

**Evolution of
Public Health Informatics**

**Satellite Conference and Live Webcast
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Faculty

**Nir Menachemi, PhD, MPH
Associate Professor
Department of Health Care
Organization and Policy
School of Public Health
University of Alabama at Birmingham**

Outline

- **What is Public Health?**
- **What is Public Health Informatics (PHI) and how did it evolve?**
 - **What do PHI professionals do and how did this change over time?**
- **What were early PHI applications?**
- **What are emerging and future PHI uses?**

Public Health’s Mission

- **“Promote Physical and Mental Health and Prevent Disease, Injury, and Disability”**
- **This is accomplished through 10 “essential public health services” organized under three main headings**
 - **Assessment**
 - **Policy Development**
 - **Assurance**

– Source: <http://www.health.gov/phifunctions/public.htm>

Essential Public Health Services

- 1. Monitor health status to identify community health problems**
- 2. Diagnose/ investigate community health problems and health hazards**
- 3. Inform, educate, and empower people about health issues**

Essential Public Health Services

- 4. Mobilize community partnerships to identify and solve health problems**
- 5. Develop policies/plans that support individual and community health efforts**
- 6. Enforce laws and regulations that protect health and ensure safety**

Essential Public Health Services

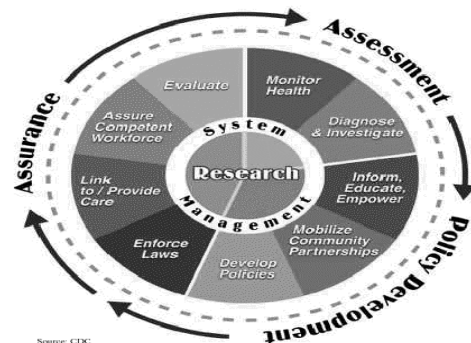
- 7. Link people to needed personal health services and assure the provision when otherwise unavailable
- 8. Assure competent health workforce

Essential Public Health Services

- 9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- 10. Research for solutions to health problems

- Source: <http://www.health.gov/phfunctions/public.htm>

Essential Public Health Services



Public Health

- Generally speaking, Public Health is:
 - Focused on preventive rather than curative aspects of health
 - Concerned with population-level, rather than individual-level health issues

What is Public Health Informatics (PHI)?

- PHI emerged when health officials began leveraging Health Information Technology in systematic ways
- PHI definitions:
 - The science of applying information-age technology to serve the specialized needs of public health (Friede et al, 1995)

What is Public Health Informatics (PHI)?

- The systematic application of information and computer science to public health practice, research, and learning (Yasnoff et al, 2000)

Public Health Informatics (PHI)

- How is PHI different than other informatics disciplines?
 - A focus on prevention in populations
 - Use of a wide range of interventions to achieve its goals
 - Constraint by operating in a governmental context

– Yasnoff et al, 2000. J Public Health Manag Pract 6(6)

PHI Professionals

- Trained in both information technology and public health
- Utilize HIT applications to solve public health problems

Evolution of PHI

1995

- PHI was first described as a needed distinct discipline (Friede, 1995)

1990's

- The PHI "movement" gained momentum in the late 1990's and early 2000's

2001

- Events of September 11th, and the subsequent anthrax attacks crystallized the need for key PHI applications

9/11



Anthrax Attacks



Early PHI Applications

- Syndromic surveillance
 - Definition
 - Concerned with the continuous monitoring of public health related information sources and early detection of adverse disease events (Yan et al, 2008)

Early PHI Applications

– Utilizes information technology, statistical algorithms, and data visualization techniques to identify trends warranting public health attention

