

Inhalational Anthrax – New York City 2001

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March 26th, 2002

International Conference on Emerging Infectious Diseases
Latebreaker II Session

NYC DOH Enhanced BT Surveillance in Response to 9/11

- Post September 11 - bioterrorism surveillance
 - Active emergency department (ED) syndromic surveillance
 - Frequent broadcast alerts
- October 4 - Anthrax case in Florida
- Active bioterrorism surveillance
 - intensive care units
 - microbiology labs
 - Infectious disease (ID) specialists/infection control

NYC DOH Anthrax Surveillance

- October 12 – First cutaneous case diagnosed
- Enhanced clinician surveillance with hotline
 - 116 highly suspicious cases investigated
- Enhanced outreach to ID specialists, laboratories, and medical examiner
- Expanded ED syndromic surveillance to 29 hospitals
- Broadcast alerts sent to veterinarians

New York City - October

- Cutaneous anthrax confirmed in four persons
- Three more suspect cases
- All cases felt to be exposed through the mail from letters mailed on September 17
- Thousands of media employees and postal workers put on prophylaxis
- Last known contaminated letter mailed on October 9 from Hamilton Township NJ to Washington DC

Case Report

- 61 year old female with history of hypertension
- October 28 – Medical presentation, case reported to DOH later that evening
- Intubated, intensive care, antibiotics
- October 30 - *B. anthracis* identified by DFA, gamma phage lysis and PCR
- October 31 – Multiorgan failure, patient died
- Strain later confirmed as identical to all other anthrax cases in 2001 outbreak

EARLY TESTS ARE POSITIVE

INHALED ANTHRAX FEARED IN CITY

**Hospital worker, 61,
fighting for life - PAGES 2-3**

Response to Inhalational Case

- Intensive epidemiologic and environmental investigation at home, workplace, postal facilities, and eventually subway system
- Unknown source of exposure
 - ? Contaminated letter
 - ? Sentinel case of an aerosolized release

Investigation Objectives

- To determine the time, location, and route of exposure
- To identify any new cases of cutaneous or inhalational anthrax
- To determine if an isolated case or sentinel case of larger outbreak

Patient Characteristics

- Resident of the Bronx, lived alone
- No family members in New York City
- Occupation
 - Worked at Manhattan hospital for 12 years
 - Delivered supplies to and from stockroom
 - **Did not work with or sort mail**
 - Stockroom and mailroom located in same room
- Social history
 - Vietnamese refugee
 - Lived in the US for 20 years

Case Investigation: Workplace

- Closed hospital for 6 days
- Performed nasal swabs – 28/28 negative
- Interviewed 232 co-workers to determine patient's activities
- Conducted focus group of close hospital friends to determine patient's regular routine
- No suspicious packages reported

Case Investigation: Home

- Interviewed 27 neighbors and 35 acquaintances
- Searched apartment for suspicious mail
- Reviewed phone records
- Visited post offices patient used
- Displayed photographs in churches
- Visited 15 businesses near home and work that patient used

Case Investigation: Cont'd

- Constructed timeline of activities
- Large segments of time remained unaccounted for
- Exposure could have occurred in multiple locations in NYC

Case Finding/Surveillance: Work

- 1700 persons screened at DOH Antibiotic Clinic
 - 69 with suspicious respiratory symptoms
 - 2 skin lesions
- Employee Health
 - All 88 employees reporting fever since October 11 interviewed
- Human Resources
 - 60 employees absent for ≥ 1 day.
 - 59 contacted and were well, one on MVA disability
- No suspicious cases identified

Case Finding/Surveillance: Home

- Held community meeting in Spanish
- Referred persons for evaluation
 - One neighbor with tonsillitis
 - One suspect skin lesion for biopsy
- No suspicious cases identified

Case Finding/Surveillance: Federal and City Employees

- Employee health records at large US Postal Service facilities in NYC
- Mass Transit Authority (MTA) employee health
- No suspicious cases identified

