

Injury Prevention: A Key Component of the Trauma System

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Disclosures

- Office of Traffic Safety (OTS) 2016-2017 Grant TS-2017-UNR UNSOM-00053
- “Evidence-based Impact of High Risk and Protective Behaviors on Outcomes in Vehicular Crashes in Nevada: Identification of Opportunities for Injury Prevention Initiatives”

Goals of a Trauma System

- Organized approach to acutely injured patients that provides full and optimal care integrated with an EMS system.
- Pre-hospital to rehabilitation and beyond
- Major goal is to enhance community health
 - Identifying Risk Factors for injury in the community
 - Creating solutions to decrease the incidence and severity of injury
- → 30-50% of injury-related deaths occur in the field and the only way to prevent the deaths is to prevent injuries.

Application to Populations

- Intentionality

- Intentional
- Unintentional

- Demographics

- Age
- Gender
- Ethnicity

- Local/Regional Data

- WISQARS and other data sources
- NTDB – trauma data from contributing trauma centers

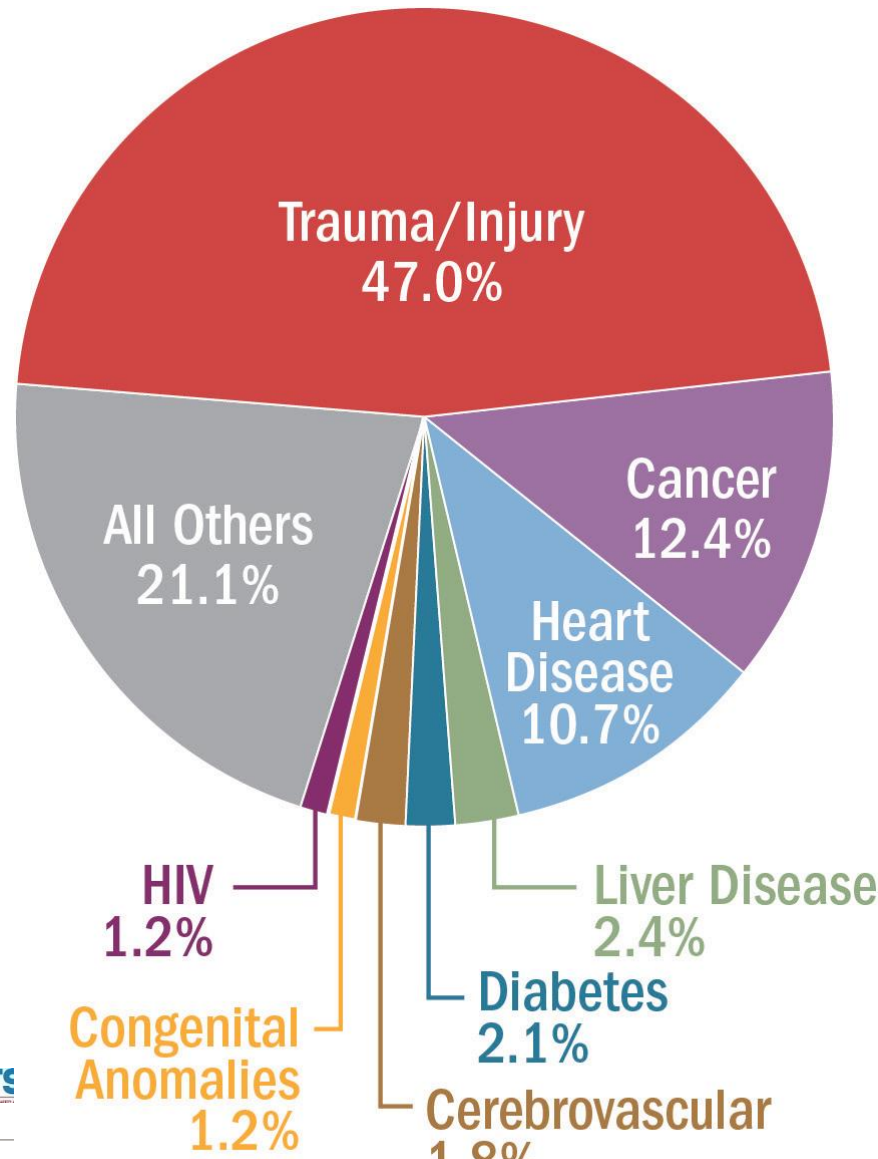
10 Leading Causes of Death, United States
2005 - 2015, All Races, Both Sexes

[Click on any colored box for detailed causes and ICD codes.](#)

