

Breast Cancer Research

Please refer to Exercise 7.6.25 to begin this project.

As a researcher, you have invented a new test for breast cancer. In order to help with the research, 10,000 volunteers have taken the test. 1103 tested positive with your test. They also took the old test at the same time. 523 of them tested positive with this test, 13 of whom also tested positive with your test. Since you cannot say how accurate your test is, further study is only conducted on these 523 participants. 81 of them are found to have breast cancer, only 2 of whom tested positive with your test.

- What would you need to compute in order to show that the tests are independent? Compute it. Given experimental error, would you say that the tests are independent or not?
- Supposing the tests are independent, compute the sensitivity and specificity of your test.
- Based on your results, would you recommend that the other participants who tested positive with your test undergo further testing?
- Which test do you think is better? Why? Are there some cases where the other test is better?
- What would you recommend for further study?

Write up your response **in complete sentences** as if presenting this research to someone unfamiliar with these tests. Do not refer to your textbook, but assume probability concepts such as conditional probability and Bayes' Theorem are known to your audience. Be sure to explain how any numbers are computed and include any figures that might be useful. Projects should be typed. Figures and math formulas may be written in by hand. This is due on Friday, April 29, 2005 **in class**.