

Exercise Evaluation Guides for Public Health Emergency Preparedness

Christine C. Bradshaw and Thomas A. Bartenfeld

INTRODUCTION

The ultimate test of proficiency for emergency responders and the systems in which they operate is an actual disaster. Fortunately, disasters happen rarely, so responders must find alternate ways to practice their skills. The best forms of practice are exercises and drills that simulate reality as closely as practicable.¹ “The true value of exercises lies in the opportunities they offer to practice skills and make mistakes in a low-cost, low-risk, low-consequence environment compared with real catastrophes.”² To fully realize this value, the ability of individuals to perform their jobs and to coordinate their efforts during an exercise must be evaluated. Though evaluation is essential, standardized instruments to assess how well responders perform during an exercise are relatively new.

The purpose of this article is to provide standardized instruments called Exercise Evaluation Guides (EEGs) for two public health functions: Epidemiologic Surveillance and Investigation and Isolation and Quarantine. These EEGs are intended to aid judgment (1) of public health responder performance using the guides’ check-lists and (2) of emergency response plans using the guides’ planning sections. In addition to providing guidance for evaluators regarding actions they should expect to observe from responders, the EEGs present (1) performance measures that measure quality, as opposed to more commonly available measures of timeliness, or percent of effort completed and (2) planning elements to evaluate adequacy of response plans.

The guides are particularly useful for evaluation because they rely on observations made by an independent third party, as opposed to assessment made by self-report. Evaluation done by an independent third party, who is neither playing in the exercise nor conducting it, is preferred to self-reported assessment because the former likely yields less biased, more credible performance data.

The initial sections of this article offer background information about EEGs, describe the methods used to create them, explain their component elements, and discuss their intended use. The EEGs, performance measures, and relevant planning elements are then provided as appendices: (1) Epidemiologic Surveillance and Investigation (hereafter called Epi), Appendix A; and (2) Isolation and Quarantine, Appendix B.

BACKGROUND

The public health EEGs presented here are based on the Department of Homeland Security (DHS) concept of capabilities. The DHS provides a definition of capabilities in operational terms: Responders become capable of performing critical tasks to expected levels of proficiency through adequate planning, equipping, training, organizing, and exercising that includes evaluation and corrective action. Capabilities-based planning has been used by the military to plan for flexible configuration and deployment of

resources under conditions of great uncertainty. The main question for each capability is: If you can help manage an incident, what are you *capable* of doing? DHS defines thirty-seven capabilities in its current version of the Target Capabilities List (September 2007).³ Two public health capabilities from the list are addressed in this article: (1) Epidemiologic Surveillance and Investigation and (2) Isolation and Quarantine. Thus, the related public health EEGs are named accordingly.

These public health EEGs are also consistent with the DHS Homeland Security Exercise and Evaluation Program (HSEEP). According to DHS, HSEEP is a “capabilities and performance-based exercise program that provides a standardized methodology and terminology for exercise design, development, conduct, evaluation, and improvement planning.”⁴ The Exercise Evaluation Guides offered by DHS are also called EEGs. The public health EEGs derive their name from the DHS EEGs. Both the DHS EEGs and the public health EEGs presented in this article aid the process of evaluation.

HOW THESE PUBLIC HEALTH EEGS DIFFER FROM THE DHS EEGS

The Planning Section

Each of the two public health EEGs presented in this article has a section to help with planning, a requirement for exemplary performance during real or mock disasters. Ideally, emergency planners anticipate the needs of responders by examining lessons learned from past events, projecting how a response might unfold, inventorying available resources, and projecting resource shortfalls. Industry “best practices” are often well represented in effective plans. However, the process of planning is frequently cited as being more valuable than having a written plan. Planning promotes responder collaboration, whereas plans do not necessarily assure it. Such conventional wisdom notwithstanding, by using the planning checklists evaluators can detect strengths and potential vulnerabilities in preparedness. Evaluators can conduct a pre-exercise document review to help determine whether planning is adequate. If a jurisdiction has paid careful attention to planning, it typically has written evidence to substantiate its efforts. Also, if player performance does not meet expectations, evaluators can consider planning deficiencies when analyzing the reasons why performance is not as expected. For example, in the Isolation and Quarantine EEG, Appendix B1: Planning, if a jurisdiction’s planners diligently identified alternate quarantine facilities before a pandemic, they will likely have current memoranda of agreement in place with those facilities to expedite transfer of legal authority to use the facility in an emergency.

Performance Measures based on Quality

Exercise evaluators must be able to determine whether players’ actions and decisions are (1) appropriate (the right action), (2) timely (done at the right time), and (3) of acceptable quality (done the right way) to achieve the intended outcomes. This article suggests measures of performance based on quality, namely quality decision-making and quality work products. The performance measures in the DHS EEGs tend to emphasize evaluation based on timeliness and occasionally on percent of effort completed.

SIMILARITIES TO THE HOMELAND SECURITY EXERCISE AND EVALUATION PROGRAM (HSEEP) AND THE DHS EEGS

Like the DHS EEGs, the public health EEGs are modular. Modularity allows exercise designers to combine different activities and critical tasks from within and between instruments in a “mix and match” fashion to create an evaluation specific for the exercise being developed. DHS describes the process at their HSEEP website, which links to a tool called the EEG Builder.⁵ The DHS tool enables emergency planners to “build an EEG” by selecting activities and tasks pertinent to the exercise they want to conduct in order to test the objectives they set forth in the exercise. These public health EEGs are created with the same process in mind. For example, if the objectives of an exercise are to (1) test the protocols for public health officials to assess an ill passenger arriving from a foreign country that is experiencing an outbreak of human cases of novel influenza and (2) determine whether isolation or quarantine are needed for the passengers and crew, the exercise designers might want to select and combine relevant activities and critical tasks from both public health evaluation instruments: Epidemiologic Surveillance and Investigation and Isolation and Quarantine. In contrast, the activity in the Epi EEG entitled “Human Health Threat Analysis for Exposures to Toxins” is not pertinent to a scenario that depicts a known contagious disease. Thus, this latter activity would likely not be incorporated into the given exercise.

METHODS

Creating EEGs requires three types of expertise: (1) subject matter, (2) exercise development and design, and (3) evaluation.

Subject Matter Expertise

In creating these public health EEGs we acquired the first type of expertise initially from small groups of five to ten subject matter experts at the Centers for Disease Control and Prevention (CDC). This cadre of experts described the major categories of activity and related critical tasks that comprise their jobs. The categories and associated tasks became the major elements of the EEG detailed in the Results section. Their discussion was based on the fifteen DHS National Planning Scenarios,⁶ which cover an array of natural and man-made disasters (e.g., an outbreak of pulmonary anthrax or a pandemic of influenza).

Next, this work was vetted with larger groups of ten to twenty state and local subject matter experts, including representative members from the Council of State and Territorial Epidemiologists, the National Association of County and City Health Officials, the Association of State and Territorial Health Officials, and the International Society for Disease Surveillance. The expertise of these public health professionals was obtained at nationally convened meetings and by requests for commentary through their professional associations. Face-to-face meetings were followed by phone and email consultation to ensure that the instruments accurately captured in words what the experts think and do in practice. In addition, we searched the published literature to get even more detail and to assure that the evaluation instruments are consistent with how

experts have handled real incidents in their particular disciplines. The expert subject matter content in the EEGs is the result of all the above consultations and deliberations.

Our goal was to strike a balance between having enough accurate content without having too much unnecessary content. Inaccurate content or omissions of critical steps can lead to poor performance and misunderstanding of public health's role, but too much unnecessary content prevents the instruments from being practical.

Exercise Development and Design and Evaluation

We acquired the second type of expertise, exercise development and design, from CDC staff who are DHS-certified Master Exercise Practitioners. We obtained the third type of expertise, evaluation, from CDC experts in evaluation practice. Collectively, these individuals helped transform the subject matter expert content into action steps that can be observed and evaluated during an exercise.

RESULTS

The Elements of an EEG

The public health EEGs are organized like the DHS EEGs, namely Capability Description, Capability Outcome, Activities, Critical Tasks, and Observation Keys.⁷ Figure 1 shows the general hierarchy of these elements; Figure 2 gives a narrative example.

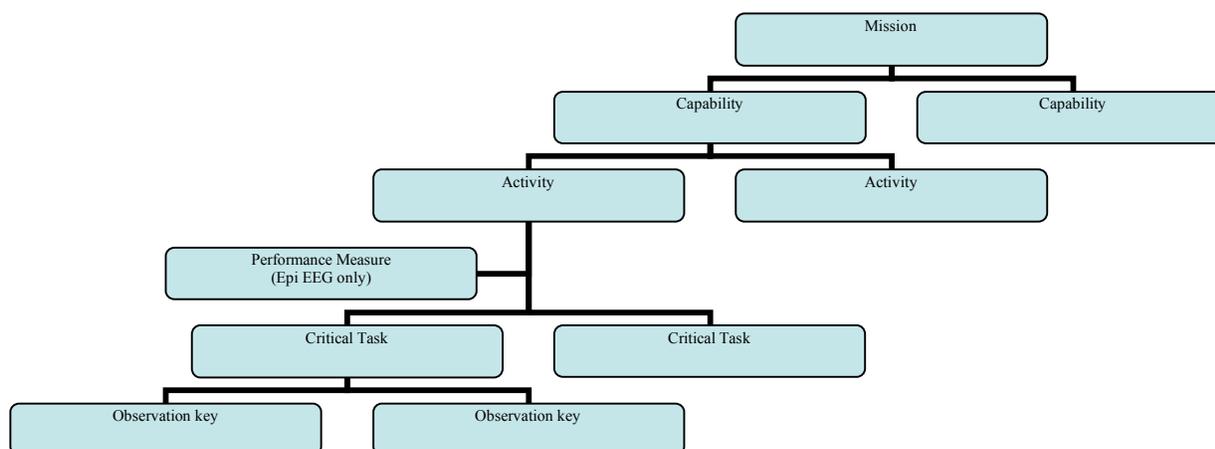


Figure 1. Evaluation elements and relatedness to the mission

Mission: Manage the Outbreak

Capability: Epidemiologic Surveillance and Investigation (Appendix A)

Activity 2: Case investigation to confirm the outbreak

Activity Description: Determining to whom the event is occurring, what is the nature of the event, and when and where it is occurring (i.e., the who, what, when, where, and how).

