Chapter 18 and Other Updates from the COT

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Disclosures

- Office of Traffic Safety (OTS) 2016-2018 Grant
Objectives

- Brief review of injury data, including the contribution of violence and elderly injuries and death
- Review the Importance of Injury Prevention
- Review COT Focus on Violence and Firearm Injuries
- Review Likely Modifications in Chapter 18 of the Orange Book and PRQ
- Integrate Principles of Injury Prevention with Requirements of Chapter 18 in the Orange Book
Trauma Prevention Coalition

Letter of Agreement for Member Organizations

The Trauma Prevention Coalition seeks to combine the resources of major professional organizations addressing the acute healthcare needs of the injured and to promote collaborative efforts and develop effective strategies in injury/violence prevention while minimizing redundant and duplicative activities. In accordance to this mission, the coalition’s member organizations are responsible for designating a representative to participate in the coalition’s activities. The member organization is responsible for the reimbursement in accordance with that organization’s polices and practices for any associated expenses related to coalition activities in which its representative participates. The member organization will have the opportunity to review all material produced by the coalition prior to publication and/or distribution and offer suggestions as to future content.

Signed
Chair, Committee on Trauma
American College of Surgeons

Date: June 29, 2012
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 → Injury Prevention is Key
  - Identify **Risk Factors** for injury in the community
  - Utilize evidence-based interventions 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.
Increasing Trauma Deaths in the United States

Peter Rhee, MD, MPH, Bellal Joseph, MD, Viraj Pandit, MD, Hassan Aziz, MD, Gary Vercruysse, MD, Narong Kulvatunyou, MD, and Randall S. Friese, MD

CONCLUSIONS

The trauma death rate has alarmingly increased since 2000, whereas the cancer and heart disease death rates have decreased. As of 2010, trauma is now the leading cause of death in individuals 46 years and younger. It remains the single, largest cause for years of life lost. The number of trauma deaths is now higher than the number of cancer deaths until age 47—and higher than the number of heart disease deaths until age 49. The changing epidemiology of trauma mortality must be a focus of robust future investigations to make strides in preventing and treating trauma, the greatest increasing killer in our era.

- Death from trauma & injury increased at a rate higher than that of population growth
National Academy of Sciences, Engineering & Medicine 2016 report

- Blueprint for National Trauma Action Plan building on progress made by military & civilian centers and systems
- Potential “plank” in national health platform; building health infrastructure

Magnitude: Trauma Accounts for 47% of Deaths up to 46 Years of Age (2014)
The Magnitude of the Problem

- **Fifth** leading cause of death overall
- More deaths in children than all other causes combined
- > 130,000 Americans die every year as a result of trauma
- 25% of all life-years lost = more than cancer + heart disease + HIV combined
- Most important problem for our children & our troops
- Health care costs + lost productivity = $676 billion/year
- 41 million ER visits; 2 million hospital admissions.
Leading Causes of Years of Potential Life Lost Up to Age 75 (2014 CDC)

- **24% Injury**
  - Unintentional: 15.2%
  - Suicide: 5.8%
  - Homicide: 3.1%

- Cancer: 21.3%
- Heart Disease: 15.1%
- Chronic Lower Respiratory Disease: 2.9%
- Liver Disease: 2.8%
- Diabetes: 2.7%

Percentage Contribution to Total Years of Potential Life Lost Before Age 75
Mortality rate vs. Funding

Stark & Shah. 2017. JAMA
Manley, Croce et al, WTA 2017
Where to Start - Application to Populations

- Intentionality
  - Intentional
  - Unintentional

- Demographics
  - Age
  - Gender
  - Ethnicity

- Local/Regional Data
  - WISQARS and other data sources – Death and Injury Data
  - NTDB – trauma data from contributing trauma centers and ED Data
  - National Violent Death Reporting System (NVDRS)
MORTALITY FROM MEDICAL CAUSES

Peak
1965–1995

Current
2009–2012

- Suicide
  (~20,000)

- Stroke
  (~30,000)

- AIDS
  (~1.1 Million)

- Heart Disease
  (~6,000)

- ALL (Leukemia)
Important to Examine
Multiple Data Sources and Trends
When Selecting Injury Prevention Strategy
Population Injuries: Patients Treated at U.S. Trauma Centers by Mechanism

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

- Falls: 44%
- Traffic: 33.5%
- Firearms: 4%
Burden of Death in the U.S. by Mechanism of Injury

CDC National Center for Health Statistics, 1999-2014
Adults—Firearm death all intents (Age 15-85+)

