Exploring Differences in Suicide Rates in the Northeast

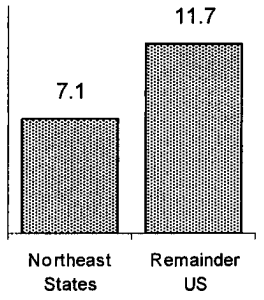
A Research Summary from the Harvard Injury Control Research Center

Harvard School of Public Health http://www.hsph.harvard.edu/hicrc/

1. SUICIDE RATES ARE LOWER IN THE NORTHEAST THAN IN THE REST OF THE UNITED STATES.

On average, the suicide rate in the Northeast (CT, ME, MA, NH, NJ, NY, RI, and VT) was 7.1 suicides per 100,000 people, compared with 11.7 suicides per 100,000 in the rest of the country for the period 1999-2002. [1]

Figure 1. Average annual suicide rate (per 100,000) in the Northeast and the remainder of the US, 1999-2002



2. ARE THE RATES RELATIVELY LOW IN ALL NORTHEAST STATES ?

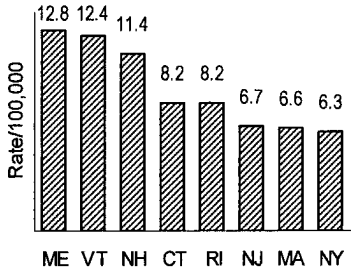
Only in certain states. Maine, Vermont, and New Hampshire have significantly higher suicide rates than the rest of the region. The rate in Maine is twice that of New York. The actual *number* of suicides is higher in the southernmost states because the population is much larger. Because of differences in population size across states, the *rate* of suicide (the number of suicides per 100,000 people) is a more useful measure with which to compare states.

Table 1. Average annual number and rate (per 100,000 population) of suicides in the Northeast, 1999-2002, by state[1]

State	No.	Rate	Age-adjusted Rate*	2000 Population
ME	164	12.8	12.4	1,274,923
VT	76	12.4	12.0	608,827
NH	142	11.4	11.2	1,235,786
CT	280	8.2	8.0	3,405,565
RI	86	8.2	8.0	1,048,319
NJ	566	6.7	6.6	8,414,350
MA	420	6.6	6.4	6,349,097
NY	1202	6.3	6.2	18,976,457

* *What are age-adjusted rates?* Since suicide rates differ by age group, age-adjusted rates show what the rate would be if the population in each state had the same age distribution. Since the ranking isn't affected by age-adjusting, throughout the remainder of this document we use crude rates (i.e. non-age-adjusted).

Figure 2. Average annual suicide rate in the Northeast, 1999-2002, by state



This research was undertaken by the Harvard Injury Control Research Center in response to an initiative by the Northeast Injury Prevention Network to assemble data on suicide in the Northeast region. Its purpose was to explore why differences in suicide rates exist across states in the region.

See final page for references and data sources.

3. ARE THE HIGHER RATES IN ME, VT, and NH LIMITED TO CERTAIN DEMOGRAPHIC GROUPS?

No, they're higher across the board. Higher rates of suicide in ME, VT, and NH are seen in both sexes and within each age group.

Table 2. Average annual rate (per 100,000 population) of suicides by age group of victim and state, 1999-2002[1]

State	5-24 yrs	25-64 yrs	65+yrs
ME	6.6	16.3	16.0
VT	6.3	14.9	20.9
NH	6.7	14.5	13.4
CT	3.6	10.9	10.1
RI	4.4	11.3	7.6
NJ	2.8	8.7	9.4
MA	3.3	9.0	6.5
NY	3.5	8.0	8.5

4. ARE THE RATES HIGHER IN ME, VT, and NH BECAUSE A LARGER PROPORTION OF THEIR RESIDENTS ARE WHITE?

Even when comparing among white residents alone, the suicide rate is significantly higher in these states than in the rest of the region (Figure 4).[1] While White non-Hispanics have higher suicide rates than Black non-Hispanics and Hispanics nationally, the higher suicide rates in the northern states are not simply a function of these states having a higher proportion of white residents.

