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INVESTING IN CHILDREN TO ADDRESS THE CHILD MENTAL HEALTH CRISIS

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ABSTRACT

The child mental health crisis has been described as the "defining public health crisis of our time." This article addresses three myths about the crisis: (i) the idea that the crisis is new; (ii) the belief that increases in youth suicide mainly reflect deterioration in children's underlying mental health; and (iii) the myth that investments in children have little impact on children's mental health. In fact, the cri-sis has existed for decades, youth suicides vary asynchronously with other mental health measures and are impacted by external factors such as firearms legislation, and investments can improve child mental health and prevent suicide.

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The U.S. Surgeon General Vivek Murthy has called the child mental health crisis "the defining public health crisis of our time" (Murthy, 2023), which is remarkable in the age of COVID-19. The American Academy of Pediatrics (AAP) has joined with the American Academy of Child and Adolescent Psychiatrists, and the Children's Hospital Association to declare a national state of emergency with respect to children's mental health (AAP, 2021). Thirteen percent of U.S. children aged 3 to 17 have a current diagnosed mental or behavioral health condition (U.S. Health Resources and Services Administration, 2020).

This rate is similar to UNICEF's 2021 estimate that 13 percent of youth aged 10–19 worldwide have a mental disorder. Yet the United States is an outlier in terms of youth suicide as shown in Figures 1a and 1b. Although suicide among 10-19-year-olds in the United States peaked in 2017 (see Figure 5), it remains historically high, and much higher than in many other rich countries such as those in the European Union (EU). For example, the suicide rate for males aged 15–19 is four times higher in the United States than in France.[1] Moreover, Figures 1a and 1b show that rates in the EU fell over the same period that U.S. rates were increasing.

The large numbers of children with mental health conditions and the toll of suicide imply a great deal of human suffering, directly lowering the utility of affected children, their families, and people who care about them. But the high cost of the child mental health crisis makes it an economic crisis as well as a public health crisis. Addressing the situation requires a clear understanding of its features and careful attention to methods of causal inference to see what works. Hence, economists have a role to play in understanding and addressing the child mental health crisis.

[1] The U.S. number was 15.6 in 2020. The number for France was 3.6 in 2017. See Bertuccio et al. (2024).

This article first outlines some of the economic costs of the child mental health crisis. I then address three myths about the crisis, which may be diverting attention from potentially productive investments in child mental health. The first myth is that the child mental health crisis is a recent and unprecedented phenomenon. It is not. There have been large numbers of children suffering from mental health disorders for decades, although the problem is now receiving much more attention.

The second myth is that increases in youth suicide are due mainly to a deterioration in children's underlying mental health. In fact, youth suicide rates show different trends compared to other measures of child mental health. They also vary more widely across geographic areas than other child mental health. In addition to underlying mental health, suicides are influenced by external factors such as firearm laws, school anti-bullying policies, and the availability and quality of mental health treatment.

The third myth is that investments in children have little impact on children's mental health or suicide rates. In fact, several types of investments have been shown to improve child mental health and/or prevent suicide, although much more research into effective interventions is needed.

I. The high costs of the child mental health crisis

According to data from the Medical Expenditure Panel Survey (MEPS), which collects comprehensive data about health care costs, child mental health services in the United States cost $31 billion in 2021 and accounted for 47 percent of all U.S. child medical spending (Loo et al., 2024, citing MEPS). One reason for these high costs is the sheer prevalence of mental health disorders relative to other types of severe child illness. In addition to direct medical costs, child

mental health disorders are costly in terms of lost parental work time, although the academic literature on this subject is sparse. Parents of children with activity limitations of any kind are less likely to be employed and have more workdays lost than parents of well children (Witt et al., 2009), and mental health conditions are responsible for a large share of child activity limitations (Currie and Lin, 2007).

Beyond these immediate costs, a growing economics literature finds that child mental health disorders are predictive of a range of negative adult outcomes. In one of the earlier papers on this question, Currie and Stabile (2006) used nationally representative data (from the National Longitudinal Survey of Youth in the U.S. and the National Longitudinal Survey of Children and Youth in Canada) in which all children were given mental health screening questions. They show that regardless of formal diagnoses, children with more mental health symptoms between the ages of 4 and 11 were less likely than siblings to still be in school at ages 16 to 19. These children also had lower test scores and were more likely to have repeated grades.[2] Currie et al. (2010) use administrative Canadian data to show that children diagnosed with mental health conditions had lower educational attainment and were more likely to use welfare programs as adults. Moreover, mental health conditions were more predictive of these outcomes than common childhood physical health conditions. Studies that have confirmed these findings of negative long-term effects include Anderson, Cesur, and Tekin (2015); Biasi, Dahl, and Moser, (2019); Busch et al. (2014); Fletcher (2010, 2014); Ding et al. (2009); Goodman, Joyce, and Smith (2011)).

[2] Similarly, Cornaglia, Crivellaro, and McNally (2015) use British survey data and find that high scores on a 12-item mental health screener is highly predictive of leaving school early and non-participation in the labor force. Berndt et al. (2000) and Case, Fertig, and Paxson (2005) provide descriptive evidence that children with mental health disorders have worse adult outcomes than other children.

These negative outcomes may reflect the fact that 50 percent of adult mental health conditions begin in childhood (Kessler et al., 2005), and that mental health conditions are leading causes of disability and working days lost (Currie and Madrian, 1999). For example, in 2022–2023, depression, anxiety, and stress accounted for 46 percent of the working days lost in the United Kingdom, while the second-largest category, musculoskeletal conditions, accounted for 32 percent (Health and Safety Executive, 2024). When employed people leave the workforce temporarily because of their mental health, they typically stay out longer than people with physical health conditions: On average, U.K. employees who lost work time due to depression, anxiety, or stress, lost 21.1 days per incident, compared to 14.3 days for musculoskeletal conditions (Health and Safety Executive, 2024).

Additional suggestive evidence about the toll of mental illness comes from data about unhoused and imprisoned populations. A large meta-analysis of data from Canada, Germany, and the United States finds that 67 percent of unhoused adults have mental health conditions (Barry et al., 2024) and over a third of the U.S. prison population has a mental illness (Substance Abuse and Mental Health Services Administration, 2024).

It is not entirely clear whether mental illness is mainly a cause or a consequence of homelessness or imprisonment. However, Cassidy et al. (2025) study children with Medicaid coverage in New York City whose families were facing eviction. Families with quasi-randomly assigned legal assistance were less likely to have evictions proceed. They find that being subject to a possessory judgment, the first step in eviction, increased the probability of a child mental health claim by 50 percent in the two years following a housing court filing, indicating that the threat of eviction undermines children's mental health. Jácome (2022) examines youth who were being treated for mental health conditions but who lost access to treatment when they aged

out of public health insurance at age 18. She shows that aging out of care significantly increased the probability of subsequent involvement with the justice system. Hence, there is evidence that the threat of homelessness causes mental health disorders among children and that mental health disorders can lead to interaction with the justice system.

II. Three myths about the child mental health crisis

Having established the large costs of the child mental health crisis, this section addresses three common myths about it: 1) The idea that the crisis is a recent and unprecedented phenomena; 2) the myth that increases in youth suicide are due mainly to a deterioration in children's underlying mental health; and 3) the myth that investments in children are ineffective in terms of improving mental health or reducing youth suicide.

A. Addressing the myth that the crisis is a recent and unprecedented phenomenon.

The most prominent narrative that has emerged about the child mental health crisis is that it is both very recent and entirely unprecedented. In turn, this idea suggests that the cause of the child mental health crisis must also be a recent development. Some causes that have been suggested as contributors to a rapid deterioration in child mental health include: toxic social media (Haidt, 2024), an increase in economic insecurity following the Great Recession (Blanchflower, Bryson and Xu, 2024), and the effects of lockdowns and school closures during the COVID-19 pandemic (Murthy, 2021).

But concerned commentators have been sounding the alarm about child mental health for decades. A 1970 report to Congress entitled, "Crisis in Child Mental Health: Challenge for the 1970s," estimated that about 12 percent of U.S. children had a serious mental health condition

(Joint Commission on the Mental Health of Children, 1970). In 2000, U.S. Surgeon General David Satcher issued a "call for action" on children's mental health in a report that calculated that 11 percent of U.S. children were affected by serious mental health conditions (U.S. Public Health Service, 2000). Cutler, Glaeser, and Norberg (2001) observed that suicide had already become the third leading cause of death among adolescent Americans (after unintentional injuries and homicide) by 1990. As Figure 1a shows, suicides among young males reached a peak in 1995 that rivals recent rates, though female suicides are now higher than in the early 1990s.

The estimated rates of mental illness from previous decades suggest that the number of children with a diagnosed mental health condition has been relatively stable over a long period of time. It is even possible that the number of children with the most serious mental illnesses has declined, since the most recent numbers apply to children with any diagnosed mental health condition rather than those with serious conditions only.

One reason for the perception of an accelerating child mental health crisis may be increases in diagnoses of specific mental illnesses, such as anxiety and depression. But much of this increase is likely due to changes in the definitions of mental illness over time. Diagnosis of mental health conditions in the United States is determined using criteria found in the International Diagnostic and Statistical Manual of Mental Disorders, commonly called the DSM. A new version of this manual, the DSM-5, was introduced in 2013, with profound changes in the definitions of many mental health conditions, including reclassifications of some existing disorders.

Definitions of anxiety and depression were broadened by including additional disorders under these umbrellas (Park and Kim, 2020; Grohol and Wright, 2022). Depression now includes

disruptive mood dysregulation disorder, bereavement disorder, dysthymic disorder (persistent low mood), and premenstrual dysphoric disorder, all diagnoses that were previously excluded from a depression diagnosis. The specifier "with anxious distress" was developed since anxiety and depression often coexist. New instructions focusing on assessing the importance of considering suicide prevention in treatment were also introduced (APA, 2013). These new instructions are likely to have increased recognition of suicidal ideation. The DSM-5 also dropped a previous rule that only persons over 17 could be diagnosed with social, and Post-Traumatic Stress Disorder was reclassified as an anxiety disorder.[3]

Other important definitional changes occurred with the adoption of the 10th International Classification of Diseases (ICD10) by U.S. hospitals in October 2015.[4] For example, the ICD10 changed injury codes in a way that forced hospital and emergency department (ED) clinicians to indicate whether an injury was self-inflicted or not. The cause could no longer be coded as "undetermined." Not surprisingly, this change in coding reduced reports of injuries with undetermined causes, and correspondingly increased reports of intentional self-harm (Stewart, Crawford, and Simon, 2017).

One helpful way to think about the impact of changes in screening, diagnosis, and coding of mental illness over time is to think of the incentives facing patients and providers. On the patient side, the potential benefits of a mental health diagnosis include access to treatment, the possibility of accommodations such as student individualized education plans, and, in some

[3] Another important change was the creation of the new Autism Spectrum Disorder diagnosis, which combined four separate previous diagnoses, as well as changes in the criterion for Attention Deficit Hyperactivity Disorder (ADHD) which allowed people who exhibited symptoms after age seven to qualify for a diagnosis for the first time. This change in who is eligible to receive an ADHD diagnosis is estimated to have increased the prevalence of ADHD diagnoses by 50 percent (VandeVoort et al., 2014). Criteria for stress disorders and obsessive-compulsive disorders were also changed.

