



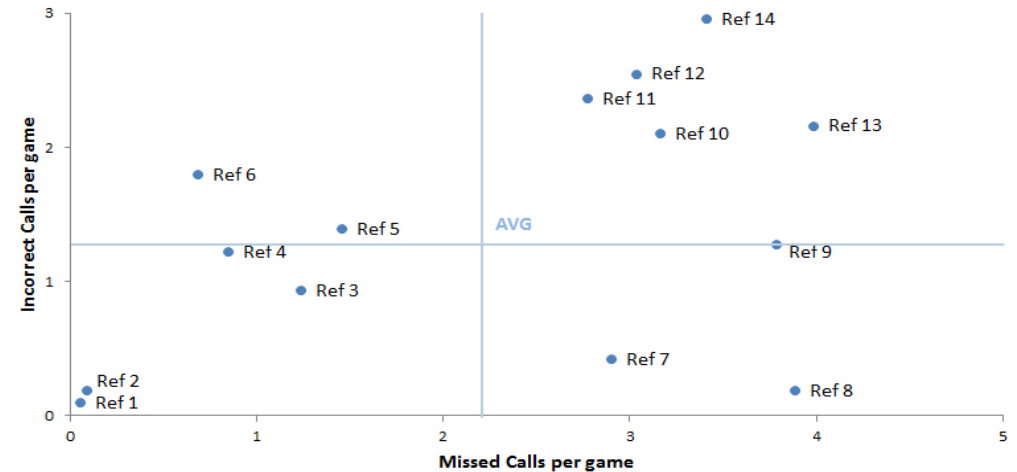
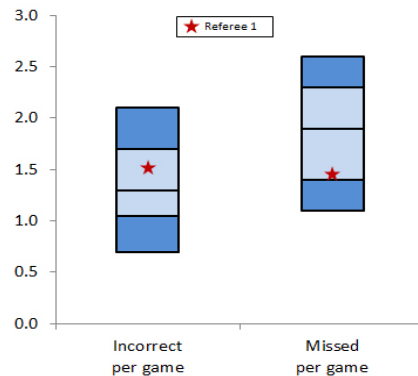
Driven By Data:

A Closer Look Into Officiating Patterns



Introduction

- Do Officials favor the home team?
- Is Official calling consistent over the course of a season?
- Do Officials favor the better team?



- Does the volume of calls an Official makes have an impact on accuracy?
- Do Official evaluators/assessors benefit from attending a game, even if they are also reviewing by video?

Our presentation will answer these and other questions about Officiating patterns.

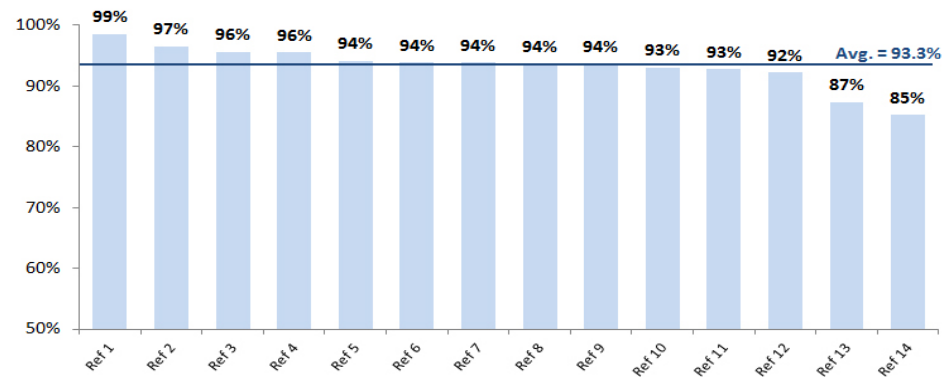
Ref360 Background



- A specialized sports Officiating practice in Segal
- Working with professional sports leagues for over 10 years
- Customized software
- Data analytics

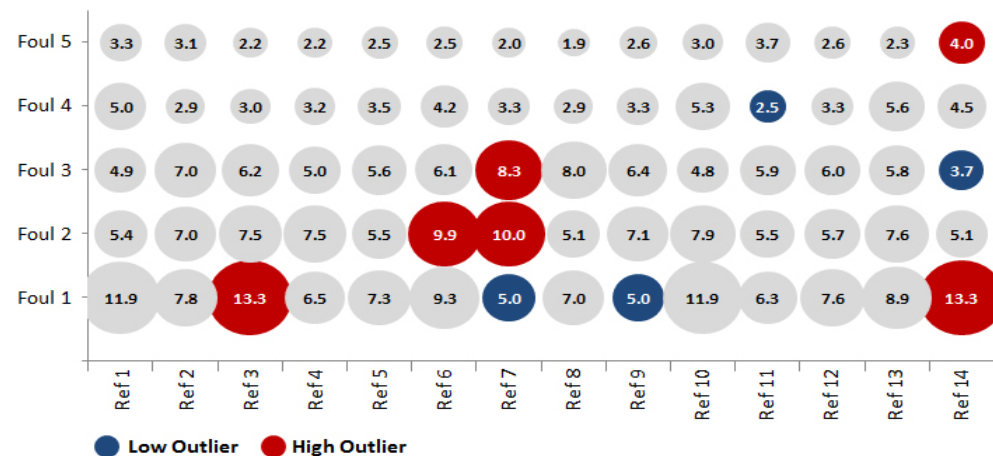
Ref360's mission

- Utilize data to help leagues foster improvement in Officiating:
 - Performance
 - Training
 - Development



Ref360 -- Driven by Data

- Data can be used to assess all aspects of Officiating, including:
 - Accuracy
 - Positioning
 - Communication
 - Effectiveness in managing players and coaches
- Accuracy alone does not show the big picture of an Official's performance; it is only part of the toolbox that league administrators use to help their Officials grow and improve
- Data as a Defense – Data can be valuable in helping league administrators defend their Officials from the claims made by
 - Coaches
 - Players
 - Media



Data can improve the quality and integrity of the game.

Officiating Patterns Analysis -- Approach

Ref360 has aggregated Officiating data to assess and identify patterns across sports

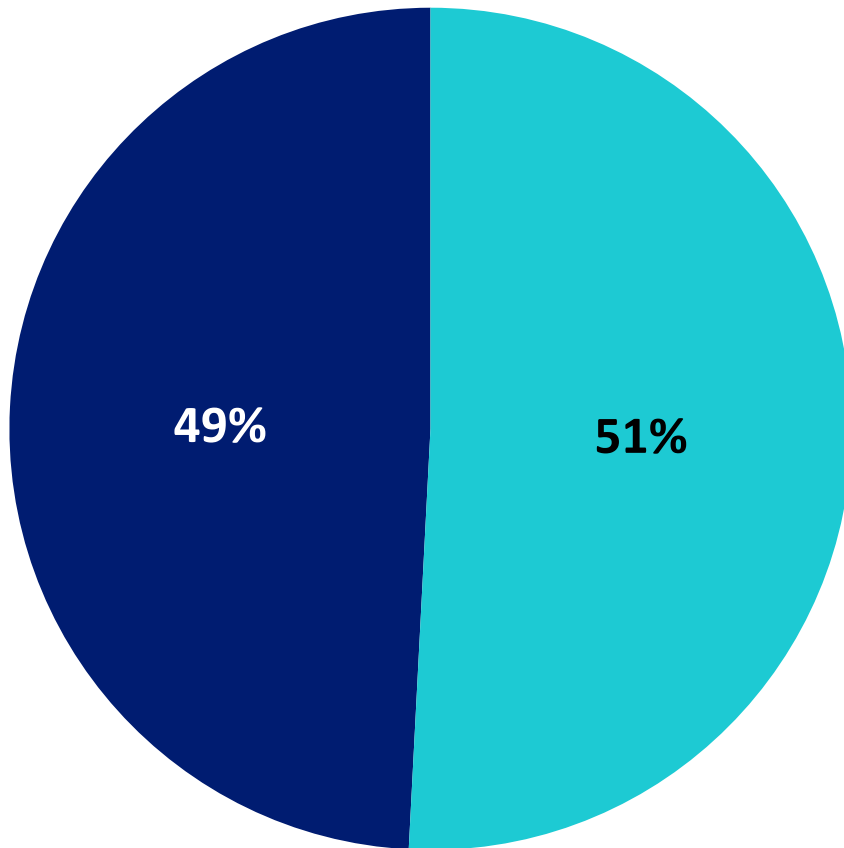
- Our analyses look at data from:
 - Professional Sports Leagues
 - 33 distinct seasons
 - US and Non-US
- All data has been aggregated and anonymized to ensure confidentiality
- Since volumes and accuracies vary by sport and league, all data is displayed as the percentile (rank) within its own group

