

## Problem Sets For Sample Size Estimation

1. Problem: The research question is whether elderly wading in flooded waters have a greater incidence of dermatitis than those who do not wade in flooded waters. A review of previous literature suggests that the 5- year incidence of dermatitis is about 0.20 in elderly wading in flooded waters. A level of significance of 0.05 for a two-sided test and a power of 0.80 is used. How many waders and non-waders will you need to study to determine whether the 5- year dermatitis incidence is at least 0.30 in non-waders?
  - a) What is the null hypothesis for this study?
  - b) What is the alternative hypothesis for this study?
  - c) What is the P2 (incidence in non-waders)?
  - d) What is the P1 (incidence in waders)?
  - e) How many samples do you need for each group?
  
- 2) Problem: The research question is whether blood ascorbic acid levels are correlated with bone density in tea drinkers. A previous study found a modest correlation ( $r = -0.30$ ) between reported tea drinkers taking vitamin C and bone density; the investigator anticipates that the blood ascorbic acid levels will be at least as well correlated. How many tea drinkers will need to be enrolled at an alpha (2-sided) = 0.05 and beta = 0.10?
  - A) What is the null hypothesis?
  - B) What is the alternative hypothesis?
  - C) What is the sample size?
  
- 3) Problem: The investigator wishes to determine the sensitivity of a new diagnostic test for COVID-19. Based on a pilot study, he expects that 80% of patients with COVID-19 will have positive tests. How many patients will be required to estimate a 95% confidence interval for the test's sensitivity of  $0.80 \pm 0.05$ ?
  
- 4) Problem: The researcher wants to determine the mean IQ of BS Biology students sophies who lives in an urban area with a 99% confidence interval of  $\pm 3$  points. A previous study found that the standard deviation of IQ in a similar city was 15 points.
  - a) What is the standard deviation?
  - b) What is the standardized width of interval?
  - C) What is the sample size?