

# Firearms and Suicide

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## Is intent all that matters?



Chronicle / John Storey



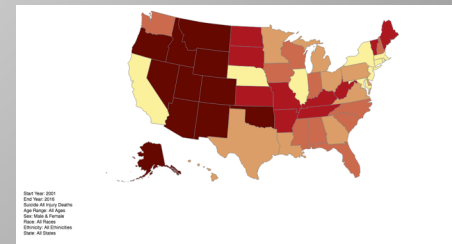
In 2018 there were 48,344 suicides

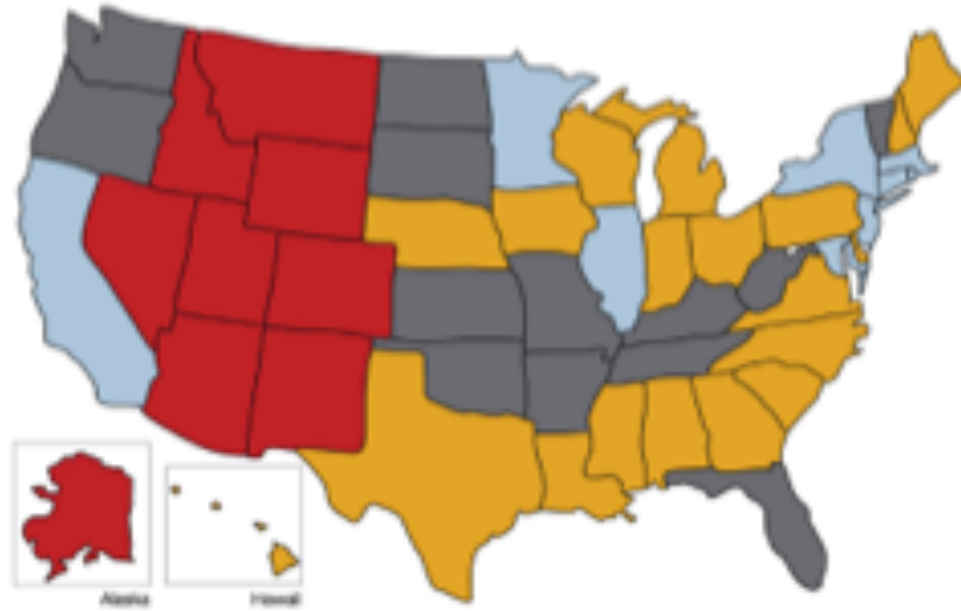
~Half (51%) were Firearm suicides (24,432)

Suicide was the

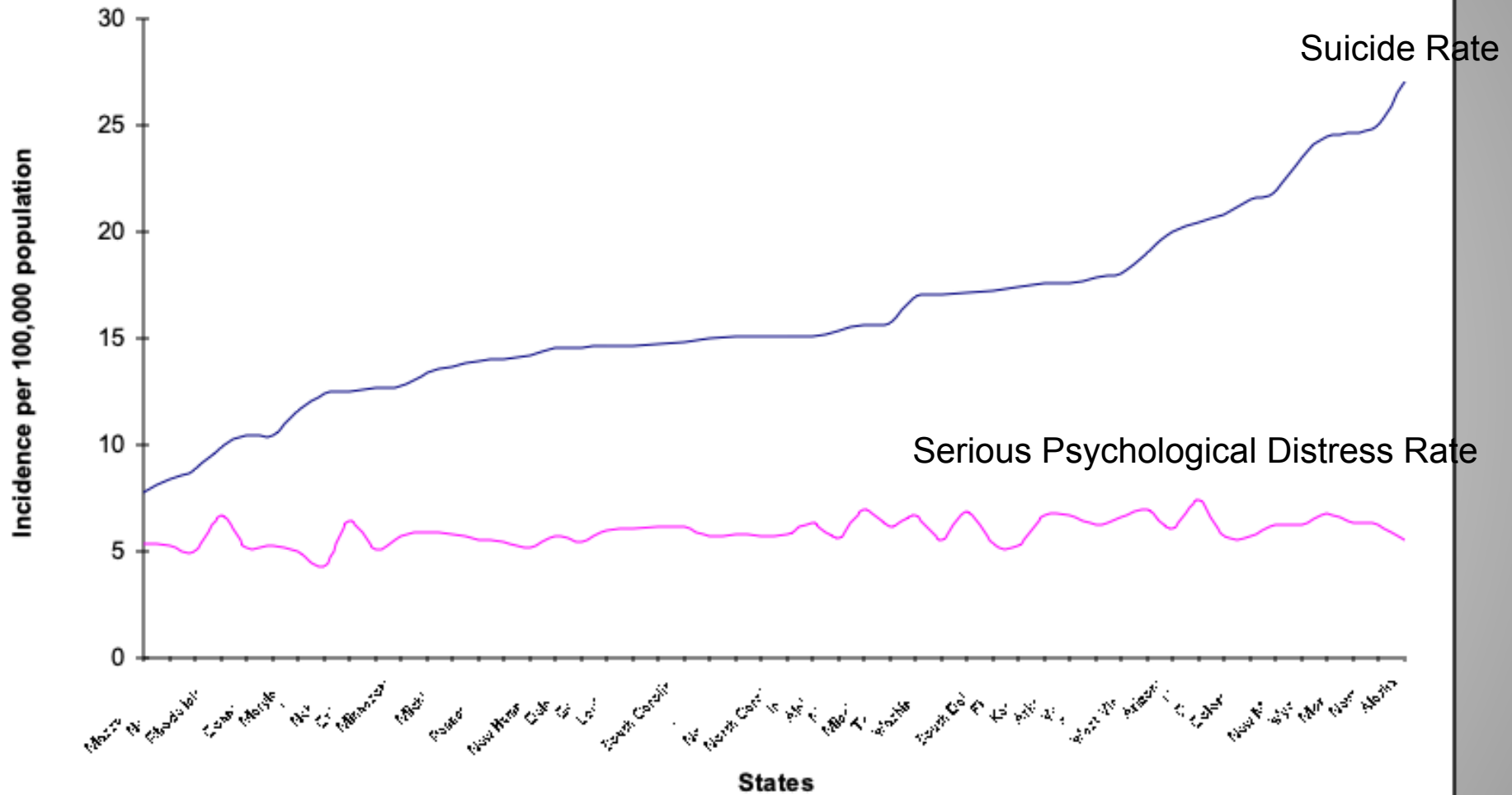
- 10<sup>th</sup> leading cause of death overall
- 2<sup>nd</sup> leading cause of death among persons under 35 years of age
- 2<sup>nd</sup> leading cause of death among persons 1-18

By contrast, in 2018 there were 18,830 Homicides (13,958 FH; 74%); 39,404 Motor Vehicle fatalities

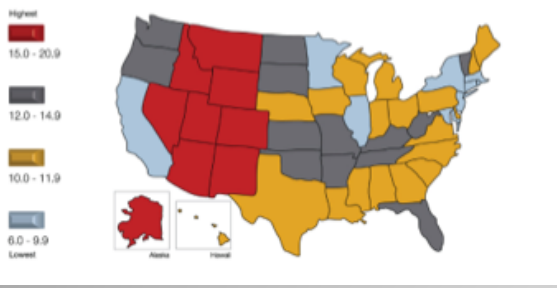




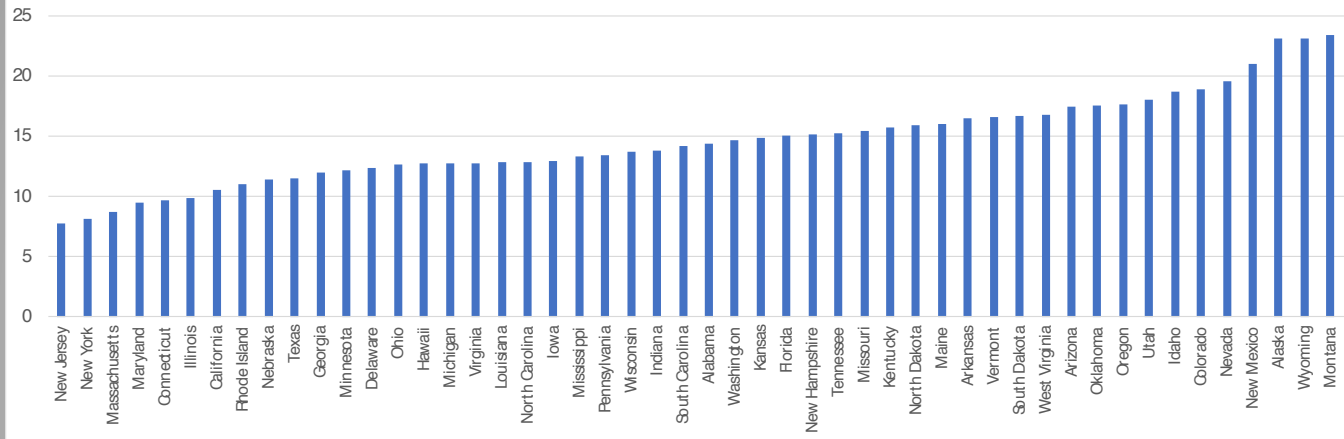
## Incidence (per 100,000 population) of Suicide and Serious Psychological Distress across the 50 U.S. States (2003-2004).



