Health IT Policy Committee

A Public Advisory Body on Health Information Technology to the National Coordinator for Health IT

Outbreak Management and Response Health IT in the United States: Introduction, Context and Terminology

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Outbreak Management and Response Health IT in the United States

- Ebola has brought to the fore important considerations for health IT
- Much of the attention in the U.S. emanated from the initial suggestion that an EHR was involved in clinical response challenges
- Dire circumstances internationally and other previous U.S. emergency events help show the importance of broader health IT readiness here
- Today we will focus on outbreak management and response health IT needs in the U.S. – they are a subset of broader public health and emergency management health IT needs

- We will hear functions that EHRs need to fulfill, functions that other public health IT systems must support, and some of the interoperability needed among them
- State and local health departments have primary responsibility for managing outbreaks in U.S. unless they are **cross-jurisdictional** or there is a declared **public health emergency**
- A challenge for health IT is the variability in the organization of health care and in different health departments nationally
- There can also be variability between **infectious disease, environmental, and natural disaster** emergencies

- Public and **population health** functions share many IT needs whether they are outbreak management, hospital infection control, chronic disease management, specialty registries, clinical research, or other activities that have a population perspective
- Importantly, population health IT and **aggregate** data systems are not synonymous - much of what you will hear is about public health functions that manage individual **cases** / patients
- Aggregate data also play an important role for reporting and **situational awareness**, particularly as data get rolled-up
- Even for infectious diseases, there are other sources of variability in public health emergencies as well

Some Other Elements of Variability

Pathogen
Ebola, MERS, SARS, Anthrax, Mumps, Pertussis…

Method of Spread
Bodily fluids, airborne, airborne droplets, environmental spores

Infectiousness
Average number of secondary cases from a primary one

Host Resistance
Natural and induced

Duration of Contagiousness
Length of pre-symptomatic, symptomatic, and post-symptomatic risk

Size of Initial Exposure
Natural and created

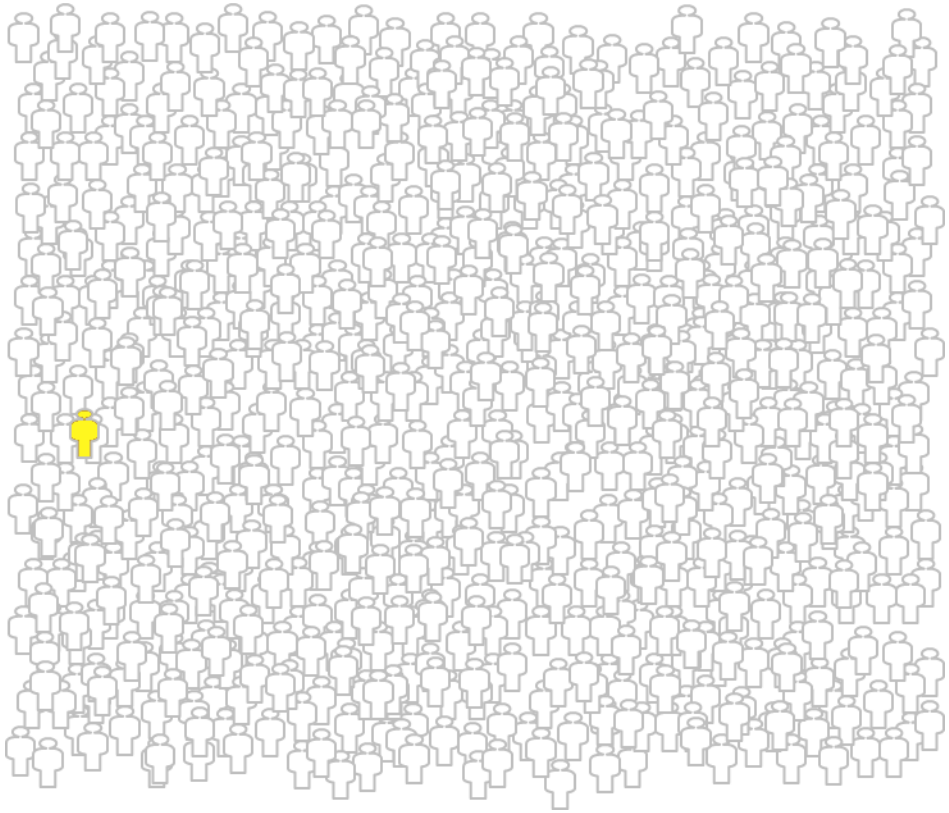
Outbreak Management HIT

1. **Index case** identification

   – Limited awareness

   – Conceptually one place "syndromic surveillance" might help, but few outbreaks identified this way

   – Providers are still the best "**detectors**," but they need information support and are not primarily "**reporters**"