A Word about Accuracy

- Call Accuracy – Considers how accurate an Official is when blowing the whistle
 - $\text{Correct Calls} / [\text{Correct Calls} + \text{Incorrect Calls}]$
- Identification Accuracy – Considers how well an Official does at identifying infractions that occur during a game
 - $\text{Correct Calls} / [\text{Correct Calls} + \text{Missed Calls}]$

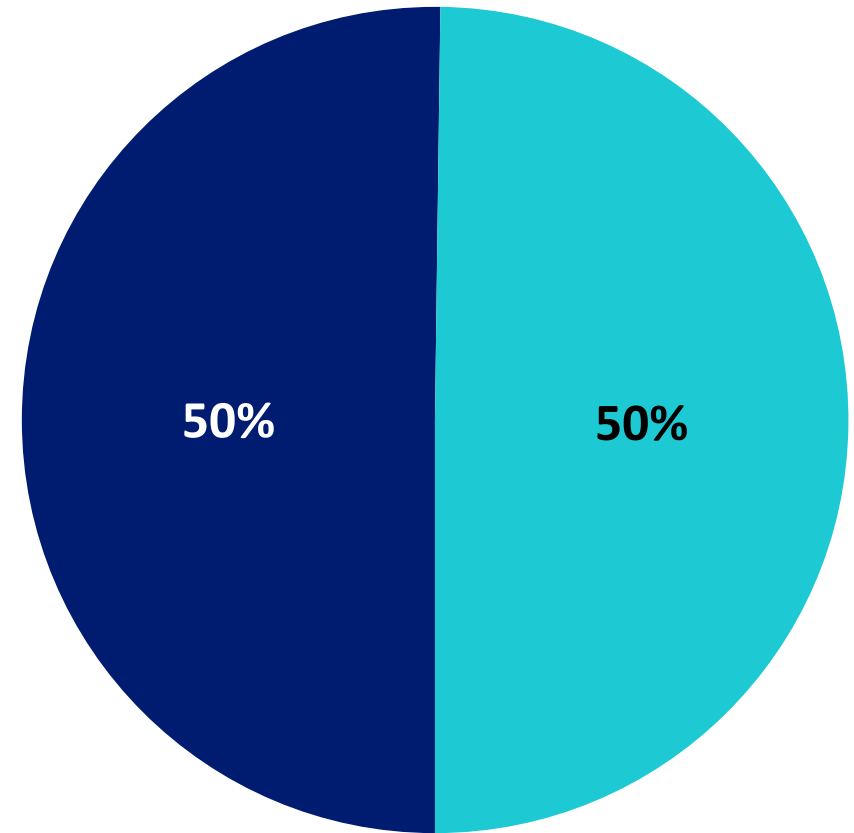
Home/Away Analysis -- All Calls and Errors

Calls Against



■ Home ■ Away

Errors Against



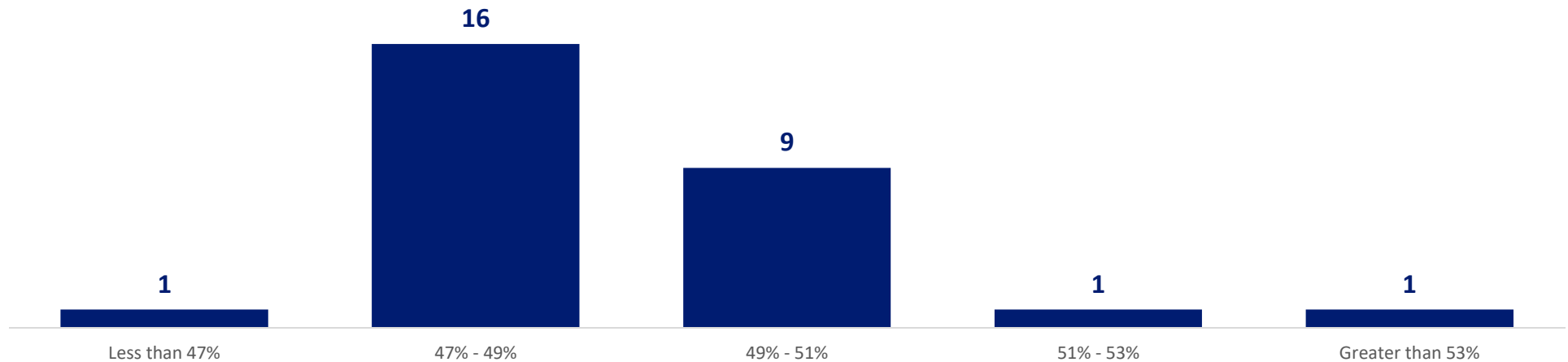
■ Home ■ Away

On average, calls and errors against each side are evenly split.

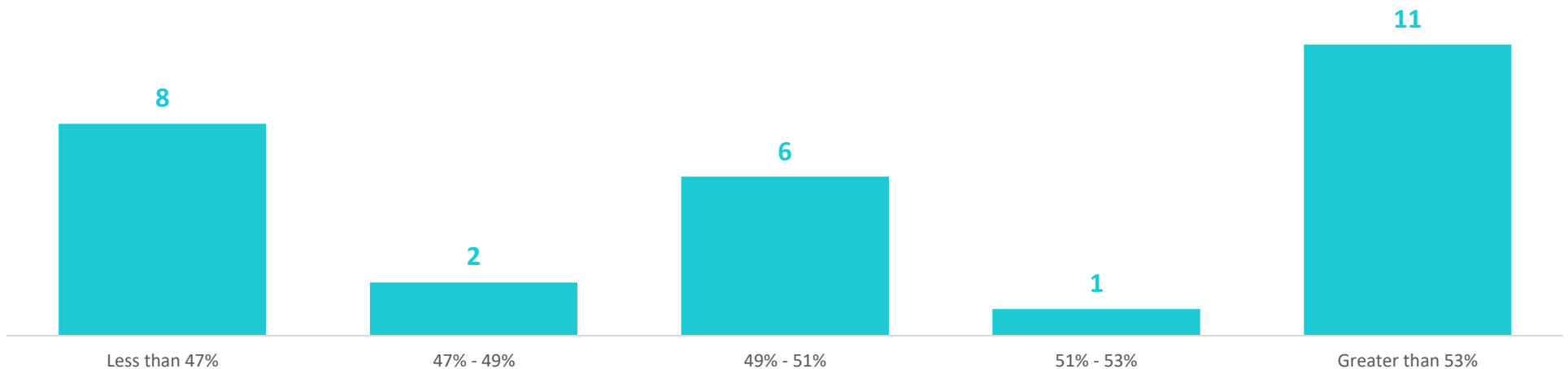
**Percentages represent an average of the percentages for each individual season.*