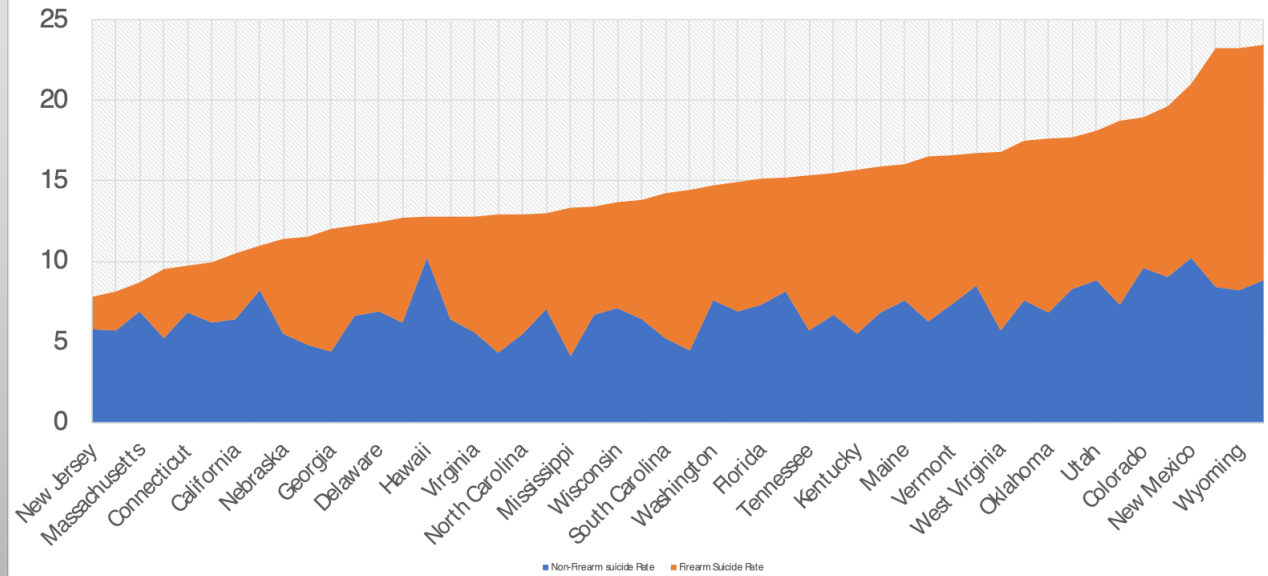
Serious Psychological Distress in Past Year, Annual Incidence Based on 2003 and 2004 NSDUH data. See <http://www.oas.samhsa.gov/2k4State/ch6.htm>.

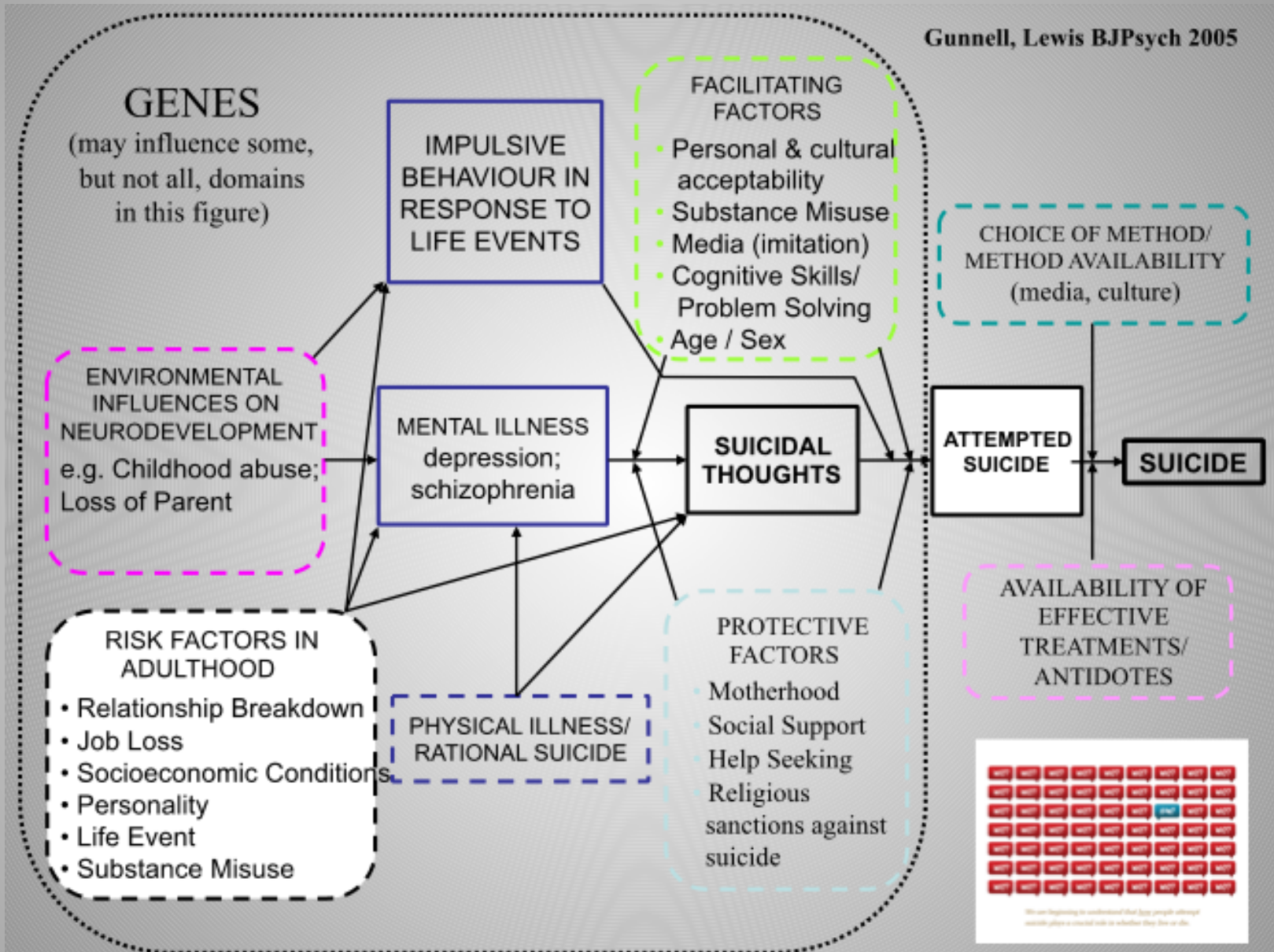


## Suicide Rate

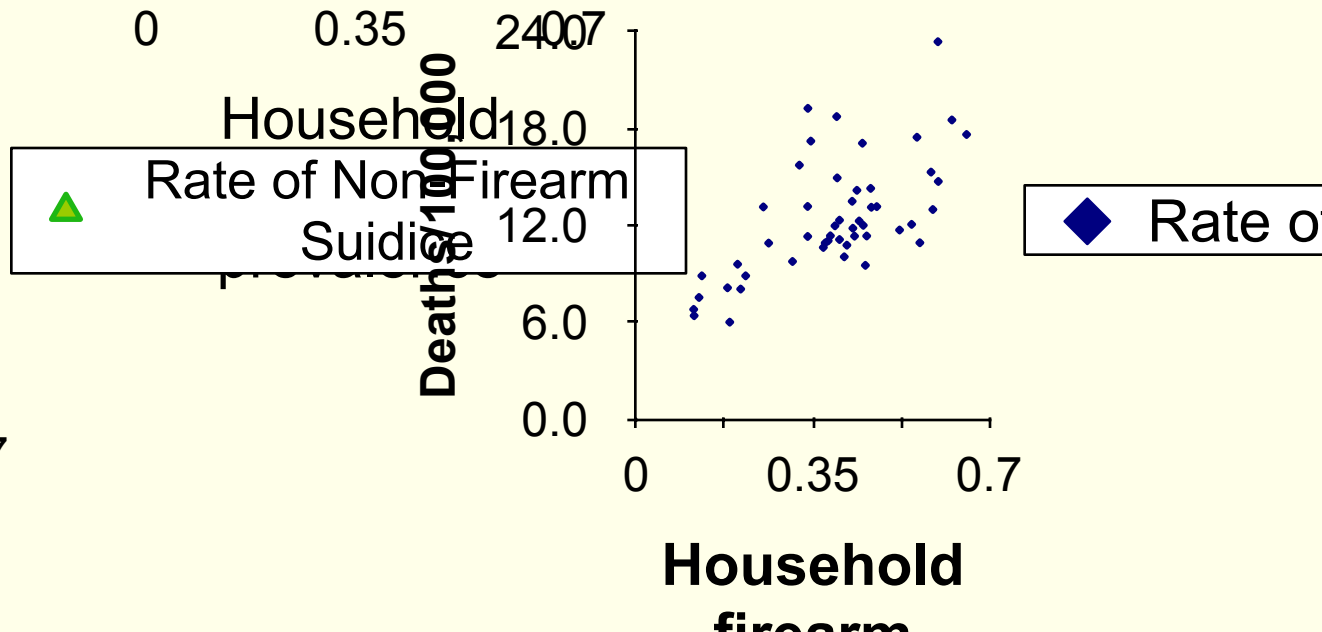
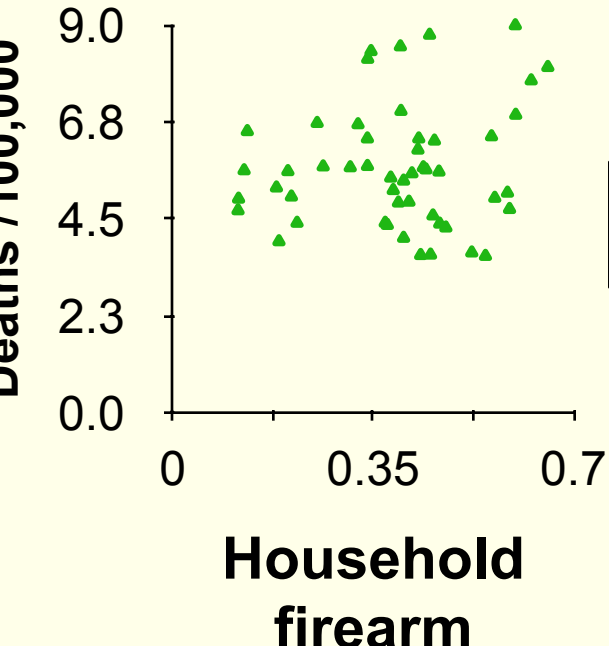
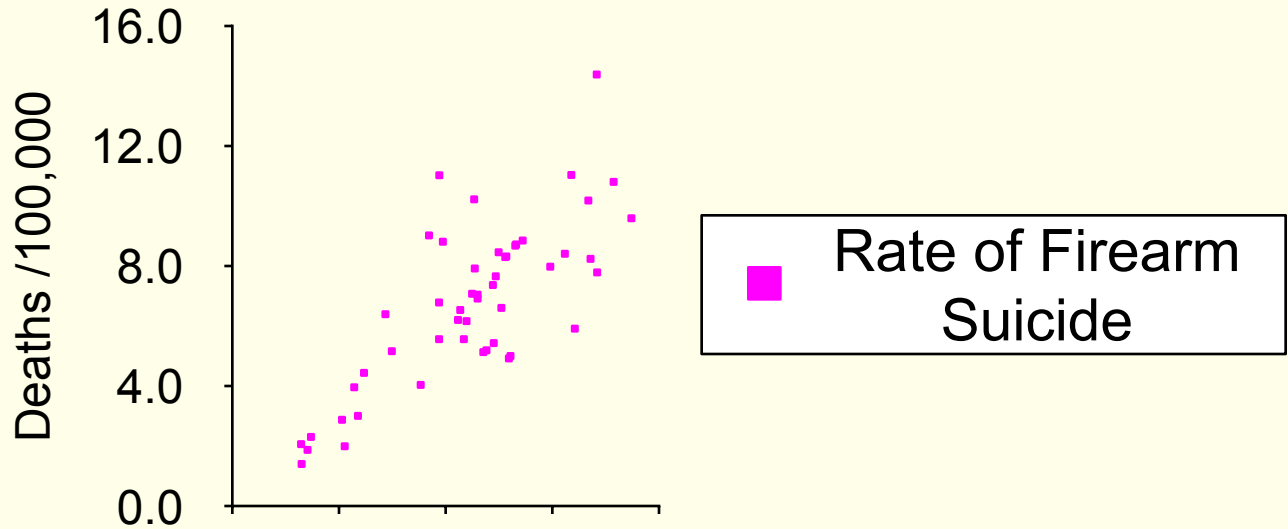
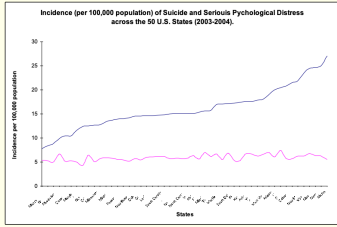


