Gun Violence:
A Leading Cause of Preventable Death in Children

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Disclosures

- We have nothing to disclose
Objectives

▸ Recognize the impact of gun violence on children and their families in the US
▸ Appreciate racial inequities in gun violence
▸ Describe two evidence-based strategies to prevent gun violence among children in the US
SPECIAL REPORT

The Major Causes of Death in Children and Adolescents in the United States

Rebecca M. Cunningham, M.D., Maureen A. Walton, M.P.H., Ph.D., and Patrick M. Carter, M.D.
Table 1. The 10 Leading Causes of Child and Adolescent Death in the United States in 2016, in Order of Frequency.1

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>No. of Deaths</th>
<th>Rate per 100,000 (95% CI)</th>
<th>Percent of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes</td>
<td>20,360</td>
<td>26.06 (25.70–26.42)</td>
<td></td>
</tr>
<tr>
<td>All injury-related causes</td>
<td>12,336</td>
<td>15.79 (15.51–16.07)</td>
<td>60.6</td>
</tr>
<tr>
<td>Motor vehicle crash</td>
<td>4,074</td>
<td>5.21 (5.06–5.38)</td>
<td>20.0</td>
</tr>
<tr>
<td>Firearm-related injury</td>
<td>3,143</td>
<td>4.02 (3.88–4.16)</td>
<td>15.4</td>
</tr>
<tr>
<td>Homicide</td>
<td>1,865</td>
<td>2.39 (2.28–2.50)</td>
<td></td>
</tr>
<tr>
<td>Suicide</td>
<td>1,102</td>
<td>1.41 (1.33–1.50)</td>
<td></td>
</tr>
<tr>
<td>Unintentional</td>
<td>126</td>
<td>0.16 (0.13–0.19)</td>
<td></td>
</tr>
<tr>
<td>Undetermined intent</td>
<td>50</td>
<td>0.06 (0.05–0.09)</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm</td>
<td>1,853</td>
<td>2.37 (2.27–2.48)</td>
<td>9.1</td>
</tr>
<tr>
<td>Suffocation†</td>
<td>1,430</td>
<td>1.83 (1.74–1.93)</td>
<td>7.0</td>
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<tr>
<td>Suicide</td>
<td>1,110</td>
<td>1.42 (1.34–1.51)</td>
<td></td>
</tr>
<tr>
<td>Unintentional</td>
<td>235</td>
<td>0.30 (0.26–0.34)</td>
<td>4.9</td>
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<tr>
<td>Drowning</td>
<td>995</td>
<td>1.27 (1.20–1.36)</td>
<td></td>
</tr>
<tr>
<td>Drug overdose or poisoning</td>
<td>982</td>
<td>1.26 (1.18–1.34)</td>
<td>4.8</td>
</tr>
<tr>
<td>Suicide</td>
<td>123</td>
<td>0.16 (0.13–0.19)</td>
<td></td>
</tr>
<tr>
<td>Unintentional</td>
<td>761</td>
<td>0.97 (0.91–1.05)</td>
<td></td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>979</td>
<td>1.25 (1.18–1.33)</td>
<td>4.8</td>
</tr>
<tr>
<td>Heart disease</td>
<td>599</td>
<td>0.77 (0.71–0.83)</td>
<td>2.9</td>
</tr>
<tr>
<td>Fire or burns</td>
<td>340</td>
<td>0.44 (0.39–0.48)</td>
<td>1.7</td>
</tr>
<tr>
<td>Unintentional</td>
<td>272</td>
<td>0.35 (0.31–0.39)</td>
<td></td>
</tr>
<tr>
<td>Chronic lower respiratory disease</td>
<td>274</td>
<td>0.35 (0.31–0.40)</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Figure 1. Mortality Rates (Deaths per 100,000 Children and Adolescents) for the 10 Leading Causes of Death in the United States from 1999 to 2016.

Data were obtained from the Wide-ranging Online Data for Epidemiologic Research (WONDER) system of the Centers for Disease Control and Prevention (CDC), known as CDC WONDER, according to the codes of the International Classification of Diseases, 10th Revision (ICD-10),1 for the leading causes of death among children and adolescents. Age was restricted to children and adolescents 1 to 19 years of age.
South Carolina & Firearm Mortality

- South Carolina ranks 6th highest in pediatric firearm death rate (7.18 per 100,000 people)
- South Carolina ranks 4th highest in pediatric homicide rate (74% committed with firearms)
- South Carolina rate increased in 2018, while it decreased overall in the U.S.

S.C. Firearm Homicide Rate Trend Ages 15-19

What About SC Laws?

https://giffords.org/lawcenter/resources/scorecard/
Firearm Injury Morbidity

- Profound burden—economic, social, and medical
- More likely to experience limiting disabilities, post-traumatic stress disorder, substance abuse, chronic health problems, and have lower educational attainment and employment compared to their peers.
- **Toxic stress**, including exposure to violence as a child, can lead to potentially permanent changes in learning, behavior and physiology
  - Higher levels of stress related chronic diseases
  - Increased prevalence of unhealthy lifestyles that can widen health disparities
- They are also *more likely to die* from a subsequent firearm injury.
- Families and communities also suffer - emotionally, psychologically and financially.


