Biosense- A Local Perspective

Farzad Mostashari, MD, MSc
Assistant Commissioner
New York City Department of Health and Mental Hygiene

fmostash@health.nyc.gov

NYC Health

Biosurveillance

The systematic ongoing collection, collation, analysis, and interpretation in real-time of existing health data essential for the planning, implementation, and evaluation of public health practice and emergency response.

A Briefing for the American Health Information Community on Biosurveillance

Bringing public health surveillance, monitoring, and response into the electronic age

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Materials Developed in Consultation With:

Thomas R. Frieden, M.D., M.P.H., & Farzad Mostashari, M.D., M.S.P.H., New York City Department of Health and Mental Hygiene
John Loonsk, M.D., Office of the National Coordinator for Health Information Technology, HHS
Leah Devlin, D.D.S., M.P.H., & Steve Cline, D.D.S., North Carolina Department of Health
Edward Sondik, Ph.D., National Center for Health Statistics, HHS
George Hardy, M.D., M.P.H. & Mary Shaffran, M.P.A., Association of State and Territorial Health Officials
Laura Conn, M.PH., Centers for Disease Control and Prevention, HHS

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Environmental Scan - Examples

National / CDC

- Coordinates nationwide health surveillance
- Provides resources and expert guidance to state/local health authorities

States Health Departments

- Primary responsibility for PH surveillance and outbreak response
- Have relationships with clinical providers and a wide range of public health informatics capacities
- Many have begun implementing electronic clinical laboratory reporting, linkages to clinical information systems, involvement in RHIO's

Local Health Departments

CDC

- Public Health Information Network
  - Architecture for public health IT
- BioSense goals:
  - Support the connection of clinical care to public health
  - Support situational awareness at a national level

North Carolina - NCHES

- Statewide hospital-based, clinical data monitoring
- Monitors real-time inpatient, outpatient and ED data to detect and manage health threats and disease outbreak
- Public-private partnership (NC Division of Public Health and NC Hospital Association)

New York City

- Ambulance dispatches, emergency dept visits, pharmaceutical purchases, outpatient visits
- 50 hospitals, 90% of all ED visits in NYC
- Used daily, demonstrated utility and flexibility; early detection, estimate disease burden, impact, reassure in non-outbreak, expand case findings

AHIC Biosurveillance Workgroup

Workgroup Charges

- **Broad Charge for the Workgroup:**
  - Make recommendations to the Community to implement the informational tools and business operation to support the real-time nationwide public health event monitoring and rapid response management across public health and care delivery communities and other authorized government agencies.

- **Specific Charge for the Workgroup:**
  - Make recommendations to the Community so that within one year, essential ambulatory care and emergency department visit, utilization, and lab result data from electronically enabled health care delivery and public health systems can be transmitted in standardized and anonymized format to authorized public health agencies within 24 hours.

Biosurveillance Priorities

1. "Volume-based surveillance"
   - Monitor disease trends
   - Estimate burden and impact
2. Individual cases of public health importance
   - Case-finding
3. Resource utilization & bed capacity

“Real time Clinical Connections” the Solution?

- Direct reporting from hospitals to CDC
- Contractor (SAIC) to set up connections
- Broad array of desired data elements
- Centralized national database
- Centralized data mining and alerts
- Success = data moving
- A mandate, not a pilot