## Suicide rates US2006-2017, by state and mechanism





# Household Firearm Ownership and Rates of Suicide in the US (2004)



## Rates of Household Firearm Ownership and Rates of Suicide, Firearm Suicide and Non-Firearm Suicide across 7 North East States, 1996-2000

	<b>Percent of Households with Firearms</b>	<b>Suicides per 100000</b>	<b>Firearm Suicides per 100000</b>	<b>Non-Firearm Suicides per 100000</b>
Vermont	42%	12.3	8.0	4.3
Maine	41%	13.3	7.8	5.5
New Hampshire	30%	11.7	6.2	5.5
Connecticut	17%	8.5	3.3	5.2
Rhode Island	13%	8.3	3.0	5.3
Massachusetts	12%	7.5	2.1	5.4
New Jersey	12%	7.1	2.3	4.8
<b>All 7 States</b>	<b>17%</b>	<b>8.2</b>	<b>3.1</b>	<b>5.1</b>



# 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

# Rationale for Means Restriction

- Suicide acts are often impulsive and crises often fleeting

## **The Houston Study: Nearly Lethal Suicide Attempts N=153 (15-34 year olds)**

Time between deciding to complete suicide and taking action:

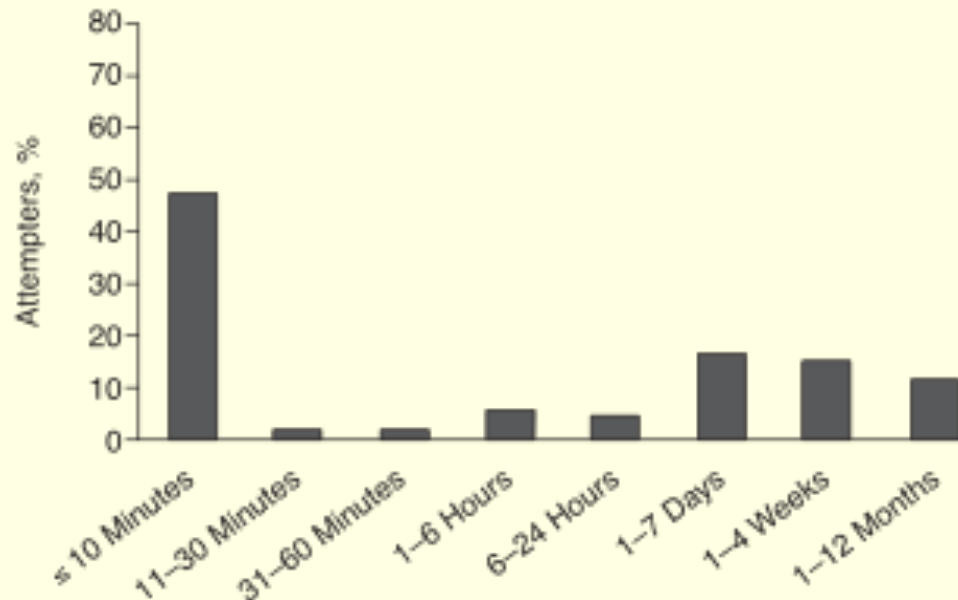
<5 minutes	24%
<20 minutes	48%
<1 hour	70%
<8 hours	86%

Simon et al. 2001. Suicide & Life-Threatening Behavior (The Houston study, data from author)

# Many Suicidal Crises Are Fleeting

Eighty-two patients referred to a psychiatric university hospital after a suicide attempt were asked questions within 3 days after the act.

Figure 1. Time Between First Occurrence of a Thought of Suicide and Suicide Attempt



Deisenhammer et al. The Duration of the Suicidal Process: How Much Time Is Left for Intervention Between Consideration and Accomplishment of a Suicide Attempt? *J Clin Psychiatry* 2009;70(1):19–24.

# Rationale for Means Restriction

- Method used largely depends on availability

Number (percent) of patients giving particular A. Reason for choosing the poison and B. expected outcome (using the questionnaire of Hawton et al).

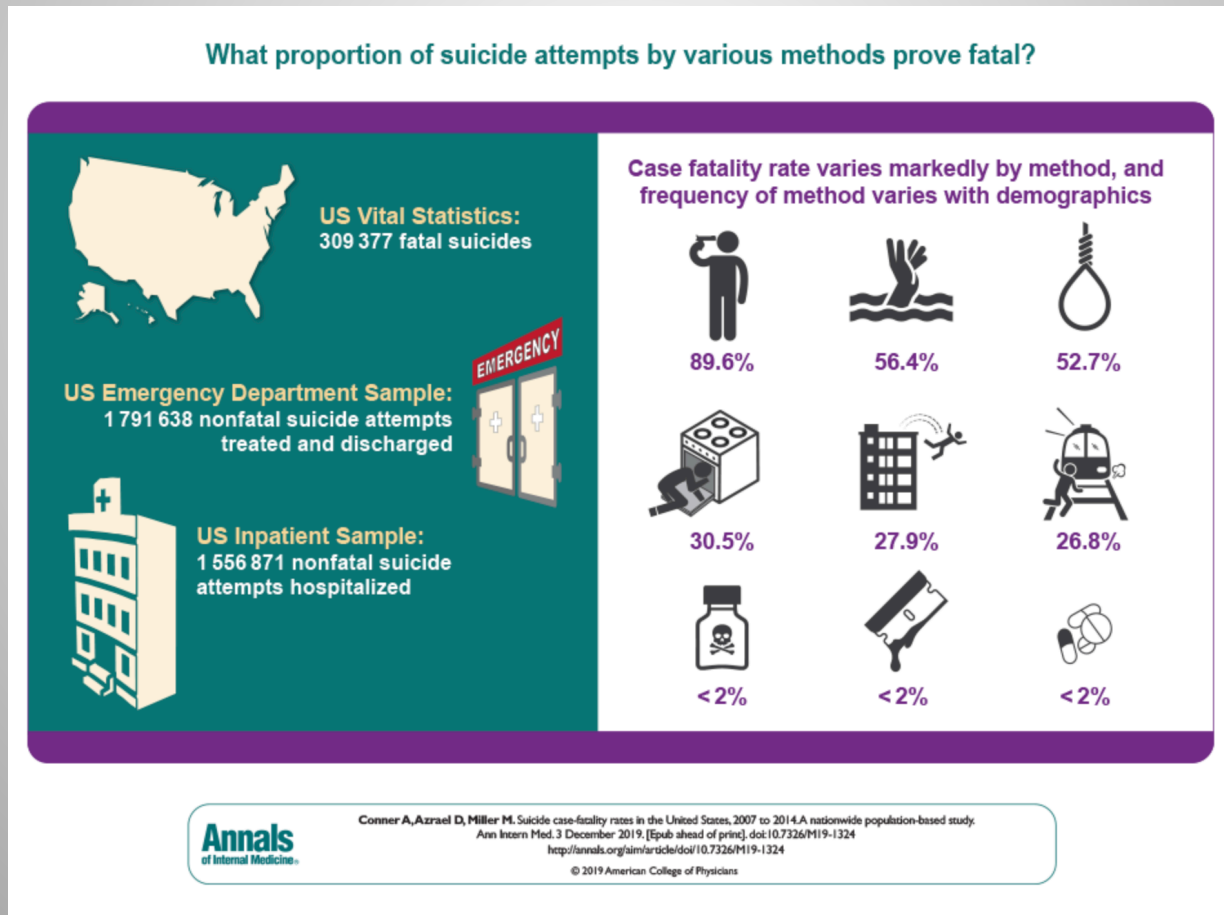
	Oleander	Paraquat	Other pesticides	Medicines
A. n =	137	23 *	41	49 *
<b>Easy availability</b>	<b>74 (54)</b>	<b>12 (52)</b>	<b>15 (37)</b>	<b>34 (69)</b>
<b>Only poison available</b>	<b>40 (29)</b>	<b>6 (26)</b>	<b>21 (51)</b>	<b>5 (10)</b>
Free/cheap	2 (1)	1 (4)	0 (0)	0 (0)
Lethal	14 (10)	2 (9)	2 (5)	1 (2)
Harmless	2 (1)	0 (0)	0 (0)	1 (2)
Other	5 (4)	2 (9)	3 (7)	8 (16)
B. n =	101	21 **	34 **	61
Cause death	58 (57)	9 (43)	25 (74)	22 (36)
Permanent damage or harmful effects	0 (0)	0 (0)	0 (0)	1 (2)
Harmful but short-lasting effects	3 (3)	1 (5)	3 (9)	3 (5)
Mild short-lived effects	9 (9)	3 (14)	1 (3)	3 (5)
Completely safe	10 (10)	2 (10)	2 (6)	6 (10)
Don't know	21 (21)	6 (29)	3 (9)	26 (43)

