



Epidemiology and Emergency Response: an Update from the Office of Public Health Preparedness and Response (OPHPR)

Dan Sosin, MD, MPH, FACP

Deputy Director and Chief Medical Officer
Office of Public Health Preparedness and Response

May 9, 2012

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Centers for Disease Control and Prevention

Office of Public Health Preparedness and Response

Building a firm foundation...



...embracing the future.

Strengthening the Public Health Response

Presentation Outline

- ❑ What is Hot?
- ❑ Strategic Planning Update
- ❑ Competencies, Capabilities, Consequentiality
- ❑ Q&A

Public Health Preparedness: What's Hot?

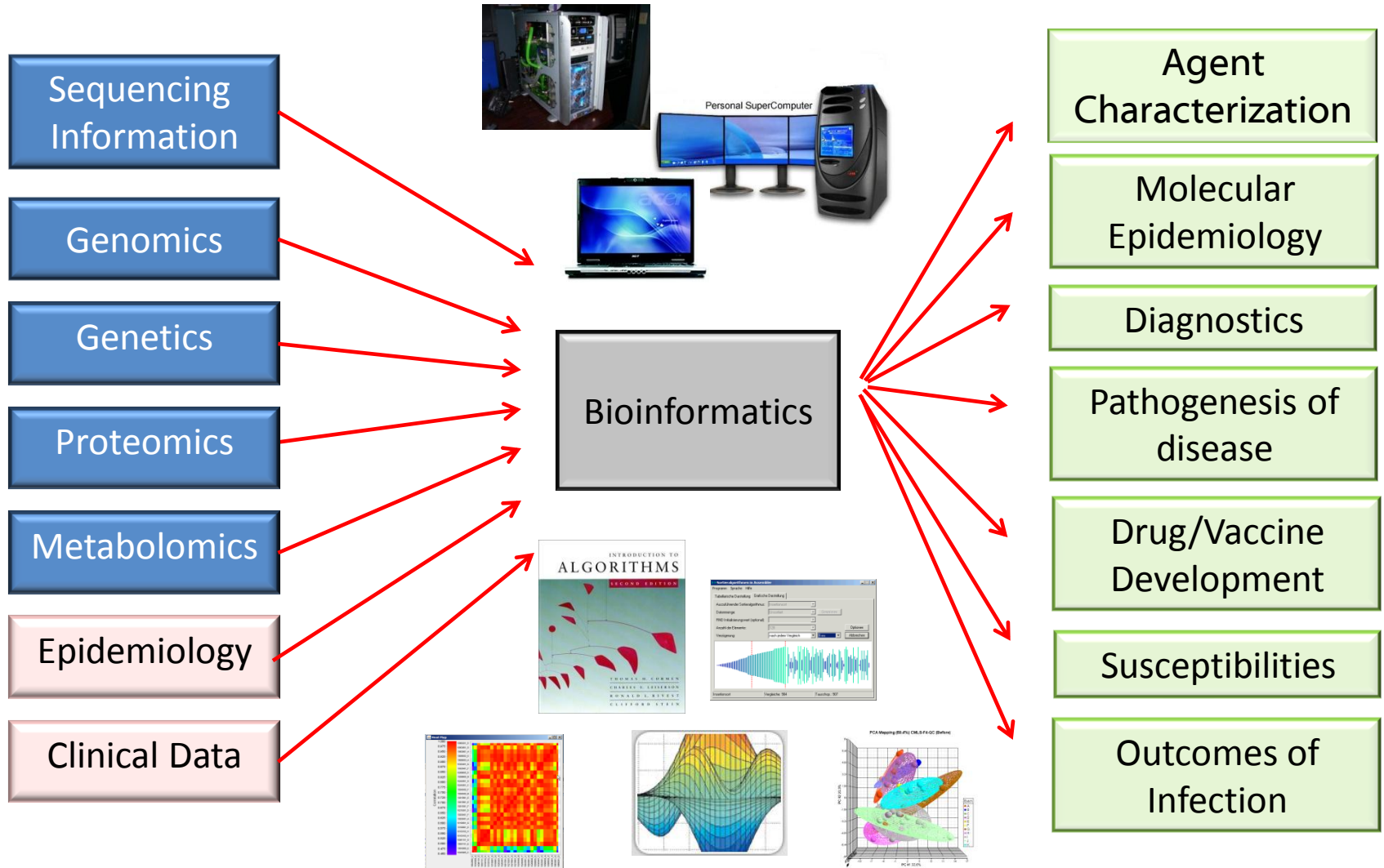
- Advancing diagnostic capabilities
- Refining utilization plans for countermeasures
- Creating situational awareness for response through more active epidemiology and surveillance approaches
- Improving measurement of preparedness to set priorities and improve programs

