CME Disclosure

I have no relevant financial relationship to disclose. No off-label products will be discussed in my presentation.
Objectives

• Review 6 top injury prevention articles
• Learn the top causes of severe injuries to children aged 0 – 4 years
• Review recommendations for injury prevention counseling as it relates to these severe injuries
• Understand the importance and effectiveness of discussing injury prevention in the office setting
• RECEIVE MOC 2 CREDIT & HAVE FUN!
Clinical Scenario 1

- 2 year old in your office
- Short amount of time for discussion
- What is the greatest injury risk for this child’s age?
Rates of Pediatric Injuries by 3-Month Intervals for Children 0 to 3 Years of Age

Phyllis F. Agran, MD, MPH*, Craig Anderson, DHSc, PhD*, Diane Winn, RN, MPH*, Roger Trent, PhD‡, Lynn Walton-Haynes, DDS, MPH‡, Sharon Thayer, MPH*

Analyze California injury rates for children < 4 years by quarter-year intervals to construct developmentally appropriate intervention strategies and to guide pediatric anticipatory counseling

### The Injury Problem

- **Leading cause of death ages 1-44 years**
- **Children < 5 years**
  - 42% deaths
  - 29% ED visits
- **More childhood deaths than all other diseases combined**
- **Agran study**
  - 23,173 injuries reviewed; 636 deaths
  - Overall injury rate 371/100,000

---

#### 10 Leading Causes of Death by Age Group, United States – 2013

<table>
<thead>
<tr>
<th>Rank</th>
<th>Age Groups</th>
<th>Cause</th>
<th>1-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Congenital Anomalies</td>
<td>47</td>
<td>22</td>
<td>71</td>
<td>199</td>
<td>817</td>
<td>1,631</td>
<td>1,285</td>
<td>559</td>
<td>194</td>
<td>6,156</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Short Gastrointestinal</td>
<td>420</td>
<td>250</td>
<td>900</td>
<td>2,800</td>
<td>2,100</td>
<td>1,500</td>
<td>500</td>
<td>100</td>
<td>100</td>
<td>7,000</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Malignant Neoplasms</td>
<td>370</td>
<td>320</td>
<td>310</td>
<td>250</td>
<td>200</td>
<td>170</td>
<td>140</td>
<td>100</td>
<td>100</td>
<td>1,300</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Malignant Neoplasms</td>
<td>328</td>
<td>270</td>
<td>290</td>
<td>190</td>
<td>140</td>
<td>100</td>
<td>90</td>
<td>50</td>
<td>50</td>
<td>870</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Overall Injury</td>
<td>135</td>
<td>110</td>
<td>120</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>450</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Pneumonia</td>
<td>102</td>
<td>70</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>450</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Malignant Neoplasms</td>
<td>80</td>
<td>70</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>450</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Malignant Neoplasms</td>
<td>61</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>450</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Malignant Neoplasms</td>
<td>93</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>450</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Malignant Neoplasms</td>
<td>34</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>450</td>
</tr>
</tbody>
</table>

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC

Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™

CDC, American Academy of Pediatrics

Dedicated to the health of all children

Ohio Chapter
Common Mechanism of Injury

- Fall #1 all ages
- Twice the second cause (poisoning)
- Height 0-2 mos
- Furniture 6-8 & 15-17 mos
- Building 24-26 mos
Answer Questions 1-3
Injuries by 3 Month Intervals

- **0-5 months**
- **12-17 months**
- **18-35 months**
- **9-11 months**

**Fall**
- Other, from heights
- From furniture
- On stairs
- From buildings

**Poisoning**
- Medications
- Other substances

**Transportation**
- Pedestrian
- Motor vehicle occupant

**Foreign body**
- Non-airway foreign body
- Airway obstruction, nonfood
- Airway obstruction, food

**Burn/fire**
- Hot liquids & vapors
- Fire/flame

**Assault & neglect**
- Battering
- Neglect

**Submersion/drowning**
- Bathtub
- Other & unspecified
Answer Questions 4-5
Clinical Scenario 2

- A toddler is being seen in your office for a well child visit
- Bruises are noted on the child’s face and extremities
- What types of bruising make you concerned about non-accidental trauma?
Bruises in Infants and Toddlers: Those Who Don't Cruise Rarely Bruise
Naomi F. Sugar, MD; James A. Taylor, MD; Kenneth W. Feldman, MD; and the Puget Sound Pediatric Research Network