CDC Wonder 2014 Accesses February 2016, crude rates per 100,000
Children – Firearm death all intents (Ages 0-14)

CDC Wonder 2014 Accessed February 2016, crude rates per 100,000
As children age, and intentional mechanisms of injury become more prominent, the rate of firearm injuries increase.
Geographic Distribution: Incidence and Intent of Firearm Fatalities by Location

2004-2010, death rates per 100,000 population

- **High**
- **Moderate**
- **Low**

**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.

**Suicide**

- 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, CDC
Data Sources: NCES National Vital Statistics System for numbers of deaths; US Census Bureau for population estimates.
Intentional vs Unintentional Injury Deaths

Figure 1. Injury-related death rate trends in the 21st century demonstrate an increase in intentional violent deaths as compared with a substantial decrease in unintentional traffic deaths. The increase in intentional death is driven by an increase in intentional self harm from both firearms and nonfirearm mechanisms and increases in firearm assault deaths.¹
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
What Can We Do?

- Statements and action plans
- Opinions vary widely and can be very divisive
- Surveyed COT and BOG members
- Areas of consensus that included:
  - Talking with patients about safe storage and ownership
  - Research to better understand interventions
  - Leverage trauma system and injury prevention
  - Violence – hospital based violence intervention programs
  - Advocacy based upon consensus
- October 2017 Bulletin (free)
- Injury Prevention website – publications, more
  https://www.facs.org/quality-programs/trauma/ipc
ACS Firearm Action Plan

Talking with Patients

- **Patient Brochure (Draft)**
  - Post on Website
  - Sign on by other professional organizations
  - Disseminate widely

- **Pediatric office Tablet Project** targeted to parents of pediatric patients.
  - Less than 10 years – safety
  - 10 years and greater - suicide
  - 7/10 centers have IRB approval
  - Data collection to start mid-June

- **Safe Storage Toolkit** under development for use:
  - In Trauma Centers
  - Outreach activities by Trauma Centers
  - Locations where firearms are sold

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Draft Patient Brochure

**Gun Safety and Your Health**

- Storing Ammunition (Bullets) away from Guns
- Who Is at a Higher Risk for Injury with a Gun?
- Storage at a Safe, Remote Location
- Disposing of an Unwanted Gun
- What to Do When a Friend or Family Member Is at Risk and Has Access to a Gun

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Safe Gun Handling

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Safe Gun Storage
The ACS COT’s approach to firearm injury prevention was highlighted in the October 2017 *Bulletin*.

- The COT’s consensus-based approach to firearm injury
- Violence intervention programs
- Survey of the ACS Board of Governors on firearm injury prevention
- Trauma surgeon uses traveling fellowship to learn about HVIPs

Survey of American College of Surgeons Committee on Trauma members on firearm injury: Consensus and opportunities

Published in the *Journal of Trauma Acute Care Surgery*

A group from the ACS COT Injury Prevention and Control Committee was tasked with outlining a comprehensive approach to institute a sustainable hospital-based violence intervention program (HVIP). The committee has developed a step-wise guide to establishing a working HVIP.
Freedom with Responsibility: A Consensus Strategy for Preventing Injury, Death, and Disability from Firearm Violence

Common American Narrative
Inclusive of the Two Conflicting Narratives
- Liberty protected by the US Constitution
- Violence major cause of preventable death & suffering
- Significantly reduce death and disability by:
  - Working together
  - Understand & address underlying causes of violence
  - Make firearm ownership as safe as possible

Firearm and Freedom Narrative
- Firearm generally beneficial
- Necessary for personal protection and safety
- Protected, Constitutional right
- Emblem of freedom
- Gun Control translates to Freedom Control

Firearm and Violence Narrative
- Firearms generally harmful
- Generally unnecessary in civil life
- Decrease personal liberty because of increased risk of harm
- Emblem of violence
- Gun Control translates to Violence Control

"The time is now for political differences to be set aside, for polarizing and incendiary language to be avoided and for our energies to be devoted to thoughtful policy development and specific actions in the context of a public health model."

"We all own the epidemic of violence in America and courageous leadership is needed. Firearm owners, those who don't own firearms, advocacy groups across the spectrum, the faith community...and the general public must commit to working together."

