

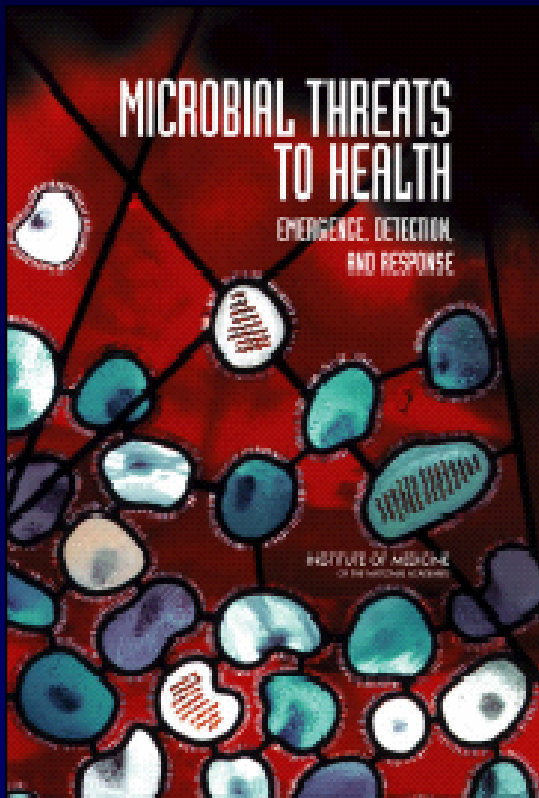
Emerging Infections in Healthcare Delivery: Roles for HL7 in Applied Public Health

Daniel B. Jernigan, MD, MPH

Division of Healthcare Quality Promotion

National Center for Infectious Diseases

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- March 2003 IOM Report
 - Important 3rd release on Emerging Infections
 - Focus on capture of existing data for improved surveillance and control of infectious diseases

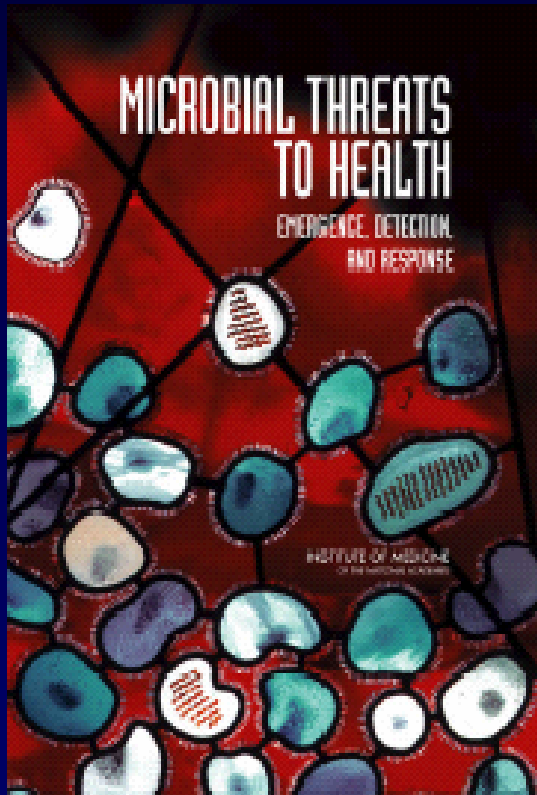
Factors in Emergence

- Microbial Adaptation and Change
- Human Vulnerability
- Climate and Weather
- Changing Ecosystems
- Economic Development and Land Use
- Human Demographics and Behavior
- Technology and Industry
- International Travel and Commerce
- Breakdown of Public Health Measures
- Poverty and Social Inequality
- War and Famine
- Lack of Political Will
- Intent to Harm

