



DEFENSE HEALTH AGENCY
115 PURPLE HEART DRIVE
DOVER AIR FORCE BASE, DELAWARE 19902

Armed Forces Medical
Examiner System

AFMES-DFT

June 5, 2023

MEMORANDUM FOR RECORD

SUBJECT: Explanation of Measurement Uncertainty

Measurement uncertainty (MU) is an estimate of the potential variability within a measurement based on the information known about the quality of the reference materials and historical method performance. The following are important characteristics to consider regarding MU:

- Calculated using advanced statistical equations.
- Includes all possible sources of fluctuation due to quality control trends, measurement bias, certified reference materials, and laboratory equipment.
- Provides limitations of the measurement by representing the largest variance associated with a final result.
- This estimate *does not imply doubt in the validity of a measurement*, but rather an increased statistical confidence of the measured result.

How is measurement uncertainty considered in the context of DFT reports? Because of the established legal limits for blood alcohol concentrations (BAC), all blood ethanol measurements are now reported with a corresponding measurement uncertainty of 15% along with a 95.45% coverage probability. Consider the following result:

Blood Ethanol: 0.080 ± 0.012 g%

- This means we are 95.45% confident that a reported BAC of 0.080 g% is within ± 0.012 g% of its true measurement.
- In other words, there is a 95.45% probability that the true measurement dwells somewhere between 0.068 g% and 0.092 g%.

When interpreting the significance of any analytical result, we always recommend consulting with a forensic toxicologist since case context and other factors may have broader implications for subjects under legal investigation. For any questions regarding MU, please contact the DFT using the information below.

Respectfully,

Division of Forensic Toxicology
Armed Forces Medical Examiner System
Email: dha.dover.AFMES.mbx.fortox@health.mil
Comm: (302) 346-8724 DSN: 366-8724