5. WHY ARE THE SUICIDE RATES HIGHER IN ME, VT, AND NH? ARE RATES OF DEPRESSION HIGHER IN RURAL STATES?

...Not according to available national data. Rural areas in the US have higher suicide rates than metropolitan areas, but the prevalence of depression does not appear to be higher in these areas, according to the limited evidence available. The National Survey of Drug Use and Health found little difference in prevalence of major depression among respondents living in large metropolitan, small metropolitan, or rural counties. See: <http://oas.samhsa.gov/depressTabs.htm#Percentgeo> The National Comorbidity Survey did not find significant differences across U.S. regions in the prevalence of major depression (Table 3), in spite of the significant differences in suicide rates across the regions.[2]

Figure 3. Average annual suicide rate by sex of victim and state, 1999-2002

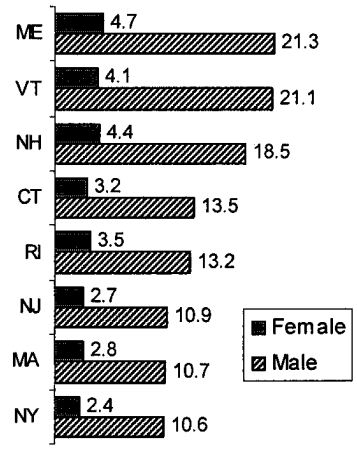


Figure 4. Average annual suicide rate among white residents, 1999-2002, by state

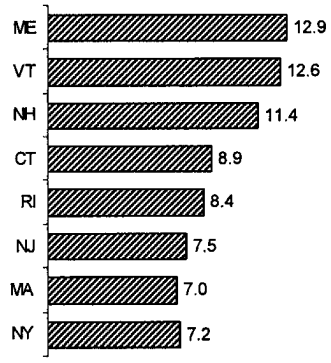


Table 3. Suicide rate and estimated lifetime prevalence of major depression, by US region of residence

	Suicide rate	Major depression
Mid-Atlantic	9.0	15.3%
Northeast	9.7	18.5%
East North Central	10.9	17.1%
West North Central	12.2	16.4%
Pacific	12.6	20.9%
West South Central	12.7	15.2%
East South Central	12.9	16.8%
South Atlantic	13.1	16.5%
Mountain	18.0	16.7%

Sources: Suicide rate/100,000: National Vital Statistics System, 1988-1997. Lifetime prevalence major depression: National Comorbidity Survey, conducted 1990-1992.

...And not according to youth surveys in the Northeast. The Youth Risk Behavior Survey asks students if over the past 12 months they have had a period lasting two weeks or more in which they felt so sad or hopeless that they stopped doing some of their usual activities. The percent answering yes was not higher in the states with high youth suicide rates.[3]

6. EVEN IF PEOPLE ARE NOT MORE DEPRESSED IN THE RURAL STATES, ARE THEY MORE LIKELY TO MAKE A SUICIDE ATTEMPT?

Not according to surveys of youth. The Youth Risk Behavior Survey asks high school students if they attempted suicide in the past 12 months and whether they received any medical care for the attempt.[3] The percent answering yes was not higher in the states with higher suicide rates (Figure 6).

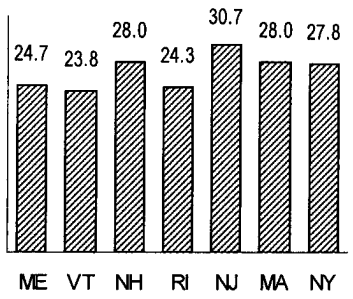
7. ARE PEOPLE WHO ATTEMPT SUICIDE IN RURAL AREAS MORE LIKELY TO DIE FROM THEIR ATTEMPTS?

