Injury Prevention Potpourri

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*I have no disclosures.
Objectives:

● Describe key anticipatory guidance topics to be included in well child and sick visits

● Assess the latest evidence for selection of injury prevention topics

● Identify the acute visit for injury as a teachable moment
What is injury prevention?

Injury prevention: the effort to prevent injuries caused by external mechanisms before they occur or to reduce severity.

Who remembers primary, secondary, tertiary prevention?

- **Primary prevention**: Prevent injuries before they occur, targets risk factors.
- **Secondary prevention**: Identify and adequately treat an injury as soon as possible to reduce impact.
- **Tertiary prevention**: Reducing disability related to injury, rehabilitation.
Basics of injury prevention

- Injuries are NOT accidents….
  - Injuries are often understandable, predictable, and preventable
  - Specific injuries share characteristics of person, place, and time
  - Interventions can be implemented to prevent or limit the extent of a given injury
A word on terminology

- **Injuries are NOT accidents…**
  - **Unintentional injuries:**
    - Motor vehicle crashes, falls, burns, poisoning, drowning, some firearm injuries, recreational activities, Rx/drug overdose, and sports
  - **Intentional injuries:**
    - Result from behaviors that are designed to hurt oneself or others
    - Multifaceted social problem, major health hazard for children/youth
    - Homicide and suicide are particularly important
The scope of the problem

Injury = the leading cause of death among persons aged 1-44

Children:
- 33 deaths/day; 12,175 each year
- 9.2 million seen in EDs each year
- Leading cause of childhood medical spending
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<th>Rank</th>
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The Injury Pyramid

- Deaths
- Hospital Admissions
- Outpatient Care
- Injured with care at home
<table>
<thead>
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<th>The Four E’s of Prevention</th>
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<tr>
<td><strong>Education</strong></td>
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<tr>
<td>Providing information to push for behavior change</td>
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<td><strong>Enforcement</strong></td>
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<tr>
<td>Mandating behavioral change by passing and enforcing laws or rules</td>
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<td><strong>Engineering</strong></td>
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<tr>
<td>Protecting through safer product and environmental design</td>
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<tr>
<td><strong>Economics</strong></td>
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<tr>
<td>Providing monetary incentives/disincentives for use of safety/unsafe behaviors</td>
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</table>
Strategies for prevention

● Active - rely on actions taken by an individual
  ○ Ex. storing meds in high/locked cabinets

★ Passive - do not rely on the efforts of an individual to be successful
  ○ Ex. packaging meds in non lethal amounts/child safety caps
What is our role?

- Surveillance
- Legislative advocacy
- Office-based counseling
Office-based counseling

- AAP – Standard of care

- RRC – One of the educational goal of training

- But it is not happening! Only ~40% of families with children 0-14 years old report receiving IP counseling
Office-based counseling

- Parents want it!
  - They think they will get it from you, and you are their “first choice”

- It works!
  - Increases knowledge, improves behavior, decreases some injuries
Barriers to office-based counseling

- Inadequate time
  - To bring up topics
  - To deal with risks if identified
- Don’t think to ask
- More important things to do
- Think parents not interested
- Unsure what to do/say
The well child visit

- Provides a venue to:
  - Assess the parents’ and the child’s current safety strategies
  - Encourage and praise their positive behaviors
  - Provide guidance about potential risks
  - Recommend community interventions that promote safety
The injury visit

- A teachable moment:
  - S/p injury or near miss
  - May learn of safety issues which they were previously unaware
  - May be more receptive to injury prevention counseling
    - Evidence with assault injured teens in the ED

Johnson et al. Pediatric emergency care. 2007
Let's think about some cases...
Your first patient is a 15 mo boy here for a WCC…

- The mother mentions that her son will be staying with grandma next week, who only has a forward facing car seat.

- His legs seem to be getting scrunched up when he is rear facing and he cries when he can’t see her, so mom was thinking of turning him forward facing anyways.

- All good?
What can you warn the mom is major concern with forward facing too early?

A) Traumatic brain injury
B) Internal decapitation
C) Pelvis injuries
D) Cardiac injury
E) Long bone fractures
What’s so important about rear-facing?

