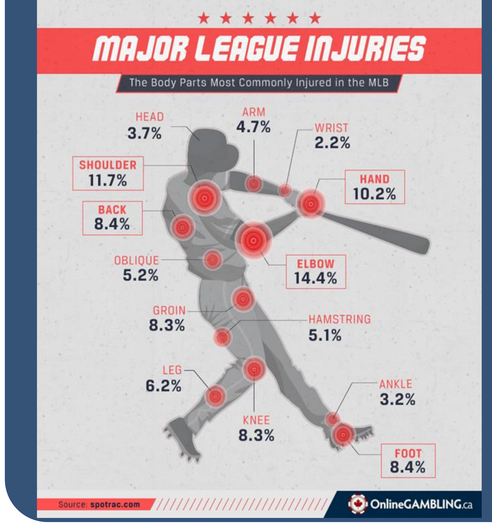
PRESENTER
Faruk Muritala

How well does this approach predict re-injury risk?



Background

Why This Study Matters? The issue of recurring injuries and its impact on teams and players.
Specifically considering injuries to MLB (baseball pitchers in general), most studies focus on;

1. Frequency of injury,
2. Performance post-injury,
3. Injury detection, and
4. Strategies for injury prevention.

Methods

N=3,057 (original)
filtering for pitchers only

↓

EXPERIMENT GROUP
(1) played for one team the whole season,
(2) had at most two stints on the IL,
(3) returned from injury prior to August of the given year, and
(4) had at least five game appearances post-injury.

→ **N = 558 (sample size)**
For i (2021 - 2023 regular seasons)
219, 192, and 147 pitchers respectively.

↓

WHIP (Walks plus Hits per Inning Pitched):

$$\text{WHIP } (W_{it}) = \frac{\text{H} + \text{BB}}{\text{IP}}$$

where; H: Hits allowed, BB: Walks allowed, IP: Innings pitched.
If $W_{it} > 0$, capable, then otherwise.

↓

CUSUM statistic;

$$C_t^+ = \max(0, C_{t-1}^+ + (W_t - 3 - k))$$

if $C_t^+ > h$, performance is below standard.

Analysis & Recommendation

Effective Monitoring: using the h range of 7–12 provides a balanced approach for injury prediction.

Why: The cost of misclassifying a struggling pitcher as injured is low (e.g., imaging by a doctor between games).

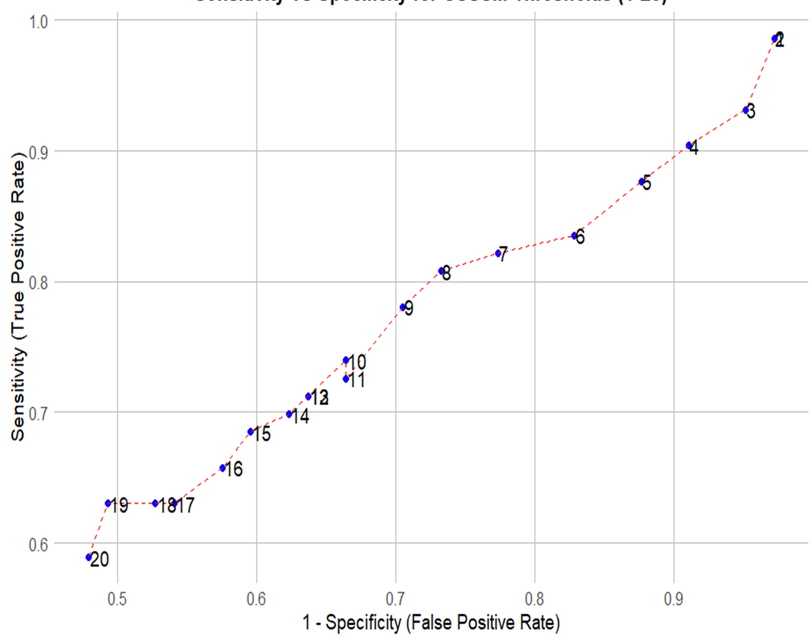
How Reliable is this Approach?

There is **a tradeoff between the sensitivity and specificity**, where increasing the decision interval (h) to be more specific also decreases the sensitivity.

The **number of game appearances before an out-of-control signal** is observed is an important metric for evaluating the reliability of the approach.
(Scan the QR-CODE for more information)

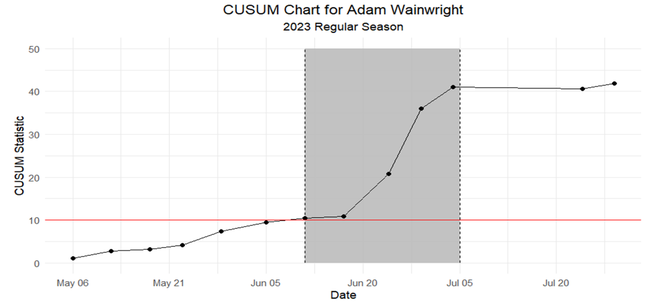
CUSUM Thresholds for Detecting Injuries

How different h-values affect detection rates.



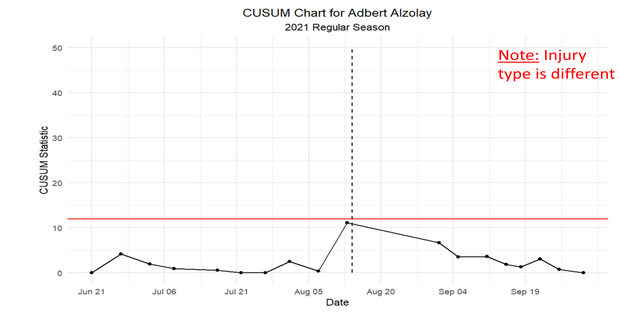
Case Study 1

A pitcher flagged by CUSUM before re-injury.



Case Study 2

A pitcher Never flagged by CUSUM After re-injury.



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A QUALITY MONITORING APPROACH TO EVALUATING RE-INJURY LIKELIHOOD TO MLB PITCHERS

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