Syndromic Surveillance for Bioterrorism and Naturally-Occurring Communicable Disease Outbreaks

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• Aberration Detection: Collaboration with University of Washington School of Public Health and Community Medicine, Clinical Informatics Research Group
  – Hospital Emergency Department Discharge Data
  – Primary Care Clinic Discharge Data
  – Emergency Medical Services (911) Calls
  – Medical Examiner - Unexplained Deaths
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• Enhanced Surveillance Activities
  – Consulting Nurse Hotline
  – Year Round Influenza Surveillance
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#### Data Sources

<table>
<thead>
<tr>
<th>Clinical Based</th>
<th>Other</th>
<th>Future Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosp ED Dx</td>
<td>Year round Flu Surv.</td>
<td>Additional Clinical Sites</td>
</tr>
<tr>
<td>Primary Care DX</td>
<td>Nurse Hotlines</td>
<td>Internet-based reporting</td>
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<td></td>
<td>School Absenteeism</td>
<td></td>
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<tr>
<td>Unexplained Deaths</td>
<td>911 Triage Codes</td>
<td></td>
</tr>
</tbody>
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**Future Directions**
- Additional Clinical Sites
- Internet-based reporting
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Current Clinical Surveillance Sites

• Emergency department (ED) A: private hospital; 48,000 adult/pediatrics, ED & urgent care (UC) visits/year
• ED B: university hospital; 30,000 adult ED & UC visits/year
• ED C: university-affiliated children’s hospital; 28,000 pediatric ED visits/year
• Primary Care Center (PCC) D: University-based student/community health; 10,000 visits/year
• Ten regional primary care clinics
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Emergency Department Sites
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Regional Primary Care Network
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Surveillance System Methods

- Data sources - existing clinical data systems
- Secure internet-based data transfer
- Central data repository
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Surveillance Methods

- Data extracted from clinical discharge diagnosis databases at three hospitals and nine primary care clinics
- Transmitted electronically
- Analyzed using CDC aberration detection program
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ED Surveillance Data Collection Methods

• Customized data extraction software
• FoxBase Pro
  – COM object
  – Remote access
• Secure internet-based transmission to central data repository
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Clinical Sites - Data Collection Methods

- Site-specific data extraction software
- Conversion to standardized representation (XML)
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### Indicator Codes - Free Text

<table>
<thead>
<tr>
<th>Diagnosis or Free Text</th>
<th>ICD-9</th>
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</thead>
<tbody>
<tr>
<td>Viral syndrome-peds</td>
<td>079.9</td>
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<tr>
<td>pneumonia-viral</td>
<td>480.9</td>
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<tr>
<td>Influenza</td>
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<tr>
<td>Flu</td>
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<td>Enterocolitis</td>
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<tr>
<td>diarrhea-infectious</td>
<td>009.2</td>
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<tr>
<td>Viral meningitis</td>
<td>047.9</td>
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<tr>
<td>bronchitis</td>
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<tr>
<td>pneumonia-peds</td>
<td>486</td>
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<tr>
<td>diarrhea-peds</td>
<td>787.91</td>
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<td>measles</td>
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<tr>
<td>Pleurisy</td>
<td>511.0</td>
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Data Collection Methods - XML Schema
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Aberration Detection Programs

• SAS Aberration Detection Programs developed by the CDC for:
  – ED and clinic discharge data
  – EMS (911) data
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Medical Examiner (ME) - Unexplained Deaths

- Deaths reported to the King County ME reviewed daily
- Definition: Unexplained death in a previously healthy person aged 1-49 years with hallmarks of infectious disease
- Suspicious cases investigated immediately
- Data is analyzed using aberration detection system developed by Washington DOH which uses death certificate ICD-9 codes to define historic baseline
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Seattle EMS (911) Calls

- The number and type of triage protocols are monitored during each 24 hour period
- Analyze using CDC Aberration Detection Software-CUSUM and Figure 1
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EMS (911) Triage Protocols

• Abdominal Pain
• Breathing Problems
• Convulsions/Seizures
• CVA/Stroke
• Chest Discomfort

• Sick Unknown
• Person Down
• Headache
• DOA
• Dizzy/Fainting
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Aberration Detection Program

Triage: 32 Sick Unknown

Cases Reported in the Past 30 Days
04/02/01 - 05/01/01

Cases

Date

Historical Limits
Case
Combined
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Secure Data Transmission

• Automated and manual system data transfer
  – Web page for upload/download
  – Secure authentication
  – Encryption via Secure Sockets Layer (SSL)
  – Secure Web Protocols for flexibility
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Central Data Repository - I

- Microsoft SQL Server 2000
  ✔ With XML for SQL Web Release
  ✔ Presently:
    - De-identified data
    - Test database built using initial XML schema
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Central Data Repository - II

✔ Under development
  • Improved Security
    – IP restriction, SSL-only, local firewall
  • Secure replication to Public Health database system
  • Secure access by
    – aberration detection software
    – GIS software
  • Improved Protocols
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Future Plans

• Refine Aberration Detection System
• Refine Epidemiologic Response to Triggers
• Add Additional Clinical Sites
• Internet-based reporting for large outbreaks
• Link to Geographic Information System
• Internet-based reporting for outbreaks
• Poison Center Data
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LIFE IN HELL

ANTHRAX!
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LET'S CHANGE THE SUBJECT.

OK.

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