

# An Analysis of Shot Quality in Major League Lacrosse (MLL)

Tyler Schanzenbach<sup>1</sup>, Jesse McNulty<sup>2</sup>, Joseph Keegan<sup>3</sup>

1 - William Penn High School Sports Analytics Club, New Castle, DE, USA – tylergs12@gmail.com

2 - William Penn High School, New Castle, DE, USA – jesse.mculty@colonial.k12.de.us

3 - Contributing Writer, Lacrosse Magazine, Boston, MA, USA – joekeegan21@gmail.com



## Abstract

Statistical analysis in the game of professional field lacrosse is very much in its infancy. In the spring and summer of 2016, the William Penn High School Sports Analytics Club collected data contributing to attempted shots from the 2015-2016 Major League Lacrosse (MLL) regular seasons. Using SAS JMP Pro 12 software package, the club will analyze offensive indicators such as shooter, primary and secondary assists, shot location zone, shot initiation, shot type, handedness, distance from net, and shot result to answer previously unanswerable questions in Major League Lacrosse.

### Introduction

The primary challenge for lacrosse teams on offense is to maximize the value of each opportunity when they possess the ball and equivalently to minimize that value when their opponent possesses it. For years, lacrosse has evaluated a player's offensive contributions by shooting percentage, goals, and assists. In this study, we look to provide alternative data to effectively evaluate a player's contribution to team success through Expected Goals (xG) and a player's performance in comparison to league averages.

#### Questions posed in this study include:

- What are the expected goals for given field areas?
- Are there common team shooting tendencies?
- Who are the league's best shooters?
- Is a two-point heavy shot strategy feasible in pro lacrosse?

Zone	2015 xG	2016 xG	2015-2016 xG
1	0.5299	0.4342	0.4773
2	0.6327	0.5000	0.5374
3	0.6420	0.6360	0.6386
4	0.6957	0.4601	0.5262
5	0.4680	0.3608	0.4152
6	0.2515	0.2751	0.2607
7	0.4093	0.3585	0.3784
8	0.3875	0.4374	0.4164
9	0.3724	0.3457	0.3522
10	0.2817	0.2682	0.2766
11	0.4412	0.2105	0.2805
12	0.2436	0.2526	0.2494
13	0.2500	0.2652	0.2573
14	0.2619	0.2550	0.2588
15	0.2333	0.2194	0.2263
16	0.2127	0.3183	0.2637
17	0.1776	0.2222	0.2004
18	0.5000	0.4000	0.4444
19	0.2326	0.3030	0.2705
20	0.3318	0.3560	0.3432
21	0.1770	0.2180	0.1975
22	0.0000	0.2000	0.1375
Total	0.2914	0.3087	0.3002
N	5065	5342	10407

Table above provides Expected Goals information for each of the twenty-two field zones. Column 1 illustrates the 2015 season, column 2 shows the 2016 season, and column 3 shows 2015-2016 combined.

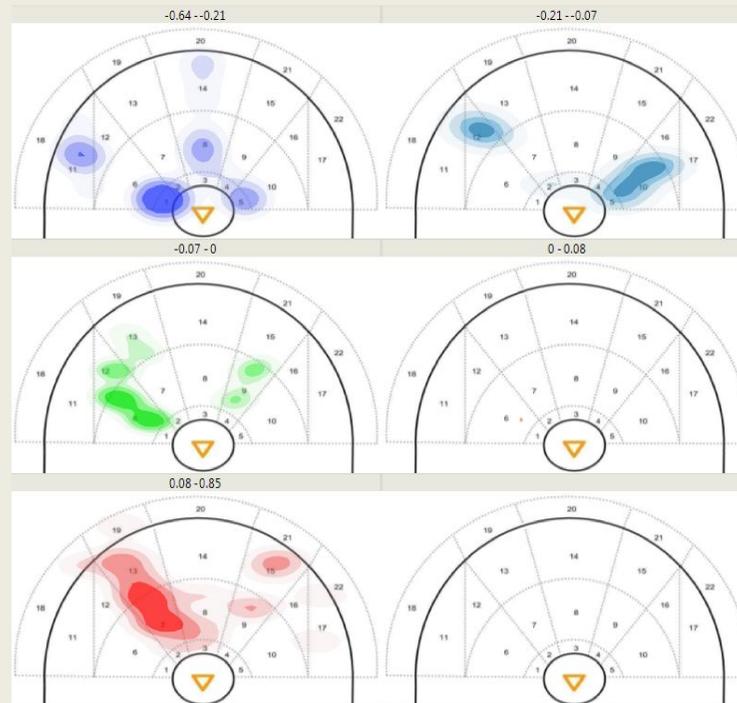
## Observations

### Benefits of Analysis

There are a variety of benefits to this type of analysis. Shot quality will allow us to provide information on opposition analysis, player acquisition during the free agency period, salary allocation, along with other methods.