Performance Measure: Health Alert Network messages must be of minimally acceptable quality (applies also to health alerts generated by jurisdictions that have the same intent and purpose as official Health Alert Network alerts). For quality criteria, see Appendix A2, Activity 2, Work Product Criteria.

Critical Tasks and Observation Keys

- Confirm the existence of an unusual occurrence or event
 - ✓ Case report data interpreted to determine meaning and implications; epidemiologic clues evaluated
 - ✓ Syndromic surveillance data analyzed using aberration detection (if available and appropriate for use in given situation)
 - ✓ Alternate explanations considered (e.g., increased clinician awareness as a result of recent media attention to certain diseases, new physicians or clinics in the vicinity, changes in diagnostic methods).

Figure 2. Narrative example of hierarchy depicted in Figure 1.

DESCRIPTION OF EEG ELEMENTS

Capability Description

The capability description is a broad overview of the resources (i.e., personnel, equipment, supplies) that contribute to management of a given emergency. It is what the capability offers to the disaster.

Capability Outcome

The capability outcome is the anticipated result of the collective effort provided by the Capability.

Activities

Activities are category headings for critical tasks that share a similar purpose. For example, an overall capability might include the public health activities of surveillance, case investigation, and mitigation and containment. Activities are subdivided into critical tasks.

Performance Measures (Epi EEG only)

Performance can be measured in terms such as time (e.g., the ambulance arrived within ten minutes of dispatch), accuracy (e.g., the triage nurse accurately categorized the patient's level of care required as "immediate" because the patient had life-threatening injuries), and quality (e.g., the attending physician administered the correct treatment). The Epi EEG suggests some performance measures which might serve as standards for evaluating the quality of decisions and work products.

Critical Tasks

Critical tasks, indicated with a checkbox () , describe steps that are deemed critical and, therefore, must be done to achieve the expected outcome of the Activity and, ultimately, the capability. Critical tasks are usually performed in sequence, in the preferred order typically followed by subject matter experts.

Observation Keys

Observation keys, indicated with a checkmark (✓), are subdivisions of each critical task, intended to help evaluators identify whether responders have met important indicators for each critical task. They do not cover every action to be taken by responders; rather, they provide supplemental information as needed to enhance the usefulness of the instrument.

HOW THE TWO PUBLIC HEALTH EEGS DIFFER FROM EACH OTHER

Epidemiologic Surveillance and Investigation

Only the Epi EEG includes some suggested performance measures, which may be used to judge the quality of responder performance. These performance measures offer criteria for determining the quality of certain decisions made and work products generated in the course of executing this capability. Quality is important because responders in other capabilities rely heavily on the decisions and work products handed off to them from the Epi capability. To conduct their own work, they need these products to be of acceptable quality. Disaster management literature repeatedly cites the hand-offs, or interfaces, between capabilities, as exceptionally prone to failure if the work that links them is inadequate or missing.⁸ When decision making is faulty, work products are of poor quality, or work products do not get handed off to the correct, linked capability the emergency response system becomes disorganized.

Because these performance measure criteria are complex with multiple variables to consider for a single decision, we included the criteria as an appendix to avoid repeatedly diverting the reader's attention from the flow of logic and sequence of critical tasks in the body text. The performance measure is described under its related activity, and the associated criteria are located in Appendix A2: Criteria for Performance.

Isolation and Quarantine

In contrast to the Epi EEG, the Isolation and Quarantine EEG embeds decision-making criteria in the body text. The decisions presented in this instrument frequently have only

two variables [e.g., Patient needs hospital-level care (yes/no)]. Including simple criteria in the body text does not disrupt logic and sequence.

Though the decision-making criteria are simple, the Isolation and Quarantine EEG contains many decisions. For example, when a public health professional is determining whether a patient's home, or alternate facility, is a suitable site for isolation or quarantine, that professional must determine whether the site has basic necessities such as utilities, ventilation, showers, and food preparation areas. If essential needs cannot be met, the public health responder assessing the suitability of the site should judge the site unacceptable. The evaluator can ask the public health official to "think out loud" and voice the criteria he is considering when determining site suitability. The evaluator can then use the criteria as a guide to ascertain whether the official is considering those criteria that experts expect to be considered.

DISCUSSION

How to Use the Public Health EEGs

The public health EEGs are primarily for use in operations-based (e.g., functional, full-scale) exercises, but they can guide the evaluation of discussion-based (e.g., tabletop) exercises as well. These exercise types are more fully explained in the DHS, *HSEEP Policy and Guidance; Volume I, HSEEP Overview and Exercise Program Management*.⁹ The public health EEGs can also be used to de-brief following routine disease outbreak investigations (i.e., routine after-action reviews) to assess the quality of decisions made and actions taken during the investigations. The EEGs are intended for use as part of a comprehensive program to assess preparedness. Evaluations of preparedness depend on other factors such as quality of exercise design, appropriateness of exercise scope, and assumptions made by planners (e.g., use of volunteers to distribute assets from the Strategic National Stockpile assumes that the volunteers will show up).

Not all elements of an EEG apply to every scenario or to every phase of a scenario. Subject matter experts are needed to create EEGs and their knowledge and judgment are equally needed to ensure correct application of the content. Their expertise is essential to all phases of exercise development. Experts should help to set the objectives for the exercise, define the exercise scope, ensure the accuracy of the scenario and its applicability to the proposed exercise, participate as evaluators, and guide the creation and implementation of a corrective action plan to improve response. In addition, when developing exercises for public health it is always prudent to consult published guidance, such as that available from the Centers for Disease Control and Prevention, as well as other expert literature, in order to assure that the exercise materials reflect the most current and accurate information available. This is likewise the case for any responder discipline and its expert knowledge base.

The EEGs obviate the need to memorize essential steps. Just as experienced pilots use preflight checklists to ensure review of critical steps before take-off, these public health EEGs prompt evaluators to look for certain evidence of planning before an exercise and particular decisions, actions, and work products during an exercise. As evaluators examine plans and observe exercise play they can take notes directly on a

printed copy of the EEG. They can record their observations guided by descriptions of elements they should expect to see.

The Relationship Between EEGs and After Action Reports/Improvement Plans (AAR/IPs)

Purposes of evaluation include the improvement of organizational and individual performance.¹⁰ Exercises are typically followed by close examination of the actions taken and decisions made by responders to determine if the exercises' objectives were met. If the objectives were not met, emergency responders and planners try to identify areas needing improvement. They especially review deficiencies in planning, organizational structure, training, equipment, and personnel staffing. Their findings are captured in After Action Reports (AAR), and, subsequently, in Improvement Plans (IP) to address deficiencies.

According to the previously mentioned DHS *EEG Builder*:

Exercise Evaluation Guides (EEGs) have been developed to assist in the evaluation of exercises by providing evaluators with consistent standards and guidelines for observation, data collection and analysis, and report writing. Using the EEGs can help you develop stronger and more consistent After Action Report/Improvement Plans (AAR/IP). EEGs provide exercise evaluators with a manageable tool with which they can collect data during an exercise, in a format allowing the easy transfer of information to the AAR/IP.¹¹

Limitations of the Public Health EEGs

These public health EEGs are only a starting point for exercise evaluation. One limitation of these EEGs is that their content has been vetted, but they have not been field tested. Another limitation is their use in highly controlled and applied settings has not been systematically studied. Their strengths and weaknesses can best be discovered by using them during actual exercises.

AN AGENDA FOR FURTHER RESEARCH

These public health EEGs are offered for current use, but they are also offered to excite research in the field of exercise evaluation. Further research is proposed in the following areas.

Setting Performance Standards

For these public health EEGs, experts suggested standards for appropriate action and acceptable levels of quality. Performance standards for timeliness are not yet defined. More experience is needed to verify that the activities and tasks described in these instruments are the correct and necessary ones to manage a variety of public health emergencies. Additional study is also needed to set performance standards for timeliness and to further define standards for quality. Ideally, standards to define the actions that responders might typically take and the decisions that they are likely to make in various scenarios would already be worked out, vetted, tested, and agreed upon. Such is not the case for many disciplines, and certainly not for public health, a relative newcomer to the arena of emergency response.

Assigning Weights

Furthermore, these EEGs will be most useful as assessment tools when the activities and tasks described in them are weighted and scored. Weights and scores reflect the relative contribution of each element toward achieving desired performance outcomes. For example, when the Epi EEG is used to evaluate performance during an outbreak investigation, are the tasks “Confirm the diagnosis” and “Create an interim case definition” equally critical? If not (e.g., if one task is more critical to identifying cases, contacts, and risk factors than the other) the more critical task should receive more weight in the assessment instrument. Expert judgment is probably the highest level of rigor currently available. Nevertheless, experience through widespread use should enable assigning realistic weights and scores to the EEG elements.

The Need for Standardized Exercises

To determine how well prepared one jurisdiction is compared to another, standardized exercises are needed. In a standardized exercise each jurisdiction conducts the exercise using the same scenario, under a standard set of conditions and a standard set of assumptions. Using standardized exercises evaluators can create an evaluation instrument specifically tailored to the exercise. In this manner, the entire “test” – the exercise and its evaluation guide – is uniform. Standardizing the “test” enables evaluators to judge performance more fairly and equitably across jurisdictions and responders. The most intriguing aspect of a standardized exercise, however, is that standardization enables the ability to model the effects that different responder decisions and actions have on the exercise objectives. When responders in an exercise can see the real impact their decisions and actions have on outcomes, the simulated experiences presented in exercises begin to more closely resemble reality.¹²

CONCLUSION

Public health responders recognize that exercises are a time-tested means to practice skills and prepare for real events. However, standardized instruments to guide the process of public health exercise evaluation are recently introduced and un-tested. Nevertheless, these EEGs serve an important purpose to assure that critical planning and performance elements are addressed and evaluated in any exercises involving the two capabilities presented in this article. There are no absolute “gold standards” to evaluate public health’s capabilities for all hazards under all conditions. Therefore, one cannot possibly overstress how essential are subject matter experts, emergency planners, exercise developers, and responders who have played in many exercises to the creation of more realistic exercises and better evaluation tools. Even these public health EEGs warrant further examination to determine if they are the best design as evaluation instruments. We anticipate that exercise evaluation will come to be an area of expertise in its own right, leading subject matter experts, exercise designers, and evaluation professionals into closer collaboration to enrich the field of exercise performance evaluation.