Environmental Investigation: Home and Workplace

- NIOSH, FBI, CDC agreed on procedures
- Performed after consultation with hospital
- 109 samples from workplace and 82 from home processed by PCR and culture
- Re-sampling performed in mailroom
- All samples tested negative

Environmental Investigation: Post Offices

- Patient purchased money orders at post office
 - Samples from Gracie post office (13)
- Contamination through the mail considered
 - Samples from Lenox Hill post office (24) , Boulevard post office (3), Bronx sorting facility (34)
- All samples tested negative

Post Offices: Cont'd

- October - Five digital bar code sorting (DBCS) machines at main NYC Morgan postal facility tested positive
- These machines sorted mail that was delivered to media companies where cutaneous cases were found
- No DBCS machines that sorted mail to patient's workplace/home zip codes tested positive

Environmental Investigation: Subway

- Metrocard recovered with her activity from October 22-26
- MTA profiled her pattern of travel from September 21-October 20
- Regular activity on subway trains and buses
- Frequent travel between Whitlock station in the Bronx and 68th St. station on Lexington Ave. line (#6 train) in Manhattan

Subway Sampling

- Sampling began on November 17 after careful planning
 - Lexington Ave. line (#6 train)
 - N/R line
 - Grand Central Station air conditioning unit
 - 2 control stations outside Manhattan
- 197 environmental swabs and 19 HEPA vacuum samples
- All samples tested negative for anthrax

*We can now conclude that the
New York City subway system
is not a sterile environment.*

Neal Cohen, MD
Commissioner of Health, NYC
November 21, 2001

America's Oldest
Continuously
Published Newspaper

Hartford Courant.



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Highs Near 55. Bf.

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A Diagnosis No One Wanted To Believe

In Victim's Memory

Family, friends and neighbors of Otilie Lundgren say goodbye in a private memorial service, as investigators try to figure out how she contracted anthrax.

Page B1

Unlikely Anthrax Case Unfolds Under Microscope

By GARRET CONDON
COURANT STAFF WRITER

DERBY — It seemed absurd to even mention anthrax, and when she did, Dr. Lydia Barakat was only half serious.

It was just before 10 a.m., Saturday, Nov. 17, and she was peering into a microscope in the cramped, brightly lit Griffin Hospital laboratory. Barakat, an infectious-disease specialist, saw rod-shaped bacteria, chained together in spaghetti-like strands, stained violet by a substance that is used to help identify such germs.

She remarked that it looked a lot like

anthrax.

Medical technologist Harold Hebb, a 29-year Griffin veteran who has specialized in microbiology, chided her.

"Come on, Dr. Barakat, where is a 94-year-old woman living by herself in Oxford going to get anthrax?"

Good point. Barakat suspected some other rod-shaped bacteria. Perhaps it was bacillus cereus, a bug that can plague the elderly. Or maybe clostridium, which is often food-borne. She immediately put the patient, Otilie Lundgren, on antibiotics to combat a host of related germs, including anthrax.

Lundgren had been admitted the day

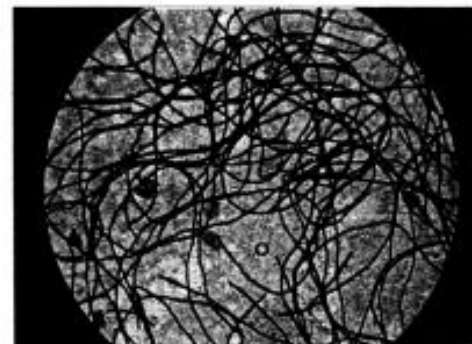
before with fever and some vague complaints. On Saturday, she was still only mildly ill, and her condition appeared stable.

"What are the odds that this is going to be anthrax?" Barakat thought.

The odds were unbelievably long, but it was anthrax nonetheless. On Wednesday morning, Lundgren became the fifth American to die of inhalation anthrax in recent weeks.

The source of the deadly spores remains an immense mystery. However, health officials might never have discov-

PLEASE SEE **STARTLING**, PAGE A12



COURTESY OF GRIFFIN HOSPITAL

A PHOTOMICROGRAPH of a blood culture sample from Otilie Lundgren shows anthrax infection. The strands are the anthrax colonies in the blood.

