

July 23, 2013

Arizona Department of Health Services Vector-borne Outbreak Investigation 2013



Situation Manual (SITMAN)
Facilitator's Version
July 23, 2013

FOR OFFICIAL USE ONLY

THIS PAGE IS INTENTIONALLY LEFT BLANK

July 23, 2013

PREFACE

The Vector-borne Outbreak Investigation (TTX) 2013 is sponsored by the Arizona Department of Health Services (ADHS). This Situation Manual (SITMAN) was produced with input, advice, and assistance from the Infectious Diseases Epidemiology TTX 2013 Exercise Planning Team, which followed the guidance set forth in the Federal Emergency Management Agency (FEMA), Homeland Security Exercise and Evaluation Program (HSEEP).

The SITMAN gives officials, observers and players from participating organizations the information necessary to observe or participate in a healthcare exercise focusing on participants' emergency response plans, policies, and procedures as they pertain to their preparedness and response capabilities. The information in this document is current as of the date of publication, **July 23, 2013**, and is subject to change as determined by the Infectious Diseases Epidemiology TTX 2013 Exercise Planning Team.

The Vector-borne Outbreak Investigation TTX 2013 is an *unclassified exercise*. The control of information is based more on public sensitivity regarding the nature of the exercise than on the actual exercise content. Some exercise material is intended for the exclusive use of exercise planners, facilitators, and evaluators, but players may view other materials deemed necessary to their performance. The SITMAN may be viewed by all exercise participants.

All exercise participants should use appropriate guidelines to ensure the proper control of information within their areas of expertise and to protect this material in accordance with current jurisdictional directives. Public release of exercise materials to third parties is at the discretion of ADHS.

This SITMAN and TTX were supported by the U.S. Department of Health and Human Services (HHS), Office of the Assistant Secretary for Preparedness and Response (ASPR), Office of Preparedness and Emergency Operations (OPEO), Division of National Healthcare Preparedness Programs (NHPP) HPP Cooperative Agreement Catalog of Federal Domestic Assistance (CFDA) number 93.889. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of HHS.

This page is intentionally left blank.

July 23, 2013

HANDLING INSTRUCTIONS

1. The title of this document is *Arizona Department of Health Services Vector-borne Disease Investigation Tabletop Exercise 2013 Situation Manual*.
2. The information gathered in this SITMAN is *For Official Use Only (FOUO)* and should be handled as sensitive information not to be disclosed. This document should be safeguarded, handled, transmitted, and stored in accordance with appropriate security directives. Reproduction of this document, in whole or in part, without prior approval from the Arizona Department of Health Services is prohibited.
3. At a minimum, the attached materials will be disseminated only on a need-to-know basis and when unattended, will be stored in a locked container or area offering sufficient protection against theft, compromise, inadvertent access, and unauthorized disclosure.
4. For more information, please consult the following point of contact (POC):

Selam Teclé, MPH
Vector-borne and Zoonotic Disease Epidemiologist
Arizona Department of Health Services
150 N 18th Avenue, Suite 140
Phoenix, AZ 85007
602-364-3890 (office)
selam.tecle@azdhs.gov

This page is intentionally left blank.

July 23, 2013

TABLE OF CONTENTS

PREFACE	iii
HANDLING INSTRUCTIONS	v
TABLE OF CONTENTS	vii
AGENDA (Subject to change if necessary)	1
INTRODUCTION	4
<i>Background</i>	4
<i>Purpose</i>	4
<i>Scope</i>	4
<i>Target Capabilities</i>	4
<i>Exercise Objectives</i>	6
<i>Participants</i>	6
<i>Exercise Guidelines</i>	7
<i>Assumptions and Artificialities</i>	7
MODULE 1:	9
<i>Day One</i>	9
<i>Day Two</i>	10
MODULE 2:	12
<i>Day Three</i>	12
<i>Day Three (continued)</i>	15
<i>Day Four</i>	17
MODULE 3:	21
<i>Day Five</i>	21
<i>Day Eight</i>	24
ADDITIONAL RESOURCES	27
APPENDIX A: FACTS ABOUT PNEUMONIC PLAGUE	28
APPENDIX B: INFORMATION FOR VETS	30
APPENDIX C: INFECTION CONTROL	32

This page is intentionally left blank.

July 23, 2013

AGENDA (Subject to change if necessary)0800 – 0900 **Registration**0900 – 0930 **Welcoming Remarks & Exercise Overview and Briefing
(TBA)**
Selam Tecele, ADHS**Module 1: Day One & Two (Assigned Breakout Room)**0935 – 0945 Discussion Group Introductions
0945 – 0950 Situation Briefing: Day One
0950 – 1000 Facilitated Discussion (10 minutes)
1000 – 1005 Situation Briefing: Day Two
1005 – 1020 Facilitated Discussion (15 minutes)
1020 – 1030 Small Group Brief Back and Questions/Comments1030 – 1040 **Break (10 minutes)**1040 – 1110 **Large Group Brief Back and Questions/Comments (TBD)****Module 2 Part I: Day Three (Assigned Breakout Room)**1115 – 1120 Situation Briefing: Day Three, Part I
1120 – 1140 Facilitated Discussion (20 minutes)
1140 – 1145 Situation Briefing: Day Three, Part II
1145 – 1155 Facilitated Discussion
1155 – 1200 Small Group Brief Back and Questions/Comments1200 – 1300 **Lunch (1 hour)****Module 2 Part II: Day Four (Assigned Breakout Room)**1300 – 1310 Situation Briefing: Day Four
1310 – 1340 Facilitated Discussion (30 minutes)
1340 – 1350 Small Group Brief Back and Questions/Comments1350 – 1420 **Large Group Brief Back and Questions/Comments (TBD)**1420 – 1435 **Break (15 minutes)****Module 3: Day Five and Day Eight (Assigned Breakout Room)**1435 – 1445 Situation Briefing: Day Five
1445 – 1510 Facilitated Discussion (25 minutes)

July 23, 2013

1510 – 1525	Small Group Brief Back and Questions/Comments
1525 – 1530	Situation Briefing: Day Eight
1530 – 1555	Facilitated Discussion (25 minutes)
1555 – 1610	Small Group Brief Back and Questions/Comments
1610 – 1700	Large Group Brief Back/HOTWASH, Questions/Comments & Evaluation (TBD)
1700	Adjourn

This page is intentionally left blank.