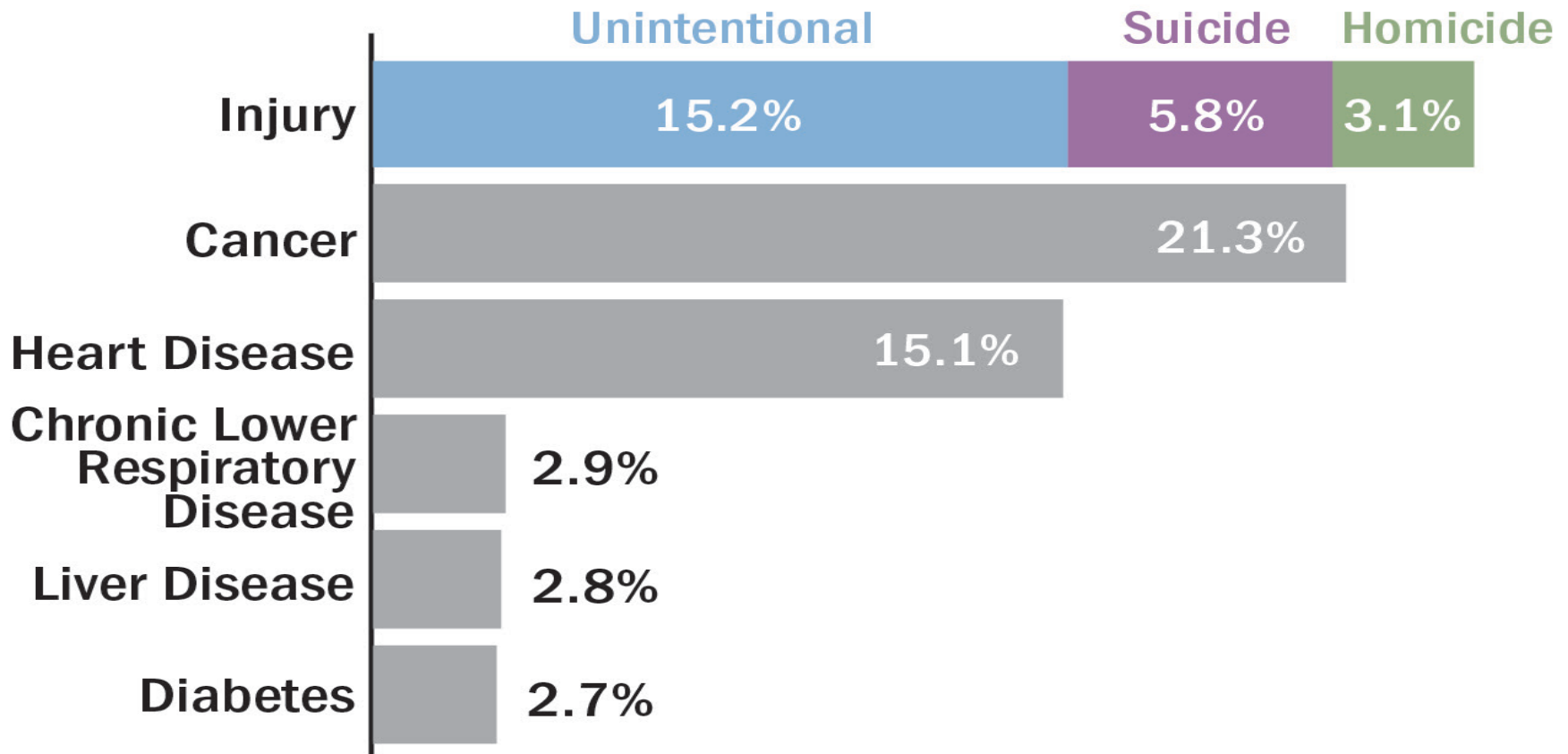
[Click on any age group for percent](#)

		Age Groups									
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	All Ages
1	Congenital Anomalies 57,501	Unintentional Injury 15,688	Unintentional Injury 9,182	Unintentional Injury 10,580	Unintentional Injury 146,974	Unintentional Injury 171,881	Unintentional Injury 176,827	Malignant Neoplasms 533,134	Malignant Neoplasms 1,194,716	Heart Disease 5,427,734	Heart Disease 6,769,307
2	Short Gestation 48,619	Congenital Anomalies 5,379	Malignant Neoplasms 4,998	Malignant Neoplasms 4,954	Homicide 53,923	Suicide 63,788	Malignant Neoplasms 138,377	Heart Disease 400,751	Heart Disease 783,144	Malignant Neoplasms 4,388,436	Malignant Neoplasms 6,321,739
3	SIDS 21,913	Homicide 4,142	Congenital Anomalies 2,003	Suicide 3,215	Suicide 50,952	Homicide 49,110	Heart Disease 122,097	Unintentional Injury 221,933	Chronic Low. Respiratory Disease 160,490	Chronic Low. Respiratory Disease 1,313,410	Chronic Low. Respiratory Disease 1,537,742
4	Maternal Pregnancy Comp. 17,951	Malignant Neoplasms 3,956	Homicide 1,401	Homicide 2,010	Malignant Neoplasms 17,636	Malignant Neoplasms 39,693	Suicide 73,364	Liver Disease 92,716	Unintentional Injury 169,785	Cerebrovascular 1,252,104	Cerebrovascular 1,468,998
5	Unintentional Injury 13,061	Heart Disease 1,768	Heart Disease 954	Congenital Anomalies 1,814	Heart Disease 11,252	Heart Disease 38,082	Homicide 30,610	Suicide 91,738	Diabetes Mellitus 134,255	Alzheimer's Disease 911,279	Unintentional Injury 1,391,307

Trauma Accounts for 47% of Deaths up to 46 Years of Age (2014)