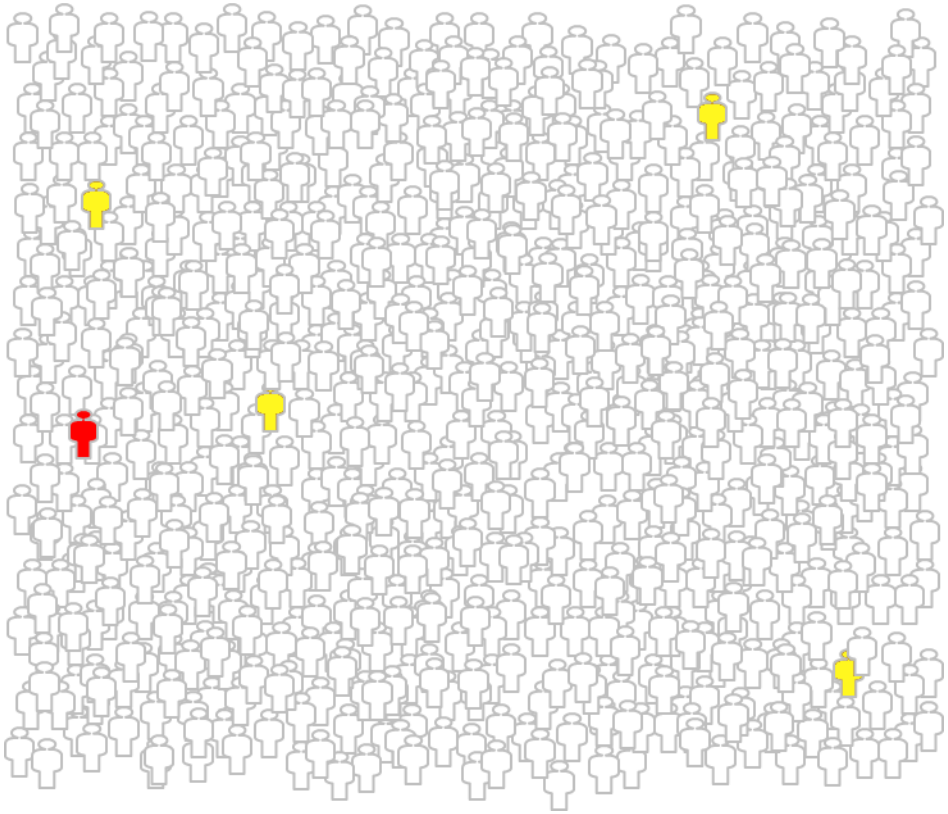


Outbreak Management HIT, continued

2. **Screening** for additional cases

   – Heightened awareness after index case brings different provider information support needs

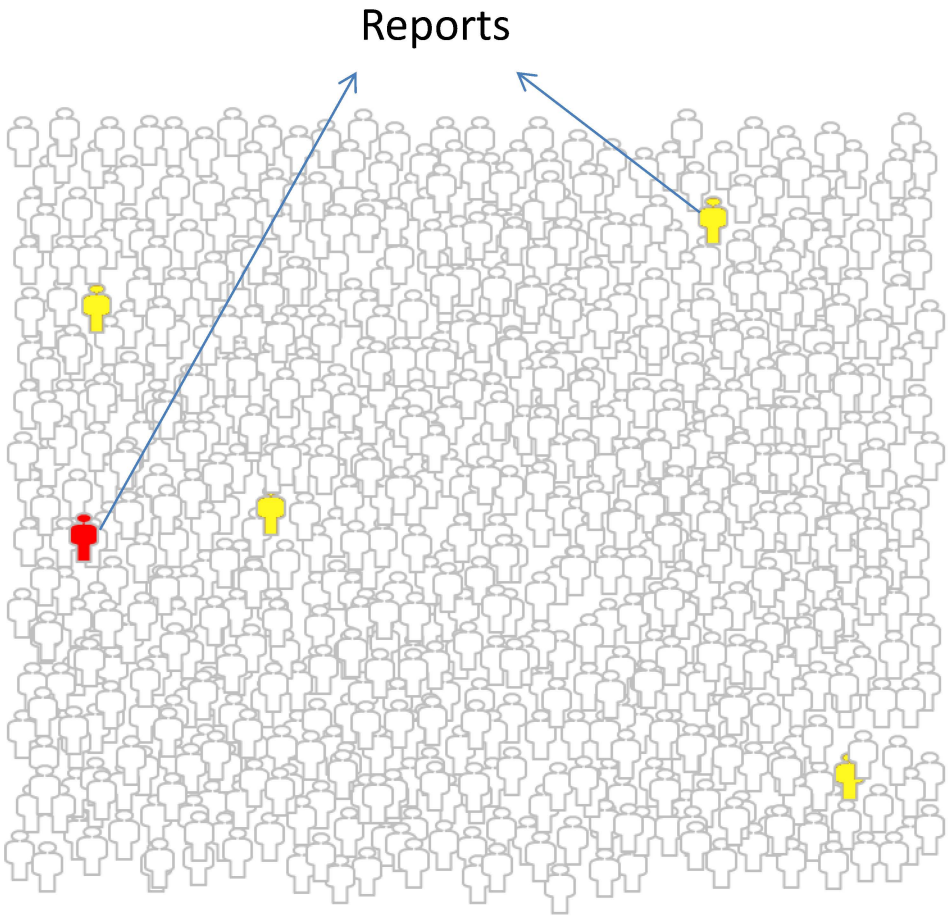
   – Getting **possible cases** to people who are focused on looking for and managing outbreaks is a critical need – they have particular population focus and tools