? Mail Cross Contamination

- Leading theory in inhalational case in CT
- Trace forward of mail also identified letters postmarked October 9 in Hamilton NJ and processed by same DBCS machine after it sorted Daschle/Leahy letters
- Some letters delivered to patient's workplace
- No letters delivered to her home
- All other hospitals in same area code also received mail sorted on October 9

Exposure Hypotheses

? Contaminated or cross-contaminated letter at home or workplace

? NYC street

? Subway system

→ We will likely never know

Limitations

- Gaps in reconstructed timeline during the incubation period mean that exposure could have occurred in locations not tested
- Dry swab method may have missed sparse contamination despite repeated testing

Conclusions

- Isolated case of inhalational anthrax in NYC
- First case in 2001 outbreak not directly linked to mail
- No evidence of a *B. anthracis* aerosol release in her workplace, home, mail facilities, or subway
- Route of exposure remains unknown
- Challenge of investigating isolated cases using standard techniques

Acknowledgements

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CDC/Colorado: Michael Bunning, David Dennis, Jacob Kool, Tony Marfin

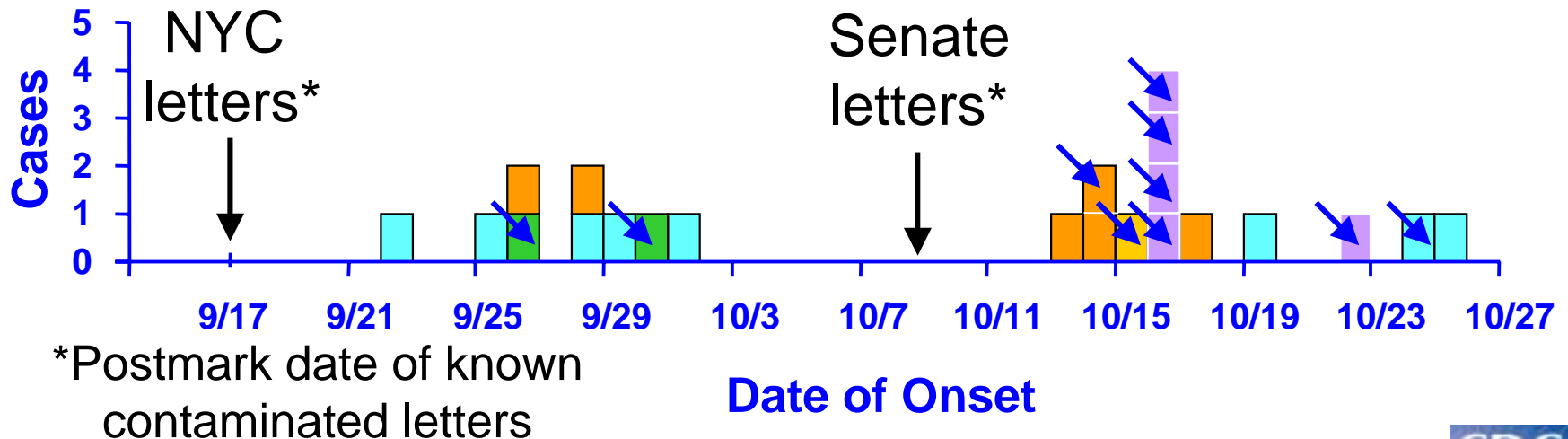
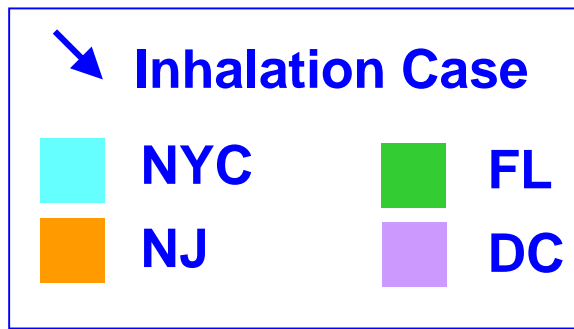
CDC/NIOSH: Josh Harney, Dan Hewett, Steve Lenhart, Ken Martinez, Rob McCleery

