

# NRT Quick Reference Guide: Brucella Species

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

<b>Agent Characteristics</b>	<p><b>Agent Classification:</b> Biological <b>Type:</b> Bacteria (<i>Brucella melitensis</i>, <i>B. abortus</i>, <i>B. suis</i>, <i>B. canis</i>)  <b>CDC Class:</b> B <b>Bio-Safety Level:</b> 3  <b>Description:</b> Brucellosis is a systemic, zoonotic (transferable between animals and humans) disease, and transferable between different animal species caused by one of four species of bacteria listed above. Virulence in humans decreases somewhat in the order given. These bacteria are small aerobic, non-motile coccobacilli that grow within monocytes and macrophages (white blood cells). They reside in tissue and bone marrow, and are extremely difficult to eradicate even with antibiotic therapy. Brucellosis is endemic in wild populations of ruminants (cloven hoofed animals). Sheep, goats, cattle (<i>B. abortus</i>), deer, elk, pigs (<i>B. suis</i>), dogs (<i>B. canis</i>), and several other animals are susceptible. Brucellosis is not very common in the US, where incidence is less than 0.5 cases/100,000 people (cases mostly infected with <i>B. melitensis</i>). Humans can be exposed to <i>Brucella</i> during the birthing and slaughtering of an animal, when handling viscera of animals, and eating/drinking unpasteurized milk, cheese, ice cream, etc. Humans can also be exposed by way of infectious aerosols inhaled or inoculated into mucous membranes. When responding to human cases, it should be determined if they are natural outbreaks or a terror event. Brucellosis is endemic in the northern mid-west of the US (WY, MT, ND, SD). Most outbreaks are seen in wild ungulates (e.g., deer, elk, moose, bison). If this is a natural event, infected herds may be culled. <b>This QRG bases sampling/decon on a weaponized <i>Brucella</i> attack.</b>  <b>Incubation Period:</b> 5-60 days.  <b>Duration of Illness:</b> Weeks to years.  <b>Person-to-Person Transmission:</b> Rare; from sexual contact or via breastfeeding.  <b>Treatments:</b> Treatment is difficult but some antibiotics have been shown to be effective. There is no human vaccine.  <b>Infectivity:</b> High.  <b>Lethality/Mortality:</b> Low; 0.5 – 6% depending on species of bacteria and whether endocarditis develops.  <b>Persistence:</b> Persistent in water and soil.</p>																
<b>Release Scenarios</b>	<p><b>Air:</b> <i>Brucella</i> is an inhalation threat to humans and to wild and domestic animals when in weapons-grade form.  <b>Soil/Surfaces:</b> <i>Brucella</i> is persistent in the soil for up to 125 days, so decon precautions should be taken.  <b>Water:</b> <i>Brucella</i> is a probable water threat because the bacteria are stable for 20-72 days.</p>																
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<b>Effect Levels</b>	<p><b>Lethality:</b> <i>Brucella</i> has low lethality (less than 2%).  <b>Infectivity:</b> <i>Brucella</i> has high infectivity.  <b>Infective Dose:</b> There is currently not an infective dose listed for brucellosis. It is estimated that the inhalation of only 10-100 weaponized bacteria is sufficient to cause human disease.</p>																
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<b>Field Detection</b>	There are field detection methods for brucellosis available for animals (e.g., Fluorescence Polarization Assay (FPA) and a 4-minute card test) but none available for humans at this time.																

