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Injuries and Injury Prevention for Children and Adolescents: Examples From Our Sports Injury Research Study

Karen D. Liller, PhD, CPH, FAAAS

Professor, Director of the Activist Lab, Strategic Lead for Policy, Practice, and Leadership

University of South Florida College of Public Health

Disclosures

- I have no disclosures related to this presentation to report.

Injury Statistics

- Every year, approximately 243,039 Americans die as a result of injuries. But deaths are only the tip of the iceberg.
- According to the Centers for Disease Control and Prevention (CDC),14,319 children were killed in 2017 due to injuries and over seven million suffered nonfatal injuries in 2017.

Injuries Worldwide

- According to the World Health Organization (WHO), there are more than 5 million injury deaths every year. Several of the following slides contain injury information from WHO.
- Violence and injuries account for 9% of global mortality, as many deaths as from HIV, malaria and tuberculosis combined.

Injuries Worldwide

- Injuries result in tens of millions of hospital emergency department visits and overnight stays.
- Usually, people with lower socioeconomic status are at higher risk of injury, suffer greater consequences and benefit less from prevention programs.

Injuries Worldwide

- Eight of the 15 leading causes of death for people ages 15 to 29 years are injury-related: road traffic injuries, suicides, homicides, drownings, burns, war injuries, poisonings and falls.

Injuries Worldwide

- Seat-belts and child restraints in vehicles are among the "best buys" in public health.
- Wearing a seat-belt during a crash reduces the risk of being ejected from a vehicle and suffering serious or fatal injury by 40% to 65%.

Injuries Worldwide

- Every third Sunday of November is a worldwide day of remembrance for road traffic victims as a sign of support to those dealing with the loss of a family member or friend.

Injuries Worldwide

- Every year over 300,000 people die from fire-related burns.
- Millions more are left with lifelong disabilities and disfigurements from such injuries, and often suffer from resulting stigma.

Injuries Worldwide

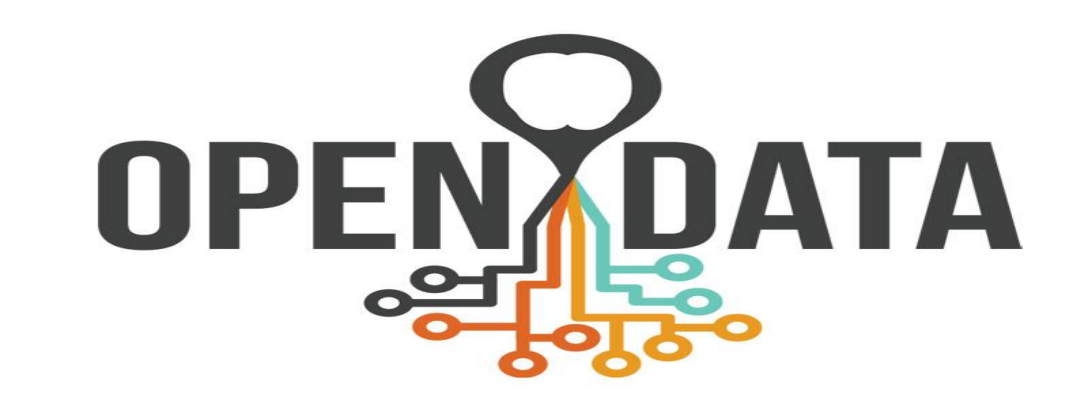
- Burns are the only form of injury that kill more women than men.
- Elevated cooking stoves, smoke detectors, regulation of water heater temperatures and flame resistant children's sleepwear are proven injury prevention techniques.

Injuries Worldwide

- About 23,000 children die every year as a result of poisoning; hundreds of thousands more accidentally ingest poisonous substances or drugs.
- Child-resistant closures for poisons could save thousands of these children's lives.

Injuries in the US and in Florida

- See link for 2017 injury values.
  - https://www.cdc.gov/injury/wisqars/index.html



Florida Child and Adolescent Injury Mortality

- For Florida, 909 children and adolescents (ages 0-19) died in 2017 due to injuries.
- Leading causes of injury death in children were unintentional injuries, suicides, and homicides.

US Injury Deaths Among Children and Young Adults

- Overall, motor vehicle-traffic events were the leading cause of injury death for children 0-19 years of age.
- Homicide was the fourth leading cause of death for 1-4 and 5-9 year olds.
- Suicide was the second leading cause of death for 10-14 year olds and 15-19 year olds.