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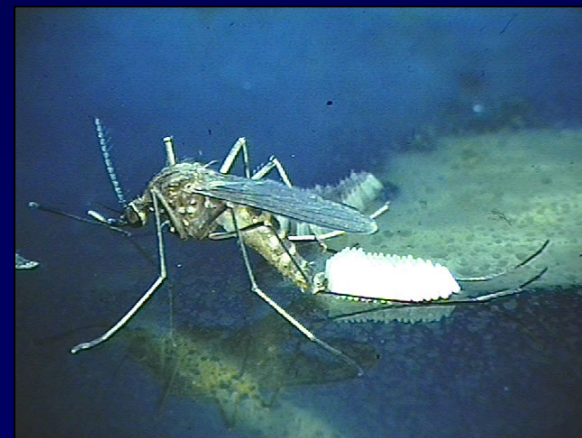
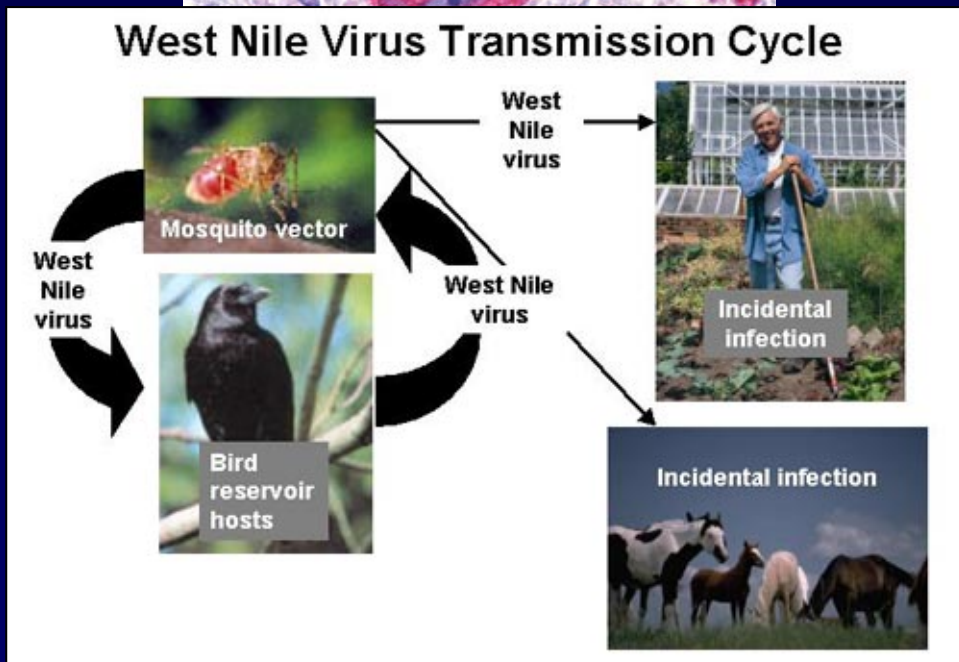
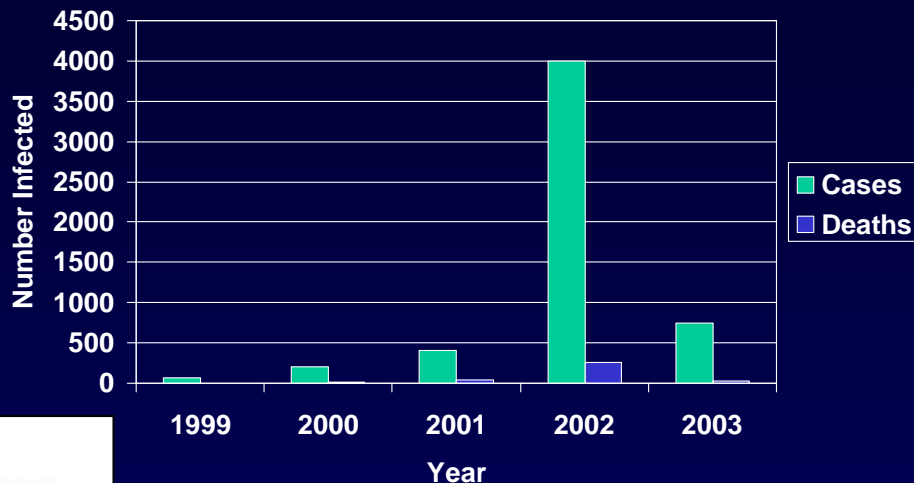