Age and Bruising

Table 1. Bruises by Age and Developmental Stage of Child*

<table>
<thead>
<tr>
<th>Age, mo</th>
<th>Precruiser</th>
<th>Cruiser</th>
<th>Walker</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>1/225 (0.4)</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>3-5</td>
<td>1/141 (0.7)</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>6-8</td>
<td>4/99 (4.0)</td>
<td>2/8 (25)</td>
<td>...</td>
</tr>
<tr>
<td>9-11</td>
<td>4/38 (10.5)</td>
<td>12/63 (19.0)</td>
<td>7/18 (38.9)</td>
</tr>
<tr>
<td>12-14</td>
<td>1/8 (12.5)</td>
<td>3/24 (12.5)</td>
<td>23/49 (46.9)</td>
</tr>
<tr>
<td>15-17</td>
<td>...</td>
<td>1/6 (16.7)</td>
<td>26/57 (45.9)</td>
</tr>
<tr>
<td>18-23</td>
<td>...</td>
<td>...</td>
<td>39/79 (49.4)</td>
</tr>
<tr>
<td>24-35</td>
<td>...</td>
<td>...</td>
<td>70/115 (60.9)</td>
</tr>
<tr>
<td>Total†</td>
<td>11/511 (2.2)</td>
<td>18/101 (17.8)</td>
<td>165/318 (51.9)</td>
</tr>
</tbody>
</table>

*Data are presented as the number of children with bruises/total number of children (percentage). Precruiser indicates a child who is not walking; cruiser, one who walks with support; walker, one who walks independently; ellipses, not applicable.
†P<.001.
### Location and Bruising

#### Table 2. More Common Sites of Bruises by Location and Developmental Stage*

<table>
<thead>
<tr>
<th>Location</th>
<th>Precruiser (n = 511)</th>
<th>Cruiser (n = 101)</th>
<th>Walker (n = 318)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior tibia or knee</td>
<td>3 (0.6)</td>
<td>12 (11.9)</td>
<td>142 (44.7)</td>
</tr>
<tr>
<td>Forehead</td>
<td>3 (0.6)</td>
<td>3 (3.0)</td>
<td>18 (5.7)</td>
</tr>
<tr>
<td>Scalp</td>
<td>3 (0.6)</td>
<td>5 (5.0)</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Upper leg</td>
<td>1 (0.2)</td>
<td>1 (1.0)</td>
<td>13 (4.4)</td>
</tr>
</tbody>
</table>

#### Table 3. Less Common Sites of Bruises by Location and Developmental Stage*

<table>
<thead>
<tr>
<th>Location</th>
<th>Precruiser (n = 511)</th>
<th>Cruiser (n = 101)</th>
<th>Walker (n = 318)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back</td>
<td>0 (0)</td>
<td>1 (1.0)</td>
<td>6 (1.9)</td>
</tr>
<tr>
<td>Chest</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (1.3)</td>
</tr>
<tr>
<td>Forearm</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>5 (1.6)</td>
</tr>
<tr>
<td>Face (cheek or nose)</td>
<td>1 (0.2)</td>
<td>1 (1.0)</td>
<td>5 (1.6)</td>
</tr>
</tbody>
</table>

*Precruiser indicates a child who is not walking; cruiser, one who walks with support; and walker, one who walks independently.

Abdomen, Trunk, Hands, Buttock are concerning
Answer Questions 6-8
Clinical Scenario 3

- The mother of an 18 month old in your practice still keeps her child in a car seat, rear facing in the back seat.
- However, she feels the child should be turned forward since her legs are bent.
- When should she transfer her child to forward facing?
Automobile Safety

Policy Statement

Child Passenger Safety

Durbin DR; Committee on Injury, Violence, and Poison Prevention.

