INDIANA UNIVERSITY

BORKENSTEIN COURSE

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# Authors' Response

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CSFS J. 40(3): 2007

# AUTHORS' RESPONSE

We thank the correspondents for their Letter to the Editor and for raising several points that we did not consider in our original paper (1).

The metropolitan city of Toronto has a population of over 2.5 million people and covers 629.91 square kilometres that are under the jurisdiction of the Toronto Police Services. In our paper on "INVALID SAMPLE" screen messages, 14 Intoxilyzer® 5000Cs were in use during the 5-year study.

A main instrument is set up at one of four permanent locations around the city with one backup instrument set up at each location. The six remaining instruments (No. 1, 3, 4, 6, 9, 11 and 12) are designated spare/mobile units to be used as replacements for instruments requiring service, or are used as mobile units for testing in hospitals, at RIDE locations, or for providing demonstrations. The number of subjects tested on each of the 14 instruments ranged from 76 (No. 1) to 3923 (No. 10) while the number of IS messages ranged from 1 (No. 1) to 56 (No. 10). The percentage of "INVALID SAMPLE" (IS) messages as a function of the number of drivers tested ranged from 0.72% to 2.31% (mean 1.52%).

Based on the Kolmogorov and Smirnov Test, the frequency distribution of the data cannot be differentiated from a normal distribution ($p > 0.05$). Therefore, all of the instruments equally produce spurious IS messages or the source of the IS message is external to the instrument. We would suggest that the latter explanation is the more reasonable one.

The data in our paper presented only those instances where two successful breath samples were obtained. However, during the 5-year study period, there were 36 cases of IS messages where no completed breath tests were obtained (n=24) or where only one successful breath test was obtained (n=12). Since an IS screen message may be caused by either residual mouth alcohol, or a variation in the breath exhalation pattern of the subject, the nature of a driver's cooperativeness in providing a suitable breath sample may be ascertained from any messages obtained following an IS message. For the 36 cases above, the overall refusal rate (n=3) for the accused not providing a breath sample was only 8.3%, while in 6 cases (16.7%), the breath technicians did not attempt to conduct another breath test following an IS message. There are many reasons why a breath technician might choose to abort a breath test, however, no conclusion can be drawn from these aborted tests (n=8; 22.2%) without detailed case information that cannot be obtained from downloaded electronic records. The incidence of deficient sample messages (n=19) was the highest (52.8%) of any message obtained following an IS message and indicates that the subject did not supply the minimum adequate breath sample within 5 minutes of first request.

The breath tests for all cases involving IS messages were conducted by 55 qualified breath technicians and the number of IS messages per operator ranged from 1 to 14 (mean 4). The percentage of IS messages ranged from 0.16% to 50% (mean 3.59%) as a function of the number of subjects tested by each breath technician. The four operators (No. 3, 23, 39, 54) with the highest percentage of IS messages (7.7%, 50%, 25%, 10%) each had one IS message out of 13, 2, 4 and 10 drivers tested, respectively. From our data, significant increases in IS messages, beyond the 95% confidence interval range of 2.5 to 5.7% are only correlated with individuals who had performed less than 14 breath tests at the time these data were collected (n = 5). Of the four breath technicians with the highest percentage of IS messages, three (No. 3, 39, 54) are still active as breath technicians while the fourth (No. 23) no longer works for the Toronto Police Services and did not conduct any further tests. Looking at the subsequent test records of the three, still active operators to

December 31, 2006, they were found to have conducted 130, 60 and 189 subject tests with 2 (1.5%), 7 (3.7%), and 1 (1.7%) IS messages, respectively. The percent of IS messages for these three operators as a function of the subject they have tested are subsequently no longer outliers and are within the range of the other operators observed during our study period.

Gullberg (2) reported that most of the IS messages in their study of 226 drivers could be due to electronic noise, abnormal exhalation patterns, or insensitive flow thermistors on the BAC DataMaster. As to the possibility that IS messages could have been generated from insensitive flow thermistors in the Intoxilyzer® 5000C used, we do not believe so due to differences in the design of the two instruments. On the Intoxilyzer® 5000C, there is a thermistor on the processor board, not on the heater block. Therefore, a faulty thermistor would be evident by positive or negative DVM drift and a corresponding "PROCESSOR ERROR 3" or "PROCESSOR ERROR 4"message, respectively. The Intoxilyzer® 5000C monitors the stability of the DVM during the Diagnostic phase, and during the "System Checks" just before it does an analysis and if the DVM is unsteady, you would get an "Unstable Reference" error message and the instrument would be disabled.

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1. Palmentier, J-P.F.P., Wigmore, J.G., Langille, R.M., and Patrick, J., Can. Soc. Forensic Sci. J., 2006; 39 (3): 101–113.

2. Gullberg, R., IACT News Letter, 2006; 17(2): 5–8.