Disparity v. Inequity

- Disparity simply means a difference
- Inequity means an unjust difference
Racial Inequities in Firearm Violence

- Black Americans are disproportionately impacted by gun violence.
  - 10 times the gun homicides
  - 15 times the gun assaults
  - 3 times the fatal police shootings of white Americans

- Black women are twice as likely to be fatally shot by an intimate partner compared to white women.

Racial Inequities in Pediatric Firearm Violence

- Firearm injuries are the LEADING CAUSE OF DEATH FOR BLACK CHILDREN IN THE US.

- Boys, older children and minorities are disproportionately affected by firearm violence

- Black boys and youths (0-19) had the highest firearm homicide rate in 2018 compared to other racial and ethnic groups among both males and females
  - 14 times higher than their White (non-Latino) peers

Police Violence and Black Americans

- 95 percent of the deaths of civilians caused by police are with a firearm
- Black people are the victims at a disproportionate rate
- Black people in America are nearly 3 times as likely to be shot and killed by the police than white Americans

Prevention: Unintentional Shootings and Suicide
Firearm Access

- 13 million US children live in a household with a gun
- 4.6 million US children live in a household with at least one loaded, unlocked gun
- The majority of children in gun-owning households are aware of where their parents store their guns
- More than 1/3 reported handling their parents’ guns
- 1/4 of these parents did not know that their children had handled the gun in their house


The Risks of Firearm Access

- Nearly 90% of unintentional gun deaths and injuries in children occur in the home
- The firearm used in youth suicide comes from the home 9 out of 10 times
- In incidents of gunfire on school grounds, 78% of shooters under the age of 18 obtained the gun from their home or the home of a friend or relative


Prevention Strategies: Firearm Access

- Preschool aged children, observed 1 week after informational intervention where they were told not to play with guns (“just say no”)
  - No difference in gun-playing behavior
- 4-7 year old children went through a week-long skills based gun safety training program
  - Just as likely as children with no training to approach or play with a handgun
- 4-5 year old children in two different gun safety programs
  - Able to verbally repeat gun safety message
  - Could not demonstrate gun safety skills in real-life assessments


Prevention Strategies: Responsible Storage

▸ Responsible storage is storing a gun LOCKED, UNLOADED and SEPARATE from ammunition.

▸ Responsible storage is associated with decreased risk of firearm suicide and unintentional firearm injury among children

▸ Households with locked firearms and separate locked ammunition:
  ▸ 78% lower risk of self-inflicted firearm injuries
  ▸ 85% lower risk of unintentional firearm injuries


How can Pediatricians Help?

- Brief physician counseling combined with distribution of a cable gun lock is effective in increasing safe storage of home firearms.
- Educational interventions targeting adults and including distribution of cable gun locks are the most likely to be effective.
- AAP recommends pediatricians routinely screen for access to firearms and counsel about risk reduction.
- On ASK day, June 21, the first day of summer, the AAP reminds parents to ensure their kids are safe by asking about gun safety and storage.


Prevention Strategies: Physician Counseling

- The majority of health care providers agree they should provide firearm counseling, but they report many barriers:
  - lack of time
  - inadequate training
  - uncertainty of the effect

- A recent study demonstrated poor pediatric resident documentation of screening for firearm access in patients with suicidal ideation or homicidal ideation

- Another recent study demonstrated low rates of firearm screening and safe storage counseling by pediatric residents in the inpatient setting


Prevention Strategies: Physician Counseling

- A 2019 study showed that when prompts for firearm screening and smoke alarms were added to the Electronic Health Record (EHR), pediatricians and residents were significantly less likely to document firearm screening than smoke alarm counseling.

- A 2020 study assessed the impact of a firearm safety counseling workshop on pediatric resident knowledge, self-efficacy and self-reported practice patterns.
  - In pre-post analysis they found participants were 5x more likely to counsel their patients on firearms (6 months post compared to pre).
  - Reported greater comfort in asking about firearms.


BE SMART

SECURE all guns in your homes and vehicles

MODEL responsible behavior

ASK about unsecured guns in other homes

RECOGNIZE the role of guns in suicide

TELL your peers to Be SMART
MUSC doctors will ask questions about guns in the home with new safety campaign
Improving the Frequency and Documentation of Gun Safety Counseling in a Resident Primary Care Clinic

Kelsey A.B. Gastineau, MD; Cassandra L. Stegall, DO; Laura K. Lowrey, MD; Barbra K. Giourgas, MD; Annie Lintzenich Andrews, MD, MSCR

