

**Enhanced Emergency Department  
Surveillance System Following the  
World Trade Center Disaster  
New York City,  
September 14 - October 10 2001**

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# Background

## Pre 9/11 Bioterrorism (BT) Detection Systems

- Passive reporting
  - Dependent on clinician/laboratory
- EMS 911 surveillance system
- Unexplained death surveillance



# Post 9/11 BT Detection Systems

- Heightened alert for BT
  - E-mail and Fax broadcasts alerts
- NYCDOH infrastructure problems
  - Communications disrupted
  - Temporary relocation

# Objectives

- Detect clusters of mild/non-specific illness representing prodromal stages of:
  - BT event
  - Other outbreaks
- Improve upon existing systems by
  - Clusters by time/space
  - Detect early BT illness

# Methods

## Enhanced Syndromic Surveillance

- 30 to 50 Epidemic Intelligence Service Officers (EISOs) stationed at Emergency Departments (EDs)
  - Sept 13 - 27
    - 15 hospitals emergency departments
    - 24 hour basis
  - Sept 29 - Oct 10 (due to resource limitations)
    - 12 hospitals emergency departments
    - 18 hour basis



**Patient Imprint Card or Label**

If imprint card is unavailable:

Last Name: \_\_\_\_\_  
 First Name: \_\_\_\_\_  
 Med Rec #: \_\_\_\_\_

Female     Male

**NEW YORK CITY DEPARTMENT OF HEALTH  
 ENHANCED EMERGENCY ROOM SURVEILLANCE**

**Instructions: FOR EACH PATIENT SEEN AT THE EMERGENCY DEPARTMENT**

1. Stamp form at top left with patient imprint card
2. Triage/registration and health care provider fill out respective sections
3. Place in drop box

**Triage/Registration Complete This Section**

Date of visit:

Age:  For age less than one year please use "1"

Home Zip Code:     Work Zip Code:

Was patient in southern Manhattan (below Canal St) on Tuesday, September 11th after the attack? (circle one)    YES    NO    Don't Know

**Hospital Code**

**Health Care Provider Complete This Section**

Please check the ONE PREDOMINANT syndrome from the following list that best represents the PRIMARY condition of the patient

- None of the following
- Trauma
- Smoke or dust inhalation
- Exacerbation of underlying respiratory condition (Asthma/ COPD)
- Anxiety reaction (including somatic complaints, insomnia)
- Diarrhea / gastroenteritis (including vomiting or abdominal cramps)
- Upper or lower respiratory infection WITH fever
- Sepsis or non-traumatic shock
- Rash WITH fever (do NOT check unless both are present)
- Meningitis, encephalitis, or unexplained acute encephalopathy
- Botulism-like syndrome (cranial nerve impairment and weakness)
- Unexplained death with a history of fever

IF YOU HAVE ANY QUESTIONS OR NEED TO REACH THE NYC DEPARTMENT OF HEALTH, PLEASE CALL 212-417-2676 AND ASK FOR THE DOCTOR ON DUTY. IF NO ONE IS AVAILABLE AT THAT NUMBER, CALL THE POISON CONTROL CENTER AT 212-764-7667.

**Triage  
 Nursing  
 Staff**

**ED  
 Health Care  
 Provider**



# Syndromes

- Diarrhea/Gastroenteritis
- Botulism-like syndrome
- Upper/Lower respiratory infection WITH fever
- Sepsis/Non-traumatic shock
- Rash With Fever
- Meningitis/Encephalitis/Encephalopathy
- Unexplained death WITH history of fever
- Trauma
- Smoke/Dust Inhalation
- Exacerbation of an underlying respiratory condition
- Anxiety reaction
- None of the above

# Daily Analysis

- Frequencies
- Cumulative Sum Statistic (CUSUM)
- Spatial scan statistic
- Alarm defined as  $p < 0.02$

# Follow-Up of Alarms

- Goals
  - Rapid investigation
  - Verify cluster of patients
  - Verify if BT-related illness
- Facilitated by EISOs at EDs
  - Review individual charts
  - Review lab results
  - Call patients at home
  - Follow up on hospitalized patients

# Results

|                                      |        |
|--------------------------------------|--------|
| Total visits reported                | 65,535 |
| Trauma                               | 12.7%  |
| Asthma                               | 5.3%   |
| Gastrointestinal illness             | 3.1%   |
| Respiratory infection with fever     | 3.0%   |
| Anxiety reaction                     | 1.4%   |
| Other syndromes (Sepsis, Rash, etc.) | <1%    |

\*For both staffing periods

# Citywide CUSUM “Alarms”

| Syndrome                           | # Alarms  |
|------------------------------------|-----------|
| Sepsis/Non-traumatic shock         | 3         |
| Rash with fever                    | 1         |
| Respiratory Infection with fever   | 3         |
| Exacerbation/respiratory condition | 8         |
| Gastrointestinal illness           | 5         |
| <b>TOTAL</b>                       | <b>20</b> |

\*For both staffing periods

# Spatial Cluster “Alarms”

| Syndrome                              | Hospital | Zip |
|---------------------------------------|----------|-----|
| Respiratory with fever (Adult)        | 0        | 7   |
| Rash with fever (Adult)               | 2        | 2   |
| Sepsis/non-traumatic shock (All ages) | 1        | 2   |
| Gastrointestinal illness (All ages)   | 3        | 3   |
| TOTALS                                | 6        | 14  |

\*For both staffing periods

\* $\alpha = 0.02$

# Summary

- “Alarms” occurred on 15 (63%) of 24 analyzable surveillance days
- No BT-associated outbreaks detected
- 85% completeness for 24 hr staffing vs. 75% for 18 hr staffing ( $\chi^2$ ,  $p < 0.001$ ).

# Resources

- Daily personnel resources
  - ~30 EISOs onsite
  - ~9 NYCDOH/~4 CDC staff at main office
- Transportation resources
  - ~5 drivers on call 24-hours
- Monetary
  - >\$1 million in CDC funds (excluding salaries)
  - >\$50, 000 in DOH funds for overtime staffing



# Discussion

- Substantial resources to implement
- Alleviate concerns for BT
- Utility of having onsite staff to investigate “alarms”

# Epilogue

## Electronic ED system

- 33 hospitals, 67% of NYC ED visits
- Daily electronic data submission
- 7-day/wk system
- Temporal and spatial analysis of key syndromes
  - Febrile illness
  - Respiratory syndromes
  - Diarrheal/gastrointestinal syndromes
- Investigation of clusters

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### NYCDOH

Communicable Disease Program  
Environmental Risk Assessment and Communication  
HIV Services  
Integrated Surveillance Program

Management Information Systems  
Operations  
Public Health Laboratories

STD Control Program  
Tuberculosis Control Program  
Vaccine Preventable Diseases