Christine C. (Chris) Bradshaw, DO, MPH, MBA is a medical officer and the lead epidemiologist in the Biosurveillance Coordination Unit (BCU) of the Coordinating Office of Terrorism Preparedness and Emergency Response (COTPER) at the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, GA. As a member of the BCU, Dr. Bradshaw is responsible for developing the National Biosurveillance Registry for Human Health (NBRHH). She previously served as a medical officer in the Coordinating Office of Terrorism Preparedness and Emergency Response (COTPER), Division of State and Local Readiness at the CDC. Dr. Bradshaw is certified by the American Board of Medical Specialties in preventive medicine and psychiatry. She possesses an undergraduate degree in chemistry and graduate degrees in medicine, public health, and business administration. Dr. Bradshaw can be contacted at ztio@cdc.gov or cbradshaw@cdc.gov.

Thomas A. Bartenfeld, PhD is a behavioral scientist with CDC's Coordinating Center for Health Promotion (CoCHP). His current activities focus on program capacity and capability-building and establishing frameworks for judging program success. Prior to his current assignment with CoCHP, Dr. Bartenfeld was with the CDC's Office of Program Planning and Evaluation, working with CDC programs on a variety of program evaluations, providing technical assistance for cross-CDC evaluations, and serving on CDC evaluation and research work groups.

DISCLAIMER

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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Appendix A
Epidemiologic Surveillance and Investigation
Exercise Evaluation Guide (EEG)
Version 1.0

CAPABILITY

Description: For the purpose of this article epidemiologic surveillance and investigation is the capability to establish and maintain systems to collect exposure and disease data; analyze data; detect aberrations; investigate and confirm unusual patterns; actively search for persons exposed to, potentially exposed to, or ill from biologic, chemical, or radiologic agents; alert medical and response partners; determine factors that put populations at risk; communicate with the public; report on and present investigation findings; recommend countermeasures; and study causes of epidemics and toxic exposures. Epidemiologic surveillance and investigation is an iterative process. New information learned while conducting the activities described in this capability is added to known information, and many steps are then repeated to improve the understanding of the event. In this manner the inferences made and the conclusions drawn from the information evolve over time during the investigation.

Outcome: The desired outcome is to prevent exposure to and control illness from infectious and toxic agents.

Note: The evaluation instruments are designed to be modular. Not all elements contained in this instrument apply to every situation. Subject matter experts and other emergency response planners should together determine which capabilities to strengthen in their jurisdictions. They, then, select which instruments and which elements (activities, tasks, observation keys, and performance criteria) apply to the exercise they design. The selection of modules, and how they are applied, greatly depends on the particular disease or exposure chosen and its related scenario. Exercise developers should consult current federal program guidance relevant to the disease or exposure and scenario chosen in order to assure exercise materials are created using the most up-to-date and accurate information available.

ACTIVITY 1: ONGOING SURVEILLANCE AND DETECTION

Activity Description: Monitoring disease and exposure data in the jurisdiction and raising awareness of unusual occurrences or patterns.¹³

Tasks and Observation Keys

- Analyze surveillance data according to existing plans and protocols.
 - ✓ A knowledgeable public health professional(s) is available to receive disease reports 24 hours per day /7 days per week /365 days per year (24/7/365)
 - ✓ Case reports from all sources validated
 - ✓ Surveillance data monitored to watch for symptoms in exposed individuals
 - ✓ Surveillance data monitored to watch for complications in persons receiving medical countermeasures
 - ✓ Surveillance data monitored to direct and evaluate public health interventions
 - ✓ Surveillance data monitored to generate hypotheses for further evaluation
 - ✓ Surveillance data monitored to identify trends in target populations
 - ✓ Surveillance data monitored to identify changes in infectious agents (e.g., antimicrobial resistance, changes in influenza virus structure)



ACTIVITY 2: CASE INVESTIGATION TO CONFIRM THE OUTBREAK

Activity Description: Determining to whom the event is occurring, what is the nature of the event, and when and where it is occurring (i.e., the who, what, when, where, and how).

Performance Measure: Public health agency personnel make a correct decision whether to conduct further epidemiologic investigation. (For quality criteria, see Appendix A2, Activity 2, Decision-Making criteria - Whether an aberration in surveillance data warrants an investigation)

Performance Measure: Health Alert Network (HAN) messages must be of minimally acceptable quality (applies also to health alerts generated by jurisdictions that have the same intent and purpose as official Health Alert Network alerts). (For quality criteria, see Appendix A2, Activity 2, Work Product Criteria - Health Alerts.)

Tasks and Observation Keys

- Confirm the existence of an unusual occurrence or event
 - ✓ Case report data interpreted to determine meaning and implications; epidemiologic clues evaluated
 - ✓ Syndromic surveillance data analyzed using aberration detection (if available and appropriate for use in given situation)

- ✓ Alternate explanations considered (e.g., increased clinician awareness as a result of recent media attention to certain diseases, new physicians or clinics in the vicinity, changes in diagnostic methods)¹⁴
- Confirm the diagnoses
 - ✓ Field investigation begun, as needed, to gather patient information and examine reported cases
 - ✓ Clinical syndrome determined
 - ✓ Epidemiologic factors determined (i.e., person, place, time)
 - ✓ Laboratory and diagnostic tests conducted (as applicable to scenario) and results reviewed
- Create an interim case definition
 - ✓ Inclusion criteria described
 - Clinical criteria (symptoms, signs, illness onset, and pertinent diagnostic tests—e.g., chest x-ray; liver enzymes; gram stain)
 - Epidemiologic criteria (person, place, and time)
 - Laboratory criteria (culture results and dates)
 - ✓ Case classified (suspected, probable, confirmed)
 - ✓ Exclusion criteria described (e.g., human monkeypox—a case without a rash that does not develop a rash within 10 days of onset of clinical symptoms consistent with monkeypox)
- Start case line listing (adapt case report form to begin case series)
 - ✓ Case definition data recorded (clinical, epidemiologic, laboratory, and exclusion criteria)
 - ✓ Established or suspected risk factors recorded
 - ✓ Demographic information recorded
 - ✓ Contact information recorded to enable follow-up
- Find cases
 - ✓ Passive surveillance increased [e.g., case definition and guidance disseminated via HAN and other communication methods- e.g., Epidemic Information Exchange (Epi-X) to facilitate case-finding]
 - ✓ Active surveillance instituted (may involve surveys, reviews of existing records and new admissions)
 - ✓ Media outreach considered
- Interview case-patients
 - ✓ Epidemiologists providing surge from assisting organizations used same case report forms as responding epidemiologists
 - ✓ Hypothesis-generating (i.e., open-ended, open-minded) questions asked
 - ✓ Case characteristics identified, sufficient to determine case status: clinical, epidemiologic, laboratory
 - ✓ Medical care and treatments documented
 - ✓ Disposition, complications, death documented
 - ✓ Patient demographic and contact information documented

- ✓ Healthcare provider contact information documented
- Identify potentially exposed individuals (i.e., trace contacts)
 - ✓ Contacts of confirmed case-patients are identified to determine exposure status
 - ✓ Demographic information recorded
 - ✓ Contact information recorded to enable follow-up
- Decide when and whether to notify law enforcement. If decision is to involve law enforcement:
 - ✓ Agency protocols followed in determining need to contact law enforcement officials
 - ✓ Law enforcement personnel needed for joint investigation notified
 - ✓ Collaboration initiated
 - ✓ Epidemiologic investigation data analyzed and interpreted in coordination with data from law enforcement investigation
 - ✓ Ongoing briefings conducted
 - ✓ Relevant evidence identified and collected
 - ✓ Efforts with scientific/forensic testing laboratories coordinated
 - ✓ Chain of custody maintained
- Complete line listing or create database of ill, exposed, and potentially exposed persons.
 - ✓ Ill, exposed, and/or potentially exposed persons identified and documented.
 - ✓ Database updated as new cases identified
 - ✓ Sufficiency of line list or database to describe cases and test hypotheses assessed
 - ✓ Need for survey considered
- Integrate into Incident Command System (ICS) according to plan
 - ✓ Epidemiologists received work assignments from appropriate ICS supervisor
 - ✓ Epidemiologists reported information through correct ICS chain of command
 - ✓ Epidemiologists requested resources through correct ICS chain of command

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ACTIVITY 3: DETERMINE WHO IS AT RISK OF BECOMING ILL

Activity Description: Collecting information about case-patients in order to identify traits, conditions, and circumstances that are putting people at risk to get sick.

Tasks and Observation Keys

- Provide case descriptive epidemiology (how much? when? where? among whom?)
 - ✓ Cases oriented by:
 - Person (unique characteristics and attributes of the case-patients)
 - Place [where is the outbreak occurring (e.g., clustered? Along drinking water distribution channels? Scattered throughout the country? etc.)

- Time (Date of illness onset—if know onset of illness and causative agent’s incubation period can infer when exposed or, if know when exposed and onset of illness, can determine incubation period and infer causative agent)
 - ✓ Case counts determined (how big is the outbreak)
 - ✓ Time course of event determined
 - ✓ Epidemic (“Epi”) curve generated
- By examining data from ill persons try to determine mode of transmission, if possible
 - ✓ Investigation data already collected carefully reviewed
 - ✓ Direct contact spread considered
 - ✓ Droplet spread considered
 - ✓ Airborne spread considered
 - ✓ Vehicle spread considered (e.g., food, water)
 - ✓ Vector-borne spread considered
- By examining the “epi” curve try to infer information about exposure
 - ✓ Point source, single exposure considered
 - ✓ Point source, continuous exposure considered
 - ✓ Person-person spread considered
 - ✓ Mixed source considered
- Conduct an additional survey(s) to gather more specific information about ill persons to determine who is at risk of getting sick, if needed
 - ✓ Investigation data already collected carefully reviewed
 - ✓ Additional questions to be asked determined
 - ✓ Survey instrument created
 - ✓ Survey conducted



ACTIVITY 4: USE DESCRIPTIVE EPIDEMIOLOGY TO DEVELOP A PRELIMINARY HYPOTHESIS ABOUT WHAT EXPOSURE COULD BE CAUSING THE DISEASE

Activity Description: Taking into account all that has been learned so far in the investigation, make an educated guess about what exposure could be making people sick (e.g., ate a hamburger at restaurant X; breathed the air in a certain building; had a medical procedure with a particular type and brand of device). The guess must be a plausible explanation of the facts uncovered during the investigation.

