Epidemiology and Impact of Prior Musculoskeletal Injury and Orthopaedic Surgery on Draft Rank, Availability, and Short-term Performance in Major League Baseball

A Summary Analysis and Matched Cohort of 1890 Predraft Players

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Major League Baseball Winter Meetings Dec. 2019

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Cleveland Indians Baseball Organization

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Disclosures

I have No Pertinent Disclosures

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Injuries in HS/College Level Baseball Players

The First Decade of Web-Based Sports Injury Surveillance: Descriptive Epidemiology of Injuries in US High School Boys' Baseball (2005–2006 Through 2013–2014) and National Collegiate Athletic Association Men's Baseball (2004–2005 Through 2013–2014)

Erin B. Wasserman, PhD*; Eric L. Sauers, PhD, ATC, FNATA†; Johna K. Register-Mihalik, PhD, LAT, ATC‡§; Lauren A. Pierpoint, MS‖; Dustin W. Currie, MPH‖; Sarah B. Knowles, PhD, MPH¶; Thomas P. Dompier, PhD, LAT, ATC#; R. Dawn Comstock, PhD‖**; Stephen W. Marshall, PhD§††; Zachary Y. Kerr, PhD, MPH‡§

- UCL reconstruction

Epidemiology of Shoulder and Elbow Injuries Among United States High School Baseball Players

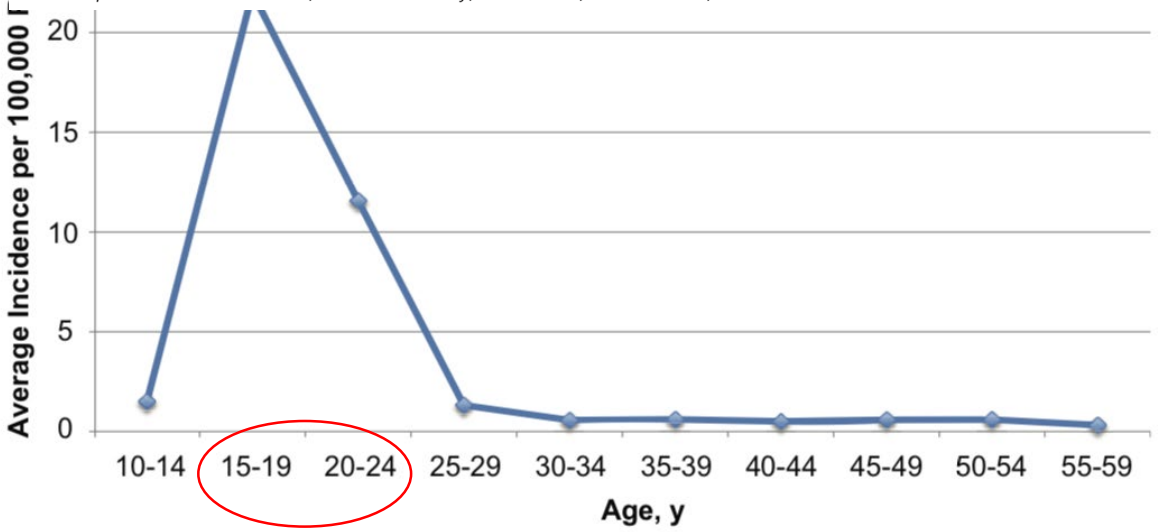
School Years 2005-2006 Through 2014-2015

Michael G. Saper,*† DO, ATC, Lauren A. Pierpoint,‡ MS, Wei Liu,§ PhD, R. Dawn Comstock,‡‖ PhD, John D. Polousky,¶ MD, and James R. Andrews,# MD
Investigation performed at the Department of Orthopedics and Sports Medicine, Seattle Children's Hospital, Seattle, Washington, USA

Epidemiology of Elbow Ulnar Collateral Ligament Injuries Among Baseball Players

National Collegiate Athletic Association Injury Surveillance Program, 2009-2010 Through 2013-2014

Steven F. DeFroda,*† MD, ME, Avi D. Goodman,† MD, Joseph A. Gil,† MD, and Brett D. Owens,† MD
Investigation performed at Department of Orthopaedic Surgery, Warren Alpert School of Medicine, Brown University, Providence, Rhode Island, USA



Tommy John data courtesy of Jon Roegele's database
Draft data courtesy of Baseball-Reference.com

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Investigation performed at the Mayo Clinic Phoenix Arizona, Phoenix, Arizona, USA

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Impact of Pre-draft Injury?