July 23, 2013

INTRODUCTION

Background

The Infectious Disease Epidemiology and Preparedness (IDES) Vector-borne Tabletop Exercise (TTX) 2013 is designed to establish a learning environment for local health departments and community partner participants to exercise their outbreak plans, policies, and procedures. To conduct an effective exercise local representatives from numerous agencies have taken part in the planning process and will take part in exercise conduct and evaluation. This Situation Manual (SITMAN) was produced at the direction of the Arizona Department of Health Services (ADHS) with the input, advice, and assistance of the Infectious Diseases Epidemiology TTX 2013 Exercise Planning Team.

Purpose

The purpose of this exercise is to provide participants an opportunity to evaluate current response concepts, plans, and capabilities for a response to an outbreak in YOUR County. The exercise will focus on communication within your agency as well as with other counties, state and federal partners and will also focus on the epidemiological and environmental investigation and response required for the event. The exercise also looks at what assets and resources may be needed to deal with the incident, as well as the role of public information to the overall response effort.

Scope

This tabletop exercise will involve County Health Departments as well as County Environmental Health Services, hospital infection control programs, and other county partners and State and Federal agencies in responding to a health emergency caused by a vector-borne disease.

Target Capabilities

The National Planning Scenarios and the establishment of the National Preparedness Priorities have steered the focus of homeland security toward a capabilities-based planning approach. Capabilities-based planning focuses on planning under uncertainty, since the next threat or disaster can never be forecast with complete accuracy. Therefore, capabilities-based planning takes an all-hazards approach to planning and preparation which builds capabilities that can be applied to a wide variety of incidents. States and Urban Areas use capabilities-based planning to identify a baseline assessment of their homeland security efforts by comparing their current capabilities against the Target Capabilities List (TCL) and the critical tasks of the Universal Task List (UTL). This approach identifies gaps in current capabilities and focuses efforts on identifying and developing priority capabilities and tasks for the jurisdiction. These priority capabilities are articulated in the jurisdiction's homeland security strategy and Multi-Year Training and Exercise Plan.

July 23, 2013

The target capabilities listed below have been selected by the Exercise Planning Team and correspond with the priority capabilities identified in the ADHS Multi-Year Training and Exercise Plan. These capabilities provide the foundation for development of the exercise objectives and scenario, as the purpose of this exercise is to measure and validate performance of these capabilities and their associated critical tasks.

Capability 4: Emergency Public Information and Warning

Capability 6: Information Sharing

Capability 10: Medical Surge

Capability 11: Non-Pharmaceutical Interventions

Capability 12: Public Health Laboratory Testing

Capability 13: Public Health Surveillance and Epidemiological Investigation

July 23, 2013

Exercise Objectives

The exercise will focus on the following exercise objectives selected by the exercise planning team.

Learning Objectives:

After completing this exercise, participants should be able to

Capability 4: Emergency Public Information and Warning

- determine when to issue public information alerts, warnings, and notifications

Capability 6: Information Sharing

- identify which stakeholders should be incorporated into information flow
- determine communication needs during a vector-borne disease outbreak

Capability 10: Medical Surge

- assess the nature and scope of the incident causing the medical surge
- discuss and determine support measures available for medical surge operations

Capability 11: Non-Pharmaceutical Interventions

- determine the infection control measures that should be implemented
- determine the precautionary protective measures associated with this vector-borne outbreak that should be communicated to the public

Capability 12: Public Health Laboratory Testing

- collection of appropriate specimens and proper handling of specimens
- obtain and conduct confirmatory testing and analysis of a clinical specimens at Arizona State Public Health Laboratory

Capability 13: Public Health Surveillance and Epidemiological Investigation

- discuss epidemiologic clues indicative of a vector-borne disease outbreak
- determine the source of an outbreak
- evaluate the bioterrorism threat potential
- discuss prevention measures to be implemented to protect the public
- describe the clinical features, epidemiology, and control of plague
- discuss how to determine the prevalence of an epizootic disease in an area

Participants

Players respond to the situation presented based on their knowledge of response procedures, current plans and procedures, and insights derived from training.

Observers support the group in developing responses to the situation during the discussion; however, they are not participants in the moderated discussion period.

Facilitators/Evaluators provide situation updates, moderate discussions and will evaluate the discussions. They also provide additional information or resolve questions as required.

July 23, 2013

Subject Matter Experts are resources of expert information on medical or technical issues.

Each module begins with an update that summarizes the key events occurring within that time period. Following the updates, participants review the situation and engage in group discussions in their respective breakout groups.

Following these discussions, participants then enter into a plenary brief back in which a spokesperson from each table presents a synopsis of the group's discussion based on the scenario and questions.

Exercise Guidelines

This is an open, low-stress, no-fault environment. Varying viewpoints, even disagreements, are expected.

Respond based on your knowledge of current plans and capabilities (i.e., you may use only existing assets) and insights derived from training.

Decisions are not precedent setting and may not reflect your organization's final position on a given issue. This is an opportunity to discuss and present multiple options and possible solutions.

Issue identification is not as valuable as suggestions and recommended actions that could improve response and preparedness efforts.

Assumptions and Artificialities

In any exercise a number of assumptions and artificialities may be necessary to complete play in the time allotted. During this exercise, the following assumptions apply:

The scenario is plausible, and events occur as they are presented.

There is no "hidden agenda", nor any trick questions.

All players receive information at the same time.

This page is intentionally left blank.