Priorities for Diagnostics

- Probing genetic and expressed material from agents and hosts
- Bioinformatics and data integration
- Point-of-care rapid diagnostics



Bioinformatics for Public Health





Diagnostics
Surveillance
Forensics
Lab Workflow QMS
Teaching Tool
E-reporting

MULTIPLE USES/BENEFITS

MULTIPLE TEST TYPES

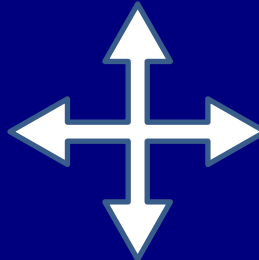
Traditional Phenotypic Tests
DNA Sequencing
Real-Time PCR
MALDI-TOF
New Technologies

High Performance Computing
Rapid querying of large datasets
Curated, dynamic databases
Secure web portal
Modular, expandable system

SYSTEM REQUIREMENTS

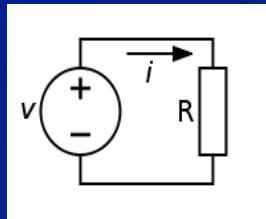
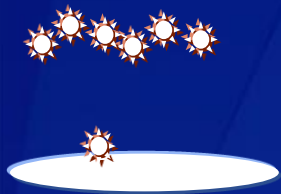
BROAD USER CAPACITY

Local Clinical
State Public Health
Forensic
CDC



Next Generation Diagnostics

Miniaturized Assays



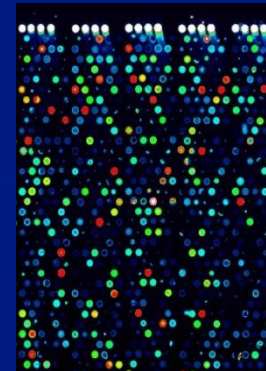
“Nano-scale” electronic assays that occur in seconds, using minimal and inexpensive reagents

Handheld Devices



Detection hardware to enable “point of need” data collection, diagnosis or detection

Complex Datasets



Multiple, simultaneous measurements yielding high-content information

Medical Countermeasure Utilization Plans

- Managing chaos (planning/exercising)
- Making safe and effective response decisions (best science)
- Timely, high-volume dispensing (logistics)



Priorities for Situational Awareness

- Be prepared for electronic health information
- Better use technologies people are already using
- Leverage data sharing and integration platforms

Measuring Preparedness

- Aligning performance measures across grants with Capabilities
- National Health Security Preparedness Index
- Risk-informed SNS formulary
- Emergency Management Accreditation Program
- Cost of Preparedness

Anthrax Diagnostics

- Recent accomplishments
 - Resolution of toxin levels with mass spectrometry
 - Rapid antimicrobial susceptibility tests
 - Pre-symptomatic infection markers
 - Laboratory testing strategy
- Opportunities
 - Point-of-care field test for pre-symptomatic infection
 - Multiplex assays to characterize illness course
 - Animal studies clarifying markers of illness progression

Anthrax Utilization Planning

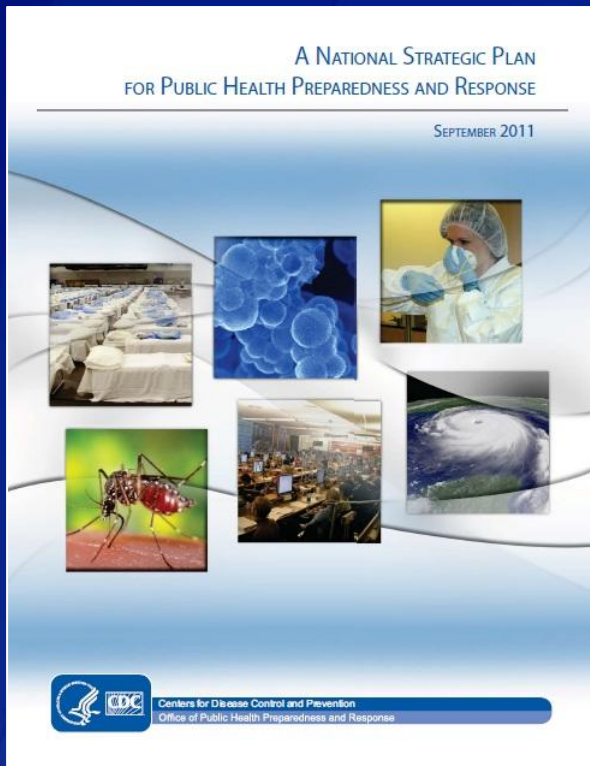
- Just-in-time communications
- Environmental sampling and clean-up
- Clinical guidelines for existing products
- Plans for IND, EUA, and managing supply constraints
- Pre-event AVA for Responders