Epidemiology of Injuries Identified at the NFL Scouting Combine and Their Impact on Performance in the National Football League

Evaluation of 2203 Athletes From 2009 to 2015

Brendin R. Beaulieu-Jones,* BS, William H. Rossy,† MD, George Sanchez,‡ BS, James M. Whalen,§ ATC, Kyle P. Lavery,† MD, Kevin J. McHale,† MD, Bryan G. Vopat,‖ MD, Joseph J. Van Allen,§ MSPT, SCS, ATC, CSCS, Ramesses A. Akamefula,‡ BS, and Matthew T. Provencher,‡¶# MD, CAPT MC USNR

Investigation performed at The Steadman Clinic, Vail, Colorado, USA and Massachusetts General Hospital, Boston, Massachusetts, USA

OJSM 2017

Performance and Injury Characteristics of Pitchers Entering the Major League Baseball Draft After Ulnar Collateral Ligament Reconstruction

AJSM 2016

Lucas Wymore,*† MD, Paul Chin,‡ MD, PhD, Christopher Geary,§ MD, Gregory Carolan,‖ MD, Daniel Keefe,¶ MD, Heinz Hoenecke,¶ MD, and Jan Fronek,¶ MD

Investigation performed at Department of Orthopedic Surgery, Scripps Clinic, La Jolla, California, USA

Effect of Predraft Ulnar Collateral Ligament Reconstruction on Future Performance in Professional Baseball

A Matched Cohort Comparison

AJSM 2018

Christopher L. Camp,*† MD, Stan Conte,‡ DPT, ATC, John D'Angelo,§ BS, Stephen A. Fealy,‖ MD, and Christopher S. Ahmad,¶ MD

Investigation performed at Hospital for Special Surgery, New York, New York, USA

Successful Performance After Ulnar Collateral Ligament Reconstruction

An Analysis of 88 Drafted Professional Baseball Pitchers With a Matched Comparison Cohort

Timothy B. Griffith,*† MD, and Xavier A. Duralde,† MD

Investigation performed at Peachtree Orthopedics, Atlanta, Georgia, USA

OJSM 2019

- NFL combine studies
- Prior MSK injury = ↓ *likelihood* of being drafted/ lower draft position
- ↑ likelihood of decreased performance

- *Equal/Better* chance of reaching MLB level
- statistical performance was similar for all measures
- No risk of increased time on DL

Impact on draft position?
Other injuries?

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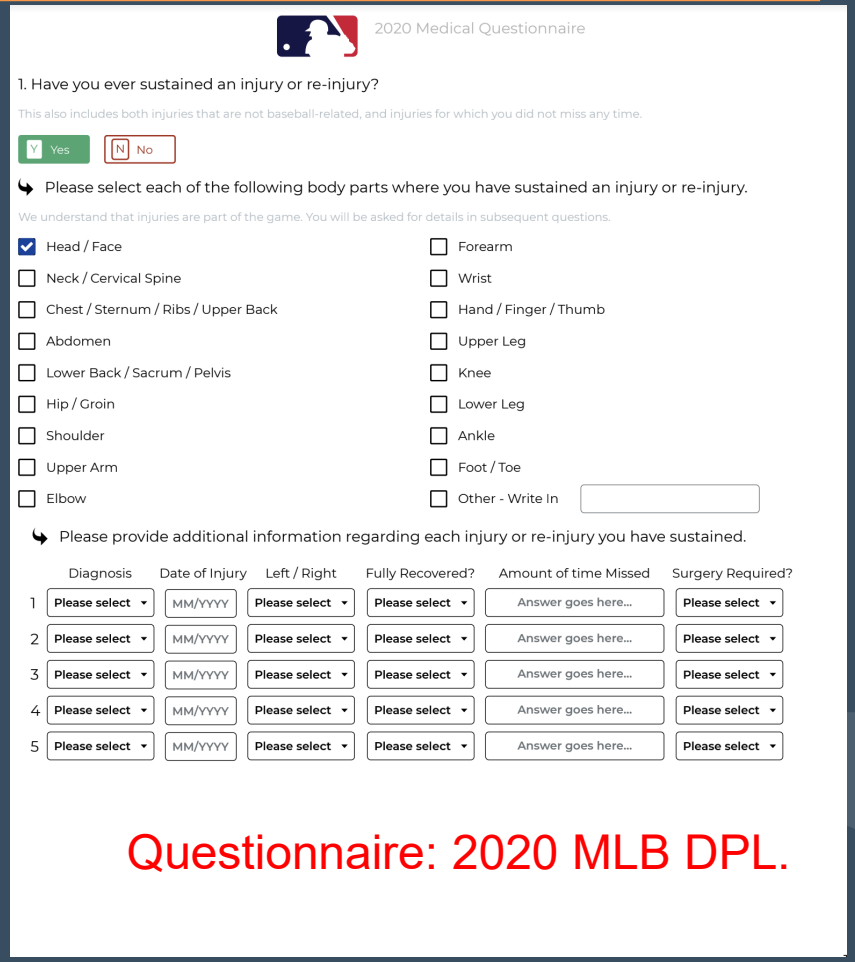
Study Goals