[4] The ICD10 classification system had been adopted a decade earlier in Europe, but the United States was slow to make the change.

cases, disability payments. One of the largest costs of receiving a mental health diagnosis is the severe stigma that still surrounds these disorders.

But mental health stigma has been declining over time, reducing the costs to patients of being diagnosed with a mental health condition. Pescondolido et al. (2021) analyze data from the General Social Survey and find that over time Americans have become more likely to endorse a biological basis for mental illness, and less likely to say that they would try to avoid someone with a mental health condition. Angermeyer et al. (2017) conduct an international meta-analysis of studies of attitudes toward treatment, and report that people have become more receptive to the idea of receiving psychiatric treatment.

Bharadwaj, Pai, and Suziedelyte (2017) compare survey data to administrative medical records and show that people are much more likely to under-report mental illness than physical illnesses such as diabetes. This result suggests that declining stigma is likely to increase the reporting of mental illness on surveys, care-seeking behavior, and mental health diagnoses. Greater availability of effective treatments, such as the introduction of Selective Serotonin Reuptake Inhibitors (SSRIs) for depression, may also make people with mental health conditions more likely to seek care by increasing the potential benefit from doing so (Conti, Busch, and Cutler, 2011).

Incentives to diagnose mental illness have also changed for providers over time. Corredor-Waldron and Currie (2024) highlight an important national change in screening practices following a 2011 recommendation from the U.S. Preventive Services Task Force (USPSTF) that women and girls 12 and over should be screened annually for depression. While not every USPSTF recommendation is followed, this one was specific in terms of recommending an annual screening which could take place during annual physicals. It also coincided with the

Affordable Care Act's requirement that insurers pay for all screenings recommended by the task force. Hence, providers could be confident that they would be reimbursed. Corredor-Waldron and Currie (2024) show that this recommendation was followed by a sharp rise in ED visits for mood disorders, anxiety, and suicidal ideation (persistent, intrusive thoughts about suicide) for girls, but not for boys.

In addition, there have been changes in provider compensation for treating patients with more complex conditions. In 2007, Medicare introduced a new reimbursement system that allowed hospitals to charge Medicare more if people with other conditions (e.g. asthma) also had major depression. This change gave hospitals an incentive to train clinicians to code depression if present.[5] Cook and Averett (2020) show that changes in coding from the 2007 change in Medicare spilled over onto other patients. Similarly, a tweak to the newly implemented ICD10 classification system in October 2016 instructed ED clinicians to record suicidal ideation as a secondary diagnosis if present, which may have resulted in higher reimbursements in some cases.[6]

Changes in provider incentives also occurred because of changes in compensation practices that were associated with the introduction of managed care. Currie, Chorniy, and Sondchak (2018) study a change in South Carolina's Medicaid insurance program that replaced a fee-for-service system with capitated managed care contracts. Under the new contracts, providers receive higher capitated payments for children with specific chronic conditions, including mental health disorders. In addition to these new incentives to diagnosis mental health conditions, providers who fell behind the norm in terms of providing well child screenings were penalized.

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[5] Legal decisions subsequently confirmed that it is perfectly legal for providers to code in a way that maximizes reimbursements (Boggs, 2019).

[6] Prior to this change, clinicians could not code suicidal ideation as a secondary diagnosis if the primary diagnosis was a mental health disorder. Doing so would result in the claim being denied.

Currie, Chorniy, and Sondchak (2018) estimate models that follow the same Medicaid-covered children before and after their providers were switched to the new managed care contracts. They find that the switch increased the rate of well-child screenings and led to a 10 percent increase in new diagnoses of ADHD and depression, as well as increases in diagnoses of chronic physical conditions like asthma. This example shows that incentivizing screening and providing higher reimbursements for children with chronic conditions is likely to increase diagnoses of mental health conditions.

1) Evidence about the importance of changes in coding from emergency department visits

In principle, ED visits provide a useful lens for examining trends in severe mental health conditions because people suffering a mental health crisis are always advised to proceed to the nearest hospital ED, whether the hospital has a psychiatric unit or not (Zeller, 2018). Hospital Eds can perform triage, sending patients to other providers as necessary. Choi et al. (2025) examine the impact of some of the provider incentives discussed above using data from the National Emergency Department Survey (NEDS) for 2006–2021.[7] NEDS is the largest all-payer ED database in America, with data from 30 million ED visits in 2021. These data represent ED visits to hospitals in 39 states and the District of Columbia. The sample approximates a 20 percent sample of hospital-owned EDs.[8]

Figure 2 shows that the number of ED visits with any diagnosis of a mental health condition (other than intellectual disability) rose between 2006 (when NEDS data first became

[7] Corredor-Waldron and Currie (2024) examine some of these issues using data from New Jersey.

[8] NEDS is designed as a stratified cluster sample where strata are defined by hospital characteristics such as urban or rural, hospitals are sampled, and every observation for a sampled hospital is included. NEDS data include patient age and sex, urban-rural residence (large central metro, large fringe metro, medium metro, small metro, micropolitan, noncore), national quartile of median household income for the patient's zip code, expected payment source of insurance (Medicaid, Medicare, self-pay, private insurance, no charge, other), identification of injury-related visits, discharge status, and diagnosis codes (ICD-9 before October 1, 2015, and ICD-10 afterwards). Further information about NEDS is available here: NEDS Overview. https://hcup-us.ahrq.gov/nedsoverview.jsp. Accessed July 20, 2024.

available) and 2011.[9] After 2011, the total number of visits with any mental health diagnosis varies but does not show a clear trend: The total number of visits with a mental health diagnosis rose by 36 percent between 2006 and 2012, and by 37 percent between 2006 and 2021. The total number of visits can be split into two groups, those with any diagnosis of an anxiety or mood disorder (such as depression), and all other ED visits with a diagnosis of a mental health disorder.[10] This split shows that there were large percentage increases in diagnoses of mood or anxiety disorders after 2011 that were offset to some extent by decreases in ED visits with any other mental health diagnosis.[11] Hence, it appears that many people were coded as having anxiety or mood disorders (such as depression) instead of another mental health disorder after 2011. The two series bifurcate further after the introduction of the DSM-5 in 2013 and after the introduction of ICD10 in 2015.

Choi et al. (2025) also show that the 2011 USPSTF recommendation of depression screening for females over 12 coincided with an increase in diagnoses of depression among girls presenting at the ED, but not among boys, and that the instruction to code suicidal ideation if present coincided with a sudden 43 percent jump in diagnoses of suicidal ideation during ED visits between 2016 and 2017. Because suicidal ideation is often grouped with self-harm and suicide attempts in a broader "suicidal behaviors" category, this change resulted in a large and

[9] We exclude intellectual disabilities which are coded as 317-319 in ICD9 and as F7 in ICD10 but keep all other mental health conditions.

[10] The ICD9 code for anxiety is 300, and in the ICD10 it is F4. Codes for mood disorders in ICD9 are 296 and 311, and F3 in ICD10. I have not taken steps to try to make the definitions in ICD9 and ICD10 conformable in terms of the exact disorders that are included – the point is that the definitions changed and using a new definition changes counts of the conditions.

[11] The patterns are similar if only primary diagnoses for ED visits are plotted. Zima et al. (2020) find similar patterns for primary diagnoses for in-patient hospital visits using the State Inpatient Discharge Sample (which includes hospital discharge records for multiple states). They report large increases in patients with suicide attempts or self-harm, depression, and anxiety, but decreases in the coding of other diagnoses such as bipolar and psychotic disorders.

sudden increase in the number of teens classified as exhibiting suicidal behavior in ED visit records.[12]

These examples suggest that while it might seem desirable to track trends in ED visits as a way of assessing trends in underlying child mental health, trends in ED visits for mental health disorders are sensitive to changes in patient and provider incentives to diagnose and record mental health conditions over time.

2) Evidence from the Youth Risk Behavioral Surveillance Survey

The U.S. Centers for Disease Control's Youth Risk Behavioral Surveillance Survey (YRBSS) provides an alternative source of information about trends in the mental health of high school-aged youth. It is a nationally representative survey of high school students that has asked consistent questions every second year since 1991.[13] The YRBSS is the largest source of health surveillance data about high schoolers.[14] In addition to the national YRBS, most states (45 in 2021) administer their own YRBS surveys. The YRBSS surveys take 45-minutes and are conducted in schools, usually in the spring. Students complete a scannable questionnaire anonymously. I focus on four YRBSS questions:

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[12] Both the commonly used Clinical Classification Software and the Child and Adolescent Mental Health Disorders Classification System combine suicidal ideation, self-harm, and suicide attempts into one measure of suicidal behaviors. For examples using this kind of grouping see Zima et al. (2020), and U.S. Agency for Healthcare Research Quality (2019).

[13] Note that question #1 about sadness and hopelessness has only been asked since 1999. A disadvantage of the YRBSS is that little demographic information is available beyond age and gender, making it impossible to control for family income and family structure, for example. For further information about the YRBSS see: https://www.cdc.gov/yrbs/index.html.

[14] Two other data sets with information about child mental health are the National Health Interview Survey (NHIS) and the National Survey of Drug Use and Health (NSDUH). The NHIS includes parent-reported questions from the Strengths and Difficulties Questionnaire, which have been shown to be predictive of child mental health. There are no trends in answers to questions such as whether the child is "often unhappy, depressed, or fearful." The NSDUH has questions from the Composite International Diagnostic Interview (CIDI), which contains diagnostic screeners for depression- and anxiety-related disorders as well as for substance abuse. However, the NSDUH was completely redesigned in 2015, which makes it problematic to use for studying trends in mental health disorders.

1. “During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?”
2. “During the past 12 months, did you ever seriously consider attempting suicide?”
3. “During the past 12 months, did you make a plan about how you would attempt suicide?”
4. “During the past 12 months, how many times did you actually attempt suicide?”

The first question about “hopelessness” echoes clinical definitions of mental illness in its emphasis on whether a person’s symptoms impaired performance of their usual activities for at least two weeks. Responses to this question have been widely reported in both the academic literature and in popular media. For example, Twenge and Campbell (2019) correlate social media use with this measure of hopelessness and Haidt (2024) also tracks trends in hopelessness. See also, U.S. Centers for Disease Control (2024) and Thompson (2022).

Figure 3a shows that since 1999 when the question was first asked, at least a third of U.S. high school students have reported that they felt so sad or hopeless continuously for two weeks or more that it interfered with their usual activities. This figure was remarkably constant until 2017, when it began to rise. By 2021, it had reached 42.3 percent, moderating to 39.7 percent in 2023, the last available survey year. The percentage of high school students reporting that they have considered suicide, or made a plan for suicide, has hovered between 16 and 20 percent. And about 10 percent of 15-19-year-old teens have been reporting that they have attempted suicide for decades. Figures 3b and 3c show that the trends are comparable for boys and girls, although the levels for girls are consistently roughly twice as high as the numbers for boys and began to rise sooner.

