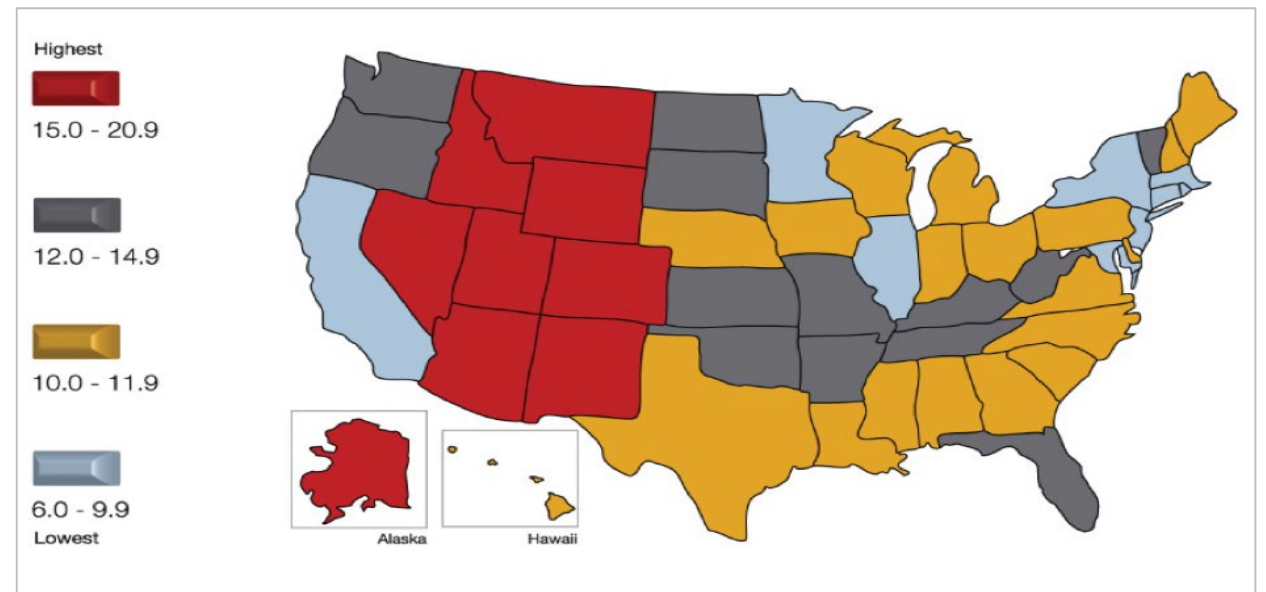


# Means Matter



Matthew Miller, MD, MPH, ScD  
Professor of Health Sciences and Epidemiology  
Northeastern University  
Adjunct Professor of Epidemiology  
Harvard T.H. Chan School of Public Health  
Co-Director, Harvard Injury Control Research Center

