

Technology in the age of a pandemic: Challenges & solutions for a statewide COVID-19 response

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Agenda

- Compare and contrast needs for a public health response
 - Typical vs. pandemic
- Initial response to COVID-19
- Adaptations
- Future (COVID-19 and beyond)



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Public health in 21st century

- Most health threats in developed world are chronic, non-infectious
 - Obesity; smoking; environmental health
 - Heart disease; cancer; diabetes
- Numerous infectious diseases are reportable for public health purposes
 - Tuberculosis; HIV; STI's
 - Foodborne outbreaks; meningitis
 - Sentinel programs: Flu



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Public health in 21st century

- Chronic diseases surveilled at population level
 - No case investigation, contact tracing, etc.
- Infectious diseases require individual records
 - Seek exposure history; examine transmission; follow course of disease; document outcome
 - often have specialized needs
 - Typically low numbers
 - 73 TB dz in 2019; 22k chlamydia & 280 HIV dx in 2018



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Public health in 21st century

- Reportable diseases rely upon passive surveillance
 - Oklahoma utilizes dual reporting, one system
 - Hospitals/physicians report clinical info.
 - Labs report diagnostic info.
- Investigations done by CHD after case entered
 - Contact information, potential exposures, etc.
 - Communicate information on isolation, precautions, etc.



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Case investigation functions

Acquire information:

- Clinical
- Diagnostic
- (Potential) Source(s)
- Exposed contacts
- Case management & outcome

Communicate information

- Isolation of patient
- Precautions (inc. quarantine) for exposed
- Care and case management info. to caregiver(s)

Data management

- Reporting to the CDC, other officials, public
- Investigate outbreaks, risk factors, etc.

Other challenges

- Hospital beds
 - Hospital staffing
 - PPE
 - Testing
-
- Outside State epi purview....



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Case investigation methods

- Case management systems were designed for endemic diseases
 - None had an ability to manage epidemic case reporting
- Oklahoma's system (PHIDDO) is ~20 years old
 - Provides detailed and complete information
 - Very dependent upon manual entry of data
 - Relatively unstable system @ high case loads



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Disease reporting methods

Legal methods for labs to report diagnostic results

- HL7 file
- “Flat file” (csv formats)
- Facsimile
- Manual entry into PHIDDO



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Many different approaches

- Some states left NBS for COVID-19
- Some adopted NBS only for COVID-19
- Many adopted SARA Alert
- Many looked to novel companies/platforms



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Oklahoma's path

Continue in PHIDDO while pursuing innovative solutions

- End dual reporting
- Only enter positive test results in PHIDDO
- Phased out fax reporting
 - Manual entry of records from both fax and csv files!



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Oklahoma's path

Continue in PHIDDO while pursuing innovative solutions

- Call center for contact tracing
 - Express personnel; MTX platform
- SpringML for diagnostic reporting
- MTX for case investigation



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Pitfalls in partnerships

- Temporary employees are not public health experts
- MTX and SpringML are technology companies

Initial results:

- Rigid systems that met specs but not needs
- Reluctance among partners to adopt new approaches



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Weakest link prevails

Successful contact tracing is dependent upon:

- Notification of lab results
- Case investigation
- Contact tracing process



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Failures in our system

- Inadequate case investigations and contact tracing
- Inabilities to get labs into HL7 reporting
 - Delays in case reporting
 - Dumping of old cases
 - Loss of percent positivity information
- Duplication of case reports/ poor QA
 - Rectified by creating a one-day lag in reporting
- Discrepancy between NCHS and ADS death tallies
 - Not really a failure
 - Result from incomplete case management entry

Stop-gap measures

- Unverified, voluntary, aggregate reporting
- Manual entry and very long hours
 - Sacrifice of other disease control efforts
- Compromise of actual public health interventions



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Continuing challenges

Integrating all data systems

- Still struggling with data reporting
- Plus, new demands and evolutions in process...
 - Previous case?
 - Vaccinated?
 - Sequencing indicate variant?
 - Schools doing testing
 - At-home testing.....



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Using (& abusing) Technological
solutions

“Leveraging technology”

- Exposure and contact tracing apps
- Testing notification apps
- Reporting apps



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“Living in age of technology”

(and instant gratification)

- Demands for real-time data
- Data vs. information
- Garbage in- Garbage out
 - Automation vs. verification/validation of information



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Lessons as state epidemiologist

- Public health functions are different from individual or informational desires
- Infrastructure cannot be built while being used
- Decentralized systems have advantages and disadvantages
- Flexibility does not indicate weakness!



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Technology into the future

- Reduce fragmentation
- Deliver meaningful functionality to ALL parties
- Retain accessibility for ALL parties



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