Georgia's Breath Test Program, Why It Does Not Assure Scientific Reliability

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Forensic Alcohol Consulting and Training, LLC Georgia's Breath Test Program, Why It Does Not Assure Scientific Reliability

Georgia uses the Intoxilyzer® 5000 EN model. This breath test instrument, manufactured by CMI INC, located in Owensboro, KY uses infrared (IR) spectroscopy and has been around for many years. You can find this instrument being used by many different jurisdictions throughout the United States, as well as different parts of the world. The basic scientific principle on how the Intoxilyzer® 5000 operates is a proven science and has stood the test of time.

Georgia's Bureau of Investigations, Implied Consent Program is the agency that has oversight and rulemaking authority for forensic breath testing of DUI suspects. Georgia uses the Intoxilyzer® 5000 as a soul source instrument for this forensic analysis of breath in suspected drunk drivers. The State of Georgia requires quarterly inspections of these instruments. However, these required inspections fall short of meeting scientific standards of reliability.

The quarterly inspection consists of various steps that are outlined in the Georgia's Bureau of Investigations Implied Consent Operations Manual, Instrument Inspection Protocol (1/2/07). This document explains the steps the Implied Consent Area Supervisor is to use when inspecting the Intoxilyzer® 5000. The inspection schedule requires the instruments used for evidential breath alcohol testing be inspected "once each calendar quarter". This means it could be up to five months and 30 days between inspections. For example, an instrument could be inspected on July 1 and would not be required to be inspected again until December 31 of that same year. What happens on December 31 if the inspection fails to meet the Georgia Bureau of Investigation standards? The instrument would be removed from service, but there would be six months worth of breath tests done on that particular instrument with no calibration checks having been conducted during that time frame.

The Implied Consent Area Supervisor is required to reprint the last breath test print card done on the instrument. This step in the quarterly inspection procedure is designed to "Determine if the operator conducted the test as trained and correctly logged the results". However, there could be hundreds of breath tests done between quarterly inspections, but the only breath test audited was the single breath test done right before the quarterly inspection. If there are 100 breath tests done between quarterly inspections, this would equate to a 1% quality control check of breath testing. Furthermore, if there were 200 breath tests done between quarterly inspections the quality control check of breath test operators drops to .5%. It is impossible to verify whether an operator followed proper procedures simply by looking at the print card. The only check that can be done is to determine if the documentation was completed correctly, not whether the breath test was performed properly.

The Intoxilyzer® 5000EN model was designed with five filters, three of which are designed to detect interfering substances. The three filters are designed to detect acetone, toluene and acetaldehyde. However, the toluene and acetaldehyde filters are not validated as part of Georgia's quarterly inspections. The acetone filter is the only filter required to be checked by the Area Supervisor according to Georgia's Instrument Inspection Protocol. The purpose for this required check is to ensure the instrument will properly identify an interfering substance during a subject breath test. It is done by "....adding 0.25ml to 0.5ml of acetone to approximately 500ml of an ethyl alcohol solution" in a wet bath simulator. This requirement is not specific on the amount of acetone or ethyl alcohol solution to be used. If 0.25ml of acetone is used that would be half the amount that might be used on another inspection where an Area Supervisor

may have used 0.5ml of acetone. Without required specific, scientific measurements of the acetone and ethyl alcohol solution, the concentration used is unknown. The instrument's interferent detection threshold is being tested by an unknown solution concentration value.

The breath test sample is taken from a suspect based on time, pressure and slope. There is a pressure switch in the Intoxilyzer® 5000 that activates a "tone" when a suspect blows hard enough to trigger the pressure switch. If the suspect continues to blow and keeps the switch closed the tone will continue to sound. The Instrument Inspection Protocol does not require the Area Supervisor to check this pressure switch during the quarterly inspections. However, the pressure switch is vital in determining if the suspect is blowing hard enough and helps ensure the breath sample is reliable. If the switch is set too low, it will trigger and activate the tone when it should not. If the switch is set too high, it may be too difficult for a person to give a proper sample. When this occurs, they may be physically unable to provide a sample and their inability to do so may be interpreted as a refusal to complete the breath test.

A calibration check is also done as part of the quarterly inspection. According to the Instrument Inspection Protocol, this check is performed with a wet bath simulator containing "0.08 grams of ethanol per 210L at 34 degrees C". The Implied Consent Manager has the discretion to allow the Area Supervisor to use a dry gas standard for this test. The instrument will conduct two analyses of the 0.08g/210L standard. This is the only check of the instrument's calibration done for the entire quarter. This is known as a single point calibration check. This check would be good for a control test done with every single breath test (as many states do), but falls short of ensuring scientific reliability of all breath tests done during the quarter between inspections.

To ensure scientific reliability, calibration validations should be much more extensive. The calibration checks should be done at different points along the range of detection for the specific instrument model. A check at both the low and high ends of the instrument's range of detection along with a check somewhere in the middle would be appropriate to check the calibration along its entire range of detection, i.e. a check at 0.04g/210L, a check at 0.15g/210L and a third check at 0.30g/210L. Completing five analyses at each of these levels and a calculation of the standard deviation of all the testing would ensure the instrument measures properly. This would more than likely allow 95% of all breath tests done in Georgia to fit within the instrument's calibration validation.

Both accuracy and precision checks are vital to ensure scientific reliability in breath testing. Georgia's Instrument Inspection Protocol lacks procedures for ensuring instrument precision. Precision can be measured by at least three analyses and a calculation of the standard deviation based on the three analyses. Although three analyses can calculate a standard deviation, it is well-advised to use more analyses. Some states use as many as ten analyses to calculate a standard deviation and measure precision. This is known as repeatability. Does the instrument give consistent results over multiple analyses?

The American Society of Crime Lab Directors (ASCLD) has even established standards stating that calibrations should use "traceable reference standards and reference materials, which confirm the accuracy and precision of the breath alcohol measuring instruments across a range of ethanol values..." (ASCLD/LAB International's Forensic Science Breath Alcohol Calibration Program, Breath Alcohol Calibrations Guidance Document, December 12, 2009)

Control testing with every breath test also helps ensure scientific reliability. Georgia does not perform a control test with every breath test, as is done in most other states. The control test is recommended by National Safety Council, Committee on Alcohol and Other Drugs, Report of the Subcommittee on Alcohol: Technology, Pharmacology and Toxicology, February 18, 2008. This control test recommendation is "an assessment of within-run accuracy and /or verification of calibration". The Intoxilyzer® 5000 is physically capable of doing control testing during the breath test sequence and can be done with either a wet bath simulator control test or a dry gas standard control test. If implemented by Georgia, a control test would check the instrument's accuracy and calibration at the time of the breath test. A calibration check done months prior to or months after a subject test does not meet the basic safeguards of ensuring scientific reliability. Even though Georgia does two diagnostic checks with every breath test, these diagnostic checks do not check instrument calibration with a National Institute of Science and Technology (NIST) traceable standard.

The breath test instrument used in Georgia is a fine instrument, but the way it is used falls short of scientific reliability. If the State of Georgia wants scientific reliability (and it should demand it) then further accuracy and precision checks should to be required in the quarterly inspection procedures. Additionally, control testing with every breath test performed must be implemented to ensure the reliability of the results.

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