Epidemiological Investigation of a Ricin-Containing Envelope at a Postal Facility - South Carolina, 2003

Centers for Disease Control and Prevention

2005 Preparedness Conference

Objectives

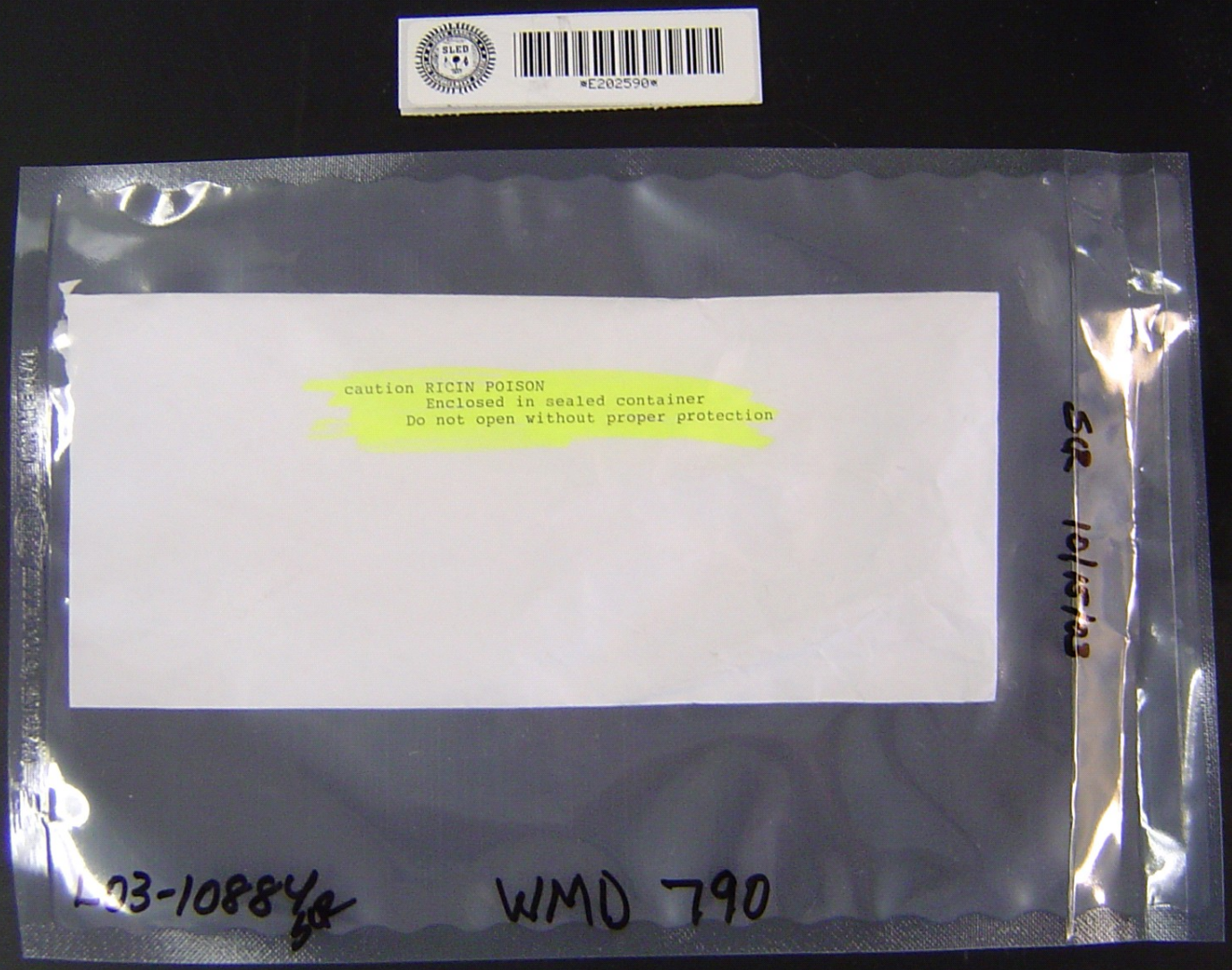
- Identify the epidemiological capacity needed on both the Local and State level to respond to an intentional biological event.
- Understand the usefulness of non-traditional data sources (e.g. Poison Control Center data) for the detection of a possible intentional biological event.
- Identify the benefit of collaborations with law enforcement in joint epidemiological interviews (e.g. Forensic Epidemiology).

