Evaluation of Breath Testing Instruments

This study will evaluate the performance of the NPAS DataMaster DMT®, the CMI Intoxilyzer® 8000, and the Drager Alcotest® 7110 MKIII-C instruments at various alcohol concentrations, with emphasis on 0.08g/210L and 0.16g/210L. In addition, the responses to mouth alcohol and potentially interfering compounds will be tested.

The Vermont Department of Health Laboratory of the Agency of Human Services oversees blood and breath alcohol testing activities in Vermont. Currently the National Patent Analytical Systems, Inc. BAC DataMaster® is the only breath alcohol analyzer approved by the VDHL.

Criteria that will be used in the evaluation of the instruments include accuracy, precision, linearity, response to mouth alcohol, and response to various potentially interfering agents. Emphasis will be placed on alcohol concentrations of 0.08g/210L and 0.16g/210L. Other issues that will be taken into consideration are ease of use, durability, and overall performance during experimental data collection .

Method:

- Precision:
  - Ethanol solutions of 0.08g/210L and 0.16g/210L will be analyzed (n=10), using the supervisor mode.
- Accuracy
  - Solutions at levels of 0.02, 0.04, 0.08, 0.16 and 0.40 g/210L will be analyzed (n=10) as calibration checks
  - All solutions will be verified by gas chromatography with flame ionization detection.
- Linearity
  - The five aqueous ethanol solutions are prepared over a concentration range that will provide vapor concentrations from 0.02 through 0.4g/210L. The ensuing results should form a straight line with all observed values within +/- 5% of the known value and with a Correlation Coefficient of at least 0.99
- Interference
  - The mouth alcohol detection system will be tested (n=10) Each test will be taken at 3-5min intervals until such time as no mouth alcohol is detected
  - 0.04% Methanol in water
  - 0.04% Isopropanol in water
  - 0.05% Acetone in water
  - 0.02% Acetone in 0.08% Ethanol
  - 0.05% Acetone in 0.08% Ethanol
  - 0.1% Acetone in 0.08% Ethanol
  - 0.04% Methanol in 0.08% Ethanol
  - 0.04% Isopropanol in 0.08% Ethanol