Anthrax Situational Awareness

- Updating case-reporting forms
- Epidemiology tool kit, to include centralized outbreak management software tools
- Tools for improving uptake and monitoring impact of interventions

A National Strategic Plan for Public Health Preparedness and Response

A National Strategic Plan for Preparedness and Response Released September 2011



www.cdc.gov/phpr

Vision: People's Health Protected; Public Health Prepared.

Mission: Strengthen and support the nation's health security to save lives and protect against public health threats.

- Identifies eight long-term objectives that describe what the nation needs to achieve in order to attain the vision by 2020.
- Developed collaboratively with input from over 350 federal, national non-federal, state, and local partners.

Plan Sets Forth Eight Overarching Objectives for the Next Decade

- 1. Prevent and/or mitigate threats to the public's health**
- 2. Integrate public health, the healthcare system, and emergency management**
- 3. Promote resilient individuals and communities**
- 4. Advance surveillance, epidemiology, and laboratory science and service practice**
- 5. Increase application of science to preparedness and response practice**
- 6. Strengthen public health preparedness and response infrastructure**
- 7. Enhance stewardship of public health preparedness funds**
- 8. Improve the ability of the public health workforce to respond to health threats**

Strategic Planning Objective Workgroups

- **Multidisciplinary workgroups addressed each of the eight strategic objectives and generated extensive list of potential project initiatives**
- **OPHPR Leadership currently prioritizing the list to generate a concise group of high impact project initiatives**

Initiative Examples

- Establish metrics and indices to quantify public health preparedness and response impact.(Objective 1)
- Engage key healthcare system decision makers in the process of integrating public health, the healthcare system, and emergency management.(Objective 2)
- Develop tools/platforms to efficiently share and integrate laboratory and epidemiologic data within CDC and with our partners for large multistate outbreak investigations and response. (Objective 4)

Additional Initiative Examples

- **Design and develop a technical assistance strategy to advance SLTT community resilience implementation. (Objective 3)**
- **Increase information exchange between the public and public health, particularly with at-risk populations, for conditions relevant to receipt of guidance or public reporting (e.g., mental health and on-scene conditions). (Objective 4)**
- **Establish infrastructure and procedures to implement research to address practice-driven priorities during emergency responses. (Objective 5)**
- **Improve data collection on practice experience (e.g., standardized elements that capture processes and outcomes; validate quality of data; figure out how to harvest after-action reports, grant reports, performance measures.) (Objective 5)**

Additional Initiative Examples, cont.

- Develop tech-enhanced registry tools to exchange information with those receiving medical countermeasures to increase compliance and track adverse events, perhaps piloted with the responder workforce (Objective 6)**
- Ensure the interoperability of data exchange through a common standard (Objective 6)**
- Train existing policy and program analysts on analytical skills to assess cost/benefit and return on investment of PHSR-funded activities. (Objective 7)**
- Pilot development of a 1-2 scenario specific workforce plans which include required staffing needs, generic/discipline-specific training requirements and estimated costs. (Objective 8)**