Tasks and Observation Keys

- Review descriptive epidemiology to formulate plausible explanations about how the disease is transmitted and what exposure is causing people to become ill
 - ✓ Clinical data reviewed
 - ✓ Epidemiologic data reviewed
 - ✓ Results of laboratory testing reviewed

- ✓ Knowledge of causative agent, if known, reviewed
- ✓ Environmental investigation reviewed
- ✓ Veterinary investigation reviewed, if applicable
- ✓ Vector-borne investigation reviewed, if applicable
- ✓ Forensic/law enforcement investigation reviewed, if applicable

Develop a hypothesis to explain what specific exposure(s) might be causing the disease

- ✓ Likely causes prioritized to guide recommendations for control measures
- ✓ Hypothesis reviewed to ensure it is consistent with the clinical, laboratory, and epidemiologic facts of the investigation

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ACTIVITY 5: CONDUCT ANALYTIC STUDY(S), IF NEEDED

Activity Description: Some outbreaks never actually make it to the analytic study phase. When control measures are instituted early after the case investigation has begun, and they prove effective, an analytic study might be deemed unnecessary. However, further analytic study might be needed to test preliminary hypotheses if 1) the cause of the outbreak remains unknown; 2) control measures are not working; and/or; 3) critical information necessary to better understand and monitor the event remains elusive. Having specific knowledge about the problem improves the ability to recommend measures to control it. If the preliminary hypothesis is not supported, new hypotheses are generated and tested.

Test hypothesis using appropriate epidemiologic investigative tests and methods

- ✓ Case definition applied consistently to all persons being investigated
- ✓ Non-ill persons (controls) are selected for comparison groups using appropriate analytic study methods
- ✓ Information on ill and non-ill persons analyzed
- ✓ Appropriate statistical tests selected to test hypothesis
- ✓ Investigation continued and new hypothesis developed, if statistical tests indicate no significant difference between ill and non-ill persons on the incriminated exposure, or if incriminated exposure does not “square” with the facts [e.g., iced tea (incriminated exposure) does not harbor *Clostridium botulinum* (case investigation fact)]

Conduct an additional survey(s), as needed, to gather more specific information about ill and non-ill persons (controls) to determine what exposure is causing the disease

- ✓ Investigation data already collected carefully reviewed
- ✓ Additional questions to be asked determined
- ✓ Survey instrument created
- ✓ Survey conducted

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ACTIVITY 6: WRITE AND DISSEMINATE INTERIM REPORT(S) AND FINAL REPORT OF THE INVESTIGATION

Activity Description: Communicating findings is an essential step in an epidemiologic investigation. Reports of the investigation's progress (interim reports) should be disseminated to appropriate officials per agency protocol. Epidemiologists can provide protective action guidance and recommend countermeasures to control an outbreak, but they rely on other decision-makers to take action on the guidance and recommendations. Therefore, epidemiologists must be able to present their thinking and findings in a manner that convinces others to act. At the conclusion of the investigation a report of the results (final report) should also be prepared, disseminated, and archived per public health agency protocol.

Performance Measure: Interim reports generated during an epidemiologic investigation must be of minimally acceptable quality. (For quality criteria, see Appendix A2, Activity 6, Work Product Criteria – Interim epidemiologic investigation reports.). Report information will improve as investigation continues and level of certainty increases.

Performance Measure: Final reports generated during an epidemiologic investigation must be of minimally acceptable quality. (For quality criteria, see Appendix A2, Activity 6, Work Product Criteria – Final epidemiologic investigation report)

Draft and disseminate interim report(s) of the epidemiologic investigation. (Note: This step occurs frequently throughout the investigation)

- ✓ All confirmed and suspected cases to date included by person, place, and time
- ✓ Epidemiologic statistics reported, as needed
- ✓ Report is disseminated to appropriate authorities per public health agency protocol

After the investigation is concluded, write and disseminate a final report. Information should be addressed and documented in a manner that reveals the thinking that underlies the investigator's decisions and actions (i.e., "show your thinking")

- ✓ Report prepared consistent in content and format with public health agency protocol
- ✓ Typical format used in peer-reviewed publications considered (i.e., Introduction, Background, Methods, Results, Discussion)
- ✓ Report disseminated per public health agency protocol
- ✓ Report archived per public health agency protocol

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ACTIVITY 7: MITIGATION AND CONTAINMENT

Activity Description: Using the findings of an epidemiologic investigation to recommend countermeasures to control or stop the outbreak.

Performance Measure: Epidemiologist's recommendations for mitigation and containment strategies must be defensible (For quality criteria see Appendix A2, Activity 7, Decision-making Criteria for Communicable Disease - What countermeasures to recommend)

Performance Measure: Epidemiologist's presentation of findings and countermeasure recommendations must be of minimal acceptable quality. (For quality criteria, see Appendix A2, Activity 7, Work Product Criteria – Epidemiologist findings and countermeasure recommendations for policy-makers.)

Tasks and Observation Keys

Design mitigation and containment strategies for communicable diseases. Relevant epidemiologic principles considered.

- ✓ Eliminate, control, or reduce infectiousness of reservoirs, including animal reservoirs
- ✓ Reduce contact rate between susceptibles (persons susceptible to infection) and potential infectives (potentially infectious case-patients) considered, if applicable
- ✓ Reduce probability potential sources are infectious (e.g., reduce the prevalence of infection in the community)
- ✓ Reduce biological susceptibility of susceptibles
- ✓ Reduce biological infectiousness of infectives
- ✓ Interrupt transmission between infectives and susceptibles, given contact
- ✓ Increase herd immunity (i.e., population level effects)
- ✓ Reduce duration of infectiousness (i.e., provide interventions such as treatment or vaccination as soon as possible)

Recommend mitigation and containment strategies (For quality criteria, see Appendix A2, Activity 7, Work Product Criteria)

- ✓ Population targeted to receive control measures identified (i.e., at risk population)
- ✓ Appropriate measures to control disease and exposure recommended
- ✓ Medical treatment for confirmed case-patients recommended

Provide public health information on investigation, mitigation, and containment strategies to emergency public information officials for release

- ✓ Release approved by legally recognized public health authority
- ✓ Release provided by Joint Information Center, if ICS established
- ✓ Interaction with public information officials continues throughout investigation

Monitor effectiveness of mitigation steps

- ✓ Adverse reactions of public health interventions monitored
- ✓ Recommendations updated

Coordinate examination of deceased suspected case-patients with the medical examiner and/or coroner

- ✓ Fatality management personnel notified of deceased patients
- ✓ Forensic and/or information provided to the medical examiner/coroner

- ✓ Fatality information periodically updated per protocol



ACTIVITY 8: INFORMATION SHARING FOR OUTBREAK OF FOODBORNE ILLNESS¹⁵

Activity Description: Exchanging information with colleagues (e.g., infectious disease epidemiologists, laboratorians, food safety specialists, environmental health specialists) who contribute their own expertise to investigating and controlling an outbreak of foodborne illness.

Tasks and Observation Keys

- Share investigation findings between infectious disease epidemiologists and assisting laboratorians, food safety specialists, and environmental health specialists for findings that relate to food facility inspection and product trace-back.
 - ✓ Initial assessments of food facilities conducted using emergency guidelines, Standard Operating Procedures, and applicable code
 - ✓ Product tracing conducted to determine the source, destination, and disposition, of adulterated or contaminated products



ACTIVITY 9: HUMAN HEALTH THREAT ANALYSIS FOR EXPOSURES TO TOXINS¹⁶

Activity Description: Exchanging information with colleagues who contribute their own expertise to investigating exposures to toxins.

Tasks and Observation Keys

- Evaluate potential exposure pathways (source, fate and transport, point of exposure, route of exposure, susceptible population)
 - ✓ Source of chemical assessed (type, duration, and magnitude of release)
 - ✓ Delivery methods assessed (transportation routes; fate and transport in air and water; food and drug distribution networks)
 - ✓ Potential points of exposure where contact with agent could have occurred assessed (e.g., swimming area downstream of chemical plant; soil near chemical waste site; residential area near smoke-stack)
 - ✓ Exposure routes assessed (indigestion, inhalation, dermal, and ocular)
 - ✓ Receptor populations, including sensitive subpopulations considered (e.g., concentrations irritating to adults might be lethal to children)
- Identify potential acute and chronic health effects
 - ✓ Acute health effects of exposure identified
 - ✓ Chronic health effects of exposure identified
 - ✓ Increased risk of birth defects determined
 - ✓ Exposed patients tracked to enable long-term medical monitoring

- Estimate potential effects on infrastructure and the environment
 - ✓ Safety concerns for rescue personnel working in contaminated environments evaluated
 - ✓ Human health threats from contamination of hospital emergency rooms and staff assessed
 - ✓ Increased risk for infectious diseases from lack of clean water, disruption of solid-waste disposal services, and contact with sewage from broken pipes monitored
 - ✓ Human health threats from contamination of government emergency operations centers evaluated
 - ✓ Human health threats from contamination of houses, schools, and offices assessed
- Identify health risk communication needs
 - ✓ Adherence to the Incident Action Plan communications plan demonstrated
 - ✓ Local Emergency Planning Committee consulted

Appendix A1 (Epidemiologic Surveillance and Investigation) Planning

Planning is essential to successful execution of capabilities. It helps ensure adequate capacity in terms of staffing, equipment required, training needs, and optimal ways to organize the personnel and equipment to carry out the capability.

Described below are elements of planning that should be in place before an event (exercise or real disaster). At a minimum these elements ought to be addressed, but the list is certainly not exhaustive. Completion of these elements can be documented, and the documents can be reviewed before exercising the capability.