Potential Data Sources for Syndromic Surveillance



Sales of over the counter drugs

Potential Data Sources for Syndromic Surveillance



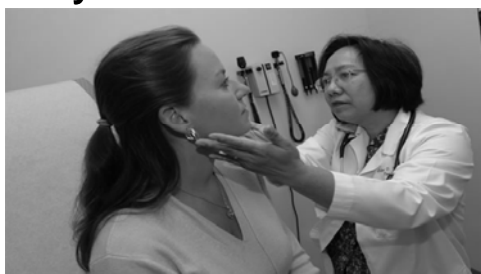
Visits to the ED for certain ailments

Potential Data Sources for Syndromic Surveillance



Absentee data from schools

Potential Data Sources for Syndromic Surveillance



Physician office visits

Potential Data Sources for Syndromic Surveillance



Nurse hotline calls

Potential Data Sources for Syndromic Surveillance



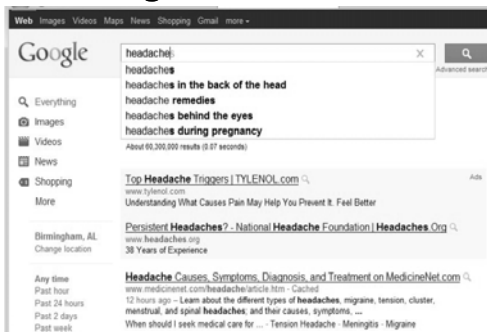
Dead bird reports

Potential Data Sources for Syndromic Surveillance



Prescription pharmaceuticals

Google Search Terms



Syndromic Surveillance

- 2004 RAND study concludes that the benefits of Syndromic surveillance are not clearly established



BioSense

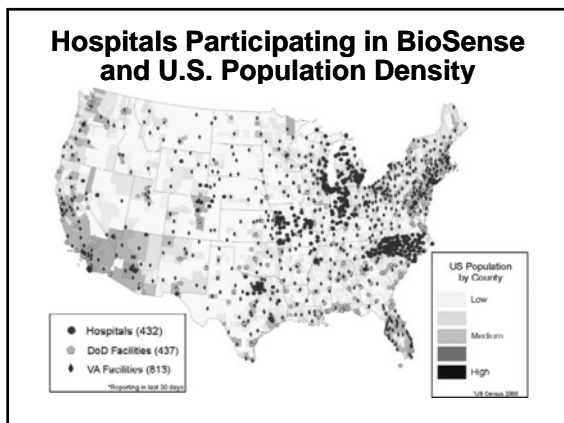
- BioSense is a national program intended to support early outbreak detection by conducting near real-time analysis of existing data from healthcare organizations across the country
 - Ambulatory data



BioSense

- Emergency room diagnostic and procedural information
- Clinical laboratory test orders and results
- Over-the-counter drug sales





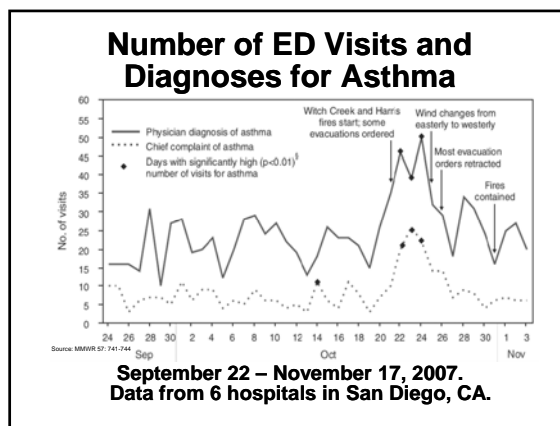
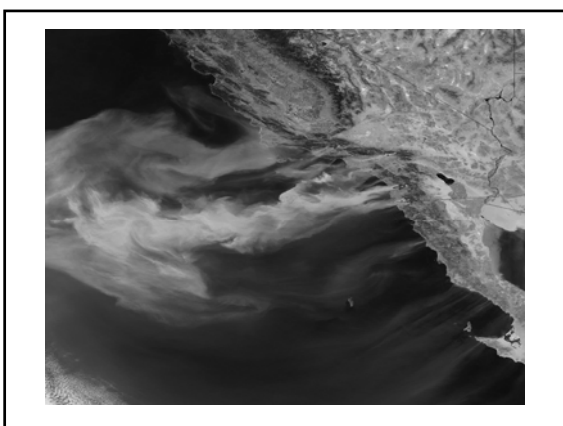
- ### History of BioSense
- Launched in 2003 to focus on Bioterrorism and related illness
 - By 2005
 - VA, DoD facilities, and some hospital direct reporting to CDC
 - By 2006:
 - State health department data

- ### History of BioSense
- By 2007:
 - Anti-infective Rx data and laboratory data
 - LabCorp and Quest

- ### BioSense and California Wildfires
- 2007: Massive wildfires in California affect millions
 - BioSense was able to provide local authorities daily reports on health activity related to the fires
 - Large increase in respiratory visits to hospitals