Initial Detection

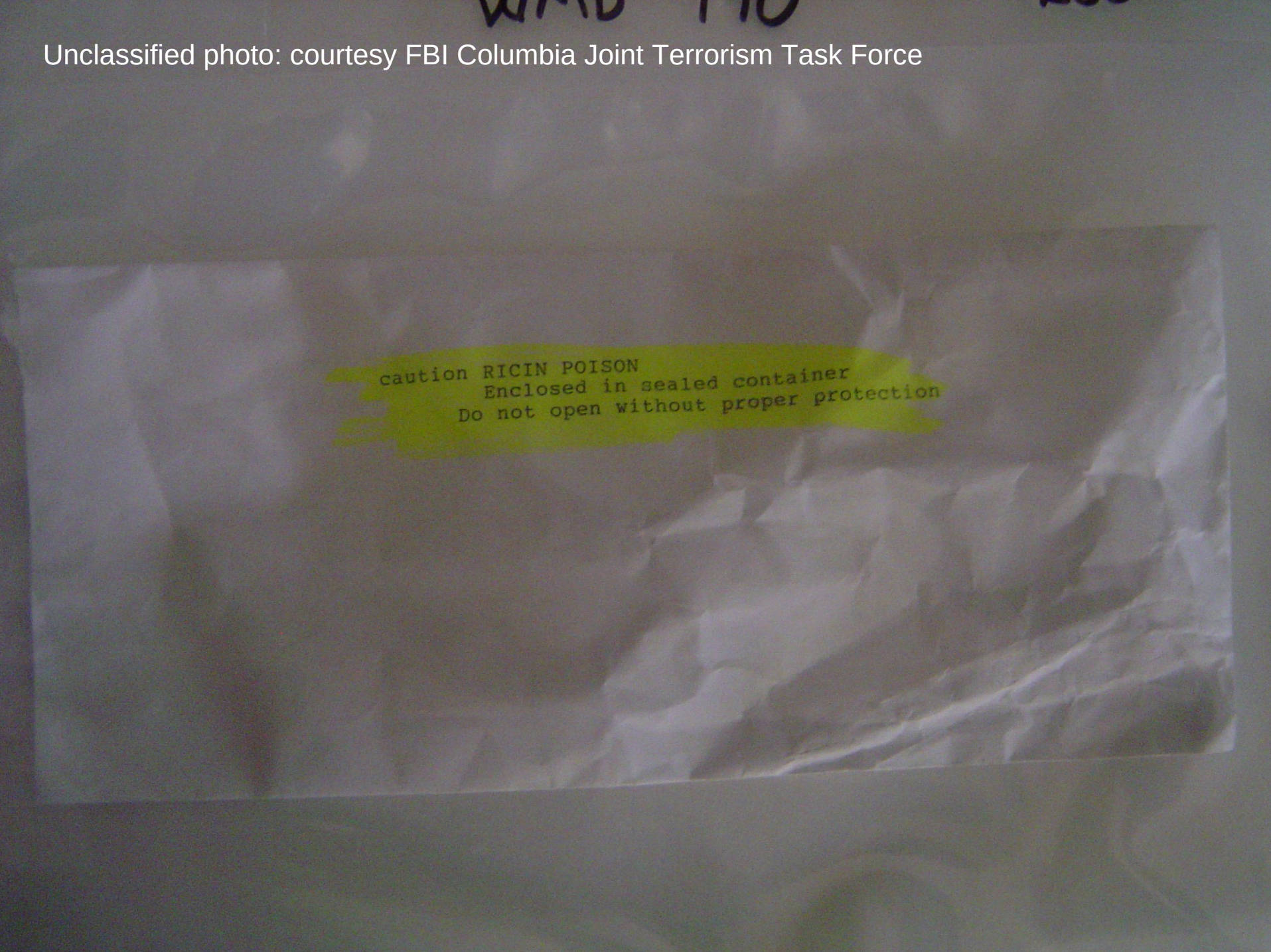
- On October 15, 2003 and envelope with a threatening note and a sealed container was received at a mail processing and distribution facility in Greenville, SC.

- The envelope was isolated from workers and other mail and removed from the facility.

Unclassified photo: courtesy FBI Columbia Joint Terrorism Task Force



Unclassified photo: courtesy FBI Columbia Joint Terrorism Task Force



Unclassified photo: courtesy FBI Columbia Joint Terrorism Task Force

The following is a representation of the language contained in the threat letter.