Competencies, Capabilities, and Consequentiality

Applied Epidemiology Competencies

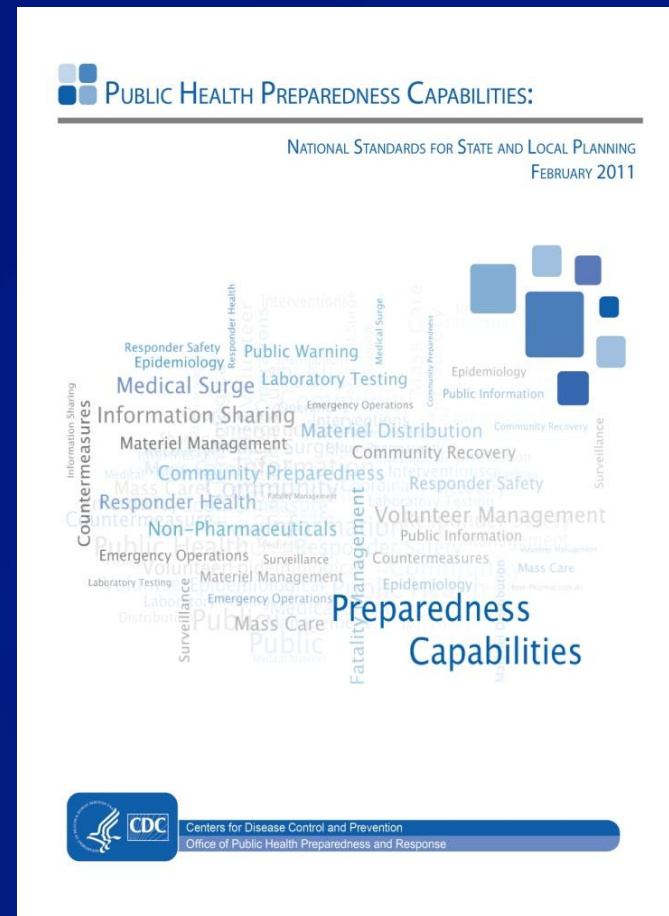
Skill Domain

- 1 Assessment and Analysis
- 2 Basic Public Health Sciences
- 3 Communication
- 4 Community Dimensions of Practice
- 5 Cultural Competency
- 6 Financial and Operational Management
- 7 Leadership and Systems Thinking
- 8 Policy Development

National standards for state and local planning

Description of 15 capabilities and related functions, tasks, performance measures, and resources necessary for achieving each capability

Suggested activities for using the national standards to help public health departments organize work and identify most pressing needs



Preparedness Capabilities

Capability Name
1 Community Preparedness
2 Community Recovery
3 Emergency Operations Coordination
4 Emergency Public Information and Warning
5 Fatality Management
6 Information Sharing
7 Mass Care
8 Medical Countermeasure Dispensing
9 Medical Materiel Management and Distribution
10 Medical Surge
11 Non-Pharmaceutical Interventions
12 Public Health Laboratory Testing
13 Public Health Surveillance and Epidemiological Investigation
14 Responder Safety and Health
15 Volunteer Management

Alignment to Public Health

PHEP capabilities were mapped to 10 Essential Services of Public Health
Some capabilities (shaded) mapped to multiple services

Service		Capability
1	Monitor	Public Health Surveillance and Epidemiologic Investigation
2	Diagnose and Investigate	Public Health Surveillance and Epidemiologic Investigation
		Public Health Laboratory Testing
3	Inform and Educate	Information Sharing
		Emergency Public Information and Warning
4	Mobilize and Manage	Community Preparedness
		Emergency Operations Coordination
		Volunteer Management
		Medical Surge (mobilization aspects)
		Medical Materiel Management and Distribution
5	Policies and Plans	Crosses all Capabilities

Service		Capability
6	Enforce Laws	Non-Pharmaceutical Interventions (legal aspects)
		Crosses many Capabilities
7	Provide Services	Medical Surge (healthcare aspects)
		Medical Countermeasure Dispensing
		Mass Care
		Fatality Management
8	Workforce	Responder Safety and Health
		Medical Surge (workforce aspects)
9	Evaluate and Improve	Community Recovery
		Crosses all Capabilities
10	Research and Best Practices	Crosses many Capabilities

PHEP Capabilities Structure

15 Capabilities

Capability

Capability
Definition

Used existing TCL v2 and v3 definitions and NHSS Capabilities as a baseline

3-5 broad “Functions” per Capability, use TCL v3 Target Outcomes, TCL v2 Activities, NHSS Capabilities as a baseline

Functions

A number (TBD) of Essential Tasks for completion of each Function

Essential
Tasks

Resource
Elements

Resource Elements include owning or, where applicable, having access to:

1. **Plans** (includes vulnerable populations, legal authorities)
2. **Skills and Training**
3. **Equipment and Technology**

Tasks form the basis for training and exercises



SME Input Obtained



Capability Definition

❑ **Public Health Surveillance and Epidemiological Investigation**

- The ability to create, maintain, support and strengthen routine surveillance and detection systems and epidemiological investigation processes, as well as to expand these systems and processes in response to incidents of public health significance

Functions

At the highest level, what things (Functions) need to occur?

