The Integrated Consortium of Laboratory Networks Newsletter

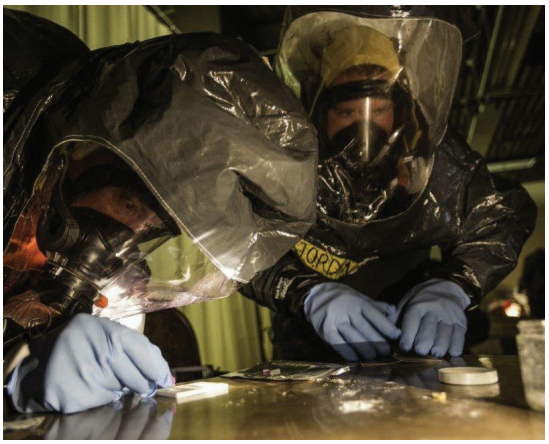
Volume 2, Issue 1, June 2022

The Integrated Consortium of Laboratory Networks (ICLN) is a system of interconnected federal laboratory networks that can quickly respond to high-consequence incidents and give decision-makers timely, credible, and interpretable data.

Upcoming ICLN BioRad Mixed Agent Tabletop Exercise (BioRad TTX)

The ICLN is currently developing a tabletop exercise that focuses on a mixed agent incident containing biological and radiological agents. The exercise is scheduled to take place in June 2022. Specific goals being covered will include:

- Identification of which networks and laboratories can analyze for the agents of concern and their analytical capacities.
- Identification of the matrices that can be analyzed by each network.
- Development and documentation of a protocol for screening and allocation of samples to appropriate laboratories for analysis.
  - Development of an outline of the process of screening potentially mixed-agent samples and allocating samples to laboratories, recognizing that labs that can analyze for a biological agent might not be in a position to analyze samples suspected of containing a radiological agent.
- Identification and resolution of sample transport issues.
- Identification of likely sampling regimes across the full environment impacted by the incident (people, animals, crops, and the environment).



Participating networks and agencies include CDC LRN-B, CDC Rad Lab, CDC One Health, DoD DLN, EPA ERLN, EPA NAREL, EPA Water Laboratory Alliance, FERN FDA, FERN FSIS, NAHLN, Vet-LIRN, DOE, FBI, and the DHS ICLN Program Office.

EPA ANALYTICAL SPOTLIGHT:

Development of a Rapid Viability RT-PCR (RV-RT-PCR) Method to Detect Infectious SARS-CoV-2 from Swabs

According to the U.S. Centers for Disease Control and Prevention (CDC), the principal transmission modes for respiratory viruses such as SARS-CoV-2 are contact, droplet, and airborne. Contact transmission is infection spread through direct contact with an infectious person or with a contaminated article or surface. One may get infected by touching the virus-contaminated surface and then touching one's own mouth, nose, or eyes. Surfaces can get contaminated via direct contact or by transmitted respiratory droplets from infected persons.

Surface transmission of SARS-CoV-2 is still not well understood. Depending on the material, type of surface, and environmental conditions used in experimental studies,

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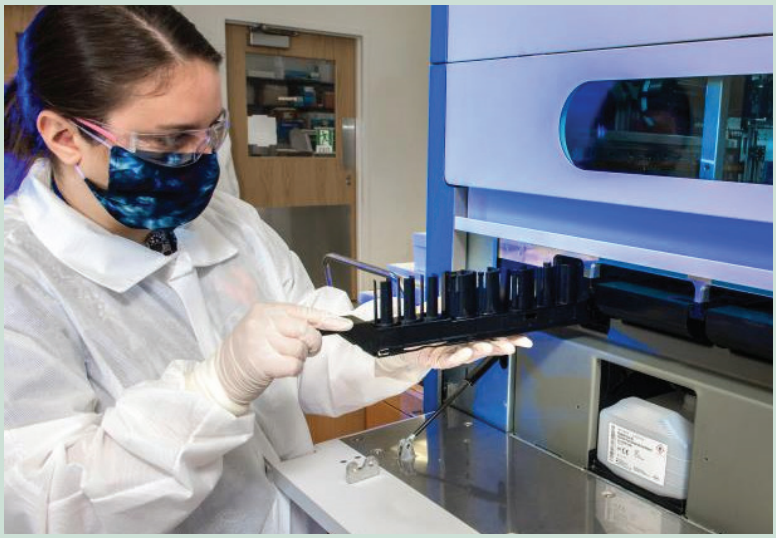
RV-RT-PCR *continued from page 1*