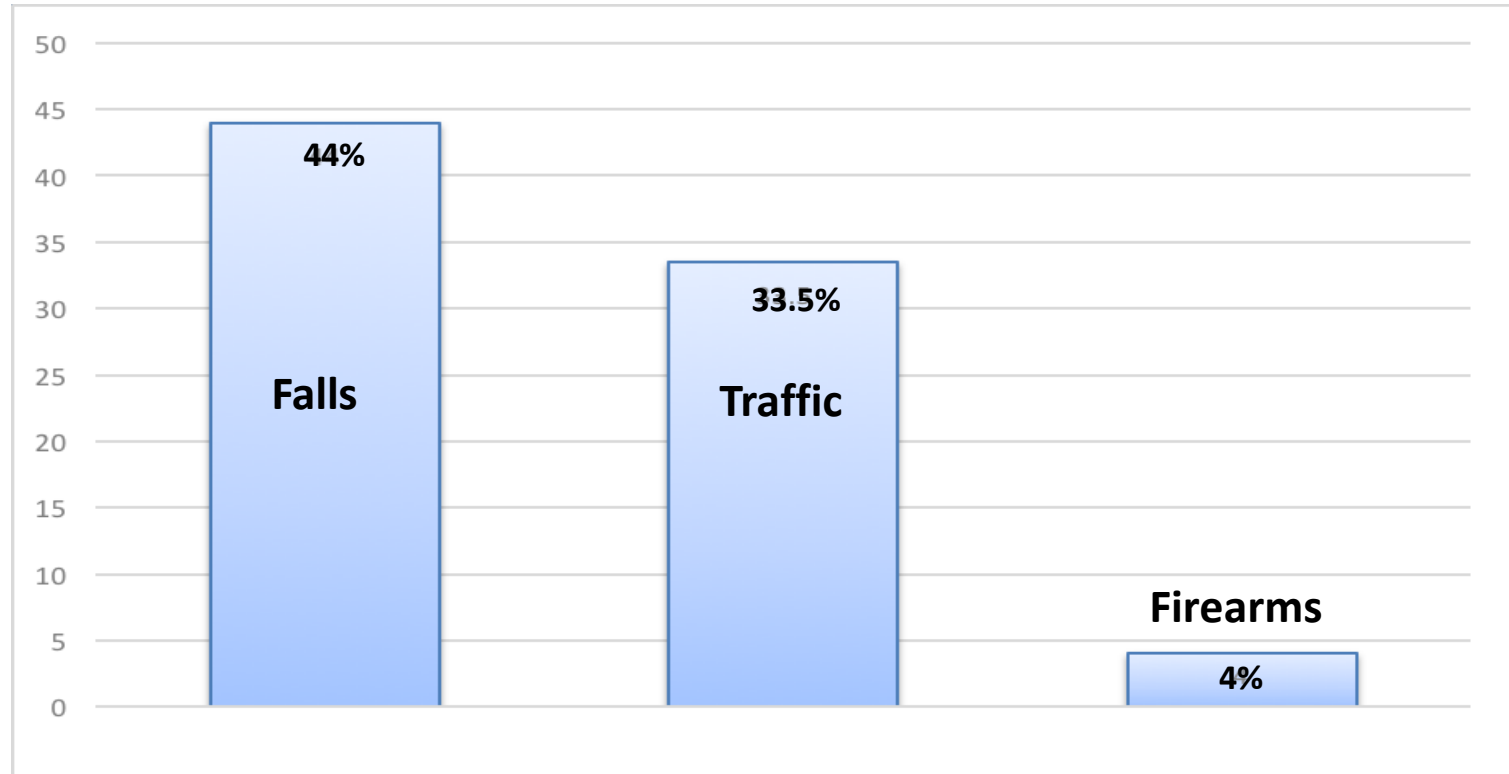


Leading Causes of Years of Potential Life Lost Up to Age 75 (2014 CDC)



Percentage Contribution to Total Years of Potential Life Lost Before Age 75

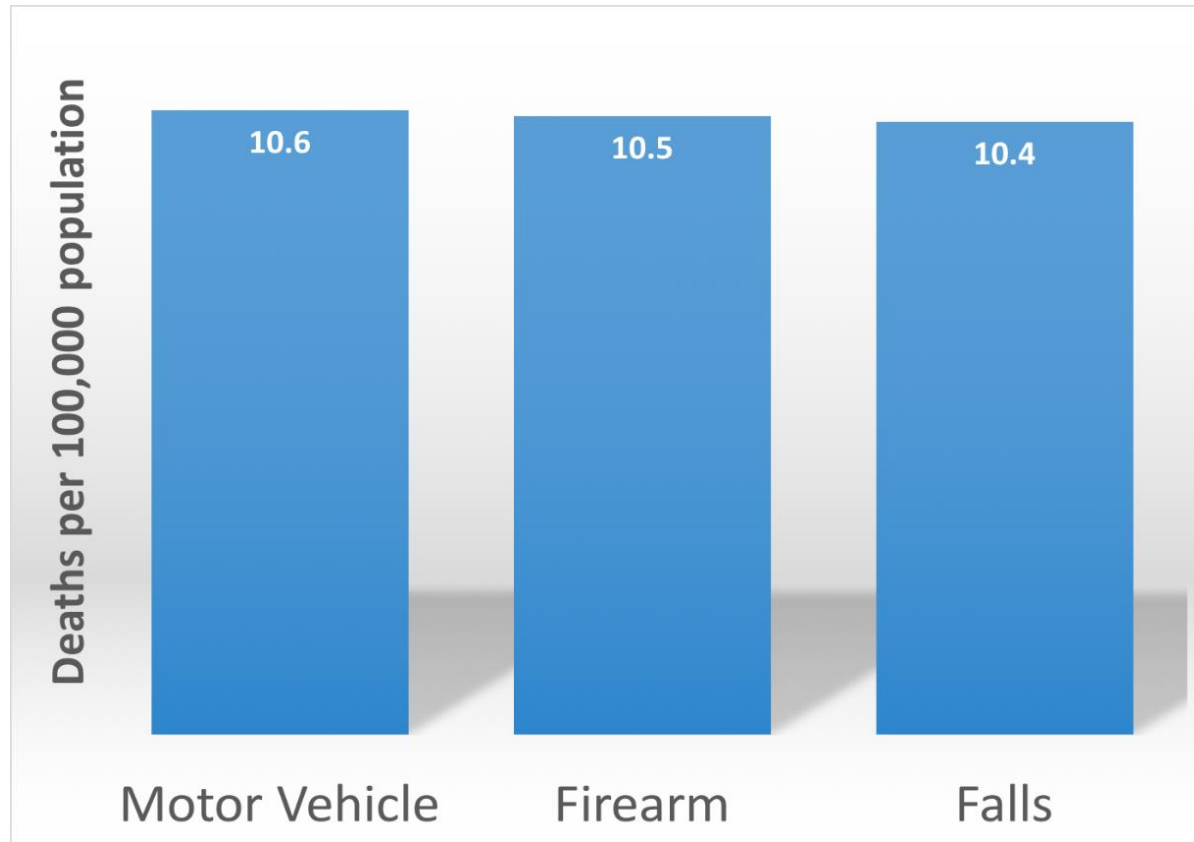
Population Injuries: Patients Treated at U.S. Trauma Centers by Mechanism