Others: US Postal Service, NYC Mass Transit Authority

U.S. Anthrax Cases

- Florida: 2 inhalational (1 fatal)
- New York: 1 inhalational (fatal)
7 cutaneous
- New Jersey: 5 inhalational
2 cutaneous
- Washington DC: 5 inhalational (2 fatal)
- Connecticut: 1 inhalational (fatal)

Bioterrorism-associated Anthrax: Inhalation and Cutaneous Cases



Case History

- 61 year old female with history of hypertension
- October 25 - Initial symptom onset
 - Chills, myalgias, and productive cough
 - Shortness of breath and chest pain for 2 days
 - Denied fever or neck stiffness
- October 26 - Patient worked full day at hospital
- October 28 am- Presented to medical care
- October 28 pm- Suspect case reported to DOH

Hospital Course

- Required intubation for respiratory distress
- Abnormal initial chest radiograph
- Admitted to intensive care and treated with levofloxacin, rifampin, clindamycin, diuretics
- Patient developed overwhelming septic shock and multi-organ failure
- October 31 - Patient died

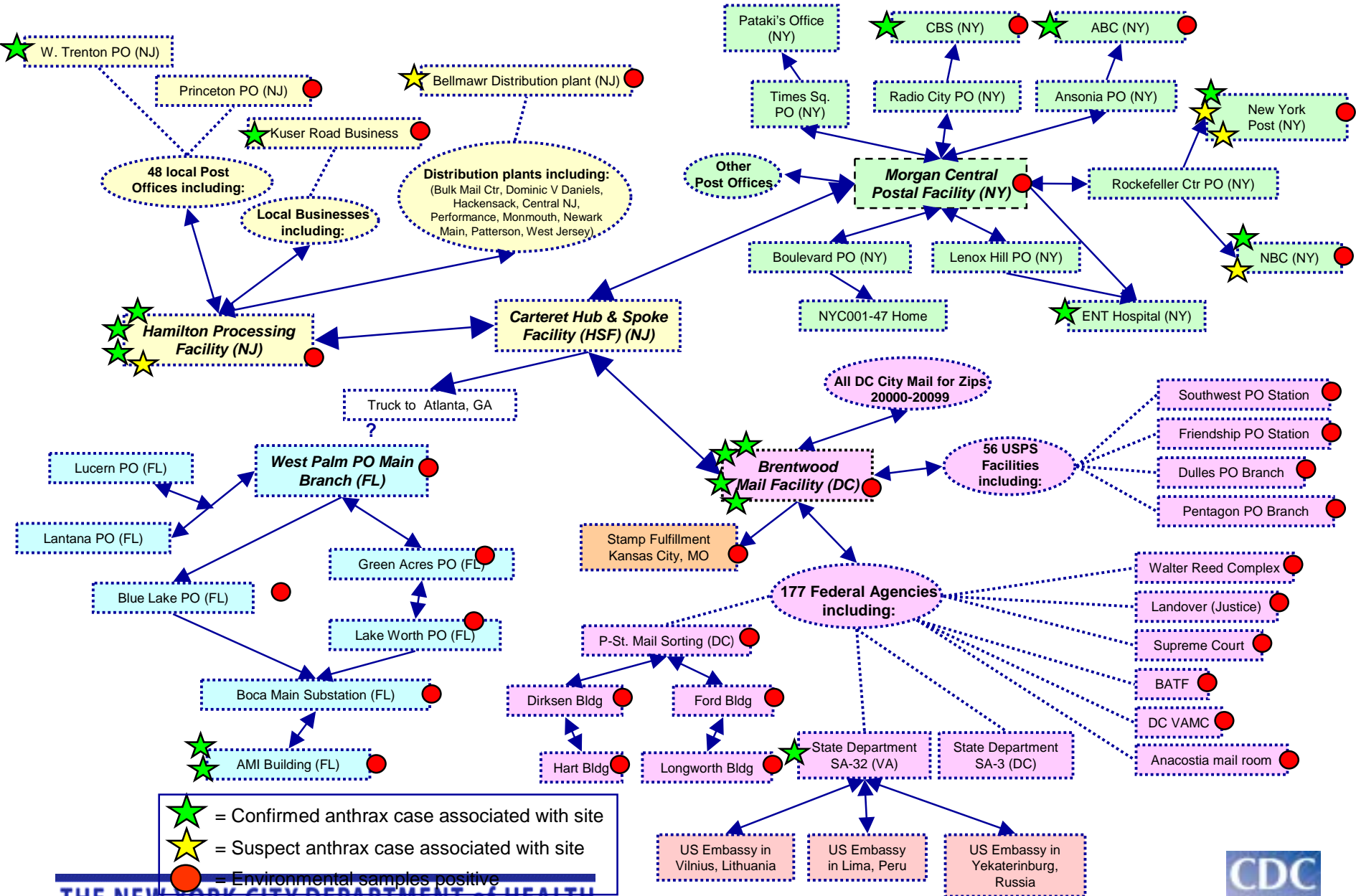
Laboratory Diagnostics

- October 29 - Gram positive rods identified by blood culture
- October 30 - *B. anthracis* identified by DFA, gamma phage lysis and PCR
- Pleural fluid (+) by PCR and culture
- Strain later confirmed as identical to all other anthrax cases in 2001 outbreak

Response to Positive Subway Sampling

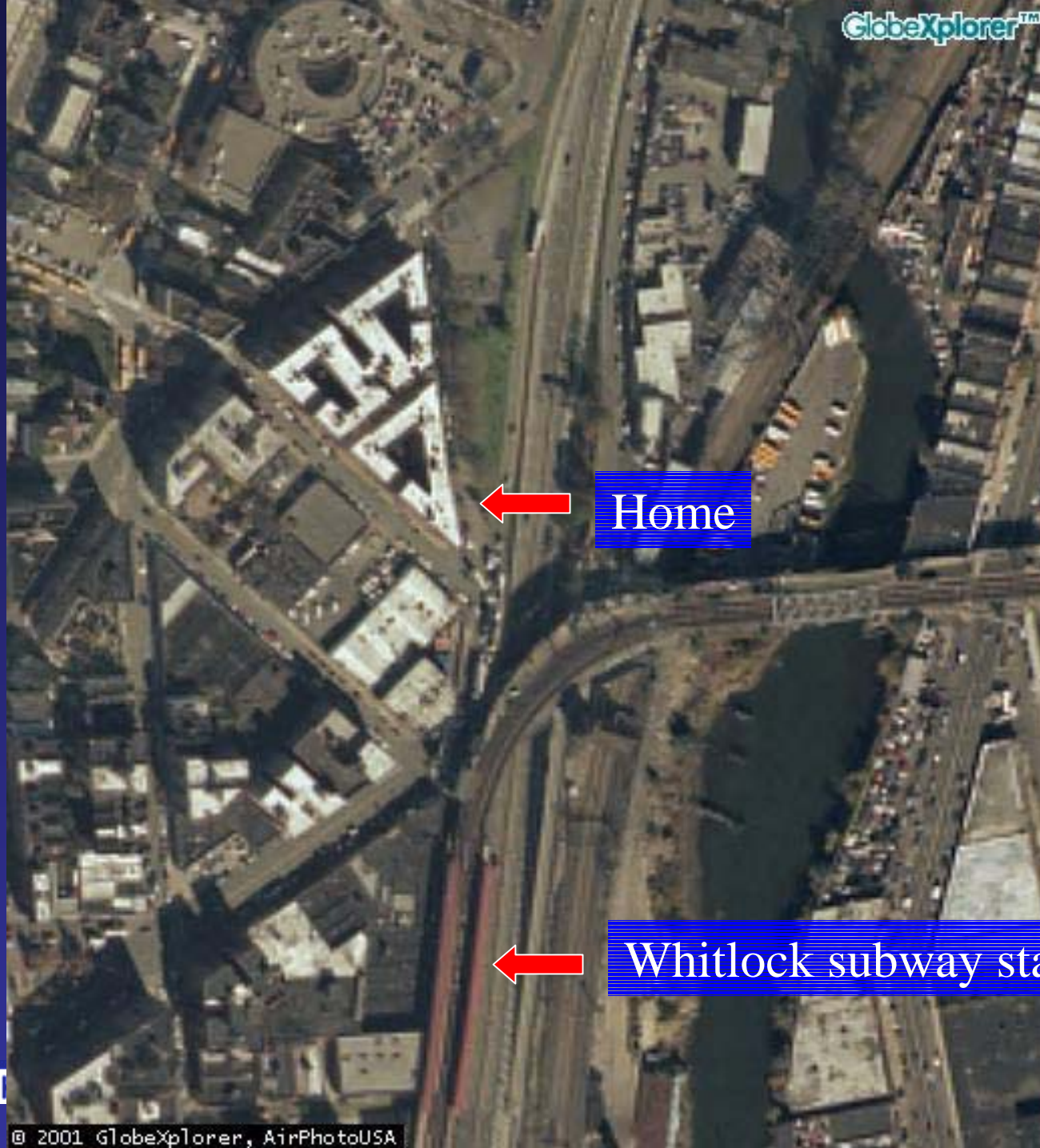
- Involved stations would be declared a crime scene
- Police Dept HAZMAT to perform thorough cleaning and disinfection
- No need for antibiotic prophylaxis or nasal swab testing of MTA employees, Transit police, or public