Interviews with 268 patients hospitalized for a poisoning suicide attempts in Sri Lanka found that just over half took the poison after less than 30 minutes of thought, often directly following an argument (Eddelston 2006). While most of the patients survived their attempts, 13 died. Like the nonfatal attempters, over half of those who died deliberated less than 30 minutes.

# Rationale for Means Restriction

- CFR's for commonly used methods vary greatly

✓ CFR firearms ~90%; CFR pills and cutting <5%



**Table 2.** Crude annual suicide act rates and case fatality rates overall and by sex, age-group, region, county-level urbanization and method: US, 2007 - 2014

	Suicides per 100,000 <sup>a</sup>	Suicide Attempts per 100,000		Suicide Acts per 100,000	Case Fatality Rate <sup>d</sup> , %
		Hospitalized <sup>b</sup>	ED Only <sup>c</sup>		
<b>All</b>	<b>13.4</b>	<b>63.2</b>	<b>74.3</b>	<b>150.9</b>	<b>8.9</b>
Sex					
Male	21.3	52.7	64.3	138.3	15.4
Female	5.7	73.2	83.9	162.8	3.5
Age group, y					
5-14	0.7	13.5	35.5	49.7	1.5
15-24	10.6	99.2	187.4	297.3	3.6
25-34	14.1	97.3	115.4	226.8	6.2
35-44	16.2	88.7	84.4	189.2	8.5
45-54	19.3	79.0	56.7	155.0	12.5
55-64	17.2	40.1	22.7	80.0	21.5
65+	15.3	18.7	7.1	41.2	37.2
	Suicides per 100,000 <sup>a</sup>	Suicide Attempts per 100,000		Suicide Acts per 100,000	Case Fatality Rate <sup>d</sup> , %
		Hospitalized <sup>b</sup>	ED Only <sup>c</sup>		
<b>All</b>	<b>13.4</b>	<b>63.2</b>	<b>74.3</b>	<b>150.9</b>	<b>8.9</b>
Method					
Drug poisoning	1.8	48.1	38.7	88.6	2.0
Nondrug poisoning	0.1	2.1	2.2	4.4	2.1
Gas	0.4	0.3	0.4	1.1	33.6
Hanging	3.3	1.0	1.7	6.0	55.0
Drowning	0.1	0.0	0.1	0.2	60.5
Firearm	6.8	0.5	0.2	7.5	90.2
Cutting/piercing	0.2	8.4	22.3	30.9	0.8
Jumping	0.3	0.4	0.3	0.9	30.5
Moving object	0.1	0.1	0.2	0.5	29.6
Other	0.2	2.3	8.3	10.8	1.9

<sup>a</sup>Based on vital statistics data from 2007 to 2014

<sup>b</sup>Based on 295,556 (unweighted) records from the 2007 to 2011 Nationwide Inpatient Sample (NIS) and 2012 to 2014 National Inpatient Sample

<sup>c</sup>Based on 382,818 (unweighted) records from the 2007 to 2014 Nationwide Emergency Department Sample (NEDS)

# Rationale for Means Restriction

Prognosis after attempted suicide

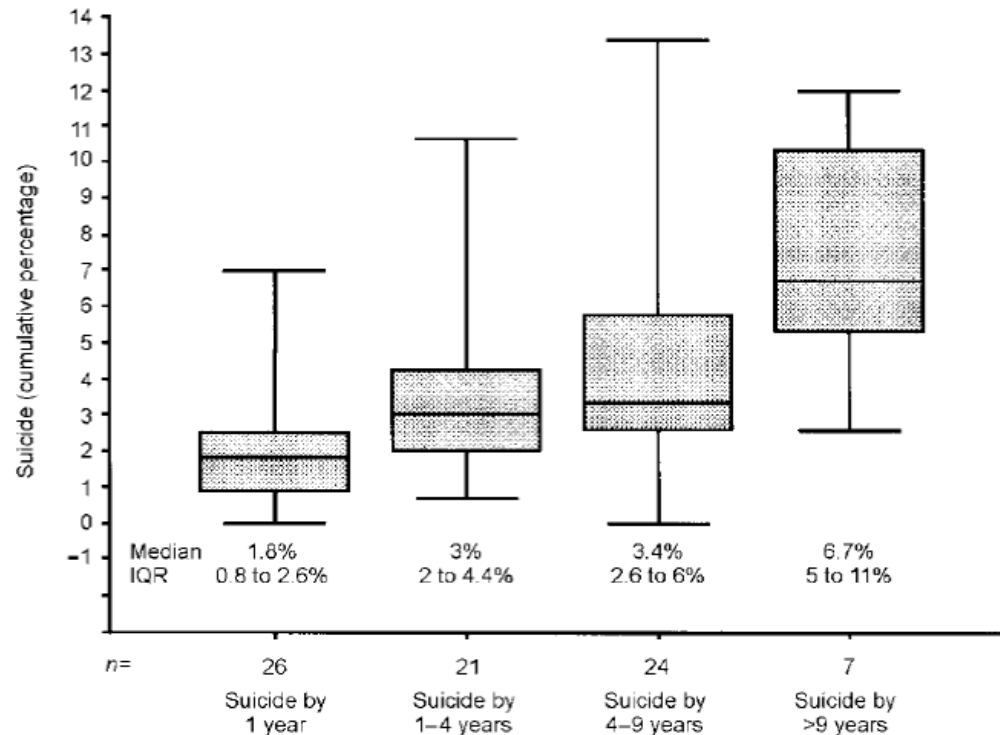
< 10%

*of survivors of near-lethal  
suicide attempts subsequently  
die by suicide*

Why is this important?

# Prognosis after attempted suicide

BRITISH JOURNAL OF PSYCHIATRY ( 2 0 0 2)193-199 REVIEW ARTICLE. Fatal and non-fatal repetition of self-harm. Systematic review. OWENS et al. 90 studies reviewed.



(b) Suicide according to duration of follow-up

**Fig. 1** Repetition and suicide studies grouped according to duration of study. Medians are indicated by horizontal bars. Vertical bars indicate the range and the horizontal boundaries of the boxes represent the first and third quartiles. IQR, interquartile range.



# 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

# What do we know about these guns?

- Most lethal method commonly used in completed suicides  
CFR~90% vs.<3% pills/cutting
- Vast majority come from victims home
  - ~75% handguns;50% long guns among rural youth
  - >85% of guns not purchased within 2 weeks of suicide (e.g., Kellerman 1992 3%)
- ~300,000,000 firearms in civilian hands
  - >1/3 households (with and w/o children)
  - ~ 5 million children in HH with loaded and unlocked guns
- Gun owners and members of gun owning homes are neither more depressed nor more suicidal than members of non-gun owning homes

# More than a dozen US Case-Control Studies:

Gun in home is a risk factor for suicide for gun owner, spouse, and children\*

\*why is this important

Factors held constant:

Age

Gender

Community

Living alone

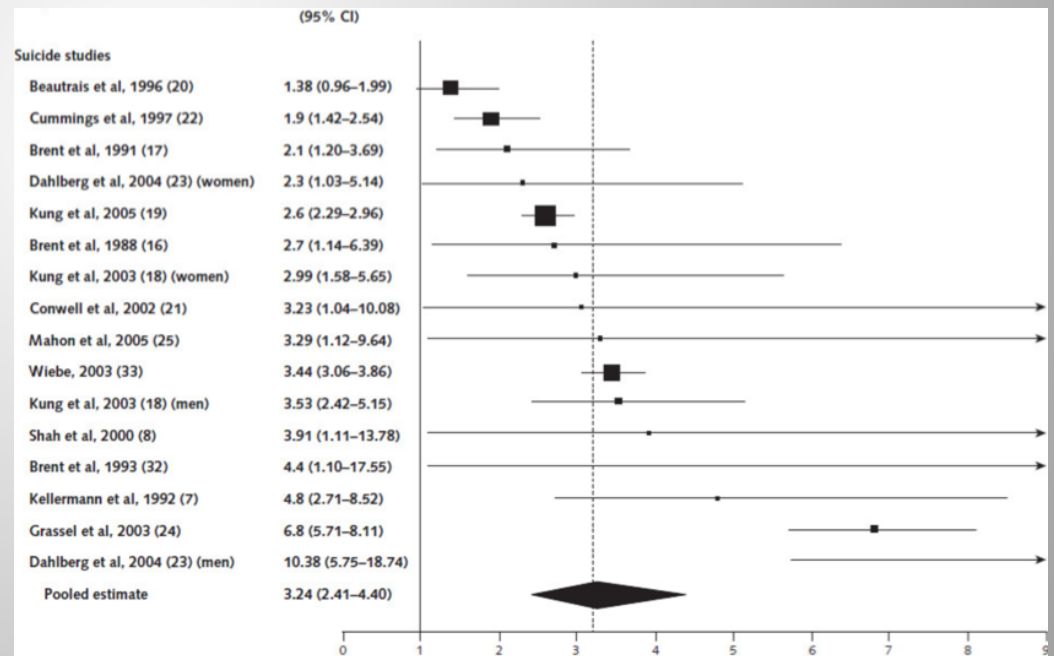
Education

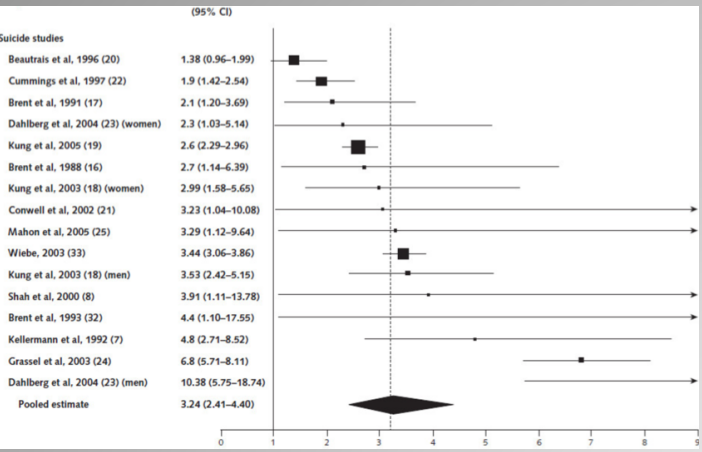
Alcohol

Depression medication

Illicit drug use

Psychiatric diagnosis





Factors adjusted for in analyses: Age, Gender, Community, Living alone, Education, Alcohol, Depression medication, Illicit drug use  
Psychiatric diagnosis

## Are people who live in homes with guns more likely to have...

...experienced a mental health problem?

Yes

No

...seriously considered suicide?

Yes

No

...attempted suicide?

Yes

No

Sorenson, 2008; Ilgen, 2008; Miller, Molnar, Azrael et al 2009; Betz, Miller, et al 2011; Valenstein 2018 (among veterans at VHA in mental health clinics re SI/SA recent and lifetime)

Does availability of method  
affect suicide rates?

