Sample Prioritization for Incident Decision Making

Integrated Consortium

of

Laboratory Networks

(ICLN)

(Version 1.0)

May 2017

Executive Summary:

This document was developed to provide response and recovery management teams with insight and an understanding of the many issues related to laboratory testing in order to promote the most efficient use of laboratory resources through sample prioritization. This document highlights the types of decisions these groups will need to make to best prioritize the samples being submitted to the various laboratories. It provides rationales and thought processes through the use of chemical, biological and radiological scenarios for prioritizing samples for laboratory analysis.

Immediately following a significant chemical, biological, or radiological release, the emergency response community, various public health and medical communities, environmental groups and the long term recovery groups need high quality, interpretable analytical laboratory data on the threat agent(s) used or released. This includes identification of the specific agent, and the extent of exposure to people and contamination of the environment and food. Decision makers need this information rapidly to allow them to respond to the incident.

In response to a large scale incident, the nation's laboratories will be called upon to analyze samples to assist with determining the extent of exposures and contamination. This will require the nation's laboratories, both governmental and commercial, to respond to the anticipated overwhelming sample load while producing high quality results to support critical and timely decision making. Given that a large scale chemical, biological or radiological incident will result in sample testing demands that will likely exceed the nation's laboratory capacity, prioritizing samples in order to address the most critical response and recovery decisions in a timely manner is needed.

The primary goal in responding to and recovering from an incident is to limit casualties, exposures, and contamination. The on-scene incident managers will require the capability to rapidly establish situational awareness of the scope of the incident, establish communications and control measures, and coordinate the large number of

response and recovery assets from local, state, and federal contributors. On-scene leadership should establish priorities and coordinate response and recovery activities. These authorities need to coordinate with the various public health and medical communities, environmental groups, public officials and the long term recovery groups to make key decisions with the available response resources. Analytical laboratory data will be a key factor in the effective coordination of response and recovery activities and public health decisions.

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Introduction:

The Integrated Consortium of Laboratory Networks (ICLN) is a coordinated and operational system of federal laboratory networks designed to provide timely, high quality, and interpretable results for early detection and effective consequence management of acts of terrorism and other large scale incidents requiring an integrated laboratory response. The ICLN was created by 10 federal departments and agencies from a memorandum of agreement that was signed in June, 2005 and renewed in January, 2012. One of the functions of the ICLN is to coordinate the efficient, timely, and effective use of national laboratory capacity and capability within this consortium of networks.

The ICLN created the Sample Prioritization Workgroup (PWG) to help promote the effective use of the available laboratory resources (capacity and capabilities). The workgroup developed the *ICLN Sample Prioritization Document* as an educational resource to assist incident response managers in the best use of laboratory resources during a large-scale incident. **The creation of this document is predicated on the fact that there is a limited level of sampling and testing resources available during any event**. **Examples of these resources include, but, are not limited to sample collectors, sampling materials, transportation, testing reagents/supplies and fixed number of laboratories. There could be competition for these limited resources requiring prioritization of samples to be collected and tested in a large-scale incident.**

During an intentional or unintentional incident that requires the response of multiple federal laboratory networks, this document identifies specific reasons for performing analytical testing and sample prioritization for clinical, environmental, food, water, animal and plant sample testing.

Purpose and Scope:

The purpose of this document is to provide response and recovery management teams with insight and an understanding of the many issues related to laboratory testing in order to promote the most efficient use of laboratory resources during a large-scale incident. This document addresses the complex task of determining how to best use the limited laboratory capacity (local and national) during a large scale emergency or terrorist incident. **A systematic approach to sample prioritization, when sample demand is greater than laboratory capacity, helps ensure the most critical samples are processed first and test results can be rapidly communicated to decision makers during the differing phases of an incident.** The document provides rationales for prioritizing samples for analysis when the available testing capacities of laboratory networks are insufficient to meet the initial sample analytical demand and turnaround time needs. This document uses biological, chemical, radiological/nuclear scenarios based on historical incidents and past tabletop exercises to illustrate the rationales used to address the challenges of sample prioritization. The scope of the document is limited to prioritization issues related to fixed-facility laboratory resources.

Scope limitations:

This document does **NOT** address:

- Sampling strategies and plans (however, it might influence how sampling strategies and plans are implemented);
- Guidance for altering field sampling to modify surge sample load during an emergency response;
- Issues related to biological, chemical and radioactive waste and mixed waste disposal;
- Laboratory analysis associated with aerial surveys, field measurements, and/or mobile field analysis; nor,
- Analysis methodology.

Overview of Scenario Types Considered for Prioritization Analysis

Scenarios that inform testing demand can be defined in two ways, either by source and transmission, or by agent type and phase of the incident: Where "transmission" represents biological entity to biological entity [e.g., human to human, plant to animal, animal to animal, and/or animal to human].

A. Source and transmission "types".

1) **Single point source – no onward transmission.**

- Cases are likely detected in a single region; analytical testing resources are focused to that region. Example: botulinum toxin, anthrax, ricin, chemical hazards, and/or radiological hazards.

2) **Single point source – with onward transmission**.

- Cases may first be detected in the region of release or outside the original region via travelers; initial case detections are followed by substantial increases in detections from secondary cases. Example: plague or smallpox release at a large gathering.

3) **Distributed point sources – no onward transmission.**

- Cases are detected in multiple locations; analytical response is broad but may be targeted to the identified sites. Example: 2001 anthrax letters, or a coordinated multi-site release of a bioterrorism/chemical/radiological agent.

4) **Distributed point sources – with onward transmission.**

- Equivalent to pandemic response. Requires distributed analytical testing response and the application of "epidemiological and clinical criteria". Cases are detected in multiple locations and spread to other locations and personnel by contaminated objects, vectors (e.g., mice/rats, mosquitoes, fleas/ticks), food/feed, water, contaminated equipment/vehicles, wind, or run-off.

Where “transmission” represents biological entity to biological entity [e.g., human to human, plant to animal, animal to animal, and/or animal to human].

B. Agent type and incident phase. This process accounts for the specific Biological/Chemical/Radiological agent chosen to represent possible incidents. These proposed specific biological, chemical and radiological/nuclear scenarios (using the source and transmission scenarios above) were chosen as possible incidents that would likely overwhelm the ICLN participating networks and result in competition for laboratory resources.

Phase Names and Definitions:

Phase names are generally based on the “*Planning Guidance for Recovery Following Biological Incidents,*” document which was published by the “Subcommittee on Decontamination Standards and Technology, Committee on Homeland and National Security, National Science and Technology Council (NSTC)” in May, 2009.

Figure 1 delineates the phases. Although the “NSTC” document is specific to biological incidents, the phases also apply to chemical and radiological responses.

Definitions for each phase are provided in Appendix A and were obtained from the glossary section of the NSTC document.

The ICLN Sample Prioritization Workgroup adopted these phases because they were agreed upon by the NSTC, which is made up of multiple interagency public health and response agencies. Phase diagrams for the chemical, biological and radiological subgroups have slightly different phase names even within the same subgroup types (e.g., there were multiple phase names for different biological agents). Phase names under the “Crisis Management” and “Consequence Management” headings can be reviewed by going to each specific scenario in the subgroup sections (Appendices B, C, and D). Scenario phases include crisis management (early); consequence management (intermediate); and monitoring (late or recovery).

Response and Recovery*					
Crisis Management		**Consequence Management**			
Notification	**First Response**	**Remediation/Cleanup**			**Restoration/ Reoccupancy**
		Characterization	**Decontamination**	**Clearance**	
Receive information on biological incident Identification of suspect release sites Notification of appropriate agencies	Initial threat assessment HAZMAT and emergency actions Forensic investigation Public health actions Screening sampling Determination of agent type, concentration, and viability Risk communication	Characterization of biological agent Characterization of affected site Site containment Continue risk communication Characterization environmental sampling and analysis Initial risk assessment Clearance goals	Decontamination strategy Remediation Action Plan Worker health and safety Site preparation Source reduction Waste disposal Decontamination of sites or items Decontamination verification	Clearance environmental sampling and analysis Clearance decision	Renovation Reoccupation decision Long-term environmental and public health monitoring
* The optimization decision process is applicable to any phase					

Figure 1: Response and Recovery Phases.
Excerpted from: *"Final Planning Guidance for Recovery following Biological Incidents"*. Subcommittee on Chemical, Biological, Radiological, Nuclear, and Explosives Standards. Committee on Homeland and National Security/National Science and Technology Council. December, 2012. Page 38.

Purpose of the Example of Scenarios

The specific scenarios portrayed in the appendices of this document were chosen to highlight the types of possible testing needs that occur in situations familiar to the participating laboratory networks. These scenarios, as stated previously, were chosen with the expectation that such incidents would likely overwhelm the laboratory networks participating in the ICLN and result in competition for laboratory resources. With the likelihood of competition for laboratory resources in mind, the testing needs presented in the phase tables are roughly prioritized relative to the perceived importance of the data to be derived from the testing activities listed. These testing needs may change based on the type and phase of the scenario considered. Follow up activities by the ICLN may result in the enhancement, replacement and/or addition of scenarios to this document to provide input on areas currently not addressed. This can be done as experience and

lessons-learned are gained from an actual incident response and/or tabletop exercise play.

Intended audience:

Intended audience for this guidance document includes, but is not limited to:

- Incident Commanders/Incident Management System (IMS) staff
- Local/state/federal Emergency Management and Response groups
- Local/state/federal Health Officers (e.g., Public Health Staff, Clinicians, Laboratorians, etc.)
- Local/state/federal Epidemiologists
- Local/state/federal Environmental Officers
- Local/state/federal Veterinarians
- Other Subject Matter Experts (e.g., Health physicists, Industrial Hygienists, Mental Health Professionals, ICLN Network Coordinators, etc.)

Subgroup Scenario Descriptions:

Each subgroup chose specific scenarios within their agent category that responders might encounter during an incident response. A short summary of each scenario follows:

Biological:

A. Anthrax – priority bioterrorism infectious disease agent; in a threat scenario, spread of its spores generally involves either an aerosolized or "white" powder distribution means. Aerosolized spores can be inhaled (cause of inhalational anthrax) or can settle on environmental or other exposed surfaces (cause of cutaneous anthrax, and, less likely, gastrointestinal anthrax).

B. Pandemic Influenza – priority non-bioterrorism emerging infectious disease agent with person to person transmission.

C. *Rathayibacter toxicus* – a bacterial plant pathogen transmitted by a nematode vector (parasitic worm). *Rathayibacter* produces a poison in grain; animals that ingest contaminated feed exhibit liver damage.

D. Foot and Mouth Disease – a virus that affects cloven-hooved animals such as cows, pigs, and deer. It is highly infectious and can be spread to animals by contaminated objects or by aerosol transmission.

Chemical:

A. Chemical in milk –a deadly rodenticide ends up in milk powder, which is used in human and animal food commodities including, but not limited to, baby formula, senior protein drink packets, and military meals (ready to eat).

B. Methyl isocyanate incident – A highly toxic chemical gas release which impacts people through multiple exposure pathways including inhalation and dermal.

Radiological/Nuclear:

A. Improvised Nuclear Device - A nuclear detonation of about 10 kT in a large urban environment causing massive damage, loss of life, injuries, and the spread of 10's to 100's of radionuclides for 10's to 100's of miles. This is based on National Planning Scenario 1 (https://www.llis.dhs.gov/sites/default/files/NPS-LLIS.pdf).

B. Radiological Dispersion Device – A large quantity of a radionuclide is widely dispersed in a large urban environment resulting in the exposure of 100's of thousands of people being exposed and a large area of the city being contaminated with the radionuclide. This is based on the National Planning Scenario 11 (https://www.llis.dhs.gov/sites/default/files/NPS-LLIS.pdf).

Summary/Recommendations/Outcomes/Discussion on conclusions

There are many similarities between the four major sections/scenarios (Biological, Chemical, Radiological and Nuclear). First, in each scenario, there is the initial identification and confirmation of the actual dispersed threat agent(s). Second, this information is shared for protective and risk reduction actions for response personnel to avoid further harm and/or to prevent further exposure.