- Identify applicable laws, policies, and implementation procedures for public health reporting and notification
 - ✓ Applicable local, state, and federal laws and regulations examined
 - ✓ Due process and Health Insurance Portability and Accountability Act (HIPAA) requirements are followed
 - ✓ Jurisdiction's disease reporting statutes selected conditions that require immediate reporting to the public health agency
 - ✓ Notifiable disease reporting laws provided to physicians, healthcare facilities, and laboratories
 - ✓ Updated requirements and/or guidance (from executive authority) communicated to healthcare providers, healthcare facilities, and laboratories
- Identify all stakeholders and agency representatives or liaisons
 - ✓ Public, private, tribal, and border government stakeholders for public health services identified
 - ✓ Response plan partners identified
- Identify data sources and data users
 - ✓ Sources of data identified (e.g., healthcare providers, poison control centers, human and animal laboratories, hospitals, infection control practitioners, media, general public)
 - ✓ Users of data are identified (e.g., public health practitioners, healthcare providers, law enforcement officials, public safety officials, elected officials)
- Coordinate resources needed to detect events of public health significance¹⁷
 - ✓ Reporting and messaging mechanisms identified (e.g., disease report phone lines, web-based reporting systems, fax, Health Alert Network)
 - ✓ Reporting and messaging mechanisms tested routinely or per agency schedule
 - ✓ Surveillance systems for notifiable conditions in place and assessed periodically for:
 - Simplicity (structure and ease of operation)
 - Flexibility (adaptable to changing information needs)

- Data quality (completeness and validity)
 - Acceptability (willingness of reporting sources to participate)
 - Sensitivity (case definition, detection of outbreak)
 - Representativeness (of target population over time)
 - Timeliness
 - Stability (reliability and availability)
- Coordinate resources needed to respond to events of public health significance
- ✓ Level of competency of public health agency epidemiologists is consistent with their assigned roles and responsibilities¹⁸
 - ✓ Epidemiology Response Team personnel identified by name, title, and primary and secondary contact information
 - ✓ Epidemiology staff trained on Emergency Operations Center procedures
 - ✓ Epidemiology staff trained on National Incident Management System principles
 - ✓ Equipment to conduct routine investigations sufficient for number of Epidemiology Response Team personnel identified and available for use (e.g., personal protective equipment, information technology, communication, clinical sampling equipment, specimen collection material)
 - ✓ Law enforcement personnel needed for response identified
 - ✓ Procedures to notify law enforcement personnel in place
- Ensure logistics support
- ✓ Logistical support plans in place before events to ensure continued operations during the incident (e.g., technical support, security, surge capacity, deployment procedures, transportation, equipment, supplies, relief staff, designated lead on epidemiology investigation team)
- Healthcare provider education
- ✓ Educational materials (e.g., fact sheets) developed ahead of time for events of public health significance
- Identify, assess, and prioritize threats
- ✓ A Hazard and Vulnerability Analysis (HVA) is conducted by jurisdiction [The Federal Emergency Management Agency (FEMA) provides instruction regarding how to conduct an HVA]
 - ✓ Jurisdiction's Hazard and Vulnerability Analysis reviewed by infectious disease and environmental health epidemiologists
 - ✓ Jurisdiction HazMat teams consulted
 - ✓ Local Emergency Planning Committee (LEPC) consulted
 - ✓ Law enforcement consulted for information on known threats in vicinity

Appendix A2 (Epidemiologic Surveillance and Investigation) Criteria for Performance

As noted in the Introduction (see Discussion: How to Use the Public Health EEGs), subject matter experts are needed throughout the design and conduction of exercises including participation as evaluators. As evaluators they are best served with written standards by which to judge how well responders trained in their same field perform their duties. Standards for quality, though, are difficult to define. Even expert opinions vary. In addition, criteria that should be factored in when making decisions about epidemiologic investigation depend on the agent involved, though criteria regarding type of content and format that ought to be present in work products can be more standard. Because of these challenges uniform criteria to judge quality of performance are rarely offered. Despite these problems we deem it essential to offer some quality criteria for this Epidemiologic Surveillance and Investigation EEG. Criteria by which to judge the quality of responder performance are provided in this appendix for three Activities: Activities 2, 6, and 7.

We divided quality criteria into decision making and work products because the results of these efforts must be handed off to responders in other linked capabilities, who await them to carry out their own work. If these decisions and work products are woefully inferior, then the missions of fellow responders in the linked capabilities may be seriously compromised.

DECISION-MAKING

To judge decision-making performance, evaluators should listen to discussions among epidemiologists during the exercise and determine whether they factor any relevant quality criteria into their decisions. Since the criteria to be considered differ by scenario, epidemiologists must participate in development of the exercise scenario to determine which criteria apply and under which conditions. The criteria they select as relevant are then included in the EEG, modified as necessary for the exercise. We propose quality criteria for two critical decisions: (1) whether an aberration in surveillance data warrants an investigation and (2) what countermeasures to recommend.

WORK PRODUCTS

To judge performance using work product criteria, evaluators should examine the relevant work products for quality content and format. We propose quality criteria for three work products: (1) Health Alerts, (2) interim and final epidemiologic investigation reports, and (3) epidemiologist findings and countermeasure recommendations for policy-makers.

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ACTIVITY 2: CASE INVESTIGATION TO CONFIRM THE OUTBREAK

Decision-making Criteria - Whether an aberration in surveillance data warrants an investigation

- Use epidemiologic clues consistent with those described in “Epidemiology of Bioterrorism”¹⁹ to decide whether to conduct further epidemiologic investigation
 - ✓ Presence of a large epidemic, with greater case loads than expected, especially in a discrete population (number of new case reports compared with baseline case reports)
 - ✓ More severe disease than expected for a given pathogen; unusual routes of exposure
 - ✓ Disease unusual for a given geographic area; found outside the normal transmission season; impossible to transmit naturally in the absence of normal vector for transmission
 - ✓ Multiple simultaneous epidemics of different diseases
 - ✓ Disease outbreak with zoonotic as well as human consequences
 - ✓ Unusual strains or variants of organisms or antimicrobial resistance patterns disparate from those circulating
 - ✓ Higher attack rates for those exposed in certain areas, such as inside a building if an aerosol was released indoors, or lower rates for in those inside a building if aerosol released outdoors
 - ✓ Intelligence that an adversary has access to a particular agent(s)
 - ✓ Claims by a terrorist of the release of a biologic agent
 - ✓ Direct evidence of the release of an agent, with findings of equipment, munitions, or tampering

Work Product Criteria - Health Alerts

- Include quality content in Health Alert²⁰
 - ✓ Description of the problem provided (e.g., large numbers of patients with rapid onset of high fever followed by muscle aches, headache, and sore throat)
 - ✓ Time period during which problem is unfolding described
 - ✓ Magnitude of the problem (i.e., number of cases) described
 - ✓ Case definition for probable, suspected, and confirmed case (clinical, epidemiologic, and laboratory criteria) described, as information becomes available
 - ✓ Exclusion criteria described
 - ✓ Request to report suspected and probable cases issued
 - ✓ Instructions regarding to whom cases should be reported provided
 - ✓ Point of contact for more information provided
 - ✓ Statement of intent to provide further updates included
 - ✓ Statement that underscores urgency to report included
 - ✓ Statement of reminder regarding jurisdiction’s laws for disease reporting included

- Use quality format when presenting Health Alerts²¹
 - ✓ Bold, succinct subject line included
 - ✓ A unique identifier included
 - ✓ Date and time of issue included
 - ✓ Level of message urgency identified
 - ✓ Audience to whom the message is directed specified
 - ✓ Name, title, and contact information of the person(s) responsible for issuing the message included
 - ✓ Required action steps specified
 - ✓ Instructions to share information with targeted audiences included
 - ✓ Instructions to provide a point-of-contact or website address for more information included
 - ✓ Public health agency's emergency contact information included in a prominent location
 - ✓ Estimated time for follow-up included, if the message was of the highest priority
 - ✓ Page numbers on each page and total number of pages identified
 - ✓ Content and format approved and authorized for dissemination according to public health agency protocol [or incident commander, unified command, or joint information center officer, if operating under National Incident Management System]



ACTIVITY 6: WRITE AND DISSEMINATE INTERIM REPORT(S) AND FINAL REPORT OF THE INVESTIGATION

Work Product Criteria – Interim epidemiologic investigation reports

- Include quality content in interim epidemiologic investigation reports
 - ✓ Information tailored to intended audience
 - ✓ Description of the problem provided
 - ✓ Statement about ongoing nature of investigation included
 - ✓ Case ascertainment elements specified
 - ✓ Number of cases found to date (time of report) provided
 - ✓ Statement of whether countermeasures were implemented included
 - ✓ Target population for countermeasures identified
 - ✓ Barriers to countermeasure implementation identified
 - ✓ Status of descriptive and analytic studies provided
 - ✓ Statement of whether countermeasures depend on results of analytic studies included
 - ✓ Findings of descriptive and analytic studies provided
 - ✓ Criteria for causation stated

Work Product Criteria – Final epidemiologic investigation report

- Include quality content in final epidemiologic investigation report
 - ✓ How notified or found out about the problem documented
 - ✓ How investigated the problem documented
 - ✓ Evidence on which based recommendations documented
 - ✓ Recommendations made documented
 - ✓ Effect of implementing recommendations documented
 - ✓ Reasons why recommendations were not or (could not) be implemented documented, if applicable
 - ✓ Further follow-up needed, if applicable

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ACTIVITY 7: MITIGATION AND CONTAINMENT

Decision-making Criteria for Communicable Disease - What countermeasures to recommend

Use epidemiologic principles, in particular the basic reproductive number (R_0), where $R_0 = dcp$; d , the duration of infectiousness; c , the contact rate with susceptible hosts; and p the transmission probability—the probability of infecting the susceptible host when contact occurs, to decide what countermeasure strategies to recommend.²²

Interventions considered to:

- ✓ Eliminate, control, or reduce infectiousness of reservoirs, including animal reservoirs
- ✓ Reduce contact rate between susceptibles (persons susceptible to infection) and potential infectives (potentially infectious case-patients)
 - Change behavior (host and or source; e.g., reduce crowding, heed travel advisories)
 - Find infectives—case finding—for intervention (e.g., isolation)
 - Isolate infectives
 - Trace susceptibles—contact tracing—for intervention (e.g., quarantine)
 - Quarantine exposed susceptibles [individual, community, geographic boundary (cordon sanitaire)]
 - Shelter-in-place (self-imposed separation of non-exposed persons)
 - Reduce number of infectives (e.g., fewer infectives encountered)
 - Promote social distancing (e.g., school closures, cancellation of mass gatherings, etc.)
- ✓ Reduce probability potential sources are infectious (e.g., reduce the prevalence of infection in community)
 - Find infectives –case finding—for intervention (e.g., isolation, treatment)
 - Identify and control infectives
 - Vaccinate [i.e., induce immunity (noninfectious), or partial immunity (less infectious)]
- ✓ Reduce biological susceptibility of susceptibles

- Vaccinate susceptibles (pre- and post-exposure) (i.e., susceptible generates own antibodies)
- Give immune globulin (pre- and post-exposure) (susceptible given pre-formed antibodies)
- Give antimicrobial drug (pre- and post-exposure)
- Treat co-factor (e.g., treat ulcerated or non-intact skin)
- ✓ Reduce biological infectiousness of infectives
 - Treat case-patients
 - Vaccinate [i.e., induce immunity (noninfectious), or partial immunity (less infectious)]
- ✓ Interrupt transmission between infectives and susceptibles, given contact
 - Physical barriers and chemical methods (masks, respirators, goggles, gloves, hand sanitizers, etc.)
 - Engineering controls (e.g., HEPA filters, negative pressure rooms)
 - Environmental controls (e.g., dis-infection, decontamination)
- ✓ Increase herd immunity (population level effects).
 - Naturally acquired immunity
 - Fraction vaccinated (vaccine coverage)
 - Fraction fully protected (vaccine efficacy)
- ✓ Reduce duration of infectiousness (i.e., provide interventions such as treatment or vaccination as soon as possible)

Work Product Criteria - Epidemiologist findings and countermeasure recommendations for policy-makers

- Include quality content when presenting epidemiologist findings and countermeasure recommendations²³
 - ✓ Problem discovered during investigation orally and visually described (e.g., can of tainted food, pictures of disease)
 - ✓ Number of cases found to date and time presented
 - ✓ Inferences and conclusions drawn from findings to date and time of presentation described
 - ✓ Countermeasure recommendations presented
 - ✓ Target population for countermeasures identified
 - ✓ Reasons for recommendations provided
 - ✓ Likely benefits and possible consequences of following recommendations described
 - ✓ Possible consequences of not following recommendations described
 - ✓ Alternative options offered, if any are being considered, and likely consequences discussed
 - ✓ Barriers to implementing countermeasures identified

- Use quality format when presenting epidemiologist findings and countermeasure recommendations²⁴
 - ✓ Simple, clear language used; use of technical jargon minimized

- ✓ Active voice, action verbs used
- ✓ Concise sentences used
- ✓ Information logically sequenced
- ✓ Thinking obviously organized
- ✓ Important information summarized
- ✓ Presentation stays within allotted time
- ✓ Handouts, if used, track with order of material presented
- ✓ Visual aids (e.g., props and pictures) enhance, support, exemplify, and/or facilitate understanding of material covered

Appendix B

Isolation and Quarantine

Exercise Evaluation Guide (EEG)

Version 1.0

CAPABILITY

Description: For the purpose of this article isolation and quarantine are defined as movement-restriction interventions to prevent the transmission of contagious illness. Isolation refers to the identification, separation, and restriction of movement of persons who are known to be ill with a contagious disease. Quarantine refers to the identification, separation, and restriction of movement of persons who have been exposed to a contagious disease but who may or may not become ill; such persons are potentially infectious.

Because both of these interventions curtail a person's right to freedom of movement, most public health officials hope affected persons will comply voluntarily with isolation and quarantine instructions. Occasionally, though, a court order is needed to enforce the restrictions. High priority must be given to gaining public cooperation with isolation and quarantine measures. Special attention must be paid to subpopulations of persons who might need additional assistance to understand and comply with isolation and quarantine interventions. Wherever these persons are confined (at home, in hospitals, or at alternate care facilities), they need information and support. They might need help getting food; monitoring their health; understanding altered workplace and school expectations; providing childcare, eldercare, or pet care; or finding financial assistance. Therefore, to be successful, isolation and quarantine involve the entire community.

Typically, the isolation and quarantine capability covers only contagious biological agents, leaving toxic chemical or radioactive agents to be covered by the WMD/Hazardous Materials Response Capability. However, because the process of involuntary movement restriction for persons who might expose others to toxins or radioactive agents (e.g., by refusing decontamination) is similar to that for persons who might spread infectious agents, a special activity called Emergency Detention for Chemical or Radiation Exposure is included in this Isolation and Quarantine EEG.

Outcome: The desired outcome is a limited spread of a newly introduced contagious disease. Persons who are infectious or potentially infectious are separated from others, prohibited from leaving confinement areas, provided with basic necessities of life, and monitored for health. Legal authority for these measures is clearly defined and communicated to the public. Logistical support is provided until the danger of transmission resides.

Note: The evaluation instruments are designed to be modular. Not all elements contained in this instrument apply to every situation. Subject matter experts and other emergency response planners should together determine which capabilities to strengthen in their jurisdictions. They then select which instruments and which

elements (activities, tasks, observation keys, and performance criteria) apply to the exercise they design. The selection of modules, and how they are applied, greatly depends on the particular disease or exposure chosen and its related scenario. Exercise developers should consult current federal program guidance relevant to the disease or exposure and scenario chosen in order to assure exercise materials are created using the most up-to-date and accurate information available.



ACTIVITY 1: ORGANIZING INTO A TIER 3 PUBLIC HEALTH AND MEDICAL OPERATIONS FUNCTIONAL AREA (As Appropriate)

Activity Description: Organizing in a Tier 3 Public Health and Medical Operations Functional Area when public health is the lead agency in a Unified Command or when supporting the jurisdiction's Emergency Operations Center as lead for Emergency Support Function #8 (ESF#8).²⁵

Critical Tasks and Observation Keys

- Organize within a public health and medical functional area in a National Incident Management System (NIMS)–compliant management structure
 - ✓ Isolation and quarantine operations logically aligned with hospital operations to facilitate coordination of effort
- Use NIMS to coordinate support for Isolation and Quarantine activities and ensure that overall incident objectives and priorities are met
 - ✓ Requests for personnel, equipment, and supplies made through the jurisdiction's Incident Command System(ICS)/NIMS structure
 - ✓ Requests for support made by using correct ICS forms



ACTIVITY 2: PROTECTED HEALTH INFORMATION—LAWFUL DISCLOSURE

Activity Description: Handling protected health information according to privacy standards established pursuant to the Health Insurance Portability and Accountability Act (HIPAA).²⁶

Critical Tasks and Observation Keys

- Comply with HIPAA
 - ✓ As needed, covered entities (health plans, healthcare clearing houses, healthcare providers) informed about lawful disclosure of protected health information-- without authorization from persons whose information is being released-- when public health authorities, who are legally authorized to collect or receive the information, request it
 - ✓ Covered entities comply with legitimate information requests from public health authorities

- ✓ Public health authorities comply with regulations regarding use of disclosed protected health information
- Resolve issues about protected health information
 - ✓ Public health legal advisors functioned as Technical Specialists in the ICS Planning Section, or wherever their specialized services are required
 - ✓ Public health legal advisors helped resolve disputes or questions about lawful disclosure of protected health information



ACTIVITY 3: EVALUATION OF PATIENT AND DETERMINATION OF NEED FOR MOVEMENT RESTRICTION

Activity Description: Using epidemiologic, medical, and laboratory data to determine if person needs to be isolated or quarantined to protect the rest of the population and to assure adequate treatment and monitoring.

Critical Tasks and Observation Keys

- Identify persons who require isolation
 - ✓ Whether person is suspected or confirmed to be infected with a contagious pathogen is established based on signs, symptoms, and available laboratory findings
- Identify persons who should be quarantined
 - ✓ Whether person has been exposed to, or has likely been exposed to, a contagious pathogen, or has arrived from an established high-risk area
- Consider relevant factors to decide whether to separate the person from the rest of the population and restrict his/her movement. The following are considered:
 - Pathogen factors (e.g., virulence, infectious dose, infectivity, ease and mode of transmission)
 - Host factors (e.g., susceptibility of the population, availability of treatment, effectiveness of treatment)
 - Environment factors (e.g., ability to achieve and enforce separation)
 - Legal factors (e.g., authority to isolate or quarantine based on the specific pathogen suspected or known)
- Decide whether to isolate, quarantine, or release the individual



ACTIVITY 4: APPROPRIATE SETTING SELECTION

Activity Description: Considering individual needs, circumstances, and exposure risk to family members and primary caregivers when selecting appropriate setting for isolation or quarantine.²⁷

Critical Tasks and Observation Keys

- Use answers to the following questions to determine appropriate settings:
 - ✓ Person needs hospital-level of care? (yes = hospital; no = home or facility)
 - ✓ Person can care for himself/herself? (yes = home; no = facility)
 - ✓ Person can monitor himself/herself for symptom deterioration? (yes = home; no = facility)
 - ✓ Person can minimize close contacts and contact with immuno-compromised persons in the household? (yes = home; no = facility)
 - ✓ A healthy primary caregiver is available? (yes = home; no = facility)
 - ✓ Person can stay in a home locally? (yes = home; no = facility (e.g., homeless, transient, tourist, business traveler, foreign traveler, displaced person, etc.))
 - ✓ Home is near a facility that can provide a higher level of medical care (yes = home; no = facility)
 - ✓ Person is willing to remain in isolation or quarantine for the full duration required? (yes = home; no = facility)
 - ✓ Person is in quarantine and deemed an essential worker? (yes = consider work quarantine; no = work quarantine not an option)
- Decide an appropriate setting. The following considered:
 - ✓ Airborne infection isolation room in hospital
 - ✓ Home (including working from home)
 - ✓ Alternate healthcare facility
 - ✓ Work



ACTIVITY 5: VOLUNTARY ISOLATION OR QUARANTINE

Activity Description: Seeking voluntary compliance with isolation and quarantine recommendations as the preferred and least restrictive means to separate infectious or potentially infectious persons from susceptible persons in the rest of the population. However, this option is also the most difficult to enforce and track, as few public health resources are available to monitor compliance.