The YRBSS questions have the virtue of having been asked in the same way for 30 years. On the other hand, it is unclear how these self-reported measures should be viewed in

relationship to other potential measures and given the possible effects of declining mental health stigma on response rates. The self-reported data on suicide attempts can be compared to data from the CDC's Web-Based Injury Statistics Query and Reporting System (WISQARS). In 2022, there were 593 ED visits for self-harm per 100,000 youth aged 15–19, which is 17 times lower than the reported rate of suicide attempts in the YRBSS. Moreover, not all self-harm has suicidal intent. Hence, these numbers imply either that most suicide attempts do not result in injuries significant enough to warrant medical attention, or that the number of suicide attempts is exaggerated in the YRBSS. Perhaps both are true.

Overall, these sources suggest that the child mental health crisis has existed for decades and that the number of children with an underlying mental health condition has been high and relatively stable over time. In retrospect, this conclusion should not be surprising given what we know about the causes of child mental health disorders. While there is a genetic component to many mental illnesses, environmental stressors also have an impact, and may be necessary to trigger the onset of a mental health condition. Some important stressors that have been shown to impact child mental health include: poverty and income shocks (or income transfers) (see Akee, Copeland, and Simeonova, 2024; Baird, de Hoop, and Özler, 2013; Jones et al., 2024; Golberstein, Gonzalez, and Meara, 2019), the birth of a sibling with a disability (Currie et al., 2024), domestic violence (Bhuller et al., 2024), school shootings (Rossin-Slater et al., 2020), and adverse childhood experiences generally (Blanchflower and Bryson, 2024). To the extent that these types of stressors existed in past decades as well as in our own, they are likely to have impacted child mental health.[15]

[15] With the exception of Baird et al. (2013) the studies cited in this paragraph deal with high income countries. Ridley et al. (2020) do not focus on children specifically but provide an overview of evidence linking poverty, mental health, and suicide in low- and middle-income countries.

B. Addressing the myth that deteriorating mental health is the only important driver of trends in youth suicide

Many would consider the alarming trends in suicide shown in Figure 1a to be the strongest possible evidence of deteriorating child mental health. Yet the measures of mental health discussed above follow quite different trends compared to the trends in suicides. Recall that despite additional incentives to code mental health conditions, ED visits with any diagnosis of mental health were relatively flat after 2011, the same period in which youth suicides began to rise. And youth hopelessness, as measured in the YRBSS, rose after 2017, which is the same period that teen suicides began to fall (see Figure 5).

How is it possible for underlying rates of child mental illness to be relatively constant in periods when youth suicides are rising? Huge differences in the prevalence of child mental illness and youth suicide provide one obvious reason why trends in these measures do not have to coincide. Recall that about 13 out of 100 children have a mental illness, while the suicide rate of 15.6 per 100,000 implies that 0.0156 youth per 100 died by suicide in the United States in 2020. Thankfully, most children with mental illness do not die by suicide, although mental illness does place them at higher risk.[16]

Leaving trends aside, males have much higher rates of suicide than females, although females have higher rates of mental illness (and of suicide attempts). Rates of child mental illness are thought to be broadly similar between the United States and Europe, while youth suicide is much more common in the United States. Stone et al. (2018) analyze data from the

[16] Rising suicide rates could also reflect a greater willingness to report suicide as a cause of death over time, consistent with reductions in stigma. However, inconsistent determinations about suicide as a cause of death within and between jurisdictions were greatly reduced following the development of guidelines on the proper determination of suicide published by a working group of coroners, medical examiners, statisticians, and public health agencies in 1988 (Rosenberg et al., 1988).

CDC National Violent Death Reporting System, covering 27 states, which allows for investigation into the circumstances surrounding suicide deaths. They find that only half of suicide deaths occurred in persons known to have a mental illness. In the other half of deaths, people often had a relationship, employment, or financial problem at the time of the death that was thought to have contributed.[17] Thus it may be a misconception that only people with mental health disorders die by suicide. In many cases, suicide may be an impulsive response to what seem like overwhelming difficulties.

Figure 4 shows that there is a huge geographical variation in youth suicide rates within the United States. In the northeast and in California, suicide rates resemble those in the EU, at about six deaths per 100,000 teens aged 15–19, and there has been no upward trend in youth suicides. More rural states, such as Alaska, Montana, Wyoming, and South Dakota, have youth suicide rates that are five to seven times higher at 30 to 41.3 per 100,000, and these states have seen youth suicide rates increase over time. In their analysis of the earlier spike in youth suicides in the early 1990s, Cutler, Glaeser, and Norberg (2001) indicate that these same states had high suicide rates at that time, indicating remarkable persistence in the rankings of states by youth suicide rates. Hence, while there are high rates of child mental illness across the United States and in Europe, there are only some places where children die by suicide in large numbers. Moreover, some groups, such as Native Americans, have youth suicide rates twice as high as for non-Hispanic whites, so research into the determinants of these high rates is especially urgent.

Figure 5 examines the method of youth suicide in the four U.S. census regions as a way of shedding light on some of the factors that drive these geographical differences. There are two dominant means of youth suicide in the United States: firearms and suffocation (hanging).

[17] Observations of the link between financial setbacks and suicide underlie some economic theories of suicide such as the early one set forth in Hamermesh and Soss (1974).

Deaths from all other causes, such as intentional drug overdoses, or falls, are much less frequent. Access to firearms may be especially important because of the lethality of guns relative to other means. In contrast, intentional drug overdoses are a common form of suicide attempt, but most such attempts are non-lethal. Owens (2002) summarized 90 studies of survivors of suicide attempts requiring medical care and found that only 7 percent of patients eventually died by suicide. Twenty-three percent had additional non-fatal attempts, and 70 percent made no further attempts. Hence, people who attempt suicide with less lethal means are more much likely to survive long-term than those who choose a more lethal means, such as firearms.

While it is notoriously difficult to count the number of guns in circulation in the United States, in many states, changes in gun laws have made firearms more readily accessible in recent years.[18] Have these changes in firearm laws increased youth suicide? And if so, are differences in firearm laws a plausible explanation for some of the geographic difference in youth suicide rates across states? I address these questions using state-level data on firearms, suicide rates, and youth hopelessness.

Public use data about suicide rates by age can be downloaded from the CDC Wonder website. However, because youth suicide is still a thankfully rare outcome, in the public use data, much of the data on suicides in specific state, age, cause of death and/or gender groups is

[18] The General Social Survey suggests that the number of households with a gun changed very little, from 36.5 to 35.2 percent, between 2000 and 2021 (Violence Policy Center, 2022). However, it is possible that many gun-owning households do not respond to social surveys such as the GSS. Estimates of the number of gun sales (based largely on background checks that are required in some states and for some types of weapons but not for others) suggest that sales have continued to grow, and that they surged in 2020 (Joint Economic Committee Democrats, 2023). In terms of the stock of guns, it is estimated that there are about 120 civilian guns per 100 persons in the U.S., more than in any other country (Karp, 2018). These data suggest that many U.S. firearm owners have multiple guns, complicating attempts to measure gun access via gun ownership.

suppressed due to small cell sizes. Therefore, in what follows, I use confidential vital statistics mortality data available by application to the CDC.[19]

Data about gun laws come from Michael Siegel (2020)'s State Firearm Law Database, updated through 2021. Gun laws are classified into five broad classes based on Everytown for Gun Safety's definitions of "foundational" gun safety laws.[20] These include: whether background checks or purchase permits are required for gun purchases, whether a permit is required for concealed carrying of a firearm, whether there is an extreme risk or "red flag" law that allows guns to be removed from people who pose a danger to themselves or others, the absence of a "shoot first" law, and a law requiring the secure storage of firearms and/or a duty to prevent child access to guns.

From 1991 to 2021, 29 states passed "shoot first" laws (also called "stand your ground" laws), which allow a person to shoot in response to feeling threatened even if they could have safely resolved the situation in another way. Twenty-six states repealed laws that had required a permit for the concealed carrying of handguns. Over the same period, 12 states passed laws requiring permits for gun ownership, 20 states passed red flag laws, and 28 states strengthened requirements for safe gun storage.

Table 1 shows estimates of two-way fixed effects (TWFE) models that take the following form:

$$(1) \quad S_{st} = b_0 + b_1 \#Law_{st} + b_2\, Hopeless_{st} + \boldsymbol{state} + \boldsymbol{year} + e_{st},$$

where S_{st} is a measure of the teen suicide rate in state s and year t, $\#Law_{st}$ is a measure of the number of gun safety laws, and $Hopeless_{st}$ is the fraction of youth in the YRBSS who reported

[19] Instructions for applying for these data are here: https://www.cdc.gov/nchs/nvss/nvss-restricted-data.htm.
[20] See EverytownResearch.org and click on "Explore by Policy."

that they were sad or hopeless for at least two weeks in the relevant state and year. When these regressions are estimated separately by gender, the relevant gender-specific percent hopeless measure is used. The vectors ***state*** and ***year*** include state and year fixed effects. If there are underlying differences between states (such as the fraction rural), or changes over time that affect most states (such as the availability of different forms of social media or reductions in mental health stigma), then these fixed effects will help to account for them.

The outcome variable S_{st} is alternatively total suicides, firearm suicides, suicides by suffocation, or the difference between suicides by firearms and suicides by suffocation. I focus on suicides by firearms and suffocation because Figure 5 shows that these are the two major categories of suicides. Looking at these different outcomes is a way to test the hypothesis that firearm laws should impact total suicides mainly by affecting firearm deaths. It is sometimes argued that if a person is prevented from accessing firearms, then they will find another way to end their life. If there was significant substitution between means of suicide, then making it more difficult for a youth to obtain a firearm could increase suicides by suffocation.

On the other hand, if both suicides by firearm and suicides by suffocation fall when there is a change in gun laws, then this might indicate that there is some other factor that is correlated both with the passage of firearm laws and with overall changes in suicide rates. For example, some states might pass firearm safety legislation and expand insurance coverage of mental health services at the same time. In this case, both suicides by firearms and suicides by suffocation might fall because of the expanded mental health services. If the firearm laws *per se* had no effect on suicide by firearms, then in this example there would be no significant change in the difference between suicides by firearms and suicides by suffocation.

$\#Law_{st}$ is measured in two ways. In the first specification, it is the number of foundational laws, where all laws are coded so that a law that increases gun safety takes the value one. Hence, the number of foundational laws in effect ranges from zero to five. In the second specification, laws are divided into firearm safety and "gun freedom" laws; gun freedom laws include the passage of a shoot first law and the repeal of permit requirements for concealed carry of a firearm. In this second formulation, the maximum number of gun freedom laws is two, and the maximum number of firearm safety laws is three. The inclusion of state fixed effects means that the focus is on changes in the number of firearm laws. In most cases, there are only one or at most two changes over the sample period.