Home/Away Analysis -- Frequency by League-Season

Calls Against Home



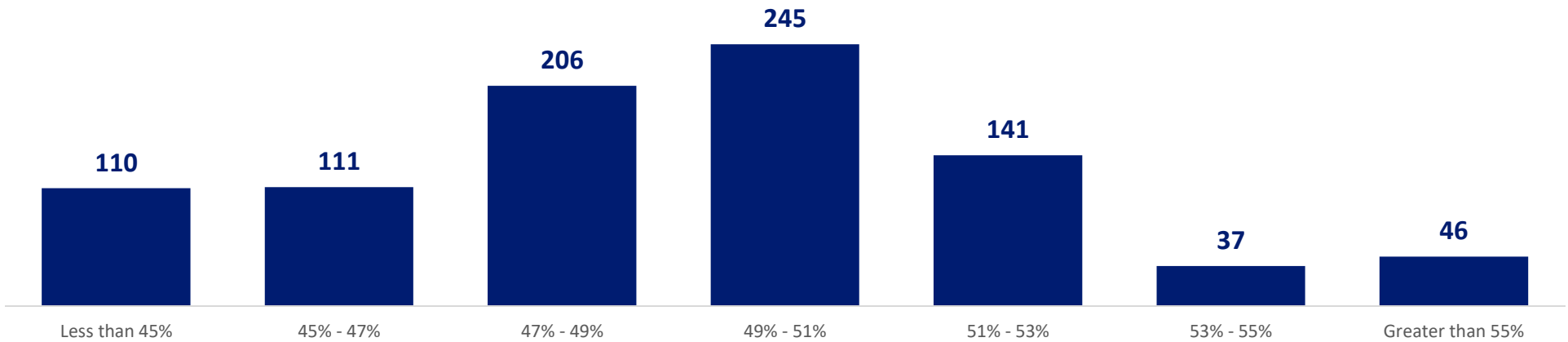
Errors Against Home



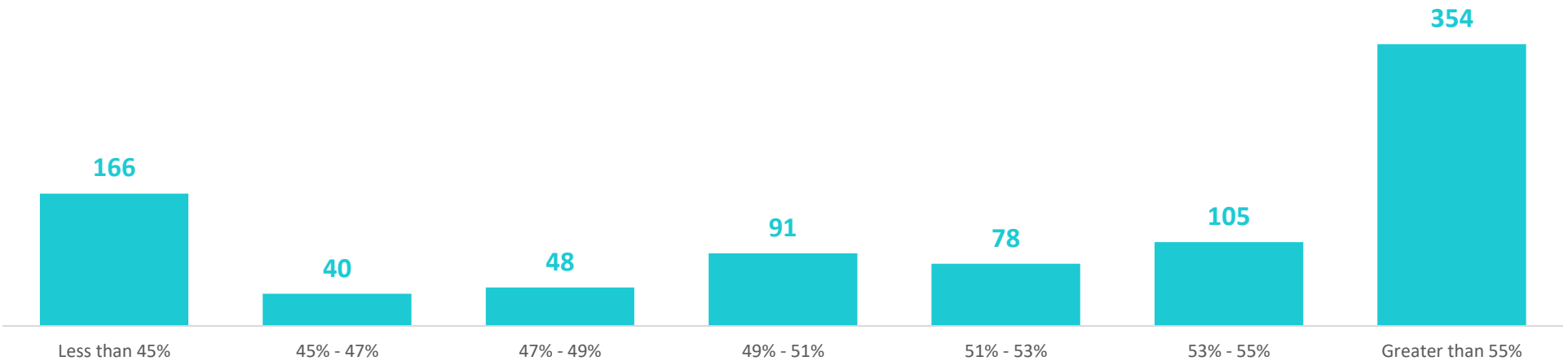
When looking at Home/Away by League-season, most seasons have very close calling. However, seasons are not as uniform with respect to errors.

Home/Away Analysis -- Frequency by Official-Season

Calls Against Home

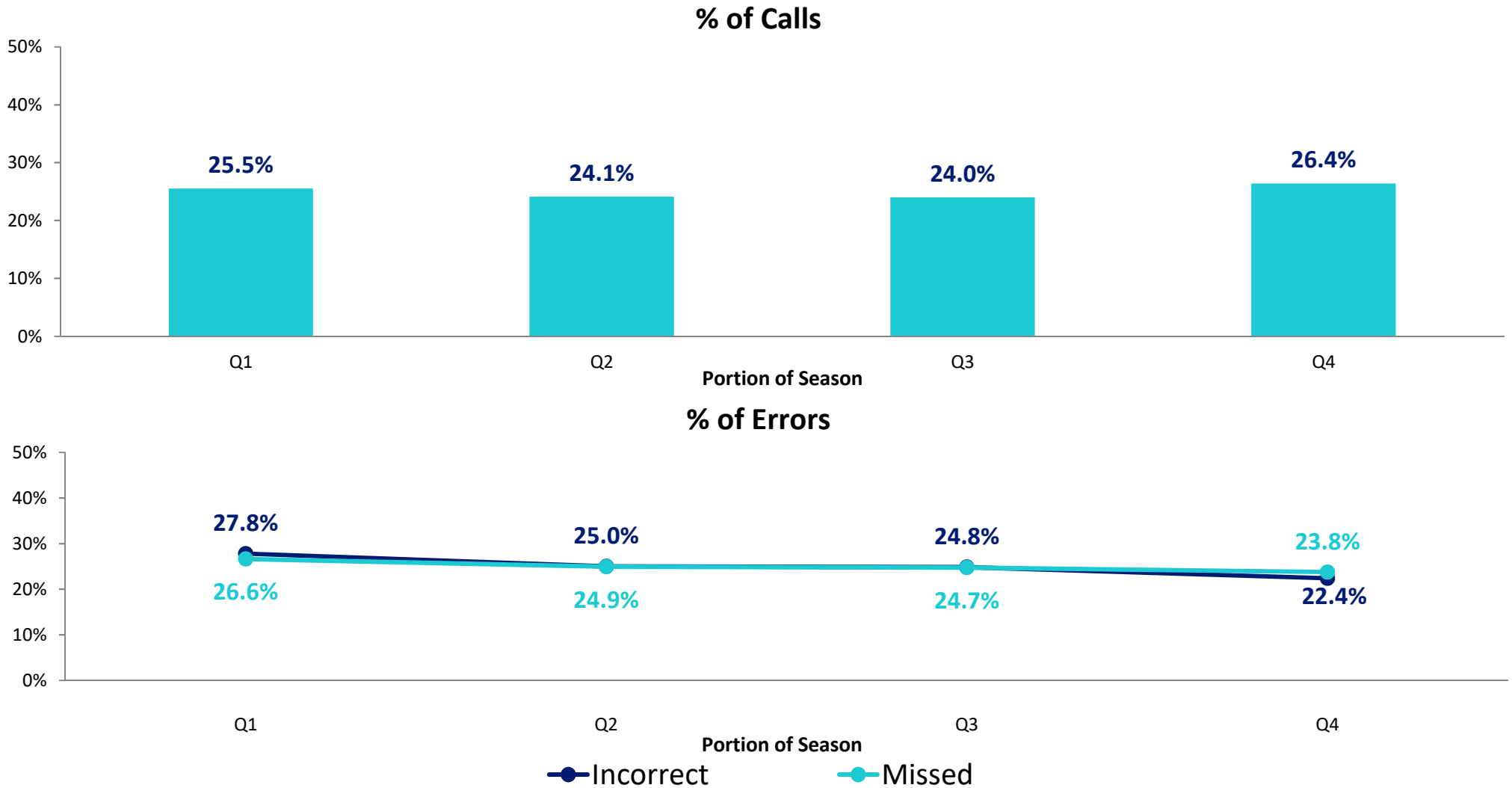


Errors Against Home



When looking at Official-seasons, the results are more varied.