Critical Tasks and Observation Keys

- Determine if persons requiring isolation or quarantine can and will comply voluntarily
 - ✓ Requests for voluntary compliance with isolation or quarantine issued only by authorized officials
 - ✓ Person agrees to comply with movement restrictions
 - ✓ Person demonstrates understanding of reasons for isolation or quarantine by re-stating reasons in his/her own words
 - ✓ Person demonstrates understanding that consequences of not adhering to voluntary movement restrictions can be court ordered confinement by re-stating consequences in his/her own words

- ✓ Person describes living circumstances that enable compliance (e.g., has a phone to enable monitoring, has family or friends who are willing to assist him, has stable housing situation)
- ✓ Person demonstrates understanding of public health official's monitoring and treatment instructions by discussing instructions with official and describing how he/she will carry out the instructions
- Provide documents and instructions in person's primary language
 - ✓ Reasons for isolation or quarantine provided
 - ✓ Instructions and guidance while under restriction provided in primary language to affected person and caregiver(s)
 - ✓ Estimate of time expected to remain in isolation or quarantine provided
 - ✓ Procedures for release from isolation or quarantine provided
- Obtain informed consent
 - ✓ Persons entering voluntary isolation or quarantine are asked to acknowledge their understanding of and agreement with the terms of the restriction, person informed of terms, understanding verified, and consent documented per agency protocol
- Track person
 - ✓ Relevant information recorded and entered into a database to facilitate monitoring of health status and compliance with movement restriction



ACTIVITY 6: INVOLUNTARY ISOLATION OR QUARANTINE

Activity Description: Compelling involuntary compliance with isolation and quarantine orders to separate infectious or potentially infectious persons from susceptible persons in the rest of the population.

Critical Tasks and Observation Keys

- Decide whether to order involuntary movement restriction for persons who pose a threat to the population. The following should be considered:
 - ✓ Disease factors [e.g., highly contagious infection, stage of disease that person is in (perhaps no longer infectious), no or very limited treatment available]
 - ✓ Likelihood of compliance factors (e.g., person is a flight risk, is irresponsible, is unreliable)
 - ✓ If contemplating a federal quarantine order, the disease must be one listed as quarantinable in executive order(s).
 - ✓ Availability of resources to enforce and monitor (an especially relevant consideration in the "one ill person" scenario v. an influenza pandemic scenario)

- Determine which legal authorities to invoke
 - ✓ If public health officer has and exercises his/her own authority to order detention, written order signed, with date and time, using proper procedures and forms per agency protocol
 - ✓ If state/local public health officer issues detention order, court officials notified in order to facilitate appeals and future court proceedings
 - ✓ If court-ordered detention sought, state/local public health officials and/or their legal advisors contact court officials to petition a judge (or magistrate) for the order using proper procedures and forms per agency protocol
- Provide reasons why involuntary movement restriction is required
 - ✓ Irrespective of the legal authority invoked, public health officials provided, in writing, the reasons and evidence to support an order for involuntary isolation or quarantine
- Deliver detention order
 - ✓ Arrangements made with law enforcement officials to serve the detention order, if law enforcement is needed
- Arrange transport of person to site of isolation or quarantine
 - ✓ Arrangements made with transport officials, if special transport is needed
- Track person
 - ✓ Relevant information recorded and entered into a database to facilitate monitoring of health status and movement restriction
- Prepare for detention hearing (typically 48–72 hours after initial detention order)
 - ✓ Evidence and statements prepared by public health officials for the hearing, during which government officials issuing or obtaining the initial detention order, the patient and/or his/her attorney, and a judge are present to hear arguments for and against continuing the involuntary restriction of patient's movement
 - ✓ To avoid risk of infecting persons attending court proceedings, patient does not appear in person, but rather is represented by an attorney, if possible

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ACTIVITY 7: RECOMMENDATIONS FOR RESPONSE PERSONNEL

Activity Description: Ensuring that response personnel likely to come in contact with contagious persons use recommended personal protective equipment (PPE), follow protective action recommendations, and are offered appropriate prophylaxis and treatment

Critical Tasks and Observation Keys

- Prepare the incident medical plan (ICS Form 206) to protect and manage responder health

- ✓ Recommendations for personal protective equipment, pre-exposure prophylaxis, and other protective actions to minimize exposure risk for responders assisting infectious and potentially infectious patients provided to the ICS Safety Officer in the Incident Medical Plan prepared by the Logistics Section, Medical Unit
 - ✓ Recommendations for post-exposure prophylaxis and treatment, if available, described in the Incident Medical Plan
 - ✓ Recommendations for post-exposure prophylaxis and treatment, if available, offered to responders who are accidentally exposed to contagious patients
 - ✓ Court officials, attorneys, law enforcement officers, patient transporters, human services personnel, and others supporting isolation and quarantine operations included as responders
 - ✓ Isolation and quarantine for sick or exposed responders considered
- Critical Incident Stress Management (CISM) specialist, if available, assists responders
- ✓ Responders coping with the psychological and emotional stress of managing a significant event involving contagious illness offered help of CISM specialist



ACTIVITY 8: HEALTH STATUS MONITORING

Activity Description: Assuring persons receive regular attention to detect trends in health status and problems with compliance.

Critical Tasks and Observation Keys

- Monitor health status of confined persons
- ✓ Confined person's health status monitored per agency protocol (e.g., daily visit, daily phone call, health status logged, etc.)
 - ✓ If health status deteriorates, action taken to re-evaluate need for higher level of medical care
 - ✓ If health status improves, action taken to re-evaluate need for confinement
 - ✓ Self-monitoring guidance issued, if appropriate
- Monitor compliance with movement restrictions
- ✓ Confined person's compliance with movement restrictions monitored per agency protocol
 - ✓ If confined person is non-compliant with movement restrictions, action taken to re-evaluate need for higher level of restriction and enforcement (e.g., change individual from voluntary to involuntary isolation or quarantine, use electronic monitoring device [e.g., ankle bracelet], assign law enforcement to guard patient, incarcerate)



ACTIVITY 9: SITE ASSESSMENT

Activity Description: Evaluating the suitability of a person's home, a healthcare facility (e.g., isolation wards in sections of or in entire hospitals), or an alternative

healthcare facility (e.g., clinic, nursing home, school, auditorium, convention center, hotel, cruise ship) as a site for isolation or quarantine.

Critical Tasks and Observation Keys

- ☐ Evaluate all site types for basic necessities. The following considered:
 - ✓ Ability to practice social distancing among quarantined
 - ✓ Utilities (water, electricity, garbage collection, bio-hazardous waste handling, heating and air conditioning)
 - ✓ Ability to isolate airflow to prevent spread of micro-organisms through heating, ventilation, and air conditioning (HVAC) system (if airborne precautions indicated)
 - ✓ Acceptable ventilation
 - ✓ Lavatories and showers
 - ✓ Laundry facilities and supplies, including diaper service
 - ✓ Food preparation areas
 - ✓ Essential supplies (clothing, food, hand hygiene, thermometers, fever log, other medical equipment and supplies)
 - ✓ Mechanism for addressing special needs (e.g., filling prescriptions)
 - ✓ Methods for communication, including telephone (for monitoring by health staff, reporting of symptoms, gaining access to support services, and communicating with family)
 - ✓ Proximity to higher levels of care
 - ✓ Ability to monitor health, including provision of areas to conduct temperature checks, etc.

- ☐ Evaluate person's home for special considerations. The following considered:
 - ✓ The isolated person can be confined to a room in the home furthest from high-traffic areas with the least opportunity for disease spread. This room has a closeable door.
 - ✓ The isolated person has access to a separate bathroom that will not be used by others during the period of isolation
 - ✓ Room ventilation is cut off from home's central air conditioning unit, and room is frequently vented to the outside of the house (i.e., windows opened as often as possible), (if airborne precautions indicated)
 - ✓ Pets are removed from the household and alternative pet care is found

- ☐ Evaluate healthcare or alternative healthcare facility for special considerations. The following considered:
 - ✓ Availability of airborne infection isolation rooms (if indicated)
 - ✓ Bed capacity and spatial separation of patients (social distancing)
 - ✓ Potential for makeshift negative pressure zones
 - ✓ Availability of autoclave
 - ✓ Ability to support designated level of care for ill patients (e.g., suction, oxygen available, if needed)
 - ✓ Ease of transporting patients to and within the facility (e.g., doors wide enough for gurneys)

- ✓ Ease of decontaminating and/or disinfecting rooms
- ✓ Ease of securing the building
- ✓ Ease of allowing family to visit the seriously ill
- ✓ Proximity to residential areas
- ✓ Proximity to space for staff, family members, clergy, counselors, equipment, supplies, food preparation, laboratory, decontamination, and mortuary
- ✓ Access in and out of facility is controlled
- ✓ Willingness of facility owner to allow structure to be used as an isolation facility
- ✓ Ability to use a facility based on legal authority, if location not previously identified



ACTIVITY 10: WORK QUARANTINE

Activity Description: Controlling infectious disease by quarantining at work.

