Conflict Statement

* I have no financial conflict of interest

* This project was supported through data collaboration by the NCAA Research Team and the Catalysis Center for Sport Injuries Research and Prevention

* All views are my own

* SOME OF THIS INFORMATION IS PRE-PUBLICATION, PLEASE DO NOT DISTRIBUTE.
Example: Staffing & Injury

的压力对体育医学临床医生进行提前返回大学运动员的问题	

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关键点:
- 认为体育医学临床医生承受来自于教练和运动员的压力。
- 医疗保健管理影响健康结果。
- 运动员的恢复经验预测他们的健康状况。
- 高风险运动员的康复时间更长。
- 体育医学临床医生的减少影响诊断和治疗的效率。

HEALTH SERVICES RESEARCH

Danabedian Model of Health Care Quality

结构

过程

结果

- 结构
  - 资源，行政
- 过程
  - 清单，最佳实践
- 结果
  - 受伤率，患者满意度

周二，3月5日，2019

CCSU体育医学研讨会

- 结构
- 过程
- 结果

- 结构
- 过程
- 结果

- 结构
- 过程
- 结果

- 结构
- 过程
- 结果

- 结构
- 过程
- 结果

- 结构
- 过程
- 结果
Phase Three: Does this generalize?

Are Structural Measures of Health Care Quality Associated with Injury Outcomes in the College Sports Medicine Setting?

- Secondary Data Analysis
  - Injuries & Exposures from NCAA STARS
  - Matching to NCAA Expenses
  - School Features from U.S. DOE Title IX Equity in Athletics

- Sample
  - NCAA 85' Participants 2009-10 through 2014-15
  - >25,000 injuries from 141 schools over 5 years

- Research Questions
  - Is the average athlete/clinic associated with injury rates?
  - Is the average athlete/clinic associated with injury rate? Time-loss?

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HEALTH CARE QUALITY

Apply to Sports Medicine Context
- Number of health care providers
- Financial oversight model
- Administrative oversight model
- Financial resources available

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Structure
Data 2009/10 through 2013/14

Sample

- 12,296 athletes
- 25 sports
- 141 schools
- 144,389 games or practices

Injuries & Injury Rates

- 25,203 injuries
- 2,517 reinjuries
- 1,566 concussions
- 52% no time loss
Athletes

- 71
- 996

Median: 388
IQR: 256-472

Clinician Case-Load

- 29
- 575
- 106

Methods
Is the number of clinicians per athlete associated with injury rates?
Re-injury rates? Concussion rates? Time loss to injury?
Injury Outcome ~ (offset by exposure) + Clinicians/Athlete +
Sport + Division of Competition + Year + School
Outcomes: Total Injury, Re-Injury, Time loss, Concussion

Comparing Injury Rates

Average Clinicians per Athlete

1 SD > Average Clinicians per Athlete

Technical Notes:
* Zero-inflated Poisson used for TL and Concussion models.
* Clinicians per athlete was standardized for ease of interpretation
* To account for non-independence of teams at the same school, school
  was included as a random effect. (R packages lme4 and psc)
Comparing Injury Rates

Average Clinicians per Athlete

1 SD > Average Clinicians Per Athlete

478 fewer injuries per year in this sample.
2,394 fewer injuries overall in this sample.

Comparing Re-Injury Rates

Average Clinicians per Athlete

1 SD > Average Clinicians Per Athlete

< 2.7% fewer Re-Injuries.
68 fewer re-injuries overall in this sample.
Comparing Concussion Rates

Average Clinicians per Athlete

1 SD > Average Clinicians Per Athlete

- 6.7% fewer concussions

21 fewer concussions annually in this sample.

105 fewer concussions overall in this sample.

Comparing Time Loss

Average Clinicians per Athlete

1 SD > Average Clinicians Per Athlete

16% more time loss
Discussion
> Clinicians per athlete associated with
  - Fewer injuries
  - Fewer re-injuries
  - Fewer concussions
  - Greater time loss

Limitations:
- Coarse measure of staffing
- Mechanism
- Generalizability

Generalizability?

<table>
<thead>
<tr>
<th>Team Type</th>
<th>Injury Type</th>
<th>Control School</th>
<th>Treatment School</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>t-Value</td>
<td>p-Value</td>
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<tr>
<td>Total Injuries</td>
<td>10 (2.5)</td>
<td>9 (1.8)</td>
<td>-2.37</td>
<td>.02</td>
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<tr>
<td>Total Re-injuries</td>
<td>10 (2.5)</td>
<td>9 (1.8)</td>
<td>-2.37</td>
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<tr>
<td>Total Concussions</td>
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<td>Proprioception</td>
<td>10 (2.5)</td>
<td>9 (1.8)</td>
<td>-2.37</td>
<td>.02</td>
</tr>
</tbody>
</table>

Design of Experiment:
- Randomized controlled trial
- Matched pairs

Key findings:
- Significant reduction in injuries and concussions
- Proprioception improved significantly
3,165 fewer injuries
High School Context

- Two studies in HS evaluated the relationship between AT presence and SES (WA state: Knobus et al., WI: Post et al.)
  - Both found ATs less frequently present at schools in lower SES areas
  - Knobus et al. also found a relationship between AT presence and concussion identification

High School Context

- High School Football Injury Rates and Services by Athletic Trainer Employment Status by Zachary Kerr et al.
  - Injury rates and services per injury were greater among full-time school employees compared with outreach ATs.
  - Injury rates did not differ when restricted to time-loss only.

High School Context

The Influence of Athletic Trainers on the Incidence and Management of Concussions in High School Athletes by McGuineet et al.

- Concussion less frequently diagnosed at schools with fewer ATs.
- Time loss greater at schools with comparatively more ATs.
- RTP protocol less frequently used for concussed at schools with fewer ATs.
RESEARCH IS A TEAM EFFORT

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