Pesticides: Sri Lanka

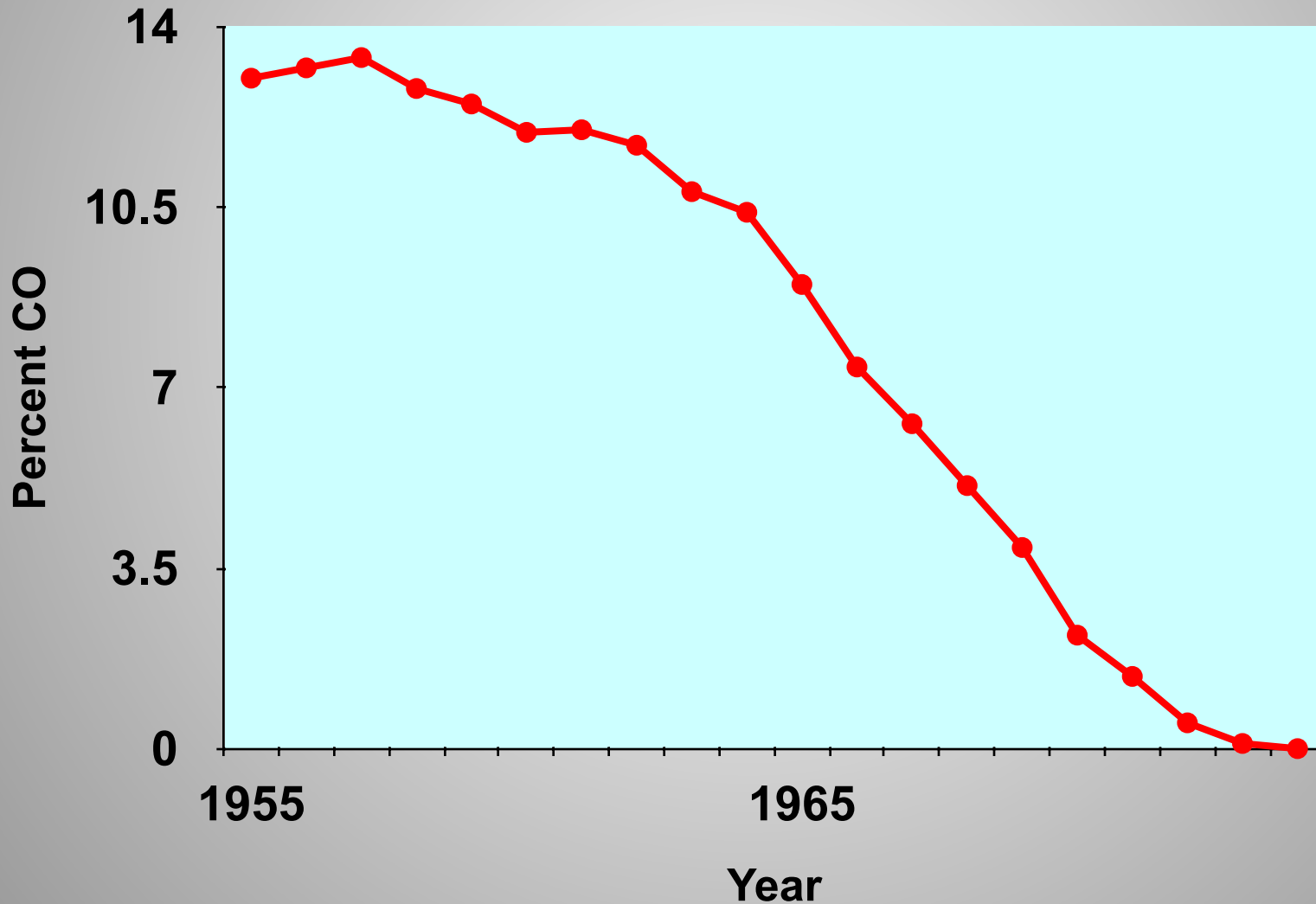
Coal Gas: England

Firearms : US, Israel

# THE COAL GAS STORY

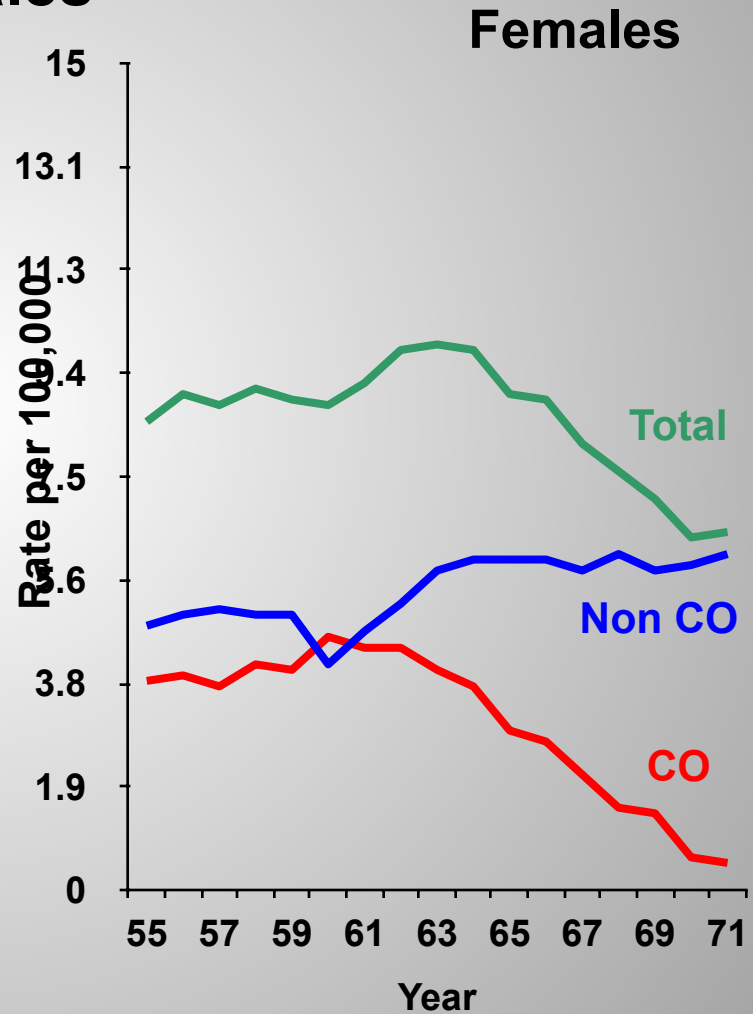
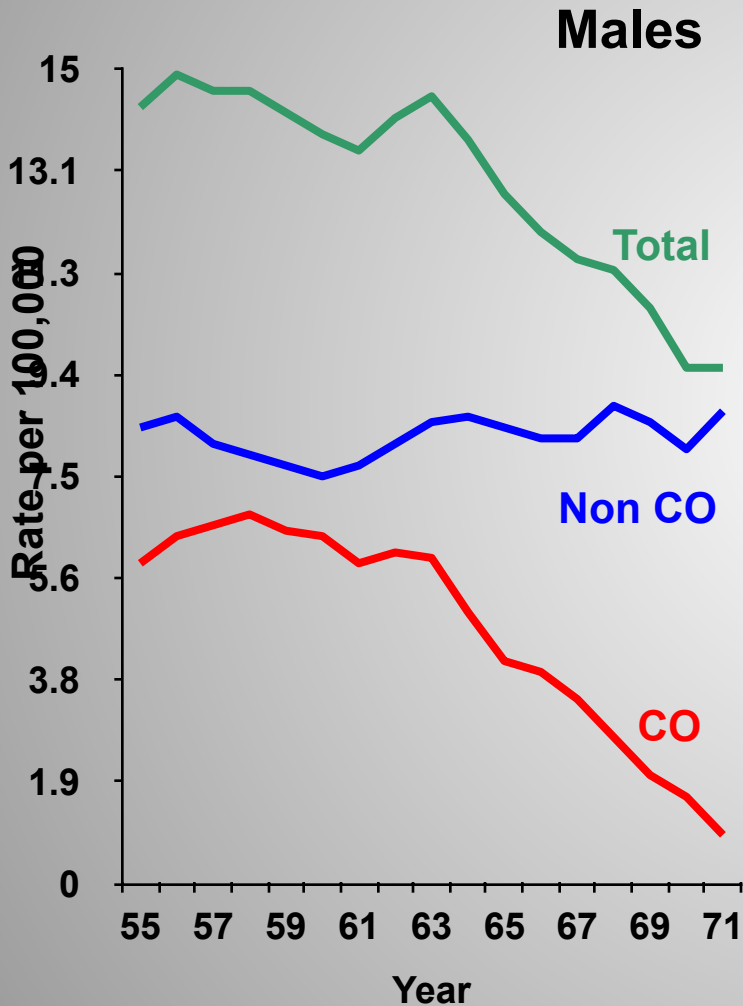
(Kreitman, 1976)

## Percentage of CO in domestic gas, United Kingdom 1955-74



# THE COAL GAS STORY (Kreitman, 1976)

## Sex-specific suicide rates by mode of death: England & Wales

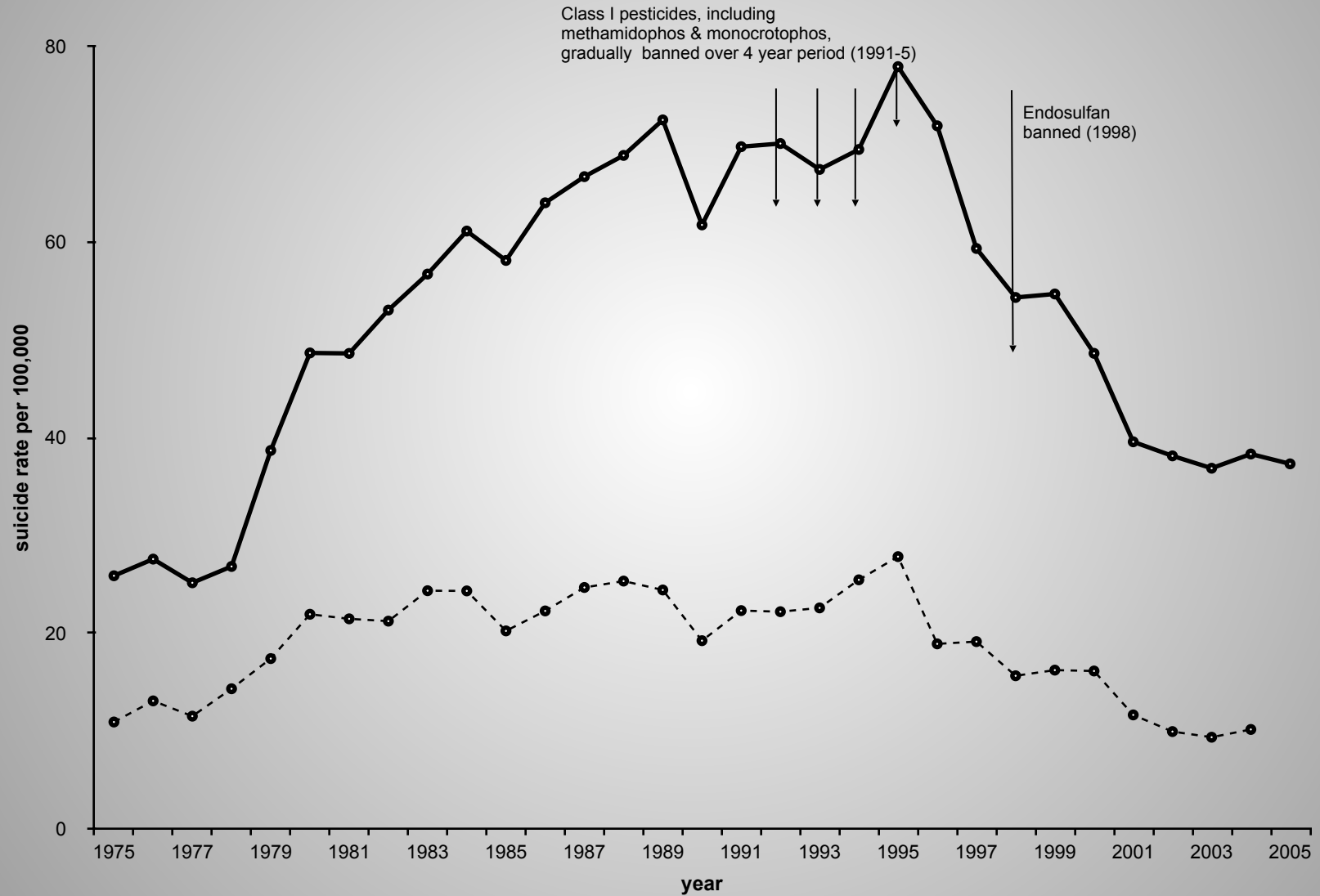




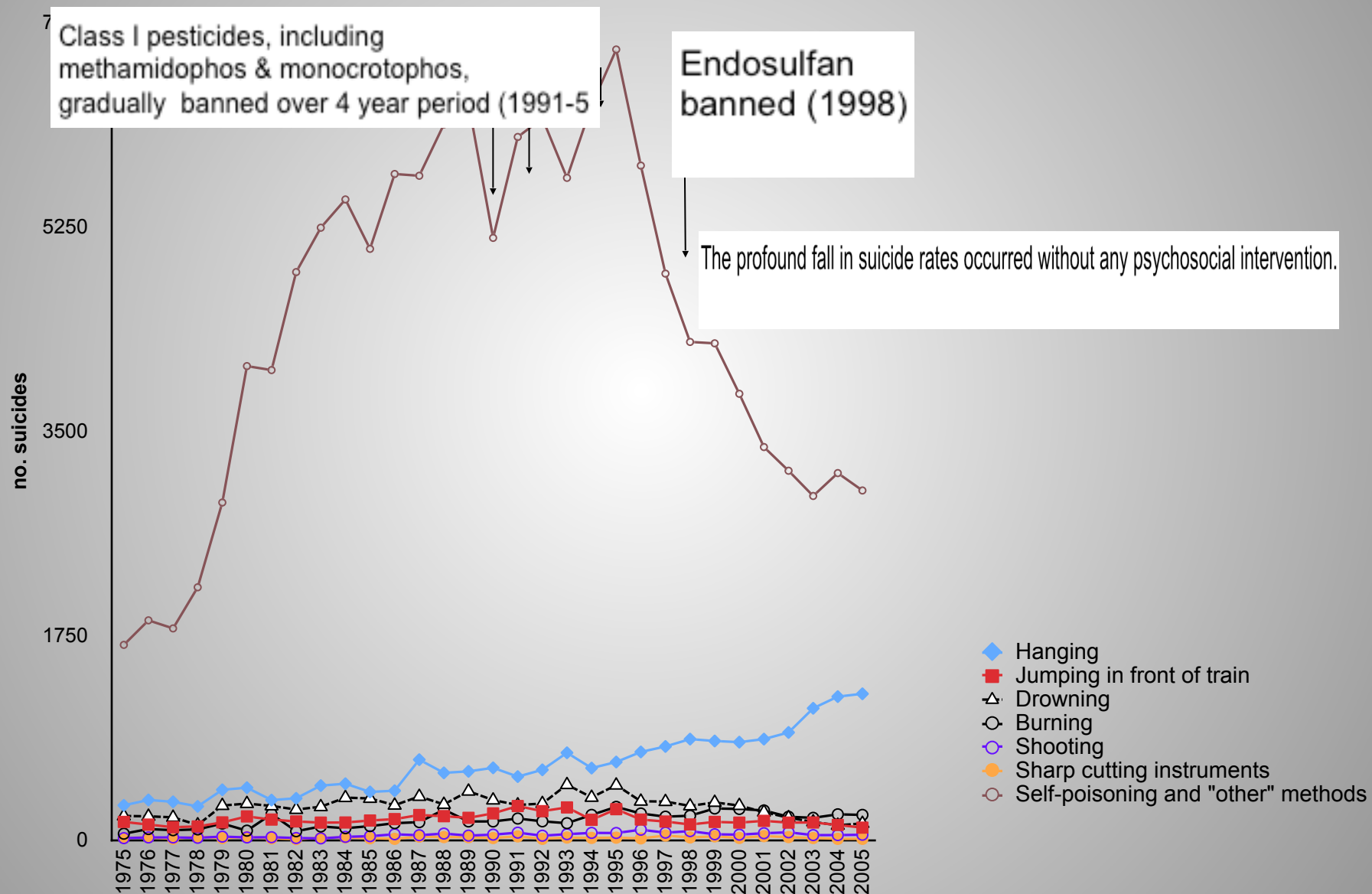
Thanks to Michael Eddleston for these slides on Sri Lanka