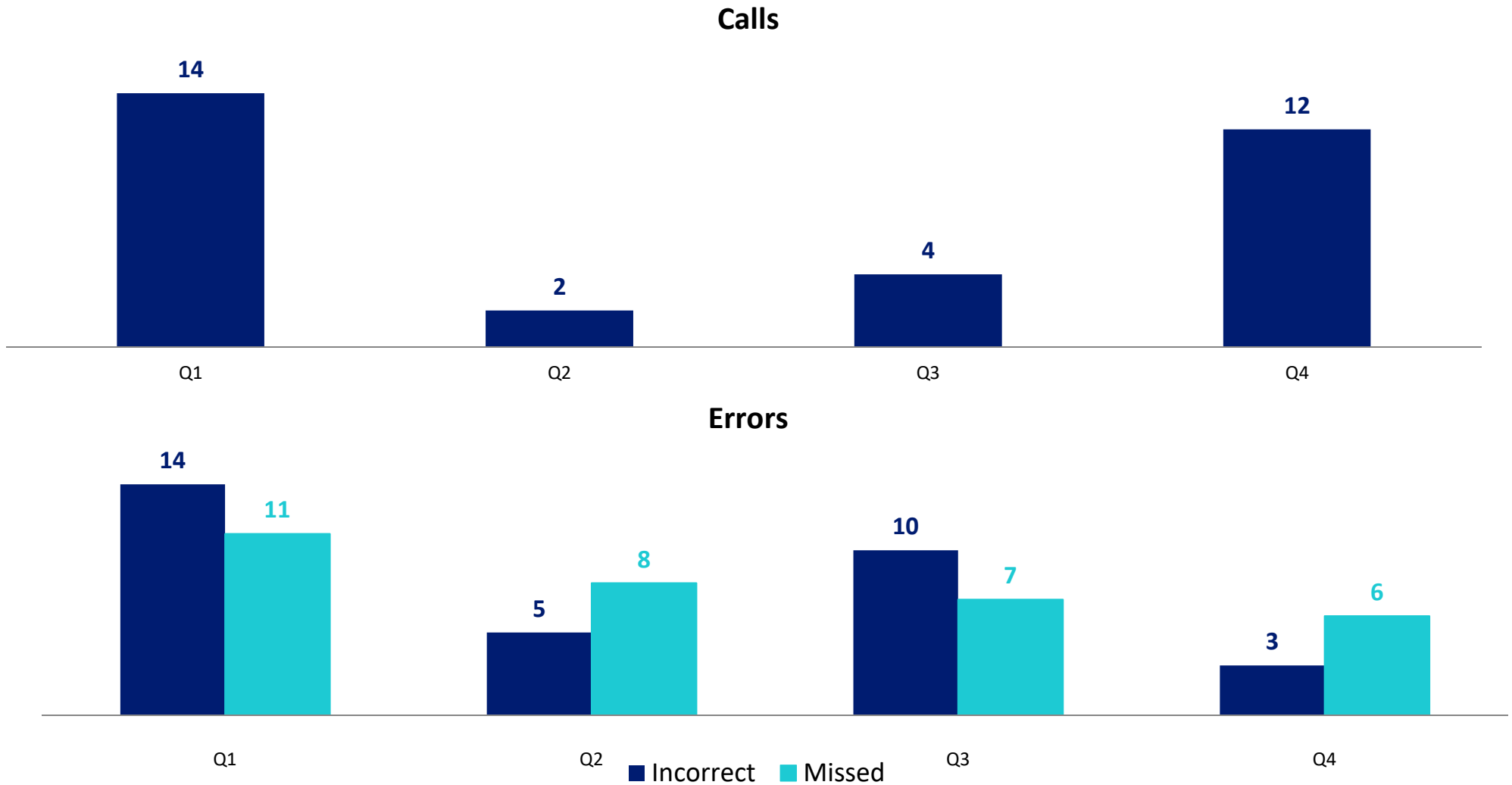
Portion of Season with Most Calls and Errors



**Call volume is higher at the beginning and end of the season.
Accuracy improves as the season progresses.**

*Q1 refers to games that were played in the first quarter of a season

Portion of Season with Most Calls and Errors -- By League-Season

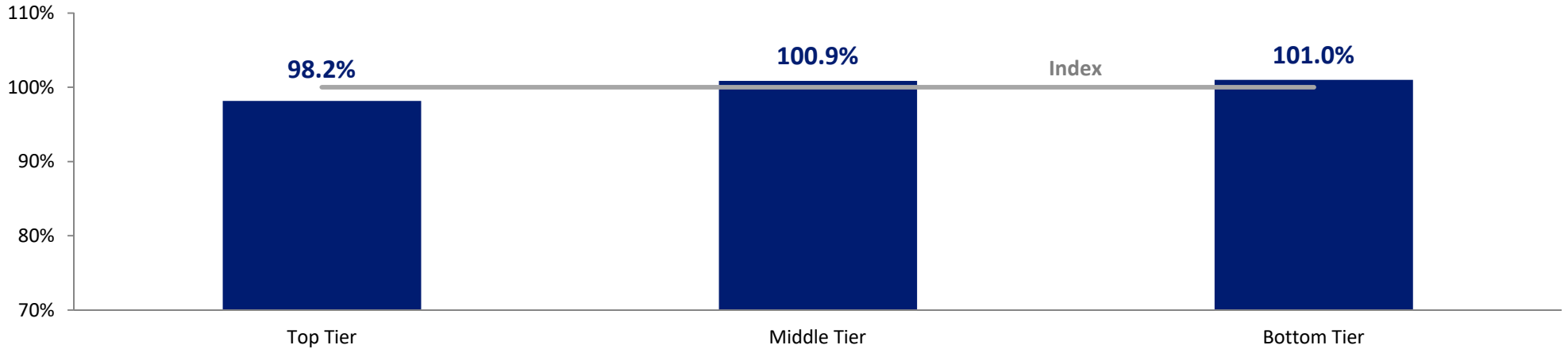


The trend of accuracy throughout the season is not as consistent when viewing the information by league-season.

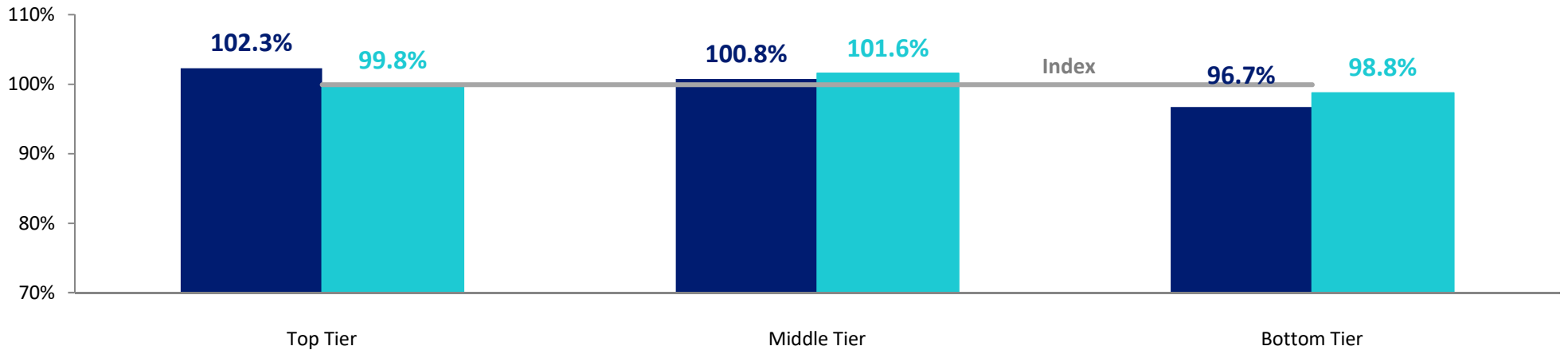
*Q1 refers to games that were played in the first quarter of a season