To the department of transportation: I'm a fleet owner of a tanker company.

I have easy access to castor pulp. If my demand is dismissed I'm capable of making Ricin.

My demand is simple, January 4 2004 starts the new hours of service for trucks which include a ridiculous ten hours in the sleeper berth.

Keep at eight or I will start dumping.

You have been warned this is the only letter that will be sent by me.

Fallen Angel

Unclassified photo: courtesy FBI (Columbia) Joint Terrorism Task Force

Initial Response

- On October 21, 2003, laboratory testing at the CDC confirmed that ricin was present in the container.

- South Carolina Department of Health and Environmental Control (SCDHEC) and the CDC initiated an epidemiological response that included both worker and environmental components.

Background

- Ricin is a toxin derived from the castor bean plant *Ricinus communis*.
- Poisoning can occur via ingestion, inhalation, or injection.
- Epidemiologic clues include increased number of patients seeking care, unexpected progression of symptoms, or a credible threat of ricin release in a community.
- Person-to-person transmission does not occur.
- Inhalation and injection are considered to be the most lethal routes of exposure.

Clinical Findings

- Ingestion:
  - Mild poisoning can result in nausea, vomiting, diarrhea, and/or abdominal pain.
  - In moderate to severe poisoning, gastrointestinal symptoms can progress (4-36 hours) to hypotension, liver and renal dysfunction, and possibly death.
- Inhalation:
  - Illness can occur within 8 hours and include cough, dyspnea, arthralgias, and fever, and can progress to respiratory distress and death.

Recommended Treatment

- Treatment is mainly supportive and includes intravenous fluid and vasopressors for hypotension.
- Activated charcoal should be administered to persons with known or suspected ricin ingestion if vomiting has not begun and airway is secure.
- Gastric lavage may be considered if ingestion has occurred in < 1 hour.
- Decontamination for ricin exposure should be performed if a powder or similar substance is found on the patient.

Federal Response - 1

- The facility was closed on October 22, 2003.
- The CDC conducted environmental assessment and sampling at the postal facility consisting of seventy (70) wipe samples and five (5) surface dust samples.
  - Dust samples: collected by sampling pumps and sampling filter media
  - Wipe samples: collected by using Dacron swabs moistened with sterile buffered solution

Federal Response - 2

- Samples were collected from specific surfaces in the facility to include: storage bins, surfaces, conveyor belts, and sorting tables that had been in contact with the letter.

- All environmental samples were analyzed at the CDC and were negative for ricin.

Federal Response - 3

- The Federal Bureau of Investigation (FBI) began the investigation of the case as an extortion threat.
- Questions or information related to the criminal investigation were directed to the FBI.
- A Joint Information Center (JIC) was established with the State Law Enforcement Department (SLED) and other State and Federal agencies.

State Response - 1

- The local “Epi-Team” partnered with representatives from the State Bioterrorism Surveillance and Response Program to perform an assessment of the health status of the workers at the postal facility.

- A face-to-face questionnaire was administered to all thirty-six (36) workers of the facility.

State Response - 2

- SCDHEC asked emergency departments, clinicians, and the local postal facility to report any cases consistent with ricin exposure to the State Health Department.

- State poison control center records and intensive care unit charts at seven (7) area hospitals were reviewed daily for illness consistent with ricin exposure.

Health Assessment Questionnaire

- Developed by Local and State Public Health.

- Questionnaire components included:
  - Demographics (including: age, address, occupation, description of job duties)
  - Exposure information (proximity to package, duration of exposure, time of exposure, symptom spectrum (to include G.I. and pulmonary components)
  - Medical care (did you seek, when, household illnesses, etc.)

State Response - 3

- Initiation of the State Health Alert Network (HAN) to both clinicians and the general public.
- Surveillance yielded a response to two (2) cases of multisystem organ failure and several nonspecific illnesses that were determined to be unrelated to the ricin event.
- Media relations staff from SCDHEC staffed the JIC.

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South Carolina Health Alert Network

October 23, 2003

Clinician Public Health Advisory

Update 1: Toxic Syndrome for Ricin Poisoning and Ricin & Abrin Case Definition

The South Carolina Department of Health and Environmental Control (SC DHEC), in conjunction with the Centers for Disease Control and Prevention (CDC), is providing this information regarding the clinical presentation of ricin toxin.