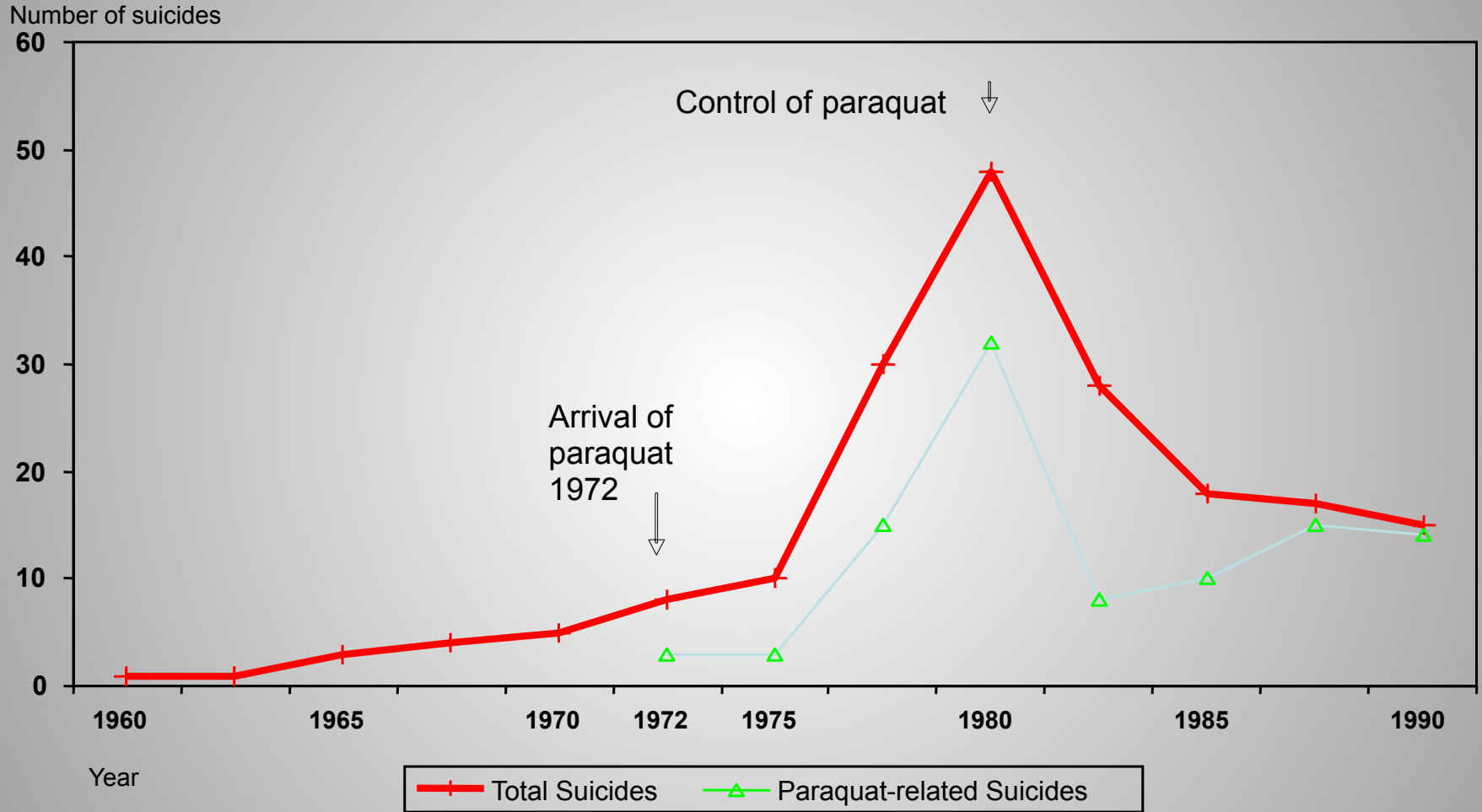
# Suicide rates by gender & pesticide bans



Suicide rates by means, Sri Lanka, documenting the rise of poisoning suicide by pesticides and the decline after serial bans on some of the most toxic, commonly used agents. The profound fall in suicide rates occurred without any psychosocial intervention.



## Number of Suicides in Samoa Related to the Arrival of Pesticides Containing Paraquat and the Control of Paraquat Sales, 1970 –1988



Adapted from: World Report on Violence and Health, WHO

Source: Bowles, J.R. in: Diekstra RFW, et. al. (eds.). Preventive Strategies on Suicide, Brill Academic Publishers, 1995.

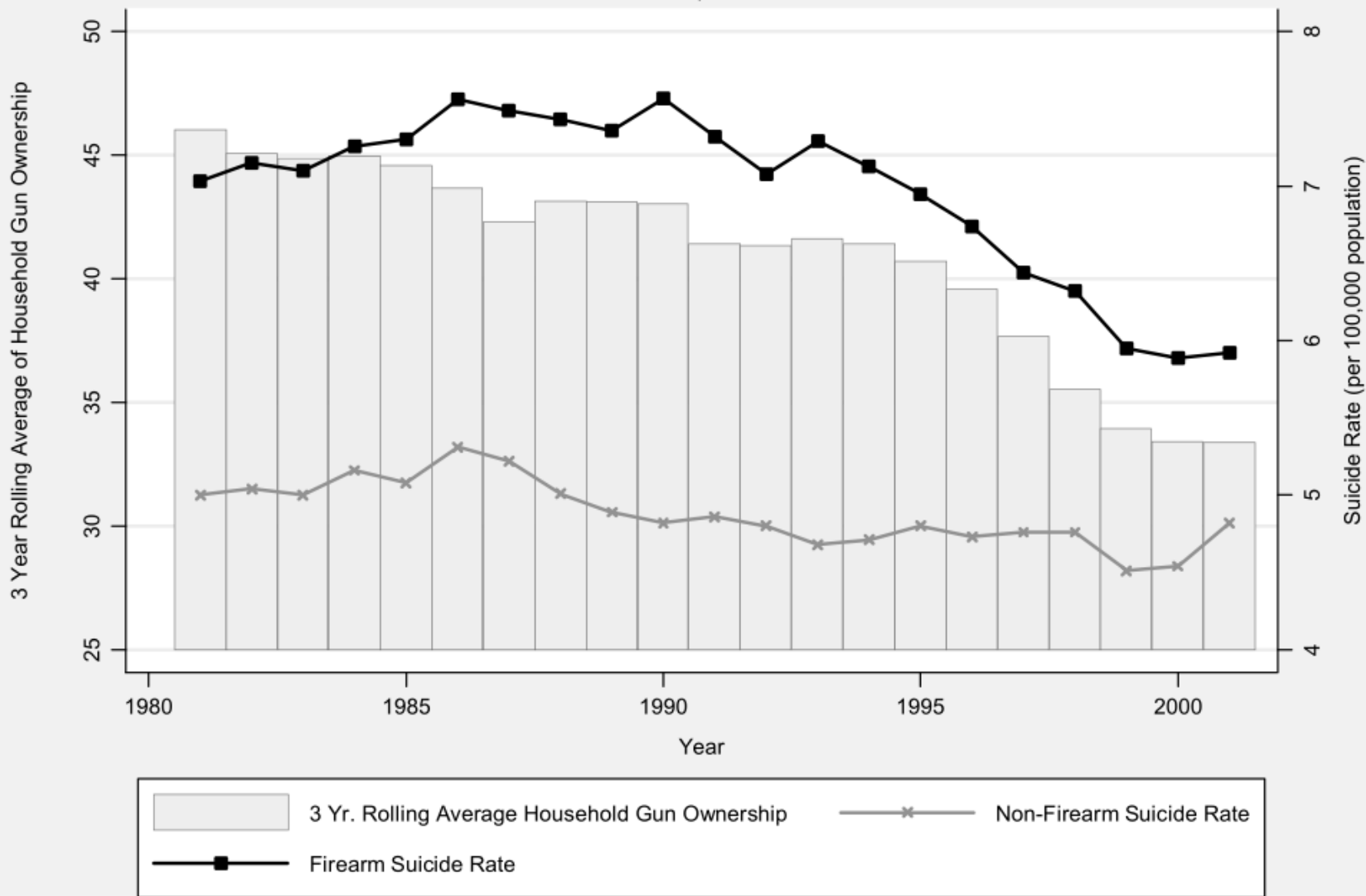
# Firearms – Israeli Military

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- Virtually all 18-21 year-olds in Israel serve in the Israeli Defense Force (IDF).
- In the early 2000s, IDF focused on preventing suicides—most of which were by firearm, with many occurring on weekends while soldiers were on leave.
- In 2006, IDF required soldiers to leave their weapons on base during weekend leaves.
- The suicide rate decreased by 40%.
- Weekend suicides dropped significantly.
- Weekday suicides did not.



