

Advanced Statistics: Theory and Methods

Probability and Statistics Baseline Assessment

Name _____ ID Number _____

1. With increased communication using the Internet, there has been an explosion of chat rooms. Here individuals can exchange opinions on various topics of interest. A side effect of such conversation is "flaming", i.e. negative criticism of others' contributions to the conversation.

M. Dsilva and colleagues studied this phenomenon ("Criticism on the Internet: An analysis of Participant Reactions", *Communication Research Reports*, 1998). The investigators were interested in the effect that personal criticism has on an individual. Would being criticized make one more likely to criticize others? The data are provided in the table below:

	Has Been Personally Criticized (O)	Has Not Been Personally Criticized	Total
Has Criticized others (C)	19	8	27
Has Not Criticized others	23	143	166
Total	42	151	193

Would being criticized make one more likely to criticize others?

2. A manufacturer claims that its drug test will detect steroid use (that is, show positive for an athlete who uses steroids) 95% of the time. The company also releases information that 15% of all steroid-free individuals also test positive (the false positive rate). Based on anonymous surveys of amateur wrestlers, it is estimated that 10% use steroids. At a recent event, one of the wrestlers has tested positive. What is the probability that he uses steroids?

3. The Public Health Department in Punjab is interested in understanding the effect of zinc supplements during pregnancy on birth weights.

(a) How would you design this study? Define the target population, sampling scheme, and data collection plan.

(b) Define the parameter(s) of interest.

(c) What are some confounding variables that may affect your results?

4. Here are results on a new experimental nasal spray vaccine: In a trial involving 1602 children, 1070 received the vaccine and 532 received a placebo. In the vaccine group, 14 children developed the flu compared to 95 in the placebo group.

- (a) State the null and alternative hypothesis. (Define the parameters of interest)
- (b) What are the consequences of making a Type I and Type II errors?
- (c) Is there sufficient evidence to suggest that the vaccine is effective in reducing the chances of getting the flu?