When comparing the case fatality rate within each weapon type, there were no major differences across the states.[4, 5] Given that depression does not appear to be higher in rural areas, nor suicide attempts more prevalent, one hypothesis might be that people in rural areas are more likely to die from their attempts, either because of their remoteness from emergency medical care or because they are more intent on dying or more knowledgeable about how to cause death by the means they choose. We do not see support for that hypothesis, however, as weapon-specific case fatality rates (the percent who die from an attempt) do not vary much across states (Table 4, next page).

The case fatality rates (CFR) by weapon type were calculated by dividing the number of deaths by the sum of the number of deaths and self-injury hospitalizations. Inpatient discharge data were provided by each state and cover all discharges from inpatient care at non-federal, acute care hospitals. Codes called "e-codes" indicate whether the injury was intentionally self-inflicted and by what means. A stronger method for testing the CFR hypothesis would have been to use emergency department data, but these data were not available from all states.

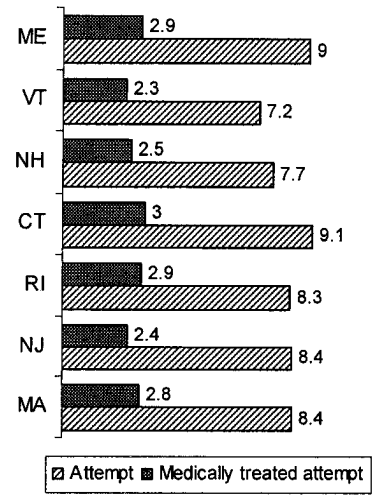
See the notes on the final page about data sources used in figures 7-10 & Table 4.

Figure 5. Percent of students who, during the past 12 mos., ever felt so sad or hopeless for 2 wks or more that they stopped doing some usual activities



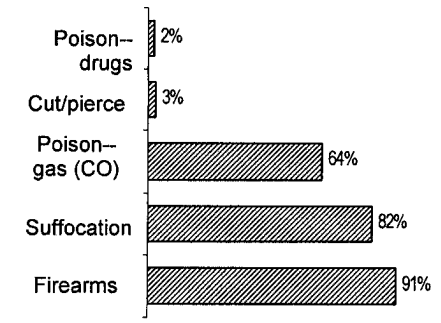
Source: Youth Risk Behavior Survey, 2003
NJ data is from 2001. CT YRBS did not ask this item.

Figure 6. Percent of students who reported they attempted suicide in past 12 mos.



Source: Youth Risk Behavior Survey, 2003.

Figure 7. Case fatality rate among self-injury deaths and hospitalizations



Source: State Vital Statistics and Uniform Hospital Discharge Data, northeast states.

Table 4. Case fatality rate among self-injury deaths and hospitalizations by weapon type and by state. [5]

	Gun	Suffo-cation	Poison--drugs	Cut, pierce	Poison--gas (CO)
ME	91%	93%	4%	3%	80%
VT	90%	74%	2%	1%	61%
NH	92%	80%	3%	3%	68%
CT	90%	77%	2%	3%	61%
RI	91%	74%	2%	3%	53%
NJ	92%	89%	2%	5%	64%
MA	89%	82%	3%	3%	66%

Note: Hospital data were not provided by NY

8. WHAT ABOUT WHEN COMPARING BY VICTIM'S COUNTY OF RESIDENCE?

Case fatality rates (CFR) by weapon type are relatively stable, even when using a unit of analysis—county—that is closer to home. [5] We assigned the 88 counties in the northeast to four categories: most rural, second most rural, second most urban, most urban. Suicide rates were markedly higher in the rural counties (Figure 8). But fatal and nonfatal suicide attempt rates (other than firearm) were not (Figure 9), nor were case fatality rates (Fig 10). Again, the evidence seems to be that while suicide rates are higher in rural areas, it is not because more people are attempting suicide or making more serious attempts within a given weapon category. CFRs also didn't differ much within weapon type when counties were grouped by poverty rates or by divorce rates. Again, a better technique for exploring attempt rates and CFRs would be to use emergency department data rather than inpatient data, but these data were not available for all states.