Percentage of 2014 NTDB/TQIP Patients by Mechanism, N = 818,212



Burden of Death in the U.S. by Mechanism of Injury

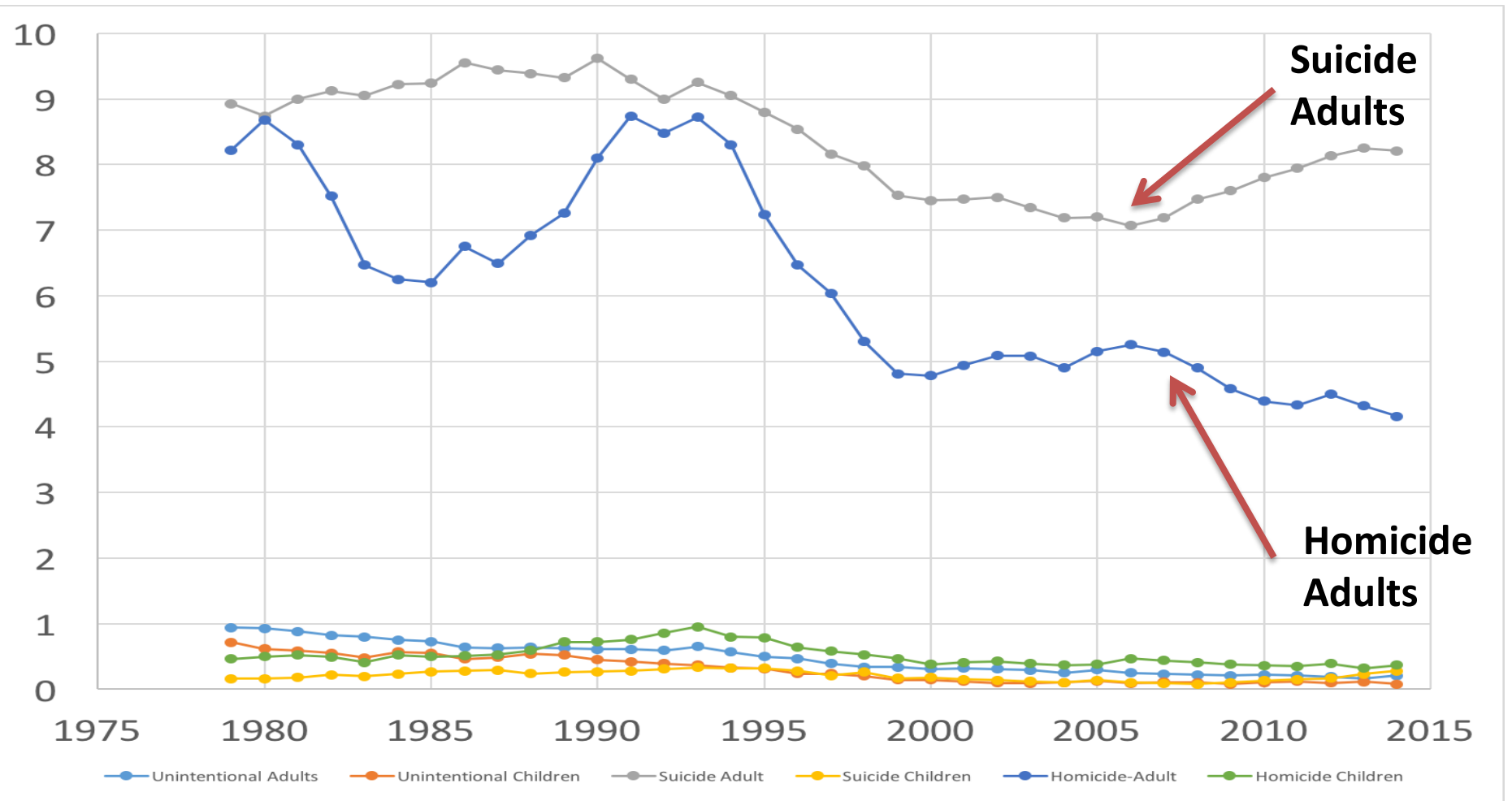


CDC National Center for Health Statistics, 1999-2014



Intentionality: Firearm Deaths in US

All Intentions in Adults & Children



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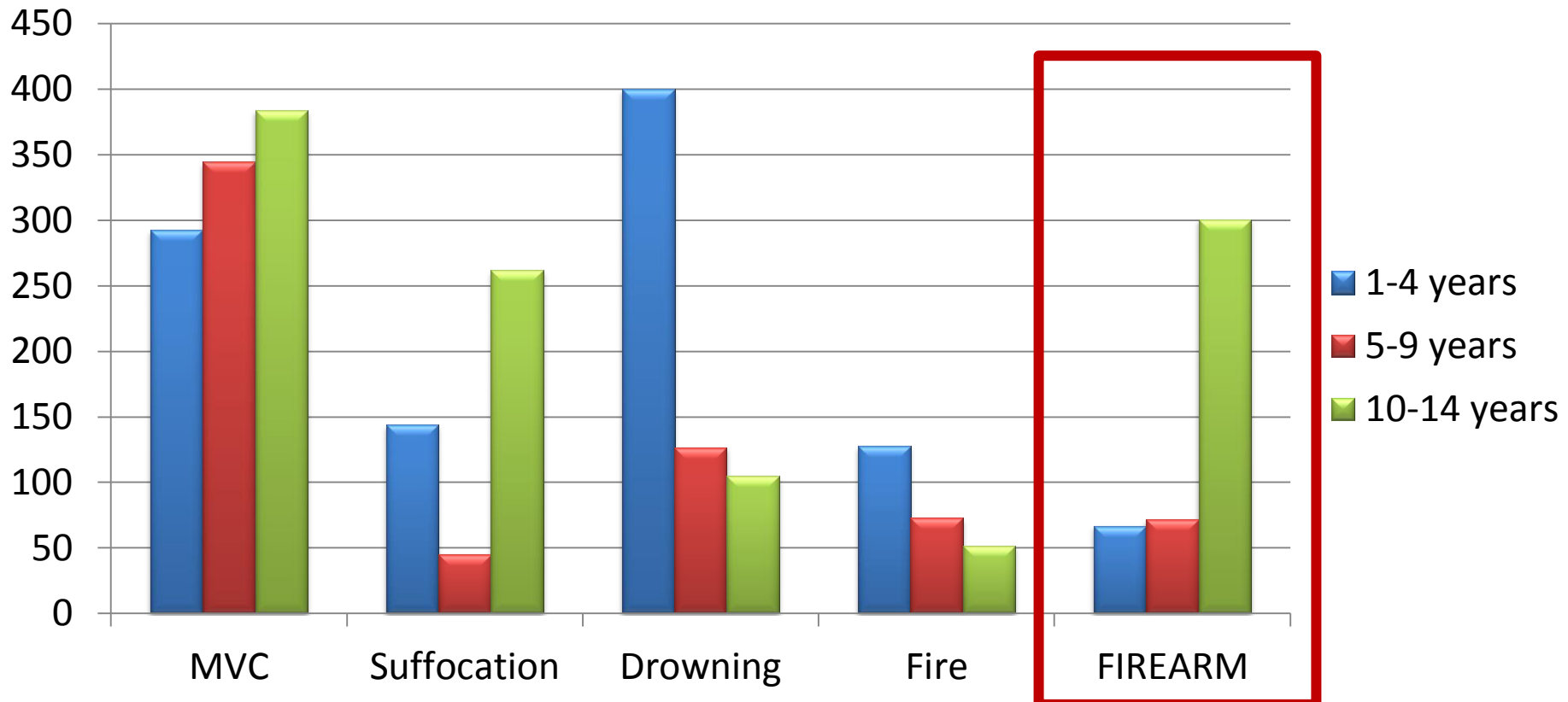
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100+years