Recent US Increases in Injury Mortality Among Children and Adolescents (10-19 years of age)

- Total death rate for 10-19 year olds declined 33% between 1999 and 2013 but increased 12% between 2013-2016.
- Recent rise is due to an increase in injury deaths in this age group during 2013-2016.

Increase in US Child and Adolescent Injuries

- Unintentional injuries declined 49% between 1999 and 2013 and then increased 13% between 2013 and 2016.
- Death rate for suicide declined 15% between 1999 and 2005 and then increased 56% between 2007 and 2016.
- Death rate for homicide declined 35% between 2007 and 2014 and increased 27% in 2016.

Examples of Injury Disparities Among US Children (from Children's Safety Network)

- Males-higher death rates and hospitalizations
- American Indian/Alaska Natives (ages10-19) highest suicide rate
- Blacks and Hispanics, ages 15-19 at increased risk for homicide and assault
- Black children increased risk for fire/burns, drownings, pedestrian injuries, and falls
- Black infants greatest risk for unintentional suffocation deaths

Children's Injury Disparities

- Injury mortality rate lower for Hispanic infants and children
- Whites ages 15-19 have higher rates of combined suicide deaths and attempts.
- White adolescents use more substances, including prescription drugs.

Other Children's Injury Disparities

- Children in the South have higher drowning fatalities.
- Rural areas have higher suicide rates but urban areas have higher homicide rates.
- Children with disabilities have higher risks for violence and unintentional injuries.
- LGBTQ populations have increased risk for suicidality, non-suicidal self-injury, bullying and assault, and physical dating violence.

Other Children's Injury Disparities

- Low SES backgrounds at higher risk for infant mortality, drowning, assault or fall-related injuries
- Lowest SES groups have twice the mortality rate and 2.6-2.8 times the unintentional injury/homicide rate.
- County-level poverty associated with unintentional injury mortality.

Injuries and Years of Potential Life Lost

- Injuries result in more potential years of life lost than any other cause: about 3 and one-third million potential years of life lost prematurely each year as compared to less than 2 million for cancer, 1.4 million for heart disease, and between one-quarter and one-third of a million each for HIV, cerebrovascular and liver disease.

General Approaches to Injury Prevention

- Public Health Approach (Surveillance, Risk Factor Identification, Intervention/Evaluation, Implementation)
- Core Functions (Assessment, Policy Development, Assurance)

Successful Injury Prevention Efforts

- Successful injury prevention efforts have focused on education, engineering, and enforcement. During the past three decades, the science of injury prevention has moved away from highly individualistic approaches to those that rely more on socially based policies (i.e. environment).

The Haddon Matrix

- The Haddon Matrix, developed by Dr. William Haddon, utilizes host, agent, and environmental factors to study injuries over time.
- Pre-event (pre-crash) includes everything that determines whether a crash will take place.

The Haddon Matrix

- Event (crash) includes everything that determines whether an injury results from a crash.
- Post-event (post-crash) determines whether the severity of the injury's consequence can be reduced.

Frieden Health Impact Pyramid

- Five-tiered model-Greatest Impact along Lower Tiers for Populations
- Tiers include:
  - **Socioeconomic Factors (Tier 1)**
  - **Changing the Context-Default Decisions Healthy/Safe (Tier 2)**
  - **Long-lasting, Protective Interventions (Tier 3)**
  - **Clinical Interventions (Tier 4)**
  - **Counseling & Education (Tier 5)**

Injury Risk Factors

- The fields of unintentional injuries and violence share many common risk and resiliency factors. Risk factor examples include:
  - **Alcohol and substance use**
  - **Economic disparity**
  - **Discrimination and bias**
  - **Built Environment**

Injury Risk Factors

- Product Design
- Risk-taking behavior
- Timing
- Mental Health
- Media

Injury Resiliency Factors

- Resiliency Factors include:
  - Financial Capital
  - Community Facilities
  - Community Partnership and Support
  - Parenting/Role Models
  - Access to Decision Makers

Project Title

- Sports Injuries and Concussions Among 5-11 year old Children in Hillsborough County, Florida Playing in Local Recreational Leagues

Study Researchers

- Karen D. Liller, PhD*
- Barbara Morris, DHSc**
- Yingwei Yang, MS, Doctoral Candidate*
- Omonigho M. Bubu, PhD*
- Brad Perich, MPH*
- Jessica Fillion, BS*
- *University of South Florida College of Public Health
- **Florida Hospital Wesley Chapel

Project Funders

- National Operating Committee on Standards for Athletic Equipment (NOCSAE)
- University of South Florida

Sports Injury Literature

- The literature shows that there are approximately 1,000,000 sports injuries reported annually to 10-17 year olds.
- Sports injuries lead to losses of thousands of dollars each year.
- Sports injuries are one of the leading reasons for school-related hospitalizations.