Past experience with non-terrorist exposure incidents has shown that human clinical testing is a priority and additional samples from the environment, food, and agriculture are tested later in the response to an incident. In a terrorist incident in which human clinical specimens are initially tested, the extent of environmental, food, and agriculture

contamination should be evaluated as soon as possible, so that a rapid response can be formulated to protect the health and life of humans, plants, and animals from further exposure. Therefore, a combination of human clinical, environmental, food, and agriculture specimens/samples must be evaluated and prioritized to help identify the potentially impacted population. The more comprehensive information that is generated from such broader testing will give an incident manager the best chance for developing an effective response and initiating community actions, based on the data, that will prevent further exposures to the population.

How to Use the Document

Due to the wide-variety of potential large-scale incidents and the complex array of variables for any given incident, it is difficult to develop a set of recommendations applicable to all large-scale incidents that prioritize samples and ensure effective use of the nation's laboratory response networks. This document provides a framework of the thought processes involved in making sample prioritization decisions using select examples of biological, chemical, radiological, and nuclear scenarios. A brief overview of each scenario is provided, accompanied by a table which prioritizes the various types of samples (e.g. clinical (human and animal), environmental, food, and agricultural) for each incident phase and the testing required to obtain critical decision-making information.

Sample prioritization in each phase was determined by consensus ranking of the data sets (e.g. clinical (human and animal), environmental, food, and agricultural). Consensus ranking is informed by the critical questions to be answered and activities to be performed following an incident. The rationale for particular tests is provided in the tables. The ICLN Sample Prioritization Working Group developed the tables, which were reviewed by subject matter experts, including, but not limited to, epidemiologists, environmental health officers, clinicians, public health officers, health physicists, industrial hygienists, and laboratorians.

The document provides an understanding of, and demonstrates the considerations and thought processes involved in prioritizing samples by phase for an incident. Therefore, the reader is encouraged to carefully review the scenarios and associated tables in their

field of interest prior to an incident. The reader should also focus on the rationale for testing provided in the tables for prioritizing sample types in each phase. The tables serve as a basic framework for sample prioritization for similar scenarios.

Path Forward

This document provides information applicable to sample prioritization at the laboratory or before samples arrive at the laboratory. Reviewing this document prior to an incident will better prepare local, state and regional incident managers to make more informed decisions on prioritization by developing a better understanding of the many nuances and caveats associated with each of the different scenarios presented. Incident managers include, but are not limited to, field managers, program managers, and managers and staff operating within an Emergency Operations Center (EOC) or an Environmental Unit (EU) operating within an Incident Command System (ICS). This document can aid in educating relevant staff/stakeholders and provide information to enhance emergency and/or incident response plans.

Appendix A:

Definitions Associated with NSTC Phase Terminology

- Crisis Management Phases:
  - Notification: The process of communicating the potential occurrence of a chemical, biological, or radiological incident through and to designated authorities who initiate First Response actions. Generally occurs as the first step in a response to a suspected or actual chemical, biological, or radiological incident.
  - First Response: Actions taken immediately following notification of an incident or release. In addition to search and rescue, scene control, and law enforcement activities, first response includes initial site containment, environmental sampling and analysis, and public health activities, such as treatment of potentially exposed persons.
- Consequence Management Phases:
  - Remediation/Cleanup: The processes of characterizing, decontaminating, and clearing a contaminated site or items, including disposal of wastes. Generally occurs after the First-Response Phase and before the Restoration Phase. A synonym for cleanup.
    - Characterization: The process of obtaining specific information about a chemical, biological, or radiological agent, such as its identity, genetic composition, formulation, physical (or chemical) properties, toxicological properties, ability to aerosolize, and persistence, and about the nature and extent of contamination of the agent, such as locations or items contaminated and the amount of contamination. Characterization of the agent and of the contamination at an affected site generally occurs after First Response and before Decontamination.
    - Decontamination: The process of inactivating or reducing a contaminant in or on humans, animals, plants, food, water, soil, air, areas, or items through physical, chemical, or other methods to meet a cleanup goal. Generally

occurs as part of Remediation. (Note: Decontamination has been defined in different ways by different Federal agencies and other entities.)

- Clearance: The process of determining that a cleanup goal has been met for a specific contaminant in or on a specific site or item. Generally occurs after Decontamination and before Re-occupancy.

- Restoration/Re-occupancy:
  - Restoration: The process of renovating or refurbishing a facility; bringing it to an acceptable condition using the optimization process to determine the appropriate use and associated clearance level at which occupants may return. Generally occurs after the Clearance Phase but before occupants are allowed to return.
  - Re-occupancy: The process of renovating a facility, monitoring the workers performing the renovation, and deciding when to permit reoccupation. Generally occurs after a facility has been cleared but before occupants are allowed to return.

Appendix B:

Biological Scenario Descriptions and Corresponding Phase Diagrams

Biological events contrasted with Chemical and Radiological/Nuclear:

Anthrax:

- Lag time for symptoms to appear and individuals to seek medical care will delay the detection of a covert release of a biological agent such as anthrax-causing *B. anthracis* spores or cells and,
- Considerations regarding infectious dose and hardiness of *B. anthracis* spores affects the extent of the decontamination effort required.

Pandemic Influenza:

- Different, unique phases of incident response that have been developed due to the infectious and highly contagious nature of influenza viruses;
- New foci of contagion will occur due to travel and social interactions of infected individuals (may be able to infect other individuals beginning 1 day before symptoms develop and up to 5 to 7 days after becoming sick) – geographic locations will be in different phases of response; and,
- Individuals can become infected via droplets produced when people with flu cough, sneeze, or talk or by touching surfaces or objects that have flu virus on them and then touching their own nose or mouth.

Rathayibacter toxicus:

- The vast expanse of agricultural fields in the grain and livestock feed producing regions of the U.S. and the movement of farm machinery will enable spread of the disease from infection foci before detection can likely occur; when the infestation is confirmed, further investigations are required to determine the extent of the infestation.

Foreign Animal Disease:

- New foci of contagion will occur due to transport of infected animals or via water contaminated with waste runoff - geographic locations will be in different phases of response; and,
- Animals can become infected by contact with another infected animal or by contact with fomites [an inanimate object that may be contaminated with infectious organisms (via contact with infected secretions and excretions - e.g., saliva, milk, feces, and urine) and serve in their transmission - e.g., animal foodstuffs, bedding, equipment, livestock holding areas, vehicles (particularly the transport compartment of livestock vehicles), clothing, etc.].

Aerosolized Anthrax Scenario:

Background: Anthrax is an infectious disease caused by gram-positive, rod-shaped bacteria known as *Bacillus anthracis*. The bacterium exists in nature in two forms: as an active growing cell (called the vegetative form) or as a dormant spore. The spores are very hardy and tolerant to extremes of temperature, humidity, and ultraviolet light and can survive for long periods of time (even decades) in the environment without nutrients or water. Anthrax spores can be found naturally in soil and commonly affect domestic and wild animals around the world. Although it is rare, people can get sick with anthrax if they come in contact with infected animals or contaminated animal products. Anthrax is not contagious e.g., you cannot catch anthrax from another person the way you might catch a cold or flu. There are 4 clinical forms of human anthrax infection: cutaneous, gastrointestinal, inhalational and injectional anthrax. Incubation period for cutaneous anthrax (from handling of anthrax spore-contaminated fomites or food products from the distribution center) ranges from 1 – 12 days following exposure, although the incubation period is typically closer to 1 day. Incubation period for gastrointestinal anthrax (from ingesting anthrax spore-contaminated food products from the distribution center) ranges from 1 – 7 days following ingestion, although the incubation period is usually 2 – 5 days. Incubation period for inhalational anthrax (from aerosolized release) ranges from as little as 2 days following exposure to spores to as long as 6 – 8 weeks after exposure. Incubation period for injectional anthrax (from intravenous injection of *B. anthracis* contaminated drugs) ranges from 1 – 4 days in most cases following injection.

Scenario Description: A terrorist in a small plane using a concealed improvised spraying device releases aerosolized anthrax over the northern outskirts of Los Angeles. Although not specifically targeted, there is a major fresh produce distribution center in the contaminated area that serves as a principle supplier to major restaurants and hotels, hospitals, supermarkets, schools and universities around the country and to the Department of Defense (DoD). The DoD distributes this produce not only to installations in the U.S., but also to installations throughout the Pacific. Farming communities also lie to the northeast of Los Angeles. (Note: winds in the Los Angeles area blow predominately from the West-Southwest). Over the next 2 - 3 days, Emergency Rooms and doctors' offices experience an increase in the number of individuals seeking evaluation and treatment for fever and respiratory complaints. Many ill patients are hospitalized with an initial diagnosis of pneumonia. Individuals are also presenting with small sores, generally on their hands and/or arms. Other patients seeking care complain

of low-grade fever, nausea, and vomiting. The first patients are predominately from the Los Angeles area or the region to the northeast of Los Angeles; however, individuals are also appearing from various other areas of southern California and of the country that have a history of recent travel to the Los Angeles region or from areas receiving fresh produce products from the distribution center. The rapidly escalating number of previously healthy persons with severe respiratory symptoms begins to trigger alarms within hospitals and at local health departments. On the 5th day following the release, the Los Angeles health department is notified by two separate clinicians about patients admitted to different hospitals with severe respiratory symptoms (potential mediastinal widening on their admission chest x-rays) that are now growing gram positive rods from blood culture. Additionally, patients initially presenting with small sores are returning to their doctors with blisters or painless ulcers covered by black scabs at the site of the initial sore. Patients initially presenting with low grade fever, nausea, and vomiting are returning with mouth or pharyngeal ulcerative (or necrotic) lesions and/or diarrhea/bloody diarrhea. No BioWatch positive result has been noted.

The Phase Tables for the Anthrax Scenario are provided below.

Aerosolized Anthrax Scenario Response and Recovery Phases [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
Identify causative agent from index cases associated with patients seeking medical care (Human Clinical Specimens)	Identify causative agent in symptomatic individuals/ animals (Human Clinical & Animal Specimens) ▪ Specimens for which antimicrobial susceptibility testing has been requested or failure to respond to treatment reported ▪ For probable cases with no exposure link to the affected areas ▪ For probable cases in affected areas with report of clinical deterioration of	Determine the extent of contamination to rule-in areas to be decontaminated using approaches such as targeted sampling. Samples to be collected in coordination with the IC/UC. (Env Samples)	Identify additional clinical cases of disease indicative of latent disease or unknown source of exposure (Human Clinical and Animal Specimens) Continuation of process to identify new cases/possible new sources of exposure carried forward in time/later phases as appropriate/ necessary	Determine the effectiveness of decontamination for clearance and provide recommendations to decision makers regarding re-use of specific areas. Samples to be collected in coordination with the IC/UC. (Env Samples)	Restore/ maintain public confidence/ trust – food commodities and environmental sites with special risk factors [Animal, Food (for humans and animals), and Env Specimens/ Samples]

Aerosolized Anthrax Scenario Response and Recovery Phases [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
	patient's condition in spite of appropriate treatment for anthrax ▪ For all other probable cases with epi-link to an affected area Continuation of process to identify causative agent in symptomatic patients carried forward in time/later phases as appropriate/ necessary				
Begin characterization of agent – virulence, pathogenicity, drug susceptibility, and markers of strain source [Human Clinical, Animal, Food (for	Identify cohorts of exposed patients prior to their becoming symptomatic. i.e., identify early/late immunological markers of human	Identify additional cases of delayed clinical presentation due to dose dependent relationship on post-exposure incubation	Determine the fate of waste material **(see related Note at end of table)**	Intentionally Left Blank	Potentially monitor reoccupied sites/areas as warranted by special risk factors (Env Samples)

Aerosolized Anthrax Scenario
Response and Recovery Phases
[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.]
[There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]

Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupancy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
humans and animals), and Env Specimens/ Samples] Continuation of process to characterize/ monitor agent carried forward in time/later phases as appropriate/ necessary	exposure to definitive anthrax bacterial antigens **(see related Note at end of table)** (Human Clinical Specimens) Continuation of process to identify cohorts of asymptomatic patients carried forward in time/later phases as appropriate/ necessary	period for onset of symptoms (Human Clinical & Animal Specimens)			
Monitor, as applicable, BioWatch dry filter units/assess validity of BioWatch Actionable Result (BAR)/ identification (Env Samples)	Continued characterization of agent and re-verification of agent identity/ characterization (**select specimens only**; Human Clinical and Animal Specimens) ▪ Specimens	Refine site characterization in order to include areas outside of the hot zone and potential areas where contamination may have been tracked. Samples to be collected in	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Aerosolized Anthrax Scenario Response and Recovery Phases [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
	from confirmed cases without epi-link to an affected area ▪ Specimens from confirmed cases with epi-link to known affected area Continuation of process to characterize/ monitor agent carried forward in time/later phases as appropriate/ necessary	coordination with the IC/UC. [Env Samples]			
Monitor, as applicable, DoD Guardian environmental (air) filter units/assess validity of Guardian test result/ identification (Env Samples)	As necessary, verification of initial reactive BAR agent identification - BioWatch Phase 1 sampling/ testing (Env Samples)	Guide decisions regarding food commodities, e.g., decisions to destroy commodities, public assurance testing to restore faith in economically important food commodities,	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Aerosolized Anthrax Scenario Response and Recovery Phases [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
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		etc. [Animal & Food (for humans and animals) Specimens/ Samples] Continuation of process carried forward in time/later phases as appropriate/ necessary			
Monitor animal events/ outbreaks in livestock (Animal Specimens)	Determine the exposure zone in order to more fully assess the potential risk to public health and safety, as well as establish initial parameters for predicting the level of health risk and actual exposure based on selective testing of population cohorts	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Aerosolized Anthrax Scenario Response and Recovery Phases [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
	through epidemiological investigations and environmental sampling. Samples to be collected in coordination with the IC/UC. [Human Clinical, Animal, Food (for humans and animals), and Env Specimens/ Samples] Continuation of process to refine exposure zone boundaries carried forward in time/later phases as appropriate/ necessary				
Intentionally Left Blank	Conduct BioWatch Phase 2 sampling/ testing to better define	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Aerosolized Anthrax Scenario Response and Recovery Phases [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
	the potential extent of the aerosol distribution of the identified agent, to guide plume studies to better inform exposure risks, and guide triage priorities for mass prophylaxis (Env Samples)				
Intentionally Left Blank	Identify and trace back contaminated food commodities and determine the potential extent of distribution in the food supply [Animal & Food (for humans and animals) Specimens/ Samples] Continuation of process carried forward	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Aerosolized Anthrax Scenario
Response and Recovery Phases
[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column.]
[There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]

Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 4 weeks**	**Characterization – phase duration of 2 weeks - 6 months**	**Decontamination – phase duration of 2 months - 1 year**	**Clearance – phase duration of 4 months – 2 years**	
	in time/later phases as appropriate/ necessary				
Intentionally Left Blank	Begin process of forensic attribution [Human Clinical, Animal, Food (for humans and animals), and Env Specimens/ Samples] Continuation of process of forensic attribution carried forward in time/later phases as appropriate/ necessary	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Notes:

Antimicrobial Susceptibility Testing: Antimicrobial testing will be performed on selected specimens as determined necessary/appropriate; early testing necessary to identify the existence of any antimicrobial resistance. Testing is then continued as determined necessary/appropriate on select specimens to monitor any changes in the organism's antimicrobial resistance profile or to detect the emergence of antimicrobial resistance.

Organism Characterization: may include testing for antimicrobial susceptibility and/or testing of specimen or culture isolates for strain typing and sequencing to identify variant or recombinant genetic engineering of the organism.

Pre-symptomatic Testing of Individuals: early infection diagnostics may also be required for use

<table>
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<tr><td></td><td></td><td colspan="3">Remediation/Cleanup</td><td rowspan="2">Restoration/ Reoccupan-cy/ Recovery – phase duration of 1 – 2 years</td></tr>
<tr><td>Event Recognition – phase duration of 2 – 7 days</td><td>First Response – phase duration of 1 – 4 weeks</td><td>Characterization – phase duration of 2 weeks - 6 months</td><td>Decontamination – phase duration of 2 months - 1 year</td><td>Clearance – phase duration of 4 months – 2 years</td></tr>
<tr><td colspan="6">of anti-toxin treatment; the detection of low level exposure to the organism; or where immunity may have been acquired from post-exposure prophylaxis (PEP), vaccination, or low level spore exposure.</td></tr>
<tr><td colspan="6"><u>Waste</u>: Testing is required to determine efficacy of decontamination process to inhibit spore viability and to determine disposal options for solid and liquid waste material (e.g. municipal waste water operations, municipal landfill, hazardous waste landfill, incinerator, etc.)</td></tr>
</table>

Pandemic Influenza Scenario:

Background: Influenza pandemics occur unpredictably, with three occurring in the 20th century (1918-1919, 1957-1958, and 1968-1969). Influenza pandemics may occur when a new influenza A virus subtype emerges and causes infection in people (termed genetic shift). If this new virus subtype, for which there is little to no immunity in the population, spreads efficiently between people, it can cause a pandemic. While influenza A outbreaks occur annually, a pandemic is a unique event. Rates of influenza illness, as well as its severity, are likely to be high because most (or all) of the human population will be susceptible, having had no prior exposure to this new influenza subtype. In addition, persons not generally at high risk may develop severe or fatal disease.

Scenario Description: For the past two years, a highly pathogenic avian influenza strain has sporadically infected domestic poultry in several countries. Spread by wild and migratory bird populations which may be asymptomatically infected, the geographical distribution of infection has increased over time. Sporadic human infections have occurred among persons who have close contact with infected poultry. The World Health Organization (WHO) has declared a "pandemic alert."

In late February of the current year, an outbreak of severe respiratory illness is identified in a small village in a country known to have experienced recent avian influenza disease. At least twenty-five cases have occurred, affecting all age groups. Several household clusters with infection of multiple family members are identified. Cases initially are investigated by national health authorities but in mid-March, after identification of new cases in neighboring villages and in the provincial capital, WHO assistance is requested. Specimens collected from several patients are sent to WHO Influenza Collaborating Center laboratories, including at the CDC in Atlanta. CDC determines that the isolates are of the avian subtype that had previously been circulating in birds but that the viral genome had undergone changes consistent with an increased ability to spread between people.

The novel influenza virus begins to make headlines in every major newspaper. Surveillance is intensified throughout many countries, including the United States. State health departments enhance influenza surveillance systems and begin diagnostic testing for the new subtype.

Over the next two months, March and April, WHO, with assistance from the U.S. and other governments, attempts to contain the outbreak, but new cases continue to occur and to spread to neighboring countries. Cases and small outbreaks also are identified in more distant countries that have extensive trade links with the affected area. In early

May, CDC reports that the virus has been isolated from ill airline passengers arriving in four major U.S. cities. State and local areas intensify influenza surveillance activities.

In June and July, small focal outbreaks begin to be reported throughout the United States. Community-wide outbreaks begin to occur more frequently as children return to school, and by late September outbreaks are occurring simultaneously throughout the country.

Pandemic Influenza Scenario

Response and Recovery Phases

Biological Subgroup – Pandemic Influenza Scenario

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Crisis Management		Consequence Management			
Investigation – phase duration of weeks to months to years *** Investigation of a novel Influenza A in humans and animals**	**Recognition – phase duration of 2-4 months** *** Recognition of elevated potential for ongoing transmission of a novel Influenza A**	**Initiation – phase duration of 6 – 10 weeks per epidemic wave within a defined geographic area** *** Initiation of a pandemic wave**	**Acceleration (continuation of activities in previous column and additional activities as listed)** *** Acceleration of the pandemic wave**	**Deceleration – phase duration of 2 – 4 months** *** Deceleration of the pandemic wave**	**Preparation – phase duration of months to years** *** Preparation for future pandemic waves**
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
Identify infections with/characterize novel influenza virus (Human Clinical & Animal Specimens) - Develop new diagnostic tools, as appropriate - Select vaccine candidate strains, as appropriate Continuation of process carried forward in time/later phases as appropriate/ necessary	Identify/confirm new cases of human influenza in affected region(s) to determine pattern(s) of person-to-person spread (Human Clinical Specimens) Prioritization of specimens from hospitalized patients/populations (e.g., young and/or elderly) Continuation of process to identify/confirm new cases/possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Monitor changes in novel influenza virus antiviral resistance profile [Human Clinical (for formulation of treatment guidance) & Animal (for possible early warning/detection of resistance profile changes) Specimens] Continuation of monitoring carried forward in time/later phases as appropriate/necessary	Confirm decontamination of flock/herd confinement facilities (including live animal markets) and eradication of novel influenza virus infected flocks/herds (Environmental and Animal Samples/Specimens) Conduct testing on a sample of cases for virologic surveillance purposes	Identify waning of infectious wave in geographic locations (Human Clinical & Animal Specimens) Conduct testing on a sample of cases for virologic surveillance purposes	Identify initiation of possible new infectious wave (Human Clinical & Animal Specimens)

Pandemic Influenza Scenario

Response and Recovery Phases

Biological Subgroup – Pandemic Influenza Scenario

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Crisis Management		Consequence Management			
Investigation – phase duration of weeks to months to years *** Investigation of a novel Influenza A in humans and animals**	**Recognition – phase duration of 2-4 months** *** Recognition of elevated potential for ongoing transmission of a novel Influenza A**	**Initiation – phase duration of 6 – 10 weeks per epidemic wave within a defined geographic area** *** Initiation of a pandemic wave**	**Acceleration (continuation of activities in previous column and additional activities as listed)** *** Acceleration of the pandemic wave**	**Deceleration – phase duration of 2 – 4 months** *** Deceleration of the pandemic wave**	**Preparation – phase duration of months to years** *** Preparation for future pandemic waves**
Identify avian and/or mammalian host populations of a novel influenza virus (Animal Specimens)	Identify and monitor novel influenza virus characteristics/antiviral resistance profile [Human Clinical (for formulation of treatment guidance) & Animal (for possible early warning/detection of resistance profile changes) Specimens] Continuation of process to monitor virus characteristics/antiviral resistance profile carried forward in time/later phases as appropriate/necessary	Identify flocks/herds with novel influenza virus infections for possible initiation of control programs and detect emergence of new virus variants (Animal Specimens) Continuation of process to identify possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Intentionally Left Blank	Ensure infection-free status of re-established flocks/herds (Animal Specimens) Continuation of monitoring carried forward in time/later phases as appropriate/necessary	Identify establishment of novel influenza virus as a circulating seasonal virus (Human Clinical & Animal Specimens)

Pandemic Influenza Scenario

Response and Recovery Phases

Biological Subgroup – Pandemic Influenza Scenario

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Crisis Management		Consequence Management			
Investigation – phase duration of weeks to months to years * Investigation of a novel Influenza A in humans and animals	**Recognition – phase duration of 2-4 months * Recognition of elevated potential for ongoing transmission of a novel Influenza A**	**Initiation – phase duration of 6 – 10 weeks per epidemic wave within a defined geographic area * Initiation of a pandemic wave**	**Acceleration (continuation of activities in previous column and additional activities as listed) * Acceleration of the pandemic wave**	**Deceleration – phase duration of 2 – 4 months * Deceleration of the pandemic wave**	**Preparation – phase duration of months to years * Preparation for future pandemic waves**
Identify avian and/or mammalian source(s) of exposure/transmission to humans, as well as intra-animal-species and inter-animal-species transmission (Animal Specimens)	Identify arrival of human novel influenza virus infections in new geographic locations (Human Clinical Specimens) Continuation of process to identify new cases/possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Restore public confidence regarding any food concerns [Food (for humans and animals) & Animal Samples/Specimens]