Summary Statistics	
N	10407
Mode	0.3102
Standard Dev.	0.0964
Std. Err. Mean	0.0009
Min. Value	0
Q1	0.2515
Median	0.2682
Q3	0.3585
Max. Value	0.6957

### Player-Specific (Will Manny - BOS) Visualization



Graph above illustrates Will Manny (Boston Cannons) Zone shooting percentage and shot density in relation to field zone. The five breakdowns are color coded and highlight zones where shots are well below, below, average, above average, and well above average for the 2015 and 2106 Major League Lacrosse seasons.

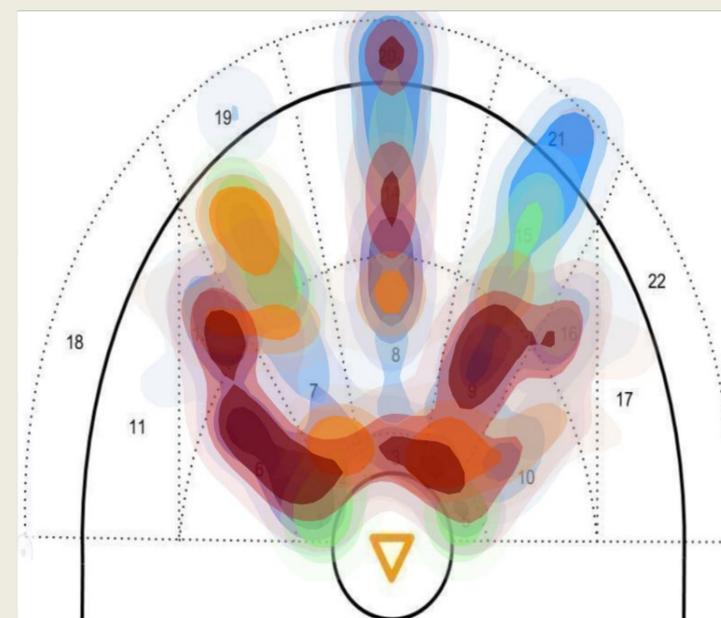
### Components of Shot Quality

The following items were considered in the analysis of each shot attempt. Each shot attempt was manually tracked through video footage from live games.

#### Variables Tracked in Shot Study:

- Zone of Shot
- Shooter
- Result of Shot
- Goaltender Save Quality (Clean/Messy)
- Handedness and footing
- Shot Situation (EMO, fastbreak, etc.)
- Offensive Team
- Defensive Team
- Primary/Secondary Assists
- Primary/Secondary Defenders
- Shot Attempt Distance From Net
- End of Possession Result

### Denver Outlaws Density and Zone xG Mapping



Graph above illustrates the Denver Outlaws Offensive Zone Shot Attempt Densities. Color coded on this map includes Denver's zone specific shooting percentage difference in relation to the league average for the 2015-2016 season. Note: All team players (regardless of position, and all shot attempts regardless of result, were considered in this visualization.

## Discussion

We have presented a method that models individual and team-specific density maps for shot generation in Major League Lacrosse. Our representation also provides an accurate low dimensional summary of shooting habits and an intuitive basis that corresponds to shot types recognizable by lacrosse fan, coaches, and front office personnel. Lastly, our representation provides a summary of shot quality in relation to league averages. We feel that this research can benefit an organization in evaluating its own talent, acquiring assets through trade and free agency, and pre-game scouting and opposition analysis.

We see a few directions for future work. First, we feel that there is a lack of data into player defensive contributions in the game of lacrosse and those contributions are often misunderstood. We feel that work on this subject can be done with the data already collected. Lastly, with known player salary information we feel that studies into market inefficiency can be investigated.

## Acknowledgements

- Mr. David Huntley, Head Coach, Atlanta Blaze Professional Lacrosse Club
- Mr. Spencer Ford, General Manager/Asst. Coach, Atlanta Blaze Professional Lacrosse Club
- Atlanta Blaze Professional Lacrosse Club
- Krossover Sports Inc.
- Google Apps for Education
- Arati Mejdal, Global Social Media Manager, JMP, Inc.
- Christopher D. Long, Chief Analytics Officer, Vorpala
- Brian Erskine, Principal, William Penn High School, New Castle, DE, USA

## References

- Major League Lacrosse 2016 Season Stats. 2016. Major League Lacrosse. Available at: <http://mll.stats.pointstreak.com/scoringleaders.html?leagueid=323&seasonid=15140>. [Accessed 1 September 2016].