surface stability of SARS-CoV-2 virus was reported from a few hours to days and even up to 28 days for some conditions. A majority of the studies for SARS-CoV-2 stability on surfaces have been conducted using the reverse transcriptase polymerase chain reaction (RT-PCR) analytical method to detect viral RNA. However, this method cannot determine whether virus in the sample is viable (infectious). The traditional cell-culture-based method is considered the gold standard; it is laborious, however, and takes several days to get analytical results. Limitations of current methods can make it difficult to quickly assess the SARS-CoV-2 survival period on real- world environmental surfaces and to understand surface transmission. This, in turn, seriously impacts environmental epidemiological investigations and transmission studies, where timely knowledge of the presence of infectious virus on a surface is critical. Therefore, a rapid, dependable, and accurate analytical method for detecting viable SARS-CoV-2 in environmental surface samples (e.g., swabs) is needed. The Environmental Protection Agency (EPA) worked on development of a Rapid Viability-Reverse Transcriptase PCR (RV-RT-PCR) method for detection of infectious SARS-CoV-2 in hours rather than several days.

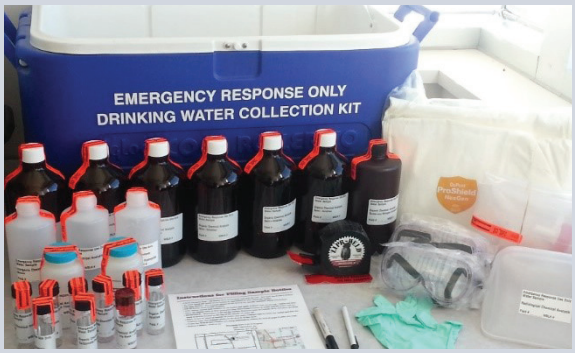
The SARS-CoV-2 RV-RT-PCR method follows the principle of the EPA's rapid viability-PCR (RV-PCR) methods for detection of high-priority bacterial biothreat agents in environmental samples. The RV-RT-PCR method integrates cell-culture-based enrichment of the virus in a sample using a 96-well plate format with virus-gene-specific RT-PCR-based molecular analysis. RT-PCR analysis is conducted before and after virus enrichment to determine the cycle threshold (CT) difference (ΔCT). The RV-RT-PCR method can detect a low number of SARS-CoV-2 virions in swab samples in 17 hours (for a batch of 12 swabs) compared to days typically required by the cell-culture-based method. The SARS-CoV-2 RV-RT-PCR method may also be useful in clinical sample analysis and antiviral drug testing and could serve as a model for developing rapid methods for other viruses of concern.

Excerpted from "Development of a Rapid Viability RT-PCR (RV-RT-PCR) Method to Detect Infectious SARS-CoV-2 from Swabs," **J Virol Methods**, 2021 Aug. 8: 114251. doi: **10.1016/j.jviromet.2021.114251** (Epub ahead of print).

LRN-C NETWORK SPOTLIGHT:

Laboratory Response Network for Chemical Threats (LRN-C) in Action

The CDC's Laboratory Response Network for Chemical Threats (LRN-C) is a national network of local and state public health laboratories that respond to chemical terrorism and other public health emergencies. During large-scale national events, CDC partners with LRN-C laboratories to test human samples for chemical exposures. Early detection and accurate identification of chemical threat agents are critical for determining effective medical countermeasures and to limit additional public health effects.



The drinking water collection kit developed by the Wisconsin Department of Natural Resources and the Wisconsin State Laboratory of Hygiene Chemical Emergency Response program. Photo: Meshel Lange

LRN-C laboratories also serve a critical role as communication liaisons between CDC and local health officials, hospitals, and poison control centers. More information about LRN-C is available at **https://www.cdc.gov/nceh/ dls/lrnc.html.**

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LRN-C in Action *continued from page 2*

Security Breach at a Local Drinking Water Facility

The Wisconsin State Laboratory of Hygiene (WSLH) is a designated LRN-C Level 1 laboratory. CDC requires that Level 1 laboratories maintain adequate staffing and equipment to support 24/7 high-volume testing with rapid turnaround times during a national chemical emergency. CDC also requires that Level 1 laboratories maintain testing capabilities for exposures to high-threat chemical agents such as mustard agents, nerve agents, and toxic industrial chemicals.