The purpose of this study was to determine:

1. Epidemiology of *all* musculoskeletal injuries and surgical procedures among players entering the MLB draft
2. Impact of prior injury or surgery on draft rank
3. Impact of injury or surgery on availability within the first 2 years of play in professional baseball

Methods

- 1890 medical records for draft eligible players from from 2014 to 2018
  - Completed Draft Medical Questionnaire
  - Supporting Clinical Documentation
- Each player was assigned to 1 of the following 3 cohorts
  - No Injury History
  - Nonoperative Injury History (previous musculoskeletal injury successfully treated nonoperatively)
  - Operative Injury History
- Draft status, overall draft rank, missed time for the first 2 seasons play were obtained for all available players



2020 Medical Questionnaire

1. Have you ever sustained an injury or re-injury?

This also includes both injuries that are not baseball-related, and injuries for which you did not miss any time.

Y Yes N No

Please select each of the following body parts where you have sustained an injury or re-injury.

We understand that injuries are part of the game. You will be asked for details in subsequent questions.

☑ Head / Face	☐ Forearm
☐ Neck / Cervical Spine	☐ Wrist
☐ Chest / Sternum / Ribs / Upper Back	☐ Hand / Finger / Thumb
☐ Abdomen	☐ Upper Leg
☐ Lower Back / Sacrum / Pelvis	☐ Knee
☐ Hip / Groin	☐ Lower Leg
☐ Shoulder	☐ Ankle
☐ Upper Arm	☐ Foot / Toe
☐ Elbow	☐ Other - Write In

Please provide additional information regarding each injury or re-injury you have sustained.

	Diagnosis	Date of Injury	Left / Right	Fully Recovered?	Amount of time Missed	Surgery Required?
1	Please select	MM/YYYY	Please select	Please select	Answer goes here...	Please select
2	Please select	MM/YYYY	Please select	Please select	Answer goes here...	Please select
3	Please select	MM/YYYY	Please select	Please select	Answer goes here...	Please select
4	Please select	MM/YYYY	Please select	Please select	Answer goes here...	Please select
5	Please select	MM/YYYY	Please select	Please select	Answer goes here...	Please select

Questionnaire: 2020 MLB DPL.