July 23, 2013

MODULE 1:

INITIAL CASE INVESTIGATION

Day One

On July 11 at 1:30pm, a 36 year old man arrives at the ED by ambulance from a local outpatient clinic in Phoenix, Arizona to be admitted for pneumonia. He is complaining of fever, chills, nausea, and general malaise. On exam his vital signs are temp 101.2 F, HR 108, BP 96/50, O2 saturation 93% on room air, and RR 24 with crackles at the right base.

At 4:30pm, his chest X-ray shows possible bilateral pleural effusion and he is placed on oxygen and started on IV Ceftriaxone and Azithromycin. The admitting team diagnosis is community-acquired pneumonia. The patient's inpatient bed does not become available until almost 4:00am.

Question 1: Would you discharge or admit this patient?

- ❖ *Would recommend admitting this patient.*

Question 2: What tests would you order? What specimens would you collect? Who would do the testing? Should the specimens be on any special transport media/conditions?

- ❖ *Tests: Blood cultures, viral cultures, Valley fever (coccidioidomycosis), Influenza*
- ❖ *Specimens: whole blood for cultures, serum for valley fever, NP swab for flu*
- ❖ *Hospital lab/commercial lab would perform testing*
- ❖ *Serum specimens and whole blood should be transported on cold packs, NP swabs should be sent in viral transport media on cold packs*

Question 3: Does this ring any bells at this point? How concerned are you at this time?

- ❖ *No bells. Not very concerned. Could note that it is July and not flu season. Ask hospital staff/IPs if this is concerning to them at all.*

Question 4: What infection control measures (if any) would you implement at this point?

- ❖ *Standard precautions (gloves/gown/mask if body fluid exposure is expected)*
- ❖ *Droplet precautions (surgical mask)*
- ❖ *Ask IPs/hospital staff about infection control protocol for pneumonia patients at their facility*

July 23, 2013

Day Two

July 12 at 6:30am, during the morning rounds the medical team finds that throughout the previous night, the patient had continuous fever of 102⁰ F and several episodes of vomiting. On exam he has worsening respiratory function, hemoptysis (blood in sputum), increasing lethargy, and there is a question of nuchal rigidity (neck stiffness).

At 10:30am, the patient is urgently intubated and moved to the ICU. He later becomes hypotensive, codes, and dies. The cause of death is unknown. The patient is classified as an unexplained death. The wife agrees to an autopsy, and also consents to an interview with PH officials. The patient's wife states that her husband has been previously healthy with no history of medical problems. He's traveled both out of county and out of state in the last month. He traveled to New York City for a few days on political advocacy business four weeks ago. Three days ago he just returned home to Phoenix from Williams, Arizona. He was attending his uncle's funeral who was diagnosed with pneumonia.

Question 5: What diseases are on the differential?

- ❖ *Hantavirus Pulmonary Syndrome, Neisseria meningitis, Influenza, Plague, Tularemia, Legionnaires' disease, Haemophilus influenza, streptococcal pneumonia, pulmonary anthrax*
- ❖ *Any non-infectious diseases on the differential? Chemicals (e.g., mercury, ricin)? Why or why not?*

Question 6: What specimens would you request be collected or saved for testing?

- ❖ *Antemortem serum, whole blood, lung tissue, NP swab, CSF, lung swab, cardiac serum, premortem specimens if available*

Question 7: What other questions regarding exposure would you ask?

- ❖ *Discuss questions about animal exposure, specifically to mice, rabbits, prairie dogs, livestock, wild animals. Contact with any sick or dead animals or pets.*
- ❖ *Any insect bites.*
- ❖ *Occupation. Recreational activities such as hiking, hunting, camping, etc.*
- ❖ *Exposure to whirlpool spas or repair/maintenance work on domestic plumbing.*
- ❖ *Any sick contacts (besides uncle previously mentioned).*
- ❖ *Cleaning any enclosed areas (e.g., shed, trailer, barn, etc.). Exposure to abandoned burrows. Lawn mowing or landscaping.*
- ❖ *Get more specifics on travel and if any of these exposures occurred while he was away.*
- ❖ *Would you ask food-borne questions? Chemical exposures? Anything else?*

July 23, 2013

Question 8: What infection control measures would you implement at this point?

- ❖ *Healthcare workers should leave gown, gloves, and mask in red biohazard bag.*
- ❖ *Standard precautions: hand-washing or alcohol gel; gloves & long-sleeved gown as needed.*
- ❖ *Droplet precautions: surgical mask with goggles or face shield in addition to standard precautions.*

Question 9: Should public health be contacted? Who is responsible for contacting public health? Who will they contact?

- ❖ *Infection preventionist should contact epidemiology at local health department*

Question 10: If you were a PH official, what are your top priorities upon receiving this information? What would your agency do to respond? What type of information needs to be collected at this time?

- ❖ *Create a public health differential for the patient*
- ❖ *Ensure the correct specimens are collected and sent to ASPHL for testing*
- ❖ *Interview the wife and any other close contacts*
- ❖ *Gather complete exposure history including onset date and history of activities while out of town*

July 23, 2013

MODULE 2:

OUTBREAK DETECTION

Day Three

July 13 at 8:30am, six recent admissions from the ED are developing severe respiratory symptoms; two of those patients are pediatric. Four ED nurses scheduled for the morning shift called in sick.

At 2:00pm, the hospital lab report indicated gram negative rods from the blood cultures that were collected from the patient on Day One. An isolate was sent to the Arizona State Public Health Laboratory (ASPHL) for *Yersinia pestis* testing by PCR and culture. ADHS Epi is notified by ASPHL that a suspect plague specimen is being sent for testing. The local county health department [Maricopa County Department of Public Health] is notified by ADHS. MCDPH were already aware about the case and were investigating it as a newly reported UNEX. The case investigation switches gears from a UNEX case to a high suspect plague case due to the hospital lab result. MCDPH interviews the wife to obtain more detailed information about the case's exposures and travel history. The home address and contact information for the uncle and aunt the case visited in Williams is obtained and provided to the local health department (Coconino County Public Health Services District) via ADHS. During the interview, the wife reports waking up with fever this morning and having abdominal cramps and nausea.

