership based on complex statistical models using limited data that are not readily available and have not been updated beyond 2016. Furthermore, the findings of Spark et al<sup>3</sup> highlight the error of assuming any state-level estimate of firearm access is homogeneously accurate.

Unfortunately, the firearm access data were hampered by the specific wording of the question itself. The survey asked, "If you wanted to get a handgun, how easy would it be for you to get one?"<sup>3</sup> It leaves open what *easy* and *get one* mean to the respondents; therefore, we cannot assume this is a measure of household ownership nor storage patterns. Regardless, the perception of easy access is enough to raise a red flag when it comes to potential suicidal actions.

More troubling is the specific limitation imposed by the use of the word *handgun*. Nationwide, handguns are the most prevalent guns owned by gun owners (72% of gunowners own handguns); however, rifles (owned by 62% of gunowners) and shotguns (owned by 54% of gunowners) are close behind. This is important because access to any type of firearm is a risk for suicide. In a study of firearm suicides in Maryland, in rural counties, long guns accounted for 51.6% of all firearm suicides.<sup>5</sup> To truly understand the risks faced by youth, the question should be revised to include access to any firearms. But even these limited data speak to the enormous blind spot that exists throughout the

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US. The last time the Centers for Disease Control and Prevention surveyed the nation about access to firearms, via the Behavioral Risk Factor Surveillance System, was 2004. That year, 29 569 firearm-related deaths occurred (9.9 deaths per 100 000 population); by 2019, the number was up to 39 707 firearm-related deaths (11.83 deaths per 100 000 population).<sup>1</sup> As a nation, we must prioritize better firearm access data to assist risk surveillance to reduce harm.

The data on youth mental health, and specifically the dire implications of youths who reported attempting suicide in the previous year, should add to the recognition of the critical burden of severe mental health concerns for the youth of our nation. While Colorado's statewide rate of suicide attempts was 7.8% overall, prevalence rates were as high as 30.7%. This occurred in the year preceding the COVID-19 pandemic. Since March 2020, the disruption of adolescents' school, home, and social lives has led to the worst adolescent mental health crisis our country may have ever known. Weekly emergency department visits for suspected suicide attempts among teenaged girls increased by more than 50% in the winter of 2021.<sup>6</sup> Depressive symptoms have increased more than 4-fold.<sup>7</sup> Concomitantly, firearm purchases have increased and, combined with these worsening mental health conditions, may eventually lead to a large increase in firearm suicides.

So, what's next? How do we protect youth from dying by suicide? As the study by Spark et al<sup>3</sup> shows, our knowledge of where youth have access to firearms is extremely limited. Other studies have shown increased risk of firearm suicide and homicide in areas with high poverty concentration, but models are no substitute for real, focused geospatial data. Child firearm access prevention laws are associated with lower fatality rates among younger children but may not alter the risk among older youth.<sup>8</sup> We as health care practitioners likely both underestimate and overestimate families' willingness to discuss firearms and mental health as well as families' awareness of the risks associated with firearm access. On the one hand, most parents state it is acceptable for physicians to screen for firearm access in the home. On the other hand, pediatricians screen only a small proportion of youth for firearm access. On the one hand, families state they understand the risks associated with having a firearm in the home. On the other hand, only 21% of firearm-owning households with children lock up their unloaded firearms and store the ammunition separately.<sup>9</sup> Furthermore, even these safely stored firearms present a real risk for suicidal teenagers: in households with all guns stored locked, more than one-third of adolescents say they could access a gun in under an hour.<sup>10</sup>

Research overall has not demonstrated that access to a firearm makes an individual more suicidal. But easy access to firearms is associated with drastically increased risk of death by suicide among adolescents. Sparks et al<sup>3</sup> provided data about handgun access and suicidality among 256 high schools and their students, which leaves more than 26 000 high schools and 16 million students about whom we know nothing.

As a final thought, we need to avoid the fallacy of assuming we know when youth are at high risk of suicide. Pediatricians and parents alike need to realize that we do not always know when youth are in crisis. We need to recognize that mental health crises can happen to anyone, anytime, and that one of the best ways to reduce the risk of suicide is to eliminate the access to firearms before it is too late.

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#### ARTICLE INFORMATION

**Published:** October 8, 2021. doi:[10.1001/jamanetworkopen.2021.27965](https://doi.org/10.1001/jamanetworkopen.2021.27965)

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**Conflict of Interest Disclosures:** Dr Fleegler reported receiving book royalties from Springer.

## REFERENCES

1. Centers for Disease Control and Prevention. WISQARS—Web-based Injury Statistics Query and Reporting System. Accessed August 15, 2021. <https://www.cdc.gov/injury/wisqars/index.html>
2. Conner A, Azrael D, Miller M. Suicide case-fatality rates in the United States, 2007 to 2014: a nationwide population-based study. *Ann Intern Med*. 2019;171(12):885-895. doi:10.7326/M19-1324
3. Spark TL, Wright-Kelly E, Ma M, James KA, Reid CE, Brooks-Russell A. Assessment of rural-urban and geospatial differences in perceived handgun access and reported suicidality among youth in Colorado. *JAMA Netw Open*. 2021;4(10):e2127816. doi:10.1001/jamanetworkopen.2021.27816
4. Schell T, Peterson S, Vegetabile B, Scherling A, Smart R, Morral A. *State-Level Estimates of Household Firearm Ownership*. RAND Corporation; 2020. doi:10.7249/TL354
5. Nestadt PS, MacKrell K, McCourt AD, Fowler DR, Crifasi CK. Prevalence of long gun use in Maryland firearm suicides. *Inj Epidemiol*. 2020;7(1):4. doi:10.1186/s40621-019-0230-y
6. Yard E, Radhakrishnan L, Ballesteros MF, et al. Emergency department visits for suspected suicide attempts among persons aged 12-25 years before and during the COVID-19 pandemic—United States, January 2019-May 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(24):888-894. doi:10.15585/mmwr.mm7024e1
7. Ettman CK, Abdalla SM, Cohen GH, Sampson L, Vivier PM, Galea S. Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. *JAMA Netw Open*. 2020;3(9):e2019686. doi:10.1001/jamanetworkopen.2020.19686
8. Azad HA, Monuteaux MC, Rees CA, et al. Child Access Prevention Firearm Laws and Firearm Fatalities Among Children Aged 0 to 14 Years, 1991-2016. *JAMA Pediatr*. 2020;174(5):463-469. doi:10.1001/jamapediatrics.2019.6227
9. Azrael D, Cohen J, Salhi C, Miller M. Firearm storage in gun-owning households with children: results of a 2015 national survey. *J Urban Health*. 2018;95(3):295-304. doi:10.1007/s11524-018-0261-7
10. Salhi C, Azrael D, Miller M. Parent and adolescent reports of adolescent access to household firearms in the United States. *JAMA Netw Open*. 2021;4(3):e210989. doi:10.1001/jamanetworkopen.2021.0989