Pediatrics 2011;127;788-793
Motor Vehicle Collisions

- Force = Bodily harm
- A leading cause of child death
- Child restraint effectiveness
  - Child safety seats
    - Reduce injury risk by 71-82%
    - Reduce death risk by 28%
      compared to seat belt
  - Booster seats
    - Reduce nonfatal injury by 45%
      compared to seat belt
- 1500 annual deaths < 16 y/o
  - Nearly ½ unrestrained
Answer Questions 9 & 10
Safety Seats of Today
Definitions – Restraint Types

Rear Facing Infant Seat

Rear or Forward Facing
Convertible Seat

Infant and Rear Facing Convertible
acceptable for < 2 years of age

Forward facing only
Combination/Integrated

Belt Positioning Booster
My Child is Less Than 2 Years

- **Infant seats** – often up to 20 lbs.
  - Have a handle for carrying and can be snapped in and out of a base
  - Only used rear-facing

- **Convertible seats** – most up to 35 lbs.
  - Forward or rear-facing
  - Typically have higher rear-facing weight and height limits

- **All rear facing until 2 years**
  - Unless reach the highest weight or height allowed by the manufacturer
  - Improved head and spine protection!
Older than 2 Years

- Forward facing in convertible or combination
- Lowest weight 40 lbs, most up to 65-80 lbs
- Should remain in this seat for as long as possible – best safety option
Belt-Positioning Booster Seat

• Help so lap and shoulder portions of the seat belt fit properly
• Shorter than 4 ft 9 in will not fit properly in vehicle lap and shoulder seat belts
• 3 questions for fitting (if “no” to any, stay in booster)
  – Tall enough to sit against the vehicle seat back with his or her knees bent?
  – Shoulder belt lie across the middle of the chest and shoulder, not against the neck or face?
  – Is the lap belt low and snug across the upper thighs, not the abdomen?
• All children < 13 y/o should be in back seat
Children with Disabilities and Special Transportation Needs

Main classifications:

– Respiratory Conditions
– Low Birth Weight
– Orthopedic Conditions
– Neuromuscular Conditions
– Behavioral Conditions
5 Most Common Installation Mistakes

- **Wrong harness slot used** - The harness straps used to hold the child in the seat were either too low or too high.
- **Harness chest clip** positioned over the abdomen rather than the chest or not used at all.
- **Loose car seat installation** - The restraint system moved more than two inches side-to-side or front to back; anything more than one inch is too much.
- **Loose harness** - More than two inches of total slack between the child and the harness strap; there should be no slack.
- **Seat belt placement was wrong** – Lap belt resting over the stomach and/or shoulder belt on the child's neck or face.

NHTSA.gov
Car Seat Use After an Accident

• Car seats need to be replaced following a moderate or severe crash
  – Replacement is not automatic for minor crashes
• What defines a minor crash?
  – The vehicle was able to be driven away from the crash
  – The vehicle door nearest the car seat was not damaged
  – None of the passengers in the vehicle sustained any injuries
  – Air bags did not deploy during the crash
  – There is no visible damage to the car seat.

NHTSA.gov
Answer Questions 11-13
Clinical Scenario 4

- The mother of a 3 year old comes to you concerned that her husband just purchased a handgun.
- What advice should you give her to make her child more safe in the home?
Firearm Prevention

Policy Statement

Firearm-Related Injuries Affecting the Pediatric Population


Pediatrics 2012 Nov;130(5):e1416-23
Guns and Ownership

- 38% of all households and 26% of all adults have or own at least 1 gun
  - 40% handguns
- Household ownership varies geographically
  - 5.2% in District of Columbia
  - 62.8% in Wyoming
- Guns unlocked in the house
  - Households with teens 41.7% of firearm owners
  - Children 0 – 12 years in house, 28.8%
Prevention Strategies for Gun Injuries in 0-4 Year Olds

- Prevention strategies
  - No Guns – best method
  - Personalized safety mechanisms
  - Gun trigger locks and lock boxes
  - Avoidance - Keeping a gun locked and unloaded in the house
  - Physician counseling directed at parents

- Gun avoidance programs are not successful

<table>
<thead>
<tr>
<th>Layers of Protection</th>
<th>Pool Drowning</th>
<th>Gun Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool fencing</td>
<td>Gun Lock</td>
<td></td>
</tr>
<tr>
<td>Supervision</td>
<td>Supervision</td>
<td></td>
</tr>
<tr>
<td>Teach child</td>
<td>Teach child</td>
<td></td>
</tr>
</tbody>
</table>
WHO IS STRONG ENOUGH TO FIRE A GUN?