## Brucella (side 2)

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<b>Sampling for Confirmatory Results</b>	<p><b>Sampling Location and Planning:</b> If release was limited to a building or container, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic or ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc.). If point of release or aerosolization is unconfirmed, use a statistically-based sampling method. <b>NOTE: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate Subject Matter Experts (SMEs).</b> More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA's "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan" TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a></p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (EPA Homeland Security Division (HSD)/ FBI) to ensure chain-of-custody. To contact the EPA HSD, call the National Response Center (1-800-424-8802) and ask them to notify the appropriate EPA HSD office within the EPA Region where the incident occurred. Samples should be packaged in an air-tight container and stored between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. <i>Brucella</i> samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit during shipment.</p> <p><b>Types of Samples:</b> Air, water, soil.  <b>Air:</b> Collect routine air samples with gel filter, Anderson sampler (check with lab for appropriate filter medium), or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of <i>Brucella</i> is suspected to have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be obtained.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with sterile 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Dairy Production and Livestock:</b> Upon confirmation of a <i>Brucella</i> outbreak, contact USDA at 202-720-5711 and the National Center for Infectious Diseases at 404-639-1711 (after hours call the Directors Emergency Operations Center at 770-488-7100) immediately since brucellosis is a zoonotic disease (transmissible between animals and humans).  <b>NOTE:</b> Weaponized <i>Brucella</i> will be highly infectious in laboratories and requires Bio-safety Level-3 (BSL-3) precautions.  <b>Environmental Samples:</b> Environmental samples/swabs must be supported by clinical samples (human or veterinary) to verify the presence or absence of <i>Brucella</i>.</p>
<b>Laboratory Analysis</b>	<p><b>Laboratory Concerns:</b> Many labs may not be able to perform analysis on all matrices (e.g., wipes and soil). Most labs use their own specific methods, so caution is needed when comparing data sets from different labs. Sample thru-put is limited to 20-30 environmental samples in a 48 hour period. Therefore, prioritizing sample type is recommended.</p> <p><b>Laboratory Information:</b> For Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support contact the Battelle security 24-hr control center: 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for Analytical Lab Support During a WMD response. For access please contact the ERT 24-hr# 732-321-6660.</p> <p><b>CDC Bioterrorism Preparedness and Response Program:</b> 404-639-0385.  <b>USDA Ames Iowa Lab:</b> USDA Ames Iowa Lab: 515-663-7388 (culture); 515-663-7563 (serology).  <b>USDA 24-hour Emergency Operations Center:</b> 202-720-5711.</p>
<b>Decontamination/Cleanup</b>	<p><b>Decon/Cleanup Planning:</b> Determine whether actual decon actions are necessary or whether natural attenuation can adequately reduce or eliminate the hazard. <i>Brucella</i> is relatively hardy, common, and may persist for many hours to even days in cool, moist, confined, shaded areas. If people cannot avoid the contaminated area for the hours to days required for natural attenuation, decon will be needed. <i>Brucella</i> can survive freezing and thawing and can survive for several weeks in milk, water, urine or damp soil. Decontamination is easily accomplished by common methods and agents (see below). Pasteurization is an effective treatment for contaminated dairy products. The decon plan should address: <b>1)</b> the physical state of the agent, how it entered the site, etc.; <b>2)</b> the extent of contamination including the amount of possible pathways that have or could have spread the agent; and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment, removal and packaging of other items such as clothing, bedding, etc., for decon and disposal. If the decon solution has killed the organism, disposal in the local wastewater system is possible, but permission to do so will be the decision of the local municipality.</p> <p><b>Decon/Cleanup Methods:</b> Decon materials for <i>Brucella</i> include, but are not limited to, <b>1)</b> a dilute household bleach solution (1 part bleach to 9 parts water); <b>2)</b> gaseous chlorine dioxide; <b>3)</b> 70% ethanol; or <b>4)</b> iodine/alcohol solutions, glutaraldehyde and paraformaldehyde. Gently cover any spills with decon solution-soaked paper towels.  <b>NOTE:</b> Decon products may have unique health and safety or PPE requirements (e.g., the use of bleach may result in chlorine gas).  <b>NOTE:</b> Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontamination agents used.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs and stakeholders will define cleanup goals. Decon is considered effective if post-decon sampling shows no evidence of growth in culture. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting <i>Brucella</i> on the surfaces and in the air.</p>
<b>Waste Disposal</b>	<p>Untreated waste should be appropriately labeled. Waste generated from <i>Brucella</i> should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the <i>Brucella</i> bacteria were inactivated or killed. Store waste in sealed containers that are appropriately labeled as Bio-Safety Level 3. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. <i>Brucella</i> is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