9. IF PEOPLE ARE *NOT* MORE LIKELY TO BE DEPRESSED, ATTEMPT SUICIDE, OR DIE FROM A GIVEN MEANS IN ME, VT, AND NH, WHAT EXPLAINS THEIR HIGHER RATES?

One major factor is that people are more likely to attempt suicide with a *firearm.* [6] What drives the overall suicide rate is variation in the *firearm* suicide rate (Table 5). The non-firearm suicide rate does not vary much across the states. Firearms have a higher case fatality rate than other weapon types. They are also largely irreversible in a way that most other methods are not. For example, a person who takes pills or inhales car exhaust has some time to reconsider and stop the event or summon help before serious harm occurs. With firearms, once the trigger is pulled, there's virtually no opportunity for rescue.

Figure 8. Suicide rate by weapon type and by urbanization of county in the northeast.

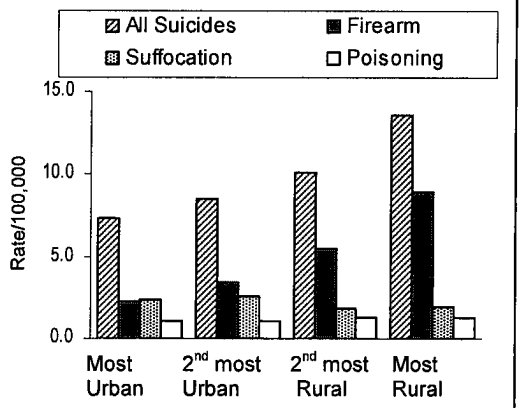


Figure 9. Suicide act rate (self-injury fatalities and hospitalizations) by weapon type and by urbanization of county in the northeast.

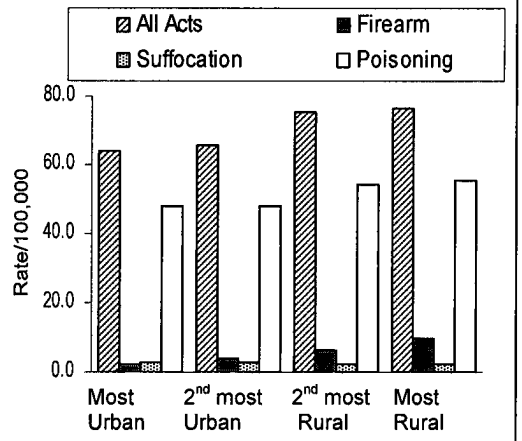
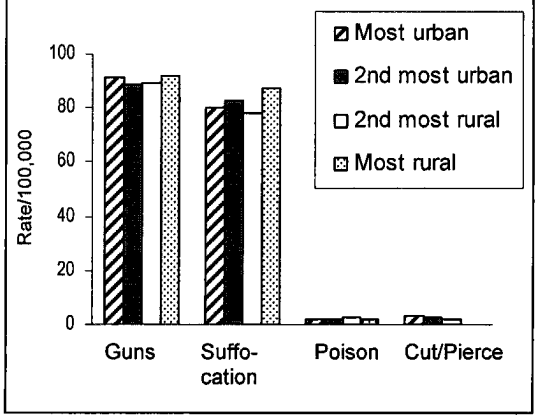


Figure 10. Case fatality rate by urbanization of county and by weapon type.



10. WHY WOULD PEOPLE ATTEMPT WITH A FIREARM MORE OFTEN IN RURAL STATES?

One possible reason is availability. Household firearm ownership is more prevalent in rural areas. Table 5 illustrates the relationship between state household gun ownership rates and total suicide rates.[6] Firearm suicide rates vary with household gun ownership levels, while non-firearm suicide rates do not. They remain relatively flat across the states, indicating that weapon substitution does not appear to play a major role in the other states. Most studies that have examined the link between household gun ownership and suicide rates[7,8]—whether ecologic (assessing correlation between ownership and suicide across jurisdictions), case control (comparing gun ownership prevalence among suicide decedents with that among matched controls), or prospective (following gun owners and non-gun owners over time to determine which group has higher suicide rates)—have found a relationship between gun availability and suicide rates, even when controlling for other factors related to suicide such as psychopathology and unemployment rates. There have been very few prospective studies of this issue, however, and these are the strongest designs for examining the role of gun availability in suicide.

