

## Chemical Terrorism Section Expands at the NPHL

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The Centers for Disease Control and Prevention (CDC) has established a nationwide program to provide 41 state public health laboratories with the analytical technology needed for detection and quantitation of agents that might be used in chemical terrorism. While some of this analytical technology is available in the private sector, many of the chemicals being tested are controlled or select agents and testing must be performed in a specially credentialed laboratory. As part of this program, the Chemical Terrorism Section was developed within the NPHL.

Known as the CDC's "Focus Area D", the chemical terrorism preparedness program hinges on development of public health laboratory capability to rapidly detect the presence of chemical agents in human specimens such as blood, urine using two types of mass spectrometers. An Inductively-Coupled Plasma-Mass Spectrometer (ICP-MS) and a Gas Chromatography-Mass Spectrometer (GC-MS) will be utilized in the program. In both types, the mass spectrometry portion is able to measure distinct charged (ionized) molecules on the basis of their mass-to-charge ratio ( $m/z$ ), with a discriminating capability of less than 1 atomic mass unit (1 amu, equivalent to the mass of a hydrogen atom). The mode of ionization of the molecules for introduction into the mass spectrometer varies for each spectrometer. An analyte molecule in GC-MS is ionized by electron-impact ionization (EI, using an electron source filament), or by chemically-induced ionization (CI, usually by reaction with methane). GC-MS is widely used in forensic toxicology for identification of unknown compounds. The ICP-MS ionizes atoms for elemental analysis (e.g., arsenic, heavy metals) and the GC-MS analyzer is used for compound analysis, such as cyanide.

The gas chromatography portion allow the analyzers to separate the compounds of interest from other components in the original sample matrix before its introduction into the ionizing chamber. Both types of instrumentation allow for the identification and quantitation of a select group of analytes that could be used in a chemical terrorism event. Training and procedures for the analysis of this select group of analytes will be provided by the CDC. A nationwide training program will ensure uniform mass spectrometry capabilities in state public health laboratories throughout the U.S., and will provide networked support services if needed. The ICP-MS and GC-MS instruments are now on site at the NPHL with training and method validation in progress. Once training and validation has taken place the Chemical Terrorism Section of the NPHL will be able to test for 13 elements including arsenic and cyanide. The NPHL anticipates testing protocols for other chemical agents will be made available from the CDC in the future.

Chemical Terrorism Laboratory Preparedness training seminars are currently being offered at the Nebraska Center for Bioterrorism Education's (NCBE) 2004 Symposia. Information regarding the NCBE's Symposia can be found by going to <http://www.nphl.org/training.html>. Questions about the Chemical Terrorism Section can be directed to Dr. Doug Stickle ([dstickle@unmc.edu](mailto:dstickle@unmc.edu) or 402-559-8785).