<table>
<thead>
<tr>
<th>Date</th>
<th>Intervention</th>
</tr>
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<tbody>
<tr>
<td>Jan-May 2018</td>
<td>Baseline time period</td>
</tr>
<tr>
<td>May 2018</td>
<td>Be SMART lecture</td>
</tr>
<tr>
<td>June 2018</td>
<td>Resident initial survey</td>
</tr>
<tr>
<td>June 2018</td>
<td>Parent Safety Survey</td>
</tr>
<tr>
<td></td>
<td>Resident follow-up survey</td>
</tr>
<tr>
<td></td>
<td>Wear Orange Day</td>
</tr>
<tr>
<td>July 2018</td>
<td>Be SMART roll-out in PPC clinic</td>
</tr>
<tr>
<td>March 2019</td>
<td>EHR prompt added</td>
</tr>
<tr>
<td>June 2019</td>
<td>Wear Orange Day</td>
</tr>
<tr>
<td>July 2019</td>
<td>New intern class</td>
</tr>
<tr>
<td>October 2019</td>
<td>Email reminder prompt to residents</td>
</tr>
<tr>
<td>Weekly</td>
<td>Informal in-person reminders</td>
</tr>
</tbody>
</table>

1. Is there a gun in the home or vehicles? Yes/No
2. Is the gun stored locked, unloaded and separate from ammunition? Yes/No
3. Was a gunlock or other additional gun safety information such as Be SMART materials provided? Yes/No?
   a. If yes, what additional materials were provided:

Figure 3. EHR prompt for firearm safety screening questions. EHR indicates Electronic Health Record.
Improving the Frequency and Documentation of Gun Safety Counseling in a Resident Primary Care Clinic

Kelsey A.B. Gastineau, MD; Cassandra L. Stegall, DO; Laura K. Lowrey, MD; Barbra K. Giourgas, MD; Annie Lintzenich Andrews, MD, MSCR

Figure 4. Statistical process control chart. LCL indicates lower confidence limit; UCL, upper confidence limit; and WCC, well-child check.
Prevention: Community Violence
Prevention Strategies: Homicide and Community Violence

Hospital Based Violence Intervention Programs

- Identify youth with violent injuries or with risks of injury

- Risk assessment… what can help this person *never experience this again*?

- Identify needs, resources, and create action plan
  - Hospital & community
  - Intensive follow-up

- Family and community support

[https://vimeo.com/139321826](https://vimeo.com/139321826)
Noteworthy Program – *WrapAround project*, San Francisco

- Hospital case management, community resources
- Participants:
  - Ages 10-30 “high-risk” patients identified by social workers
- Outcomes
  - Recidivism for violent injury
- Budget $320k annually

- N=254, recidivism significantly lower compared to historical controls (16% vs. 4.5%)
- Services most associated with success:
  - Mental health support
  - Employment
- $4 saved for every $1 spent in health care alone

*Smith R et al. J of Trauma, 2013*
What Does This Look Like for a Client?

**Who**

16 yo male laceration to the arm after punching a window

**Situation**

Tearful, poor eye contact
Locked in room for punishment

**Assessment**

Parents recently separated
Physical punishment in home
Fights at school
Marijuana use
Dropping grades
Firearm in home
Symptoms of PTSD

**Plan**

Weekly contact
Follow-up with program coordinators, school counselor, social worker
Family meetings monthly
Psychological counseling

**Follow-up**

Psychology (TRRP)
CPS referral
School counselor
Peer mentor
Parks & Rec Arts program
Lethal means access counseling
Summer internship

Other social determinants of trauma...
Hospital Based Violence Intervention Programs: Successful and Cost Effective

- Systematic review of trauma center-based youth violence programs (Ages 10-24)
  - 90% demonstrated improved outcomes
  - >50% showed lower recidivism
- Individual, intensive community-based case management are most successful

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**Hospital-centered violence intervention programs: a cost-effectiveness analysis**


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**AAST 2014 Plenary Paper**

Saving lives and saving money: Hospital-based violence intervention is cost-effective

Catherine Juillard, MD, MPH, Randi Smith, MD, MPH, Nancy Anaya, MD, MS, Arturo Garcia, MD, James G. Kahn, MD, MPH, and Rochelle A. Dicker, MD, San Francisco, California

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**Current Opinion**

Hospital-based violence intervention programs save lives and money

Jonathan Purtle, MPH, MSC, Rochelle Dicker, MD, Cornell Cooper, MD, Theodore Corbin, MD, MPP, Michael B. Greene, PhD, Anne Mack, MPP, Diana Creaser, MS, RN, Deere Topp, MPH, and Dawn Moreland, RN, BSN
Hospital Based Violence Intervention Programs: Supported by 44 Medical & Public Health Organizations

Proceedings from the Medical Summit on Firearm Injury Prevention: A Public Health Approach to Reduce Death and Disability in the US

Eileen M Bulger, MD, FACS, Deborah A Kuhls, MD, FACS, Brendan T Campbell, MD, FACS, Stephanie Bonne, MD, FACS, Rebecca M Cunningham, MD, FACEP, Marian Betz, MD, FACEP, Rochelle Dicker, MD, FACS, Megan L Ranney, MD, MPH, FACEP, Chris Barsotti, MD, FACEP, Stephen Hargarten, MD, MPH, Joseph V Sakran, MD, MPH, FACS, Frederick P Rivara, MD, MPH, FAAP, Thea James, MD, FACEP, Dorian Lamis, PhD, Gary Timmerman, MD, FACS, Selwyn O Rogers, MD, FACS, Bechara Choucair, MD, Ronald M Stewart, MD, FACS