Mail Flow in Florida, NJ, NY, and D.C.



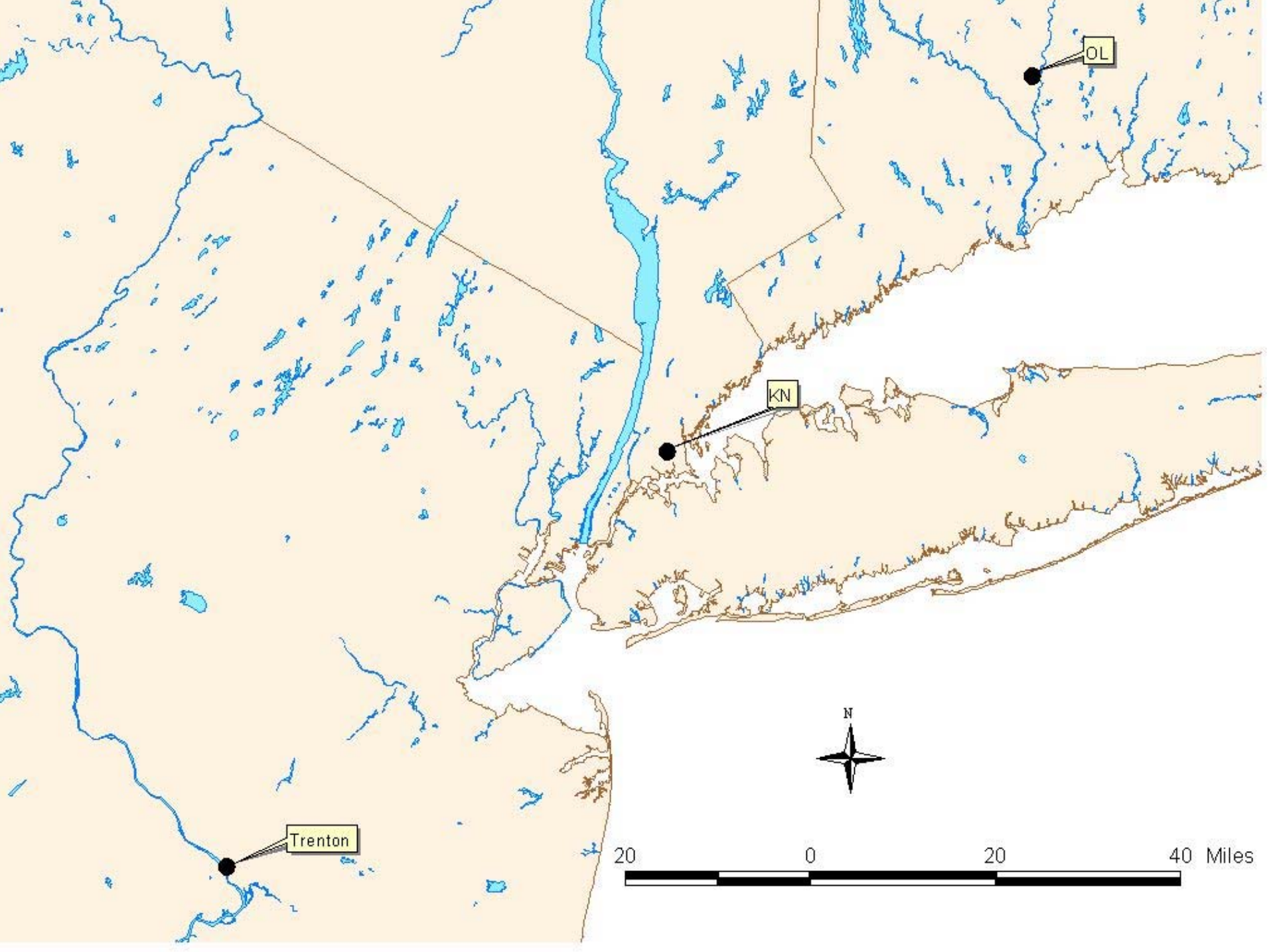
★ = Confirmed anthrax case associated with site
★ = Suspect anthrax case associated with site
● = Environmental samples positive