11. WHY WOULD A GUN AT HOME MATTER? IF A PERSON REALLY WANTS TO DIE, THEY CAN ALWAYS FIND A WAY.

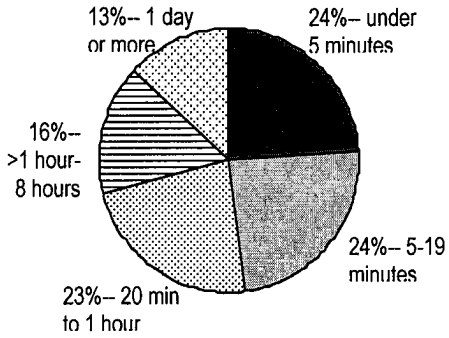
Many suicide attempts are impulsive. Some suicide victims do have a longterm, sustained desire to die and will indeed find a way. But others are responding to a temporary crisis and if thwarted today may not seek a way tomorrow. The Centers for Disease Control and Prevention conducted a study among nearly-lethal suicide attempters, ages 15-34, and asked how much time elapsed between their decision to commit suicide and their act. *For nearly a quarter, the answer was less than five minutes,* and for over two-thirds, it was an hour or less.[9] Data assembled by HICRC and collaborators on a sample of 1,670 suicide victims indicated that one out of three youths ages 17 and under experienced a precipitating crisis such as an argument or bad grade on the day they took their life.[10] Various studies have followed victims of nearly-lethal attempts over time and found that 10 to 20 years later, 90 percent or more had not gone on to commit suicide.[11-13] For some suicide attempters, therefore, their impulse is short-lived, and what weapon they reach for during that impulse determines whether they live or die. If the weapon is immediately available, immediately lethal, and

Table 5. Percent of households with firearms in 2001 and average annual suicide rate, 1999-2002, by major method and by state

	% of Households With Guns	*Total Suicide Rate*	*Firearm Suicide Rate*	*Non-Firearm Suicide Rate*
ME	41%	12.8	6.9	5.9
VT	42%	12.4	7.7	4.7
NH	30%	11.4	5.5	5.8
CT	17%	8.2	3.1	5.1
RI	13%	8.2	2.8	5.4
NJ	12%	6.7	2.0	4.6
MA	12%	6.6	1.7	4.9
NY	18%	6.3	2.3	4.0

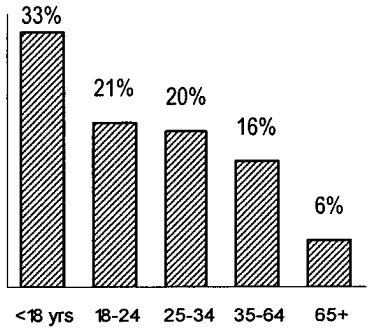
Source: Household firearm ownership, Behavioral Risk Factor Surveillance System, CDC.

Figure 11. Time elapsed between decision to commit suicide and the attempt, among nearly-lethal suicide attempters ages 15-34.



Source: Houston Case-Control Study of Nearly Lethal Suicide Attempts

Figure 12. Percent of suicide victims whose death investigation report indicates a crisis occurred on the same day that they committed suicide, by age group of victim.



Source: NVISS. 1,670 suicide victims in CT, ME, UT, WI, Allegheny County PA, San Francisco County CA, 2001

irreversible—a firearm—the result will almost always be death.