Pandemic Influenza Scenario

Response and Recovery Phases

Biological Subgroup – Pandemic Influenza Scenario

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Crisis Management		Consequence Management			
Investigation – phase duration of weeks to months to years * Investigation of a novel Influenza A in humans and animals	**Recognition – phase duration of 2-4 months * Recognition of elevated potential for ongoing transmission of a novel Influenza A**	**Initiation – phase duration of 6 – 10 weeks per epidemic wave within a defined geographic area * Initiation of a pandemic wave**	**Acceleration (continuation of activities in previous column and additional activities as listed) * Acceleration of the pandemic wave**	**Deceleration – phase duration of 2 – 4 months * Deceleration of the pandemic wave**	**Preparation – phase duration of months to years * Preparation for future pandemic waves**
Identify environmental sources of exposure/transmission to a novel influenza virus (if any – e.g., exposure to environmental surfaces associated with live poultry markets or live animal exhibits such as county fairs or, if determined to be appropriate, associated with bats such as caves, housing areas, or under bridges) (Env Samples)	Identify movement of novel influenza virus into new poultry flocks, swine herds, migratory birds, and, if determined to be appropriate, bat populations (Animal Specimens) Continuation of process to identify possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Return to normal Investigative/Surveillance operations (Human Clinical & Animal Specimens)

Pandemic Influenza Scenario

Response and Recovery Phases

Biological Subgroup – Pandemic Influenza Scenario

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Crisis Management		Consequence Management			
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Identify geographic location(s) where animal/human infections with a novel influenza virus are occurring (Human Clinical & Animal Specimens)	Identify presence of novel influenza virus in birds (including wild/migratory birds and/or poultry)/animals presented for slaughter [Animal and, if necessary, Food (for humans and animals) Samples/Specimens] Continuation of process to identify possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Pandemic Influenza Scenario

Response and Recovery Phases

Biological Subgroup – Pandemic Influenza Scenario

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Identify sustained human to human transmission (Human Clinical Specimens)	Monitor spatial and species distribution of novel influenza virus (Animal Specimens) Continuation of process to identify possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank
Identify sustained cross-species transmission (Animal Specimens)	Identify presence of novel influenza virus in birds/animals/bats from mass die-offs (Animal Specimens) Continuation of process to identify possible new sources of exposure carried forward in time/later phases as appropriate/necessary	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank
Definitions:					
R_0: the average number of individuals directly infected by an infectious case during his or her entire infectious period, when he or she enters a totally susceptible population					

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Response and Recovery Phases
<u>Biological Subgroup – Pandemic Influenza Scenario</u>
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* Preparation for future pandemic waves</td></tr>
<tr><td colspan="6"><u>Pandemic Wave Duration Considerations:</u>
Dependent on R_0 and imposition/effectiveness of non-medical countermeasures (e.g., social distancing, etc.)</td></tr>
</table>

Plant Pathogen Scenario (*Rathayibacter toxicus)*:

Background: *Rathayibacter toxicus* is a select agent and is a cross-domain pathogen: a nematode-vectored, Gram-positive bacterium that causes a plant disease (gummosis) and a potentially damaging agent to forage consuming animals through exposure to toxins produced by the pathogen in the forage grasses. Animals ingest infected forage and then suffer neurological symptoms that lead to death. In addition, *R. toxicus* can potentially colonize and produce toxins in a wide range of cereals consumed by humans, such as those put in dry organic breakfast cereals. A plant infestation of the pathogen can go undetected for long periods of time, making visual detection of a deliberate release a serious challenge. The nematode vector and bacterium can survive in the dry state for many years. The threat of introduction and establishment of *R. toxicus* in the U.S. is very high due to presence of susceptible grasses and potential nematode vectors in pasture and rangeland throughout the United States.

Scenario Description: Annual ryegrass fields are intentionally contaminated by terrorists with *R. toxicus* in three States via seeding with nematode and bacteria infected seed galls – KS, WY, and CO. In mid to late summer, hay made from ryegrass from the contaminated fields is fed to feedlot cattle in multiple locations, with the cattle subsequently showing neurological symptoms that in many progresses to death. Necropsies of the animals are performed and tissue specimens are sent to Federal and State veterinary diagnostic laboratories. Analysis of the tissue identifies the presence of *R. toxicus* toxins. The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) is alerted and begins analysis of grass feed stocks to identify the source of the toxins. APHIS also begins a risk assessment regarding potential contamination of cereal crops and the possible implications for human health if such contamination did occur.

Plant Pathogen Scenario (*Rathayibacter toxicus*):
Response and Recovery Phases
Biological Subgroup – *Rathayibacter toxicus* Scenario
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Crisis Management		Consequence Management			
		Remediation/Cleanup			Restoration/ Re-occupancy/ Recovery – phase duration of 3 years - ongoing
Event Recognition – phase duration of 3 – 21 days	**First Response – phase duration of 3 – 12 weeks**	**Characterization – phase duration of 12 – 14 weeks**	**Decontamination – phase duration of 4 – 27 months**	**Clearance – phase duration of 1 - 3 years**	
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
Investigate any result indicating a regulated plant pest obtained through the Cooperative Agricultural Pest Survey (CAPS) program. (Note: Although not designed to detect an intentional release, CAPS could potentially detect a pathogen's presence in agricultural crop samples before the testing of clinical specimens from ill animals identifies Rathayibacter toxicus as the causative bio-agent involved. If so, the overall timeline would be accelerated by two weeks.) (Plant Samples)	Trace human and livestock exposure through clinical means (Human Clinical & Animal Specimens)	Complete agricultural and environmental area delimitation sampling and monitoring of further spread. (Plant & Environmental Samples) Note: Plant and Environmental Sample timelines conditioned by temperate zone season	Remediate infestation and spread (Plant & Environmental Samples)	Monitor areas that are de-regulated (Plant & Environmental Samples)	Verify containment of infestation (Plant & Environmental Samples)

Plant Pathogen Scenario (*Rathayibacter toxicus*):
Response and Recovery Phases
Biological Subgroup – *Rathayibacter toxicus* Scenario
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Crisis Management		Consequence Management			
		Remediation/Cleanup			Restoration/ Re-occupancy/ Recovery – phase duration of 3 years - ongoing
Event Recognition – phase duration of 3 – 21 days	**First Response – phase duration of 3 – 12 weeks**	**Characterization – phase duration of 12 – 14 weeks**	**Decontamination – phase duration of 4 – 27 months**	**Clearance – phase duration of 1 - 3 years**	
Investigate/ diagnose toxicity in livestock (Animal Specimens) ▪ Test results from Foreign Animal Diseases Diagnostic Laboratory (FADDL) to rule in/rule out known foreign animal diseases ▪ Necropsies performed by FAD Diagnostician - fecal samples and samples of stomach contents, kidney, liver, and muscle tissues	Initiate initial Emergency Action Notifications (EANs) trace-back (Plant Samples)	Quantify extent of infestation within the regulated area. Intensive sampling of high-risk areas. (Plant & Environmental Samples)	Track post treatment monitoring for area-wide treatment for agricultural and environmental decontamination (Plant & Environmental Samples)	Follow post treatment monitoring of regulated areas (Plant & Environmental Samples)	Monitor decontamination/ clearance effectiveness after USDA regulatory declaration of eradication to maintain compliance with international export/trade standards and agreements (Plant Samples)
Identification of causative agent and/or toxin [Animal & Animal Food (e.g., seed, feed, and/or hay) Samples/ Specimens]	Delimiting surveys for agricultural environment (Plant & Environmental Samples) Set up of quarantine zones and regulated movement of material in areas testing positive (Plant Samples)	Intentionally Left Blank	Intentionally Left Blank	Restore public confidence regarding: ▪ trade agreements with export countries (Plant Samples) ▪ return to normal Surveillance operations (Plant & Environmental	Intentionally Left Blank

Plant Pathogen Scenario (*Rathayibacter toxicus*):
Response and Recovery Phases
Biological Subgroup – *Rathayibacter toxicus* Scenario
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Crisis Management		Consequence Management			
		Remediation/Cleanup			Restoration/ Re-occupancy/ Recovery – phase duration of 3 years - ongoing
Event Recognition – phase duration of 3 – 21 days	**First Response – phase duration of 3 – 12 weeks**	**Characterization – phase duration of 12 – 14 weeks**	**Decontamination – phase duration of 4 – 27 months**	**Clearance – phase duration of 1 - 3 years**	
				Samples) ▪ informing regulation and law enforcement of measures to prevent possible new infections (Plant & Environmental Samples)	
Trace-back of causative agent infestation to field location(s) (Plant & Environmental Samples)	EPA testing of nearby water reservoirs for contamination due to rainfall for further toxicity to animals drinking that water and water contamination and spread of the nematode vector in water (Environmental Samples)	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank
Intentionally Left Blank	Begin process of forensic attribution [Animal Clinical, Food (for humans	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Plant Pathogen Scenario (*Rathayibacter toxicus*):
Response and Recovery Phases
Biological Subgroup – *Rathayibacter toxicus* Scenario
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	and animals), and Environmental Samples/ Specimens] Continuation of forensic attribution process carried forward in time/later phases as appropriate/ necessary				
Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank

Foreign Animal Disease Scenario/Foot-and-Mouth Disease (FMD):

Background: Foot-and-Mouth (FMD) is a highly contagious viral vesicular disease of cloven-hoofed animals (e.g., cattle, goats, sheep, swine), and may be the most contagious of animal diseases. Although seldom lethal in adult animals, it causes serious production losses and is a major constraint to international trade in livestock and livestock products. Severe mortality may occur in young stock, particularly lambs and piglets. The disease may be transmitted in many ways, but most commonly by either direct contact between infected and susceptible animals or by indirect contact, e.g., spread mechanically by a variety of fomites (an inanimate object that may be contaminated with infectious organisms and serve in their transmission) including animal foodstuffs, bedding, equipment, livestock holding areas, vehicles (particularly the transport compartment of livestock vehicles), clothing, etc. that have been contaminated with infected secretions and excretions (saliva, milk, feces, and urine).

Scenario Description: Members of a terrorist organization enter the United States to survey large operations in the livestock industries. The terrorists target several locations for a coordinated bioterrorism attack on the agricultural industry.

Between November 1 and 3, terrorist teams travel to livestock transportation nodes in several States and contaminate animal shipments.

In one State, a cattle rancher notices that several of his animals are sick. A veterinarian arrives at the farm late on November 8 and suspects that the cattle have a case of either infectious bovine rhinotracheitis, or bovine respiratory syncytial virus. However, based on the clinical findings and the rapid spread of illness among the cattle, he contacts State animal health authorities. On November 9, the Federal Assistant District Director sends a Foreign Animal Disease diagnostician (FADD) to the farm. Specimens/samples are sent to the Foreign Animal Disease Diagnostic Laboratory (FADDL) at the Plum Island (New York) Animal Disease Center.

On November 8 in another State, a farmer on a corporate operation enters a swine barn and discovers several sick animals. He immediately calls the company veterinarian who, on examination of the animals, fears the existence of a FAD. The State Department of Agriculture, the Consumer Services Emergency Programs Office, and the Federal Animal and Plant Health Inspection Service (APHIS) office in the State are contacted, and a FADD is sent to the farm. Tissue specimens are taken and flown to FADDL Plum Island.

On November 9, FADDL Plum Island reports that specimens/samples taken from the swine operation have undergone confirmatory testing for the causative agent of a specific FAD. The specimens/samples have tested positive. FADDs assigned to the case report clinical evidence of a specific FAD in the affected animals. Later that day, FADDL Plum Island reports that specimens taken from the cattle have undergone confirmatory testing for the specific FAD and have tested positive.

On November 10, FADDL Plum Island reports that three sets of specimens taken from animals in three additional States have undergone confirmatory testing and have tested positive for a specific FAD. On November 11, FADDL Plum Island isolates live FAD agent in specimens/samples from the first State to report the possible FAD. A specific FAD infection is now confirmed in the United States.

