BIOMEDSCI 552: Problem Set 3

Note: For all questions, show your work! Partial credit can be given if you get a wrong answer and then carry it forward and use it correctly later, but only if I understand how you got there.

1. You want to test a bat for a rare infection, with a prevalence of 0.74% in the population. You have two tests – one with a false positive rate of 8% and a false negative rate of 12%, which can be administered in the field, and costs $2. There is another test that requires a refrigerated sample and costs $282 but has a false positive rate of 0.1% and a false negative rate of 0%.

   If your bat is positive on the first test, what's the probability it's infected?

   If you bat is positive on the second test, what's the probability it's infected?

   If there a benefit to serial testing, administering the first test, and then the second if the first is positive?

2. You have a friend who is taking part in a yearly competitive event, and they have been trying to improve. They want to know if their efforts have been worthwhile and ask you to look at the data from this year's event and last year's to tell them if they are.

   What is one sort of estimate you could make to measure this?

   What is your null hypothesis?

3. You are considering running a study of the HPV vaccination status of college students. One of your colleagues suggests a respondent driven sampling approach to recruiting students. What are some of the benefits of this approach that you can envision? What are some of the drawbacks?

4. In your own work, would you rather have a significant result that isn't important, or an important result that isn't significant? Why?