

Practice Sheet #4

Hypothesis Determination

1. A scientist is interested in determining if a specific gene is part of a pathway for spina bifida. One way to assess this is to look at the amount of folic acid that is absorbed during a key developmental period. A high level of folic acid is important for neural tube development. In a normal population, folic acid levels average 250. What null and alternative hypothesis would reflect the scientist's interest?
2. Microbes are an important part of most bioremediation procedures. Finding ways to increase a microbe's effectiveness would increase the value of any procedure. Assuming that I have a potential additive and wish to study an existing, well known procedure, what hypotheses would I use, and how might I run the experiment?
3. There are two competing treatments for high cholesterol that need to be tested. Assuming that I have 20 similar patients to run a test to compare the two treatments, what hypotheses would I use and how might I run the experiment?
4. There are two competing treatments for poison ivy that need to be tested. Assuming that I have 20 patients to run a test to compare the two treatments, what hypotheses would I use and how might I run the experiment?

Confidence Intervals

1. I have taken a sample of 10 observations from a population where the population variance is 86. The observations are: 104, 118, 143, 123, 110, 135, 122, 135, 109, 115. Compute a 95% confidence interval for the mean. Do you think that the population mean could be 122? What about 132?
2. Redo the previous problem; only now do not assume that you know the population variance.
3. Assume the data for the spina bifida problem discussed above are: 247, 259, 288, 145, 189, 210, 237, 240. Compute a confidence interval and test the hypotheses that were established. Redo the test using a one-sided confidence interval.