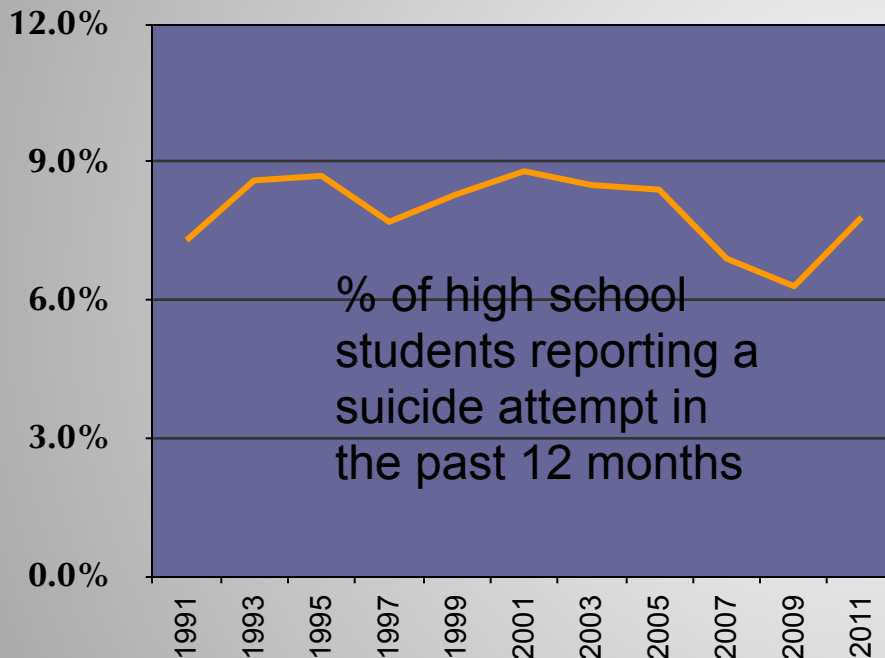
Figure 2. Household gun ownership levels and rates of firearm and non-firearm suicide mortality: United States, 1981-2002



Miller M, Azrael D, Hepburn L, Hemenway D, Lippmann SJ. The association between changes in household firearm ownership and rates of suicide in the United States, 1981-2002. *Inj Prev.* 2006; 12(30): 178-82

# US Suicide Attempt Rates

## Youth Risk Behavior Survey



Source: [www.cdc.gov/HealthyYouth/yrbs/trends.htm](http://www.cdc.gov/HealthyYouth/yrbs/trends.htm)

## National Comorbidity Survey

Made a suicide attempt or gesture in past 12 months	
1990-92	0.7%
2001-03	0.8%

Household survey, ages 18-54

Source: Kessler et al., JAMA 2005

2009 NSDUH data indicate adult attempts on par with NCS

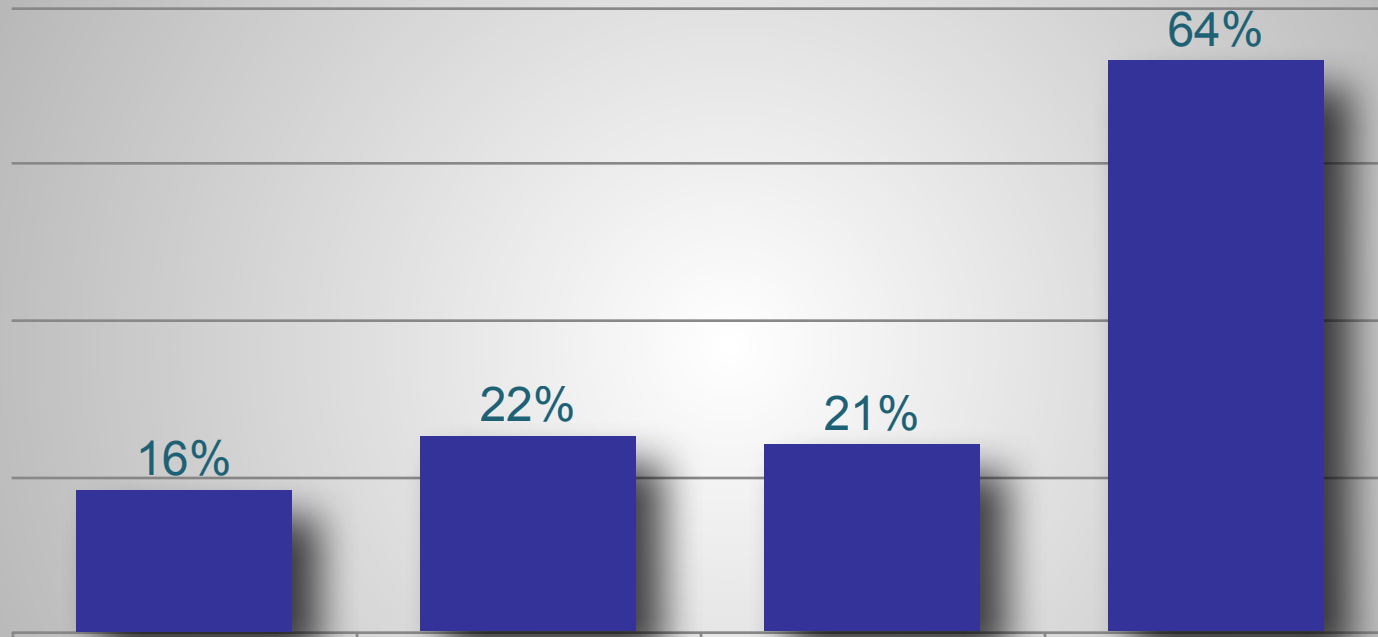
## Does availability of method affect suicide rates?

- ✓ Population level restrictions:
- ✓ Pesticides: Sri Lanka
- ✓ Coal Gas: England
- ✓ Firearms : US, Israel

What about clinical practice/other interventions?

# When Providers Ask about Gun Access

% Reporting they almost always ask

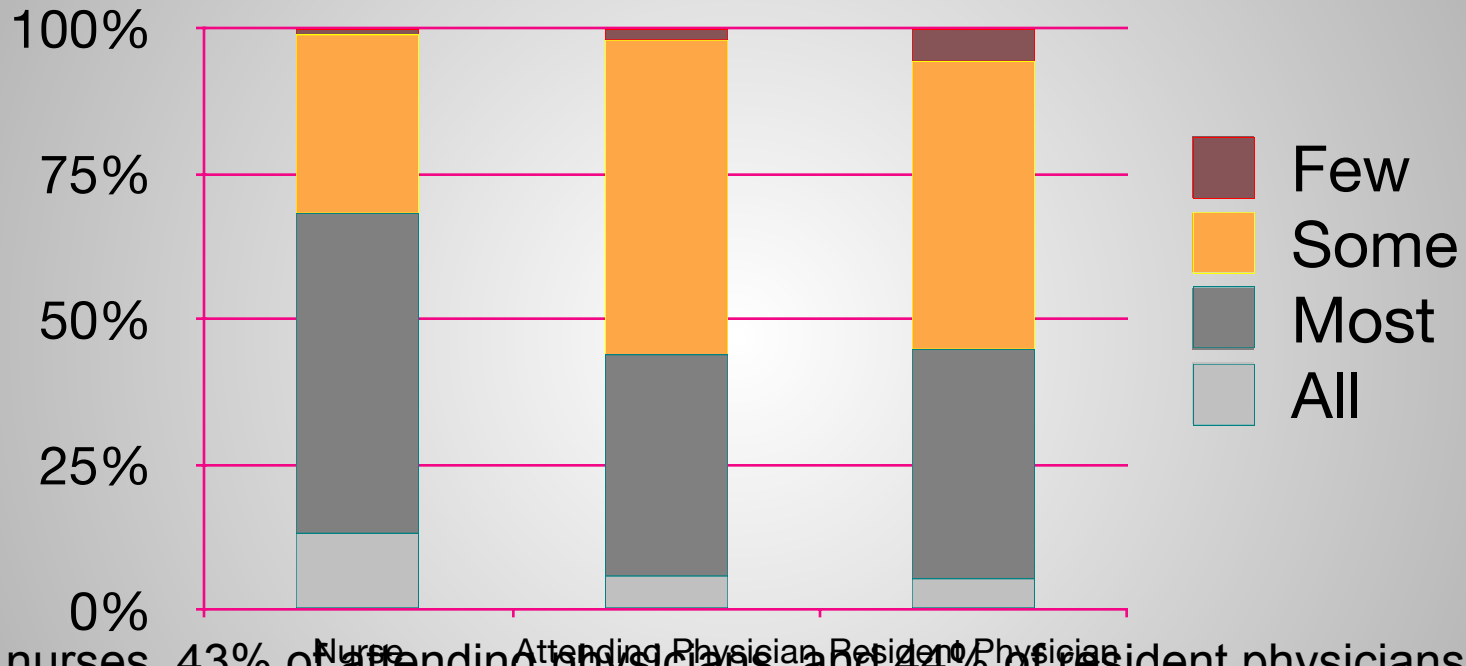


Pt suicidal in past mo, not now Suicidal today, non-gun plan  
Anonymous survey completed by nurses & physicians at 8 EDs (2010/11). Item prompt says, “I ask if there are firearms at home...” and poses patient scenarios. Response categories are “Almost always,” “Often,” “Sometimes,” “Hardly ever.”



# What health providers think and do about means restriction

“Each month in the United States, over 1,000 people die by suicide using firearms. Had a firearm not been accessible to them, how many do you think would have found another way to die by suicide?”



67% of nurses, 43% of attending physicians, and 44% of resident physicians said that “most” or “all” firearm suicide decedents would have died by another method had a firearm been unavailable.

# 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%

**And only 1/3 health care providers agree**

# Means Matter

