



Understanding Past and Current Performances of the Nation's Laboratory Systems

Chemical and Environmental Emergencies

March 23, 2023

Ewa King, PhD
Chief Program Officer

Public Health Emergencies Involving Chemical Agents

Chemical spill or release into the environment and subsequent human exposures

example: release of vinyl chloride and other VOCs following a train derailment in East Palestine, OH (February 2023)

example: PFAS exposures following contamination of water supplies in MN, NH, NY



Public Health Emergencies Involving Chemical Agents

Ingestion of products containing toxic substances that results in adverse health effects

example: e-cigarette use or vaping associated lung injury (EVALI) in the summer and fall of 2019

example: overdose death caused by acetylfentanyl (fentanyl analog) in RI in 2013



Laboratory Testing Needs in a Chemical Emergency

- **Environmental Monitoring**

Laboratories to test environmental samples from the area of release: ambient air, soil, water (especially drinking water sources)

- **Product Testing**

Laboratories to test implicated product: food, pharmaceuticals or other drugs, consumer products

- **Biomonitoring**

Laboratories to test clinical samples (blood, urine, hair) to determine if individuals have been exposed to the chemical and to what extent

Success Story (EVALI)

- Coordinated federal agencies' (CDC and FDA) response to multiple cases of acute lung injury nationwide
- Clear communication to states on what samples needed to be collected, how to transport to laboratories
- LRN-C, FERN and other state laboratories facilitated product collection and storage
- Complex product testing performed at multiple state and federal laboratories
- CDC NCEH laboratories performed clinical (BAL) testing; FDA Forensic Chemistry Center laboratories led product testing
- Likely chemical cause of injury (Vitamin E acetate) identified through laboratory testing (first at Wadsworth Center)

What Works Well

- (CDC) LRN-C laboratories established in PHLs in all states
- Testing methodology for priority agents designed for high-throughput
- “Peacetime” use of LRN-C laboratories for biomonitoring of chronic environmental exposures or characterization of drug overdoses possible
- (FDA) FERN laboratories established in some PHLs for testing of chemical contamination of foods
- Extensive drinking water testing capabilities exist in most PHLs, and many utility laboratories
- Commercial environmental testing laboratories available for chemicals with established test methods (priority pollutants) in water, soil, and hazardous waste
- Some emergency response resources available through EPA WLA

Ongoing Gaps and Concerns

- Laboratories testing for chemical contaminants are regulated by different federal agencies (EPA, FDA, CMS/CLIA) and/or state agencies depending on sample type, location, purpose of the test.
- There is no coordinated and funded emergency response network for governmental Laboratories involved in environmental testing. EPA ERLN and WLA are not funded, underutilized and not activated for environmental emergencies.
- The number of potentially toxic chemicals in multiple sample types makes it difficult to maintain sufficient laboratory capacity for targeted testing.
- There is insufficient capacity for non-targeted analysis that may be needed in the early stages of responses.

Ongoing Gaps and Concerns

- Even a small-scale incident involving radionuclides would overwhelm laboratory capacity in the US (example: May 2019 incident involving a breached blood irradiation source at a Seattle hospital).
- Critical shortage of radiochemistry laboratories and trained laboratory scientists.
- Limited national capacity in detecting radionuclides in environmental samples and almost non-existent in clinical samples (bioassay).
- No LRN-R! There is no network of radiochemistry labs to respond to emergencies.

Thank you!