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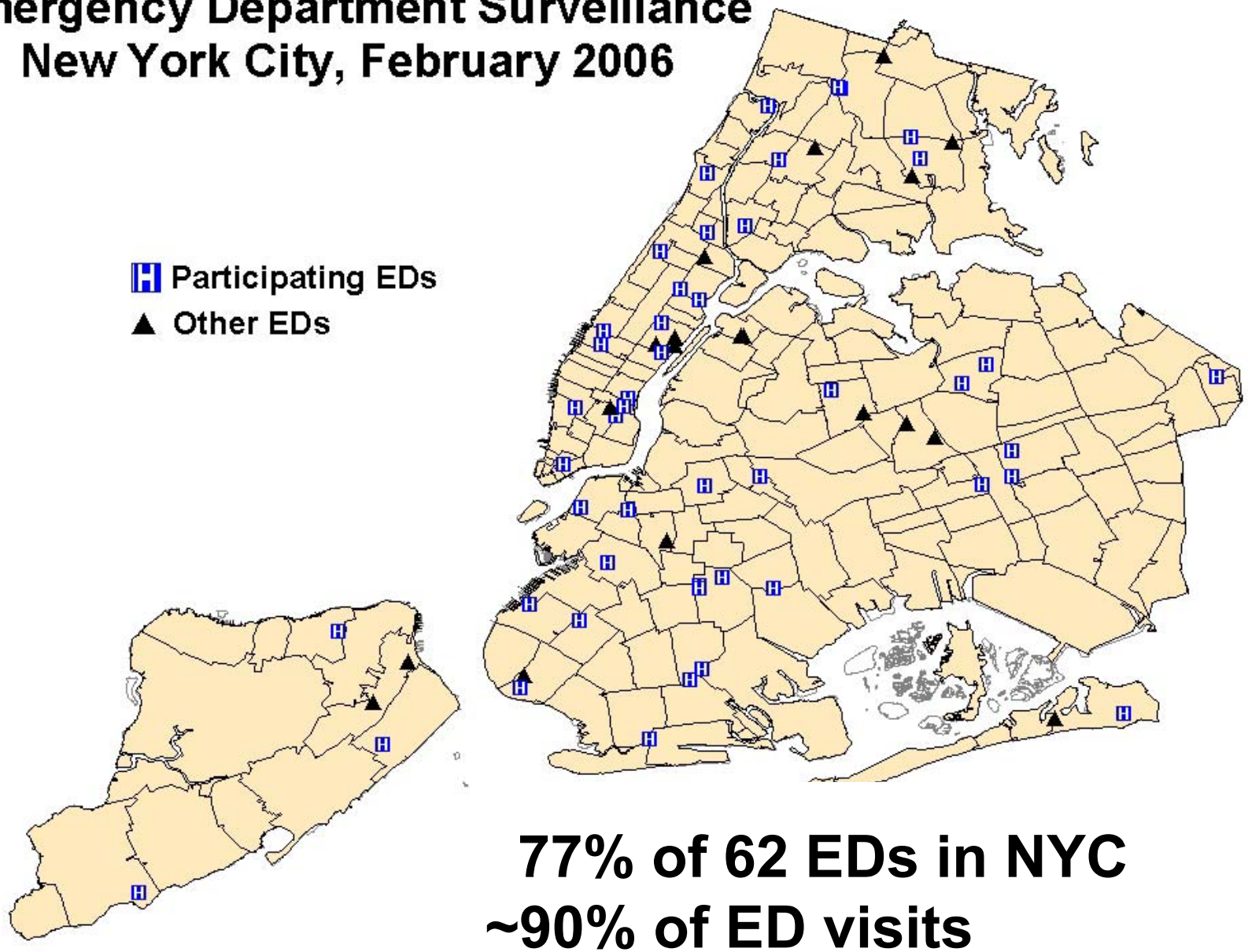
Biosense Concerns

- Direct reporting from hospitals to CDC Contractor (SAIC) to set up connections

- Not consistent with the NHIN
- Disrupts local relationships
- Doesn’t build on existing systems
- Who will maintain connection?
- Who will investigate?

Emergency Department Surveillance
New York City, February 2006



77% of 62 EDs in NYC
~90% of ED visits

Legal Mandate

Local health officers shall exercise due diligence in ascertaining the existence of outbreaks of illness or the unusual prevalence of diseases, and shall immediately investigate the causes of same

New York State Sanitary Code, 10 NYCRR Chapter 1, Section 2.16(a)

Legal Mandate

National Communications and Surveillance Networks.-- ``(1) In general.--The Secretary, directly or through awards of grants, contracts, or cooperative agreements, shall provide for the establishment of an integrated system or systems of public health alert communications and surveillance networks between and among–

(A) Federal, State, and local public health officials;

(B) public and private health-related laboratories, hospitals, and other health care facilities; and

(C) any other entities determined appropriate by the Secretary.

``(2) Requirements.--The Secretary shall ensure that networks under paragraph (1) allow for the timely sharing and discussion, in a secure manner, of essential information concerning bioterrorism or another public health emergency, or recommended methods for responding to such an attack or emergency.