- Rear facing car seats support the head, neck, and spine and distributes forces during a crash.
- Prevents the relatively LARGE head from loading the proportionately smaller neck with weak musculature.
- This is key for both front and side impact crashes.
25%  18%  6%

1 year  3 years  Adult
Neck anatomy/development

- Toddlers vertebrae connected via cartilage

- Have the ability to stretch **up to two inches**. Yet only $\frac{1}{4}$ inch stretch is enough to rupture the spinal column, resulting in paralysis or death

- AKA internal decapitation
Rear facing until AT LEAST age 2

- AAP policy statement released April 2011
- Eleven states have changed laws to match:
  - CA, CT, NE, NJ, NY, PA, RI, SC, OK, OR and VA
Rear end collisions, lacking data

- In 2015, a study suggested some head injuries in rear facing infants due to impact with back seat
- Worse with latch compared to seat belt attachment, less injury if top tether used to attach car seat to floor
- However 2018 study indicates that rear facing car seats mitigate crash forces and provide good protection in rear
- We will stick with rear facing… use top tether to keep it stabilized

Williams et al. Traffic injury prevention 2015
Mansfield et al. SAE technical paper
What about the legs?

- Studies show that:
  - Rear facing kids tuck into cannonball-position in event of crash, no injury to legs
  - Forward facing kids’ legs fly up and hit front seat which lurches back, compresses legs causing injury

Bennett et al. Journal of Trauma, 2006
Next on your schedule, a ED follow up after MVC…

- 7 year old girl, belt restrained passenger in rear passenger seat of car
- MVC. Car was side swiped and front passenger air bag deployed
- Patient may have hit head on side door but no LOC, no residual headache, vomiting, or change in mentation
- She was monitored in ED, discharged home

In your office:
- 1 day s/p MVC
- Vital signs – normal
- Physical exam – normal
What percent of 7 year olds can travel safely without a booster?

A) 0%
B) 5%
C) 15%
D) 20%
E) 25%
Who should ride in booster seats?

- All children whose weight/height exceeds care seat limit should use belt-positioning booster seat until the seat belt fits properly.

- Typically will need booster until 4 feet 9 inches tall!

- Most children will not fit in most vehicle seatbelts without a booster until 10 to 11 years of age.
A child can ride **safely** without a **booster** seat when you can say **YES to ALL 5**

1. Back against the vehicle seat
2. Knees bend at edge of seat
3. Lap belt on tops of thighs, not on belly
4. Shoulder belt between neck and shoulder
5. Sits properly. No slouching, no playing with seat belt, etc.

*To ride safely, most kids need a booster until age 10-12.*

THE CAR SEAT LADY
Restraint type for child passengers 4-7 years old

- Booster, 44.5%
- Car seat, 17.9%
- Seat Belt, 25.8%
- Unrestrained, 11.6%

NHTSA, 2015
Booster Seat Use Among 4-7 year olds, 2006-2015

NHTSA, 2015
Why should we care?

- Children 4-8 years old have the greatest proportion of inappropriate restraint use of any age group.

- Booster seats reduce serious injury by 59% for children aged 4–8 years, compared with seat belt use alone.

Durbin et al. JAMA 2003
What works?

- Distribution & education
- Policies & laws
- Enhanced enforcement
  - Primary vs secondary restraint laws
Drivers’ behaviors matter

One study looked at restraint patterns of drivers and children <80 lbs:

- 77% drivers were restrained

- If driver wearing seat belt, 92% of children were restrained in car seat, booster seat, or seat belt

- If driver not wearing a seat belt, only 62% of children were retrained

NHTSA, 2004
Child passenger safety, laws, and advocacy

- Bill introduced in 2017 to match AAP policy regarding rear facing

**RHODE ISLAND**
- Child Restraint Required: ≤2 years and <30 lbs in **rear-facing** car seat
- Booster seat: <8 years and shorter than 57" and under 80 lbs
- Seat belt: ≥8 years and 80 lbs or 4’9" or taller
- Seating Position: ≤7 and younger must be in a rear seat if available
Next room! An anxious mom of a 18 month old comes in to ask you this:

“Someone gave these to me as a gift and I don’t know what to do with them!?”
What is this device used to prevent?

A) Hot water scald burns
B) Ingestion/poisoning
C) Window fall
D) Furniture/TV tip-over
E) Stairwell falls
Window lock or stop

Window guard
Window falls!