- ### BioSense and California Wildfires
- Helped determine impact of wildfire smoke on patients with chronic illnesses
 - Lessons learned very valuable
 - “Real time” situational awareness
 - CDC Report: BioSense is Useful Tool During California Wildfires

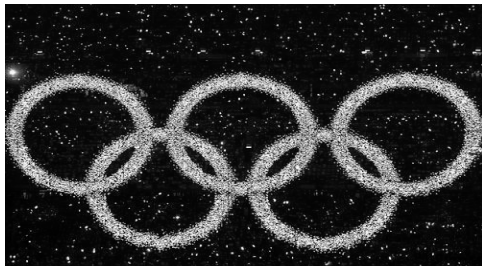




- ### Local and State Efforts
- Many local syndromic surveillance systems have been implemented at the local, county, and state levels
 - Many focus on identifying trends indicating a possible bioterrorism attack
 - Anthrax
 - Botulism toxins

- ### Local and State Efforts
- Small pox
 - Plague
 - Q-fever
 - Tularemia
 - Brucellosis
 - Hemorrhagic fever
 - Viral-encephalitides
 - Staph. enterotoxin-B

**Syndromic Surveillance for
Special Events**



Olympic Games

**Syndromic Surveillance for
Special Events**



FIFA World Cup

**Syndromic Surveillance for
Special Events**



G8 Summit

**Syndromic Surveillance for
Special Events**



World Series

**Syndromic Surveillance for
Special Events**



Super Bowl

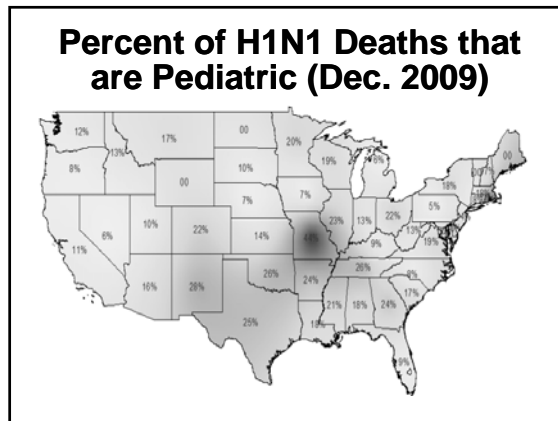
**Syndromic Surveillance for
Special Events**



Kentucky Derby

Syndromic Surveillance for Special Events

H1N1 Pandemic



Future of Syndromic Surveillance

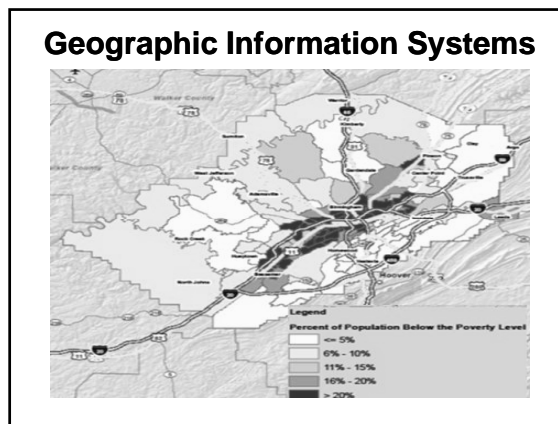
- Take advantage of Electronic Health Record data
- Connect with Nationwide Health Information Network (NHIN)

Future of Syndromic Surveillance

- Expand beyond “early detection” and provide data for:
 - Situational awareness
 - Other routine public health practices
- Electronic submission of “reportable” diseases
- MRSA occurrence tracking

Emerging PHI Applications

- Geographic Information System (GIS)
- SMS text messaging



SMS Text Messaging

- Has been used for public health purposes including:
 - Behavior change support
 - Disease prevention
 - Contact tracing
 - Health education campaigns
 - Data collection



Future PHI Applications

- Electronic Health Record and Health Information Exchange enabled PHI applications
- Web 2.0 technologies including social networking systems



Final Thoughts

- The use of PHI applications may raise
 - Ethical issues
 - Social issues
 - Political issues

Final Thoughts

- On-going transparency and open debate will likely resolve many concerns and allow PHI to enable more efficient and effective public health practice