Conduct Public Health Surveillance and Detection



Can the jurisdiction collect, analyze, interpret, and manage public health-related data to verify an incident of public health concern, characterize and manage it effectively through all phases of the incident?

Conduct Public Health and Epidemiological Investigation



Can the jurisdiction identify, characterize, and document investigations of disease, injury or exposure, determine the population at risk, and report the summary results of the analysis to jurisdictional and/or federal partners?

Recommend, Monitor, and Analyze Mitigation Actions



Can the jurisdiction recommend and/or facilitate public health interventions to mitigate an incident, monitor and document the effectiveness of the interventions?

Improve Public Health Surveillance and Epidemiological Investigation Systems



Can the jurisdiction assess internal agency surveillance and epidemiologic al investigation systems both during and after an incident and subsequently implement the quality improvement/corrective actions that are within the public health agency's control?



Tasks

At the next level, what steps (Tasks) need to be taken to accomplish the Function?

Conduct Public Health Surveillance and Detection



Engage and retain stakeholders who can provide health data to support routine surveillance, including daily activities outside of an incident, and to support response to an identified public health threat or incident.

Conduct routine and incident-specific morbidity and mortality surveillance as indicated by the situation using inputs such as; reportable disease surveillance, vital statistics, syndromic surveillance. (State awardees only)

Provide statistical data and reports to public health and other applicable jurisdictional leadership in order to identify potential populations at-risk for adverse health outcomes during a natural or man-made threat or incident.

Maintain surveillance systems that can identify health problems, threats, and environmental hazards as well as send, receive, and respond to (or investigate) reports 24/7

Resources

What things (Resources) need to be in place to accomplish the function?

Conduct Public Health Surveillance and Detection



(Priority) Written plans should document the legal and procedural framework that supports information exchange with community partners, including those serving communities of color and tribes

(Priority) Written plans should include processes and protocols for accessing health information that follow state and federal laws and that protect personal health information via security and confidentiality policies.

(Priority) Written plans should include processes and protocols to gather and analyze data from multiple sources

(Priority) Written plans should include procedures to ensure 24/7 health department access to collect, review, and respond to reports of potential health threats



Resources

What things (Resources) need to be in place to accomplish the function?

Conduct Public Health Surveillance and Detection



(Priority) Written plans should include processes for participating in jurisdictional syndromic surveillance programs. The processes should also account for the need to adapt the jurisdictional surveillance system to include novel and/or emerging public health conditions

(Priority) Personnel conducting data collection, analysis, and reporting in support of surveillance and epidemiologic investigations should achieve at a minimum, the Tier 1 Competencies and Skills for Applied Epidemiologists in Governmental Public Health Agencies

(Priority) Health information infrastructure and surveillance systems must be able to accept, process, and analyze standards-based electronic messages as defined by Centers for Medicare and Medicaid Medicare and Medicaid Programs; Electronic Health Record Incentive Program; Final Rule



Functions

At the highest level, what things (Functions) need to occur?

**Conduct Public Health
Surveillance and Detection**



Can the jurisdiction collect, analyze, interpret, and manage public health-related data to verify an incident of public health concern, characterize and manage it effectively through all phases of the incident?

**Conduct Public Health and
Epidemiological Investigation**



Can the jurisdiction identify, characterize, and document investigations of disease, injury or exposure, determine the population at risk, and report the summary results of the analysis to jurisdictional and/or federal partners?

**Recommend, Monitor, and
Analyze Mitigation Actions**



Can the jurisdiction recommend and/or facilitate public health interventions to mitigate an incident, monitor and document the effectiveness of the interventions?

**Improve Public Health
Surveillance and Epidemiological
Investigation Systems**



Can the jurisdiction assess internal agency surveillance and epidemiologic al investigation systems both during and after an incident and subsequently implement the quality improvement/corrective actions that are within the public health agency's control?



Tasks

At the next level, what steps (Tasks) need to be taken to accomplish the Function?

