Emergency tests focus on lab radioactivity analyses

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Working under severe time pressure, government laboratories can analyze radioactive samples fairly quickly -- in a matter of hours -- but with variable accuracy, and sometimes relaxed quality control procedures, according to a published analysis of two federally organized tests of the labs' emergency preparedness.

The exercises, described in a recent paper, were organized by the National Institute of Standards and Technology (NIST) and the Environmental Measurements Laboratory (EML), a Department of Homeland Security Science and Technology laboratory. Six laboratories, including federal, state and one foreign organization, participated in the NIST tests, and 17 in the EML tests.

The tests were conducted to let government officials know how quickly data can be obtained from radioactive samples after an accident or attack, and how accurate the results are likely to be, as well as to identify opportunities for improvement. Decisions concerning the protection of emergency workers and public health, as well as the provision of food, shelter and medical care, may depend on timely, reliable data.

The tests evaluated measurement capability and capacity, effect of time spent counting radioactivity, measurement accuracy and confidence, and operational issues. The NIST and EML tests involved different types of samples and analyses, but the results were consistent: The average measurement across all matrices and measurement types was within about 30 percent of the expected value. (This compares to 2-4 percent in

the regular NIST Radiochemistry Intercomparison Program, which has a 60-day turnaround time.) Some laboratories, in order to respond quickly, had to modify standard operating procedures, reducing quality control over the data. In addition, some labs underestimated the precision of their measurements, while others overestimated it. As experience is acquired in future exercises, improvements are expected in the labs' capabilities.

Considering how to improve response to a radiological emergency, the authors recommended that informational guides on estimating measurement uncertainties be developed, and technical exchange between laboratories be increased; that participation in NIST's traceable radioassay preparedness exercises be increased; that radiochemical alpha and beta assay capabilities be improved; and that guidelines be developed for decision makers to help them better understand the relevance of measurement uncertainty at various stages of an emergency response.

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Source: NIST