Outbreak Management HIT, continued

3. Reporting for monitoring and case management

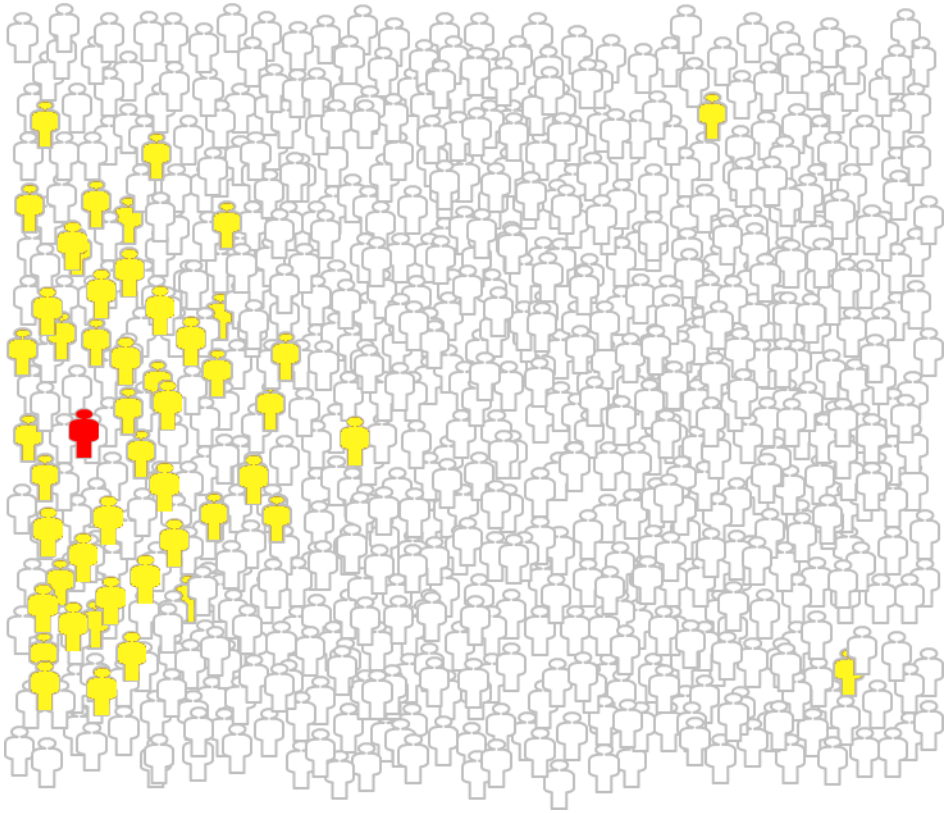
   - Focus moves outside of EHR
   - Automating the movement of cases to public health systems has demonstrated significantly greater **yield** of cases
   - Also need link-back for clinical **investigation** of the outbreak population and for information sharing with providers



Outbreak Management HIT, continued

4. **Case management**

   - Public health receives **possible and confirmed cases** and works these populations
   - Cases confirmed with lab results and / or investigation
   - **Contact tracing** to manage, link, and work what can be a rapidly increasing number of possible cases



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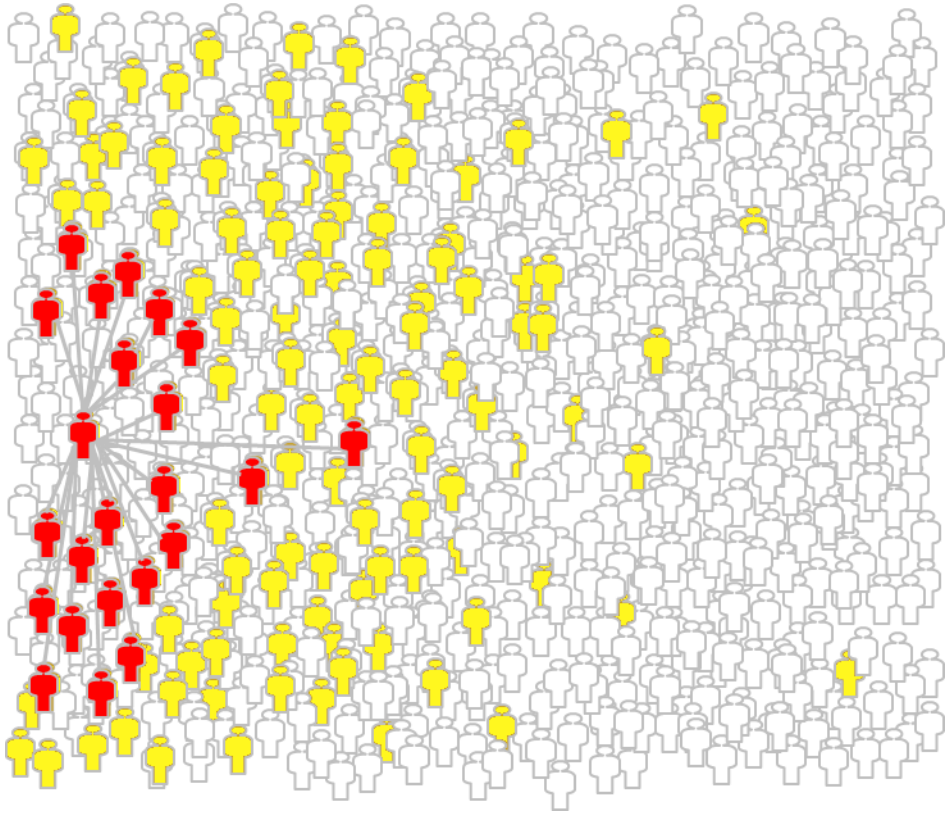