Foreign Animal Disease Scenario/Foot-and-Mouth Disease (FMD): **Response and Recovery Phases** **Biological Subgroup – Foot and Mouth Disease Scenario** **[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]**					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 3 weeks**	**Peak – phase duration of 4 – 8 weeks**	**Peak (continuation of activities in previous column and additional activities as listed duration 2-4 months)**	**Deceleration – phase duration of 4 – 6 months**	**Resolution – phase duration of 6 months to years**
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
Identify/ diagnose Foreign Animal Disease (FAD) causative agent in blood and tissue specimens submitted by a FAD Diagnostician NOTE: FAD Diagnostician is deployed to a site to investigate report of clinical signs/ symptoms indicative of a FAD. FAD	Determine the size and the extent of the Foot and Mouth Disease (FMD) outbreak, trace and test animals and premises that have been exposed to known affected animals. (Animal & Env Samples/ Specimens) Confirmation, as necessary, of screening test results at FADDL in cases of new species, new	Identify additional cases ▪ Probable cases in affected areas with report of clinical signs/ symptoms ▪ All other probable cases with epi-link to an affected area ▪ Confirm cases without epi-link to an affected area ▪ Confirm cases with epi-link to known affected area (Animal & Env Samples/ Specimens) Continuation of	Support, via continued sampling, identification of new areas affected by spread of the outbreak. (Animal & Env Samples/ Specimens)	Verify depopulated sites within the infected zone (sites are allowed to “rest” for 28 days and then sampled) are free of FMD virus. (Env Samples)	Restore/ maintain public confidence/ trust – food commodities (e.g., milk) and environmental sites with special risk factors [Animal, Food (for humans and animals), and Env Samples/ Specimens]

Foreign Animal Disease Scenario/Foot-and-Mouth Disease (FMD): **Response and Recovery Phases** **Biological Subgroup – Foot and Mouth Disease Scenario** **[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]**					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Resolution – phase duration of 6 months to years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 3 weeks**	**Peak – phase duration of 4 – 8 weeks**	**Peak (continuation of activities in previous column and additional activities as listed duration 2-4 months)**	**Deceleration – phase duration of 4 – 6 months**	
Diagnostician collects blood and tissue specimens. Specimens are sent to the National Veterinary Services Laboratories - Foreign Animal Disease Diagnostic Laboratory (FADDL) on Plum Island, NY and a NAHLN laboratory if deemed appropriate. At a time determined to be appropriate, activation of the NAHLN laboratories is initiated in order to provide surge capacity testing	geographic location, and new presentation of disease. (Animal & Env Samples/ Specimens)	process to identify new cases/possible new sources of exposure carried forward in time/later phases as appropriate/ necessary			
Establish Infected	Serotype results for the	Intentionally Left Blank	Provide evidence that	Verify repopulated	Intentionally Left Blank

Foreign Animal Disease Scenario/Foot-and-Mouth Disease (FMD): **Response and Recovery Phases** **Biological Subgroup – Foot and Mouth Disease Scenario** **[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]**					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Resolution – phase duration of 6 months to years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 3 weeks**	**Peak – phase duration of 4 – 8 weeks**	**Peak (continuation of activities in previous column and additional activities as listed duration 2-4 months)**	**Deceleration – phase duration of 4 – 6 months**	
Zone(s), Buffer Zone(s), Control Area(s), and Surveillance Zone(s) as appropriate (see definitions at bottom of table)	purpose of determining whether use of vaccination is appropriate (will require somewhere between 5 hours and 3 days following confirmatory test positive result depending on the sample being tested). (Animal Specimens) Determine response strategy to be used based on extent of outbreak (Animal Specimens): 1. Stamping out (SO) (SO indicates depopulation of all animals showing clinical signs/ symptoms of disease and all those having		premises are free of FMD, thereby permitting animal and product movement.(Animal & Env Samples/ Specimens, e.g., nasal & oral swabs, blood, tissue, milk, soil (in areas contaminated w/ feces); surfaces contaminated by body fluids (swabs)) Continuation of process carried forward in time/later phases as appropriate/ necessary	sites remain free of FMD and animals were able to remain healthy. (Animal & Env Samples/ Specimens)	

Foreign Animal Disease Scenario/Foot-and-Mouth Disease (FMD): **Response and Recovery Phases** **Biological Subgroup – Foot and Mouth Disease Scenario** **[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]**					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Resolution – phase duration of 6 months to years**
Event Recognition – phase duration of 2 – 7 days	**First Response – phase duration of 1 – 3 weeks**	**Peak – phase duration of 4 – 8 weeks**	**Peak (continuation of activities in previous column and additional activities as listed duration 2-4 months)**	**Deceleration – phase duration of 4 – 6 months**	
	contact with animals showing clinical signs/ symptoms of disease) 2. SO with vaccination to slaughter (i.e., non-symptomatic/ non-exposed animals vaccinated and allowed to mature normally to time of slaughter) 3. SO with vaccination to live (i.e., non-symptomatic/ non-exposed animals vaccinated and allowed to live out the remainder of their lives) 4. Vaccinate to live (no SO)				
Intentionally Left Blank	Intentionally Left Blank	Intentionally Left Blank	Reassess zones in order to develop a plan for providing access to	Intentionally Left Blank	Intentionally Left Blank

<table>
<tr><th colspan="6">Foreign Animal Disease Scenario/Foot-and-Mouth Disease (FMD):
Response and Recovery Phases
<u>Biological Subgroup – Foot and Mouth Disease Scenario</u>
[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]</th></tr>
<tr><th colspan="2">Crisis Management</th><th colspan="4">Consequence Management</th></tr>
<tr><th></th><th></th><th colspan="3">Remediation/Cleanup</th><th rowspan="2">Resolution – phase duration of 6 months to years</th></tr>
<tr><th>Event Recognition – phase duration of 2 – 7 days</th><th>First Response – phase duration of 1 – 3 weeks</th><th>Peak – phase duration of 4 – 8 weeks</th><th>Peak (continuation of activities in previous column and additional activities as listed duration 2-4 months)</th><th>Deceleration – phase duration of 4 – 6 months</th></tr>
<tr><td></td><td></td><td></td><td>previously contaminated areas. (Env Samples)

Continuation of process carried forward in time/later phases as appropriate/ necessary</td><td></td><td></td></tr>
<tr><td><u>Definitions</u>:</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6"><u>Infected Premises</u>: Premises where presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, FMD case definition, and international standards</td></tr>
<tr><td colspan="6"><u>Contact Premises</u>: Premises with susceptible animals that may have been exposed to FMD, either directly or indirectly, including, but not limited to, exposure to animals, animal products, fomites, or people from Infected Premises</td></tr>
<tr><td colspan="6"><u>Suspect Premises</u>: Premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with FMD – intended to be a short-term premises designation</td></tr>
<tr><td colspan="6"><u>Infected Zone</u>: Perimeter should be at least 3 km (~ 1.86 miles) beyond perimeters of presumptive or confirmed Infected Premises. Will depend on disease agent and epidemiological circumstances. This zone may be redefined as the outbreak continues.</td></tr>
<tr><td colspan="6"><u>Buffer Zone</u>: Perimeter should be at least 7 km (~ 4.35 miles) beyond the perimeter of the Infected Zone. Width is generally not less than the minimum radius of the associated Infected Zone, but may be much larger. This zone may be redefined as the outbreak continues.</td></tr>
<tr><td colspan="6"><u>Control Area</u>: Perimeter should be at least 10 km (~ 6.2 miles) beyond the perimeter of the closest Infected Premises. This area may be redefined as the outbreak continues.</td></tr>
<tr><td colspan="6"><u>Surveillance Zone</u>: Width should be at least 10 km (~ 6.2 miles), but may be much larger. Should be established outside and along the border of the Buffer Zone.</td></tr>
</table>

Appendix C:

Chemical Scenario Descriptions and Corresponding Phase Diagrams

Differences

Differences due to Chemical incidents (as contrasted with Biological and Radiological):

ChemR2 Scenario:

- Early symptoms may not necessarily be indicative of a chemical agent.
- Basic clinical testing (for food poisoning, etc.) will be negative. A definitive diagnosis will require clinical sampling and analysis usually conducted by specialized laboratories such as CDC LRN-C, USAMRIID, etc.
- Specialized testing may identify clinical metabolites indicative of a chemical class of compounds but not necessarily a specific chemical. However, it can be determined that the illnesses are being caused by a chemical agent as opposed to a biological or radiochemical agent.
- Once the causative agent is identified as a chemical, the source of the chemical must be isolated. This will require collection of numerous samples from all food items and water sources. Laboratories with expertise in analysis of food products will be needed.
- Through analysis of the food, the specific chemical agent causing the illness can be confirmed.
- Once the chemical agent is confirmed, it will be necessary to determine if the food contamination was for terror purposes or accidental.
- The source of contamination (silo, transporting truck, warehouse, etc.) will have to be determined. Contaminated products will need to be identified, segregated, and properly disposed. To keep food supplies safe and available, contaminated trucks, salvageable equipment, storage containers, etc., will have to be properly and effectively decontaminated and tested before being returned to service.
- Environmental testing will be necessary to ensure protection of workers engaged in food processing operations as well as the food being produced.

- Clinical samples (human and animal) and samples from food, water, operating equipment, and environmental sources could potentially number in the tens or hundreds of thousands.

Bhopal India Scenario:

- Releases in this scenario will produce a rapidly expanding plume potentially covering many square miles. The plume will continue to expand until the source of the release is mitigated.
- Immediate identification of chemicals of concern will have to be made based on knowledge of current chemical plant operations and historical chemical use and storage. Specific identification of the chemical released will be delayed until on-site testing is performed.
- Continuous air monitoring must be conducted as soon as practical to evaluate and verify the zone of contamination at levels of public health concern.
- Upon coming into contact with the environment, the chemicals may react to form persistent toxins. These toxins may collect on plants or be ingested by animals and fish, potentially resulting in long term hazards to humans through consumption of food.
- Remediation of the contamination will involve long-term efforts and may generate extensive amounts of hazardous waste.
- Tens or hundreds of thousands of environmental samples must be tested during the time immediately following the initial release until remediation of the contamination is completed.

ChemR2 Scenario:

Prior to dropping milk off at the local dairy processing plant, a driver covertly put 5 pounds of ChemR2 into an 8,100 gallon tanker truck. The contaminated milk from the tanker truck was incorporated into the general processing volume at the plant. The milk was combined with other milk being stored in silos which feed into the dehydrator and is turned into milk powder which is included in the following:

- Baby formula (Human);
- Milk replacer (bovine, goats, sheep);
- Milk shake powder used in military MREs (Meal, Ready to Eat); and,

A company of Marines were provided a new lot of MREs and fifty Marines subsequently became ill. Clinical samples of blood, urine and feces were taken from the eleven Marines and sent to the base hospital's laboratory. As no pathogenic microorganism had been isolated from the earlier stool samples and no other apparent cause of the illness had been identified via analysis of the other specimens, the lab director initiated contact with the CDC and the decision was made to refer aliquots of all specimens to the LRN-C and, as available, to the U.S. Army Research Institute of Infectious Diseases, U.S. Army Research Institute of Chemical Defense, and Edgewood Chemical Biological Center. The new samples plus the residual samples from the first batch were all sent to CDC LRN-C.

Clinical samples were taken from the ill and the deceased and sent to CDC LRN-C. Additionally, 1,400 Marines began to show similar symptoms. Within a few weeks, fifteen Marines had died. Tissue samples were obtained during autopsy. Samples were sent to LRN-C, the DoD Joint Pathology Center and the Armed Forces Medical Examiner System. Ten samples were taken per cadaver. Additionally, MREs from the stockpile were sampled for a total of 9,000 food samples.

During the same time period as the Marine deaths and illnesses, Hurricane Emily hits the panhandle of Florida and displaces a total of 1 million individuals from a 3 state area. Food and water are needed for those that are displaced. Most of the hospitals in the area have shut-down thus minimizing the ability for the potentially injured to get checked out, medically. The Army National Guard has been authorized to provide MREs to help feed those that were impacted by the disaster.

A total of 850,000 meals were distributed to the impacted areas and a few days later and it is reported that displaced hurricane victims in the three-state area are seeking medical assistance due to strange symptoms not associated with the hurricane. Approximately 8,000 cases of the unexplained illness were reported. Samples of blood, stool, and urine to determine the agent that is causing this suspicious illness are being

collected. Approximately 24,000 human clinical samples were generated from this effort. Five deaths were also reported.

Samples were taken from each lot of each selection MRE food type. To minimize the number of samples due to laboratory capacity, one MRE per food selection type per pallet was sampled. A total 49,500 samples were obtained from the 3 state area. These samples were sent to FERN and specific DLN-participating laboratories as identified by the DLN. Analytical results from FERN noted presence of a rodenticide in the milk shake packet.