Public Health Security and Bioterrorism Preparedness and Response Act of 2002

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Biosense Concerns

- Broad array of desired data elements

- "Minimum Necessary" principle
- Utility not demonstrated
- Anonymization very difficult
- Privacy risks and consequences amplified
- Complexity increases exponentially

Data Elements Needed

No.	Institution Data	Minimum	Target	Notes from NYC Review	Minimum	Target
1	Hospital Medicare Number	X	X		X	X
2	Hospital System*	X	X	No need to transmit in real time, use lookup table	X	X
3	Main facility ID/name*	X	X	No need to transmit in real time, use lookup table	X	X
4	Location address*	X	X	No need to transmit in real time, use lookup table	X	X
5	Number of facility beds*	X	X	No need to transmit in real time, use lookup table	X	X
6	Type of bed*	X	X	No need to transmit in real time, use lookup table	X	X
* These elements may be available from other sources related to Hospital Medicare						
No.	**Daily Facility Summary**	**Minimum**	**Target**		**Minimum**	**Target**
1	Date/time of report	X	X		X	X
2	Admissions last 24 hours	X	X	Calculate from patient-level data. Target only.	X	X
3	Discharges last 24 hours	X	X	Questionable utility. Requires calculation on hospital side or manual entry. Alternative is to capture patient-level discharge information. Target only.	X	X
4	Deaths last 24 hours	X	X	Requires calculation on hospital side or manual entry. Alternative is to calculate from patient-level disposition information, which would enable classification of deaths by illness category. Target only.	X	X
No.	**Census by Unit**	**Minimum**	**Target**		**Minimum**	**Target**
1	Unit name		X	Monitoring hospital capacity is a key goal yet is not covered in the minimum dataset. These three fields require calculation of institutional-level data on the hospital side (or manual entry).		X
2	Number of patients by unit		X			X
3	Number of beds available by unit		X			X
4	Number of patients boarded in ED		X	HAvBED collects "ED open/closed", see below.		X
No.	**Patient Data**	**Minimum**	**Target**		**Minimum**	**Target**
1	Randomized data linker	X	X		X	X
2	Encounter date	X	X		X	X
3	DOB (month and year of birth)	X	X	Workgroup should explicitly discourage collection of DOB. Month of birth increases privacy concerns while adding no value except for infants.	X	X
4	Age (if DOB, not available)	X	X	Age/units better.	X	X
5	Gender	X	X		X	X
6	Race		X	Likely to be very incomplete. Increases privacy concerns without adding value.		X
7	Ethnicity		X	Likely to be very incomplete. Increases privacy concerns without adding value.		X
8	Occupation		X	Likely to be very incomplete. Increases privacy concerns without adding value.		X

No.	Institution Data	Minimum	Target	Notes from NYC Review	Minimum	Target
9	Zip	X	X	Raises privacy concerns in sparsely-populated areas. When combined with gender and month/year of birth, patient is readily identifiable.	X	X
10	State	X	X		X	X
11	County of residence		X			X
12	Country of residence		X			X
13	Date/time last update	X	X	Questionable utility.	X	X
No.	**Clinical Data**	**Minimum**	**Target**		**Minimum**	**Target**
1	Admit time/date		X		X	X
2	Discharge time/date		X			X
3	Diagnosis/Injury Code	X	X	Useful if available, though often several day lag.	X	X
4	Diagnosis type	X	X		X	X
5	Diagnosis date/time	X	X	Questionable utility.	X	X
6	Discharge disposition	X	X		X	X
7	Patient class (Outpatient, Inpatient, ER)	X	X	Monitoring of inpatients should be limited to critical admission and discharge information only. Collection of transactions throughout an inpatient stay risks overwhelming the surveillance system while adding little value for event detection and management.	X	X
8	Date and time onset of illness	X	X	Likely to be very incomplete. Target only.	X	X
9	Chief complaint	X	X	This is the most complete and useful indication of illness category at most hospitals.	X	X
10	Temperature	X	X	Useful if available.	X	X
11	Date/time temp		X	Questionable utility.		X
12	Blood pressure		X	Questionable utility.		X
13	Date/time BP		X	Questionable utility.		X
14	Pulse Ox		X	Questionable utility.		X
15	Date/time Pulse Ox		X	Questionable utility.		X
16	Current medications		X	Collection of all medications raises significant privacy concerns and adds to complexity of dataset. Utility has not been shown.		X
17	Procedures preformed		X	Collection of all procedures raises significant privacy concerns and adds to complexity of dataset. Utility has not been shown.		X
No.	**Laboratory and Radiology Test Orders**	**Minimum**	**Target**		**Minimum**	**Target**
1	Order number	X	X	Collection of all test orders raises significant privacy concerns and adds to complexity of dataset. Utility has not been shown. Might be reasonable if narrowly focused (e.g., viral	X	X
2	Ordered test	X	X		X	X
3	Reason for test		X			X
No.	**Laboratory/Microbiology Results**	**Minimum**	**Target**		**Minimum**	**Target**
1	Reporting Lab ID	X	X		X	X
2	Performing laboratory	X	X		X	X
3	Report date/time	X	X		X	X
4	Report status	X	X		X	X
5	Collection date	X	X		X	X
6	Collection method	X	X	Collection of all test results, including non-notifiable diseases and/or particularly sensitive diseases (HIV/STD) raises serious privacy concerns and adds significantly to the complexity of dataset. It also overlaps and in	X	X
7	Specimen site	X	X		X	X
8	Specimen	X	X		X	X
9	Ordered test	X	X		X	X