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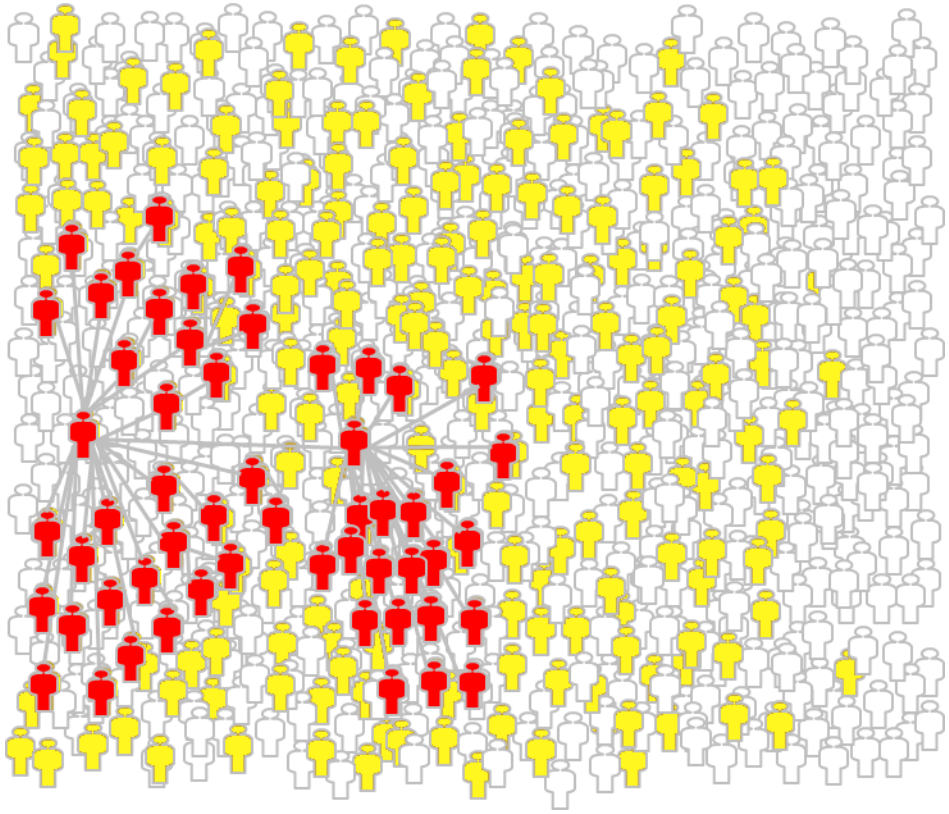

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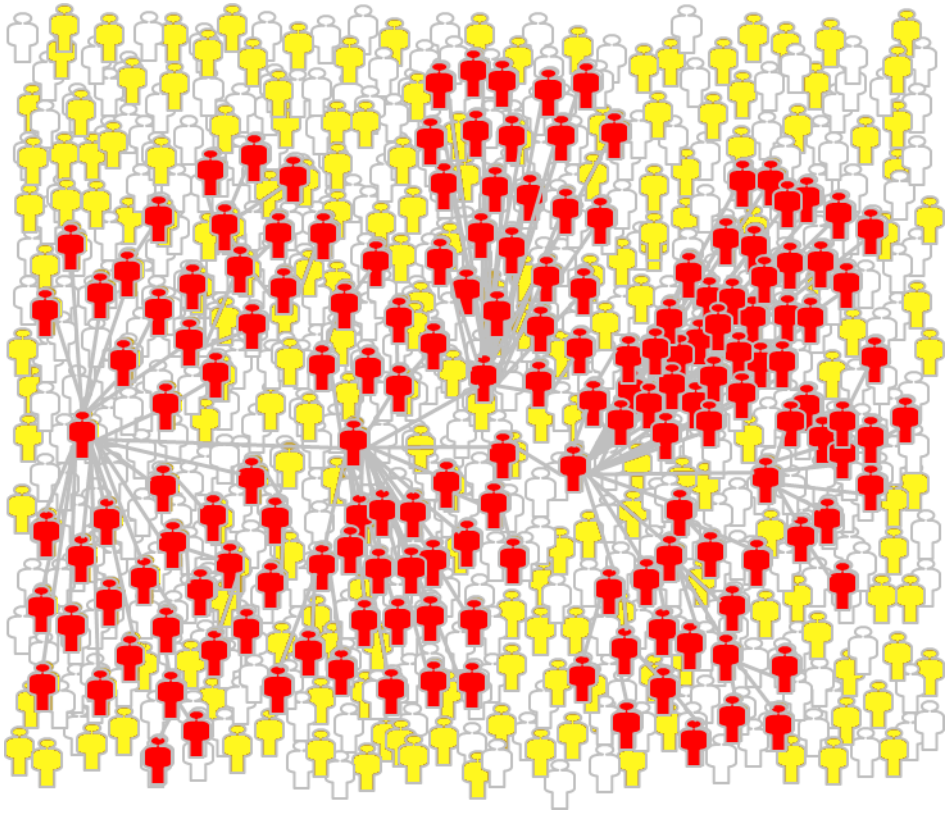
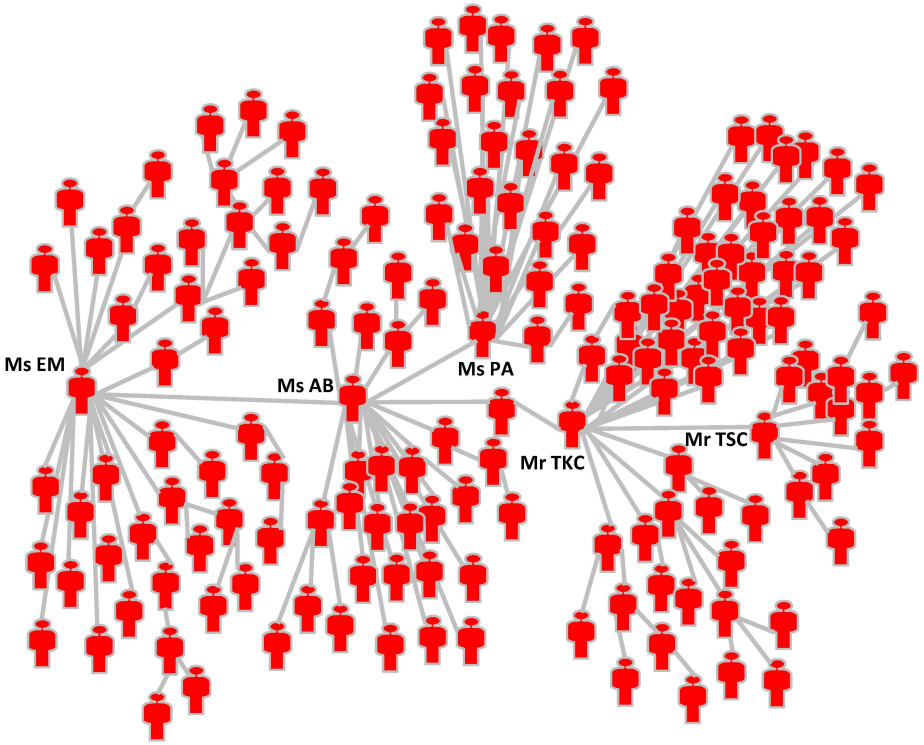