The first panel of Table 1 shows the estimated effect of changes in the number of foundational laws while holding constant the percentage of youth who reported experiencing hopelessness in the YRBSS. The estimates are shown for teens aged 10–19 and for youths aged 15–19 (which matches the age range of the YRBSS more closely). Estimates are shown separately for all, for males, and for females. The estimates in column (1) indicate that an additional gun safety law reduces youth suicide by –0.397 per 100,000 on a baseline of 6.753, for a reduction of about 6 percent. The effects are almost entirely accounted for by males. While the point estimates are larger for youths aged 15–19, the percentage effects are quite similar given the higher baseline suicide rate in this age group. The YRBSS measure of hopelessness is also significantly related to suicides. The estimate suggests that a 5-percentage point rise in hopelessness would be associated with a 10.7 percent increase in suicides among males aged 10–19 and a 9.9 percent rise among 15-19-year-olds.

Panels B and C of Table 1 break suicide deaths down by the means of suicide. They focus only on males since no significant effects were estimated for females. (This null result is

probably because female suicides are much rarer, so I have little power to investigate their determinants even in state-level data). Panel B shows that firearm laws only impact deaths due to firearms. Hopelessness has a larger estimated effect on firearm deaths than on deaths by hanging, but I cannot reject the hypothesis that the estimated effects of hopelessness are similar for both means of suicide. There is no evidence of substitution from firearms to suffocation in response to changes in firearm laws. Panel C shows that when we try to break down gun laws into gun freedom vs. firearm safety laws, only the former are estimated to have statistically significant effects. Passage of an additional gun freedom law is estimated to increase firearm suicides among males aged 10–19 by 16.4 percent. The estimate for youth aged 15–19 is similar at 16.7 percent.

Figure 6 shows event-study estimates of the effects of changes in gun freedom laws using the Callaway and Sant'Anna (2021) estimator. The treatment states are restricted to be those that enacted a gun freedom law and had no other gun freedom law changes in the five years before and the five years after the index law change. Multiple law changes per state are allowed if they satisfy the five-years before and after without changes criterion. There are 28 qualifying changes in gun freedom laws and only four qualifying changes in firearm safety laws, which is why I focus on gun freedom laws for these event studies.[21] The control states are defined as those that enacted no gun freedom laws between 2001 and 2021. The estimating equation includes state and year fixed effects as well as three indicators for the presence of each of the three remaining firearm safety laws.

While noisy, the patterns in Figure 6 are consistent with those in Table 1, suggesting that gun freedom laws increase firearm suicides, have no effect on suicides by suffocation, and

[21] Estimates are similar if we focus only on the first observed law change in the time window. In that case, there are 25 qualifying gun freedom law changes and only three qualifying gun safety law changes in the time window.

significantly increase the gap between the two types of suicides.[22] While these results suggest that firearm laws are a significant contributor to youth suicides, it is likely that many other factors drive variation in youth suicide deaths as well. The opioid epidemic has been discussed as one possible contributor. For example, Powell (2023) finds that areas with larger increases in the abuse of illegal opioids among adults have higher youth suicide rates.

Is it plausible that differences in social media use could explain geographic disparities in youth suicide? Much attention has been paid to the effects of social media on children's mental health, and it is possible that social media use has negative effects on at least some child users. Randomized controlled trials that incentivized college students to reduce social media use found positive effects on self-reported mental health (Allcott et al., 2020, 2022). A study of the Facebook rollout across college campuses in 2004 to 2006 found that it increased scores on a clinically validated depression screening measure, though the effects sizes were modest (Braghieri et al., 2021).[23]

It is intuitive that if social media has harmful effects on adult college students, then it could also have harmful effects on younger students. But there is very little evidence demonstrating a causal effect. Hancock (2022) conducted a meta-analysis of 226 studies on the correlational relationship between child social media use and mental health. They find that on average, greater social media use is associated with small increases in anxiety and depression as well as small improvements in feelings of connectedness and social well-being. There was no effect on an aggregate index of mental health that included all these constructs. These findings suggest that the aggregate effects of social media use cannot be very large, or they would be

[22] These results are also consistent with Donahue, Cai, and Ravi (2023), who find that mandatory waiting periods for handgun purchases reduce suicides among younger people.
[23] Specifically, depression increased 2 percentage points on a baseline of 25 percent.

much more apparent in the data. There is also some evidence of beneficial effects for some groups of children. Berger et al. (2022) conduct a meta-analysis of 26 studies and suggest that social media use is beneficial to the mental health of LGBTQ youth, who use it to fight isolation and connect with validating peers. More research about the effects of social media that is specific to children and allows for the possibility of positive as well as negative effects would be helpful, as would work on suicide contagion (and the role that social media might play in amplifying it).[24]

It is difficult to test for a relationship between state-level trends in suicide and the use of social media. Social media use has not been measured in a consistent way over time, in part because of rapid changes in its nature. However, the states with the highest suicide rates had the lowest fraction of students reporting that they were on screens for three hours or more per day in the 2019 YRBSS. Moreover, social media use has arguably become more toxic in the past few years (e.g., with the introduction of TikTok in fall of 2016; see Haidt, 2024). Yet after rising since 2011, teen suicide rates peaked in 2017 and have started to decline. Hence, while social media use may harm individual children and impact learning by distracting children in school, it seems unlikely to be the main driver of aggregate trends in youth suicide rates.

C. Addressing the myth that investments in children have little impact on mental health

The United States has greatly expanded health insurance for pregnant women and children, preschool education, nutrition assistance, and cash support for households with children in recent decades. Between 2002 and 2019, I estimate that real government spending on children

[24] Cutler, Glaeser, and Norberg (2001) conclude that such spillover or contagion effects are likely to be very important, but there has been little work that separates the effects of spillovers *per se* from the effects of shared determinants of suicides.

rose almost 60 percent, bringing U.S. spending on children closer to that of other rich countries.[25] Trends in many child indicators suggest that these investments have paid off. Child poverty, measured in a way that includes government transfers, has fallen. Child mortality has declined: Deaths among children aged 10–14 fell from 2 to 1.5 per 100,000 between 2000 and 2019, while deaths among children aged 15–19 fell from 6.7 to 4.9 per 100,000 over the same period. Ninety-four percent of U.S. young adults now have at least a high school education, up from 88 percent in 2000. Teen births per 1,000 teens aged 15–19 fell from 49 to 16.7 between 2000 and 2019. And arrests of children younger than 17 for violent offenses fell from 95,000 to 45,000 between 2000 and 2019.[26] In many ways, this is a remarkable success story.

However, the persistence of the child mental health crisis raises questions about whether these types of investments make a difference to child mental health. This section considers several types of investments that have been shown to have positive effects on child mental health: investments during pregnancy and early childhood; investments in school-aged children and adolescents; and improvements in mental health treatment.

1) Investment during pregnancy and early childhood

Chorniy, Currie, and Sonchak (2020) show that compared to their own siblings, 6-12-year-old children who were prenatally exposed to the Supplemental Nutrition Program for Women, Infants, and Children (WIC) are 5 to 6 percent less likely to have ADHD and other mental health conditions commonly diagnosed in childhood. The most obvious mechanism for this effect is through improving nutrition. Poor nutrition in utero has been found to harm mental

[25] It is complicated to try to separate spending on children from other spending on social programs or to compare it across countries. An appendix explaining the derivation of these numbers is available on request.

[26] The numbers cited in this paragraph come from the following sources: https://wonder.cdc.gov/mcd.html (vital statistics); https://nces.ed.gov/programs/coe/pdf/coe_caa.pdf (educational attainment); https://ojjdp.ojp.gov/publications/trends-in-youth-arrests.pdf (criminal justice); https://opa.hhs.gov/adolescent-health/reproductive-health-and-teen-pregnancy/trends-teen-pregnancy-and-childbearing (teen births).

health: Almond and Mazumdar (2011) discuss Ramadan fasting; Dinkelman (2016) examines hunger caused by drought in apartheid South Africa; Adhvaryu, Fenske, and Nyshadham (2019) look at nutritional deprivation in farm families caused by fluctuating cocoa prices; and Stein et al. (2009) focus on starvation in the Netherlands during the Dutch hunger winter. Hoynes and Schazenbach (2016) survey a large literature showing that participation in WIC reduces the prevalence of low birthweight, which has been linked to higher rates of ADHD (Pettersson, 2015). WIC may also work through other mechanisms, such as by providing counselling, facilitating access to prenatal care, and generally offering support and reducing stress among pregnant women.

Persson and Rossin-Slater (2018) use Swedish registry data to investigate the effects of severe maternal stress during pregnancy. They compare mothers who had a death in the family during pregnancy to mothers who had a death in the family shortly after giving birth. This choice of control group is important because not all families are equally likely to suffer a death. They find that children of the mothers who suffered the loss in utero are 25 percent more likely to be prescribed ADHD medications as children, 13 percent more likely to take medications for anxiety as adults, and 8 percent more likely to take medications for depression as adults. These findings are consistent with a large observational psychological literature linking maternal stress during pregnancy to future externalizing behaviors in children (see Tung et al., 2023).[27] Evans and Garthwaite (2014) find that the Earned Income Tax Credit (EITC) in the United States, which provides cash payments to low-income families, is protective of mothers' mental health.

[27] Aizer, Stroud, and Buka (2016) find that a direct measure of stress during pregnancy (cortisol levels) predicts a higher probability of any chronic condition at age 7 as well as lower measures of educational attainment but do not specifically examine effects on child mental health.

To the extent that programs such as WIC or the EITC improve maternal mental health and reduce stress, they could have a positive effect on the mental health of offspring.

Early childhood programs can also impact mental health. Heckman, Rodrigo, and Savelyev (2013) find that disadvantaged children who participated in the Perry Preschool experiment, which combined an enriched preschool experience with home visits, were less likely than randomly selected controls to have externalizing conditions such as ADHD at ages 7 to 9. These childhood conditions have in turn been linked to lower educational attainment and other negative adult outcomes, as discussed above. They conclude that this may be a reason such programs have proven to be tremendously cost effective. Bütikofer et al. (2023) use Norwegian administrative data to show that there is a strong intergenerational correlation (IGC) in diagnoses of mental health conditions. However, a multi-faceted intervention with children under age six whose parents had mental health disorders reduced the ICG by 40 percent. The intervention included greater screening, special intervention teams, and coordination with childcare centers, among other inputs.

2) Investments in school-aged children and adolescents

There is a great deal of evidence that investing in young children is cost effective (see the survey in Almond, Currie, and Duque, 2018). But research focusing on school-age children, and specifically on adolescents, shows that investments in these years can also be productive (Hendren and Sprung-Kayser, 2020; Guryan et al., 2023).

Data on schooling-related seasonality in youth suicides suggests that intervention in this age group is necessary. In the United States, suicide rates in school-aged children have a pronounced seasonal cycle, spiking in October and April and falling during the summer and winter holidays, as shown in Figure 7. This pattern is not found in young adults aged 20–24

(Hansen and Lang, 2011) suggesting that the pattern is generated by school attendance. Figure 7 further shows that the peak to trough swings have become more pronounced over time along with rising youth suicide rates. This seasonal pattern has also been found in Germany (Chandler et al., 2022), though the German youth suicide rate is lower.