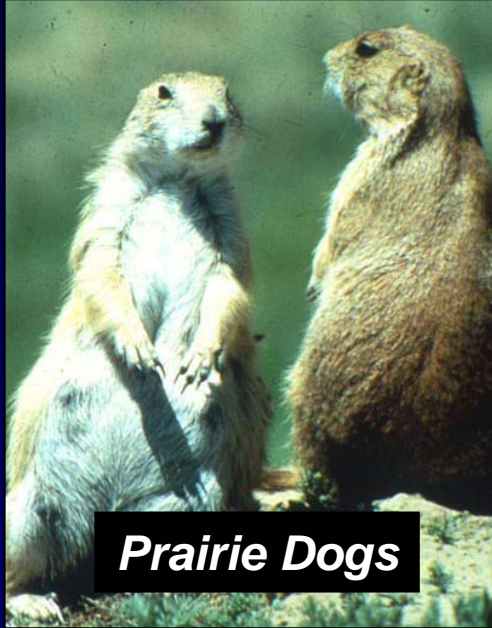
- “It’s conceivable, in fact, that in certain places microbial “perfect storms” could occur— convergences of all the factors—and unlike meteorological perfect storms, the events would not be on the order of once-in-a-century, but frequent.”

Emerging Infections

- What are some examples of emerging infections?
- What factors of emergence are associated with healthcare delivery?