Outbreak Management HIT, continued

4. **Case management, continued**

- From a World Health Organization report diagram detailing SARS transmission in Singapore
- No diagnostic lab test, no vaccine, no medication
- Health IT case management is a critical



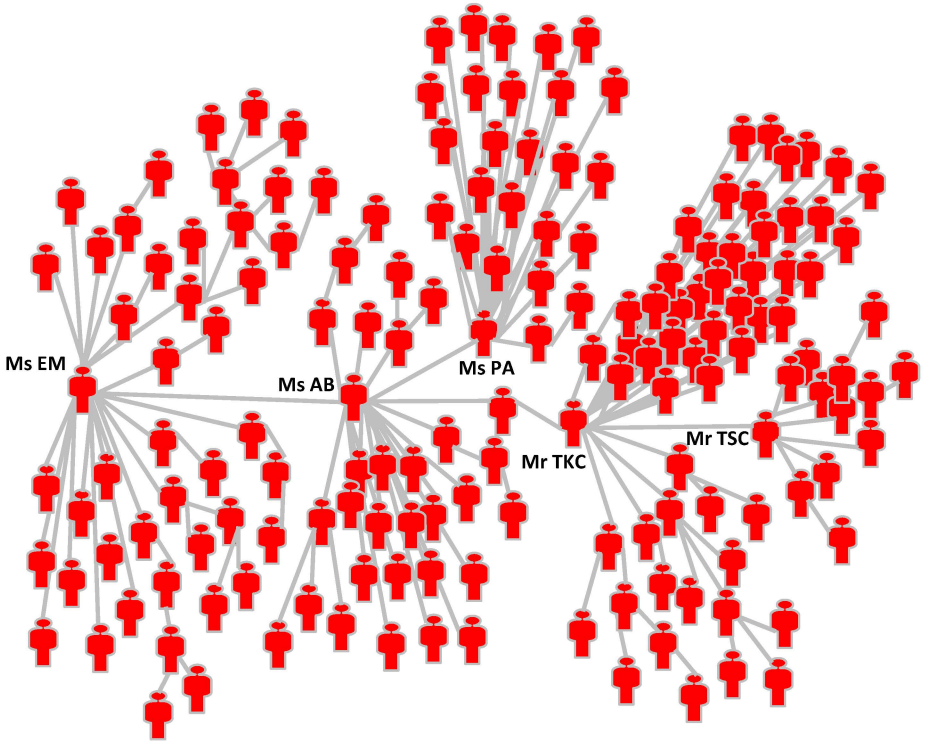
From SARS transmission in Singapore
World Health Organization Regional Office for the Western Pacific 2005

Outbreak Management HIT, continued

5. **Case reporting** and visualization
   - Managing **case counts** is a significant coordination issue

6. **Countermeasure** delivery and tracking
   - Medication and vaccine (inside and outside of healthcare)
   - **Quarantine** management (phone video monitoring, elsewhere - smart bracelets)