Question 11: How is plague transmitted? Are we more concerned about one type of plague versus another?

- ❖ **Flea bites.** *Plague bacteria are most often transmitted by the bite of an infected flea. During plague epizootics, many rodents die, causing hungry fleas to seek other sources of blood. People and animals that visit places where rodents have recently died from plague are at risk of being infected from flea bites. Dogs and cats may also bring plague-infected fleas into the home. Flea bite exposure may result in primary bubonic plague or septicemic plague.*
- ❖ **Contact with contaminated fluid or tissue.** *Humans can become infected when handling tissue or body fluids of a plague-infected animal. For example, a hunter skinning a rabbit or other infected animal without using proper precautions could become infected with plague bacteria. This form of exposure most commonly results in bubonic plague or septicemic plague.*
- ❖ **Infectious droplets.** *When a person has plague pneumonia, they may cough droplets containing the plague bacteria into air. If these bacteria-containing droplets are breathed in by another person they can cause pneumonic plague. Typically this requires direct and close contact with the person with pneumonic plague.*

July 23, 2013

Transmission of these droplets is the only way that plague can spread between people. This type of spread has not been documented in the United States since 1924, but still occurs with some frequency in developing countries. Cats are particularly susceptible to plague, and can be infected by eating infected rodents. Sick cats pose a risk of transmitting infectious plague droplets to their owners or to veterinarians. Several cases of human plague have occurred in the United States in recent decades as a result of contact with infected cats.

- ❖ *Pneumonic plague is the most concerning from public health standpoint because it can be transmitted from person-to-person.*

Question 12: What sources of infection should PH officials focus?

- ❖ *Priority is to rule out bioterrorism threat and find the source. Northern Arizona does have prairie colonies that are positive for plague in the environment and the case has travel to the area.*

Question 13: Do we have any hypotheses as to source at this time?

- ❖ *Not yet. Discuss what information is needed to develop a hypothesis.*

Question 14: Should we be concerned about the possibility of this being a bioterrorism event? Who would we contact to notify them of the potential BT threat?

- ❖ *Yes. Discuss contacting BT program at county and state. Would you contact law enforcement at this time?*
- ❖ *More information should be collected before contacting law enforcement. BT program is kept in the loop but more info is needed before any actions are made.*

Question 15: What other diseases would you keep on the differential, if any, at this time?

- ❖ *Tularemia. Both grow gram-negative coccobacillus in culture and present similarly.*
- ❖ *With Tularemia lab exposures can occur easily if proper precautions are not taken. This should be kept in mind when dealing with suspect tularemia case.*

Question 16: Is it likely for four ED nurses from one shift call in sick? Would anyone question whether their illnesses might be related?

- ❖ *Discuss steps that might be taken to identify if the illnesses were related.*
- ❖ *Are they in fact ill? Possible they called out sick because they were afraid of being exposed to plague.*
- ❖ *Is this something the IP would mention to public health officials?*

July 23, 2013

Question 17: How do you handle the rumors circulating among hospital staff concerning the fatality and new admissions with similar complaints?

- ❖ *Discuss educating staff on precaution measures. No special precautions or prophylaxis are recommended for staff who have no contact with patients or their immediate environment such as materials and equipment associated with their care.*
- ❖ *Discuss steps taken to differentiate the worried-well from the true cases. Testing is not ideal, culture takes 24-48 hours to grow and PCR testing is only offered at ASPHL (not at commercial labs).*
- ❖ *New patients and staff will need to be triaged. Should a separate area be designated for new suspect plague patients? What kind of infection control precautions would you take? Masks for everyone waiting in the ED?*

Question 18: Are you experiencing an outbreak?

- ❖ *There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak of plague when there is an unusual clustering (≥ 2) of cases in time and/or space.*
- ❖ *At this point, neither the index case nor any other person has been confirmed for plague; however, the wife, the four ED nurses, and the six inpatient admits should be considered suspect plague cases. Specimens should be collected for testing and they should all be put on the appropriate antibiotic treatment.*

Question 19: Would your Emergency Operations Center be activated?

- ❖ *Most likely, discuss the steps necessary to activate your EOC.*
- ❖ *Discuss if EOC is activated at the hospital, local, and state level.*
- ❖ *SNS may be required for hospital supplies- gowns, masks, etc.*

Question 20: Should CDC be notified at this time?

- ❖ *Yes, CDC should be notified as soon as soon as *Yersinia pestis* was indicated in a clinically compatible case. The case also has travel to area with known presence of plague increasing the likelihood of this being a confirmed case.*

July 23, 2013

Day Three (continued)

At 4:00pm, MCDPH contacts the hospital Infection Control Practitioner (ICP) to get a line list of patients and staff potentially exposed and requiring prophylaxis. The hospital ICP is frantic. 20% of the nursing personnel have called out sick for the night shift as have numerous staff and physicians. A resident doctor reports to work with fever and cough. Many hospital employees are requesting antibiotic prophylaxis.

Question 21: The medical examiner has heard it might be plague and no longer wants to do the autopsy. What do you do?

- ❖ *Deceased individuals who have not been treated or treated less than 48 hours should be considered to be contagious. Educate the ME on the proper precautions to take when conducting the examination. Gown, gloves, and surgical mask with goggles or face shield are the proper personal protective equipment for plague.*
- ❖ *In the past if a ME refused, the body had to be transported to another county to get the autopsy.*

Question 22: What infection control measures do you take at this point at the hospital? What kind of isolation precautions? What kind of personal protective equipment (PPE) should be worn by health care workers?

- ❖ *Suspect patients should wear surgical mask to cover patient's mouth and nose until placement in private room. If space available, isolate suspect patients in private room with door closed at all times.*
- ❖ *Healthcare workers should wear gown, gloves, and surgical mask with goggles and dispose of them in red biohazards bag*
- ❖ *Droplet and standard precautions should be implemented. Person-to-person transmission can occur within a 6-foot radius by aerosols expelled from the oropharynx.*

Question 23: Would the 20% call-out rate cause you to seek staffing support from other resources?