CDC Wonder 2014 Accessed February 2016, crude rates per 100,000



Specific Populations: Cause of death, ages 1-14 years, 2014



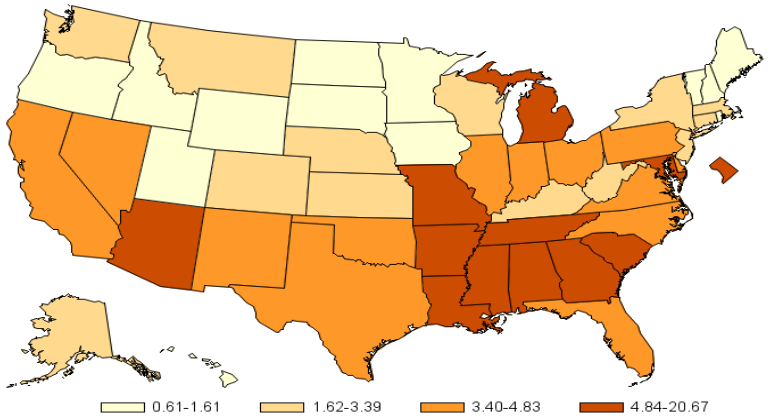
As children age, and intentional mechanisms of injury become more prominent, the rate of firearm injuries increase

 Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Geographic Distribution: Incidence and Intent of Firearm Fatalities by Location