7. Research and **long term follow-up**
   - Tail of outbreak life cycle



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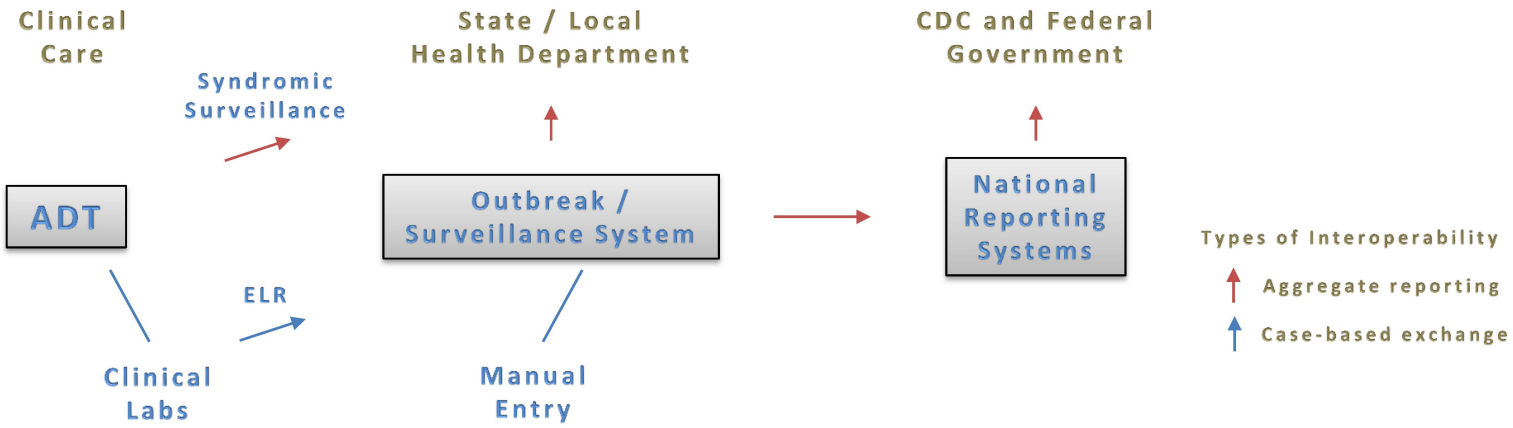
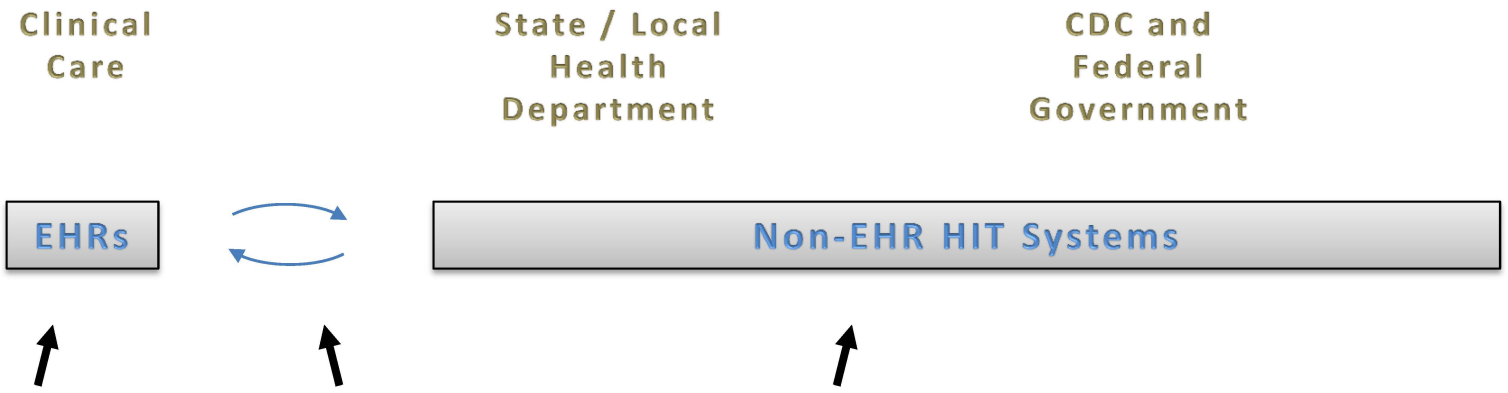


Before widespread EHR adoption:

- Even "electronic" case reporting is manual
  - Reporting yield can be very low at times
  - in extreme example CDC reports that one out of ten cases of Lyme disease, recorded in clinical care, are reported to health department despite state laws
  - Providers frequently do not know when, how, or where to report
- **Electronic Laboratory Reporting (ELR)** is at times a case reporting surrogate
  - Automated delivery from lab systems leads to high yield
  - Data are limited to what is available in the lab order and the test result
- **Syndromic Surveillance** takes advantage of available electronic data
  - Automated, immediate data from clinical care organizations
  - Started with Admission Discharge and Transfer (ADT) "chief complaints"
  - Not suitable for case management



Outbreak Functions:

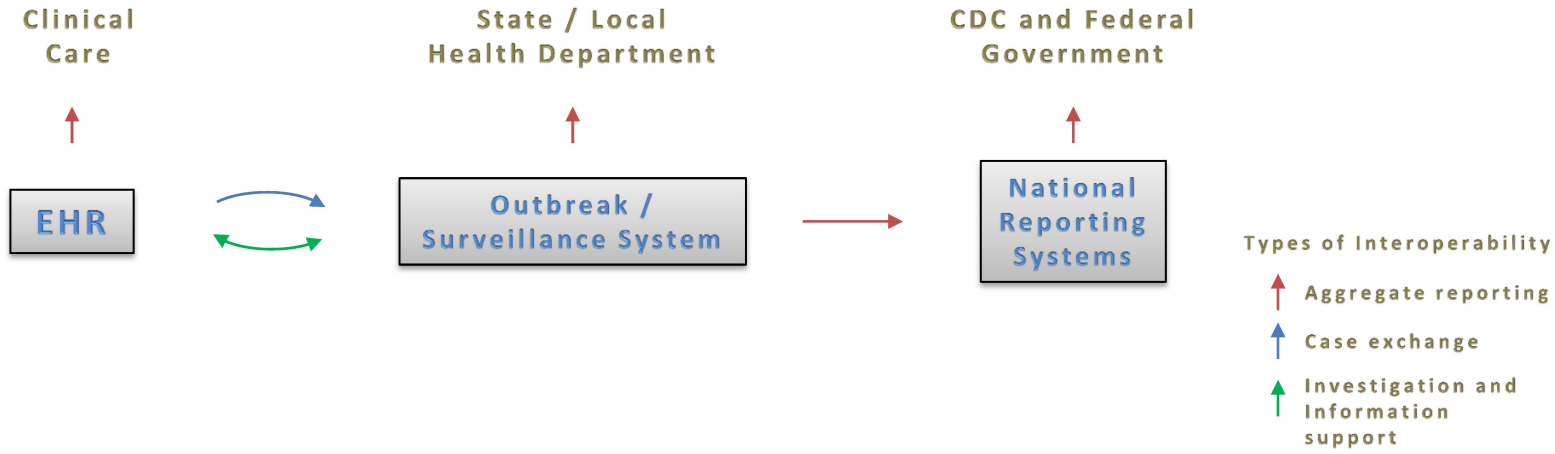
1. Support for index case detection
2. Screening for additional possible cases
3. Isolation