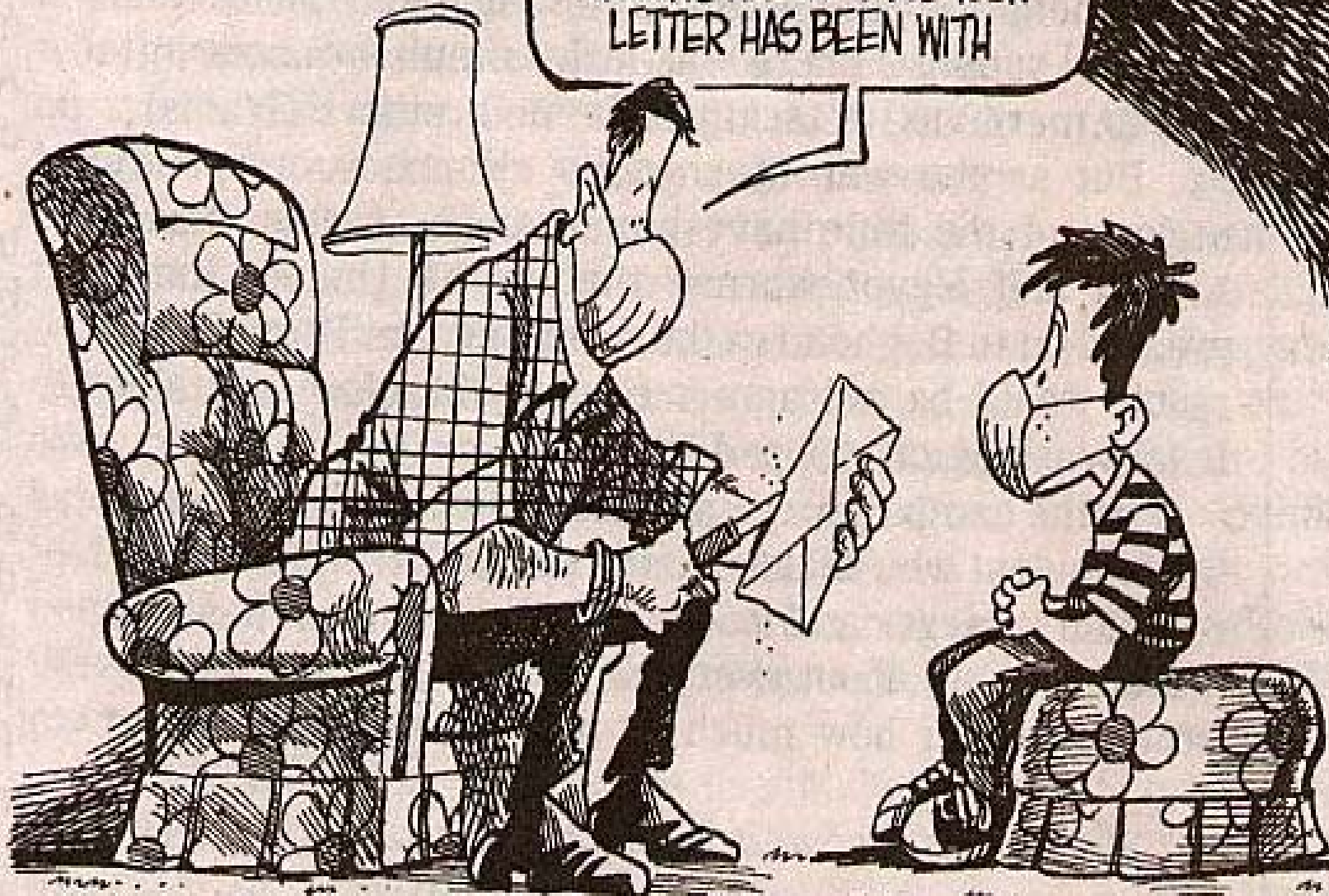


Home

Whitlock subway station



SON, YOU'RE NOT JUST
OPENING YOUR LETTER, YOU'RE
OPENING ALL THE MAIL YOUR
LETTER HAS BEEN WITH





New York City Department of Health

During business hours, please call the Provider Hotline at 866-692-3641. Please let the hotline operator know that you are a physician calling regarding a suspicious case, and they will refer your call to a NYCDOH or CDC physician consultant.

If you are unable to get through, please call one of the following temporary numbers for the Communicable Disease Program:

212-295-5658 212-295-5670 212-295-5665

212-295-5671 212-295-5675

After hours, please call the Poison Control Center at 212-764-7667. (If that number is not working, please call 1-800-222-1222).

November 12, 2001

ALERT #8: Update on Anthrax

- **No new anthrax cases have been diagnosed in New York City since October 29th; Healthcare providers should remain alert for additional suspect cases of inhalational and cutaneous anthrax**
- **Summary of anthrax outbreak in NYC, and the United States**
