**Basic Statistics for Infection Preventionists**

**Module 2 – Inferential Statistics**

Scenario A

You are investigating methods for improving healthcare worker influenza vaccination rates and discover two studies:

* Study 1 shows an increase in vaccination rates from 50% to 95%. The authors used an alpha of 0.05 as their level of significance and ended up with a p-value of 0.120.
* Study 2 also shows an increase in vaccination rates from 50% to 95%. The authors similarly used an alpha of 0.05 but ended up with a p-value of 0.001.

1. Which study had a statistically significant result?
2. Study 1
3. Study 2
4. Which of the following might be the reason that study is significant when the other study is not?
   1. The researchers used a more expensive statistician.
   2. The researchers were more willing to risk a false positive result.
   3. It’s a more clinically relevant study.
   4. It had a larger sample size.

Scenario B

You are reading through the results from a project in which the investigators assessed the impact of using a new type of Foley catheter on their CAUTI rate. Their null hypothesis was that the CAUTI rate would stay the same after the new Foley was implemented. Their alternative hypothesis was that the CAUTI rate would change. They compared the “Before Implementation” and “After Implementation” CAUTI rates using a measure called a relative risk, where the CAUTI rates from before and after the implementation of the new Foley catheter would be considered equal if the value of the relative risk was 1. In the results they indicate that:

* Relative risk = 0.7
* 95% confidence interval = 0.23 to 0.86
* No p-value was provided.

1. Was this finding statistically significant?
   1. Yes
   2. No
2. What was the alpha for this analysis?
   1. 0.05
   2. 0.70
   3. 0.95
   4. Cannot be determined

Bonus Project

We will not specifically be going over this one in class but you are invited to tackle it as a personal exercise. That said, you are welcome to bring it up during the Q&A session of the class if you wish.

Look through a research article from a peer-reviewed journal (e.g. AJIC, ICHE). Do the authors state their hypotheses?

Next, find the section in the article titled “Statistical analysis” (or something similar). Don’t worry about the specific tests used, but try to spot phrases that reflect the topics covered this week.

Examples:

* One-sided vs. Two-sided tests
  + All tests of statistical significance were two-sided.
  + All reported P values are two-sided.
* Alpha / Level of significance
  + The significance level was set at p = 0.05.
  + A p-value of 0.05 or less was considered to indicate statistical significance.

What do these statements tell you about what you can expect to see in this study?