- 25% of 3 to 4 year olds
- 70% of 5 to 6 year olds
- 90% of 7 to 8 year olds
What We Know

- Children *commonly* live in environments containing unsecured firearms
- Children have the ability to fire guns
- Little children are *curious*; Big children are *impulsive*
  - Fatal shootings are usually inflicted by other children or youth, typically friends or siblings
- Guns are lethal
Answer Questions 14-17
Clinical Scenario 5

- As a practitioner, I have heard about the “Back to Sleep” campaign.
- What other recommendations should I tell parents about sleep safety?
Improving Safe Sleep Environments for Well Newborns in the Hospital Setting

Brooke Mason, MD
Carolyn R. Ahlers-Schmidt, PhD
Christy Schunn, LSCSW
Early AAP Recommendations to Reduce Sleep-Related Deaths

- SIDS is the leading cause of death for infants 1 month to 1 year.
- 1992 - Back to Sleep Recommendation
  - Non-prone position optimum for reducing deaths
- 2000 - “Back is best” Side not recommended

50% Decline in Overall SIDS Rate
2011 AAP Task Force

• Expanded its focus towards creating a safe sleep environment for infants
• Eighteen recommendations for parents, healthcare providers, researchers, and policy makers
• In particular
  – Alone
    • Firm surface/No soft bedding or objects (no bumpers)
  – Back
    • Supine position (no elevating head of crib)
  – Crib
    • In their own crib – not a car seat when at home
    • Room sharing, not bed sharing
Role of Hospitals in Safe Sleep

- Despite new recommendations, nurses often place children on side to avoid aspiration risk
- Parents model observed behaviors
  - Twice as likely to place child supine at home if witnessed in the nursery
- Only 25% of sleeping infants were safe at sleep per recommendations
  - Majority of unsafe sleep was a result of environment
- Hospital setting is commonly viewed where experts work
# Baseline Safe Sleep Knowledge of Parents

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Response</th>
<th>% correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are ABCs of safe sleep?</td>
<td>Alone, Back, Crib</td>
<td>60%</td>
</tr>
<tr>
<td>SIDS is the leading cause of death of infants between 1 month and 1 year of age</td>
<td>True</td>
<td>95%</td>
</tr>
<tr>
<td>After traveling, babies can stay sleeping in their car seat when at home</td>
<td>False</td>
<td>85%</td>
</tr>
<tr>
<td>Smoking during pregnancy increases the risk of low birth weight and preterm birth</td>
<td>True</td>
<td>97%</td>
</tr>
<tr>
<td>When my baby rolls over to his belly I should turn him over to his back</td>
<td>False</td>
<td>17%</td>
</tr>
<tr>
<td>The safest place for babies to sleep is in the same room with parents</td>
<td>True</td>
<td>64%</td>
</tr>
</tbody>
</table>

Only 5% answered all 6 questions correctly
Other Hospital Interventions to Improve Sleep Safety by 30%

• Mandatory safe sleep video viewing within the first 24 hours of arrival to the newborn unit
• Safe sleep posters in all post-partum rooms
• Changing hospital policy
• Initial discussions on safe sleep were moved
  – From discharge to the post partum room orientation
• Assessment of safe sleep environment with every assessment of the baby
• Commending parents for following guidelines and educating those who were not
Answer Questions 18-22
Clinical Scenario 6

I know a kid from your school who was hurt very badly because he didn’t have a helmet on.

He got a very serious brain injury.

Your parents might let you ride farther if you wore a helmet.

Maggie, I’d wish you’d think about wearing a helmet.

Just wear a *#@! helmet you little punk.

Can injury prevention counseling in the clinical setting be effective?
Injury-Prevention Counseling and Behavior Among US Children: Results From the Second Injury Control and Risk Survey

Jieru Chen, MSa,
Marcie-jo Kresnow, MSa
Thomas R. Simon, PhD
Ann Dellinger, PhD, MPHc

Provides recent national prevalence estimates of pediatric injury-prevention counseling by providers compared to similar findings from 1994

Types of Interventions to Prevent Injuries (4 E’s)

• Enforcement/Legislation
  – Child safety seat laws, speed limit enforcement, GDL

• Engineering/Technology
  – Airbags, smoke alarms, booster seats

• Environmental Modification
  – Bike lanes, traffic signals, window guards

• Education
  – Screen for modifiable risk and educate families and patients about prevention
Who is the right person to provide IP education?

