Self Evaluation Problems
Class 2

Suppose we are interested in estimating the mean dollars charged for coronary artery bypass graft (CABG) surgery at a major medical center. From the literature, the standard deviation of expenditures among patients within a hospital is thought to be approximately $3,000.

1) Suppose we want to compare the cost of a CABG procedure between Johns Hopkins and the Mayo Clinic. Assume s= $3,000 for both hospitals. If we desire equal sample sizes at each hospital, how large a sample of patients for each institution is needed in order to have 80% power to reject the null $H_0 : \mu_H = \mu_{MC}$? Assume a two-sided test with a significance level of 0.05 when the true difference is $1,000.

In designing a clinical investigation to evaluate a new digital mammography (DM) system, we must screen about 1,000 women to find 10 cancers. Suppose that we want to estimate the sensitivity of the new DM method to within ±5%. We expect the sensitivity to be around 0.75.

2) How many women will we have to screen?

3) If the guess that sensitivity is 0.75 proves mistaken and sensitivity is really 0.90, how many women should we have to screen?

4) What does the difference in results in Problems 2 and 3 tell you about planning screening studies to estimate sensitivity?

5) Suppose we want to compare the sensitivity of a new DM system to the standard analog mammography system. If the sensitivity of the analogue system is 0.65, what sample size would be needed in each group in order to detect a 10% improvement in sensitivity with the new DM system? Assume a two-sided test with a 5% significance level and 80% power?

How large is the sample size if 90% power is desired?

