Introduction:

In this activity, we will explore NCAA Division I Lacrosse faceoff percentages to compare a specific team's performance with overall league statistics. By analyzing the data from the 2022-2023 season, we aim to understand the concept of one sample proportion hypothesis testing and its practical application in sports statistics.

Learning Goals:

By the end of this activity, you will develop a fundamental understanding of one sample proportion hypothesis testing and how it can be used to evaluate a specific team's faceoff percentage in comparison to other league teams.

Data:

The dataset for this module includes information from the NCAA Division I Lacrosse 2022-2023 season, comprising 72 different Division I lacrosse teams. We will focus on two variables, "total faceoffs" and "faceoff wins," to investigate team performance in faceoffs throughout the season.

Exercises:

1. Suppose Duke is playing against Maryland. If each team has an equal chance of winning any faceoff (i.e., the winner of the faceoff is completely random), what is the chance that Duke would win a single faceoff?

*Given that they both have an equal chance of winning, Duke would have a 50% chance.*

2. Duke won 330 out of 548 total faceoffs in 2022-2023. State the null and alternative hypotheses to determine if Duke’s faceoff win percentage is better than what we’d expect with random chance only?

*Ho: p = 0.5 (The proportion of faceoffs won is equal to 0.5 – represents random chance)*

*Ha: p > 0.5 (The proportion of faceoffs won is* ***greater than*** *0.5 – represents a better than random chance)*

3. Determine the sample size and sample proportion for Duke's faceoff performance.

*Sample size: n = 548*

*Sample proportion:* $\hat{p}$ *= 0.602*

4. Under the assumption that the null hypothesis is true, check if the sample satisfies the success-failure condition.

$nP\_{0}$*= 548(0.5) = 274 > 10*

$n(1-P\_{0}$*) = 548(1-0.5) = 274 > 10*

5. Calculate the test statistic for Duke's faceoff performance.

*Z =* $\frac{(.602 - 0.5)}{\sqrt{\frac{0.5 \* 0.5}{548}}}$ *= 4.776*

6. Based on the significance level ⍺ = .05, determine if this sample proportion provides evidence that Duke has a higher faceoff win percentage than expected under random chance in the 2022-2023 season. Provide all necessary details and a conclusion in context.

*We estimate the proportion of Duke lacrosse faceoff wins in the 2022-2023 season to be 0.602. Therefore, there is strong evidence that their proportion of faceoff wins is different than 0.5 (Z = 4.78, p-value ≈ 0.000).*

7. Considering that Duke was the second-best team in the country last season, reflect on the hypothesis test results and its implications on faceoffs in Division I Lacrosse. How does this statement align with the findings from the hypothesis test? Consider the broader implications of faceoffs in Division I Lacrosse and how this aspect of the game may impact team rankings and outcomes.

*Considering they were the second-best team in the country, it seems that having a faceoff win percentage above the average is important for the success of a team. Faceoff wins may be highly related to goal scoring which means winning faceoffs will likely equate to winning games.*