

*BIOS 522: Survival Analysis Methods*

**Activity 11:**

**Survival analysis in clinical trials**

*This week we discussed important key concepts in clinical trials. We then focused on sample size and power calculations for clinical trials with survival outcomes. We discussed clinical trial monitoring.*

Problem 1. Moderna COVID vaccine protocol

For today’s activity, we will answer questions about Moderna’s pivotal Phase III COVID-19 vaccine efficacy trial protocol. The protocol is posted on Canvas. Answers to today’s questions can be found within the following sections:

* Section 1.1 Synopsis (pp 6-17)
* Table 1: Objectives and Endpoints (pp 34-37)
* Section 9: Statistical Considerations (pp 83-98)

1. Define the primary efficacy OBJECTIVE of the trial. (*What is the goal?*) Define the primary efficacy ENDPOINT of the trial. (*How is it defined?*) Define the primary efficacy ANALYSIS of the trial. (*How is it analyzed?*)
2. What is the null hypothesis? Express this both in terms of vaccine efficacy and hazard ratio.
3. Describe the assumptions for the sample size calculations.
   1. What is the smallest effect size they want to be powered to detect?
   2. What is the desired power?
   3. What is the type 1 error level?
   4. What is the required number of events?
   5. What is the expected incidence rate in the control group?
   6. What is the expected dropout rate?
   7. What is the expected percent of the study population that will be excluded from the primary analysis?
   8. Approximately how many patients did they plan to enroll?
4. Describe the interim-monitoring strategy and thresholds
5. Considering again the primary efficacy analysis. What type of test is used to test the null hypothesis? How are ties handled?
6. Did the investigators study severe COVID-19?
7. How did the study team guarantee that the trial included enough high-risk individuals?
8. How does the study team determine the time of the event? Describe how the patients are followed to assess their COVID status during the course of the trial.