West Nile Virus





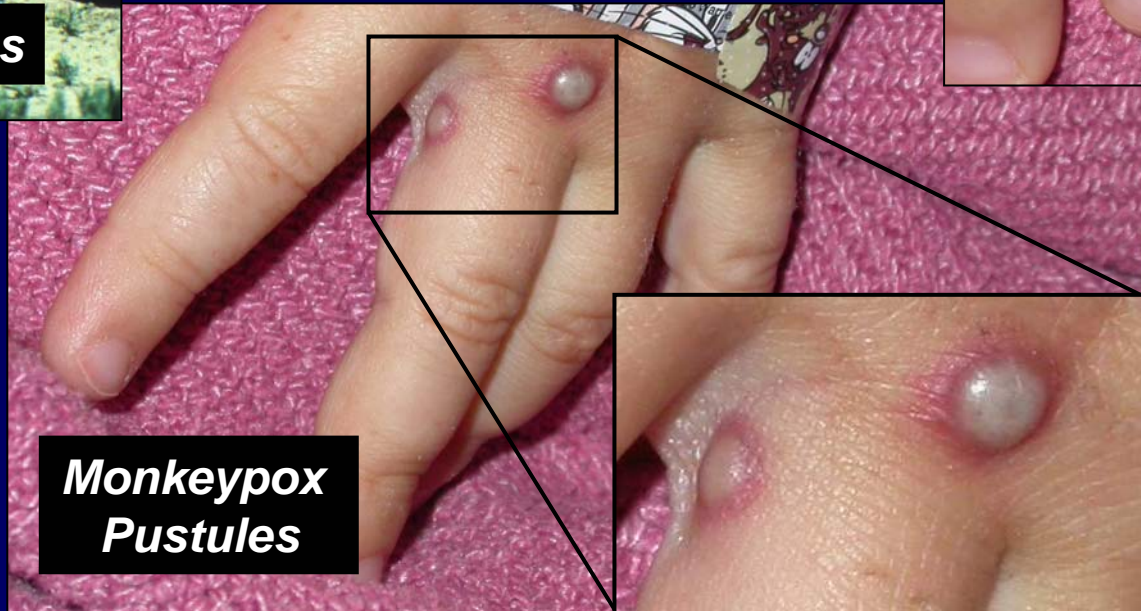
Prairie Dogs



Gambian Rat



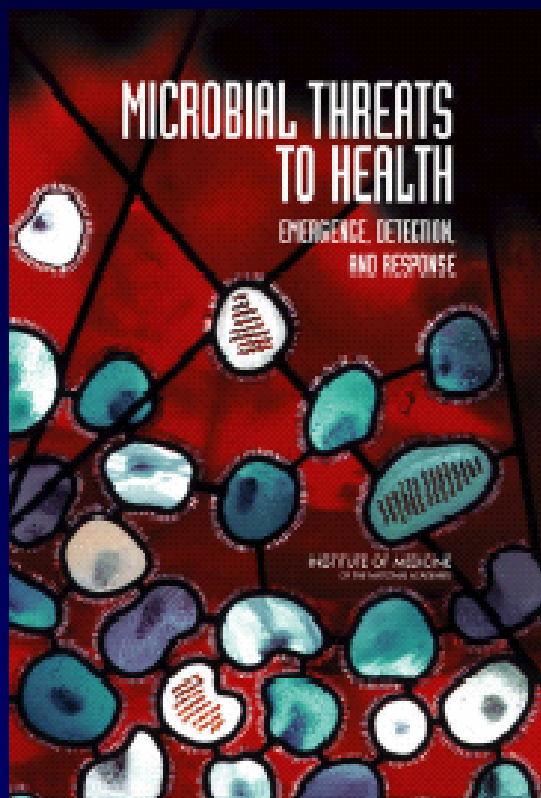
Monkeypox



Monkeypox Pustules

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Breakdown of Public Health Measures