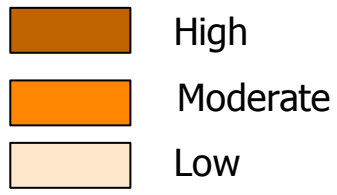
Homicide



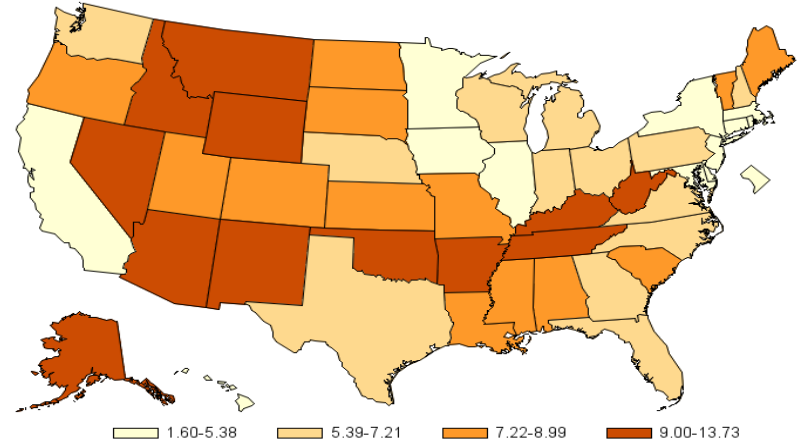
Reports for All Ages include those of unknown age.
 * Rates based on 20 or fewer deaths may be unstable. States with these rates are cross-hatched in the map (see legend above). Such rates have an asterisk.

Produced by: the Statistics, Programming & Economics Branch, National Center for Injury Prevention & Control
 Data Sources: NCES National Vital Statistics System for numbers of deaths; US Census Bureau for population estimates