- a) If no, what rate would cause you to request staffing aid?
- b) If yes, identify the resources available for staffing support?

- ❖ *Discuss the resources available in your jurisdiction*
- ❖ *Medical reserve corps? Any MOUs (memorandum of understanding) with other hospitals?*

July 23, 2013

Question 24: Do we need to be concerned about possible more wide-spread exposure outside of the hospital? Where are potential exposures likely to have occurred?

- ❖ *Yes, contact tracing of the index case should be conducted to identify others that may be exposed. A case is contagious once onset of respiratory symptoms occurs. Discussion should include locations such as case's home, work, public transportation, ambulance, any other location the case may have visited during infectious period. The source of infection has not yet been identified so other people may be continually exposed to the source at this time. Most likely scenario is that the case was exposed during travel to Northern Arizona*

July 23, 2013

Day Four

July 14 at 9am, Coconino County PHSD Epidemiologist and Environmental Health travel to Williams to identify any risk exposures for plague near the place of residence the index case traveled to. After speaking with the aunt of the index patient, the investigators learn that the family had two cats that were recently ill. Both cats were outdoor cats. The first cat (cat #1) was an older cat (13 years old) that fell ill and died on July 2, right before the uncle developed symptoms. The aunt explained that they did not take cat #1 to the vet since it was so old and they were certain it died of natural causes. The uncle began feeling ill the day after, on July 3, and was admitted to the hospital on July 6 where he declined rapidly and expired shortly thereafter. The index case traveled to Williams upon hearing his uncle being admitted on July 6 and stayed for the funeral and left to return to Phoenix on July 9. The aunt reported she noticed the second cat (cat #2), which was much younger (4 years old), looked sick on July 7. The index case told his aunt not to worry and that he would handle the cat and take cat #2 to the vet.

At 10:30am, the Arizona State Public Health Laboratory reports that the index case's isolate tested positive for *Yersinia pestis* by PCR (Polymerase Chain Reaction) and confirmatory testing (culture) has started.

Question 25: What is the most likely route of transmission? Is the index case the true index case?

- ❖ *The death of cat #1 and the uncle's sudden illness should be a red flag.*
- ❖ *Cat #1 transmitted pneumonic plague to the uncle and to cat #2. Cat #2 transmitted pneumonic plague to our index case.*
- ❖ *Specimens from cat #1, cat #2, and from the uncle should try to be obtained for confirmation of this hypothesis.*
- ❖ *Index case is defined as the first case identified, so the index case is and always will be the true index case. The uncle is a retrospective case that was identified. In this scenario, he was the first human case.*

Question 26: How would you go about conducting the contact investigation?

- ❖ *Identify contacts that may have been exposed to the source of infection and/or to infectious cases of plague*
- ❖ *Include detailed information regarding method of travel and itinerary for cases with primary pneumonic plague during the 1 to 4 days prior to onset of symptoms*
- ❖ *Refer contacts for proper prophylaxis therapy (if necessary) and place under medical surveillance for fever and cough for 7 days after exposure*

July 23, 2013

Question 27: Who is leading the public health response and what are the roles and responsibilities of the people who report to this agency?

- ❖ *ADHS (state) is leading the PH response since it is multijurisdictional. Role is mostly supportive and able to assist in field investigations if requested. Will also provide public health messaging and notify the other counties of the situation. State will also report to the CDC of the case and request their assistance if necessary.*
- ❖ *County health departments will be conducting the investigation in their respective counties. Counties will report to ADHS.*

Question 28: What additional agencies are involved in this response? What are their roles and actions?

- ❖ *County environmental health departments: field investigations (pulling blood from cats/dogs in the area, flea sampling, etc.)*
- ❖ *NAU/university: laboratory capacity for testing of environmental samples (rodents, fleas, etc.)*
- ❖ *CDC: mostly supportive and can provide guidance. If an Epi Aid is requested then CDC will lead the investigation.*

Question 29: Would you consider calling in additional assistance at this time? Why or why not? Where would you obtain them?

- ❖ *Counties to discuss if they would want additional assistance from ADHS? CDC Epi-Aid?*

Question 30: Would you activate your emergency response plan now, if you have not done so already?

- ❖ *Also ask as a neighboring county what would you do? Would you activate your EOC in preparation even though you have zero cases?*

Question 31: What additional clinical, animal, or environmental specimens should be collected at this point?

- ❖ *Specimens from both cats should be collected. Cat #1 has been buried for at least a week; therefore, bone marrow sample may be the only viable specimen.*
- ❖ *Try to obtain specimens for the uncle; contact the hospital and any commercial labs used for testing his specimen.*

July 23, 2013

Question 32: What are the typical sources of plague in the area? How would we determine if there was an epizootic going on?

- ❖ *Look for carcasses/die off of prairie dogs, ground squirrels, rabbits, wood rats. Start in the area around case's home and expand from there.*
- ❖ *Trap and test fleas near rodent burrows*
- ❖ *Look at rodent burrows for signs of die off (e.g., spider webs, no fresh droppings, no fresh digging)*
- ❖ *Bleed animals in the area including dogs and cats to test for plague antibodies*
- ❖ *Query vets in the area about sick cats and other animals presentation*
- ❖ *Cats are more susceptible to plague than dogs. Dogs are less likely to develop clinical illness but can act as flea buses and expose owners to fleas.*

Question 33: What public health messaging would your agency develop at this time?

- ❖ *HANs for public, providers, and veterinarians*
- ❖ *Epi-X (CDC) to notify states in case tourists/residents from other states were exposed during travel to Northern Arizona*
- ❖ *Press release (state and county)*
- ❖ *Hotline*
- ❖ *Webpage, social media*
- ❖ *Phone bank to answer questions from the public*
- ❖ *As a resident, what information would you want to know? At the same time, what information should you withhold to avoid the worried-well?*

This page is intentionally left blank.

