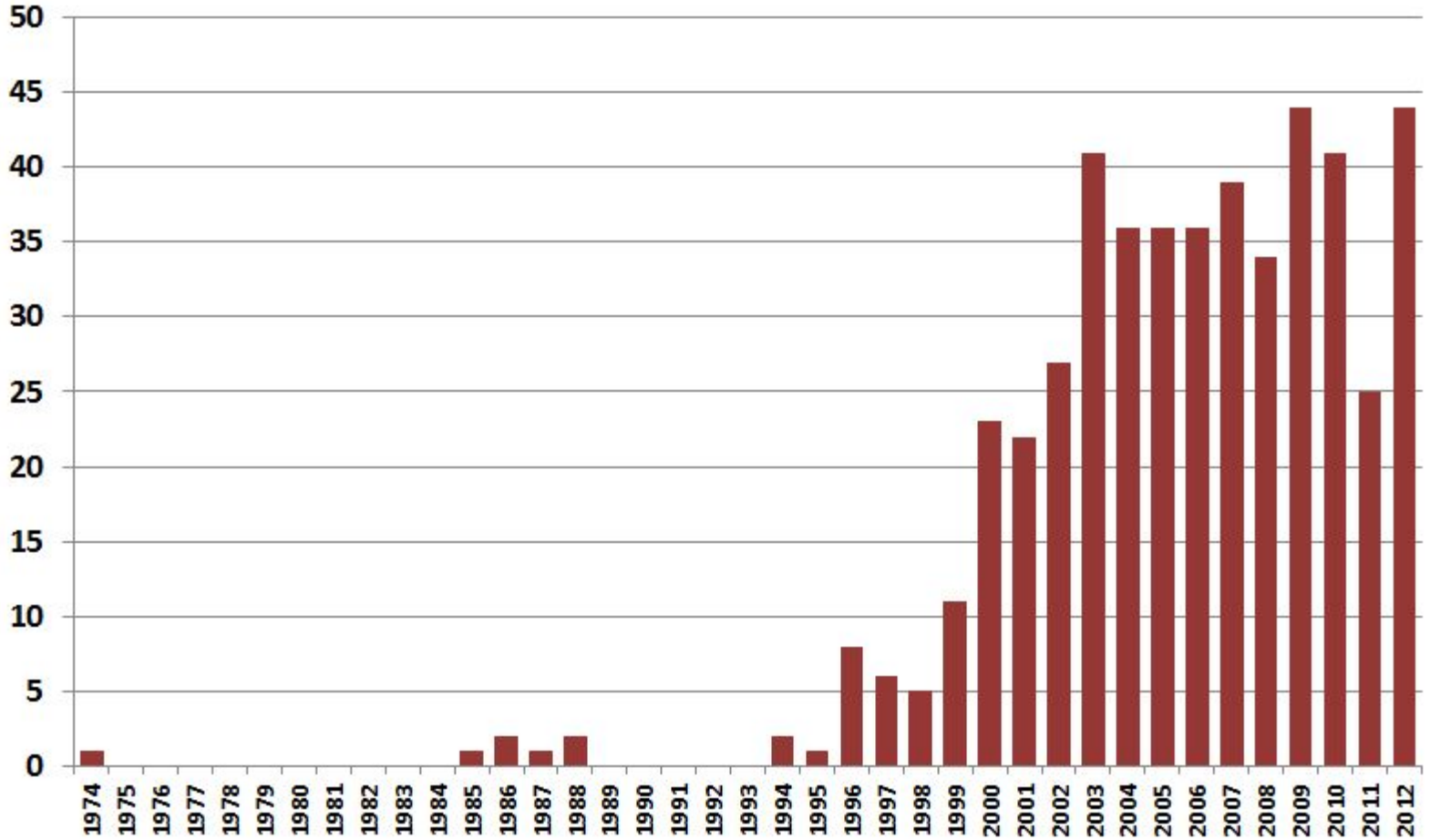
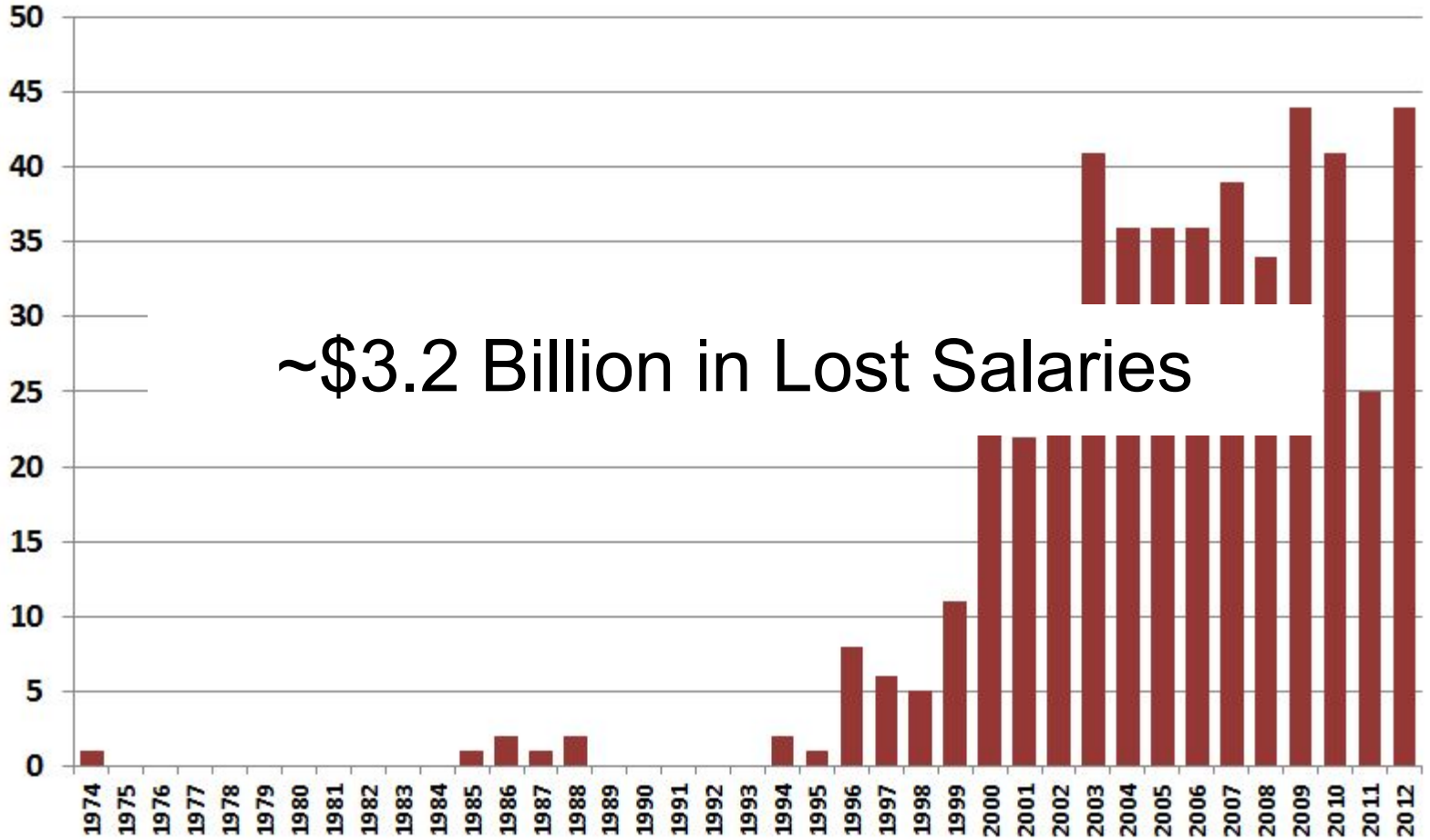
Can we predict pitcher injuries in baseball?