Volume and Errors Index by Team Success

Calls Against Compared to Average



Errors Against Compared to Average

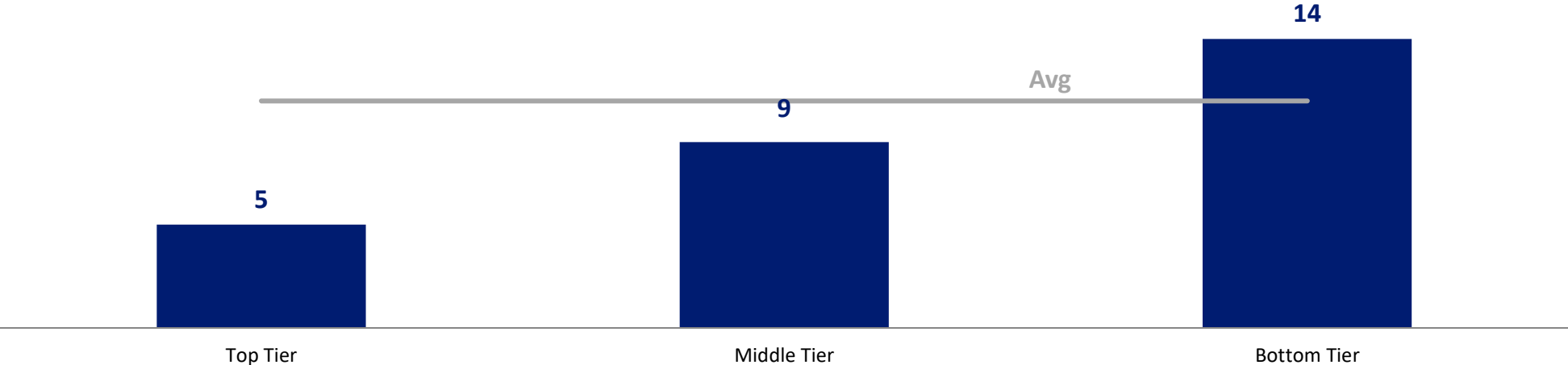


■ Incorrect Calls ■ Missed Calls — Index

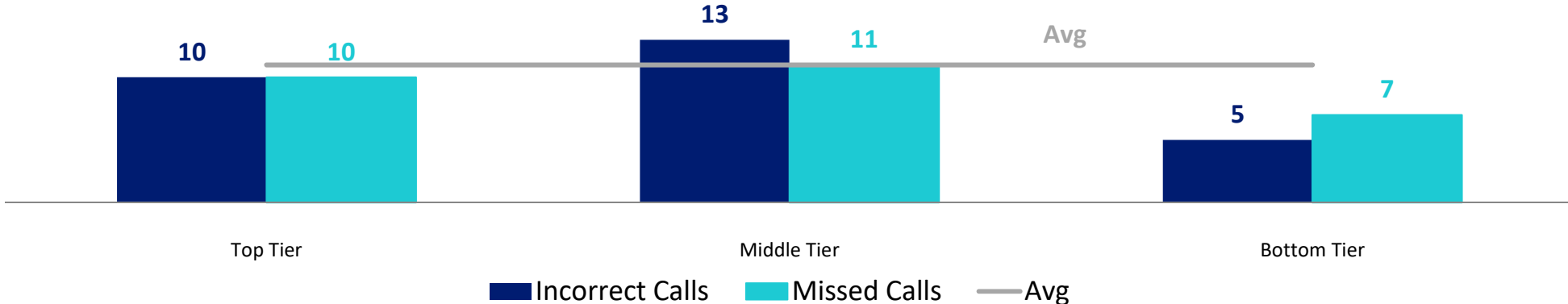
While Officials make more calls against teams with worse records (indicating they commit more fouls), more errors are made against the better teams.

Volume and Errors Index by Team Success -- By League-Season

Calls Against Compared to Average



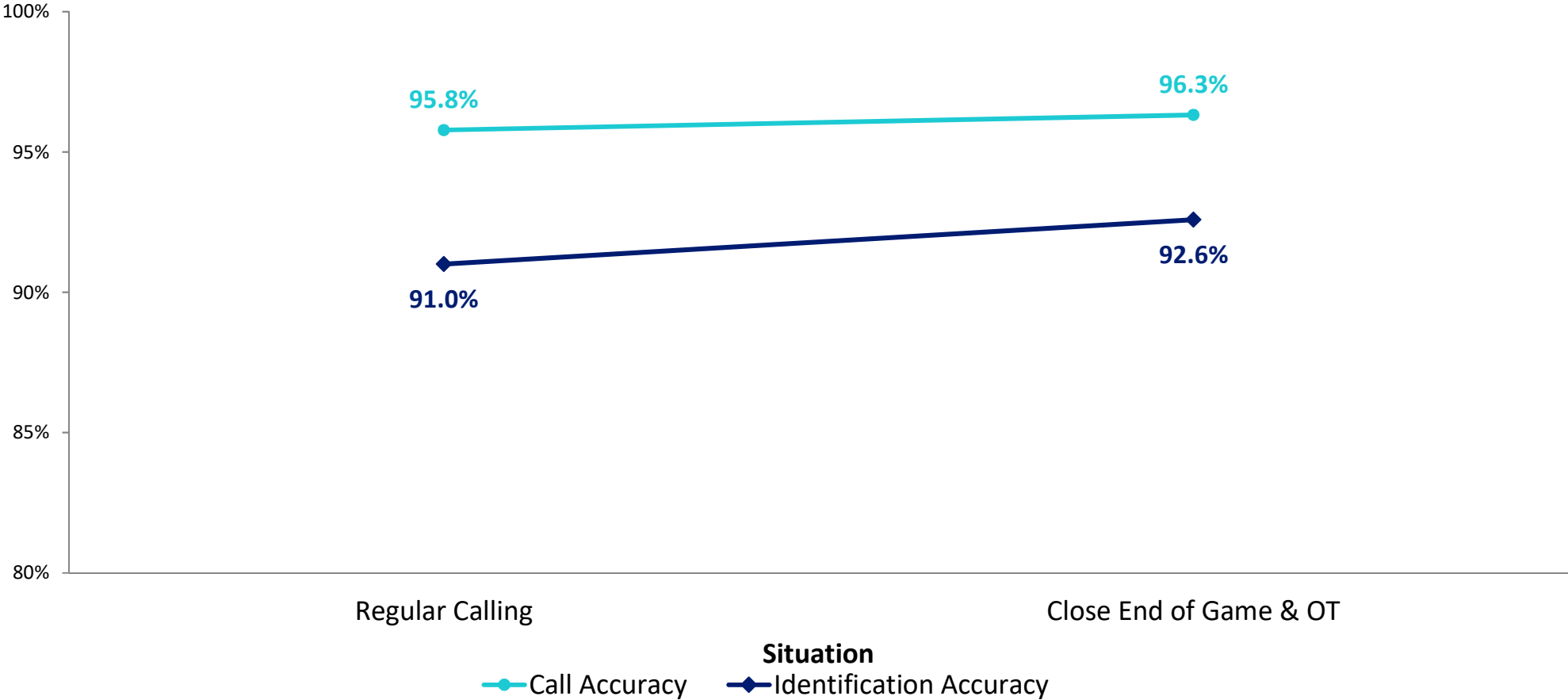
Errors Against Compared to Average



While the results shown on the previous page were relatively close across the Tiers, the Bottom Tier teams received the most calls and fewest errors in a high percentage of the seasons studied.