Report any release of WMD to the National Response Center 1-800-424-8802

# NRT Quick Reference Guide: Botulinum Toxin

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Toxin (from <i>Clostridium botulinum</i> bacteria) Types A, B, E, F (different toxins resulting from different bacterial strains) cause the human disease Botulinum Toxin Intoxication (BTI). <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 3</p> <p><b>Description:</b> These bacteria are ubiquitous in soil and can be found in fish, animals, and poorly preserved canned food. There are various types of botulism caused by <i>C. botulinum</i> releasing botulinum toxin, a poisonous substance (see types and routes of exposure). In solution, the toxin is colorless, odorless, and tasteless. The botulinum toxin can be aerosolized.</p> <p><b>This information is for naturally occurring botulinum toxin. If weaponized, this information could change.</b></p> <p><b>MW</b> = 150-165 kDa (varies depending upon toxin type).</p> <p><b>Time to symptom onset:</b> Variable 2 hours to 8 days (typically 12-72 hours after ingestion).</p> <p><b>Lethal Dose:</b> LD<sub>50</sub> (injected) 0.001µg/kg body weight; LD<sub>50</sub> (inhaled) 0.003-0.07µg/kg body weight.</p> <p><b>Duration of Illness:</b> 24 - 96 hours (acute), months/years (chronic).</p> <p><b>Person-to-Person Transmission:</b> No.</p> <p><b>Persistence:</b> May persist under certain circumstances (see release scenarios below).</p> <p><b>Stability:</b> Rapidly inactivated by exposure to sunlight and air.</p>																
Release Scenarios	<p><b>Air/Aerosolization:</b> Botulinum toxin can be aerosolized. Aerosolization is a consideration with weaponized or inhalation botulism. Botulinum toxin's ability to aerosolize is based on its purity. Weather conditions and the size of aerosolized toxin determine how long the toxin remains airborne, but it is estimated that the majority of toxin would be inactive within 2 days of release. Extremes of temperature and humidity will degrade the toxin, while fine aerosols will eventually dissipate into the atmosphere. Depending on the weather, aerosolized toxin can decay at rates of 1%-4% per minute. At a decay rate of 1% per minute, substantial inactivation of toxin occurs within two days of aerosolization. If people cannot avoid the contaminated area for the hours to days required for degradation, decontamination will be conducted. Decontamination will be necessary if the toxin has been engineered to be more persistent.</p> <p><b>Soil/Surfaces:</b> Specifics of toxin persistence are not well known.</p> <p><b>Food/Water:</b> Botulinum toxin is a food and water threat. Botulinum toxin is typically found in contaminated food. A small amount of botulinum toxin needs to be added to food and/or untreated water to cause illness. Usually routine water treatment plant chlorination processes and canned goods sealing processes inactivate <i>C. botulinum</i> spores. Botulinum toxin could be used to contaminate buffet dinners/lunches and soft drink distribution centers. If food or water is contaminated with botulinum toxin, it is a public health emergency and it is critical that the victim receive treatment as soon as possible. The anti-toxin is available from the Centers for Disease Control (CDC) through the 24-hour State Public Health Department emergency line (listings for all states are available at <a href="http://www.cdc.gov/doc.do/id/0900f3ec80226c7a">http://www.cdc.gov/doc.do/id/0900f3ec80226c7a</a>).</p> <p><b>NOTE:</b> Keep in mind that botulinum toxin could be engineered to become more persistent in the environment. As such, decisions regarding PPE, sampling, and decon should not be made without verifying if botulinum toxin was naturally-occurring or weapons-grade.</p>																
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Field Detection	Field detection tests are not available. Results must be validated using LRN sampling and analysis protocols using live animals, and may take days before results are provided.																