Critical Tasks and Observation Keys

- Decide whether to allow work quarantine
 - ✓ Determine if worker considered essential to maintaining critical infrastructure (e.g., healthcare workers, police, fire fighters, utility workers)
- Establish work quarantine
 - ✓ Quarantined persons stay home at all times when not working or stay at work, if home or alternative quarantine facilities are unavailable
 - ✓ Transportation arrangements for quarantined persons moving between home or facility quarantine and work ensure no exposure to susceptible persons, or person in quarantine uses barriers (e.g., mask and gloves, as appropriate) to minimize exposure to susceptible persons



ACTIVITY 11: ENTIRE FACILITY QUARANTINE

Activity Description: Controlling infectious disease by quarantining an entire facility

Critical Tasks and Observation Keys

- Decide whether to quarantine an entire facility if
 - Facility has experienced a high potential for exposure
 - Facility has a particularly high case count
 - ✓ Quarantine of entire facility considered because above conditions met
- Establish facility quarantine
 - ✓ Quarantined persons cohorted (when necessary) with family, friends, or persons exposed under similar circumstances
 - ✓ Efforts made to create makeshift negative pressure rooms or corridors, as appropriate

- ✓ Facility layout arranged for easy removal of quarantined persons to isolation, if signs or symptoms develop
- ✓ Facility layout arranged for efficient monitoring, observation, and care
- ✓ Temporary facilities (e.g., for food and laundry services) erected, if necessary
- ✓ Generators are used to provide energy, heating, and cooling, if basic utilities are otherwise unavailable
- ✓ Special arrangements and procedures for work quarantine are implemented for first responders and medical personnel
- ✓ Access in and out of facility is controlled



ACTIVITY 12: ENTIRE COMMUNITY QUARANTINE (CORDON SANITAIRE)

Activity Description: Controlling infectious disease by quarantining an entire geographic area such as an apartment complex, neighborhood, or section of community.²⁸

Critical Tasks and Observation Keys

- Decide to quarantine an entire geographic area if
 - The area has experienced a high potential for exposure
 - The area has a particularly high case count
- ✓ Quarantine of entire community considered because above conditions met
- Establish quarantine perimeters
 - ✓ The size of perimeters that limit where the quarantine begins and end determined
 - ✓ Access controls into and out of quarantined area established by security or law enforcement officials
 - ✓ Access controls included setting-up buffer or warm zones between the quarantine (hot zone) and non-quarantine regions to limit contacts and facilitate delivery of essential goods and services, if appropriate
 - ✓ Access to hot zone permitted only to persons with properly authorized credentials
 - ✓ Special access provided to those requiring temporary entrance into quarantine (e.g., work quarantines, service providers, law enforcement, family members, friends, critical service providers, emergency responders, and business continuity staff)
 - ✓ Vehicles for transporting quarantined persons available, as needed
 - ✓ A transport call center to track and coordinate transport to and from quarantine established, in coordination with the local emergency management system and law enforcement officials and public health
 - ✓ Facilities established and maintained for nonresidents, homeless, and dislocated persons within the quarantined community



ACTIVITY 13: PUBLIC MENTAL HEALTH NEEDS

Activity Description: Differentiating between normal stress reactions and mental illness to provide appropriate care and support.

Critical Tasks and Observation Keys

- Promote normalcy
 - ✓ People confined in isolation and quarantine and the population at large provided access to an ongoing, reliable flow of credible information about the disaster and associated relief efforts
 - ✓ Persons confined in isolation and quarantine provided with means to contact family and friends (particularly important in the case of isolation, when family members are most worried about their sick relatives)
 - ✓ If death of a person in isolation is imminent, family members permitted into isolation area provided they use appropriate personal protective equipment and are willing to enter quarantine after the visit, if necessary
 - ✓ Normal cultural and religious events maintained or re-established (including grieving rituals conducted by religious practitioners)
 - ✓ Children and adolescents in quarantine provided access to formal or informal schooling and recreational activities
 - ✓ Adults and adolescents in quarantine provided concrete, purposeful, common-interest activities to participate in
- Provide psychological first aid²⁹
 - ✓ Non-intrusive pragmatic care focused on listening to affected persons, but not forcing them to talk
 - ✓ Basic needs assessed and met to a reasonable extent
 - ✓ Company from significant others encouraged, but not forced
 - ✓ Basic information about common reactions to stress and trauma provided
- Coordinate care for mentally ill
 - ✓ Care for urgent psychiatric complaints provided
 - ✓ Relevant treatment for persons with pre-existing psychiatric disorders maintained to avoid harmful, sudden discontinuation of medications

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ACTIVITY 14: EMERGENCY DETENTION FOR CHEMICAL OR RADIATION EXPOSURE

Activity Description: Identifying, separating, and restricting movement of persons who may have been exposed to a toxic or radioactive contaminant and can, therefore, potentially contaminate others. Persons exposed to toxic chemicals or radiation are expected to comply voluntarily with decontamination; their cooperation is typically assumed. Note: This activity will typically be led by law enforcement officials in collaboration with healthcare providers. The role of public health in this situation is to help characterize the event and differentiate infectious disease from chemical and radioactive materials exposure.

Critical Tasks and Observation Keys

Decide whether to order involuntary movement restriction and decontamination for persons who refuse decontamination and, therefore, pose a threat to others. The following considered:

- ✓ Contaminant factors (e.g., likelihood that contaminant poses a significant exposure risk to others, amount of contamination present, no or limited treatment available)
- ✓ Patient factors (e.g., patient is incoherent from effects of exposure, is a flight risk, is irresponsible, is unreliable)

Determine which legal authorities to invoke

- ✓ If immediate detention required because of imminent and substantial risk of serious harm to self or others, peace officers (in many jurisdictions) can detain without a warrant
- ✓ If public health officer has and exercises his/her own authority to order detention, written order signed, with date and time, using proper procedures and forms per agency protocol
- ✓ If public health officer issues detention order, court officials notified in order to facilitate appeals and future court proceedings
- ✓ If court ordered detention sought, public health officials and/or their legal advisors contact court officials to petition a judge (or magistrate) for the order using proper procedures and forms per agency protocol

Appendix B1 (Isolation and Quarantine) Planning

Planning is essential to successful execution of capabilities. It helps ensure adequate capacity in terms of staffing, equipment required, training needs, and optimal ways to organize the personnel and equipment to carry out the capability.

Described below are elements of planning that should be in place before an event (exercise or real disaster). At a minimum these elements ought to be addressed, but the list is certainly not exhaustive. Completion of these elements can be documented, and the documents can be reviewed before exercising the capability.

Ensure incident planning activities are consistent with established National Incident Management System (NIMS) preparedness guidance.³⁰ The following planning activities are consistent with NIMS guidance:

- ✓ Exercises, consistent with Homeland Security Exercise and Evaluation Program (HSEEP) principles and practices
- ✓ Personnel qualification and certification
- ✓ Equipment acquisition and certification
- ✓ Mutual aid agreements
- ✓ Publications management
- ✓ Information and intelligence management

Ensure that emergency operations plans follow NIMS principles. The following NIMS principles are evident in jurisdiction's emergency operations plans:

- ✓ Common terminology
- ✓ Modular organization
- ✓ Management by objectives
- ✓ Reliance on an Incident Action Plan
- ✓ Manageable span of control
- ✓ Pre-designated locations and facilities
- ✓ Comprehensive resource management
- ✓ Integrated communications
- ✓ Establishment and transfer of command
- ✓ Chain of command and unity of command
- ✓ Unified command
- ✓ Accountability
- ✓ Deployment

Establish applicable isolation and quarantine laws, policies, and procedures to do the following:³¹

- ✓ Declare a public health emergency
- ✓ Remove and detain suspected or confirmed cases, contacts, and/or carriers who are or may be endangering the public health
- ✓ Accept custody of detained persons from federal quarantine officers
- ✓ Order mass quarantine

- ✓ Close public venues
- ✓ Restrict intrastate and interstate modes of transportation
- ✓ Order isolation and quarantine
- ✓ Conduct judicial review
- ✓ Terminate isolation and quarantine orders

□ Identify by person, job title, and contact information the persons who have legal authority to implement applicable isolation and quarantine laws, policies, and procedures

- ✓ Persons in jurisdiction identified
- ✓ Persons in jurisdictions of neighboring cities, counties, states, tribal governments, military installations, and cross-border foreign governments, identified as applicable

□ Provide evidence that jurisdiction emergency response plans show coordination among the following organizations and agencies:

- ✓ Emergency management agency
- ✓ Jurisdiction public health agencies, including tribal and military
- ✓ Jurisdiction hospitals, including tribal and military
- ✓ Law enforcement
- ✓ Public safety
- ✓ Jurisdiction judiciary and legal counsel to governing authorities
- ✓ Public works (for retrieval and disposal of contaminated articles)
- ✓ Public and private providers of critical goods and services (e.g., food, water, medical supplies, medical gas, clean linens, internet services, home healthcare, childcare, and eldercare for essential workers)

□ Ensure access to mainstream communications channels

- ✓ Relationships with contacts in the broadcast media developed and maintained
- ✓ Emergency Alert System (EAS) and other warning systems periodically tested

□ Develop a civic network or Community Outreach Information Network of trusted leaders within the community's subpopulations to disseminate information outside of mainstream communication channels³²

- ✓ Subpopulations in the jurisdiction who cannot (or will not) receive, understand, or act on Isolation and Quarantine messages, or who might need special assistance are defined. These subpopulations may need assistance because of
 - economic disadvantage
 - limited language proficiency
 - disability (physical, mental, cognitive, sensory)
 - isolation (geographic [e.g., extremely rural], cultural [e.g., religious sect], social [e.g., homeless])
 - age
- ✓ Subpopulations located and mapped by using Geographic Information Systems (GIS), highlighted streets maps, or other mapping techniques and forms of visual display

- ✓ Members of a community outreach information network, or other trusted information channels, identified to function as “nodes” that will convey messages to persons and households in the community (e.g., church outreach coordinators, homeowner association leaders, club administrators)
 - ✓ Ability to reliably reach Community Outreach Information Network (COIN) members, or persons functioning as “nodes,” and get acknowledgement that messages are received is exercised
 - ✓ Persons and households in the subpopulations randomly sampled to assess awareness and understanding of disseminated messages
- Train relevant staff in disease exposure control measures and proper use of personal protective equipment
- ✓ Staff who should be trained are identified
 - ✓ Training records maintained
- Develop educational materials for isolation and quarantine. The following materials are developed:
- ✓ Disease fact sheets
 - ✓ Frequently asked questions (FAQs) regarding isolation and quarantine
 - ✓ Proper setup of a home isolation room
 - ✓ Social distancing
- Provide evidence of planning for employees (applies to business sector)³³
- ✓ Sick leave policies coordinated to support public health recommendations
 - ✓ Businesses prepared to extend (and ask for) grace periods for financial obligations affected by the emergency
 - ✓ Employee volunteerism to assist in emergencies encouraged
 - ✓ Continuity of Operations Plans (COOPs) developed
 - ✓ Business and public health leaders plan together
- Perform community-wide inventory
- ✓ Total number of hospital isolation beds available determined
 - ✓ Feasibility of alternative sites for additional isolation capacity determined
 - ✓ Stockpiles of personal protective equipment (e.g., N-95 respirators, surgical masks, goggles, face shields, gowns) established before events; contracts in place for rapid replenishment, if needed

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