Additional evidence about the relationship between school attendance and youth suicide comes from the COVID-19 pandemic-era school closures. Hansen, Sabia, and Schaller (2024) show that when U.S. schools closed in March 2020, youth suicides fell 25 percent. Using county-level data on school reopening dates, they find that the staggered return to in-person schooling subsequently increased suicides 12 to 18 percent.

While it is widely assumed that school closures during the COVID-19 pandemic damaged other measures of children's mental health, the evidence is mixed.[28] For example, Brodeur et al. (2021) find that there was an increase in Google searches for boredom, loneliness, worry, and sadness during the pandemic, but that searches for stress and suicide decreased. In Sweden, children aged 14 to 16 stayed in school throughout the pandemic, while youth aged 17 to 19 had remote instruction. Björkegren, Svaleryd, and Vlachos (2024) compare these two groups of children and find that remote instruction significantly reduced depression and anxiety. Hence, while school closures were bad for learning, they reduced suicides and had a positive effect on at least some measures of mental health.[29]

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[28] An additional issue is that the pandemic may have changed the reporting of mental illnesses. For example, parents might have been better able to observe concerning behaviors when they were locked down with their children. On the other hand, Freedman et al. (2024) report a reduction in new diagnoses of ADHD. Schools play a key role in the diagnosis of ADHD in part because diagnosis requires the child to display symptoms in more than one setting.

[29] Another explanation for why being in school is related to suicide is that children may feel pressure to drink alcohol in social settings. Higher beer taxes and stricter drunk driving laws have been associated with significant past declines in teen male suicides (Markowitz, Chatterji, and Kaestner, 2003; Carpenter, 2004). But since these legal measures had already been implemented by the early 2000s, they are unlikely to have affected trends in suicides over the period discussed here. They do however provide an example of the way that policy can impact youth suicide rates.

The initial decline in suicides during the school closures may have followed from a reduction in cyberbullying. Both bullying and cyberbullying are strongly linked to suicidal ideation and suicide attempts in children (U.S. CDC, 2014). Perhaps surprisingly, previous studies have shown that cyberbullying and in-person bullying are complements and not substitutes: Most cyberbullying concerns incidents that happen during in-person interactions (Waasdorp and Bradshaw, 2015). Consistent with this finding, Bacher-Hicks et al. (2022) show that in-person bullying and cyberbullying move together in the YRBSS. They then show that pandemic school closures reduced Google searches related to *both* in-person bullying and cyberbullying. This result suggests that while being online does potentially expose children to the risk of cyberbullying, cyberbullying is mostly fueled by in-person school interactions and not by spending more time on social media *per se*.

Using data from the YRBSS, Rees, Sabia, and Kompas (2022) examine state laws requiring schools to enact anti-bullying policies, which were passed in all states between 2001 and 2015.[30] Using a TWFE framework, they find that among female students, the laws reduced bullying by 12 percent, self-reports of depression by 5 percent, suicidal ideation by 9 percent, and suicide by 15 percent. However, there were no significant effects of the laws on boys.[31]

These results complement randomized controlled trials (RCTs) which show that it is feasible to intervene in classroom settings to reduce bullying. Alan et al. (2021) study a program designed to improve students' ability to understand another person's point-of-view. Students in treatment schools received the intervention for three hours a week through most of an academic

[30] These laws tend to have several common elements including requirements that schools adopt a definition of bullying that is consistent with state laws, requiring both teachers and students to be trained to identify bullying, allowing anonymous reporting of bullying, requiring school authorities to investigate all reports of bullying, and establishing sanctions commensurate with the seriousness of the offenses.

[31] They also find larger effects among LGBTQ students, although few states asked about sexual orientation or gender identity early in the survey, so these effects are identified using changes in only four states.

year. The program reduced severe victimization of students significantly—for example, treated children perpetrated 64 percent fewer violent incidents. Cunha et al. (2023) discuss a less intensive intervention that aimed to teach empathy. The program involved eight parent-child reading activities and four movies over a period of four months. Implementation was randomized across 48 classrooms in two schools. The program reduced bullying at a cost of about $12.50 per incident. They suggest that involving parents may have been key to the effectiveness of this intervention because encouraging parental investments is one of the ways that social programs can impact a child's human capital (Attanasio et al., 2020).[32]

Schools or educational expectations can also create other types of stresses on children. Chen et al. (2024) compare children born in August and September of the same year in Taiwan. Because of strict rules about the age of school entry, children born in August reach critical milestones in their education one year earlier than children born in September. They show that the use of antidepressant medications jumps at middle school entry when students face increased pressure to start preparing for high-stakes high school entry exams. The use of antidepressants falls when those critical exams are over. These effects are larger in areas of the country where parents and children have higher educational expectations.

This evidence about the links between schooling and mental health suggests that schools are a particularly important place to intervene to try to improve child mental health. And in fact, many children receive mental health services at school. One study using the 2012 to 2015 National Survey of Drug Use and Health found that 57 percent of students who received any mental health care received it at school (Ali et al., 2019).

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[32] While the discussion in this section has emphasized reducing bullying to improve mental health, there is also RCT evidence that interventions that improve mental health through the provision of cognitive behavioral therapy can reduce violence in schools (Heller et al., 2017; Blattman et al., 2017).

Golberstein et al. (2024) study the roll out of expanded in-school mental health services in Minneapolis schools. The expansion added licensed mental health clinicians to schools. These new staff were in addition to existing school counselors and social workers.[33] Using both administrative records and data from a mental health survey, they find an 11 percent increase in the probability of any new mental health diagnosis, and a 13 percent increase in the use of psychotherapy. There was no effect on the use of psychiatric medication, which the new mental health workers were not authorized to prescribe, but there was a 15 percent decline in self-reported suicide attempts.

3) Improving the availability and quality of treatment

Several studies suggest that access to appropriate mental health treatment can improve children's outcomes. Busch, Golberstein, and Meara (2014) study the Food and Drug Administration's (FDA's) imposition of a "black box" warning label on antidepressants in 2004. The label warned that these drugs could cause suicidal behavior in children. It caused a sudden reduction in pediatric antidepressant use which they link to lower educational attainment and more substance abuse.[34] In a finding reminiscent of Jácome (2022), Deza, Lu, and MacLean (2021) use county-level data to show that greater availability of mental health professionals is predictive of lower rates of juvenile offenses. Dalsgaard, Nielsen, and Simonsen (2014) and Chorniy and Kitashima (2016) show that children who see physicians who are more likely to prescribe ADHD treatments are more likely to receive them, other

[33] The new clinicians are qualified to diagnose and treat mental health disorders and to refer students to other clinicians such as psychiatrists if necessary. Clinicians also work with teachers to identify students who could benefit from treatment. These clinicians are employed by community health agencies and bill to the student's insurance; state funds pay for services for uninsured students. See also Reback (2010), who examines the impact of variations in access to school mental health services and finds evidence of reductions in behavior problems.

[34] This result is consistent with Ludwig, Marcotte, and Norberg (2009), who examine the cross-country rollout of SSRIs and show that the availability of these medications reduced suicides.

things being equal. They then show that the marginal children who receive ADHD treatment because they see high-prescribing physicians have fewer risky behaviors and less hospital use.[35]

In 2016, only about half of children aged 6–18 with a parent-reported diagnosis of depression, anxiety, or ADHD received services from a psychiatrist, psychologist, psychiatric nurse, or clinical social worker (Whitney and Mark, 2019, citing data from the 2016 U.S. National Survey of Children's Health). Lack of appropriate care is an important problem even among insured children. About half of the antidepressants and anti-anxiety medications prescribed to children are prescribed by pediatricians and general practitioners who may lack expertise and training in treating child mental illness.[36]

Improving the quality as well as the quantity of child mental health treatment could help to improve outcomes. Looking across U.S. counties, antidepressant prescription rates for children aged 10–19 vary tenfold, which is unlikely to be justified by underlying rates of mental illness.[37] Cuddy and Currie (2020) find that in a large sample of insured U.S. children who were receiving prescriptions for psychiatric medications for the first time, 45 percent got prescriptions that should raise a red flag. These included benzodiazepines, older tricyclic antidepressants, and/or drugs that were not approved by the FDA for any indication in patients of the child's

[35] One issue with this research design is that parents might choose high prescribing physicians. However, the authors argue that in practice parents have little choice in these settings. Currie, Stabile, and Jones (2014) look at increases in the use of ADHD medication that followed an expansion of prescription drug coverage in Quebec. They find negative effects on college attendance and increases in depression among girls, but the marginal child being treated might have been quite different in this setting.

[36] Author's calculations based on IQVIA data on retail prescriptions. Swagel (2024) examines prescribing of ADHD and antidepressant drugs by general practitioners. He finds great variation in prescribing rates across the country, with about half (65 percent) of the variation in ADHD (depression) prescribing coming from differences in provider practice style.

[37] Based on the author's calculations using IQVIA data on 30-day retail prescriptions to children aged 10–19 in 2018. The median per capita number of prescriptions was 0.6, and the 99th percentile was 9.5 per year.

age.[38] The type of treatment received depends in part on the local supply of providers—children in areas with more psychiatrists per capita are more likely to receive drug treatment, conditional on the number of other mental health providers, while those in areas with more therapists in the mix are more likely to receive therapy. However, Currie and Musen (2025) show that even when they are treated by the same doctors, young children on Medicaid are more likely than children with private insurance to be prescribed antipsychotics. Currie, Kurdyak, and Zhang (2023) find the same pattern in Ontario, Canada, where there is universal health insurance, suggesting that the differences in treatment are not only due to differences in insurance coverage.

Because there is likely to be non-random matching of patients and providers, Cuddy and Currie (forthcoming) use variations in the supply of clinicians, and in local practice style, as instruments for the type of care that their sample of privately insured children received conditional on diagnosis. They distinguish between the small set of treatments that are FDA approved, treatments that are consistent with guidelines provided by professional associations but not FDA approved, and treatments that are inconsistent with professional guidelines and are not FDA approved for any indication in children of the index child's age. They find that on average, treatment with medication is associated with lower medical care costs and lower probabilities of self-harm. But the outcomes vary considerably between the different drug classes. Children who got a medication that was neither FDA approved nor consistent with professional guidelines have higher rates of self-harm over the next two years compared to children who received an FDA-approved treatment.

[38] Children being treated for anxiety, depression, or adjustment disorders for the first time would normally be prescribed an SSRI if medication was deemed necessary. Benzodiazepines are potentially addictive and dangerous in overdose. Tricyclic anti-depressants have a worse side-effects profile than SSRIs.

These results suggest that poor quality mental health treatment is harmful, and that professional guidelines may help to improve the quality of care. They confirm Currie and MacLeod's (2019) finding that while experimentation with a wide variety of drugs can be useful in the hands of a skilled practitioner, violations of practice guidelines lead to poorer patient outcomes, including higher medical costs, more emergency department visits, and more hospitalizations.