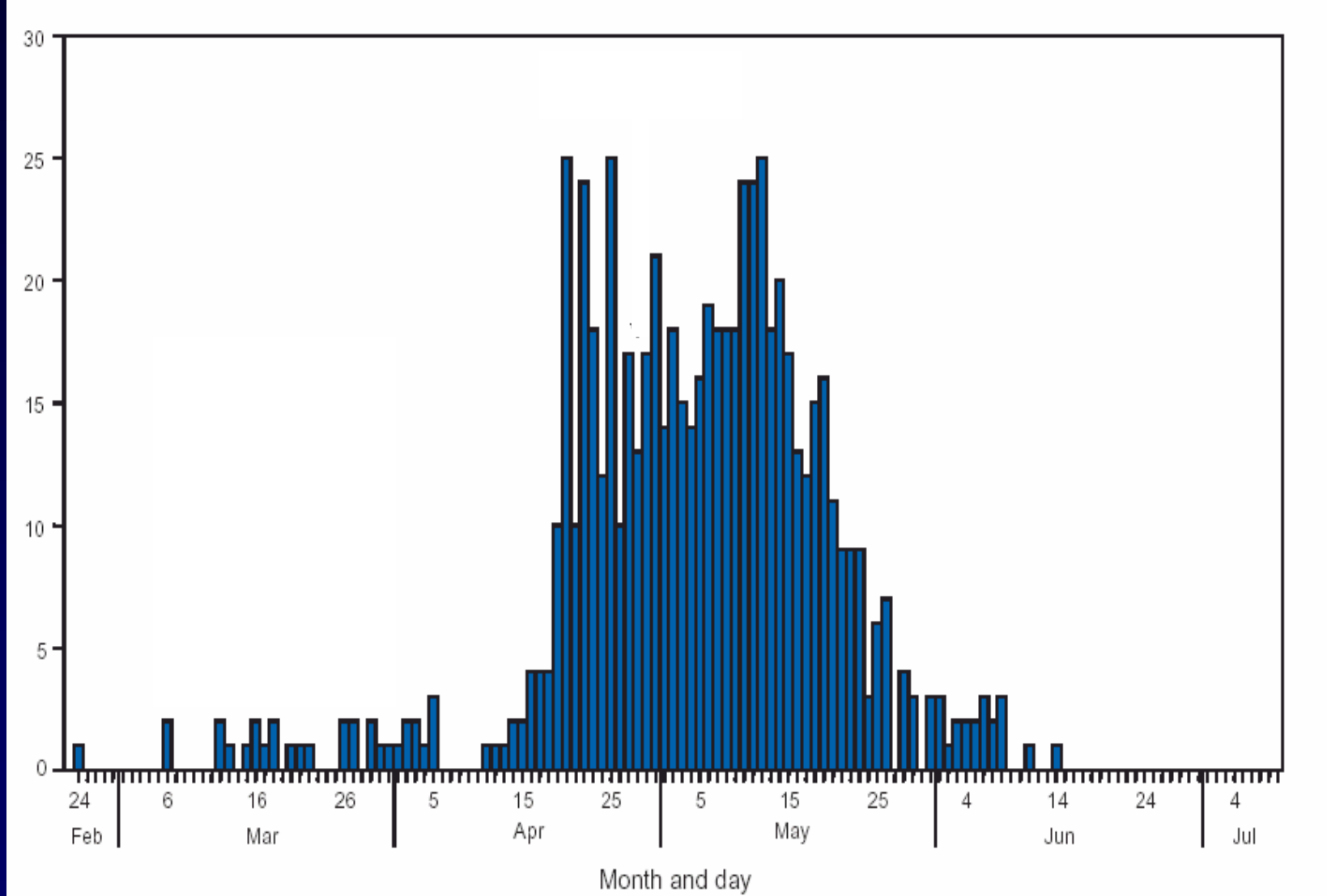


- “The breakdown of public health measures in the United States has resulted in an increase in nosocomial infections...”
- "Hospitals are perfect breeding grounds for transferring infections among patients, health care providers, and the community."

Healthcare-Associated Infections in the U.S.

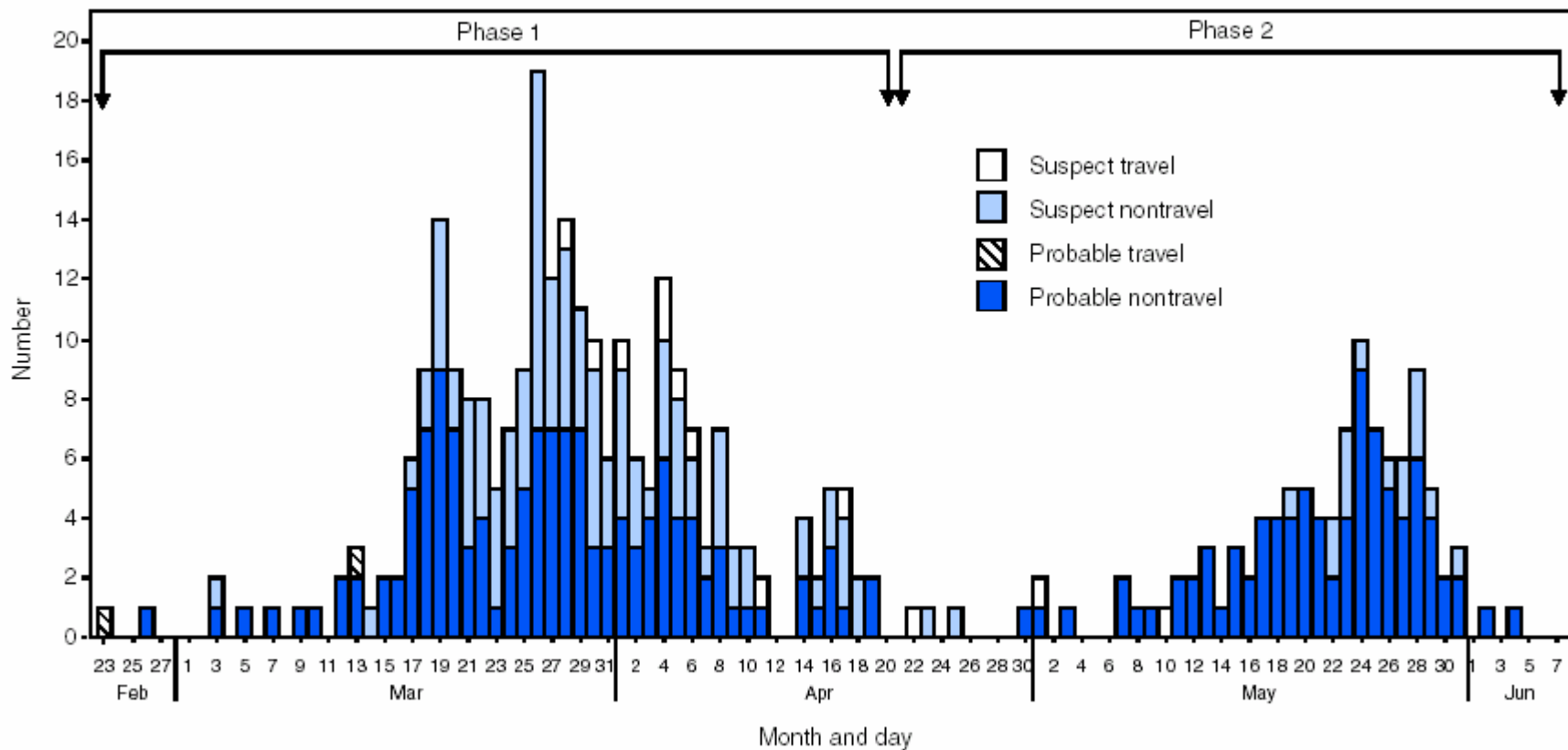
- 1.8 million hospitalized patients infected/year
- 88,000 infections contribute to death/year
- 5 pathogens associated with 50% of all infections
- Outside the US, one emerging pathogen recently had a profound impact as a healthcare-associated infection