FDA initiated recall of MREs and did trace-backs on the milk shake packet. Commodities which made up the milk shake packet were traced. It was found that milk powder that originated from the particular dairy processing facility was common in each of the MREs which caused illness.

CHEMR2/Rodenticide Scenario:
Response and Recovery Phases

Scenario 1: CHEMR2 (a rodenticide) covertly placed in Bovine Replacement Formula (BRF), milk powder/baby formula, and Meals Ready to Eat

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[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]

Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Re-occupancy/ Recovery (t=Weeks 26 – 2 years)**
Notification (t= Once product has been distributed and used, notification about negative impact should be seen within a few weeks once animals and people that ingested the product get sick)	**First Response (t= Weeks 0 - 6)**	**Characterization (t= Weeks 2-20)**	**Decontamination (Decon will mainly be done on machinery where the milk powder was processed. All food items (for animals or humans) will be destroyed, not saved or decontaminated. (t=Weeks 10 - 26)**	**Clearance (Clearance is not an issue. Product will be destroyed. Samples MAY need to be analyzed to verify product safety to ensure consumer confidence. t=Week 26 +)**	
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
Identify the causative agent through clinical testing of patients seeking medical help.	Confirm cases for expanded number of patients seeking medical care (clinical testing).	Determine extent and concentration level of contamination at each affected site (i.e., contaminated food item, food processing equipment, food shipping trucks, workers, facility grounds, etc.).	Make decisions on the fate of the product/waste.	Determine that all affected areas have levels of contamination that are below agreed upon clearance levels.	Monitor previously affected areas for public confidence (sampling of food processing equipment, environmental sampling, and possibly limited human screening tests).
Determine what is the potentially affected area (i.e., is this an isolated event or wide spread). Requires	Screen humans that may not be showing severe signs of exposure and may not be seeking medical care		Confirm decontamination efficacy (environmental samples).	Analyze samples (equipment, bulk product, soil).	

CHEMR2/Rodenticide Scenario:
Response and Recovery Phases

Scenario 1: CHEMR2 (a rodenticide) covertly placed in Bovine Replacement Formula (BRF), milk powder/baby formula, and Meals Ready to Eat

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Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Re-occupancy/ Recovery (t=Weeks 26 – 2 years)**
Notification (t= Once product has been distributed and used, notification about negative impact should be seen within a few weeks once animals and people that ingested the product get sick)	**First Response (t= Weeks 0 - 6)**	**Characterization (t= Weeks 2-20)**	**Decontamination (Decon will mainly be done on machinery where the milk powder was processed. All food items (for animals or humans) will be destroyed, not saved or decontaminated. (t=Weeks 10 - 26)**	**Clearance (Clearance is not an issue. Product will be destroyed. Samples MAY need to be analyzed to verify product safety to ensure consumer confidence. t=Week 26 +)**	
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
bulk product testing.	(clinical testing).				

Bhopal Scenario:

Due to faulty safety features, a gas leak occurred at a pesticide manufacturing facility in Bhopal, India. The plant was used to manufacture “Sevin”, a carbaryl pesticide which was made using methyl isocyanate (MIC) as an intermediate. Due to faulty or non-existent backup safety systems, water and MIC came in contact with each other causing a build-up of temperature which forced an emergency venting of pressure from the MIC holding tank and caused the accidental release of MIC gas and other chemicals (phosgene, hydrogen cyanide, carbon monoxide, hydrogen chloride, oxides of nitrogen, monomethyl amine [MMS] and carbon dioxide). Over a 45 to 60 minute period, it is estimated that 30 metric tons of MIC was released. The gas cloud stayed close to the ground and spread outwards, asphyxiating those in its path and throughout the town in which the facility was located. Exposure pathways include inhalation and dermal as well as ingestion.

It was reported that 700,000 people were exposed. The initial death toll immediately after the gas leak incident was given as 3,787 people. The death toll reported at 2 weeks was 8,000 people. Over 170,000 people were treated at hospitals and temporary dispensaries. Dead animals (buffalo, goats, and other animals) were collected and buried. Leaves on trees yellowed and fell off. Food became scarce and fishing was prohibited. Groundwater wells in the area were heavily polluted and were not to be used as potable water.

Initial health effects included coughing, vomiting, severe eye irritation, and a feeling of suffocation. Those that ran inhaled more than those who had a vehicle to ride in. Since the gas cloud stayed close to the ground, children were more exposed due to their height. The health care system was inadequate and was quickly overloaded. Much of the medical staff was under-qualified to deal with such an event. Secondary contamination of rescuers and medical staff with MIC gas is not a hazard. Recovery and clean-up of this location occurred for decades after the incident.

Formal statements by the “government” cited that air, water, vegetation and foodstuffs were safe within the city. However, although poultry was supposedly unaffected, citizens were warned not to consume fish.

Long-term impact to heath included 558,125 injuries. Long-term health effects to those that survive exposure may include respiratory and eye damage as well as skin sensitivity. Years later, soil and water samples collected from near the factory and inside the plant were found to be toxic to fish. Soil and groundwater in the area was severely polluted.

Chemicals at the abandoned plant continued to leak and pollute the groundwater. It was stated that over 100 wells were contaminated. Approximately fifteen years later, samples were taken of groundwater, soil, and vegetables grown in the area around the site of the gas leak and all samples came back as being heavily contaminated. Even breast milk of women living in the area was found to be contaminated with toxic chemicals. Clean-up of the site began after the gas leak and continued for about fifteen years.

If this type of incident were to occur in the U.S. today, the tests that would be performed include:

- Environmental Sampling: Air samples can be obtained and analyzed using the XAD-7 adsorption tubes followed by HPLC.
- Human clinical tests: Rapid tox screen blood + rapid tox screen urine, oximetry, chest x-ray, and arterial blood gas testing.
- Food tests: HPLC testing of food sample.

Bhopal Scenario:
Response and Recovery Phases

Scenario 2: Methyl isocyanate (MIC) gas exposure, such as what occurred in the Bhopal, India incident. Gas cloud accidentally released by nearby chemical plant in heavily populated urban area. Many dead due to asphyxiation or injured due to pulmonary damage, eye or skin injury. Over 700,000 overtly exposed. Almost 4,000 dead.

[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]

Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Re-occupancy/ Recovery (t= Years+)**
Notification **(t=Immediately after incident)**	**First Response** **(t=Week 0 to 6)**	**Characterization** **(t=Weeks 2 - 20)**	**Decontamination** **(t=weeks - 10+ years)**	**Clearance** **(t=Years)**	
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
Identify the primary agent of concern. Information during investigation of the plant will identify primary agent as Methyl isocyanate (MIC).	Determine the concentration of the agent of concern for applicable exposure routes for appropriate public health and worker safety protection.	Determine the extent of contamination from original release of MIC and associated contaminants (environmental samples).	Confirm the effectiveness of decontamination.	Determine that affected areas have levels of contamination that are below agreed upon action levels (environmental samples).	Monitor previously affected areas for public confidence and ensure that there is no reoccurrence of contamination. Take appropriate actions, if necessary and respond to those with health concerns, as necessary.
Determine causative agent(s) for any patients seeking medical care (clinical sampling- will determine potential of other chemical contamination other than (MIC)).	Determine the extent of chemical exposure to food sources*, groundwater, surface water, etc. Confirm MIC and other possible breakdown products associated with release of MIC.	Determine exposure of population to past release of chemicals (clinical screening).			

Bhopal Scenario:

Response and Recovery Phases

Scenario 2: Methyl isocyanate (MIC) gas exposure, such as what occurred in the Bhopal, India incident. Gas cloud accidentally released by nearby chemical plant in heavily populated urban area. Many dead due to asphyxiation or injured due to pulmonary damage, eye or skin injury. Over 700,000 overtly exposed. Almost 4,000 dead.

[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]

Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Restoration/ Re-occupancy/ Recovery (t= Years+)**
Notification **(t=Immediately after incident)**	**First Response** **(t=Week 0 to 6)**	**Characterization** **(t=Weeks 2 - 20)**	**Decontamination** **(t=weeks - 10+ years)**	**Clearance** **(t=Years)**	
Testing in order to…	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**	**Testing in order to…**
	Determine levels of exposure to sick patients in order to provide appropriate medical care (clinical samples).	Define the action levels followed by determination of appropriate capability (to meet those action levels).			

Appendix D:

Radiological Scenario Descriptions and Corresponding Phase Diagrams

Differences due to Radiological or Nuclear incidents (as contrasted with Biological and Chemical):

Improvised Nuclear Device (IND):

- Instant mass destruction of buildings, infrastructure, communications, etc., for miles. Extensive loss of life and hundreds of thousands of people injured and exposed to deadly radiation doses. The environment is heavily contaminated with highly radioactive dust for miles (along with people, animals, food, water, etc.). Greater than 500,000 people will need testing for radiation exposure or contamination: many square miles of buildings will need testing to be able to reoccupy. All of this without any advance warning so the labs will be overwhelmed from the first day of the incident. This can be equated to the worst possible earthquake **with** extensive radiation contamination and exposures.

Radiological Dispersal Device (RDD):

- Depending on the radionuclide chosen by the terrorist, the radionuclides could be easy to detect in people, food, animals, water and the environment (e.g. Cesium-137), or it could be very challenging to detect in all samples (e.g. Plutonium-239). The incident would spread the radioactive contamination many city blocks (many rooms inside the buildings) with a wide range of radioactivity block by block, building by building due to the wind patterns of the urban environment. This will require extensive sampling of the environment, people, animals, food, etc. for the decision makers to allow people back in buildings (every room of the building must be tested) and medical management of contaminated people. Unlike most infectious diseases, a lab test is required to determine if the person will need medical treatment to remove high levels of radiation from inside their bodies. Although there are many portable hand held radiation meters that could be used for detecting high levels of radiation, final decision making for medical management, building safety, food safety and animal welfare will be dependent on laboratory analysis.

Prioritization of samples from a radiological incident is based on two national planning scenarios: one involving an improvised nuclear device (IND) and the other involving a

radiological dispersive device (RDD), or “dirty bomb.” Background and scenario specifics are provided in the following subsections.

Improvised Nuclear Device Scenario (based on the National Planning Scenario #1)

In this scenario, terrorist members of the Universal Adversary group plan to assemble a gun-type nuclear device using Highly Enriched Uranium (HEU) stolen from a nuclear facility. The nuclear device components will be smuggled into the United States. The device will be assembled near a major metropolitan center. Using a delivery van, terrorists plan to transport the device to the business district of a large city and detonate it. This scenario postulates a 10-kiloton nuclear detonation in a large metropolitan area. The effects of the damage from the blast, thermal radiation, prompt radiation, and the subsequent radioactive fallout have been calculated (based on a detonation in Washington, DC), for several large cities.

The response timeline will begin the instant the detonation occurs. Initially, only survivors in the immediate area will conduct rescue and lifesaving activities. Later (minutes to hours), rescue teams will begin to arrive and provide assistance. These initial efforts are likely to be uncoordinated. With the current state of education, training, and equipment, it is likely that many of these responders will subject themselves to very large (perhaps incapacitating or fatal) doses of radiation. As various command posts are set up (which may take hours to days), the response will become more coordinated. The productivity of rescue and direct lifesaving activities will decrease significantly as a function of time and will be very low within a couple of days.

Within the first few hours to days, environmental monitoring must be performed to delineate fallout boundaries, verify predictive models, and provide assurances that populated areas are safe. After public contamination and initial evacuation issues have been addressed, incident management resources will shift to supporting ground surveys and conducting sampling efforts.

A nuclear surface burst will produce significant downwind radioactive fallout, up to about 160 kilometers (100 miles). This fallout is due to the large quantity of material (e.g., dirt, asphalt, concrete, and steel) close to the device when it detonates. Much of this material is vaporized in the detonation and is carried up by the rising fireball. The fireball mixes the radioactive fission products and this vaporized material. These particles are carried off and dispersed downwind where the larger, heavier particles fall to the ground first. This dispersal is a complicated process that depends on many factors, including the amount of heat energy in the fireball, the amount and composition of the vaporized material, and the size of the particles formed, as well as the weather conditions. The radioactive fission products in the fallout may emit alpha, beta, or gamma rays or combinations of these.

