**IHP 525 Module Four Problem Set**

1. **Pediatric asthma survey, *n* = 50.** Suppose that asthma affects 1 in 20 children in a population. You take an SRS of 50 children from this population. Can the normal approximation to the binomial be applied under these conditions? If not, what probability model can be used to describe the sampling variability of the number of asthmatics?

1. **Fill in the blanks.** A particular random sample of n observations can be used to calculate a sample proportion. The count of successes in the sample will vary according to a (a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ probability distribution with parameters n and (b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When the sample is large, the number of success will vary according to a normal distribution with μ = (c) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and σ = (d) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. At the same time, the sampling distribution of proportion in large samples will be Normally distributed with mean p with standard deviation equal to (e) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. **Misconceived hypotheses.** What is wrong with each of the following hypothesis statements?
3. H0: μ = 100 vs. Ha: μ ≠ 110
4. H0: = 100 vs. Ha: < 100
5. H0: = 0.50 vs. Ha: ≠ 0.50
6. **Patient satisfaction.** Scores derived from a patient satisfaction survey are Normally distributed with μ = 50 and σ = 7.5, with high scores indicating high satisfaction. An SRS of *n* = 36 is taken from this population.
7. What is the SE of *x̅* for these data?
8. We seek evidence against the hypothesis that a particular group of patients comes from a population in which μ = 50. Sketch the curve that describes the sampling distribution of *x̅* under the null hypothesis. Mark the horizontal axis with values that are ±1, ±2, and ±3 standard errors above and below the mean.
9. Suppose a sample of *n* = 36 finds an *x̅* of 48.8. Mark this finding on the horizontal axis of your sketch. Then calculate the zstat for the result. Does this observation provide strong evidence against H0?
10. **Patient satisfaction (sample mean of 48.8).** In Exercise 4, you tested H0: μ = 50 based on a sample of *n* = 36 showing sample mean = 48.8. The population had standard deviation σ = 7.5.
11. What is the one-sided alternative hypothesis for this test?
12. Calculate the z-statistic for the test.
13. Convert the zstat to a P-value, and interpret the results.