SARS



Cases of Probable SARS – Taiwan, 2003

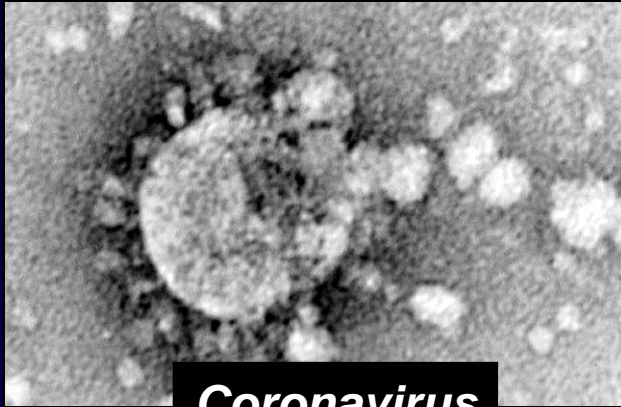
SARS



* N = 361.

Cases of SARS – Toronto, 2003

SARS



Coronavirus



Budding SARSologist



Personal Protective Equipment



Disinfecting Taipei

Lessons from SARS

- Healthcare-associated transmission of SARS was the primary accelerator of disease in Toronto and Taiwan
- SARS represents the confluence of both emerging infections issues and patient safety issues
- Surveillance for healthcare-associated infections is a vital component for preventing both emerging infectious diseases and for improving patient safety

Healthcare-Associated Infections

- What systems are available to monitor healthcare-associated (nosocomial) infections?
- How is HL7 incorporated into these efforts?

CDC's Healthcare Surveillance Activities

- Designed to help infection control, dialysis, and occupational health programs promote patient and healthcare personnel safety by providing tools to:
 - Identify the existence of problems that need to be addressed
 - Monitor the success of interventions
 - Trend data over time
 - Determine what events to target for greatest efficiency and resource management



National Healthcare Safety Network

- Comprised of three existing networks
 - NNIS: National Nosocomial Infections Surveillance System
 - Est 1970
 - Determines national baselines for hospital infections and antimicrobial resistance
 - DSN: Dialysis Surveillance Network
 - NaSH: National Surveillance System for Healthcare Workers



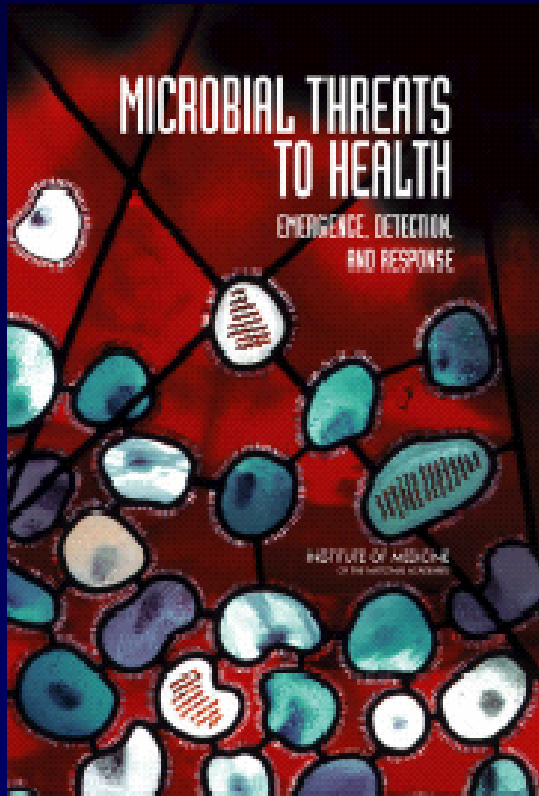
National Healthcare Safety Network



- Built on architecture developed for:
 - *Public Health Information Network (PHIN)*
 - *National Electronic Disease Surveillance System (NEDSS)*
- HL7 messages and models
 - Data repository modeled after V3 RIM
 - Messaging capabilities for V2.x and V3
 - Standard terminology consistent with HL7 goals
 - Utilizes V3 public health notification messages