- Not extremely common, but cause severe injury and death
- Initially thought to be urban problem, with high-density, high rise housing structures
- More recently shown to be both urban/suburban
  - 30% first floor, 63% 2nd floor, 7% 3rd floor or higher
Window falls!

 Majority preschool age

 Peaks during spring/summer

 More boys than girls

 Vaughn et al, Pediatrics 2011
Window fall injuries

Vaughn et al, Pediatrics 2011
Window fall prevention campaigns

- Dramatic decreases seen in NYC and Boston:
  - up to a 96% decrease in incidence over 10 years
- Parent and community education & window guards made available
- NYC: Mandated installation of window guards in multi-family dwellings with children <11 years old
So what should pediatricians advise?

- Install window guards or window locks
- Should allow an opening of $\leq 4$ inches
- Open window from top down if option
- Do not place bed/furniture next to window
- Screens do NOT keep children in, they only keep bugs out!
Long morning so far! And now...15 yo for follow up

- Has struggled with depression for the past year
- Not seeing counselor anymore
- Reports passive SI and looks disengaged
Who is more likely to commit suicide?

A) Adolescent boys

B) Adolescent girls

C) No difference by gender
The numbers

- BOYS 15 - 19 years old had 3 x more completed suicides than girls

- For 10 to 24 year olds, the rate is 4x higher
  - 81% of suicide deaths were boys
  - 19% of suicide deaths were girls

- However, suicide attempts are 2 x higher in girls than boys
Method of completed suicide, 1994-2012

Boys 10-24 years old

Girls 10-24 years old

Sullivan et al. MMWR 2015
Suicide Rates for Teens Aged 15–19 Years, by Sex 1975–2015

Curtin, MMWR 2017
Suicide Deaths by Method in the United States (2015)

Data Courtesy of CDC

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<thead>
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<th></th>
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<tr>
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<td>Percent</td>
<td>Method</td>
<td>Percent</td>
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<td>Suffocation</td>
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<td>25.3</td>
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<td>32.1</td>
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<td>56.6</td>
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- Other
- Suffocation
- Poisoning
- Firearm
Among high school students

- **39% of girls and 21% of boys** felt sad or hopeless almost every day for at least 2 weeks in a row in the past 12 months
- **16.9% of girls and 10.3% of boys** had planned a suicide attempt
- **10.6% of girls and 5.4% of boys** had attempted suicide
- **3.6% of girls and 1.8% of boys** had suicide attempt requiring medical attention

2013 Youth Risk Behavior Survey
Adolescents with depression or dysthymia

- **Up to 85%** will have suicidal ideation
- **32%** will make suicide attempt during adolescence or young adulthood
- **20%** will make > 1 attempt
- **2.5% to 7%** will commit suicide by young adulthood
Case 1

- A 20-year-old with a drug problem moved back in with his parents after his girlfriend broke up with him. When he stopped going to work, his parents contacted a mental health center and urged him to see a counselor. He refused. He called his girlfriend hoping to get back together, but she wouldn’t speak to him. He felt desperate. He went to his father’s gun cabinet, removed a loaded gun, and shot himself in the head. He died within seconds.
Case 2

- A 20-year-old with a drug problem moved back in with his parents after his girlfriend broke up with him. When he stopped going to work, his parents contacted a mental health center and urged him to see a counselor. He refused. He called his girlfriend hoping to get back together, but she wouldn’t speak to him. He felt desperate. He went to his father’s gun cabinet, but the guns were gone. He found a razor and cut his wrists. His parents found him an hour later and brought him to the hospital where he was treated and agreed to get help.
What was the difference between the two cases?

In Case 2, when the parents expressed concern that their son might be suicidal, the counselor not only spoke about ways to get help but also suggested that any guns at home be stored elsewhere until the situation improved.
Lots of people have guns at home. What some families in your situation do is store their guns away from home until the person is feeling better, or lock them and ask someone they trust to hold onto the keys. If you have guns at home, I’m wondering if you’ve thought about a strategy like that.

“Lethal means” counseling

Explain that you are concerned their loved one is at risk for suicide.
Does lethal means counseling change behavior?

- YES!
  - ED counseling led to 100% of firearms and 76% of medications locked up post-counseling

- Firearm counseling, in general:
  - A study on firearm storage counseling found that 64% of participants improved gun storage safety by the end of the study

Physician counseling on firearm safety: a new kind of cultural competence

“Some patients who own firearms, especially those who have had interactions with physicians who seem unaware of the issues or intolerant of another’s perspective, may not view physicians as trustworthy sources of info...”