Stewart, et al. J Am Coll Surg, August 2018
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, secure firearms, 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
Chapter 18 Revisions

Currently Underway
Expected by Year End
Implementation One Year After Finalized
Chapter 18 Revision Process

- Diverse Committee Proposing Modifications
  - Demographic groups: adult, children, geriatric expertise
  - Physicians, nurses, injury prevention personnel
  - Intentionally included Injury Prevention Personnel like ourselves and a representative of the Safe States Standards and Indicators Initiative

- Chapter Criterion Deficiencies were open to comment

- Goal is not to increase Criterion Deficiencies

- Evidence-based; encourage trauma centers to target injuries and deaths in their area (use more than trauma database)

- Complete by year-end; changes to PRQ as well

- Transform to “living document”
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; 6 Criterion Deficiencies
- Published in 2014; currently being revised
- Also online: Criteria Quick Reference Guide with 2014 Changes noted in Orange
- 2018 changes are expected by the end of the calendar year
Organized and Effective Injury Prevention (IP)

- Prioritize IP activities based upon local data (CD-1)
  - Trauma Registry
  - Other Sources of Epidemiology
    - Coroner data (WISQARS, VDRS)
    - CDC data – state or regional
    - Local and State Health Department
    - Other – violence data (VDRS)
  - NEW for Levels III and IV Trauma Centers
Violent Death Reporting System (VDRS)

State Profiles
Violent Death Reporting System (VDRS) Example

2015, NVDRS States: VA
All Victims Death Counts and Rates per 100,000
All Intents, Mechanism: Firearm
All Races, Both Sexes, All Ages

<table>
<thead>
<tr>
<th>Number of Deaths</th>
<th>Population</th>
<th>Crude Rate</th>
<th>Age-Adjusted Rate**</th>
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<tbody>
<tr>
<td>912</td>
<td>8,382,993</td>
<td>10.88</td>
<td>10.44</td>
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Violent Death Reporting System (VDRS)

2015, NVDRS States: VA
All Victims Death Counts and Rates per 100,000
All Intents, Mechanism: Firearm
All Races, Both Sexes, Ages 10 to 34

<table>
<thead>
<tr>
<th>Age Group</th>
<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
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<tr>
<td></td>
<td>Number of Deaths</td>
<td>Population</td>
<td>Crude Rate</td>
</tr>
<tr>
<td>10-14</td>
<td>_*</td>
<td>521,486</td>
<td>_*</td>
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<tr>
<td>25-29</td>
<td>102</td>
<td>598,976</td>
<td>17.03</td>
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<tr>
<td>30-34</td>
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Organized and Effective Injury Prevention (IP)

- Community partnerships with experts in specific injury prevention, advocacy; (CD-6)

- 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)
  - Examples
Effective Leadership – Designated IP Professional

- Must be a designated injury prevention professional with a job description that includes IP (CD-2)
- L1 – must be a person separate from trauma program manager; must have salary support for IP
- L2-4 – may be the trauma program manager (TPM) only if job description includes detailed responsibilities in IP and IP does not interfere with the other responsibilities of the TPM
- Empower the IP Professional – encourage clinicians to get involved in injury prevention
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 ready for change.

- Choose Proven or Promising Programs

- Leverage advocacy and media; track effectiveness

- Increased focus; more resources; enhance PRQ
Proximate Cause

• Screening and brief intervention for alcohol
  – Required of all trauma centers (CD-3)
  – Effective screening instrument (CDC, other)
  – Considering a threshold for screening (?80%?); encourage all hazards approach
  – Encourage violence intervention and HVIPs, other

  ▪ Cutoff Score; How do you track?
    – Have all patients who screen positive received a brief intervention by trained personnel at Level I and II Trauma Centers? (CD-4)
    – How do you track and document?
    – Considering a threshold for brief interventions (?80%?)
Proximate Cause – Other Examples

• Screening for other drugs of abuse could benefit from research (suggestion!)

• Firearm Injuries
  – Safe Storage
  – Violence Intervention

• Socioeconomic, cultural, environmental, engineering
  – Auto versus pedestrian
  – Falls
Proven and Promising Programs

• Proven and promising – others are using and/or researching with promising results

• Complete review of the literature (East, CDC, Cochrane)

• Adapt programs to your community

• **Level 1 and Level 2 centers** must implement at least 2 programs that address one of the major causes of injury in the community (**CD-5**)

• Collect data – numbers, effectiveness, follow-up
Summary Criterion Deficiencies

1. Prioritize IP activities on local data (CD-1)
2. Designated injury prevention coordinator (CD-2)
3. Screening and brief intervention for alcohol (CD-3)
4. Perform Brief intervention (Level I and II) (CD-4)
5. Implement at least 2 programs that address one of the major causes of injury in the community (CD-5)
6. Community partnerships with experts in specific injury prevention, advocacy; (CD-6)
Secondary Injuries and Second Trauma