Data Needs

- Minimum data are available however on injuries and exposures of young children playing in recreational leagues.

Project Purpose

- This study aims to:
  - Collect and analyze sports injury and neurocognitive data on children, ages 5-11, who play in recreational leagues in Hillsborough County, FL from 2016-2018.
  - Make targeted recommendations for injury prevention strategies for this population.

Project Methods

- A certified athletic trainer (ATC) collected injury and exposure data (number of athletes at each competition or practice) for baseball/softball, soccer, and football being played at a large athletic facility in west-central Florida.
- The Reporting Information Online (RIO) tool was used to collect injury data.
- The ImPACT® Pediatric neurocognitive test was used for baseline and follow-up testing and values were compared to norms.

IRB Approvals

- The collection of data for injury analysis was approved by the University of South Florida Institutional Review Board and the Hillsborough County Athletic Association.

RIO Definition for a Sports Injury

- occurs as a result of participation in a recreational league competition or practice;
- requires medical attention by a team physician, certified athletic trainer, personal physician, or emergency department/urgent care facility; and
- results in restriction of the athlete's participation for one or more days beyond the day of the injury*
- *Any fracture, heat illness, concussion, or dental injury regardless of restriction status is reported.

ImPACT Pediatric

- Major categories assessed were word lists, design rotation, stop and go number correct, memory touch, picture match, and color match.
- Responses relate to sequencing/attention, word memory, visual memory, and reaction time.
- The athletes completed the testing on Ipads provided by the researchers.
- The ATCs received training on the tool and read each section to the athletes (one-on-one) and verified their understanding.

Project Methods

- SAS 9.4 was used for the analysis.
- Internal and external advisory boards were consulted throughout the study.
- Frequencies and logistic regressions were used to determine significant factors for injury.

Frequency Results

- Over 1,500 athletes, ages 5-11, were observed during each year of the study.
- Eight-hundred-eighty-two (882) ImPACT Pediatric baseline tests were conducted with 13 follow-ups.
- There were 26 RIO-Reportable injuries and 33 more minor injuries that were attended by the ATC.
- The leading sport for injury in Year 1 was football and soccer in Year 2.

Concussion Results

- Twelve concussions took place over the two years of the study.
- Most concussions were in soccer (83.3%; N=7 in boys soccer and N=3 in girls soccer) followed by softball (16.7%; N=2).
- Average age of the female players for concussions was 9.4.
- Average age of the male players for concussions was 9.6.

Project Limitations

- Cannot ensure accuracy of injury data supplied by coaches only.
- Not all injured athletes may have reported injuries to the ATCs.
- All recreational leagues played at one athletic complex so generalizations should be done with caution.

The Future

- Continued data collection with the inclusion of additional sites (more diverse) and sports in the future, such as basketball and volleyball
- Development of continued recommendations for coaches and parents whose children play in recreational leagues:
  - Need for coach and parent injury prevention education
  - Need to hire ATCs for practices and competitions
  - Enhanced communication between ATCs and coaches
  - Consistent use of protective equipment
  - More time on sports mechanics in practice

The Future

- Development of targeted injury prevention programs for young athletes playing in recreational leagues that will be efficacious in decreasing athlete morbidity and mortality for a lifetime

ACTIVIST LAB AT USF COPH

- MAJOR AREAS:
  - ADVOCACY
  - EDUCATION
  - RESEARCH
  - SERVICE
  - INTERDISCIPLINARY PROJECTS AND PROGRAMS

Injuries-We Can Make a Difference!

- Injuries are not “accidents” but predictable and preventable.
- Join our efforts in allowing children and young adults to have bright and healthy futures.

Injury Prevention Video

- Enjoy our video! Soon to have a firearm component?
- https://www.youtube.com/watch?v=h2wxNY1n0GU

THANK YOU

Safetymatters

QUESTIONS?