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Exploring Innovative Systems of Surveillance



- “Advances in information technology, such as automated systems of syndromic surveillance, may also be helpful”

Syndromic Surveillance

- What efforts to facilitate syndromic surveillance have been initiated?
- How is HL7 incorporated into these efforts?

eHI Activities

- Collaboration with eHealth Initiative (eHI), CDC, and others to develop standard messages to improve reporting of syndromes potentially indicating infectious diseases of public health importance
- HL7 2.3.1 message implementation guides for connecting clinical systems to public health
 - Chief Complaint
 - Healthcare Orders
 - Microbiology Results



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Centers for Disease Control and Prevention
1600 Clifton Rd.
Atlanta, GA 30333
U.S.A
(404) 639-3311

Messaging

Implementation Guides / XML Schemas / Standards

- [Introduction To PHIN Health Level Seven \(HL7\) Implementation Guides](#)  (123 KB)
- [Bioterrorism Lab Result Implementation Guide](#)  (778 KB)
This implementation guide documents the use of Health Level 7 (HL7) Version 2.4 to support reporting laboratory results in the context of Bio-terrorism response messaging.
- [Disease Specific Implementation Guides - Part 1](#) (zip file, 4.2 MB)
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For More Information:

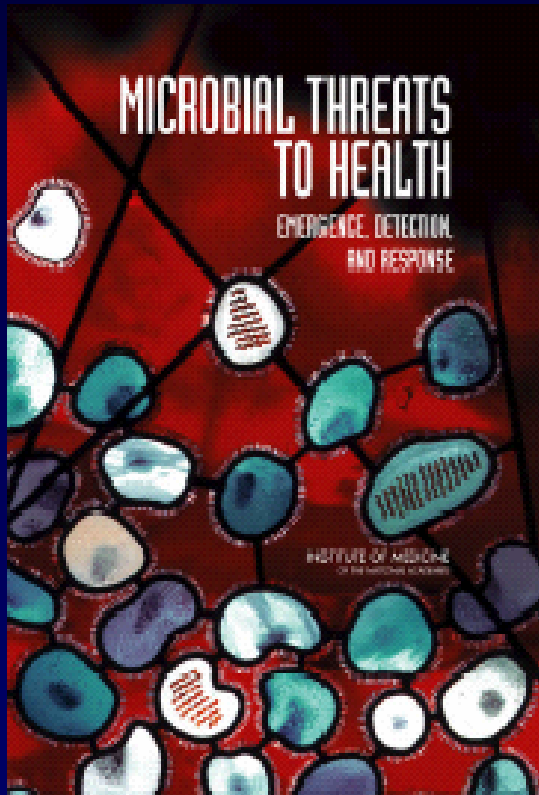
- **Phone:** 1-800-532-9929 OR (770) 216-1299
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Microbial Adaptation and Change



- "Antimicrobial resistance is a paramount microbial threat of the twenty-first century"
- "With the presence of antimicrobial resistance may come a corresponding increase in mortality and morbidity from untreatable disease..."

