



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Adlae H. D'Orazio	Project Number J1403
Project Title False Positive and False Negative Paradox	
Abstract Objectives/Goals Testing for diseases sometimes gives false positive or false negative results. Even for tests that are 99% accurate, it was hypothesized that, in the testing of a population, there would be more false positives than true positives and more false negatives than true negatives for rare diseases. The objectives of this project were to see if the hypothesis was correct and to determine the conditions causing false test results to be greater than true test results. Methods/Materials Calculations were done using a population of 100,000 with various disease rates and test accuracies. An Excel spreadsheet was programmed to cover a wide range of possibilities. Experiments were run to simulate the calculations and to check if the calculations worked for a population as low as 200. The experiments involved rolling dice, sometimes 2 and sometimes 3, to match disease rates and test accuracies. Results were tallied and analyzed. Results Calculations showed that there is a greater likelihood of getting more false positives than true positives if the disease is rare and more false negatives than true negatives if the disease is common. The experiments verified the calculations and showed that even a population as low as 200 had a similar result. Conclusions/Discussion The detailed hypothesis, which guessed that greater false tests would occur for rare diseases, was found correct for false positives but incorrect for false negatives (because more false negatives occurred for common diseases). The work from this project adds to the knowledge of doctors and health officials who are concerned about scaring people with false positive results or failing to correctly notify people with false negatives.	
Summary Statement The conditions causing the paradox of more false positive than true positive disease test results and more false negative than true negative disease test results were investigated.	
Help Received My dad checked my math and helped me write the abstract in the proper format.	