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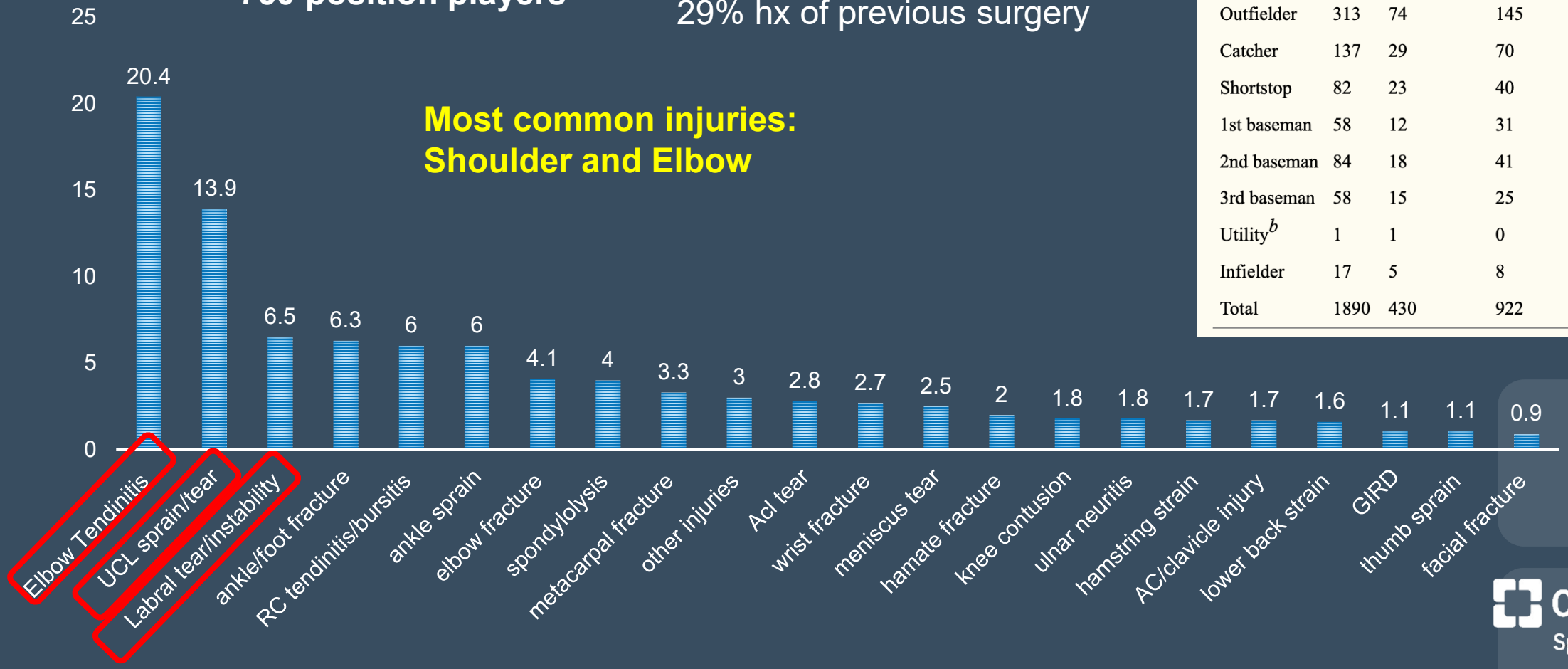
Epidemiology

1140 pitchers
750 position players

23% reported no injuries
49% treated non operatively
29% hx of previous surgery

Most common injuries:
Shoulder and Elbow



Position	Total	Noninjured	Nonoperative	Operative
Pitcher	1140	253	562	325
Outfielder	313	74	145	94
Catcher	137	29	70	38
Shortstop	82	23	40	19
1st baseman	58	12	31	15
2nd baseman	84	18	41	25
3rd baseman	58	15	25	18
Utility[b]	1	1	0	0
Infielder	17	5	8	4
Total	1890	430	922	538

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MSK/Surgical Intervention:

