

Section 2A Discussion

Nov 12th, 2009

p528, #15

The National Center for Education Statistics monitors several aspects of elementary and secondary education nationwide. Their 1996 numbers are often used as a baseline to assess changes. In 1996, 34% of students had not been absent from school even once during the previous month. In the 2000 survey, responses from 8302 students showed that this figure had slipped to 33%. Officials would, of course, be concerned if student attendance were declining. Do these figures give evidence of a change in student attendance?

- (a) Write an appropriate hypothesis.
- (b) Check the assumptions and conditions.
- (c) Determine the test statistic and find the p-value.
- (d) State your conclusion. Use $\alpha = 0.10$.
- (e) Do you think the change was meaningful? Explain.
- (f) Create and interpret a 90% confidence interval that is appropriate for this problem.
- (g) True or False: There is a 90% probability that the interval contains the true proportion.

p529, #23

A company with a fleet of 150 cars found that 7 out of the 22 they tested failed to meet the pollution control guidelines. Is this strong evidence that more than 20% of the fleet might be out of compliance? Test an appropriate hypothesis. Be sure to check appropriate assumptions and conditions before you proceed.

p552, #1

In each of the following situations, determine the hypotheses.

- (a) A business student conducts a taste test to see whether students prefer Diet Coke or Diet Pepsi.
- (b) PepsiCo recently reformulated Diet Pepsi in an attempt to appeal to teens. They run a taste test to see if the new formula appeals to teenagers more than the standard formula.
- (c) A budget override in a small town requires a two-thirds majority to pass. A local newspaper conducts a poll to see if there is evidence it will pass.
- (d) One financial theory states that the stock market will go up or down with equal probability. A student collects data over several years to test this theory.

p553, #9

In August 2004, *Time* magazine reported the results of a random telephone poll commissioned by the Spike network. Of the 1302 men who responded, only 39 said that their most important measure of success was their work.

- (a) Estimate the percentage of all American males who measure success primarily by their work. Use a 98% confidence interval. Don't forget to check the conditions first.
- (b) Suppose we want to conduct a hypothesis test to test whether this data shows the fraction of men who measure success by their work is below the 5% mark. What does your confidence interval indicate? Explain.

p574, #9

Researchers at the National Cancer Institute released the results of a study that investigated the effect of weed-killing herbicides on house pets. They examined 827 dogs from homes where an herbicide was used on a regular basis, diagnosing malignant lymphoma in 473 of them. Of the 130 dogs from homes where no herbicides were used, only 19 were found to have lymphoma. The standard error for the difference between the two proportions is given by

$$SE_{\hat{p}_1 - \hat{p}_2} = \sqrt{\frac{0.572 * 0.428}{827} + \frac{0.146 * 0.854}{130}} = 0.036$$

where $\hat{p}_1 = 0.572$ represents the proportion of dogs with malignant lymphoma from the herbicide group and $\hat{p}_2 = 0.146$ represents the sample proportion with malignant lymphoma from the second group.

- (a) Construct a 95% confidence interval for the difference.
- (b) State an appropriate conclusion.
- (c) Suppose you increased the confidence level to 99%. Would your interval (i) get wider, (ii) shrink, (iii) stay the same, or (iv) none of the above?
- (d) If you increased the sample size of each group and held the confidence level constant, would your confidence interval (i) get wider, (ii) shrink, (iii) stay the same, or (iv) none of the above?