Currie, MacLeod, and Ouyang (2024) address some of the reasons for doctor-level variation in harmful prescribing practices using data on all retail prescriptions of antidepressant and antianxiety medications to children from 2006–2019. They divide doctors into cohorts defined by their year of graduation and medical school rank. Then practice style is decomposed into a training component measured using the behavior of doctors from the same cohort who live outside the doctor's own zip code; a spillover component measured using the behavior of doctors from other cohorts who practice in the same zip code as the index doctor; a doctor-specific fixed effect; and a zip code residual measuring "place" effects. A 20 percent increase in questionable prescribing by psychiatrists from other cohorts who practice within the index doctor's zip code increases the index doctor's red-flag prescribing by 4 percent. Spillover effects are consistently larger for non-psychiatrists than for psychiatrists, suggesting that specific training may help to insulate doctors from adopting the questionable practices of other doctors in their local area.

The doctor fixed effect is the most important component of variation in practice style, accounting for almost a quarter of red-flag prescribing. This finding suggests that practice style shows little change once doctors leave medical school, so that better medical school training might be the key to improving practice. However, there is very little research assessing on this

question.[39] More research into determinants of doctor behavior and how to influence it could potentially improve the quality of care.

III. Discussion and Conclusions

The child mental health crisis is imposing enormous costs on children, families, and society. But research by economists is helping to bring the nature of the crisis into clearer focus. This essay has focused on using this research to explode three common myths about the crisis.

The first myth is that the number of children with mental health disorders has skyrocketed in the past ten years. In fact, there have been large numbers of children with mental health disorders for decades. This point is important because if the crisis is of long standing, then we should look for long-standing causes rather than focusing solely on more recent innovations, such as social media. Much of the increase in specific diagnoses, such as depression and anxiety, is likely to be due to changes in definitions, as well as in screening and recording practices. These changes in turn are often due to specific incentives in the health care system, such as paying clinicians more to screen, or paying more if patients have more conditions.

The second myth is that youth suicides are driven mainly by deterioration in children's underlying mental health. Or to put it more simply, that youth suicide has increased because rates of depression have increased. Instead, I show that there is considerable variation in suicide rates across geography and over time even conditional on measures of underlying mental health conditions. Factors such as firearm laws play an important role given that firearms are a leading

[39] The National Institutes of Mental Health (NIMH) has increasingly favored research on genetics and the neuroscience of mental illness rather than research on clinical care. Thomas Insel, a former director of NIMH, has said of the research conducted during his 13-year tenure, "I don't think we moved the needle in reducing suicide, reducing hospitalizations [or] improving recovery for the tens of millions of people who have mental illness" (Rogers, 2017). This assessment may be unduly harsh. Possibly the basic science research previously conducted will have future payoffs for clinical care.

means of suicide even among teens. This point is important because it suggests that it is possible to reduce youth suicide even if underlying rates of mental illness remain high.

The third myth is that there is little that we can do to improve child mental health. Instead, economic research has shown that social investments in the prenatal, early childhood, and adolescent periods can all improve children's mental health. It is possible that in the absence of social investment, children's mental health would have deteriorated further in the face of trends such as increases in school shootings, fears about climate change, and bitter partisanship in public life. Interventions that reduce self-harm and suicides specifically include school-based mental health centers, anti-bullying policies, better mental health treatment, and firearm safety laws. Investing in these measures can help reduce the huge social costs of childhood mental illness so that children can reach their full potential.

Table 1: Changes in Firearm Laws and Youth Suicide Rates

Panel A: Number of "Foundational" Gun Safety Laws

	All 10-19	Male 10-19	Female 10-19	All 15-19	Male 15-19	Female 15-19
#Foundational Laws	-0.397*	-0.598*	-0.189	-0.580	-0.998*	-0.144
	(0.182)	(0.269)	(0.127)	(0.338)	(0.504)	(0.220)
% Hopeless in YRBSS	0.132*	0.218*	0.059	0.204*	0.334*	0.086
	(0.043)	(0.072)	(0.038)	(0.062)	(0.114)	(0.058)
Mean	6.753	10.14	3.176	11.16	17.18	4.78
R-squared	0.768	0.834	0.537	0.734	0.700	0.453

Panel B: Number of "Foundational" Gun Safety Laws and Male Suicides, by Cause

	Firearms 10-19	Suffocation 10-19	Firearm-Suffocation 10-19	Firearms 15-19	Suffocation 15-19	Firearm-Suffocation 15-19
#Foundational Laws	-0.543*	-0.029	-0.572*	-0.975*	0.108	-1.083*
	(0.220)	(0.085)	(0.215)	(0.397)	(0.187)	(0.396)
% Hopeless in YRBSS	0.125*	0.085*	0.040	0.215*	0.098	0.117
	(0.051)	(0.030)	(0.060)	(0.084)	(0.052)	(0.105)
Mean	5.396	3.822	1.574	9.36	6.126	3.233
R-squared	0.727	0.47	0.542	0.701	0.455	0.534

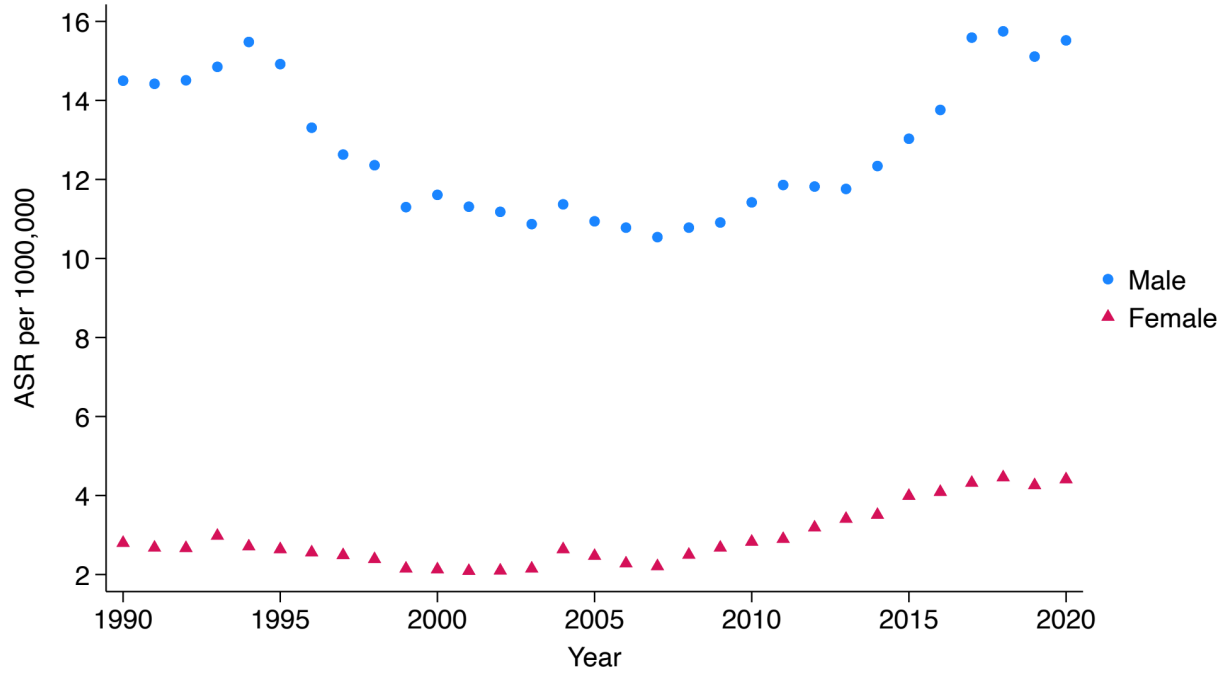
Panel C: Gun Freedom, and Firearm Safety Laws and Male Suicides, by Cause

	Firearms 10-19	Suffocation 10-19	Firearm-Suffocation 10-19	Firearms 15-19	Suffocation 15-19	Firearm-Suffocation 15-19
#Gun Freedom Laws	0.882*	-0.142	1.025*	-0.309	-0.136	-0.174
	(0.359)	(0.144)	(0.401)	(0.482)	(0.258)	(0.465)
#Gun Safety Laws	-0.158	-0.100	-0.058	1.561*	-0.322	1.883*
	(0.294)	(0.149)	(0.284)	(0.695)	(0.310)	(0.792)
% Hopeless in YRBSS	0.113	0.089*	-0.024	0.195*	0.105*	0.090
	(0.049)	(0.030)	(0.059)	(0.080)	(0.051)	(0.103)
Mean	5.396	3.822	1.574	9.36	6.126	3.233
R-squared	0.729	0.47	0.545	0.702	0.456	0.537

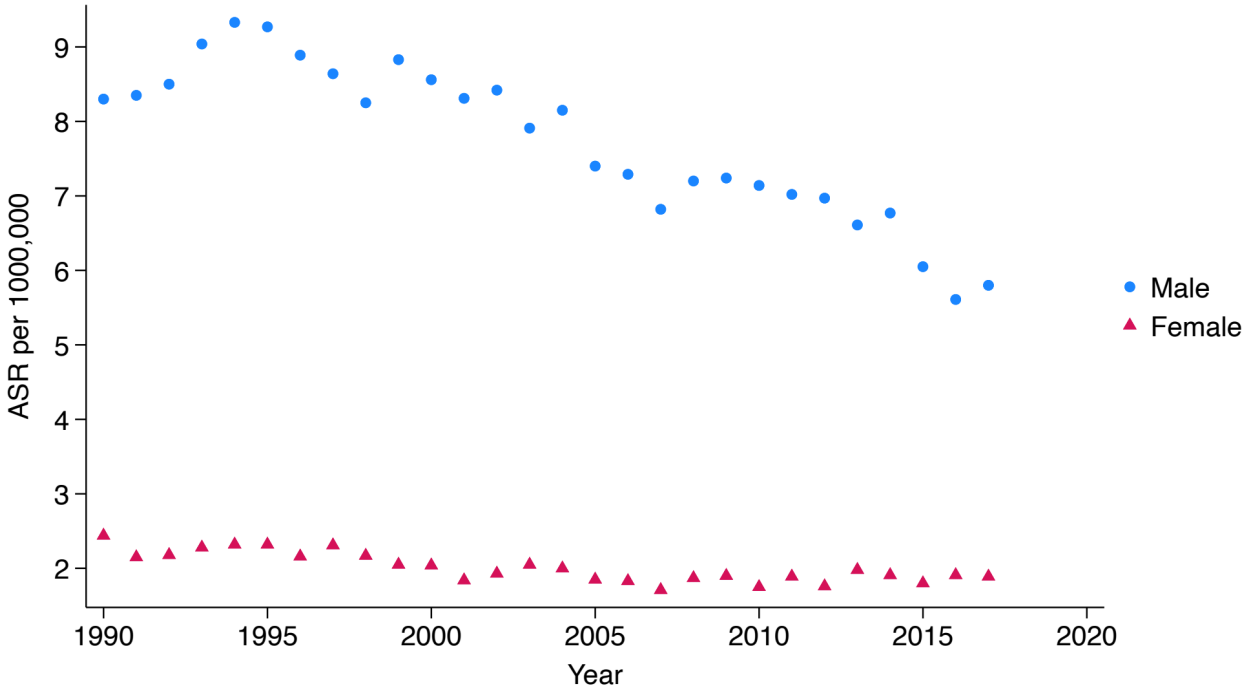
Notes: There are 987 state-year observations. All regressions include fixed effects for states and for years. Standard errors in parentheses. A * indicates statistical significance at the 95% level of confidence.