Tuberculosis

Malaria

**Antimicrobial
Resistance**

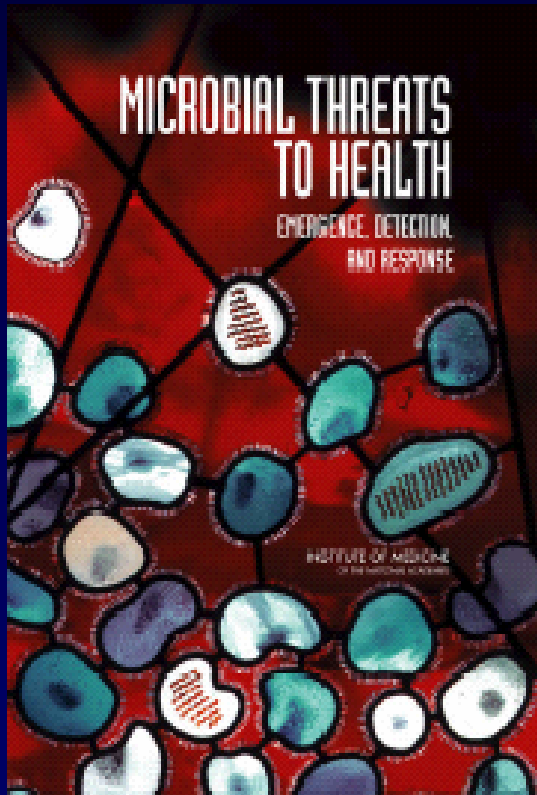
**Vanco
Resistant**

Community MRSA

Staphylococcus aureus

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Microbial Adaptation and Change



- “CDC should implement automated electronic laboratory reporting of notifiable infectious diseases from all major clinical laboratories to their state health departments as part of a national electronic infectious disease reporting system.”
- “This would not only improve surveillance but assist in the control of antimicrobial resistance.”

Electronic Laboratory Reporting

- What systems are available to automatically report laboratory data electronically?
- How is HL7 incorporated into these efforts?

Electronic Laboratory Reporting

- ELR improves timeliness and accuracy
- HL7 messaging incorporated into NEDSS Base System – available to state health departments for public health reporting
- Uses HL7 v2.3.1 ORU message and acks
- Messages from LabCorp, Quest, and others



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NHSN Medication Module

AUR Option

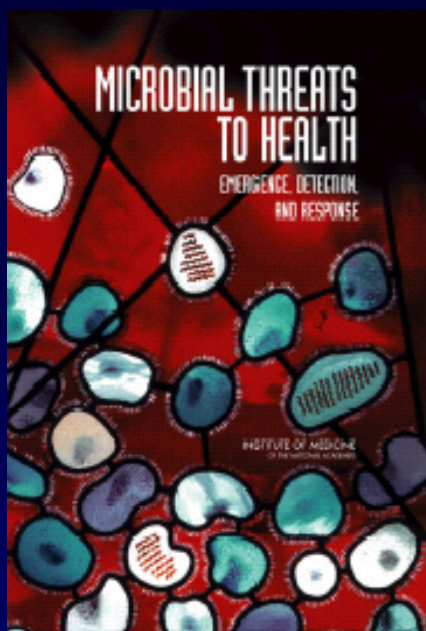
- Collects microbiology/antimicrobial susceptibility data from existing data source
- Utilizes V3 message for transport
- Imported into NHSN database
- Use of the AUR Option will assist hospitals in collecting data on antimicrobial resistance and/or antimicrobial use so that this information can be used for prevention purposes.

National Monitoring of Antimicrobial Use and Resistance

- Collaboration with CDC, HL7, and Theradoc
- Transmit nationally representative micro and susceptibility data from a national data repository to CDC using HL7 v3 derived messages
- Pharmacy and ADT messages to follow

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Integrating Reporting



- “...develop innovative strategies to improve communication between health care providers and public health authorities”
- “...implement a national electronic infectious disease reporting system”

Integrated Reporting

- What efforts are underway to integrate public health reporting?
- How is HL7 incorporated into these efforts?

Adverse Event Reporting

- Collaboration between HL7, FDA, and CDC to build a common V3 HL7 message
- Business requirements include:
 - Device-associated adverse events
 - Food/Supplement-associated adverse events
 - Vaccine Adverse Events
 - Public Health Notifiable Diseases
 - Animal products/drugs pending
 - Tissue Allografts/Biologicals under consideration

Conclusion

- A number of factors contribute to emerging infections, those associated with healthcare delivery include:
 - Infection control lapses leading to nosocomial infections
 - Antimicrobial resistance
- Recent efforts to improve monitoring of healthcare-associated and antimicrobial-resistant infections utilize HL7 messaging and modeling in the prevention of infectious diseases

Questions - Comments

Dan Jernigan, MD MPH

DJernigan@cdc.gov

1-800-893-0485