



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Sphygmomanometers: Are the Home Units as Accurate as the Gold Standard of a BP Reading from a Mercury Sphygmomanometer?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project was to determine the accuracy of home blood pressure monitors when compared against the 'Gold Standard' of a blood pressure reading from a Mercury Sphygmomanometer taken by a physician. In addition, I wanted to determine which of the units was most and least accurate.</p> <p>Methods/Materials Informed consent was obtained from 30 randomly selected adults. Each test subject was put through the same testing environment and positioning, three minutes rest between tests, and would be redone if any reading was +/-20 from the Mercury Sphygmomanometer reading. The blood pressure readings taken (in order) was the Mercury Sphygmomanometer reading done on the right arm at the same time the left arm test was done by the Automatic Oscillometric unit and then reversed. The test subject was then tested with the Manual Aneroid, Wrist, and Finger units. All readings were compared against the 'Gold Standard' blood pressure readings and evaluated.</p> <p>Results The average percent error of the Automatic, oscillometric device was 4.55% systolic and 2.64% diastolic (right arm, same time), in the left arm/same time was 3.36% systolic and 5.13% diastolic, and same arm/different times was 4.27% systolic and 2.97% diastolic. The Manual Aneroid unit had an average percent error of .540% systolic and 1.19% diastolic. The average percent error for the Wrist Oscillometric unit was 1.45% systolic and 7.64% diastolic while the Finger Oscillometric unit was 11.2% systolic and 7.53% diastolic. Reviewing all readings, the number of readings that were +/-2 from the 'Gold Standard' for both systolic and diastolic were 2 for right arm/same time; 0 for left arm/same time; 3 for right arm/different time; 3 for Manual Aneroid; 2 for Wrist; and 0 for the Finger unit.</p> <p>Conclusions/Discussion The Manual Aneroid unit was the most accurate. The Finger Oscillometric unit was most inaccurate. All units had very few readings within +/-2 on both systolic and diastolic from the 'Gold Standard'. These data suggest that manual units must be calibrated and blood pressure readings must be supported by Mercury Sphygmomanometer readings.</p>	
Summary Statement My project is to determine if home blood pressure units are accurate and which of the tested units are the most accurate when compared against the BP reading from a Mercury Sphygmomanometer.	
Help Received Physician took the blood pressure readings with the Mercury Sphygmomanometer to become the 'Gold Standard' for my project.	