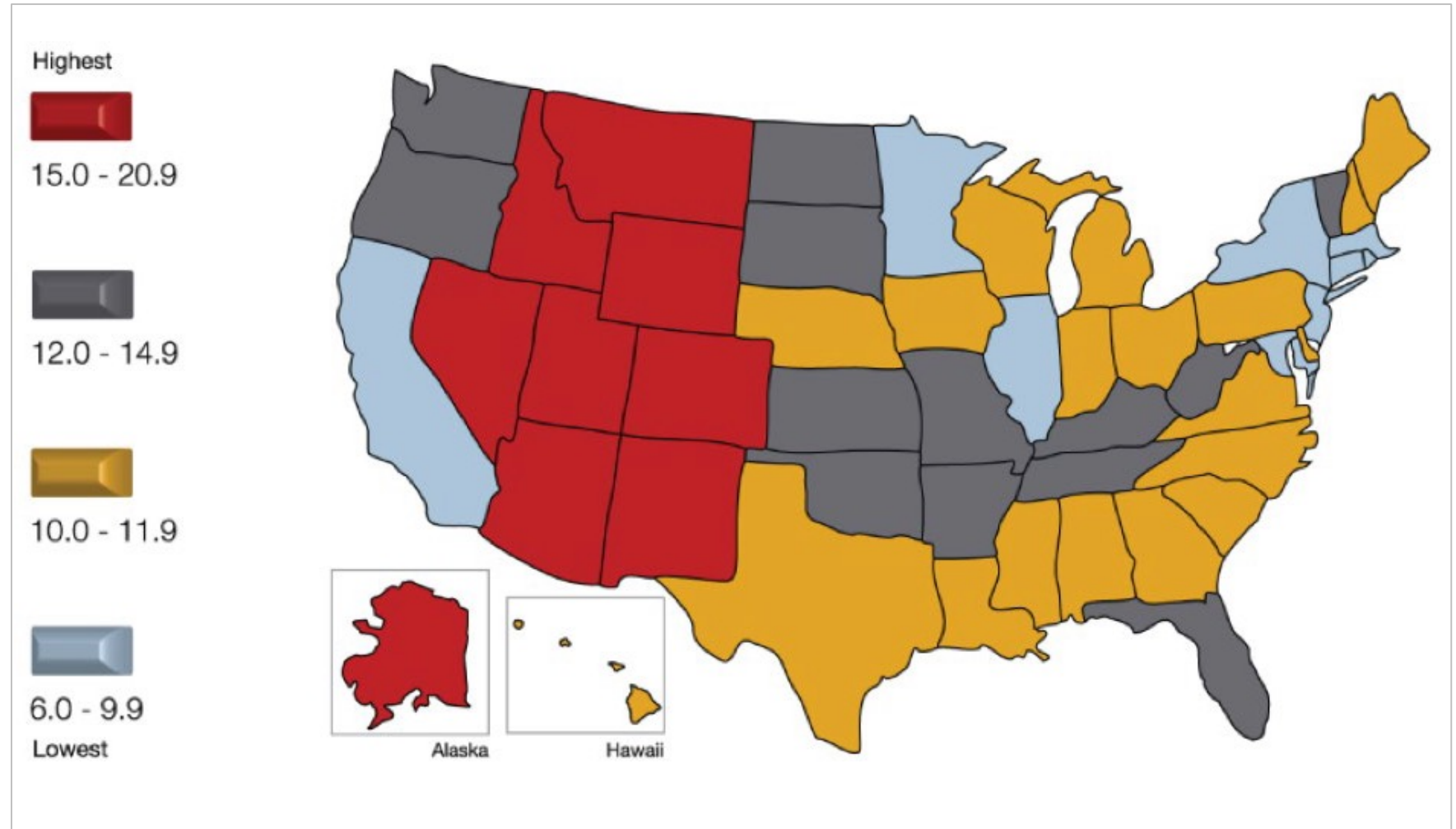
Is intent all that matters?