2004-2010, death rates per 100,000 population



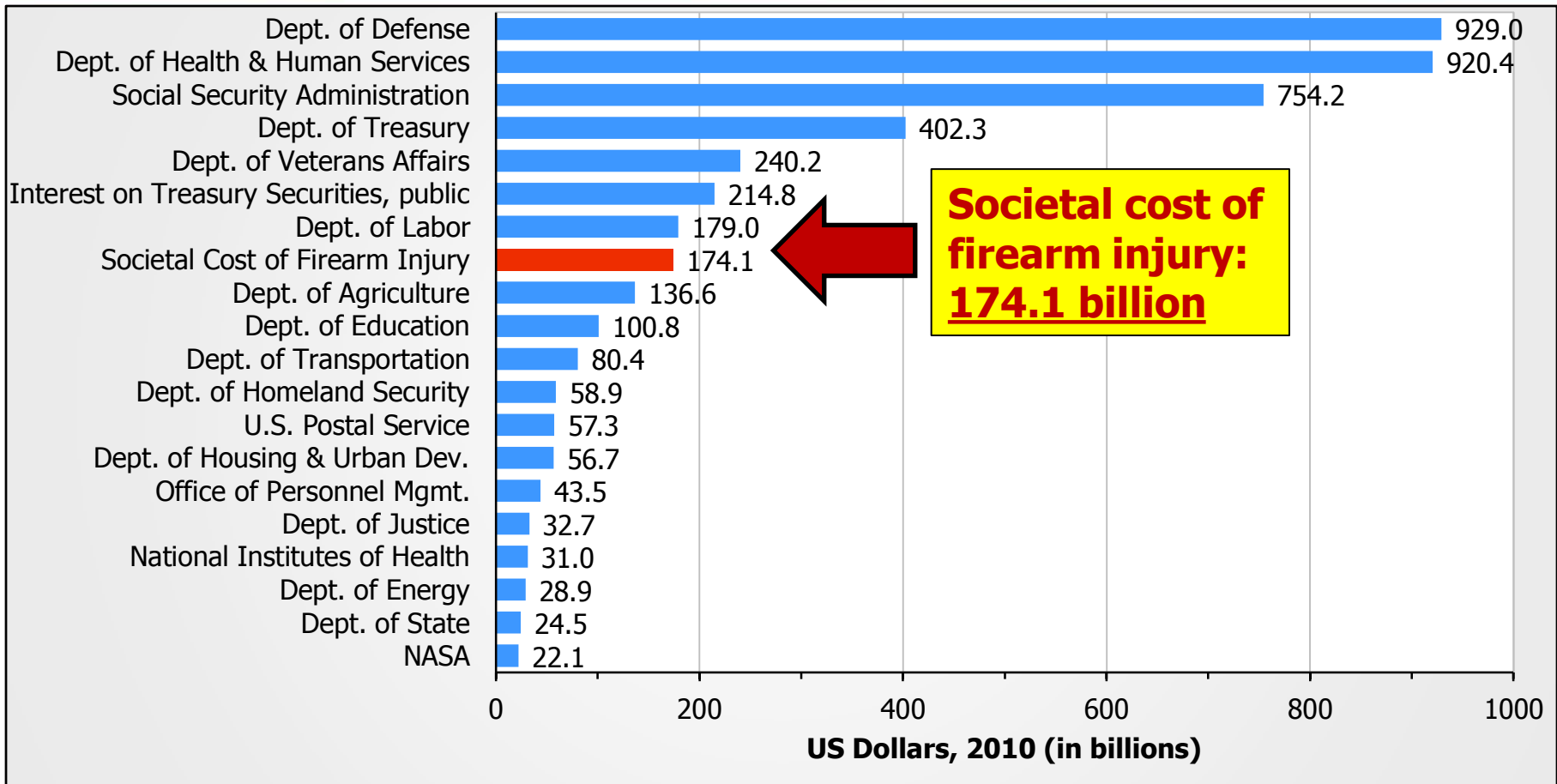
Suicide



Reports for All Ages include those of unknown age.
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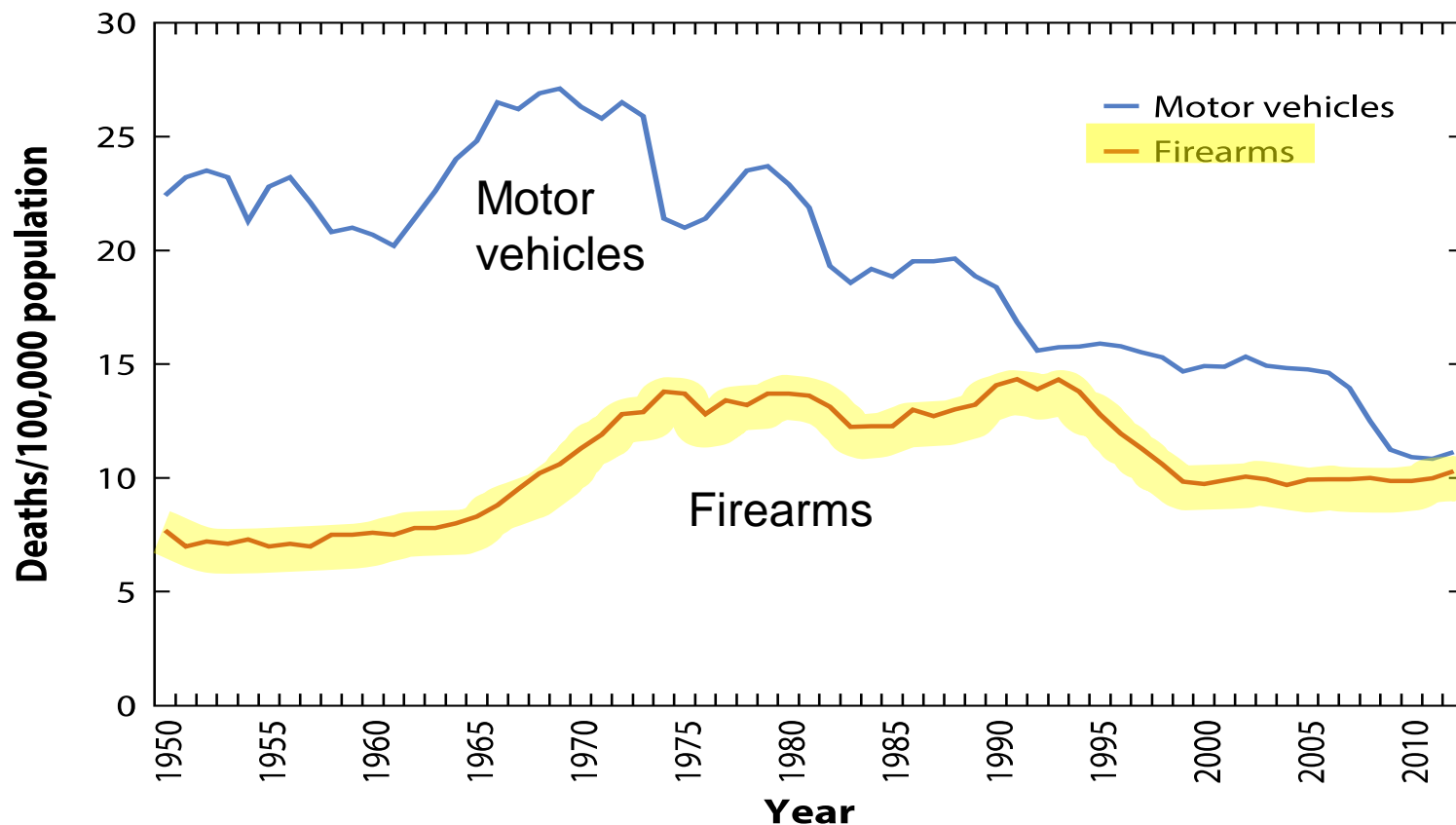
Produced by: the Statistics, Programming & Economics Branch, National Center for Injury Prevention & Control, CDC
 Data Sources: NCES National Vital Statistics System for numbers of deaths; US Census Bureau for population estimates.

Cost of Injury - Firearms



Lee J, Quraishi SA, Bhatnagar S, Zafonte RD, and Masiakos PT The economic cost of firearm-related injuries in the United States from 2006 to 2010. *Surgery*. 2014 May;155(5):894-898. doi: 10.1016/j.surg.2014.02.011. Epub 2014 Feb 22.

Injury Prevention Can Make a Difference: Motor Vehicle versus Firearm Deaths



The Epidemiology of Firearm Violence in the Twenty-First Century US Garen J.Wintemute,
10.1146/annurev-publhealth-031914-122535

Haddon's Matrix – Common Paradigm

- William Haddon, 1974
- Modifiable Human, Vector and Environmental Factors in three phases of injury:
 - Pre-event
 - Event
 - Post-event

Pre-Event Phase

1. Prevent the creation of the hazard; prevent the “exposure” to the hazard. For example, prevent childhood exposure handguns.
2. Reduce the amount of the hazard. Reduce speeds of vehicles.
3. Prevent the release of the hazard that already exists. Placing a trigger lock on a handgun.