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<b>Sampling for Confirmatory Results</b>	<p><b>Sampling Location and Planning:</b> If release was limited to a building or container, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic or ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc.). If point of release or aerosolization is unconfirmed, use a statistically-based sampling method. <b>NOTE: These are general guidelines and do not replace need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs.</b> More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan" TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a></p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on whether the toxin is weaponized or naturally occurring as well as: <b>1)</b> physical state of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (EPA Homeland Security Division (HSD)/FBI) to ensure chain-of-custody. To contact the EPA HSD, call the National Response Center (1-800-424-8802) and ask them to notify the appropriate EPA HSD office within the EPA Region where the incident occurred. Samples should be packaged in an air-tight, light-tight container and kept between 39–50° Fahrenheit during shipment.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. Botulinum toxin samples should be packaged in an air-tight, light-tight container and kept between 39–50° Fahrenheit during shipment.</p> <p><b>Types of Samples:</b> Sampling will be performed for the botulinum toxin, not for <i>C. botulinum</i>.</p> <p><b>Air:</b> Collect routine air samples with gel filter, Anderson sampler (check with lab for appropriate filter medium), or impinger.</p> <p><b>Water:</b> Botulinum toxin can persist in water; therefore, any consumable liquid should be sampled. If the consumable liquid is chlorinated, the chlorine needs to be neutralized immediately with a 2% sodium thiosulfate final concentration prior to shipment to a laboratory for analysis.</p> <p><b>Soil Samples:</b> For the localized areas where soil deposition of botulinum toxin may occur (e.g., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.</p> <p><b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with single-strength, ready-to-use (1X) phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this is not available, plain deionized water (DI) can be used. Do not use dry wipes.</p> <p><b>Agricultural/Food:</b> Agricultural products, food, and condiments should be left in the original container if possible OR placed in a sterile, leak-proof container (e.g., Ziploc® bag). The sample should be refrigerated between 39–50° Fahrenheit during shipment, and analyzed as quickly as possible.</p>
<b>Laboratory Analysis</b>	<p><b>Laboratory Concerns:</b> Many labs may not be able to perform analysis on all matrices (e.g., wipes and soil). Most labs use their own specific methods, so caution is needed when comparing data sets from different labs. Sample thru-put is limited to 20-30 environmental samples in a 48 hour period. Therefore, prioritizing sample type is recommended.</p> <p><b>Laboratory Information:</b> For Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support, contact the Battelle security 24-hr control center: 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for Analytical Lab Support During a WMD response. For access please contact the ERT 24-hr# 732-321-6660.</p> <p><b>National Laboratory Network Labs:</b> Food Emergency Response Network Lab (FERN); Environmental Laboratory Response Network (ELRN); National Animal Health Networks (NAHN); and Integrated Consortium Labs (ICLN) Labs.</p> <p><b>USDA Ames Iowa Lab</b> – 515-663-7388 (culture); 515-663-7563 (serology).</p> <p><b>USDA 24-hour Emergency Operations Center</b> – 202-720-5711.</p> <p><b>CDC Bioterrorism Preparedness and Response Program</b> – 404-639-0385.</p>
<b>Decontamination/Cleanup</b>	<p><b>Decon/Cleanup Planning:</b> Site specific decon/cleanup plan should be developed and approved by all necessary organizations/SMEs. Responders should develop a plan that takes into account <b>1)</b> the physical state of the toxin, how it entered the site, etc.; <b>2)</b> the extent of contamination including the amount and possible pathways that have or could have spread the toxin. It is advisable to isolate the contaminated area; and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment/removal/packaging of other items such as clothing, bedding, etc. for decon and disposal. Determine whether actual "decon" actions are necessary or whether natural attenuation can adequately reduce or eliminate the hazard. Botulinum toxin may persist for many hours to even days in cool, moist, confined, shaded areas, or longer if weaponized. If the decontamination solution has denatured the toxin, disposal in the local wastewater system is possible, but permission to do so will be the decision of the local municipality. If people cannot avoid the contaminated area for the hours to days required for degradation, decon will be needed. <b>NOTE: Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontaminating agents used.</b></p> <p><b>Decon/Cleanup Methods:</b> Decon materials for botulinum toxin include, but are not limited to <b>1)</b> a dilute household bleach solution (1 part bleach to 9 parts water); <b>2)</b> gaseous chlorine dioxide; or <b>3)</b> possible natural attenuation (time and weathering). Gently cover any spills with decon solution-soaked paper towels. <b>NOTE: Decon products may have unique S&amp;H or PPE requirements (e.g., use of bleach may result in release of chlorine gas).</b></p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective if post-decon sampling shows no evidence of toxin activity. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting toxin on the surfaces and in the air.</p>
<b>Waste Disposal</b>	<p>Botulinum toxin is not regulated under Subtitle C of the Resource Conservation and Recovery Act (RCRA), but should be handled with caution. In some states and localities, waste management will vary; for instance, <i>C. botulinum</i> and waste from botulinum toxin may be considered municipal, medical, or infectious substance waste with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. Botulinum toxin is subject to DOT regulations, CDC's Select Agent program requirements, FDA and USDA's Food Safety Inspection Service. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting infectious substances) and <a href="http://www.cdc.gov/od/sap/">http://www.cdc.gov/od/sap/</a>. If the decontamination solution has denatured the toxin, disposal in the local wastewater system is possible, but permission to do so will be the decision of the local municipality. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496].</p>

