

Stat 10, Section 1A
Thursday, May 6th, 2010

1 Reminder: extra component for all future labs

At the top of your lab write-up, summarize the lab by completing (1)-(5) below. Provide a single sentence answer for each part, and the total answer for all parts should be no more than 150 words.

1. Summarize the question being answered or the problem being solved in the lab.
2. Briefly describe the data and study type.
3. Briefly describe the analysis techniques that you applied (in plain language).
4. Provide a conclusion in plain language.
5. Describe a real world decision that might be influenced by your conclusion.

Recommendation: Have a friend who is not in statistics read your answer, which should be in plain language.

2 Quiz problems

- (3) A study published in 1996 conducted a randomized, double-blind, placebo-controlled examination of the effectiveness of using zinc lozenges to treat the common cold. The researchers reported that the subjects who took zinc lozenges had their symptoms relieved significantly sooner than those in the placebo group, and report a p-value of 0.001. The best interpretation of this p-value is
 - (a) There is a 0.1% chance that zinc lozenges are ineffective.
 - (b) If the zinc lozenges are ineffective, differences as extreme as those observed occur by chance only 0.1% of the time.
 - (c) There is a 99.9% chance that zinc lozenges are effective.
- (4) In a survey of 1,000 television viewers, 40% said they watch network news programs. For a 90% confidence level, the margin of error for this estimate is 2.5%. If we want to be 95% confident, how will the margin of error change?
 - (a) Since more confidence requires a wider interval, the margin of error will be smaller.
 - (b) Since more confidence requires a more narrow interval, the margin of error will be smaller.
 - (c) Since more confidence requires a wider interval, the margin of error will be larger.
 - (d) Since more confidence requires a more narrow interval, the margin of error will be larger.
 - (e) There is not enough information to determine the effect on the margin of error.
- (5) Two random samples of 50 undergraduates each from two universities are taken to determine the proportion of students who approve of the food services at their respective schools. One university had an enrollment of 5,000 and the other has 35,000 undergrads. Which is the most accurate statement?

- (a) The variability of the sample from the larger university will be greater than the variability of the sample from the smaller school.
- (b) The proportion of students who approve of the food services will be the same since the sample sizes are the same.
- (c) The enrollment figures from the two universities are not relevant to whether the sample statistics obtained are unbiased estimates of the parameters of the two populations.
- (d) If a university that enrolled 100,000 undergrads conducted a random sample, the results would be less accurate than either of the samples discussed in this problem.

3 Problems comparable to those in the homework

Homework problem (comparable problem):

p.479 #5 (6), 7 (8), 9, 13 (14)

p.503 #3 (4), 8 (7), 17 (18), 22, 35 (36), 41 (42)

p.527 #15 (16), 29 (28), 30 (31), 33 (35)

4 Practice problems

p480, #14. In early 2007 the Mortgage Lenders Association reported that homeowners, hit hard by rising interest rates on adjustable mortgages, were defaulting in record numbers. The foreclosure rate of 1.6% meant that millions of families were in jeopardy of losing their homes. Suppose a large bank holds 1731 adjustable-rate mortgages.

- (a) Can you apply the Central Limit Theorem to describe the sampling distribution model for the sample proportion of foreclosures?
- (b) Sketch and clearly label the sampling model, based on the 68-95-99.7 Rule.
- (c) How many of these homeowners might the bank expect will default on their mortgages?
- (d) Would you consider it unusual if 3% of the 1731 mortgages for this bank were in foreclosure?

p507, #36. In preparing a report on the economy, we need to estimate the percentage of businesses that plan to hire additional employees in the next 60 days.

- (a) How many randomly selected employers must we contact in order to create an estimate in which we are 98% confident with a margin of error of 5%?
- (b) Suppose we want to reduce the margin of error to 3%. What sample size would suffice?

p530, #35. Like a lot of other Americans, John Wayne died of cancer. But is there more to the story? In 1955 Wayne was in Utah shooting the film *The Conqueror*. Across the state line, in Nevada, the United States military was testing atomic bombs. Radioactive fallout from those tests drifted across the filming location. A total of 46 of the 220 people working on the film eventually died of cancer. Cancer experts estimate that one would expect about 30 cancer deaths in a group this size.

- (a) Is the death rate observed in the movie crew unusually high?
- (b) Does this prove that exposure to radiation increased the risk of cancer in the folks on the movie set? Justify your answer.