Haddon's Matrix – Event Phase

Event Phase

4. Modify the rate or spatial distribution of the release of the hazard from its source. For example, seatbelts, airbags.
5. Separate in time or space the hazard being released from the people to be protected. For example, separation of vehicular traffic and pedestrian walkways.
6. Separate the hazard from the people to be protected by a mechanical barrier. For example, protective helmets.
7. Modify the basic structure or quality of the hazard to reduce the energy load per unit area. For example, breakaway roadside poles, rounding sharp edges of a household table.
8. Make what is to be protected (both living and nonliving) more resistant to damage from the hazard. For example, fire and earthquake resistant buildings, prevention of osteoporosis.

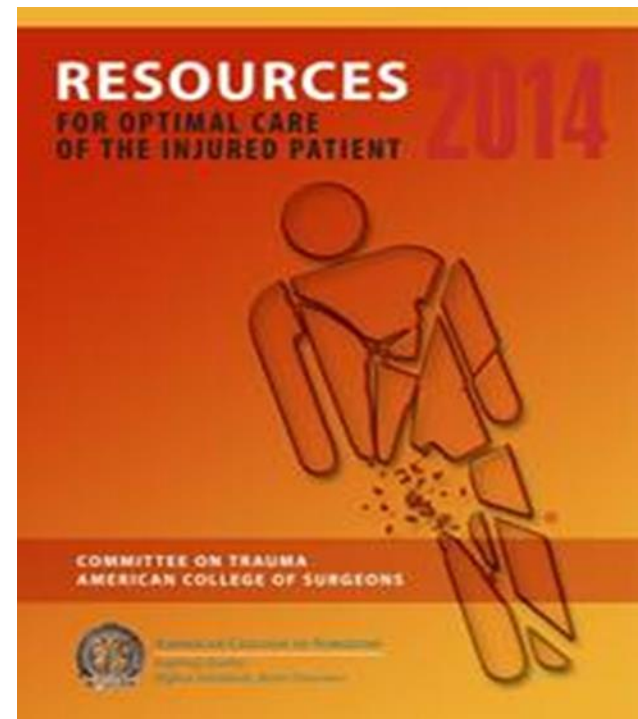
Haddon's Matrix – Post-Event

■ Post-Event Phase

- 9. Detect and counter the damage already done by the environmental hazard. Examples, emergency medical care, trauma care.
- 10. Stabilize, repair, and rehabilitate the damaged object. Examples, acute trauma care, reconstructive surgery, physical therapy.
 - Monitor for secondary effects of trauma: depression, PTSD, suicide ideation, other

Role of Injury Prevention in Trauma Centers

- Resource Guide for Optimal Care of the Injured Patient
- Also online
- New Criteria Quick Reference Guide
- Changes are noted in Orange
- Chapter 18



Organized and Effective Injury Prevention (IP)

- Prioritize IP activities based upon data
 - Trauma Registry
 - Epidemiology – several sources
 - Coroner data
 - CDC data – state or regional
 - Local and State Health Department
 - Other
 - NEW for Levels III and IV Trauma Centers

Organized and Effective Injury Prevention (IP)

- Community partnerships with experts in specific injury prevention;
- Exchange of data to better understand the root cause of the problem and how to intervene to decrease injury/death.
- **Must be effective programs: (Evidence-Based)**
 - Data driven
 - Evidence based reviews (East, Cochrane, others)
- Effective Leadership – designated IP Coordinator

Effective Injury prevention

- 3 most common causes of injury and traumatic death in trauma center community
- Target contributing factors:
 - Drugs and alcohol
 - Behavioral problems
 - Education alone is not necessarily effective
 - →Target audience is not necessarily motivated and ready for change.
- Choose Injury prevention programs that are proven or promising
- Leverage advocacy and media
- Track effectiveness

NASEM Recommendations – Injury Prevention

- **#1** The White House should set a national aim of achieving zero preventable deaths after injury and minimizing trauma-related disability.
- **#3** The Secretary of Defense should ensure combatant commanders and the Defense Health Agency (DHA) Director are responsible and held accountable for the integrity and quality of the execution of the trauma care system in support of the aim of zero preventable deaths after injury and minimizing disability.
- **#4** – sustained effort
- **#6** – best practices
- **#7** – strengthen research ... outcomes

Secondary Injuries

- Disabilities – physical
 - The civilian trauma centers likely have a lot to learn from our military colleagues
- Disabilities – emotional and psychological
 - Depression
 - PTSD
 - Interpersonal violence
 - Suicide
- Second Trauma
 - Families and significant others

Opportunities

- EMS – benefit us all – work with EMS providers – they are healthcare providers – falls prevention; they have access to homes
- Share data and publications
- Share interventions and injury prevention strategies and tactics
- Identify risks in our populations that overlap
- Major initiative – firearm injury prevention, guided by survey of COT members, 29% of which have had military experience.
- <https://www.facs.org/quality-programs/trauma/ipc>

Opportunities



Trauma Prevention Coalition

- 11 member organizations working together to develop effective strategies in injury/violence prevention
- Join 3rd Annual Injury Prevention Coordinators Symposium – May 15-16, 2017

<http://www.amtrauma.org/page/IPCS2017>

Thank You
Lets Work Together on Action Steps
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