Comparing Two Samples   Math 111

1. An article in the June 10, 2002, issue of the *Archives of Internal Medicine* reported on a study of the effectiveness of a nicotine lozenge for helping smokers quit smoking. Smokers who participated in the study were randomly assigned to receive either the nicotine lozenge or a placebo (no active ingredient) lozenge. The subjects were then monitored over the course of a year for whether they successfully abstained from smoking for that year.

   Of the 459 subjects assigned to take the nicotine lozenge, 82 successfully abstained from smoking for the year, compared to 44 successful abstainers among the 458 subjects in the placebo group.

   (a) Identify the explanatory and response variables.

   (b) Is this an experiment or an observational study?

   (c) What percent of people using the nicotene lozenge quit smoking? What percent using the placebo quit smoking. How many times more likely were the nicotene lozenge group to quit than the placebo group?

   (d) The formula for a 2-sample confidence interval is says that there is a 95% percent chance that the true difference in percentages between the two groups is

   $$0.0826 \pm 0.0451$$

   Is it plausible that the difference is just a random fluke? Why not?

2. The herbal supplement Garcinia Cambogia is advocated by Dr. Mehmet Oz (a celebrity doctor) as an effective weight loss aid. A 1998 study of 135 people found that it was no more effective than a placebo. Here is a summary of the results from that study.

> A total of 135 subjects were randomized to either active hydroxycitric acid [The active ingredient in G. Cambogia] ($n = 66$) or placebo ($n = 69$); 42 (64%) in the active hydroxycitric acid group and 42 (61%) in the placebo group completed 12 weeks of treatment. Patients in both groups lost a significant amount of weight during the 12-week treatment period; however, between-group weight loss differences were not statistically significant.

Group	n	$\bar{x}$	s
Treatment	42	4.1	3.9
Control	42	3.2	3.3

The $\bar{x}$ column gives the mean weight lost over 12 weeks of treatment (in pounds), and the s column gives the standard deviations for each group.

(a) Use the 95% confidence interval formula

$$(\bar{x}_1 - \bar{x}_2) \pm 2\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

to estimate how much more weight the people taking Garcinia Cambogia lost than the people taking the placebo.

(b) Using the confidence interval in part (a), explain why the results are not statistically significant.