

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. Please copy/paste relevant computer output into your report as appropriate.

Botox for back pain?

A study published in the journal *Neurology* (2001) examined whether the drug botulinum toxin A (botox) is helpful for reducing pain among patients who suffer from chronic low back pain. The thirty-one subjects who participated in the study were randomly assigned to one of two treatment groups: 16 received a placebo of normal saline and the other 15 received botox. The subjects' pain levels were evaluated at the beginning of the study and again after eight weeks. The researchers found that 2 of the 16 subjects that received the saline experienced a substantial reduction in pain, compared to 9 of the 15 subjects who received botox.

- a) Organize the data into a 2×2 table, with the response variable in rows.
- b) Explain the importance of using the “placebo treatment” of saline in this study.
- c) Is this an observational study or a randomized experiment? Explain how you can tell.
- d) Describe the null model for this study.
- e) Determine the p-value for Fisher's exact test applied to these data. Feel free to use Minitab, but be sure to indicate which probability distribution you use, what its parameter values are, and what region you find the probability of.
- f) Interpret what this p-value means (i.e., it's the probability of what?).
- g) Is the observed difference between the groups statistically significant at the $\alpha = .05$ level? Explain how you know.
- h) Summarize your conclusion. Be sure to address whether it's valid to draw a cause-and-effect conclusion between botox and reduction in back pain.