- **Distinguishing influenza-like illness from inhalational anthrax as we approach the influenza season**
- **Importance of Starting Influenza Vaccinations for Patients at Higher Risk**
- **The NYCDOH continues to post all medical information on anthrax on our Web site at <http://www.nyc.gov/html/doh/html/cd/wtc1hep.html>**

Breaking News

NYC Hospital Worker Dies of Inhaled Anthrax Spread beyond mail connections causes concern

NYC Anthrax Victim Dies Thousands to be tested after inhaled anthrax case in city

From Staff and Wire Reports

October 31, 2001, 11:21 AM EST

A 61-year-old Bronx woman, who had been ill with inhalation anthrax died early this morning, becoming the nation's fourth bioterrorism fatality this month.

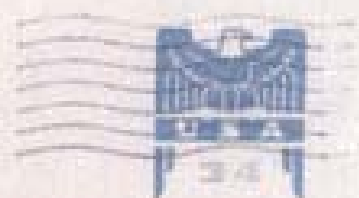
Kathy T. Nguyen, 61, died three days after checking herself into the hospital and being diagnosed as the city's first case of the inhaled form of the disease.



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ANTHRAX

THIS

**Stricken
New York
Post girl's
message
to the
terrorists**

My battle
with Anthrax:
Pages 4 & 5