Figure 1: Suicide rates for 10–24-year-olds from the World Health Organization Mortality Data Base

A: United States

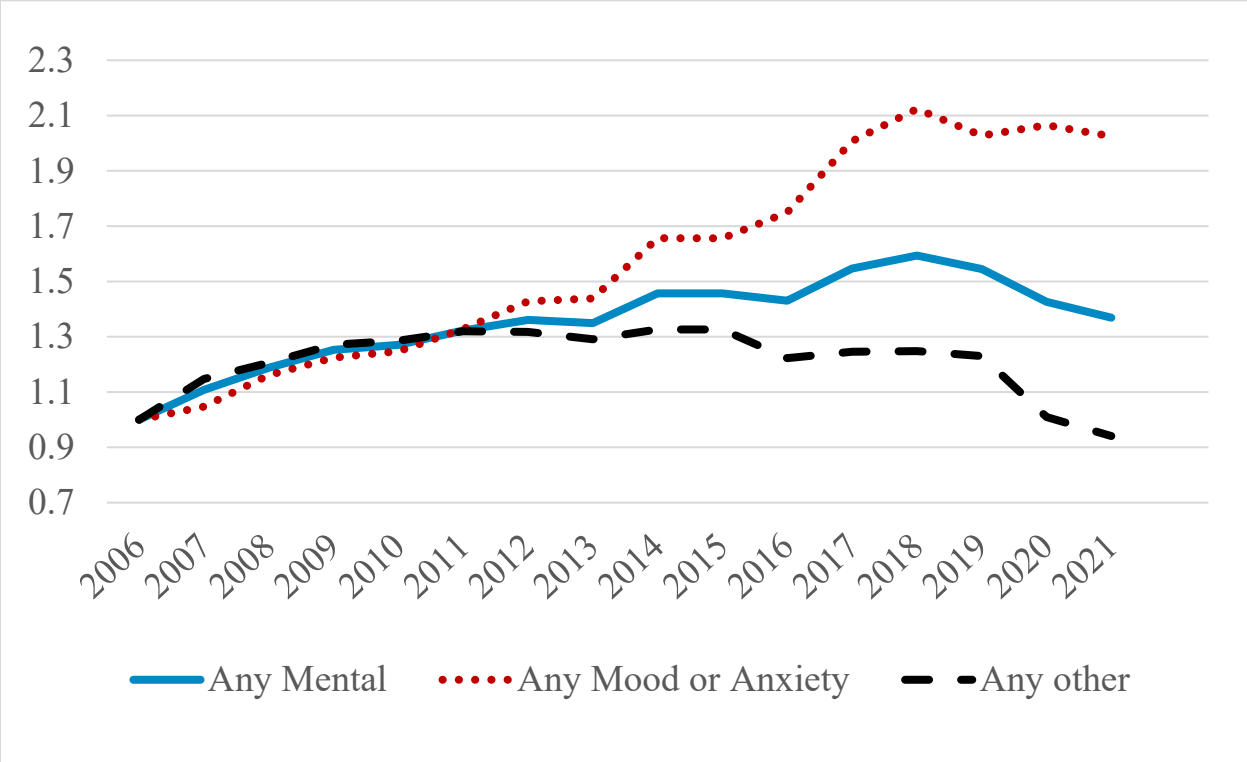


B: European Union (EU-27)



Notes: Source is Bertuccio et al. (2024). These are age-adjusted rates. I am grateful to Prof. Bertuccio for sharing their underlying data.

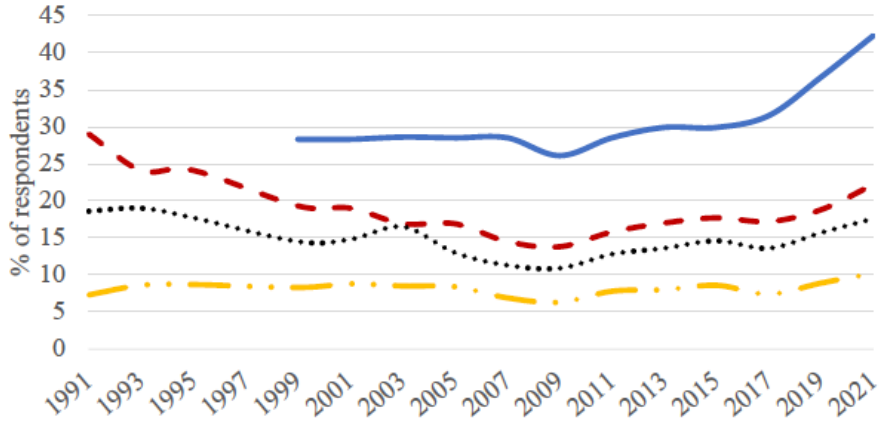
Figure 2: Emergency Department visits for mental disorders, 10-19-year-olds, 2006=1, Nationwide ED Sample



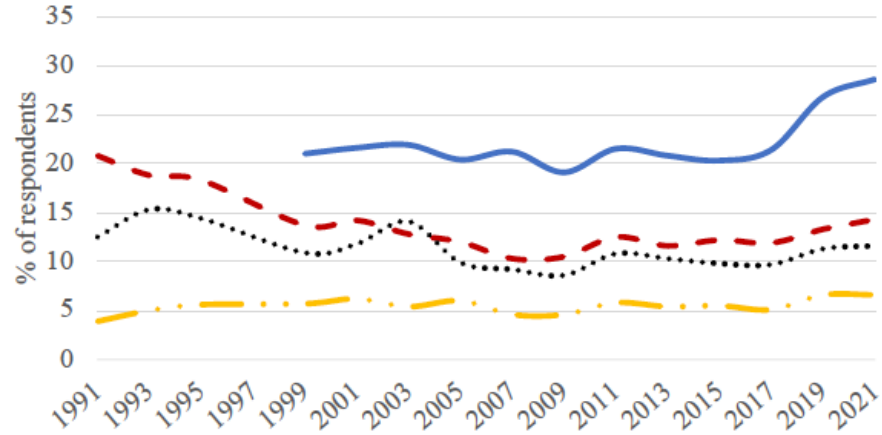
Note: The figure includes ED visits with any mental health diagnosis. Total diagnoses are then broken into those with *any* mood or anxiety diagnosis and all others. ICD9 code for anxiety is 300, and in ICD10 it is F4. ICD9 code for mood is 296 and 311, and in ICD10 it is F3. Data for the 4th quarter of 2015 is interpolated using data from the first 3 quarters of 2015 and the share of diagnoses in the 4th quarter of 2014 and 2016 because of missing data on diagnosis following the introduction of ICD10. The total number of visits in the 4th quarter of 2015 was not affected.

Figure 3: Mental Health Questions from the Youth Risk Behavioral Surveillance Survey of 15-19-year-old high school students