Improvised Nuclear Device Scenario: Response and Recovery Phases Improvised Nuclear Device (IND) Matrix for Sample Prioritization during an IND Incident (based on the National Planning Scenario #1) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Years)**
Immediate Notification (0-4 Hours)	**First Response (4-24 Hours)**	**Initial Characterization (1-7 Days)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery and Monitoring (Years)**	
Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:
Determine the approximate initial shape and characteristics of the IND plume fallout at the local level* (e.g., local, state, RadNet and federal sources).	Perform initial evaluation of the extent of the plume fallout and define the **damage** and **danger** zones (immediate local coverage) from local, state, federal sources.	Evaluate and verify the boundaries of the **damage** and **danger** zones, via environmental samples. These zones are initially based on field measurements, flyover results, computer modeling, and limited laboratory testing to guide evacuation, public health decisions and actions, epidemiological investigations, and lab testing requirements.	Evaluate the extent of the human exposure and contamination (e.g., clinical samples to guide medical management of both exposure and/or contamination).	Provide surveillance of human exposure and contamination (e.g., clinical samples to provide public health guidance).	Continue the surveillance of human exposure and contamination (e.g., clinical samples to provide public health guidance).
Determine the initial direction and the extent of the fallout plume at the regional level* (e.g., RadNet Data).	Evaluate the initial extent of the fallout plume **danger** zones (regional coverage) (e.g., EPA's RadNet).	Perform initial evaluation of the extent of the human exposure and contamination by **damage** and **danger** zones (e.g., clinical samples to guide	Evaluate the extent and specifics of environmental contamination by zones to help guide public health decisions and actions and define exclusion zones.	Evaluate the extent and specifics of environmental decontamination to support recovery decision making relative to established clean-up levels to guide public	Provide environmental and decontamination data for long term public health guidance and assessments.

Improvised Nuclear Device Scenario: Response and Recovery Phases Improvised Nuclear Device (IND) Matrix for Sample Prioritization during an IND Incident (based on the National Planning Scenario #1) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column] [There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Years)**
Immediate Notification (0-4 Hours)	**First Response (4-24 Hours)**	**Initial Characterization (1-7 Days)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery and Monitoring (Years)**	
Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:
		medical management of both exposure and/or contamination).		health decisions and actions and reevaluate exclusion zones.	
	Perform initial evaluation of the extent of the human exposure and contamination by **damage** and/or **danger** zones (e.g., clinical samples to guide medical management of both exposure and/or contamination).	Perform initial evaluation of the extent of drinking water contamination by **danger** zones.	Evaluate the extent of drinking water contamination to help guide drinking water system consequence management.	Evaluate the extent of drinking water decontamination relative to established action levels to guide water system consequence management.	Support higher frequency of sampling and analysis of drinking water systems to provide data for long term health assessments relative to drinking water consumption.
		Perform initial evaluation of the extent of contaminated food by **danger** zones.	Evaluate the extent of food contamination by **danger** zones to help guide public health decisions and actions.	Perform surveillance of food contamination in effected fallout zones and abutting areas to guide mitigation techniques and health advisories.	Continue the surveillance of food contamination in effected fallout zones and abutting areas to guide mitigation techniques and health advisories.

Improvised Nuclear Device Scenario:
Response and Recovery Phases
Improvised Nuclear Device (IND) Matrix for Sample Prioritization during an IND Incident
(based on the National Planning Scenario #1)
[Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column]
[There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]

Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Years)**
Immediate Notification (0-4 Hours)	**First Response (4-24 Hours)**	**Initial Characterization (1-7 Days)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery and Monitoring (Years)**	
Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:	Testing in order to:
		Perform initial evaluation of the extent of agricultural contamination by **danger** zones.	Evaluate the extent of agricultural contamination by **danger** zones to help guide public health decisions and actions.	Perform surveillance of agricultural contamination in effected fallout zones and abutting areas to guide mitigation techniques and health advisories.	Continue the surveillance of agricultural contamination in effected fallout zones and abutting areas to guide mitigation techniques and health advisories.
			Perform evaluation of the efficacy of decontamination activities.	Perform evaluation of radioactive waste/debris removal, disposal and storage actions.	
			Evaluation of radioactive waste/debris removal, disposal and storage actions.		

- **Agricultural**: plants (for food production), animals (livestock)
- **RadNet**: the EPA network of fixed location Gamma detectors
- **Damage Zone**: Zones defined by DHS as Light, Moderate and Severe damage zones (based on the distance from the detonation).
- http://hps.org/homeland/documents/Planning_Guidance_for_Response_to_a_Nuclear_Detonation-2nd_Edition_FINAL.pdf
- **Dangerous Fallout Zone**: A zone defined by DHS as the area covered by fallout that impacts responder life-saving operations and/or has acute radiation injury potential to the population.
- http://hps.org/homeland/documents/Planning_Guidance_for_Response_to_a_Nuclear_Detonation-2nd_Edition_FINAL.pdf

*This will be based on field measurements and real-time monitoring measurements (i.e., RadNet).

Radiological Dispersive Device Scenario (based on National Planning Scenario #11)

In this scenario, a terrorist organization carries out coordinated attacks on three separate, but regionally close, U.S. cities. The attacks have no advance notice or intelligence that indicates their possibility. The attacks are initiated by detonating an RDD in the downtown business district of City One. The explosion in City One draws local and regional emergency responders. The radiological component associated with the explosion in City One is not immediately recognized, leading to contamination of first responders and inadvertent contamination spread until responding units arrive with gamma detection equipment. The attacks in City Two and City Three are timed to detonate simultaneously approximately an hour after the explosion in City One. The latter explosions in City Two and City Three are promptly identified as "dirty bombs."

The explosion from each breaks out windows and causes severe damage to nearby buildings. The plume dispersion spreads the contamination over a 36 block area and extends beyond the business district to homes, crowded shopping areas, and a high school. Complex urban wind patterns carry the contamination in unpredictable directions, leaving highly variable contamination deposition with numerous hot spots created by wind eddies and vortices. Contamination is spread into buildings via cracks around windows, doors and ventilation systems. In City One, the subway system is contaminated through the subway ventilation system air intakes.

In all cities, foot and vehicular traffic after deposition re-suspend and transfer contamination for hours afterward until the entire scene has been effectively controlled and cordoned, contributing to contamination spread beyond the city. People who were in the deposition zone also take contamination home with them in hair and clothing.

At each site, the blast results in approximately 180 fatalities and about 270 injured requiring medical care. In each city, tens of thousands of people located downwind have minor external and internal contamination and will require monitoring and medical surveillance. Low-level contamination may enter food and water supplies.

All exposed individuals will need to be monitored for health outcomes over their lifetimes, especially those that suffer internal contamination.

Site restoration will require that several buildings (those most damaged) to be torn down and eventually rebuilt. Decontamination activities are undertaken for building exteriors and interiors, streets, sidewalks, and other areas. The extent of contamination will be a major challenge during decontamination and cleanup. Most surfaces will be systematically decontaminated to low levels. Over the long term, decontamination efforts are expected to be effective, but some property owners choose demolition and rebuilding. Many square blocks will be unavailable to businesses and residents for

several years until remediation is completed. Throughout the entire decontamination phase, collected wastes will require appropriate disposal.

Deviations: The national planning scenario is based on Cs-137 as the radiological component in the RDD. For purposes of sample prioritization, the radiological component could be a beta-emitting nuclide such as Sr-90.

Radiological Dispersive Device Scenario: Response and Recovery Phases Radiological Dispersal Device (RDD) Matrix for Sample Prioritization during an RDD Incident (based on National Planning Scenario #11) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Months-Years)**
Immediate Notification (0-12 Hours)	**First Response (12-24 Hours)**	**Initial Characterization (24-96 Hours)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery, and Monitoring (Months)**	
Testing in order to:	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***
Determine the approximate shape, extent of, and characteristics of the RDD plume fallout* (e.g., local, state, and limited federal sources). *Based on field measurements	Refine which radionuclides are potentially present from the RDD.	Confirm the identification of the radionuclide(s) in the RDD.	Monitor the extent of the human exposure and contamination (e.g., clinical samples to guide medical management of both exposure and/or contamination).	Provide surveillance of the extent of human exposure and contamination (e.g., clinical samples to guide medical management of both exposure and/or contamination).	Continue surveillance of the extent of human exposure and contamination (e.g., clinical samples to guide medical management of both exposure and/or contamination).

Radiological Dispersive Device Scenario: Response and Recovery Phases Radiological Dispersal Device (RDD) Matrix for Sample Prioritization during an RDD Incident (based on National Planning Scenario #11) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Months-Years)**
Immediate Notification (0-12 Hours)	**First Response (12-24 Hours)**	**Initial Characterization (24-96 Hours)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery, and Monitoring (Months)**	
Testing in order to:	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***
Potentially identify select radionuclides that are present - particularly gamma emitters).	Refine the initial evaluation the extent of the blast plume fallout using environmental samples from local, state, and federal sampling and analysis teams.	Evaluate and verify the boundaries of the geographical zones (blast dispersion zones) which are initially based on environmental samples, for public health decisions and actions, and epidemiological investigations.	Evaluate the extent and specifics of environmental contamination by geographical zones to help guide sampling teams and public health decisions and actions.	Evaluate the extent and specifics of environmental decontamination to support recovery decision making relative to established clean-up levels to guide sampling teams and public health decisions and actions and define the decontamination zones.	Determine if additional environmental decontamination /cleanup is needed and to provide data for long term health assessments.
	Perform initial evaluation of the extent of the	Refine the initial evaluation of the extent of the human	Refine evaluation of the spread of contamination beyond the boundary	Perform surveillance of food contamination in quarantined or	Continue surveillance of food contamination in

Radiological Dispersive Device Scenario: Response and Recovery Phases Radiological Dispersal Device (RDD) Matrix for Sample Prioritization during an RDD Incident (based on National Planning Scenario #11) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Months-Years)**
Immediate Notification (0-12 Hours)	**First Response (12-24 Hours)**	**Initial Characterization (24-96 Hours)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery, and Monitoring (Months)**	
Testing in order to:	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***
	human exposure and contamination by geographical zones (e.g., clinical samples to guide medical management of both exposure and/or contamination).	contamination by geographical zones (e.g., clinical samples to guide medical management of both exposure and/or contamination).	zones through human and vehicle traffic/dispersion.	effected fallout zones and abutting areas to guide mitigation techniques and health advisories.	quarantined or effected fallout zones and abutting areas to guide mitigation techniques and health advisories.
		Perform initial evaluation of the spread of contamination beyond the boundary zones through human and vehicle traffic/dispersion.	Evaluate the extent of food contamination by geographical zones to help guide sampling teams and public health decisions and actions.	Evaluate the extent of drinking water decontamination relative to established action levels to guide sampling teams and water system consequence management, if	Support higher frequency of sampling and analysis of drinking water systems to determine if additional decontamination/ remediation is

Radiological Dispersive Device Scenario: Response and Recovery Phases Radiological Dispersal Device (RDD) Matrix for Sample Prioritization during an RDD Incident (based on National Planning Scenario #11) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Months-Years)**
Immediate Notification (0-12 Hours)	**First Response (12-24 Hours)**	**Initial Characterization (24-96 Hours)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery, and Monitoring (Months)**	
Testing in order to:	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***
				appropriate.	needed and to provide data for long term health assessments, if appropriate.
		Perform initial evaluation of the extent of contaminated food by geographical zones.	Evaluate the extent of drinking water contamination to help guide sampling teams and water system consequence management, if appropriate.	Evaluate radioactive waste/debris removal, disposal, and storage actions.	Continue surveillance of possible agricultural contamination in quarantined or effected fallout areas and abutting areas to guide mitigation techniques and health advisories, if needed.
		Perform initial	Evaluate the efficacy of	Perform surveillance	

