

You may work with one partner on this assignment, submitting one report with both names, provided that both students contribute substantially to the work. Word-processed reports are preferred to hand-written ones. Integrate computer output into your report as appropriate.

Nicotine Lozenge?

Helping smokers to quit continues to be a very important and challenging public health goal. In a recent study of the effectiveness of a nicotine lozenge, smokers who wanted to quit were recruited to participate through advertisements near four sites in the United Kingdom and 11 sites in the United States. Those smokers who met the screening qualifications were randomly assigned to one of two groups: one group received nicotine lozenges and the other group received placebo lozenges. The subjects were compared on various background variables at the beginning of the study, and at the end of the study they were compared on whether or not they successfully abstained from smoking.

Of the 459 subjects in the nicotine group, 42.9% were male. Of the 458 subjects in the placebo group, 40.2% were male. Conducting a two-sided, two-sample z -test to compare these proportions gives a test statistic of $z = 0.84$ and a p -value of .399.

a) What test decision would you make at the .05 significance level? Explain why the researchers would be pleased that the data resulted in this test decision.

At the end of the 52-week study, 17.9% of the nicotine group had successfully abstained from smoking, compared to 9.6% of the placebo group.

b) Calculate and interpret the odds ratio from these data.

c) Use the normal approximation to test whether these data provide strong evidence that the nicotine lozenge is more effective than the placebo lozenge, using the .01 significance level. Report the hypotheses, test statistic and p -value. Also verify that the technical conditions are satisfied, and summarize your conclusion from this test.

d) Based on this study and your test result, is it legitimate to draw a cause-and-effect conclusion between the nicotine lozenge and the increased rate of abstaining from smoking? Explain.

e) Explain what a Type II error would mean in the context of this study.

f) Produce a 95% confidence interval for the odds ratio of successfully abstaining from smoking between the two groups. Also interpret this interval.

g) Now consider only the subjects that received nicotine lozenges. Produce a 95% confidence interval to estimate the population proportion who would successfully abstain from smoking for 52 weeks when using the nicotine lozenge. Would you conclude that the nicotine lozenge is very successful for smokers who want to quit?