Calling at the End of Close Games

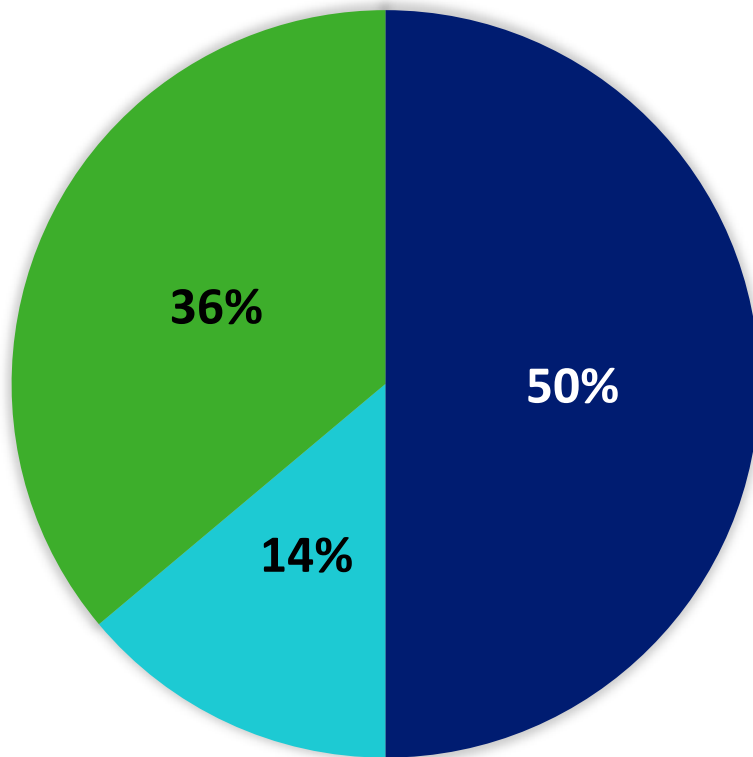
Accuracy



Overall, Call Accuracy and Identification Accuracy improves at the end of close games.

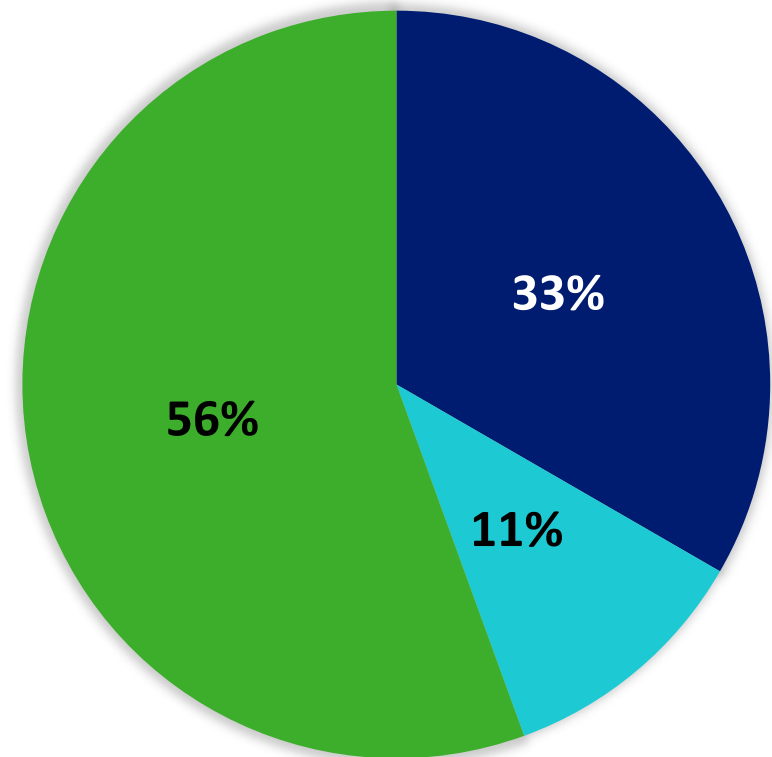
Change in Accuracy During End of Close Games -- By League-Season