Exchange Functions:

4. Case-based data
5. Aggregate data
6. Guidance information
7. Investigation

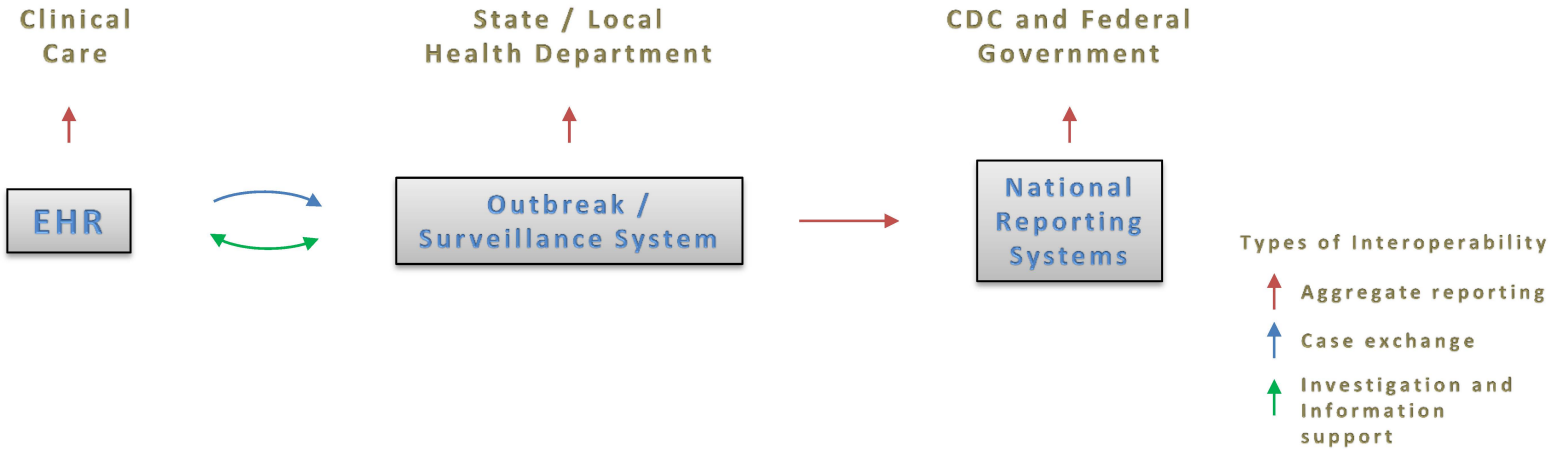
Outbreak Functions:

8. Case management
   - Confirmation of possible cases
   - Lab result integration (public health and clinical)
   - Contact tracing
9. Case reporting and visualization
10. Situational awareness
11. Countermeasure delivery and tracking
    - Meds, vaccines, and more in commercial supply chain, health departments, and stockpile
    - Quarantine management
12. Research and long term follow-up



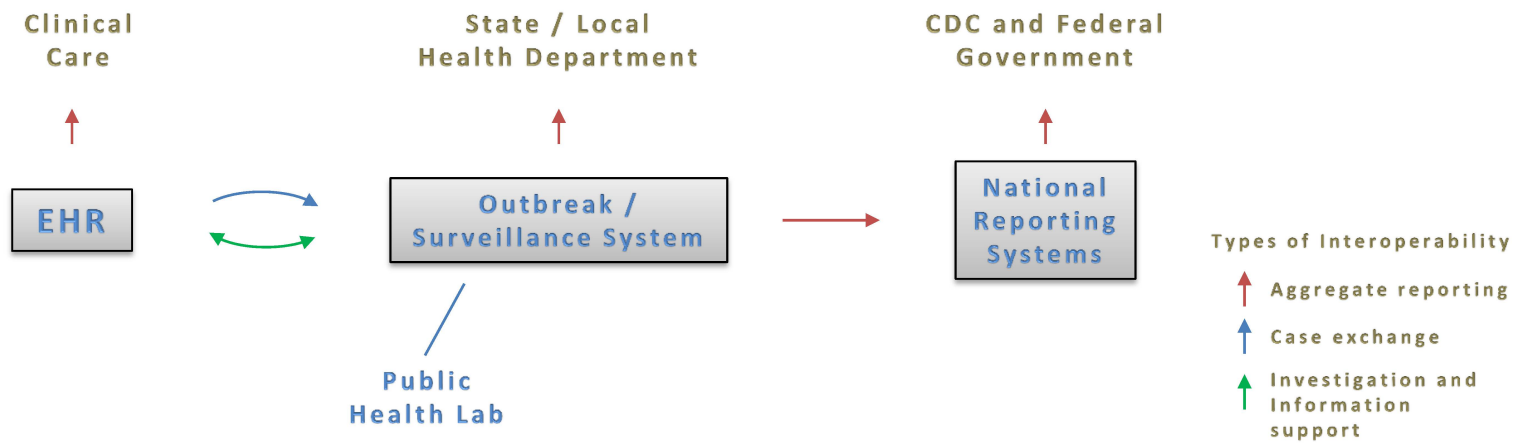
Electronic Health Records

- Information to support index case and additional case identification is historically oriented to provider interpretation, not algorithmic implementation
- Guidance frequently changes during an event
- Case reports - including clinical (epidemiologic) and lab data that exist need to be sent to surveillance / outbreak management systems
- Support for further investigation is also needed



