



## FACT SHEET

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# Laboratory Testing for Ricin in Environmental Samples

This fact sheet provides a brief outline of how laboratory testing is done on environmental samples that may contain ricin, a poisonous protein from the castor bean plant.

## How biological and chemical agents are detected

Certain locations around the country, such as government and U.S. Postal Service offices, use sensors to test for traces of threatening agents. Sometimes powders or other indications suggest that these agents are present.

“Threatening agents” are biological organisms or chemicals that could cause harm to people’s health. Processed ricin toxin is such an agent that could harm people if it is released into water, air, or food.

When a sensor signals positive for the detection of a harmful agent, or when other indications suggest that an agent may be present, laboratory tests must be done to confirm that an agent is present and to identify the agent. If a sample is suspected to contain ricin, it is referred to a specialized laboratory for further testing. These specialized laboratories are part of a network called the Laboratory Response Network (LRN). The Centers for Disease Control and Prevention created the LRN and maintains the network through a partnership with other federal agencies and private organizations.

## What the Laboratory Response Network is

The CDC established the LRN in 1999 to test for biological and chemical agents that could be used in a terrorism incident. The LRN includes the state department of health laboratory (called the public health laboratory) in each of the 50 states as well as national, military, state-based, and other types of laboratories. The LRN is currently working to include hospital-based laboratories in the LRN as sentinel laboratories. Sentinel laboratories represent the thousands of hospital-based laboratories that may test the first samples containing a threatening agent.

Each laboratory in the LRN follows the same sets of rules for sample collection, shipping, agent containment, and testing. LRN laboratories maintain secure communication channels among themselves, state and local health authorities, CDC, and other federal agencies. The LRN’s mission is to maintain a laboratory network that will quickly respond to acts of biological and chemical terrorism.

## How the Laboratory Response Network is structured

The LRN member laboratories are designated as either “reference” or “national.” Reference laboratories, sometimes referred to as “confirmatory reference,” can perform tests that detect and confirm the presence of a threatening agent. These laboratories ensure a timely local response in the event of a terrorist incident. Reference laboratories are capable of obtaining conclusive results that prompt federal, state, and local agencies to respond.

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LRN reference laboratories that test for ricin in environmental samples are public health and partner laboratories with specialized procedures and test reagents provided by the LRN laboratories at CDC. “Test reagents” are chemicals that react in specific ways to help determine whether an agent, such as ricin, is present.

National laboratories are select laboratories, such as CDC and USAMRIID (United States Army Medical Research Institute of Infectious Diseases), that have unique resources to handle highly infectious agents and identify specific strains of an agent.

Sentinel laboratories are not LRN members in the same way that reference laboratories are. Sentinel laboratories handle clinical samples such as blood and urine. They are not set up to do environmental tests for ricin. If sentinel laboratories come in contact with a suspicious clinical sample, they are responsible for shipping it to the appropriate reference laboratory.

### How samples are routed

When an environmental sample is suspected to contain ricin, the sample is sent directly to an LRN reference laboratory for testing. If a sample tests positive for ricin at a reference laboratory, it may be sent to CDC for additional testing, defining, archiving, or storage.

### What tests can be done for ricin in environmental samples

When a reference laboratory receives an environmental sample suspected of containing ricin, the laboratory performs specific tests to detect the presence of the agent. Tests performed on ricin-suspicious samples include the following:

- **Time-resolved fluorescence immunoassay:** In this test, the laboratory technicians use an antibody that binds to ricin to enable them to detect it in environmental samples.
- **Polymerase chain reaction (PCR):** PCR is a test used to locate and make copies of parts of the DNA contained in the castor bean plant. The search can specifically look for the DNA of the gene that produces the ricin protein.

Currently, the PCR test for ricin is done only at CDC, but it will be available very soon to laboratories in the LRN.

### Where you can get more information

For more information on shipping procedures, visit <http://www.bt.cdc.gov/labissues/index.asp>. For more information about ricin, visit <http://www.bt.cdc.gov/agent/ricin/index.asp>.

This fact sheet is based on CDC’s best current information. It may be updated as new information becomes available.

For more information, visit [www.bt.cdc.gov](http://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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