July 23, 2013

MODULE 3:

DESCRIPTIVE EPIDEMIOLOGY AND PUBLIC HEALTH MESSAGING

Day Five

Overnight, one of the ambulance workers who transported the index case to the hospital became ill and was hospitalized. The wife of the index case has been hospitalized since Day 3 when she first developed symptoms and is showing improvement. Contact tracing also identified that two pediatric cases shared a room with the index case while in the ER. These two patients developed pneumonic plague but are now improving after ciprofloxacin was administered to them immediately. The other four severe respiratory patients were diagnosed with another disease than plague. Contact tracing in Coconino County identified a veterinarian who is also showing symptoms of pneumonic plague. Interviews conducted with the aunt revealed that she had been on ciprofloxacin for 2 weeks during her husband's infectious period due to a urinary tract infection diagnosed by her doctor in late June.

Environmental health inspected prairie dog communities in the surrounding area of Williams and noted signs of prairie dog die-off. Prairie dog sampling and flea sampling was also conducted.

A Health Alert Network (HAN) message is sent out to notify the hospitals, providers, and veterinarians in the state about the plague cases including treatment information, isolation precautions, and enhanced surveillance information.

Question 34: How do you handle the increasing number of ill and worried-well?

- ❖ *Phone bank with consistent messaging*
- ❖ *Hospitals may need surge capacity. Discuss ICS and ask preparedness people about plans*
- ❖ *How would track the ill?*
- ❖ *Discuss post-exposure prophylaxis and how you would determine who would receive it? List criteria.*
 - *Prophy people with contact to confirmed cases*
 - *Prophy people with compatible clinical picture that have travel to Northern Arizona 1-2 weeks before onset*
 - *Would you prophy those with just environmental contact? (probable not)*
 - *Would you prophy people with no contact and no symptoms?*

Question 35: What are your communication needs? At the hospital? Around Williams?

- ❖ *Consistent messaging between agencies is very important*

July 23, 2013

- ❖ *Open channels of communication between the media and agencies involved*
- ❖ *Set up teleconference between state, county, and tribes to keep everyone updated with most current information. Discuss setting up a joint information center (JIC).*

Question 36: Is any other additional messaging required? Who else should be notified?

- ❖ *Discuss and brainstorm.*

Question 37: How will you handle communication with the media? Who will you coordinate with? What types of information should be included in this type of messaging? Give examples.

- ❖ *Coordinate with your agency's public information officer (PIO)*
- ❖ *Hold a press conference*
- ❖ *Messaging should include exposure definition, signs and symptoms, prevention measures- flea collars, stay at home if sick and call your doctor, etc.*

Question 38: What actions do the local health department need to do?

- ❖ *Case and contact tracing*
- ❖ *Public health messaging*
- ❖ *Active/enhanced surveillance*
- ❖ *Providing hospitals with antibiotics if necessary*
- ❖ *Providing PEP to contacts*
- ❖ *Conduct needs assessment of antibiotic supply from local pharmacies*
- ❖ *Possibly require SNS*

Question 39: What actions do the state health department need to do?

- ❖ *Assist counties and CDC*
- ❖ *Public health messaging*
- ❖ *Coordinating testing of cases at ASPHL and CDC*
- ❖ *Manning ICS/HEOC*
- ❖ *Phone line*
- ❖ *Possibly activate SNS*

Question 40: If cases are identified on tribal lands, what additional steps need to be taken? How do you and to whom would you communicate?

- ❖ *Need invitation from tribe for state or county partners to investigate*
- ❖ *CDC usually plays liaison and communicates directly with tribe (federal entity to federal entity)*

July 23, 2013

- ❖ *Discuss the powers and limitations IHS has regarding investigations on tribal lands. They still require permission from the tribe.*

July 23, 2013

Day Eight

After continuous contact tracing investigations were completed by both Maricopa and Coconino county health departments, 12 additional cases were identified excluding the index case and his uncle. The 7 cases in Maricopa County included the wife of the index case, 2 pediatric patients, 2 ED nurses, an ED physician, and the ambulance worker. The other 5 cases were identified in Coconino County included the veterinarian and vet technician (fatal), a nurse at the hospital, and 2 neighbors of the uncle (one fatality). Over one hundred people were given post-exposure prophylaxis (PEP) in both counties. 10 out of 12 symptomatic cases survived due to the immediate identification of plague. Environmental health officials treated the identified epizootic areas with pesticides and are conducting enhanced surveillance of the prairie dog communities in the surrounding areas to identify any early signs of plague activity. Signs near campsites and notifications in the local media outlets were posted to make the public aware of the risks of contracting plague and educate on how to protect themselves and their families.

Question 41: Does the prairie dog die-off rule out the bioterrorism (BT) threat?

- ❖ *Very good indication that it is not a BT event.*

Question 42: Would you consider activating Points of Dispensing clinics (PODS)?

- ❖ *Debate whether necessary or not given scenario.*
- ❖ *Would you just rely on the hospital to handle demand of prophylaxis?*
- ❖ *What if the hospital demand was too great? Public demand?*

Question 43: Would prophylaxis be given to hospitalized patients at the hospital where the index case was treated? How do you decide which patients to prophylaxis?

- ❖ *Develop criteria of high risk exposure and low risk exposure and triage using definition*
- ❖ *Get a list of patients (and staff) in the ED during the time of index case stay there*
- ❖ *County health department would work with hospital in following up with potentially exposed patients and giving them PEP*

Question 44: How long would you conduct enhanced surveillance for plague?

- ❖ *At least 2-4 weeks for hospitals in Maricopa County but heightened awareness should be maintained*
- ❖ *Counties within the epizootic area (N. Arizona) should maintain enhanced surveillance throughout the summer*

July 23, 2013

Question 45: Is there anything you would have done differently now knowing what you know?

❖ *Discuss.*

Question 46: What additional steps need to be taken to complete the investigation at this time?

- ❖ *Stand down ICS/EOC*
- ❖ *After action, hot wash, final investigations*
- ❖ *Final investigation report (state and CDC)*

This page is intentionally left blank.