- Disabilities – emotional and psychological
  - Depression
  - PTSD
  - Interpersonal violence
  - Suicide

- Second Trauma
  - Families and significant others
Many Opportunities

- EMS – benefits 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
- Don’t forget advocacy!
  - Use local and national data
SB 156

Deborah A. Kuhls, MD
Laura K. Gryder, MA
Child Restraint Law in Nevada
NRS 484B.157

• Existing law: children <6 years and ≤60 lbs. must be secured in a Child Restraint System (CRS).
• Proposed bill will extend CRS requirements to include children <8 years and <57 inches in height.
• Child safety seats reduce the risk of injury by 71-82%, and risk of death by 28% as compared to seat belts.
• **For children 4- to 8-year-olds, booster seats reduce injury risk by 45 percent compared to seat belts alone.**
• AAP Recommendations:
  • Children who have outgrown a forward-facing seat should use a booster seat until the lap-and-shoulder belt fits properly (generally 4 ft. 9 and between 8 and 12 years old).
  • Children should ride in the back seat until age 13 years of age.
New Injury Severity Score Groups
Children age 4-7 (N=240)
Linked NDOT-Trauma Years 2005-2014

<table>
<thead>
<tr>
<th>Injury Level</th>
<th>CRS</th>
<th>No CRS</th>
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<tr>
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<td>27</td>
<td>7</td>
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<tr>
<td>Minor-Moderate</td>
<td>42</td>
<td></td>
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<tr>
<td>Serious-Critical</td>
<td>14</td>
<td>44</td>
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Center for Traffic Safety Research
University of Nevada, Reno School of Medicine
New Injury Severity Score Groups
Children age 6-7 (N=124)
Linked NDOT-Trauma Years 2005-2014

Center for Traffic Safety Research
University of Nevada, Reno School of Medicine

No injury
Minor-Moderate
Serious-Critical

6 5 15 73 4 21

CRS  No CRS
Lack of CRS equates to an average additional $19,000 in hospital charges per child aged 4-7.

From 2005-2014, use of CRS among Nevadans aged 4-7 could have saved over four million dollars or $420,000 per year in hospital charges.
• **Children age 6 – 7 with NO Child Restraint System accrued higher hospital charges** compared to those in a Child Restraint System.

• From 2005-2014, use of CRS among Nevadans aged 6-7 could have saved **2.8 million dollars or $280,000 per year.**

• The passage of this law should result in decreased injury in children involved in MVC in the State of Nevada.
Children under 13 should ride in the back?
Conclusion:
The needs to address Nevada’s Child Restraint Law Gap

• Booster seats save lives and reduce injuries!

• Gaps that need to be addressed:
  • Age 6 – 7 year olds, there is no requirement under Nevada law that they are restrained in a booster seat, as recommended by the American Association of Pediatrics.
  • There is no requirement under Nevada law that children ride in the back seat until age 13 years old.
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Data acquired from:
2005-2014 Data from NDOT Crash data linked with all four Nevada Trauma Center Data or Trauma Data only. Chi-square, and Mann Whitney U (SPSS v.24) were used to analyze the Nevada crash data. The significance level was set at p<.05

**Epidemiology:**

- In 2014, 121,350 children aged 0-12 were injured in a Motor Vehicle Crash (MVC). During this period 602 children died in MVCs, 34% of whom were unrestrained (CDC 2016). Many more children are improperly restrained.
- For every death, 18 children are hospitalized and 500 receive medical attention.
- Child Restraint Systems (CRS) reduce risk of injury by 71-82%, and risk of death by 28% as compared to seat belts.
- **Booster seats reduce risk on nonfatal injury by 45% in children 4-8 years old.**
- According to National 2014 injury death data, MVCs are the leading cause of unintentional death for persons aged 5-24, and the second leading cause for those aged 1-4.

**Nevada Data:**

- In Nevada, from 2009-2013 MVCs were the leading cause of injury death for children and youth aged 5-19.
- **Eighty percent** of children aged 6-7 years treated at

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**Fig. 1 Average New Injury Severity Score (0-75) for Children Aged 6-7 by use of Child Restraint System**

(Mann Whitney U = 867, p = .018)

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<tr>
<th>NISS</th>
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</table>
YOU Make a Difference
Stay Tuned for Chapter 18 Revisions

Thank You

Let's Work Together on Action
Steps and Generating Data

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