# Rationale for Means Restriction

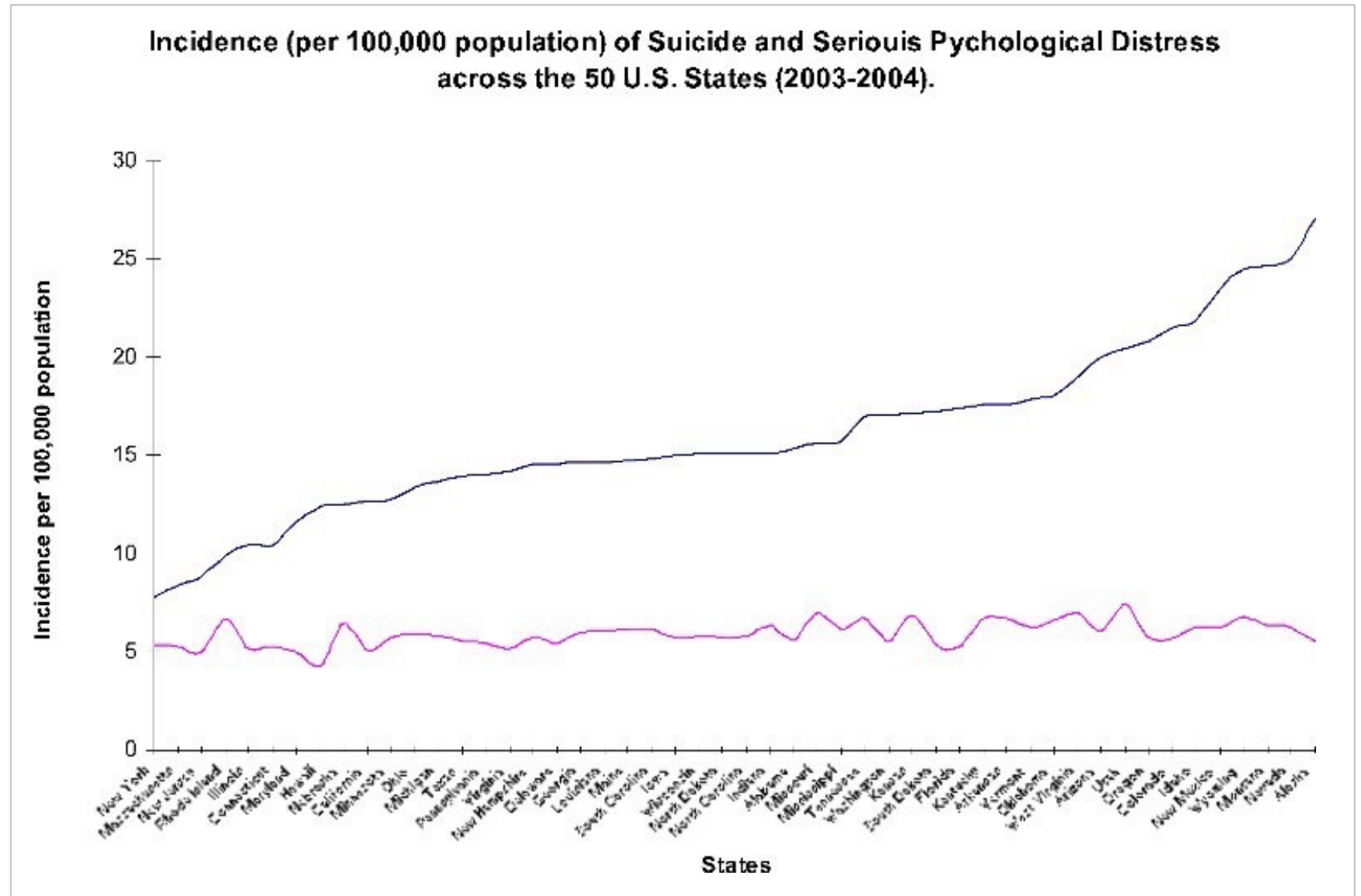
- ▶ Suicide acts are often impulsive and crises often fleeting
- ▶ Method used largely depends on availability
- ▶ CFR's for commonly used methods vary greatly
  - CFR firearms ~90%
  - CFR pills and cutting <5%
- ▶ Fewer than 10% of survivors—even of near-lethal suicide attempts—go on to die by suicide
  - ▶ Implication: preventing a suicide today likely saves a life in the long run

# Suicide Rates in the United States



Source: Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS), [www.cdc.gov/ncipc/wisqars](http://www.cdc.gov/ncipc/wisqars)