Conduct Public Health and Epidemiological Investigation



Conduct investigations of disease, injury or exposure in response to natural or man-made threats or incidents; ensure coordination of investigation with jurisdictional partner agencies.

Provide epidemiological and environmental public health consultation, technical assistance, and information to local health departments regarding disease, injury or exposure and methods of surveillance, investigation, and response. (States awardees only)

Report investigation results to jurisdictional and federal partners, as appropriate.

Resources

What things (Resources) need to be in place to accomplish the function?

Conduct Public Health and Epidemiological Investigation



(Priority) Written plans will include investigation report templates that contain the following minimal elements (see document for list) (State awardees only)

(Priority) Maintain staffing capacity to manage the routine epidemiological investigation systems at the state and local level as well as to support surge epidemiological investigations in response to natural or man-made threats or incidents

Functions

At the highest level, what things (Functions) need to occur?

Conduct Public Health Surveillance and Detection



Can the jurisdiction collect, analyze, interpret, and manage public health-related data to verify an incident of public health concern, characterize and manage it effectively through all phases of the incident?

Conduct Public Health and Epidemiological Investigation



Can the jurisdiction identify, characterize, and document investigations of disease, injury or exposure, determine the population at risk, and report the summary results of the analysis to jurisdictional and/or federal partners?

Recommend, Monitor, and Analyze Mitigation Actions



Can the jurisdiction recommend and/or facilitate public health interventions to mitigate an incident, monitor and document the effectiveness of the interventions?

Improve Public Health Surveillance and Epidemiological Investigation Systems



Can the jurisdiction assess internal agency surveillance and epidemiologic al investigation systems both during and after an incident and subsequently implement the quality improvement/corrective actions that are within the public health agency's control?



Tasks

At the next level, what steps (Tasks) need to be taken to accomplish the Function?

Recommend, Monitor, and Analyze Mitigation Actions



Determine public health mitigation actions to be recommended for the mitigation of the threat or incident based upon data collected in the investigation and on applicable science-based standards

Provide information to public health officials to support them in decision making related to mitigation actions.

Monitor and analyze mitigation actions throughout the duration of the public health threat or incident.

Recommend additional mitigation activities, based upon mitigation monitoring and analysis, throughout the duration of the incident, as appropriate.

Resources

What things (Resources) need to be in place to accomplish the function?

Recommend, Monitor, and Analyze Mitigation Actions



(Priority) Written plans should include protocols for recommending and initiating, if indicated, containment and mitigation actions in response to public health incidents.

(Priority) Staff awareness level training with the Homeland Security Exercise and Evaluation After Action Report process

Functions

At the highest level, what things (Functions) need to occur?

Conduct Public Health Surveillance and Detection



Can the jurisdiction collect, analyze, interpret, and manage public health-related data to verify an incident of public health concern, characterize and manage it effectively through all phases of the incident?

Conduct Public Health and Epidemiological Investigation



Can the jurisdiction identify, characterize, and document investigations of disease, injury or exposure, determine the population at risk, and report the summary results of the analysis to jurisdictional and/or federal partners?

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Tasks

At the next level, what steps (Tasks) need to be taken to accomplish the Function?

Improve Public Health Surveillance and Epidemiological Investigation Systems



Identify issues and outcomes during and after the incident.

Conduct post-incident/post-exercise agency evaluation meeting(s) including all active participants to identify internal protocols and deficiencies that require corrective actions.

Develop an After Action Report Improvement Plan (AAR/IP).

Communicate recommended After Action Report Improvement Plan corrective actions to public health leadership.

Resources

What things (Resources) need to be in place to accomplish the function?

**Improve Public Health
Surveillance and Epidemiological
Investigation Systems**



(Priority) Written plans should include procedures to enlist partners in communicating the improvement plan to key stakeholders, including partners representing at-risk populations and in implementing corrective actions identified in the improvement plan

Conclusions

- ❑ Public Health Preparedness is what we do every day and the skills that make epidemiologists effective are needed across many functions
- ❑ Public health serves a critical role in application of diagnostic technology, safe and effective delivery of medical countermeasures, use of epidemiology and surveillance for situational awareness, and metrics for improvement
- ❑ Innovation for basic public health functions provides much opportunity, but infrastructure is stretched to its limit

Questions?

Daniel M. Sosin, MD, MPH

dms8@cdc.gov

404.639.7855

www.cdc.gov/phpr



For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333

Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



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