



CDC's Laboratory Response to Suspicious Substances

In October 2001, a series of letters containing spores of *Bacillus anthracis* was sent to Florida, New York City and Washington D.C. through the U.S. Postal Service. Since then there have been several incidents where threatening letters containing suspicious substances have been discovered. Determining whether suspicious letters pose a real danger to postal workers and the public requires a detailed threat assessment and accurate laboratory testing. This fact sheet explains how federal, state and local agencies respond to threatening letters and how laboratories play a role in detection and response.

Notifying agencies and determining response

Biological and chemical terrorism come in two forms – announced (overt) and unannounced (covert). An overt incident involves the announced release of an agent, often with some type of threat made. For example, a letter containing a powder and a note saying the recipient has been exposed to anthrax is considered overt.

Response to these types of threats normally begins with law enforcement, followed by notification of the Federal Bureau of Investigation (FBI), state emergency management, and state or local public health officials. The FBI and public health authorities contact the Centers for Disease Control and Prevention (CDC). Together, federal, state and local authorities determine whether the threat is real. If the threat is real, the FBI arranges for samples of the suspicious substance to be sent to a special laboratory that can perform the necessary testing. The lab is likely to be a state or local public health lab that is part of the Laboratory Response Network (LRN), a national network of labs coordinated by CDC.

Notification of federal, state and local authorities, assessment of the situation, and transfer to a laboratory for testing can take about 4 hours.

Lab testing

Lab workers can do a number of tests to identify an unknown substance. One of those tests is called PCR (polymerase chain reaction). PCR tests for the presence of DNA unique to each disease agent. Test results usually take between 3 to 5 hours. PCR can confirm whether earlier tests, such as those used by postal facilities to screen letters, were accurate.

Some postal facilities have or will have on-site air collectors that use PCR to test samples. These tests are considered screens and detect a limited number of agents.

PCR tests performed by LRN labs are considered more accurate and reliable because lab workers have been trained to use CDC-developed tests, which are performed in controlled laboratory conditions.

A positive result from a screening test is considered presumptive, meaning additional tests must be performed to confirm the original test result. An LRN laboratory performs confirmatory tests. A positive result from a confirmatory test sets off a chain of actions. These include a criminal investigation to uncover the person or persons who mailed the letter and a public health investigation to determine how many people were exposed and the best course of treatment.

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Response plans

Depending on the agent that was detected, a response plan is set into motion. The immediate concern is the health of those who may have been exposed. One of the actions that may be taken is to give medicine to those who may have been exposed to the threat agent to prevent them from getting sick or to reduce the effects of their illness. Whether people are given medicine, such as antibiotics, depends upon the agent and their risk for getting sick. Anthrax, for example, calls for antibiotics like ciprofloxacin. Other threat agents, such as ricin toxin, have no drug treatment and call for supportive care if a person develops symptoms. For treatment information on specific terrorism-related diseases, visit CDC's Emergency Preparedness and Response Website at <http://www.bt.cdc.gov>.

LRN Laboratories

Because of threats of terrorism using disease and chemical agents, the CDC created the LRN in 1999. The LRN played a critical role in the anthrax investigation in 2001, as well as other incidents where suspicious substances were found. (For more information, see "Facts About the Laboratory Response Network" at www.bt.cdc.gov/lrn/factsheet.asp.)

Labs that are part of the LRN are labeled as either National, Reference, or Sentinel.

Labs at CDC and the US Army Medical Research Institute for Infectious Diseases (USAMRIID) in Ft. Detrick, MD, are the national labs. These labs perform confirmatory testing for disease agents that other labs are not capable of testing. They can also detect specific strains of disease agents and perform other specialized tests. Clinical specimens involving known or unknown chemical agents are also sent directly to CDC.

Reference labs include state and local public health, federal, military, veterinary, food, water and environmental testing labs. Reference labs perform confirmatory tests for biological agents. This allows local authorities to respond quicker to "positive" results rather than having to wait for CDC confirmation.

Sentinel labs are the thousands of private, commercial, and hospital-based labs that test patient specimens as part of their daily routine. These labs are in a unique position to spot unusual results, alert public health and law enforcement authorities, and refer suspicious specimens to LRN reference laboratories for confirmatory testing.

CDC is working with state and local health authorities to prepare for biological and chemical terrorism. Specifically, it continues to expand its network of laboratories and provide support to these labs so that they can detect threat agents. Also, CDC and other federal partners are working on procedures to ensure that proper authorities are notified quickly so that response is efficient and that the public is protected.

For more information, visit www.bt.cdc.gov, or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (español), or (866) 874-2646 (TTY).

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