EBP Session: Incorporating Injury Surveillance into Clinical Decision Making

Matt Hoch, PhD, ATC
School of Physical Therapy and Athletic Training
Old Dominion University, Norfolk, VA
• No conflicts of interest.
Acknowledgement

• EATA Planning Committee

• Jennifer McKeon, PhD, ATC
  – Ithaca College, Ithaca, NY
Objectives

• Define “injury surveillance” for athletic training clinical practices.

• Describe how injury surveillance can be incorporated into an EBP framework.

• Review several common measures for evaluating injury trends.

• Discuss how injury surveillance can inform clinical practice and be incorporated into decision making.
• Over 7 million students participate in interscholastic athletics and 500,000 participate at the collegiate level.

• Injuries commonly occur as a consequence of participation which has personal and societal implications.
  – Time loss
  – Long-term health
  – Financial burden

• Understanding injury patterns is an important step in evidence based decision making.
  – Designing protective equipment
  – Rule changes for competition
  – Providing information to consumers
Ankle sprains represent 16% of all high school sport injuries.

Females are 2x more likely to sustain a first-time ACL injury.

For every one pound increase in neck strength, the odds of concussion decreased 5%.

The study of injury occurrence in athletic populations.
Injury Surveillance - The documentation of injuries.

- Requires systematic, consistent, and accurate injury documentation records.
- Foundation for understanding injury rates, injury risk, making decisions for injury prevention.
- Large scale (n=10,000) or small scale (n=500)
  - Both can be valuable in making decisions for your clinical practice.
Injury Surveillance

Large Scale Injury Surveillance

• Benefits:
  – Large number of participants
  – Longitudinal documentation
  – Well defined reporting mechanisms and resources
  – Strong inferences can be made for injury trends in specific sports, level of competition, and modifiable risk factors
Small Scale Injury Surveillance

- Injury documentation associated with a single clinical site, small group of related clinical sites, or athletic league.
- May occur as part of routine clinical documentation and standard of practice.
- Information can be used in much the same way as the data collected from large scale injury surveillance programs
  - Focused on target population
  - Less precise because of smaller sample size
Connecting Injury Surveillance to EBP

Best Available Research Evidence

Clinical Expertise & Data

Patient/Client Values & Preferences

Potential for optimal decision making

Large scale injury surveillance

Small scale injury surveillance

EBP
Injury and Exposure

What constitutes an *injury* and a unit of *exposure*?
- Basis for measuring injury trends.
- Different surveillance systems may have different definitions or criteria.
- Consider your goals, clinical questions, and objectives.
- Consistency is crucial

**Injury** - An incident of interest.

**NCAA ISP:**
1) Occurred during organized intercollegiate practice or competition.
2) Required medical attention by an AT or physician.
3) Participation restriction for ≥1 day

**Exposure** – An opening up to the chance of sports injury occurring.

**NCAA ISP:**
Participation in sanctioned practice or competition.
• Many epidemiology statistics can be easy to calculate and interpret.

• Establish the clinical question or objective.
  – “What is the proportion of participants who currently have an injury right now?”
  – “How many participants are expected to acquire a new injury over the course of a season?”
  – “How many participants do I need to treat to prevent a single injury?”

http://kpc.am/15gEWao
Prevalence is the segment of a group who are injured at a given time point.

\[
\text{Prevalence} = \frac{\text{Number of Injured Participants}}{\text{Number of Total Participants}} \times 100
\]

“What is the proportion of participants who currently have an injury?”

- Measure of the injury problem you currently have to manage.
- Larger the prevalence, larger the injury problem.
**Prevalence ratio** determines if the prevalence of injury is greater in one group than another.

\[
\text{Prevalence Ratio} = \frac{\text{Prevalence Group 1}}{\text{Prevalence Group 2}}
\]

- A PR of 1 would indicate the prevalence is the same in both groups.
- A PR >1 indicates the prevalence is greater in Group 1.
- A PR <1 indicates the prevalence is greater in Group 2.
**Incidence rate** refers to the number of injuries that occur per a given time frame.

- The concept of *exposure* is revisited

\[
\text{Incidence Rate} = \frac{\text{Number of New Injuries}}{\text{Total Exposure Time}}
\]

- Typically requires total number of exposures and injuries across all participants during a specific period of time.
- Expressed as number of injuries per athlete exposure (0.052 injuries per AE or 5.2 injuries per 1000 AE).
- “How many participants are expected to acquire an injury over the course of a season?”
Incidence rate ratio determines if the incidence rate of injury is greater in one group than another.

\[
\text{Incidence Rate Ratio} = \frac{\text{Incidence Rate 1}}{\text{Incidence Rate 2}}
\]

- An IRR of 1 would indicate the incidence rate is the same in both groups.
- An IRR >1 indicates the incidence rate is greater in Group 1.
- An IRR <1 indicates the incidence rate is greater in Group 2.
Incidence proportion is a preliminary step in quantifying injury risk and a measure of the probability of injury.

\[
IP = \frac{\text{Number of Newly Injured Participants During a Certain Period}}{\text{Number of Total Participants at Risk in the Beginning of the Period}} \times 100
\]

- Interpreted as the probability or risk of sustaining an injury during the specific period of time (an athletic season).
- Greater IP represent a greater probability of sustaining an injury.
**Risk ratio** is a comparison of risk between two groups, seasons, or clinical interventions.

\[
\text{Risk Ratio} = \frac{\text{Incidence Proportion Group 1}}{\text{Incidence Proportion Group 2}}
\]

- A RR of 1 would indicate the risk of injury is the same in both groups.
- A RR >1 indicates the risk of injury is greater in Group 1.
- A RR <1 indicates the risk of injury is greater in Group 2.
**Absolute risk reduction** represents the risk difference between an intervention group and a control group.

\[
\text{ARR} = \text{IP Intervention Group} - \text{IP Control Group}
\]

- An ARR of 0% indicates the intervention did not reduce the risk of injury.
- An ARR >0% indicates the intervention reduced injury risk.
- An ARR <0% indicates the intervention increased injury risk.
Numbers needed to treat to benefit (NNTB) represents the number of participants who need to be treated with the intervention to prevent a single injury compared to receiving no intervention.

- Should be strongly considered when examining a prevention program for your clinical practice.

\[
\text{NNTB} = \frac{1}{\text{ARR}}
\]

- NNTB values closer to 1 are desirable as this would indicate treating 1 participant would prevent 1 injury.
- NNTB values closer to infinity indicate that the intervention is not capable of preventing injury.
- Clinical judgment is required to determine what is an acceptable NNTB for adoption into your clinical practice.
**Odds** represent the probability of an injury occurring compared to the probability of it not occurring.

\[ \text{Odds} = \frac{IP}{1-IP} \]

**Odds ratio** compares the odds of sustaining an injury between two groups.

\[ \text{Odds Ratio} = \frac{\text{Control Group Odds}}{\text{Intervention Group Odds}} \]

- OR of 1.0 indicates the odds are identical for both groups.
- OR >1.0 indicates an increased odds of injury occurring in the control group.
- OR <1.0 indicates an increased odds of injury occurring in the intervention group.
Key Points

• Basic injury documentation combined with simple calculations can provide new insights into your clinical practice.

• Some key points to remember:
  – Rates are used to determine or compare the magnitude of an injury problem
  – Risk is used to determine the chance of injury
  – You can use these calculations to compare across teams, sports, seasons, etc. and make evidence-based determinations about the injury prevention strategies that you might use.
  – Consistent and accurate documentation is a standard of clinical practice, and can inform the decision-making process.


THANK YOU

m hoch@odu.edu