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ED Data

Age	Sex	Home Zip	Time	Chief Complaint	Discharge Diagnosis ICD9
15	M	11691	01:04	ASSAULTED YEST	
1	M	11455	01:17	FEVER 104	
42	F	11220	03:20		
9	F	10013	22:51	ASTHMA ATTACK	493.9
48	M	10027	13:04	SOB AT HOME.	
66	M	10031	17:01	PT. CYANOTIC	

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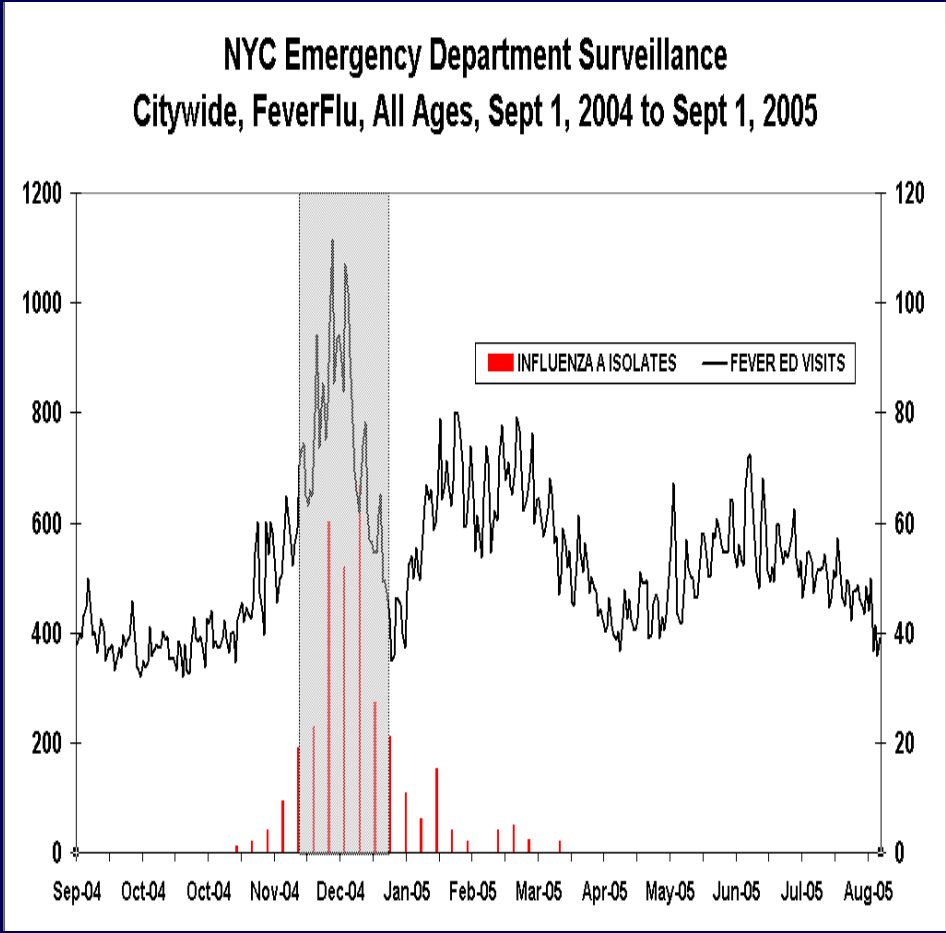
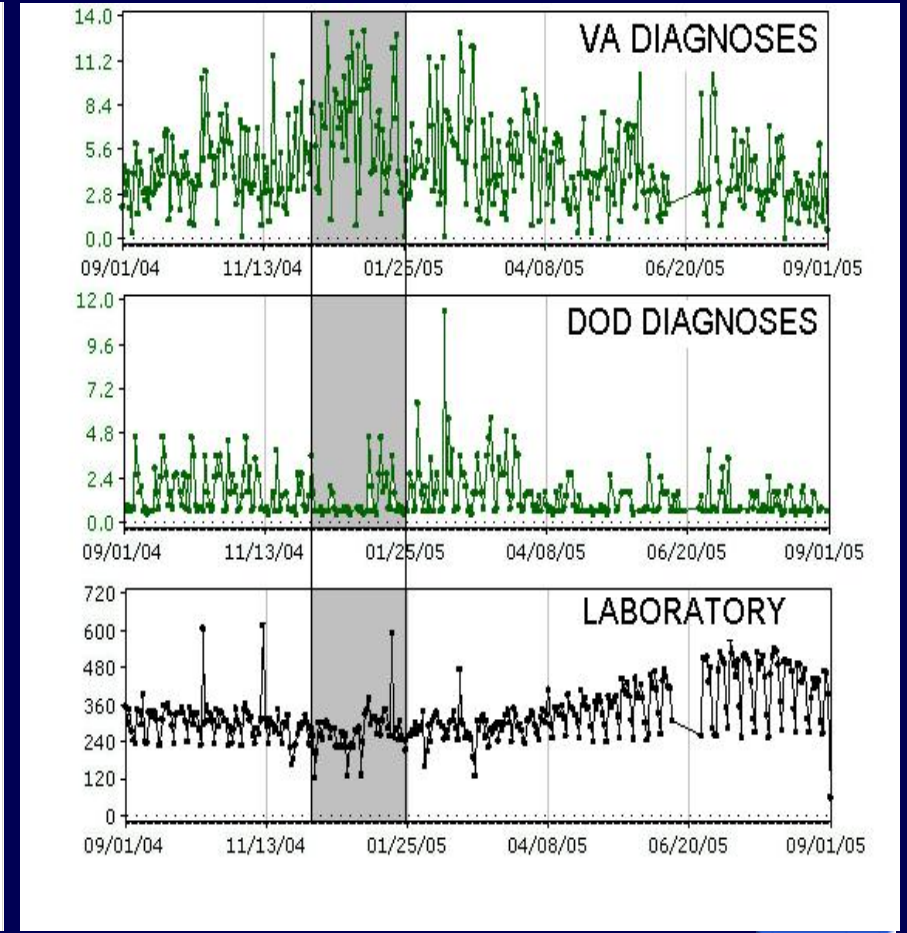
Volume-Based Surveillance