Call Accuracy



■ Similar ■ Lower ■ Higher

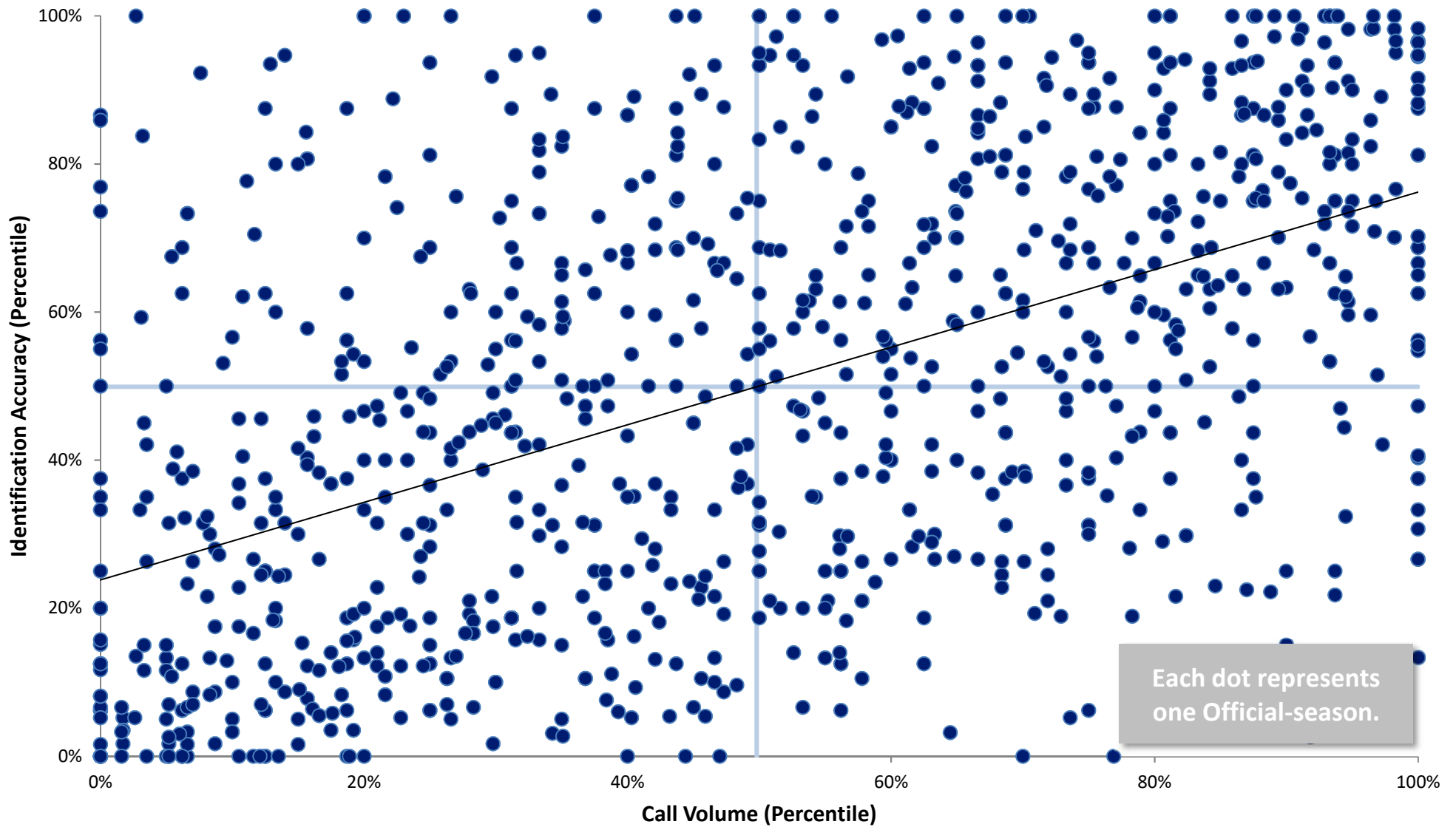
Identification Accuracy



■ Similar ■ Lower ■ Higher

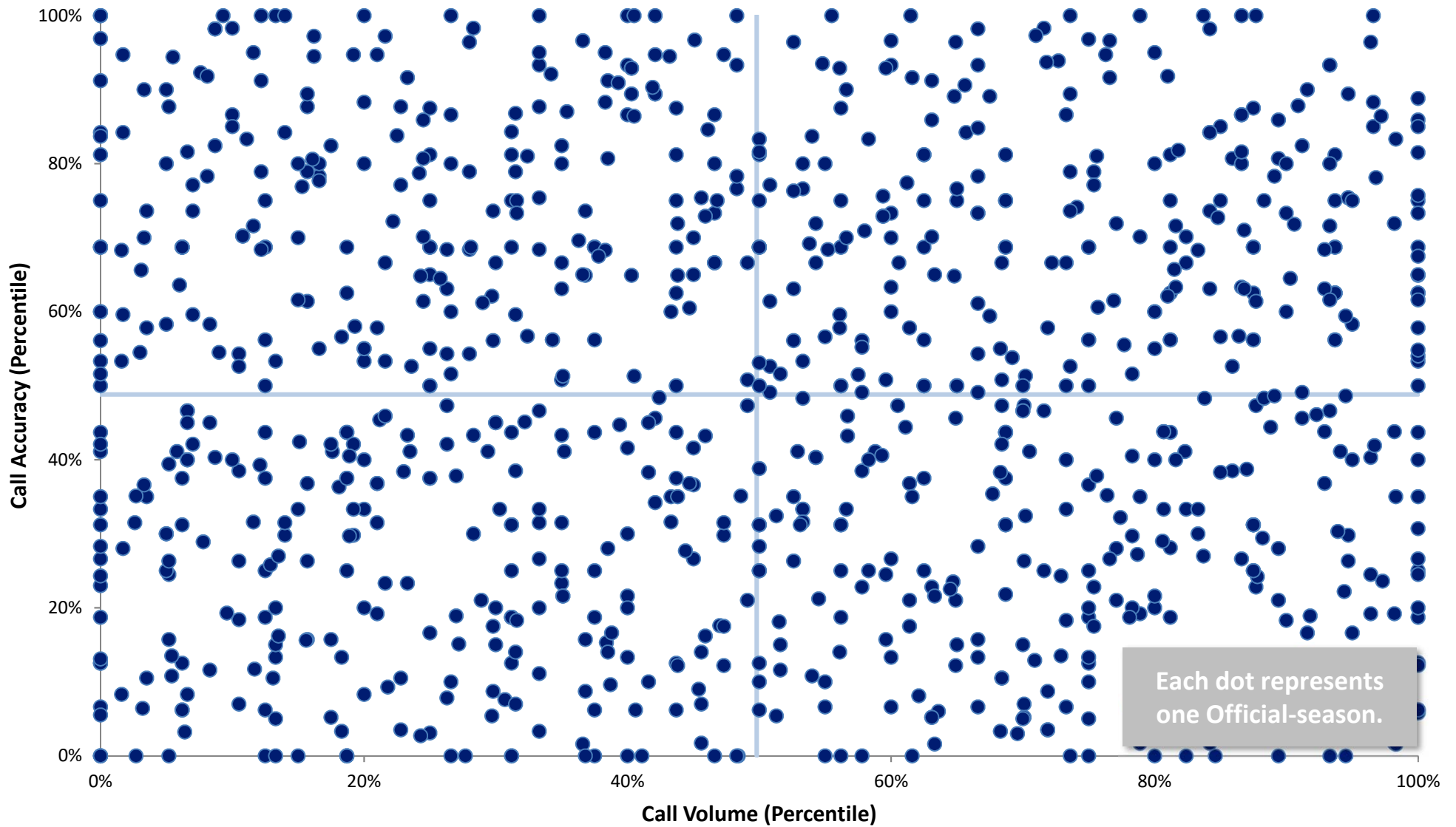
Accuracy during the end of close games is as good or better in most League-seasons.

Volume and Identification Accuracy Scatter



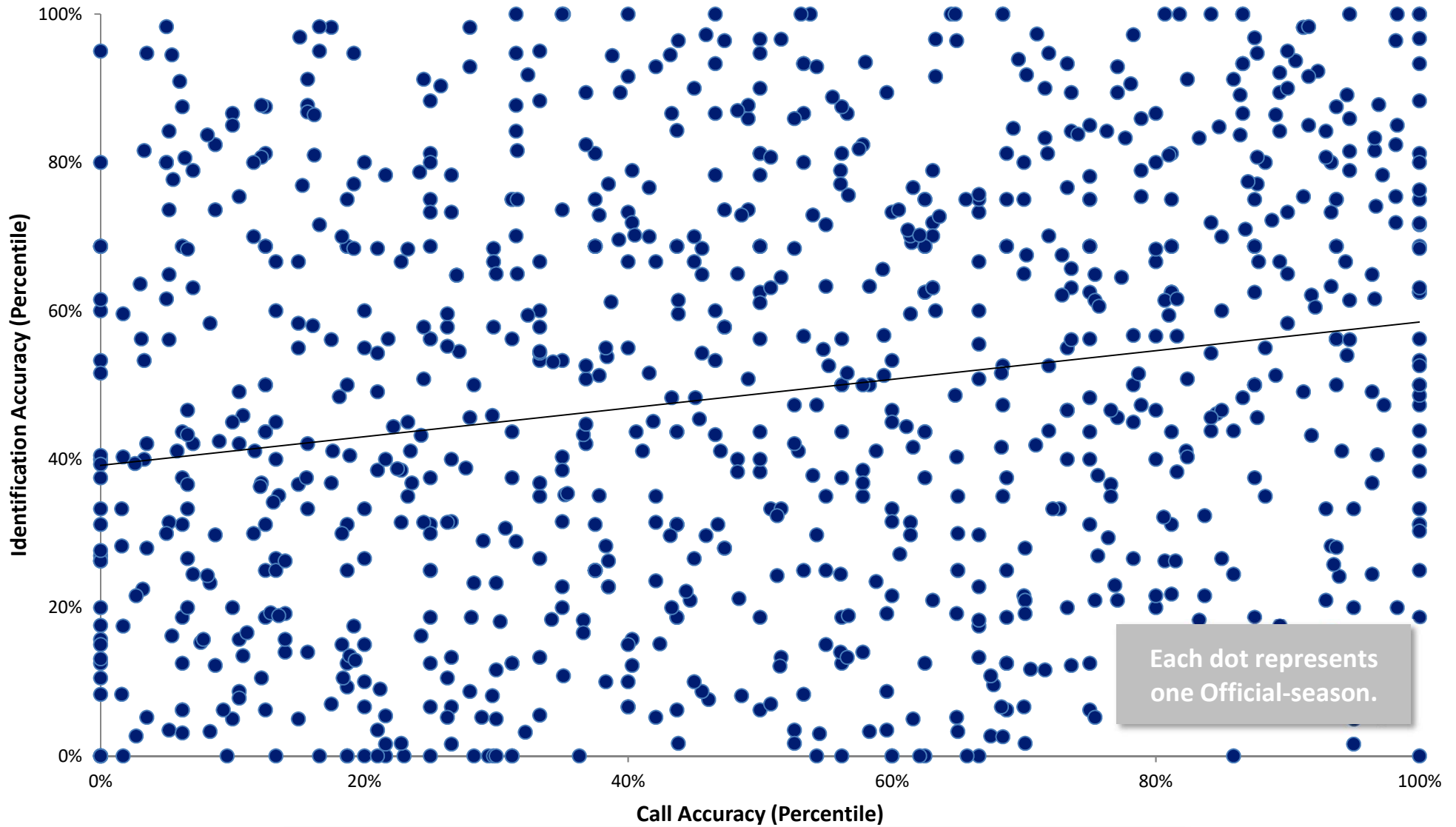
Officials that make more calls are better at identifying infractions.