# State-Level Suicide Rates in Relation to Rates of Mental Health Problems

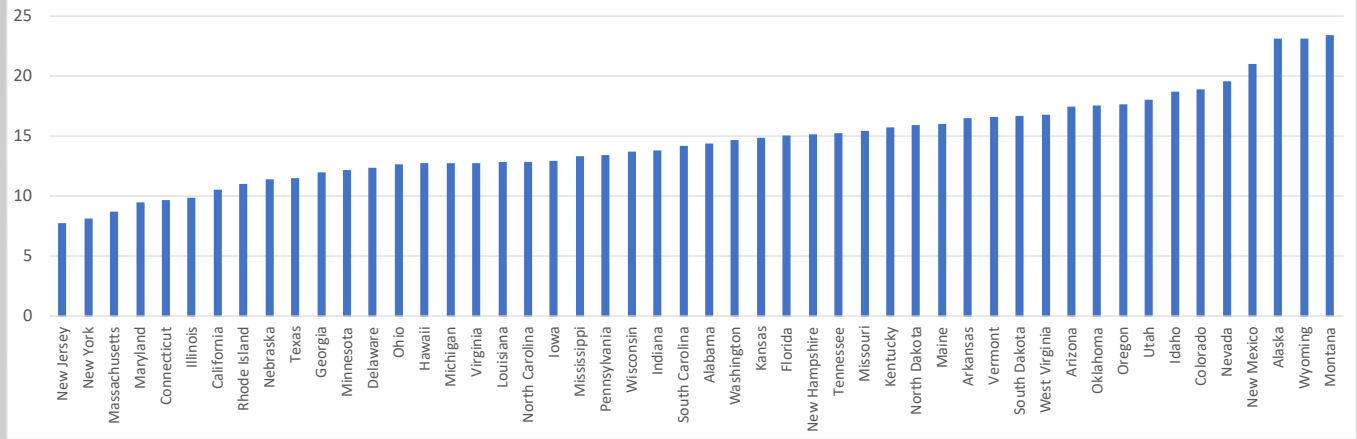


Source: Suicide data from WISQARS; Serious Psychological Distress in Past Year, Annual Incidence Based on 2003 and 2004 NSDUH data.