ADDITIONAL RESOURCES

Heymann, DL. Control of Communicable Diseases Manual – Plague section. 2008 19th Edition.

Plague Training Module for Veterinarians. Plague, Veterinary Issues. CDC Emergency Preparedness and Response. National Center for Preparedness, Detection, and Control of Infectious Diseases. 2007 Feb; Lesson 7: 1-21. <http://www.bt.cdc.gov/agent/plague/trainingmodule/7/>

CDC Plague Training Module: <http://www.bt.cdc.gov/agent/plague/trainingmodule/intro4.asp>

OSHA Plague Information: <https://www.osha.gov/SLTC/plague/>

Borio L. Plague as an agent of bioterrorism. In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Diseases, 6th Edition*. Philadelphia, PA: Churchill Livingstone; 2005.

CDC Plague Web page. Centers for Disease Control and Prevention.
<http://www.cdc.gov/ncidod/dvbid/plague>

Plague information Web page. Centers for Disease Control and Prevention, Emergency Preparedness and Response. <http://www.bt.cdc.gov/agent/plague>.

Health aspects of chemical and biological weapons, 1st edition. World Health Organization, United Nations; 1970. <http://www.who.int/csr/delibepidemics/biochem1stenglish/en/index.html>

Hinckley AF, Biggerstaff BJ, Griffith KS, Mead PS. [Transmission dynamics of primary pneumonic plague in the USA](#). *Epidemiol Infect.* 2011 Jul 7:1-7.

Inglesby TV, Henderson DA, O'Toole T, Dennis DT. [Safety precautions to limit exposure from plague-infected patients](#). *JAMA* 284:1648-1649, 2000.

Human plague—four states. *MMWR*. August 25, 2006;55 (Dispatch): 1-3.
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm55d825a1.htm>

Inglesby TV, Dennis DT, Henderson DA, et al., for the Working Group on Civilian Biodefense. Plague as a biological weapon: medical and public health management. *JAMA*. 2000;283(17):2281-2290.

Plague fact sheet. World Health Organization (WHO). Revised February 2005.
<http://www.who.int/mediacentre/factsheets/fs267/en/index.html>

Plague overview. National Institute of Allergy and Infectious Disease, National Institutes of Health.
<http://www3.niaid.nih.gov/healthscience/healthtopics/plague>

WHO: [Plague Manual: Epidemiology, Distribution, Surveillance & Control](#)
Communicable Surveillance & Response (CSR), World Health Organization.

APPENDIX A: FACTS ABOUT PNEUMONIC PLAGUE

Available at <http://www.bt.cdc.gov/agent/plague/factsheet.asp>

Facts about Pneumonic Plague

Plague is an infectious disease that affects animals and humans. It is caused by the bacterium *Yersinia pestis*. This bacterium is found in rodents and their fleas and occurs in many areas of the world, including the United States.

Y. pestis is easily destroyed by sunlight and drying. Even so, when released into air, the bacterium will survive for up to one hour, although this could vary depending on conditions.

Pneumonic plague is one of several forms of plague. Depending on circumstances, these forms may occur separately or in combination:

- **Pneumonic plague** occurs when *Y. pestis* infects the lungs. This type of plague can spread from person to person through the air. Transmission can take place if someone breathes in aerosolized bacteria, which could happen in a bioterrorist attack. Pneumonic plague is also spread by breathing in *Y. pestis* suspended in respiratory droplets from a person (or animal) with pneumonic plague. Becoming infected in this way usually requires direct and close contact with the ill person or animal. Pneumonic plague may also occur if a person with bubonic or septicemic plague is untreated and the bacteria spread to the lungs.
- **Bubonic plague** is the most common form of plague. This occurs when an infected flea bites a person or when materials contaminated with *Y. pestis* enter through a break in a person's skin. Patients develop swollen, tender lymph glands (called buboes) and fever, headache, chills, and weakness. Bubonic plague does not spread from person to person.
- **Septicemic plague** occurs when plague bacteria multiply in the blood. It can be a complication of pneumonic or bubonic plague or it can occur by itself. When it occurs alone, it is caused in the same ways as bubonic plague; however, buboes do not develop. Patients have fever, chills, prostration, abdominal pain, shock, and bleeding into skin and other organs. Septicemic plague does not spread from person to person.

Symptoms and Treatment

With pneumonic plague, the first signs of illness are fever, headache, weakness, and rapidly developing pneumonia with shortness of breath, chest pain, cough, and sometimes bloody or watery sputum. The pneumonia progresses for 2 to 4 days and may cause respiratory failure and shock. Without early treatment, patients may die.

Early treatment of pneumonic plague is essential. To reduce the chance of death, antibiotics must be given within 24 hours of first symptoms. Streptomycin, gentamicin, the tetracyclines, and chloramphenicol are all effective against pneumonic plague.

Antibiotic treatment for 7 days will protect people who have had direct, close contact with infected patients. Wearing a close-fitting surgical mask also protects against infection.

A plague vaccine is not currently available for use in the United States.

APPENDIX B: INFORMATION FOR VETS

Available at:

<http://www.cdc.gov/plague/healthcare/veterinarians.html>

Information for Veterinarians



Background

Cats are highly susceptible to plague and are a common source of *Yersinia pestis* infection in humans (owners and veterinarians). Dogs infected with plague are less likely to develop clinical illness than cats.

Most cases of plague in cats present with a sub-mandibular lymphadenitis. Abscessed lymph nodes may be clinically indistinguishable from abscesses due to other causes, like bite wounds. Cats with pneumonic plague can pose a significant plague risk to owners, veterinarians and others who handle or come into close contact with these animals due to possible aerosolization of bacteria. Transmission to humans can also occur directly, by bites, scratches, and direct contact with infectious exudates or indirectly, as the pets may carry infected fleas to their owners.