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Biosense Concerns

- Centralized national database
  Centralized data mining and alerts

- Raw surveillance data
- Huge analytic resources needed-(large number of highly skilled analysts)
- Multiple comparisons problem (Many many false alarms)
- Smoke detectors need local investigators
- Single point of failure

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Some Lessons Learned

- Evaluate before you add
- Know your data
- Scrub data meticulously (dups/ errors)
- Code syndromes based on performance
- Optimize analytic methods recursively
- Rule out anomalies before investigating
- Use false positives to improve system

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Biosense Concerns

- Success = data moving
  A mandate, not a pilot

- Shortcuts and HL7 sniffers
- Utility needs to be established
- Evaluation is critical
- Content experts and public health officials must drive needs

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Cautions

- It's about Epidemiology not Technology
- Don't disrupt local systems & relationships
- Don't drown in data
- Beware the privacy backlash

What's the Alternative?

Simpler, Faster, Cheaper

- Volume-based surveillance
  - Build on 100+ local systems
  - Define standards (case definitions)
  - Aggregate reporting
- Individual cases
  - Strengthen local public health
  - Electronic Lab Reporting & NEDSS
  - Pilot more detailed clinical data
- Resource utilization and bed capacity
  - Develop national system for hospital reporting (HavBed)
  - Incorporate into CCHIT requirements for inpatient systems

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And

- Rigorously evaluate all initiatives and expand only those with utility.

- Work with privacy advocates, public health officials and legal experts to educate the public about the necessity of public health surveillance, and define the boundaries and protocols that can ensure the public's continued trust in public health systems.

National Health Information Network?

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Federal Investigation Authority?

"Follow-up may include case investigation, contact tracing, exposure assessment and other activities by Federal, state, and local health agencies acting under Federal, state and local statutory and administrative authorities"