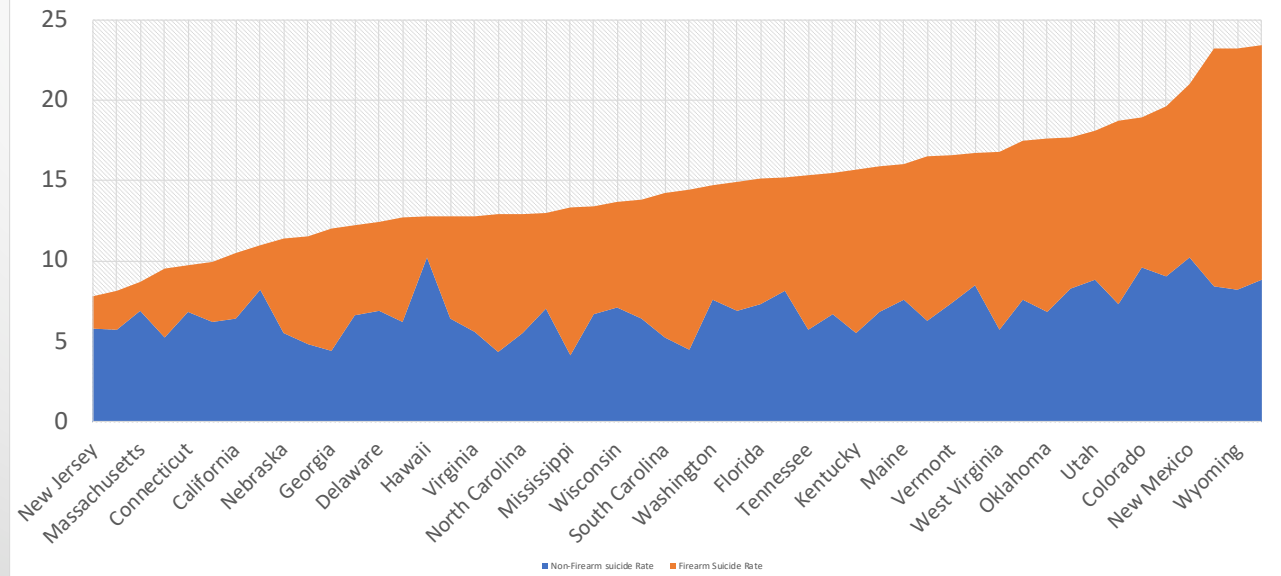
SR 2007-2016



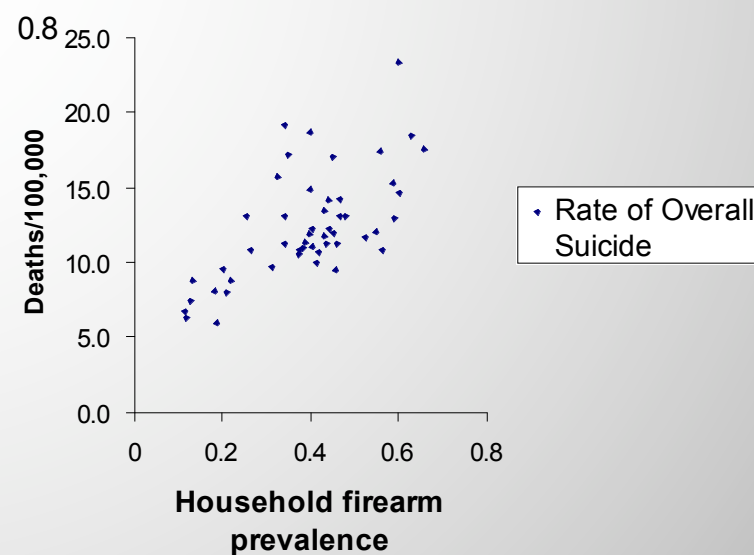
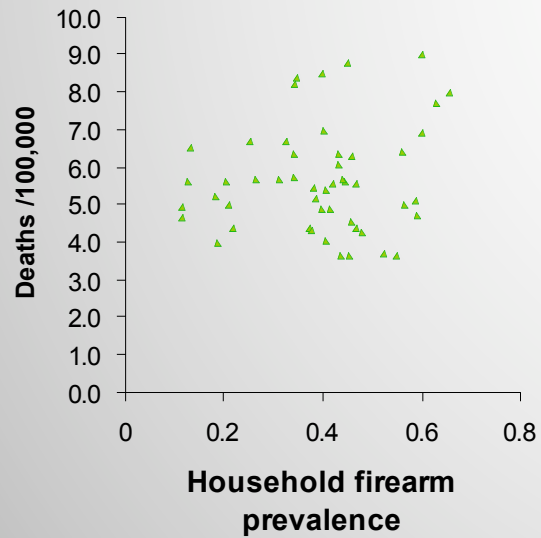
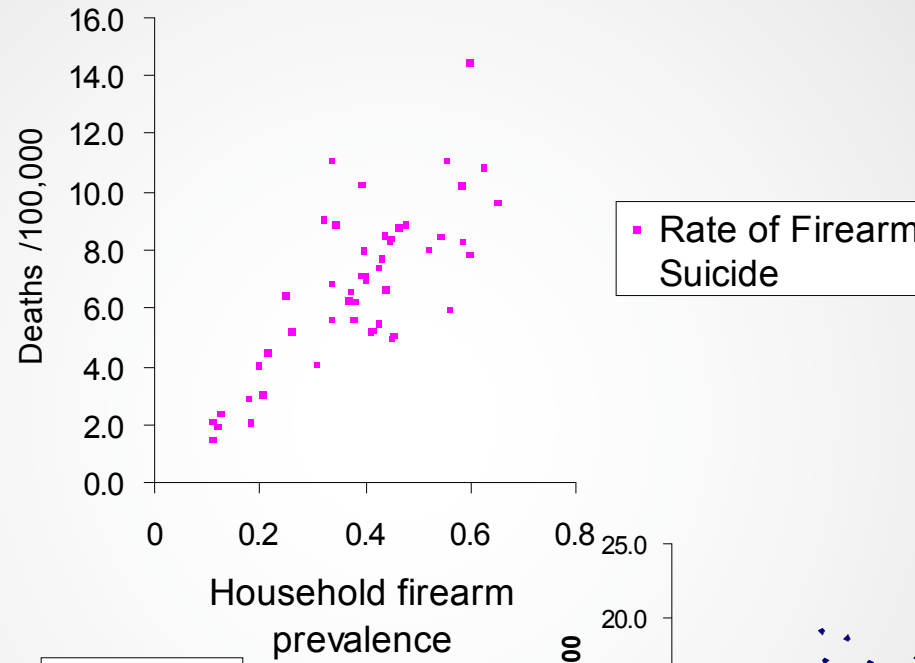
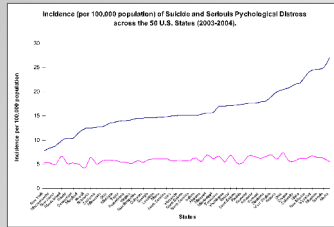
Suicide Rate