Diagnostic testing

- *Y. pestis* may be identified microscopically by examination of Gram, Wright, Giemsa, or Wayson's stained smears of peripheral blood, sputum, or lymph node specimen. Visualization of bipolar-staining, ovoid, Gram-negative organisms with a "safety pin" appearance permits a rapid presumptive diagnosis of plague.
- Appropriate biologic samples for diagnostic testing include: lymph node aspirate, lymph node, liver, spleen, lung, bone marrow, and whole blood.
- Antibiotic therapy should be started promptly, but pre-treatment samples are ideal for diagnostic testing.
- Tissue samples should be placed in a clean container and chilled (not frozen).
- Contact local or state health officials to determine the best place to send samples for diagnostic testing.

Treatment for dogs and cats

- Streptomycin is the treatment of choice, but is difficult to obtain. Alternatives include:
 - Gentamicin (2-3 mg/kg tid, IM or SQ)
 - Doxycycline (5 mg/kg bid, PO)
 - Tetracycline (22 mg/kg tid, PO)
 - Chloramphenicol (50 mg/kg bid, PO)
- Parenteral antibiotics may be switched to oral therapy upon clinical improvement.

Avoiding occupational risks

-
- Veterinary staff is at risk of plague if there is contact with infectious exudates, respiratory droplets, oral secretions, tissues or fleas.
 - Any material used in examination of plague-suspect cats should be disinfected, autoclaved, or incinerated.
 - Masks and gloves should be worn when examining and treating cats suspected of having plague.
 - Veterinarians should use appropriate personal protective equipment (PPE) before beginning a necropsy on a plague-suspect animal. PPE should include gloves, an N95 respirator or the equivalent, and protective eye equipment.
 - If any veterinary staff is exposed to infectious material, they should watch their health closely for 2 weeks following the exposure and discuss post-exposure prophylaxis or fever watch with a health care provider and public health officials.

Prevention and control

It is important that public health officials be notified promptly when plague is suspected in a cat.

- Public health officials will assist with follow-up investigations and implementation of preventive measures at sites where cats might have been exposed to minimize future risk.
- Follow-up will help identify persons who might have been exposed to the infected animal so that appropriate preventive measures, including prophylactic antibiotic therapy if indicated, can be implemented.
- Owners of plague-positive animals frequently ask veterinarians about their own risk of contracting plague. They should be advised:
 - That their risk of plague depends on the type of contact with the infected animal (casual contact versus inhalation of infectious coughed material).
 - To see their health care provider and watch their health closely for 2 weeks following the last possible contact with the infected animal.
 - That post-exposure antibiotic therapy may be warranted, depending on the type and duration of the contact. Health department personnel should be placed in touch with owners of plague-positive animals to ensure no animal-to-human transmission occurs.

General plague prevention messages can be disseminated by veterinarians to animal owners. These include:

- All ill animals, especially cats, should be seen by a veterinarian.
- If you live in areas where plague occurs, treat pet dogs and cats for flea control regularly and do not allow these animals to roam freely.
- Eliminate sources of food and nesting places for rodents around homes, work places, and recreation areas; remove brush, rock piles, junk, cluttered firewood, and potential food supplies, such as pet and wild animal food. Make your home rodent-proof.
- Pet owners should be encouraged to not pick up or touch dead animals.

APPENDIX C: INFECTION CONTROL

PNEUMONIC PLAGUE EMERGENCY INFORMATION:

TRANSMISSION, PREVENTION & INFECTION CONTROL

WHAT IS PNEUMONIC PLAGUE?

- Occurs when plague bacteria, *Yersinia pestis*, infect the lungs. Symptoms include high fever, chills, difficulty breathing, cough, & bloody sputum. Nausea, vomiting, and abdominal pain may also occur.
- Pneumonic plague is a public health emergency since it is quickly and easily spread through airborne droplets.

TRANSMISSION & INCUBATION

- Person-to-person transmission within a 6-foot radius by aerosols expelled from the oropharynx. Remote, airborne transmission between humans has not been described.
- Incubation period is usually 2-4 days (range 1-6 days) with death following shortly thereafter in untreated patients.
- Patients are contagious from the onset of respiratory symptoms until the completion of 48 hours of therapy and significant clinical improvement occurs.
- Deceased individuals who have not been treated or treated less than 48 hours should be considered to be contagious.
- Transmission can take place by breathing in *Yersinia pestis* particles, which could happen in an aerosol release during a bioterrorism attack.

HOW LONG CAN PLAGUE BACTERIA EXIST IN THE ENVIRONMENT?

- *Yersinia pestis* is easily destroyed by sunlight and drying. When released into air, the bacterium will survive for up to one hour, depending on conditions.

DECONTAMINATION

- Generally not necessary unless gross contamination is evident.

POST-EXPOSURE PROPHYLAXIS/IMMUNIZATION

- Doxycycline 100 mg or Ciprofloxacin 500 mg orally twice daily for 7 days.

<p>PRECAUTIONS FOR STAFF WITHOUT PATIENT CONTACT</p>	<ul style="list-style-type: none"> • No special precautions or prophylaxis are recommended for staff who have no contact with patients or their immediate environment such as materials and equipment associated with their care.
<p>PRECAUTIONS FOR STAFF WITH PATIENT CONTACT</p>	<ul style="list-style-type: none"> • HCW leaves gown, gloves, & mask in red biohazard bag. • Standard precautions: hand-washing or alcohol gel; gloves & long-sleeved gown as needed. • Droplet precautions: surgical mask with goggles or face shield in addition to standard precautions. • Add contact precautions if bubonic plague is also suspected.
<p>PATIENT PRECAUTIONS</p>	<ul style="list-style-type: none"> • Surgical mask to patient's mouth and nose until placement in private room. • Isolate in private room. • Keep door closed.
<p>ENVIRONMENTAL PRECAUTIONS</p>	<ul style="list-style-type: none"> • Follow routine housekeeping cleaning with 0.5% hypochlorite or EPA approved disinfectant. • Terminal cleaning wearing long-sleeved gown, gloves, surgical mask & goggles or face shield; room door closed. • Biohazard waste disposal for disposable items, including cleaning supplies & solutions. • Place linens in biohazard bag and discard. • Routine cleaning/Disinfection of non-disposable items.