“13-41% of physicians own guns.”

“Physicians who own guns should be asked to provide leadership in developing cultural competence in firearm safety counseling, rather than being marginalized or silenced within the physician culture.”
Some patients who own firearms, especially those who have had interactions with physicians who seem unaware of the issues or intolerant of another’s perspective, may not view physicians as trustworthy sources of info...

"13-41% of physicians own guns.”

“Physicians who own guns should be asked to provide leadership in developing cultural competence in firearm safety counseling, rather than being marginalized or silenced within the physician culture.”
Why are firearms an issue?

- Firearms self-injury/suicides
- Firearms assault/homicide
## ACCESS TO GUNS RAISES THE RISK OF SUICIDE

<table>
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<tr>
<th>VARIABLE</th>
<th>States with the Highest Rates of Gun Ownership</th>
<th>States with the Lowest Rates of Gun Ownership</th>
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<tbody>
<tr>
<td>Average population 2001–2005</td>
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<td>50 million</td>
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<tr>
<td>Percent of households with guns</td>
<td>47</td>
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<td>Total firearm suicides</td>
<td>16,577</td>
<td>4,257</td>
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<tr>
<td>Total nonfirearm suicides</td>
<td>9,172</td>
<td>9,259</td>
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In general, about 30% of handguns are kept loaded and unlocked.
Does gun education with kids increase safety?

- Study of boys ages 8-12 years old placed in room with hidden water guns and one real gun
  - 72% had found the gun
  - 76% handled the gun
  - 50% pulled the trigger
  - Only ONE left room to tell an adult
  - > 90% who pulled trigger had received some sort of gun safety education

- Eddie Eagle programs have never been shown to be effective
Red flag laws and suicide

- Risk-based firearm seizure law
- In the press recently due to school/mass shootings
- IN, CT, CA, OR, RI, & WA

- June 2018 study looked at Indiana and Connecticut
  - IN: 7.5% reduction in firearm suicides in the 10 years after enactment
  - CT: 13.7% reduction in firearm suicides in post–Virginia Tech period, when enforcement of the law substantially increased

Kivisto et al. Psychiatric services 2018
Bullying and suicide

- Clear relationship between both bullying victimization and perpetration and suicidal ideation and behavior
  - Females at risk regardless of frequency; males only with frequent bullying

- Not just the victims! Increased rates for victims, bullies, AND highest rate for bully/victims

Klomek et al. 2009
Challenges to injury prevention counseling in general

- Cultural or personal beliefs
- Cultural or gender roles
- Economic realities
Evidence for or against counseling

- Systematic reviews confirm: counseling is effective and beneficial
- Bass et al – Improved knowledge, safety behaviors, and decreased injuries involving motor vehicles
- Barkin et al – Parents can retain only limited number of topics
- Effectiveness of counseling can be improved if a health care professional knows the risks specific to the local population
Conclusions

- Injuries are not accidents
- Know the data/evidence
- Gather your “stories” to give advice
- Patients do listen
- You can make a difference!
Post-presentation questions
True or False: Injury prevention counseling can impact behavior and reduce injuries

A) True
B) False
Unintentional injuries, suicide, and homicide make up the top three causes of death in which age group:

A) 1-4 years
B) 5-9 years
C) 10-14 years
D) 15-24 years
E) None of the above
Which is an example of a “passive strategy” injury prevention intervention

A) Storing ammunition separate from firearm
B) Signage encouraging seat belt use
C) Poison warnings on pesticide labels
D) Airbags standard in all cars
E) Laws requiring rear facing until age 2
When can a child transition out of a booster?

A) When they weigh > 80 pounds
B) Usually around 7 years of age
C) When they pass the car seat “fit test”
D) When they surpass the height and weight limits of their forward facing car seat
References


Johnson, S. B. et al. (2007). Characterizing the teachable moment: is an emergency department visit a teachable moment for intervention among assault-injured youth and their parents?. *Pediatric emergency care*, 23(8), 553-559.

References


Li, HR et al. (2016). The 2015 National Survey of the Use of Booster Seats (No. DOT HS 812 309).


References