Imagine a 16-year-old boy who storms out of the living room after a furious argument with his mother. If he reaches into the hall closet, takes out a loaded gun, and pulls the trigger, a life is lost. But if there is no gun, in the 15 minutes it takes to burst enough pills from their blister packs and start feeling their effect, he may change his mind. Or in the interval it takes to fill the garage with car exhaust, a family member might find him and call 911. Even with hangings, if it is partial-suspension hanging, the attempter has a short window of opportunity to change his or her mind. For impulsive suicides, anything that puts temporal distance between the person and a weapon may help.

A gun at home appears to place not only the gun owner but other family members as well at increased risk of suicide. Safe storage (storing guns unloaded and locked and storing ammunition separately and locked) appears to be protective when comparing among households with guns, according to a recent study.[14]

12. ARE GUNS THE ONLY FACTOR?

Not at all. Guns are only one part of the picture, and further research is needed to better understand other factors that contribute to, and protect against, suicide in each state. Also, while suicide rates are a useful way to compare the prevalence of self-harm across geographic areas, it is also useful to look at raw numbers. The *rates* of suicide are relatively low in MA, NY, and NJ, but given their larger populations, the actual *numbers* of victims are much higher than in the northern New England states, including the numbers of hangings and poisonings. Therefore, strategies to prevent suicide must be comprehensive, addressing suicides by any weapon type and by any degree of impulsivity or deliberation.

REFERENCES

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2 Hemenway D, Miller M. "The Association of Rates of Household Handgun Ownership, Lifetime Major Depression and Serious Suicidal Thoughts with Rates of Suicide across US Census Regions." *Injury Prevention,* 2002; 8:313-16.

3 Centers for Disease Control and Prevention. Youth Online: Youth Risk Behavior Surveillance System [Online]. National Center for Chronic Disease Prevention and Health Promotion. Available from: http://apps.nccd.cdc.gov/yrbss/

4 Miller M, Azrael D, Hemenway D. "The Epidemiology of Case Fatality Rates for Suicide in the Northeast." *Annals of Emergency Medicine.* 2004; 723-30.

Data sources used: Uniform Hospital Discharge Data and state Vital Statistics data supplied by state agencies for the years 1996-2000 (RI), 1996-1999 (CT, NH, VT), 1996-1998 (MA, NJ), 1998-1999 (ME). NY data were unavailable during the study period. The following external cause of injury codes ("E-codes") from the International Classification of Diseases were used to identify self-injury: E950.0-E959.9 for hospital discharge data and for mortality data for 1996-1999, and X60-X84 for mortality data after 1999. E-code rates in hospital discharge data were calculated using the STIPDA Injury Surveillance Workgroup formula and were as follows: 97% (MA, NH), 96%(CT, NJ, RI), 89% (ME), 86% (VT). Northeast Injury Prevention Network members at their respective state health departments graciously assisted in making the data available.

5 Unpublished data, based on same data sources and methods as in Miller above.

6 Miller M, Hemenway D; Azrael D. "Firearms and Suicide in the Northeast" *Journal of Trauma.* 2004;57:626-632.

[7] Miller M, Hemenway D. "Gun Prevalence and the Risk of Suicide: A Review." *Harvard Health Policy Review,* 2001; 2:29-37.

For a brief summary of relevant studies on the connection between firearm availability and suicide, see: http://www.hsph.harvard.edu/hicrc/pdf/litreviewfirearmdeaths.pdf

[8] Miller M, Azrael D, Hemenway D. "Household Firearm Ownership Levels and Suicide across U.S. Regions and States, 1988-1997." *Epidemiology*. 2002; 13:517-524.

[9] Simon TR, Swann AC, Powell KE, et al. "Characteristics of Impulsive Suicide Attempts and Attempters." *Suicide and Life-Threatening Behavior,* 2001; 32 (Supplement): 49-59.

Information on the proportion of attempters who deliberated five minutes or more was supplied by personal email correspondence from Thomas Simon on 3/16/2005.

[10] National Violent Injury Statistics System. Characteristics of Victims of Suicide in CT, ME, UT, WI, Allegheny County PA, and San Francisco County CA in 2001. Harvard Injury Control Research Center, Harvard School of Public Health, 2004. (handout)

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