Anthony Kim

Number of Major Elbow Surgeries, by year



Number of Major Elbow Surgeries, by year



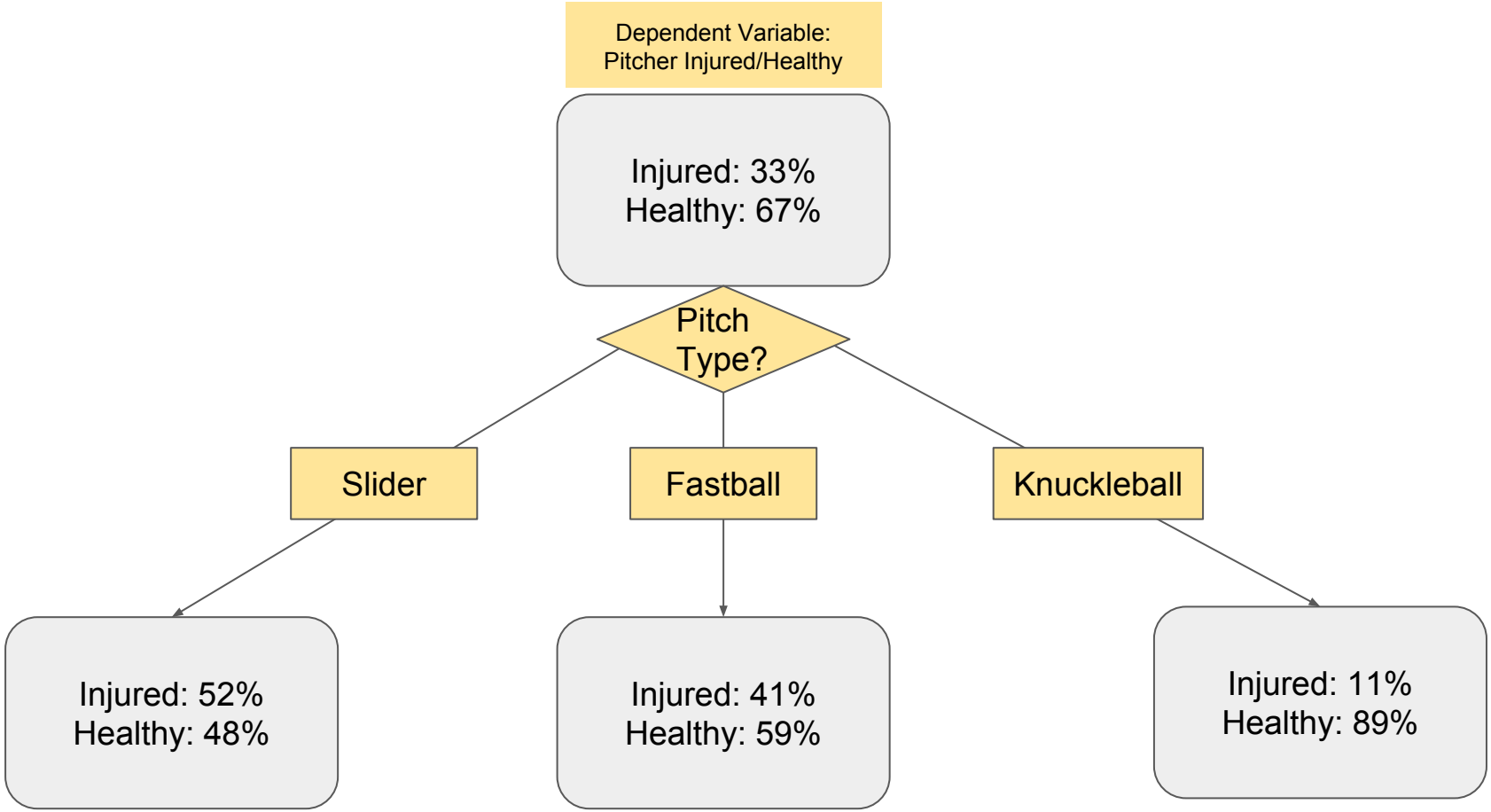
~$3.2 Billion in Lost Salaries

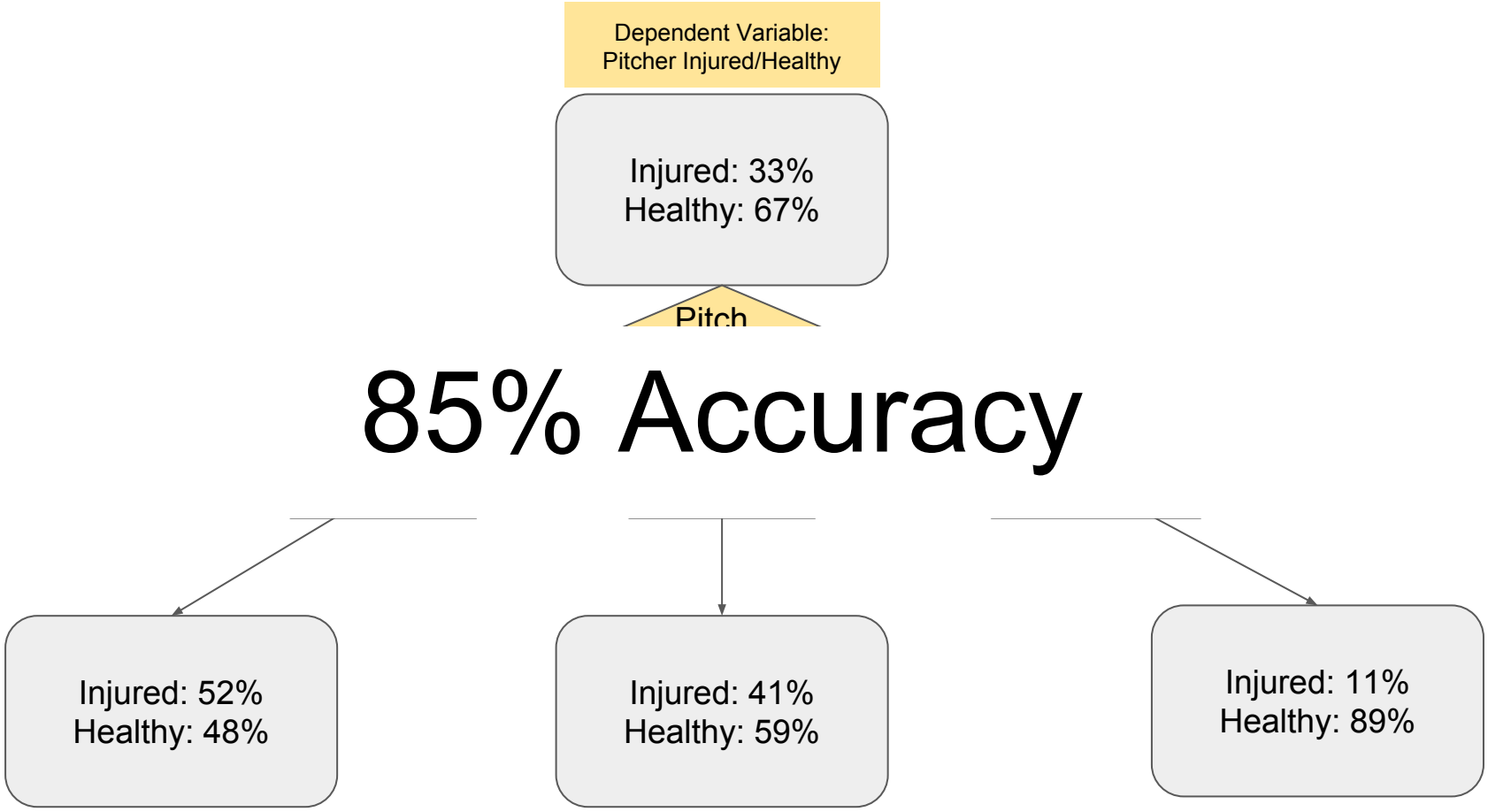
Theories for Pitcher Injury

- Freak accidents / Random Noise
- Wear-and-tear over time
- Harder/Faster pitches being thrown

Data and Methods

- Raw Pitch F/X data with every pitch thrown in 2013-2015 seasons
- Features of Interest - Pitch type, velocity, spin rate, spin direction, release point
- Used prior season data to predict injuries the following season
  - I.e. 2014 pitch data to predict 2015 injuries
- Random Forest
  - Non-linearity / Interactions
  - Ensemble method - weak learners -> strong learner


Dependent Variable:
Pitcher Injured/Healthy
Injured: 33%
Healthy: 67%
Pitch
Type?
Slider
Fastball
Knuckleball
Injured: 52%
Healthy: 48%
Injured: 41%
Healthy: 59%
Injured: 11%
Healthy: 89%


Dependent Variable:
Pitcher Injured/Healthy
Injured: 33%
Healthy: 67%
Pitch
85% Accuracy
Injured: 52%
Healthy: 48%
Injured: 41%
Healthy: 59%
Injured: 11%
Healthy: 89%

Top 10 pitchers most-likely to be injured, test data

Pitcher	Injury Risk