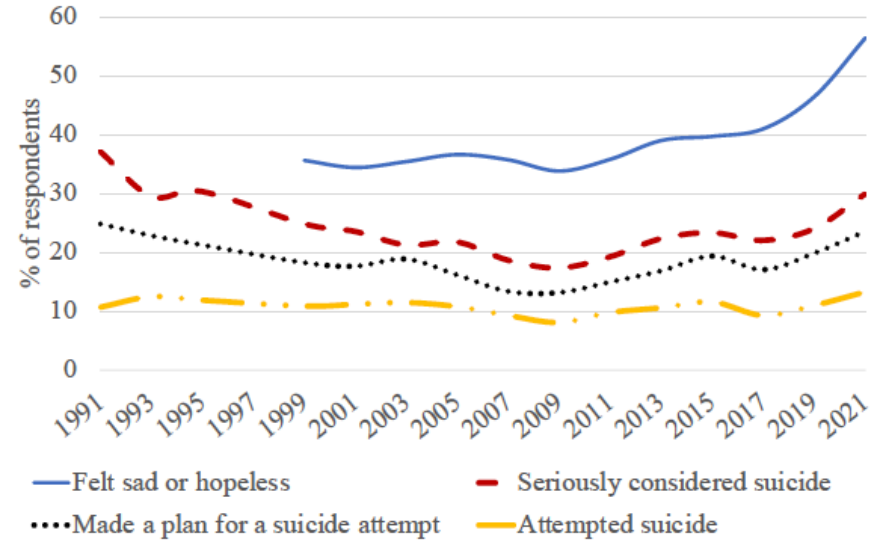
A: Percent of all students



B: Percent of male students

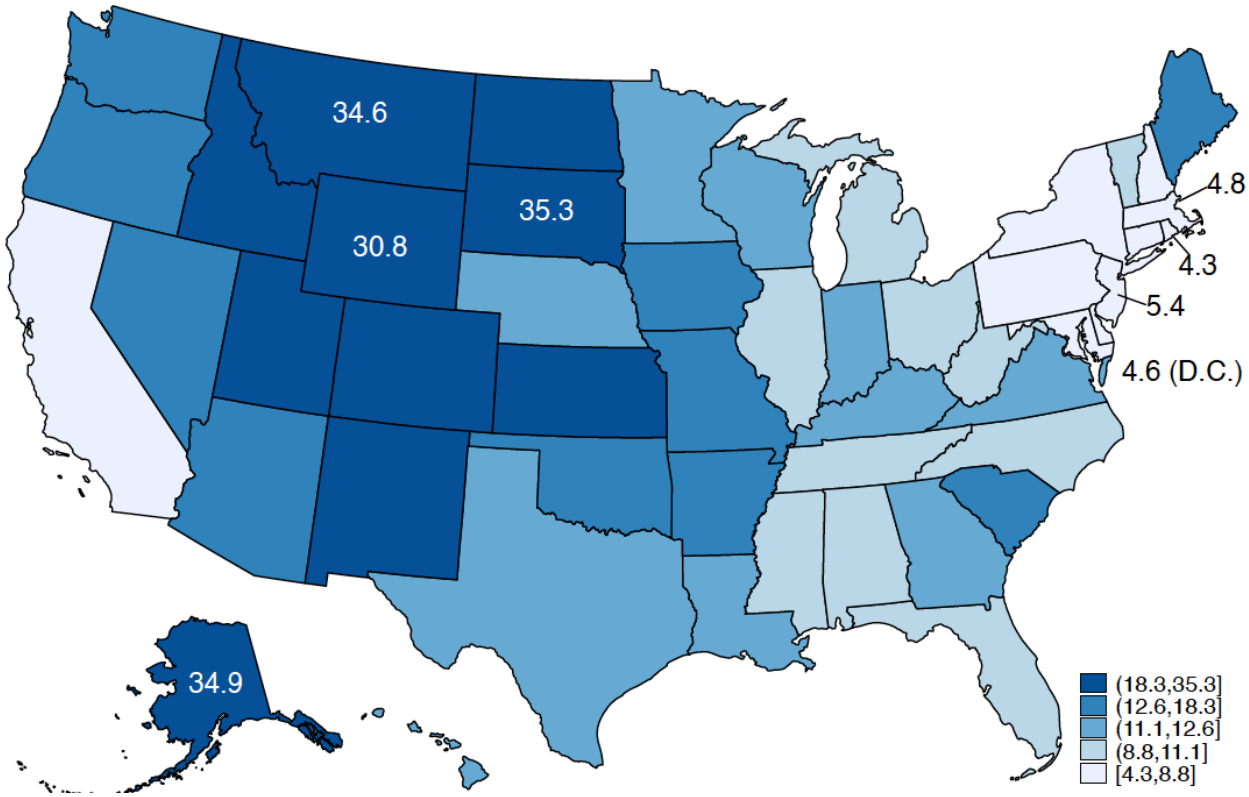


C: Percent of female students



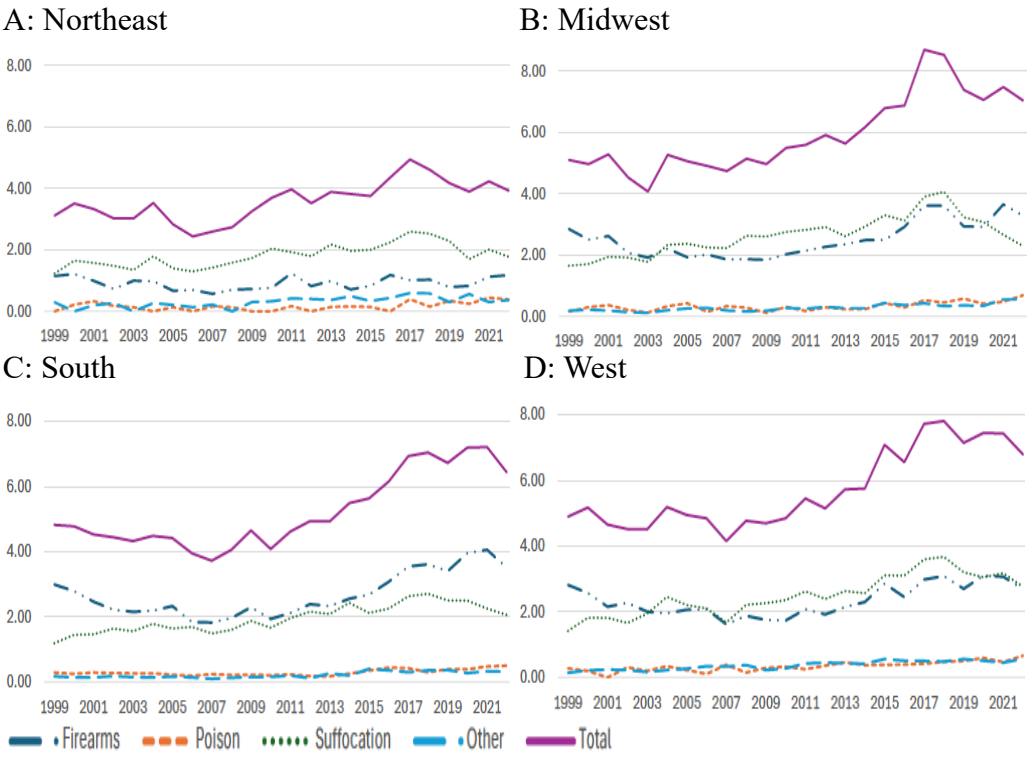
Notes: See text for the exact wording of the questions.

Figure 4: Suicide deaths per 100,000 persons 15-19 by state, 2019-2021



Notes: Source is CDC Wonder Multiple Cause of Death Files for 2019-2021. Numbers show the suicide rate per 100,000 15–19-year-olds in the relevant state. Map is adapted from https://www.americashealthrankings.org/explore/measures/teen_suicide.

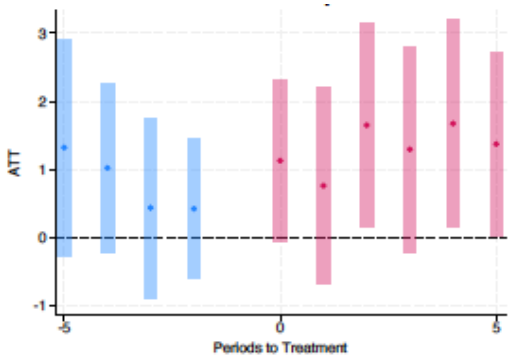
Figure 5: Suicide deaths per 100,000 teens 10-19, by Census region, type, and method



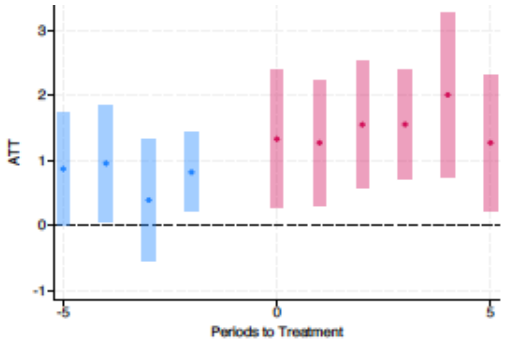
Notes: Author's calculations from confidential Vital Statistics Mortality data with non-supressed cells. Instructions for applying for these data are here: https://www.cdc.gov/nchs/nvss/nvss-restricted-data.htm.

Figure 6: Event studies of the relationship between new "gun freedom" laws and suicide rates for 10-19-year-olds.

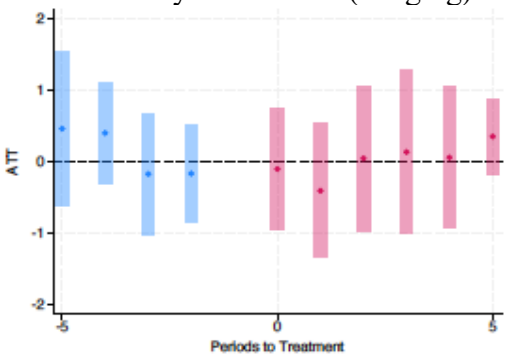
A: All suicides



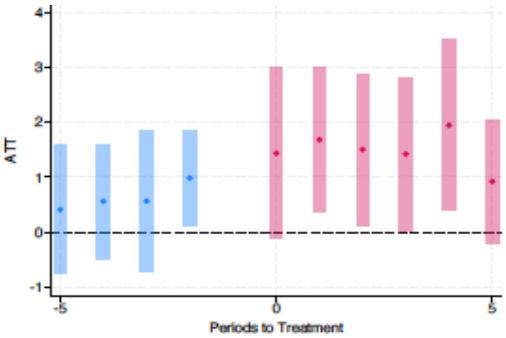
B: Suicides using firearms



C: Suicides by suffocation (hanging)

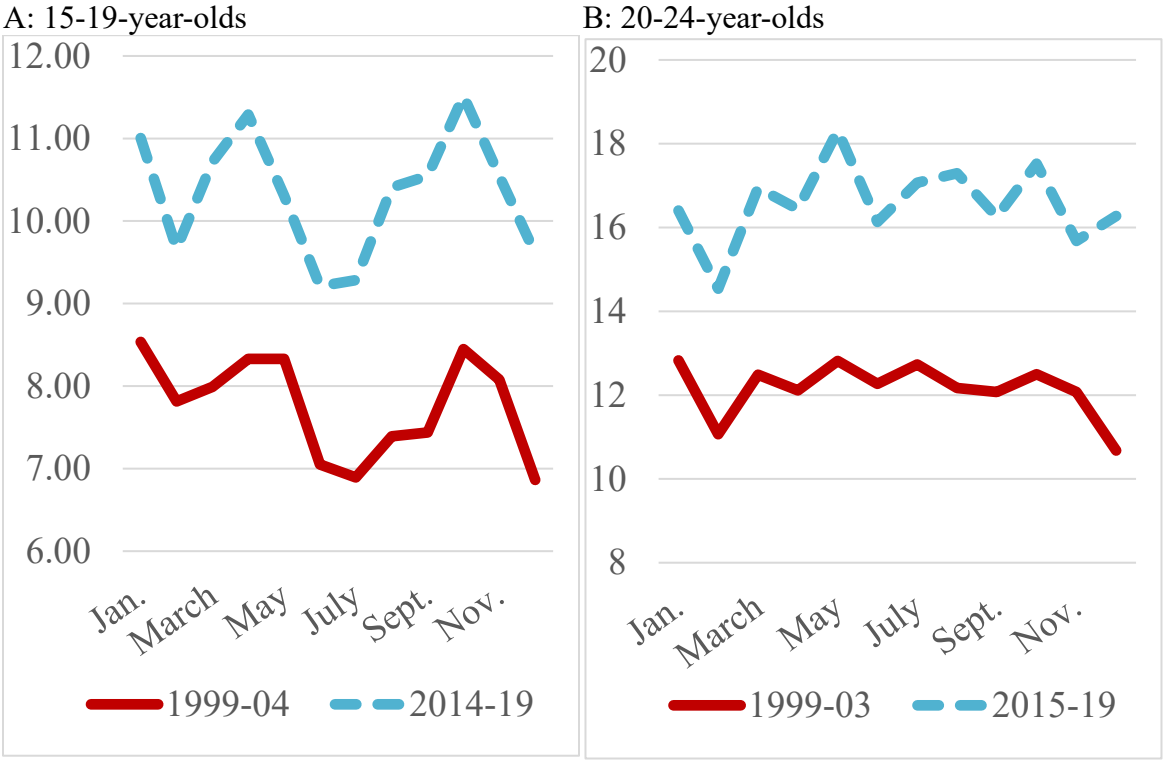


D: Difference (suicides by firearms and by hanging)



Notes: Blue indicates the years before the law change, while red indicates the year of the law change and those following. The sample includes 28 adoptions of gun freedom laws that satisfy the criterion that there was no other change in gun freedom laws in the five years before or after the index change. There were only four gun safety law enactments that satisfy this five years pre/post restriction. Control units are all state years for the never treated states (i.e. those with no enactments of gun freedom laws from 2001-2021). Controls include state and year fixed effects and 3 indicators for whether a state has one of the other gun safety laws. Models are estimated using the csdid command in Stata to implement Callaway and Sant'Anna (2021).

Figure 7: Suicides over the school year,
ages 15-19 vs. 20-24 for 1999-2004 and 2015-2019



Notes: Computed using publicly available CDC mortality data on the number of deaths by month. Rates are obtained by dividing by the population at the midpoints of each time interval (20,456,284 in 2001 and 21,131,660 in 2017).

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