There has been no evidence of human exposure to ricin in South Carolina. Health assessments, conducted by both district and central office public health personnel have reported no illnesses associated with the events in Greenville.

The following clinical information pertaining to Ricin poisoning is the **current information available**. Updated information as it becomes available, can be found at both on the DHEC (www.scdhec.gov) and the CDC (www.cdc.gov) websites.

Summary statement

Ricin is a potent biological toxin that is derived from castor beans. Its mechanism of action is inhibition of protein synthesis. Clinical manifestations are dependent on the route of exposure. Ingestion of ricin typically leads to profuse vomiting and diarrhea followed by multisystem organ failure and possibly death within 36 – 72 hours of exposure. Inhalation of ricin typically leads to respiratory distress, fever, and cough followed by the development of pulmonary edema, hypotension, respiratory failure and possibly death within 36 – 72 hours.

The amount and route of the exposure to ricin and the premorbid condition of the person exposed will contribute to the time of onset and the severity of illness. For example, the inhalation of ricin would be expected to lead to a quicker onset of poisoning and to cause a more rapid progression of poisoning when compared to the ingestion of ricin, given the same exposure amount.

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Clinical description

Ingestion of ricin (or abrin, a closely related toxin) typically leads to profuse vomiting and diarrhea, that may or may not be bloody, followed by hypovolemic shock and multi-system organ failure. Influenza-like symptoms of fever, myalgia, and arthralgia, and weakness may also be reported.

Differential diagnosis

Inhalation:
Staphylococcal enterotoxin B
Exposure to pyrolysis by-products of organofluorines (Teflon, Kevlar)
Oxides of nitrogen
Phosgene

Ingestion:
Enteric pathogens
Mushrooms
Caustics
Iron
Arsenic
Colchicine

Signs and Symptoms

Gastrointestinal signs and symptoms

- Abdominal pain
- Vomiting
- Diarrhea (nonbloody or bloody)
- Abnormal liver function tests
- Multiple ulcerations and hemorrhages of gastric and small-intestinal mucosa on endoscopy

Respiratory signs and symptoms (progression of illness may occur despite antibiotic therapy):

- Cough
- Chest tightness
- Dyspnea
- Hypoxemia
- Noncardiogenic pulmonary edema

Skin and mucous membranes:

- Redness and pain of eyes and skin

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October 23, 2003

Clinician Public Health Advisory

Update 2: Ricin toxin General Information

What Is Ricin?

- Ricin is a poison that can be made from the waste left over from processing castor beans.
- It can be in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.
- It is a stable substance. For example, it is not affected much by extreme conditions such as very hot or very cold temperatures.

Where Is Ricin Found, and How Is It Used?

- Castor beans are processed throughout the world to make castor oil. Ricin is part of the waste "mash" produced when castor oil is made.
- Ricin has some potential medical uses, such as bone marrow transplants and cancer treatment (to kill cancer cells).

How Can People Be Exposed to Ricin?

- It would take a deliberate act to make ricin and use it to poison people. Accidental exposure to ricin is highly unlikely.

Conclusions - 1

- What worked:
  - Forensic epidemiology training with local public health response staff aided in collaboration with FBI investigators.
  - Previous collaborations with FBI agents (both Greenville and Columbia) provided rapid transition to joint interviews.
  - Activation of HAN to providers increased surveillance activities and potential identification of new cases.
  - Division of labor between State/Local Public Health and Federal Public Health partners.

Conclusions - 2

- What didn't:
  - Timely notification of event.
  - When to pull the "public health notification" trigger.
  - Availability of ricin FAQ's and survey tools.
  - Availability of reagents for ricin testing within the state public health laboratory.
- Public Health Objective: To protect the health and safety of postal employees and the general public.

Acknowledgements

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- Linda Ard, District Surveillance and Response Coordinator
- William Moorhead, District Public Health Preparedness Director

State Public Health Partners:

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- Dr. Tom Fabian, Medical Director, Bioterrorism Surveillance and Response Program
- Dan Drociuk, Epidemiologist, Program Manager, Bioterrorism Surveillance and Response Program
- Dr. Arthur Wozniak, Bureau of Laboratories
- Thom Berry, Director Media Relations

Other State Partners:

- Palmetto Poison Center
- Area hospitals

Federal Partners:

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- Roger Stanton, State WMD Coordinator, Federal Bureau of Investigation
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- Scott Deitchman, MD, MPH, Assistant Director for Emergency Preparedness, NIOSH
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