- Most families prefer to hear preventative information from their pediatrician/physician – Immunizations, Reach out and Read
- No study looking at efficacy of intervention by provider
Effectiveness of anticipatory guidance: Does it work?

- Increased knowledge about injuries
- Behavior change in
  - Motor vehicle restraint use
  - Safe home hot water temperature checks
  - Smoke alarm use
  - Infant safe sleep
- Decrease in injuries
  - Falls and other home
  - Automobile

-Bass, Pediatrics 1999
-DiGuiseppi, Future Child 2000
## Anticipatory Guidance: What’s Provided?

<table>
<thead>
<tr>
<th>Injury Topic</th>
<th>Weighted % (95% Confidence Interval)</th>
<th>ICARIS-2</th>
<th>ICARIS-1994</th>
<th>Pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any topic – Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1</td>
<td>42.4 (39.9–44.9)</td>
<td>39.3 (36.2–42.3)</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>2-6</td>
<td>62.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-12</td>
<td>44.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-14</td>
<td>39.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>27.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke detectors, 0–14 y</td>
<td>14.9 (13.0–16.8)</td>
<td>8.8 (7.2–10.5)</td>
<td>&lt;.01</td>
<td></td>
</tr>
<tr>
<td>Poison control number, 0–6 y</td>
<td>25.7 (22.5–28.9)</td>
<td>24.9 (21.1–28.6)</td>
<td>.75</td>
<td></td>
</tr>
<tr>
<td>Firearm storage, 2–14 y</td>
<td>10.0 (8.3–11.8)</td>
<td>6.3 (4.8–7.8)</td>
<td>&lt;.01</td>
<td></td>
</tr>
<tr>
<td>Bicycle helmets, 5–14 y</td>
<td>30.4 (27.5–33.3)</td>
<td>18.6 (15.5–21.7)</td>
<td>&lt;.01</td>
<td></td>
</tr>
<tr>
<td>Car seats/seat belts, 0–14 y</td>
<td>28.7 (26.4–31.0)</td>
<td>25.4 (22.7–28.1)</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>0–6</td>
<td>38.5 (34.9–42.0)</td>
<td>30.7 (26.8–34.6)</td>
<td>&lt;.01</td>
<td></td>
</tr>
<tr>
<td>7–14</td>
<td>19.0 (16.2–21.9)</td>
<td>20.5 (16.9–24.2)</td>
<td>.52</td>
<td></td>
</tr>
</tbody>
</table>
## Association Between Counseling and Behavior Change

<table>
<thead>
<tr>
<th>Injury Topic</th>
<th>Practiced Safety Behavior</th>
<th>Odds Ratio (95% Confidence Interval)</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Counseled (\textit{n})</td>
<td>Not Counseled (\textit{n})</td>
<td>Crude</td>
</tr>
<tr>
<td>Smoke detectors, 0–14 y</td>
<td>(319) 97.3</td>
<td>(2148) 97.6</td>
<td>0.87 (0.41–1.82)</td>
</tr>
<tr>
<td>Poison control number, 0–6 y</td>
<td>(227) 73.4</td>
<td>(397) 47.8</td>
<td>3.02 (2.08–4.40)</td>
</tr>
<tr>
<td>Firearm storage, 2–14 y</td>
<td>(38) 95.6</td>
<td>(527) 88.0</td>
<td>2.94 (0.95–9.09)</td>
</tr>
<tr>
<td>Bicycle helmets, 5–14 y</td>
<td>(148) 57.9</td>
<td>(287) 44.4</td>
<td>1.87 (1.29–2.71)</td>
</tr>
<tr>
<td>Car seats/seat belts, y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–14</td>
<td>(660) 94.9</td>
<td>(1702) 92.4</td>
<td>1.51 (0.92–2.47)</td>
</tr>
<tr>
<td>0–6</td>
<td>(451) 96.7</td>
<td>(678) 93.5</td>
<td>2.05 (0.94–4.46)</td>
</tr>
<tr>
<td>7–14</td>
<td>(209) 91.1</td>
<td>(1024) 91.6</td>
<td>0.94 (0.49–1.79)</td>
</tr>
</tbody>
</table>
Answer Questions 23-25
Summary

- Injuries cause significant morbidity and mortality to the children we serve
- Different injuries effect different aged children at various developmental stages
- Know the prevention information to counsel your patients
- Injury prevention counseling in the office setting works, if provided!