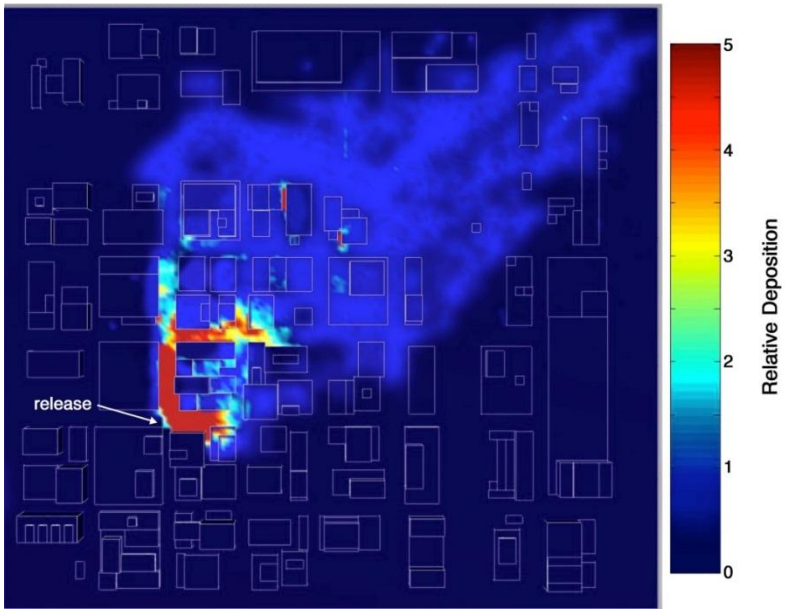
Radiological Dispersive Device Scenario: Response and Recovery Phases Radiological Dispersal Device (RDD) Matrix for Sample Prioritization during an RDD Incident (based on National Planning Scenario #11) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Months-Years)**
Immediate Notification (0-12 Hours)	**First Response (12-24 Hours)**	**Initial Characterization (24-96 Hours)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery, and Monitoring (Months)**	
Testing in order to:	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***
		evaluation of the extent of contaminated drinking water by geographical zones, as appropriate.	decontamination activities.	of possible agricultural contamination in quarantined or effected fallout zones and abutting areas to guide mitigation techniques and health advisories, if needed.	
		Perform initial evaluation of the extent of possible agricultural contamination by geographical zones, if needed.	Evaluate radioactive waste/debris removal, disposal, and storage actions.		
			Evaluate the extent of possible agricultural contamination by geographical zones to		

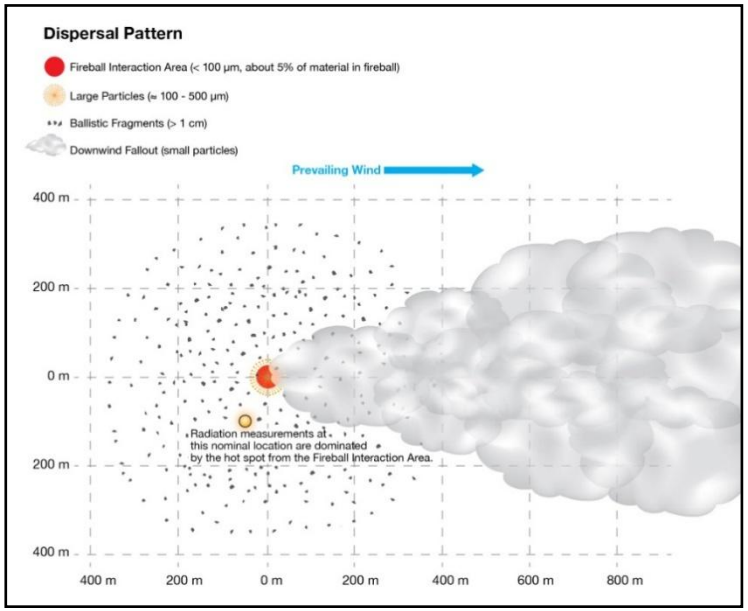
Radiological Dispersive Device Scenario: Response and Recovery Phases Radiological Dispersal Device (RDD) Matrix for Sample Prioritization during an RDD Incident (based on National Planning Scenario #11) [Items of the highest priority are listed at the top and items of lesser priority are listed toward the bottom of the column. There may be overlap in activities and sample collection/prioritization between phases as advance from left hand side to right hand side of table.]					
Crisis Management		**Consequence Management**			
		Remediation/Cleanup			**Re-occupancy/ Monitoring (Months-Years)**
Immediate Notification (0-12 Hours)	**First Response (12-24 Hours)**	**Initial Characterization (24-96 Hours)**	**Refined Characterization / Decontamination (Weeks-Months)**	**Clearance, Recovery, and Monitoring (Months)**	
Testing in order to:	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***	***Testing in order to:***
			help guide sampling teams and public health decisions and actions, if needed.		

Agricultural: plants (for food production), animals (livestock)

Note: This scenario is a modification of the National Planning Scenario #11. In this scenario we are limiting the RDD to one city but have the used three radionuclides which are alpha, beta and gamma emitters**.**

Pictorial explanation of geographical zones can be found below.





From M. Brown (LANL)

This image is best viewed and printed in color.

Musolino, et.al. Health Physics, 2013, Volume 105, pages 65-73

Appendix E:

Sample Prioritization Workgroup Members

Name	E-Mail	Agency	Network(s)	Workgroup
Adeuya, Tony	Anthony.Adeuya@fda.hhs.gov	FDA	FERN	Chem
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Jones, Robert	rljones@cdc.gov	CDC	LRN-R LRN-C	Chem, Rad/nuke
Tech. Support Team:				
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	Updated: 04/08/2015			

Appendix F:
List of SMEs within agencies and offices/centers/units that have provided input on Chem./Bio./Rad. Phase tables and/or overall document.

[Version as of 11/16/2016]

Dept./Agency	Name of Reviewer	Office/Activity of Reviewer
DoD	Christopher L. Perdue, MD, MPH, LCDR, PHS	Armed Forces Health Surveillance Center
DoD	Tod Marchand, MAJ, U.S. Army	Joint Staff J-33 Homeland Defense, Nuclear & Current Operations Protection Division, CBRNE Branch
DoD	Bill Nauschuetz, Ph.D.	G-3/5/7, Allied Clinical Services U.S. Army Medical Command
DoD	F. Christy Music	Health/Medical Policy Office of the Assistant Secretary of Defense for Homeland Defense and Americas' Security Affairs
DoD	Tony Alves, DVM, DACVP, LTC, U.S. Army	DoD Veterinary Service Activity
DoD	Bob E. Walters, COL, U.S. Army	DoD Veterinary Service Activity
DoD	Carol Walters, Lt Col, U.S. Air Force	Office of the Assistant Secretary of Defense for Global Strategic Affairs
DoD	Elizabeth A. Macias, Ph.D., D(ABMM)	PHE Epidemiology Laboratory Service U.S. Air Force School of Aerospace Medicine
DoD	Luther Lindler, Ph.D.	Armed Forces Health Surveillance Center
DOE/ NNSA	Daniel Blumenthal, Ph.D.	Office of Emergency Response, Program Manager Consequence Management
DOE	Stephen Musolino, Ph.D.	Radiological Assistance Program, Brookhaven National Laboratory
DOE/ NNSA	Carolyn T. Wong	Federal Radiological Monitoring and Assessment Center (FRMAC), Lawrence Livermore National Laboratory
DOE/ NNSA	Sonoya Shanks	Federal Radiological Monitoring and Assessment Center (FRMAC), Sandia National Laboratory
DOE/EM	Berta Oates	National Analytical Management Program (NAMP)
EPA	Marissa Mullins	EPA Office of Emergency Management
EPA	Terry Smith	EPA Office of Emergency Management
EPA	Sam Poppell	Commander, Radiological Emergency Response Team (RERT); Center Director, Center for Environmental Management (CEM), EPA
EPA	Marc S. Greenberg, Ph.D.	Office of Superfund Remediation & Technology Innovation

Dept./Agency	Name of Reviewer	Office/Activity of Reviewer
HHS/CDC	Richard B. Kellogg	LRN Program Manager and Interagency Liaison, Division of Preparedness and Emerging Infections, National Center for Emerging and Zoonotic Infectious Diseases
HHS/CDC	John J. Kools	Senior Advisor for Laboratory Preparedness, Acting Office of Public Health Preparedness and Response
HHS/CDC	Joseph D. Miller, PhD	Chief Laboratory Preparedness Officer, Influenza Division, National Center for Immunization and Respiratory Diseases
HHS/CDC	Jasmine Chaitram	Deputy Branch Chief Laboratory Preparedness and Response Branch Division of Preparedness and Emerging Infections
HHS/CDC	Angela Weber	Office of Infectious Diseases National Center for Emerging and Zoonotic Infectious Diseases
HHS/CDC	Chad Dowell	National Institute for Occupational Safety and Health
HHS/CDC	Sean Shadomy	Bacterial Special Pathogens Branch
HHS/CDC	Lisa Delaney	National Institute for Occupational Safety and Health
HHS/FDA	Patricia A. Hansen, Ph.D.	Deputy Director, Office of Cosmetics and Colors, Center for Food Safety and Applied Nutrition (CFSAN)
HHS/FDA	Michael J. Noska, M.S.	Radiation Safety Officer and Senior Advisor for Health Physics, Office of the Commissioner/Office of Operations
HHS/FDA	William C. Cunningham, Ph.D.	Research Chemist/Regulatory Review Scientist, Chemical Contaminants branch/Office of Regulatory Science, CFSAN
HHS/FDA	David L. Anderson, Ph.D.	Research Chemist/Regulatory Review Scientist, Chemical Contaminants branch/Office of Regulatory Science, CFSAN
HHS/FDA	Selen Stromgren, PhD	Deputy Director, Office of Regulatory Science, ORA/ORS
USDA/FSIS	Thomas E. Beacorn, DVM	Senior Staff Officer, FERN
USDA/FSIS	Marcus A. Head, Ph.D.	Senior Staff Officer, FERN
USDA/FSIS	Robert W. Phillips, Ph.D.	Senior Staff Officer, FERN
USDA/FSIS	Randal C. Layton, DVM, MPH, DACVPM	Director, FERN
USDA/FSIS	Kevin J. Vought, MS	Senior Staff Officer, FERN

Biological Subgroup/SMEs that reviewed the phase tables or document:

- CDC LRN-B
- DLN
- EPA ERLN
- FERN
- NAHLN
- NPDN

Chemical Subgroup/SMEs that reviewed the phase tables or document:

- CDC LRN-C
- DHS
- EPA ERLN
- FERN

Radiological Subgroup/SMEs that reviewed the phase tables or document:

- CDC LRN-C, LRN-R
- DOE NAMP
- DRLN
- FERN

Appendix G:

Acronym List

APHIS	Agricultural Plant Health Inspection Services
BRF	Bovine Replacement Formula
CAPS	Cooperative Agricultural Pest Survey
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosive
CDC	Centers for Disease Control and Prevention
DHS	U.S. Department of Homeland Security
DLN	Department of Defense Laboratory Network
DoD	U.S. Department of Defense
DoE	U.S. Department of Energy
EANs	Emergency Action Notifications
EPA	U.S. Environmental Protection Agency
ERLN	Environmental Response Laboratory Network (EPA)
FADD	Foreign Animal Disease Diagnostician
FADDL	Foreign Animal Disease Diagnostic Laboratory
FDA	Food and Drug Administration
FERN	Food Emergency Response Network (FDA & USDA)
FMD	Foot-and-Mouth Disease
HEU	Highly Enriched Uranium
ICLN	Integrated Consortium of Laboratory Networks
ICS	Incident Command System
IC/UC	Incident Command/Unified Command
IMS	Incident Management System
IND	Improvised Nuclear Device
IRA	Integrated Response Architecture
LANL	Los Alamos National Labs
LRN	Laboratory Response Network
LRN-B	Laboratory Response Network-Biological (CDC)
LRN-C	Laboratory Response Network-Chemical (CDC)
MIC	Methyl Isocyanate
MREs	Meals, Ready to Eat (Military)
NAHLN	National Animal Health Laboratory Network (USDA)
NIMS	National Incident Management System
NPDN	National Plant Diagnostic Network (USDA)
NRF	National Response Framework
NSTC	National Science & Technology Council
PWG	Prioritization Workgroup
RDD	Radiological Dispersal Device
SO	Stamping Out
USDA	United States Department of Agriculture
Vet-LIRN	Veterinary Laboratory Investigation and Response Network
WHO	World Health Organization