Suicide rates US 2006-2017, by state and mechanism



# Household Firearm Ownership and Rates of Suicide in the US



# Firearms and suicide: is risk independent of underlying suicidal behavior?

**Table 3.** Suicides and Suicide Attempts in US States with the Highest and Lowest Gun Ownership Levels, 2008–2009

Population Group by State Gun Ownership Level	Person-Years	No. of Firearm Suicides	No. of Nonfirearm Suicides	Total No. of Suicides	Population With Suicidal Acts, <sup>e</sup> %	95% CI
High-gun ownership states <sup>a,b</sup>						
All adults	62,383,037	7,275	4,153	11,428	0.41	0.18, 0.63
Adult men	30,273,657	6,263	2,905	9,168	0.38	0.16, 0.60
Adult women	32,109,380	1,012	1,248	2,260	0.44	0.17, 0.71
Adults aged 18–29 years	13,829,694	1,303	960	2,263	1.04	0.40, 1.67
Adults aged ≥30 years	48,553,343	5,972	3,193	9,165	0.24	0.09, 0.38
Low-gun ownership states <sup>c,d</sup>						
All adults	62,447,876	1,697	4,341	6,038	0.49	0.00, 0.98
Adult men	29,810,942	1,572	3,207	4,779	0.38	–0.04, 0.79
Adult women	32,636,934	125	1,134	1,259	0.60	–0.01, 1.21
Adults aged 18–29 years	13,335,648	219	778	997	0.97	–0.01, 1.94
Adults aged ≥30 years	49,112,228	1,478	3,563	5,041	0.26	–0.06, 0.58

Abbreviation: CI, confidence interval.

<sup>a</sup> High-gun ownership states are Alabama, Alaska, Arkansas, Idaho, Iowa, Kentucky, Louisiana, Mississippi, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, Tennessee, West Virginia, and Wyoming.

<sup>b</sup> In high-gun ownership states, 51% of adults live in households with firearms.

<sup>c</sup> Low-gun ownership states are Connecticut, Hawaii, Massachusetts, New Jersey, New York, and Rhode Island.

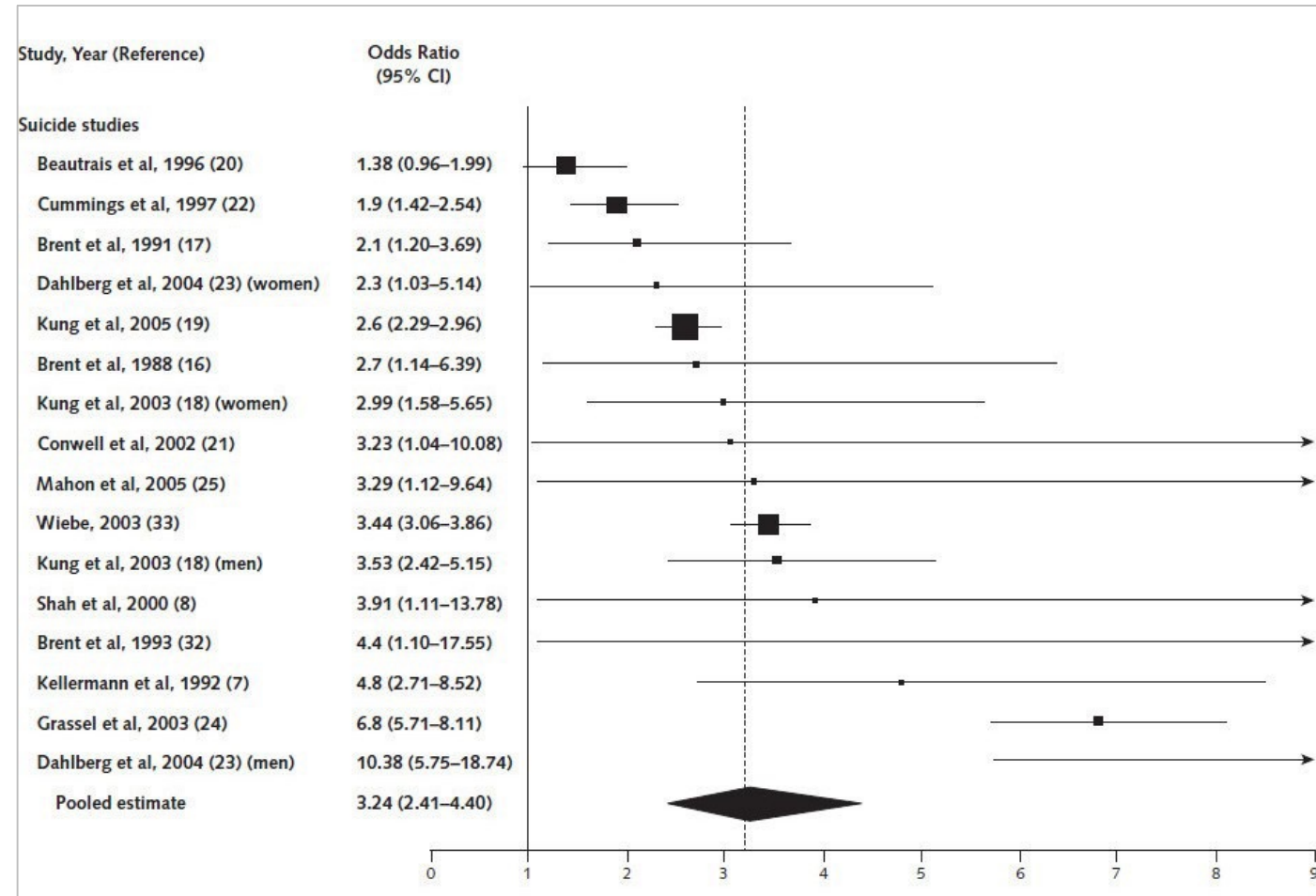
<sup>d</sup> In low-gun ownership states, 15% of adults live in households with firearms.