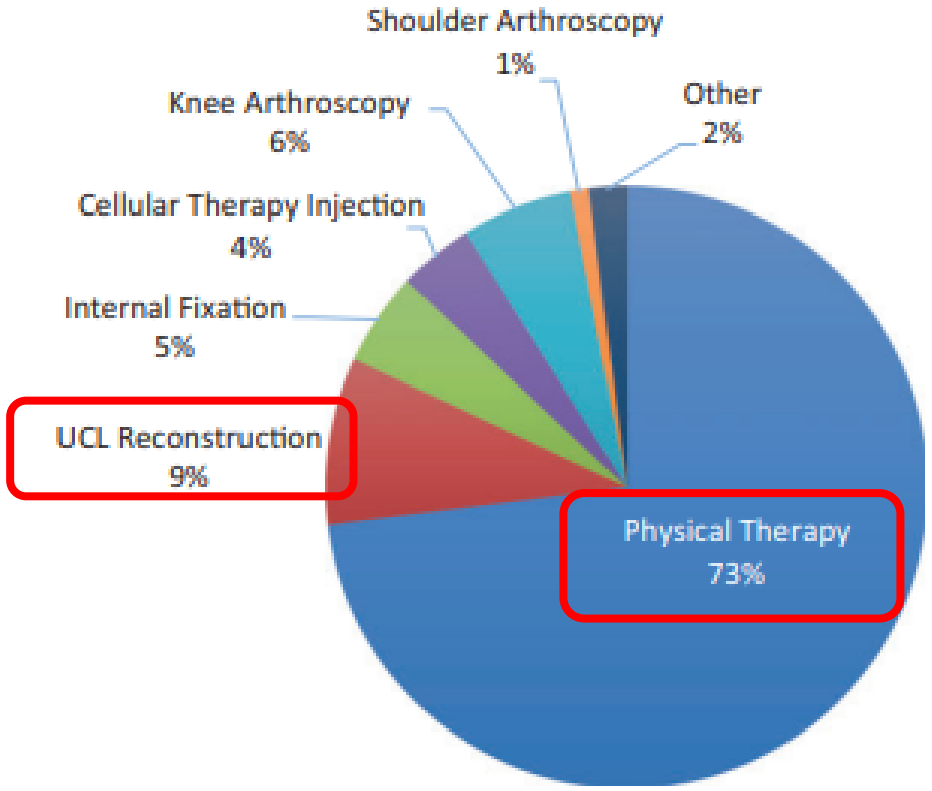

Figure 1. The most common musculoskeletal interventions and surgical procedures among predraft Major League Baseball players. UCL, ulnar collateral ligament.

Effect on draft status/draft Position?

- 719 players drafted (38%) and played 2 years (MiLB or MLB)
- Injury Hx (non op/OP) =less likely to be drafted, but not significant
  - No diff: PP v Pitcher
  - No effect on draft position
- Age was only significant variable- increasing odds of being drafted and an earlier draft position

TABLE 4
Results of Drafted Logistic Regression and Overall Draft Rank Linear Regression[a]

	Dependent Variable	
	Drafted (Yes/No): Logistic	Overall Draft Rank: Linear
Age	0.161 (0.032)	–23.152 (6.116)
P value	<.0001	.0002
Pitcher (vs position player)	–0.024 (0.101)	38.213 (18.881)
P value	.813	.044
Nonoperative (vs noninjury)	–0.304 (0.127)	23.895 (23.042)
P value	.017	.300
Operative (vs noninjury)	–0.250 (0.143)	30.430 (25.666)
P value	.081	.236
Intercept	–2.307 (0.637)	818.869 (123.696)
P value	.0003	<.0001
Observations, n	1890	1258

[a]Values are reported as estimate (standard error).

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Effect on Future Availability?

- No significant difference between athletes with no injury and those with nonoperative or operative injury treatment.
- Pitchers had decreased availability, regardless of pre-draft injury status

TABLE 5
Beta Regression Results for Availability and Performance Ranks[a]

	Dependent Variable	
	Availability	Performance
Age	0.072 (0.032)	–0.022 (0.032)
P value	.025	.494
Overall draft rank	–0.0004 (0.0002)	–0.0002 (0.0002)
P value	.014	.330
Pitcher (vs position player)	1.146 (0.098)	1.049 (0.098)
P value	<.0001	<.0001
Nonoperative (vs noninjury)	–0.207 (0.113)	–0.124 (0.114)
P value	.068	.279
Operative (vs noninjury)	–0.152 (0.126)	–0.001 (0.127)
P value	.231	.997
Intercept	–1.802 (0.654)	–0.051 (0.658)
P value	.006	.939
Observations, n	719	719

[a]Values are reported as estimate (standard error).

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Conclusion

- most common predraft injuries among MLB athletes included shoulder and elbow injuries
- physical therapy was the most common nonoperative intervention
- UCL reconstruction was the most common surgical procedure
  - UCL reconstruction is not a deterrent (Wymore AJSM 2016; Camp AJSM 2018, Griffith OJSM 2019)
- Overall, musculoskeletal history did not affect draft rank or short-term availability for MLB prospects.

Limitations

- Retrospective review of medial history of those who participate
  - limited to submitted charts/reads
  - not exams/imaging

- Draft Prospect Link created in 2019
  - Ability to uniformly upload medical documents
  - Sig increase in responses/questionnaires
  - Opportunity to standardize, ask the right questions

MLB Medical History Questionnaires Available	
2019	2018
1978	800
147% increase from 2018-2019	

Medical on File from MLB for Top 200/300 Players			
Year	Top 200/300	MLB Medical on File	%
2019	300	276	92%
2018	300	260	87%
2017	300	228	76%
2016	200	138	69%
2015	200	148	74%

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Thank you for your Attention

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