Previously, the Wisconsin Department of Natural Resources (DNR) and the WSLH Chemical Emergency Response program worked together to develop drinking water collection kits to be distributed throughout the state. These kits contain supplies to facilitate collection, transport, and subsequent testing at the WSLH.

In October 2020, a security breach was discovered in the restricted area of a drinking water reservoir in rural Wisconsin. A locked hatch protecting the water had been removed and discarded several feet away. No explicit threats had been reported, and no apparent health effects had been observed in the local community.

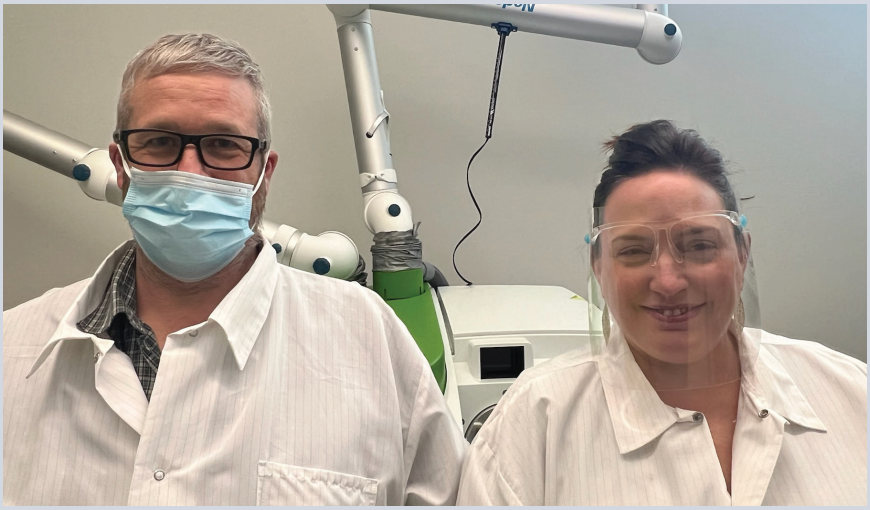
Two emergency response drinking water collection kits were used for the investigation. One kit was used to sample the main reservoir. The other kit was used to sample a terminal point in the system where the water had been stored for a longer period.

DNR issued a "do not drink" order for the reservoir's service area while the incident was under investigation, and WSLH tested the samples. LRN-C laboratory staff members worked through the night and over the weekend to analyze nearly 200 analytes. They used 14 different chemical assays to confirm that results were consistent with normal Wisconsin drinking water. Thanks to WSLH's rapid laboratory response and analysis, the "do not drink" order was lifted for nearly 200 local Wisconsin residents after only 4 days.

Thallium Contamination at Local Meat Slaughtering Facility

The Utah Public Health Laboratory (UPHL) is a designated LRN-C Level 2 laboratory. Level 2 laboratories must maintain testing capabilities for exposures to chemical terrorism agents, volatile organic compounds, toxic industrial chemicals, and toxic metals such as lead, thallium, and mercury.

In September 2021, the Utah Department of Agriculture and Food randomly collected a beef sample at a local meat slaughtering facility for testing at the U.S. Department of Agriculture (USDA) Eastern Laboratory in Athens, Georgia. The beef sample was found to contain unsafe thallium levels outside the USDA thresholds. After further investigation, seven animals harvested on the same occasion were found to have high levels of thallium. Samples of hair and urine from ranch livestock also showed detectable levels of thallium.



Rodney Goller (left) and Jacquilyn Patel of the Utah Public Health Laboratory staff.

Three family members who had eaten the contaminated beef submitted urine samples for testing at the UPHL Chemical Threats Response Laboratory. Within 24 hours, the LRN-C laboratory reported that the urine had elevated thallium levels, as compared with typical levels reported from the National Health and Nutrition Examination Survey. Thanks to strong interagency partnerships, Utah's Chemical Threats Response Laboratory was able to quickly provide laboratory results to help limit additional thallium exposure at this local ranch.