Henderson Alvarez	73.3%
Jon Niese	70.3%
Drew Smyly	66.9%
Homer Bailey	59.4%
Jake Arrieta	51.0%
A.J. Burnett	48.1%
Brandon Maurer	42.5%
Mike Minor	42.3%
Gerrit Cole	41.0%
Chad Bettis	40.9%

Top 10 pitchers most-likely to be injured, test data

Pitcher	Injury Risk	Injured?
Henderson Alvarez	73.3%	Yes
Jon Niese	70.3%	Yes
Drew Smyly	66.9%	Yes
Homer Bailey	59.4%	Yes
Jake Arrieta	51.0%	No
A.J. Burnett	48.1%	No
Brandon Maurer	42.5%	Yes
Mike Minor	42.3%	Yes
Gerrit Cole	41.0%	Yes
Chad Bettis	40.9%	No

Top 10 pitchers most-likely to be injured, 2016

Pitcher	Injury Risk
Michael Pineda	51.2%
Tyson Ross	50.7%
Alfredo Simon	50.3%
Yovani Gallardo	49.8%
Raisel Iglesias	49.7%
Zach Davies	49.7%
Corey Kluber	49.2%
Jeremy Hellickson	48.4%
Chris Sale	48.2%
Ubaldo Jimenez	48.0%

Top 10 pitchers most-likely to be injured, 2016

Pitcher	Injury Risk	Injured?
Michael Pineda	51.2%	No
Tyson Ross	50.7%	Yes
Alfredo Simon	50.3%	Yes
Yovani Gallardo	49.8%	Yes
Raisel Iglesias	49.7%	Yes
Zach Davies	49.7%	No
Corey Kluber	49.2%	No
Jeremy Hellickson	48.4%	No
Chris Sale	48.2%	No
Ubaldo Jimenez	48.0%	No

Thank You!

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