<sup>e</sup> The percent of the population that engaged in fatal and nonfatal suicidal acts over the past year.

Miller M, Barber C, White R, Azrael D. Firearms and suicide in the United States: is risk independent of underlying suicidal behavior? *Am J Epidemiology*. 2013

# More than a Dozen US Case-Control Studies

- ▶ Gun in home is a risk factor for suicide for gun owner, spouse, and children
- ▶ Factors held constant:
  - ▶ Age, gender, community, living alone, education, alcohol, depression medication, illicit drug use, psychiatric diagnosis



Source: Anglemyer et al. (2014). The accessibility of firearms and risk for suicide and homicide victimization among household members: a systematic review and meta-analysis. *Ann Intern Med*;160(2):101–110. <http://doi.org/10.7326/M13-1301>



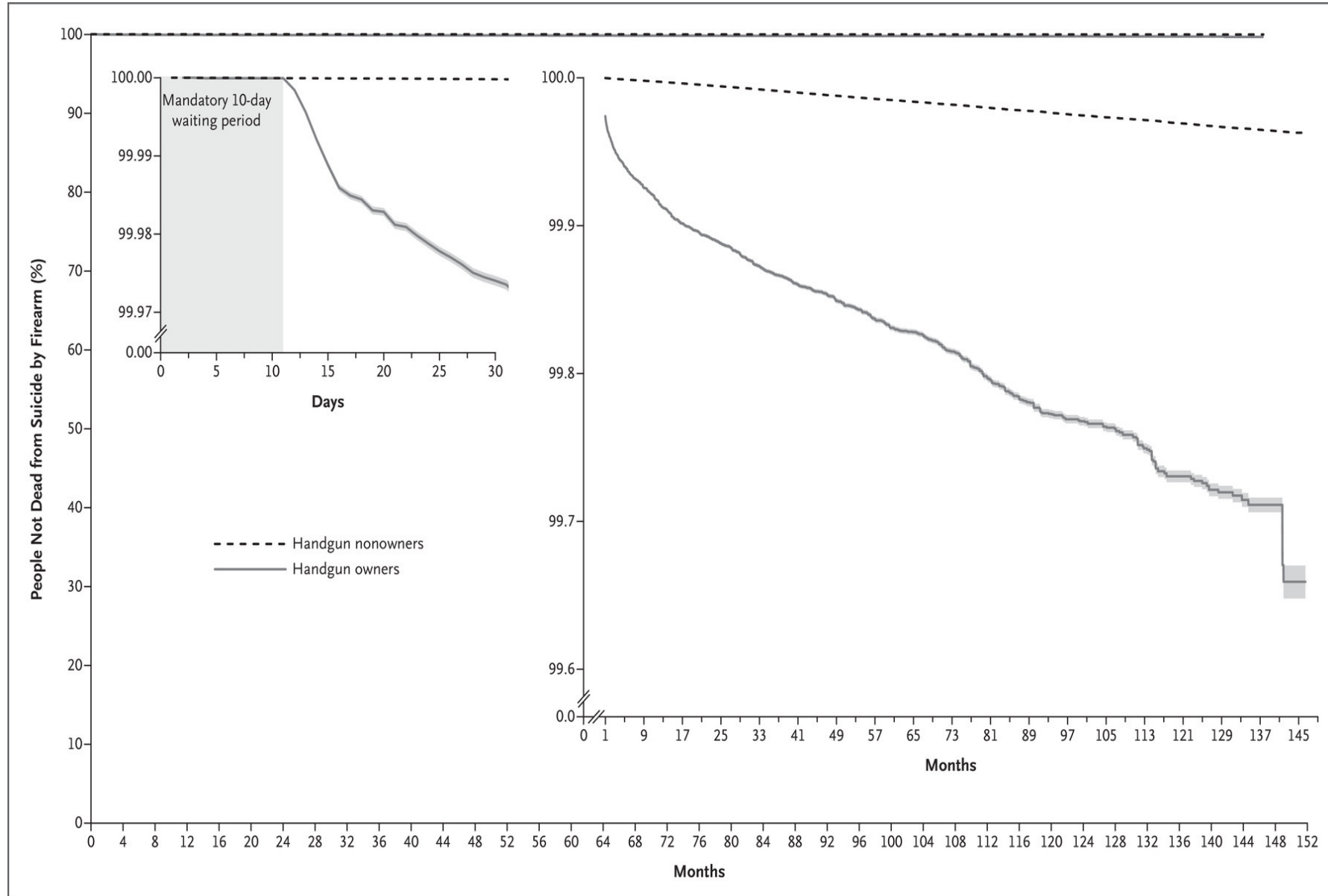
**Table 2.** Counts, Crude Rates, and Adjusted Hazard Ratios for All-Cause Mortality and Suicide among Cohort Members, According to Handgun Ownership Status.