Volume and Call Accuracy Scatter



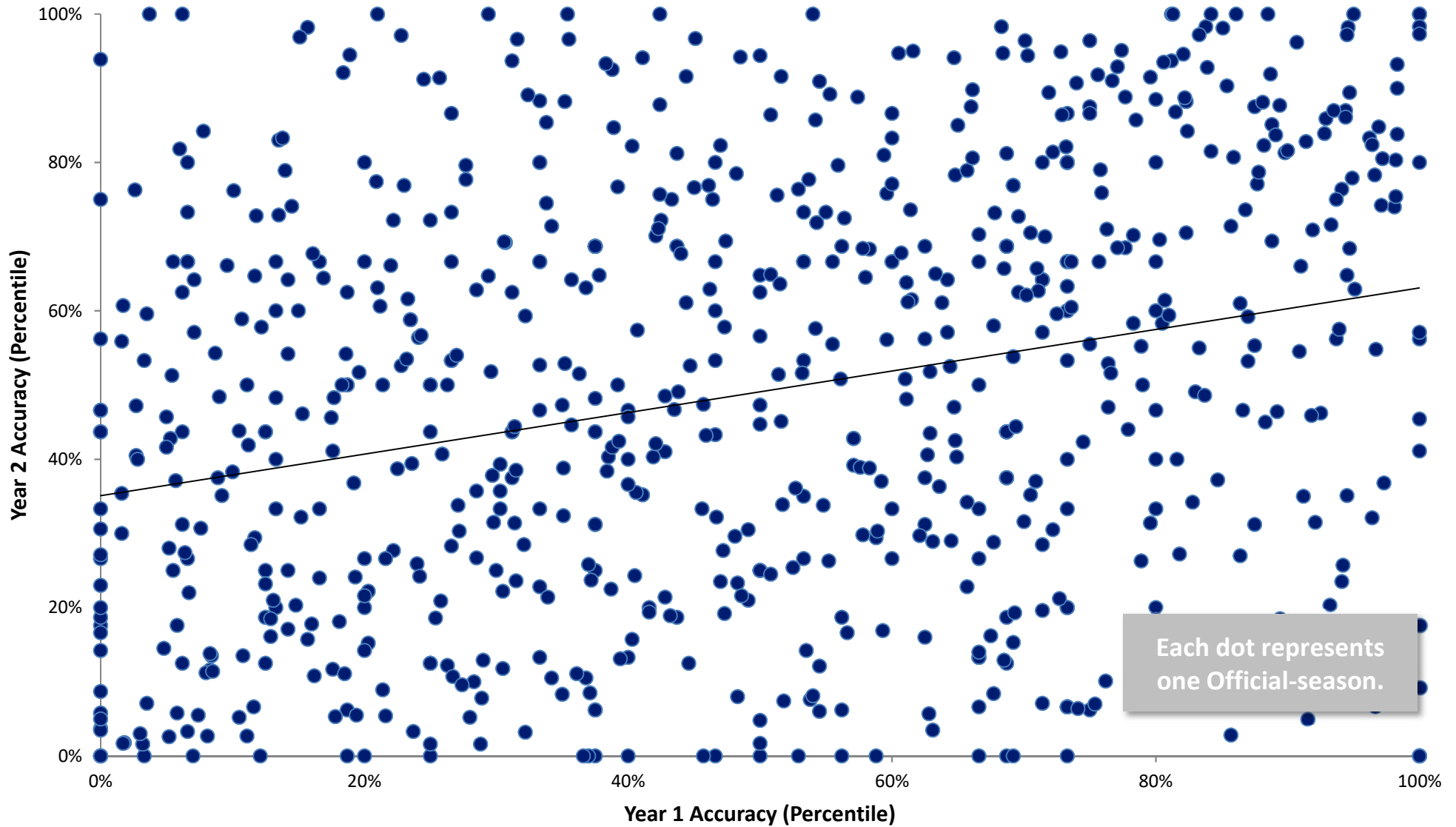
The number of calls an Official makes does not correlate with the number of incorrect whistles blown.

Identification and Call Accuracy Scatter



Although correlated, those with high Call Accuracy are not always those with the highest Identification Accuracy.

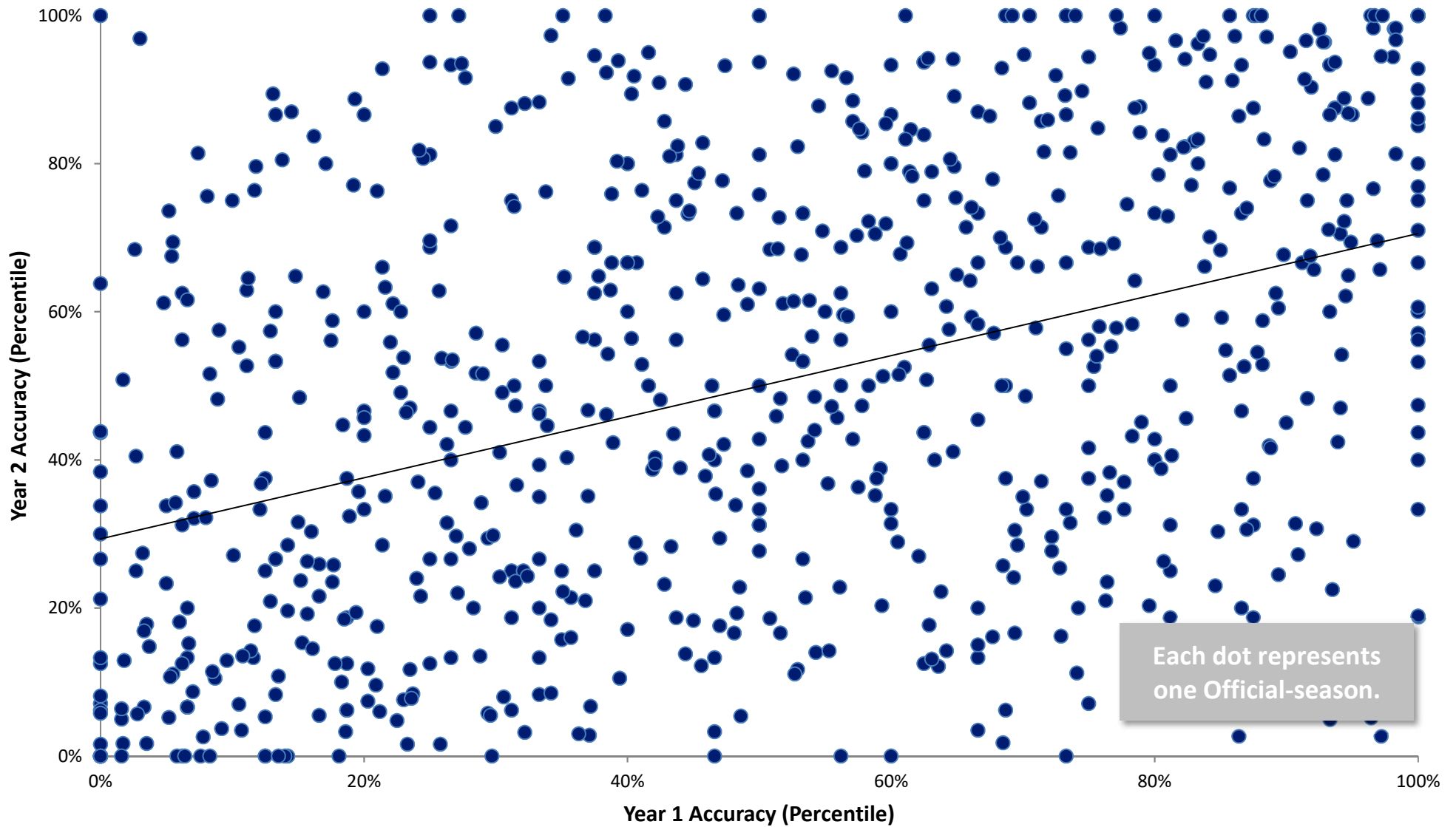
Year Over Year Consistency -- Call Accuracy



Generally, Officials with higher call accuracy tend to be more accurate year over year.

Analyses look at sequential individual season pairs (e.g., 2014 vs. 2013, 2015 vs. 2014, etc.)

Year Over Year Consistency -- Identification Accuracy



Generally, Officials with higher identification accuracy are consistently more accurate year over year.

Analyses look at sequential individual season pairs (e.g., 2014 vs. 2013, 2015 vs. 2014, etc.)

Grades by Evaluation Type

Impact of Evaluator Doing Video Only Review

Identification of
Incorrect Calls


↑ 4.7%

Identification of
Missed Calls

↑ 5.8%

Evaluators identify more errors when reviewing a game by video only, as opposed to also attending a game.

Questions / Follow-Ups



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