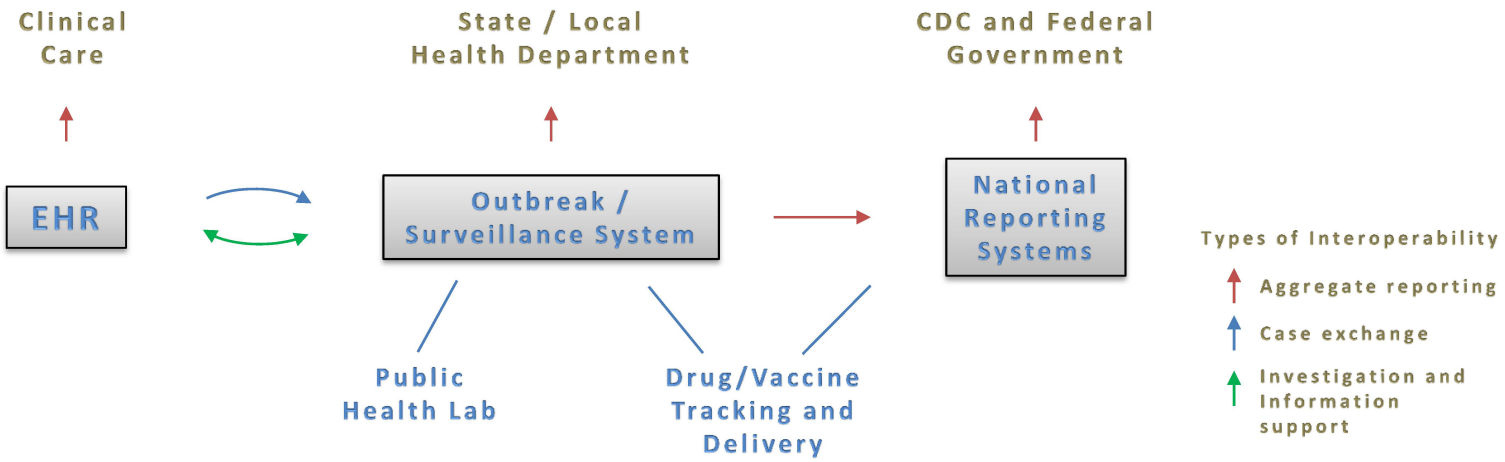
Surveillance / Outbreak Management Systems

- Commercial, self developed, and CDC developed systems
- Implemented at state and local health departments and some mobile applications
- Surveillance, case management, contact tracing, investigation support, reporting to local and state health departments as well as CDC



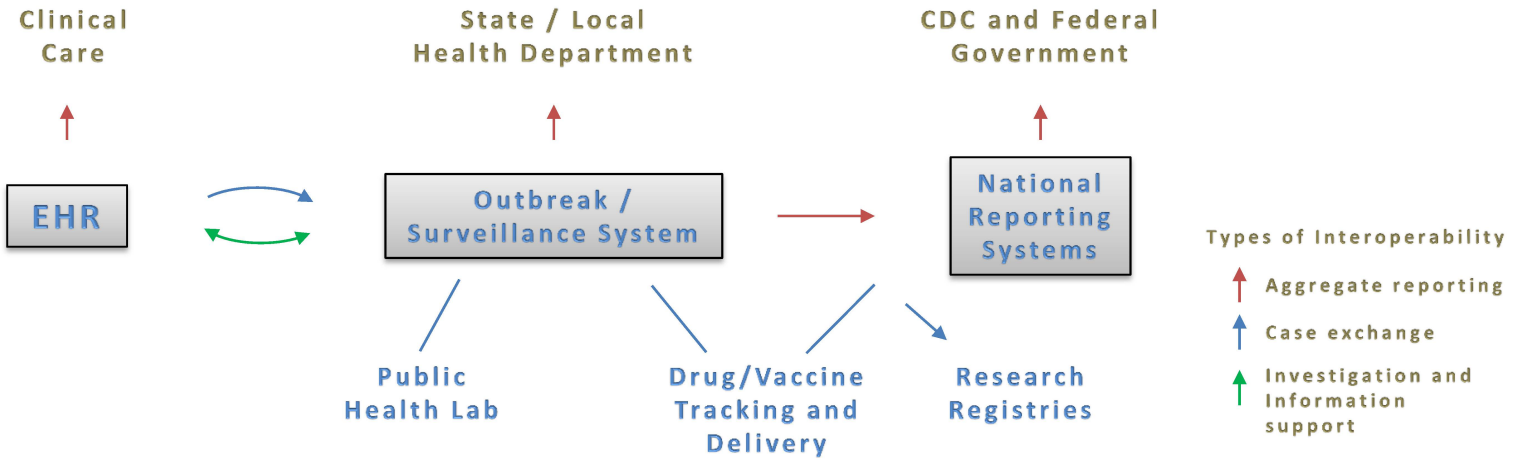
Public Health Lab Information Management Systems

- Support testing that only public health labs do and when only public health labs will do it
- Rigorous preparedness protocol adherence
- Support surge capacity
- Must integrate with state health department, multiple federal agencies and clinical care



Countermeasure Tracking and Delivery Systems

- Track and manage countermeasures in state and local health departments, the national stockpile, and the commercial supply chain
- Push for use of new vaccines can have additional “take” and adverse events surveillance needs
- Important connections with immunization information systems, variety of systems / organizations that deliver vaccines



Research and Long Term Follow-Up Registries

- An important part of a learning health system
- With emerging infectious diseases, changing environmental pressures, antibiotic resistance and more, understanding how to deal with threats and best apply health IT for populations
- Insure that the safety net is in place that the public expects from their support