Cause of Death	Owners		Nonowners		Adjusted Hazard Ratio (95% CI)‡
	Deaths*	Crude Rate†	Deaths*	Crude Rate†	
All causes	10,863	382.94	1,447,118	820.91	0.80 (0.79–0.82)
Male	9,343	409.60	697,731	910.11	0.81 (0.79–0.83)
Female	1,500	271.78	739,924	747.99	0.72 (0.68–0.76)
Suicide	1,354	47.73	16,540	9.38	3.67 (3.46–3.89)
Male	1,132	49.63	11,376	14.84	3.34 (3.13–3.56)
Female	219	39.68	5,107	5.16	7.16 (6.22–8.24)
Suicide by firearm	1,200	42.30	5,491	3.11	9.08 (8.48–9.73)
Male	1,003	43.97	4,575	5.97	7.82 (7.26–8.43)
Female	194	35.15	900	0.91	35.15 (29.56–41.79)
Suicide by other methods	154	5.43	11,049	6.27	0.68 (0.58–0.80)
Male	129	5.66	6,801	8.87	0.64 (0.55–0.76)
Female	25	4.53	4,207	4.25	1.01 (0.68–1.50)

‡ Adjusted for neighborhood, race/ethnicity, age, long gun ownership

	Men (hazard ratios)	Women (hazard ratios)
<b>Suicide</b>	3.34	7.16
<b>By firearm</b>	7.82	35.15
<b>By other methods</b>	0.64	1.01
<b>All cause</b>	0.81	0.72

# Relative risk over time



# Storage Practices and Firearm Suicide Risk, 5- to 19-year-olds

<b>Firearm storage practice</b>	<b>Cases (N=106)</b>	<b>Controls (N=480)</b>	<b>Adjusted odds ratio (95% CI)</b>
Gun unloaded	66%	91%	0.30 (0.16–0.56)
Gun locked	32%	58%	0.27 (0.17–0.45)
Ammunition locked	24%	48%	0.39 (0.23–0.66)

# Suicide Risk: Does a Gun in the Home Increase the Risk of Suicide?

	All	Gun owner	Non-gun owner in gun home	Non-gun owner
Disagree	48%	68%	64%	37%
Neither agree nor disagree	37%	26%	27%	43%
Agree	15%	6%	9%	20%