Report any release of WMD to the National Response Center 1-800-424-8802

# NRT Quick Reference Guide: Bunyaviridae-Rift Valley Fever (RVF)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (<i>Bunyaviridae</i>) <b>Bio-Safety Level:</b> 3  <b>Description:</b> Rift Valley Fever (RVF) is a member of the <i>Phlebovirus</i> genus and affects domestic animals such as cattle, buffalo, sheep, goats, and camels. RVF can also affect humans. RVF is transmitted from the bites of mosquitoes and other bloodsucking insects, and also from exposure to either blood or bodily fluids of infected animals. Infection through aerosol transmission of RVF virus has resulted from contact with laboratory specimens containing the virus. RVF is included as a member of the viral hemorrhagic fever group.  <b>Person-to-Person Transmission:</b> Yes, via direct contact with bodily fluids and objects contaminated with bodily fluids.  <b>Infectivity/Lethality:</b> Not well known.  <b>Infective Dose:</b> Unknown.  <b>Persistence/Stability:</b> Stable in vectors/water.</p>									
Release Scenarios	<p>RVF is traditionally transmitted through exposure to animal blood and fluids as well as mosquito bites, but can be engineered to become more viable. As such, decisions regarding PPE, sampling, and decon should not be made without verifying if the virus was naturally-occurring or weapons-grade.  <b>Air/Aerosolization:</b> Aerosolization is a possible means of transmission. Airborne transmission is not well characterized. An attack of RVF would most likely be identified after humans or animals started showing symptoms.  <b>Soil/Surfaces:</b> Infected mosquito eggs can remain dormant but viable in soil for years.  <b>Water:</b> Not transmitted through drinking water.  <b>Other:</b> RVF is a potential threat to livestock and domestic animals. In most cases, RVF is more devastating in animals than in humans. Decon will most likely be necessary. Depending on the threat, insect control might be necessary especially after heavy rains. Heavy rains cause standing pools of water that provide the media for hatching dormant infected mosquito eggs.</p>									
Health Effects	<p><b>ONSET</b></p> <p><b>SIGNS/ SYMPTOMS</b></p> <p><b>EXPOSURE ROUTES</b></p>	<p>Symptoms may occur within 2-5 days after exposure.</p> <p>Initial signs and symptoms include significant fever, light sensitivity, headache, encephalitis, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, from the internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures. Retinal failure may occur post-recovery.</p> <p><b>Inhalation:</b> Inhalation of tiny viral particles from feces, blood, urine, saliva, etc. of infected animals, especially if weaponized.  <b>Skin:</b> Direct contact with blood and/or secretions of infected person and objects or equipment that have been contaminated with infected blood and/or secretions may pose a threat. Infection may also occur through mosquito bites and other blood sucking insects.  <b>Ingestion:</b> Highly unlikely.  <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients and animals or if weaponized, in an aerosol.</p>								
Effect Levels	<p>Unknown.</p>									
Personal Safety	<p><b>CONCERNS</b></p> <p><b>MEDICAL SURVEILLANCE</b></p> <p><b>FIRST AID/ DECON</b></p> <p><b>PPE</b></p>	<p>Check with the Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plans (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE levels listed below are general suggestions only. Care should be taken to protect from mosquito bites using insect repellent (DEET) on the outside of PPE.</p> <p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Plasma is also used during convalescent-phase; otherwise treatment is supportive.  <b>During Incident:</b> Conduct medical monitoring; observe for any signs and symptoms and ensure medical attention is provided as soon as possible, if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.</p> <p>Antibiotics available for treatment: Ribavirin, plus supportive treatment for all Bunyaviridae. For skin decon, use warm soapy water, taking care not to abrade the skin. Contaminated PPE, clothing, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, combine water to household bleach (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution.</p> <p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC <i>Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents</i>: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> <li>Protect from mosquito bites using DEET.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> <li>Protect from mosquito bites using DEET.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, insect control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> <li>Protect from mosquito bites using DEET.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> <li>Protect from mosquito bites using DEET.</li> </ul>
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Field Detection	<p>No field detection methods are available.</p>									

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<b>Sampling for Confirmatory Results</b>	<p><b>Sampling Location and Planning:</b> If this was a weaponized aerosol release, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic/ventilation systems (e.g., elevator buttons, mail, corners of hallways, baseboards, light switches, and door knobs). If point of release or aerosolization is unconfirmed, use a statistically-based sampling method. <b>NOTE: These are general guidelines and do not replace need for a site specific sampling plan that should be reviewed and approved by appropriate Subject Matter Experts (SMEs) and/or through ICS channels.</b> More specific sampling procedures/guidance for biowarfare agents can be found at the ert.org website in “<b>Sampling Requirements for Chemical and Biological Agent Decontamination Efficacy</b>.” (LLNL, March 2001).</p> <p><b>Sampling Concerns:</b> If this was a weaponized aerosol release, different detection/analytical equipment and sampling techniques will be highly site-specific and depend on: <b>1)</b> the characteristics of the terrorist agents; <b>2)</b> the type of contaminated surfaces (porous vs. nonporous, etc.); <b>3)</b> the phases/purposes of sampling (initial identification vs. post-decon surface sampling); and <b>4)</b> the sampling procedures of the analytical laboratory. <b>Before obtaining samples, clearly identify and coordinate with laboratory to be used</b> (not all laboratories can handle all types of media, etc.). Basic Ordering Agreements (BOAs) for laboratory sampling analysis have been established with contract labs. Contact ERT for details. Coordinate with investigative units (CID/FBI). Ensure there is a plan for appropriate chain-of-custody.</p> <p><b>Sample Packaging and Shipping:</b> Packaging and transporting samples are subject to various regulations established by DOT, CDC, USPS, OSHA, and IATA. It is also important to consult with the analytical laboratory receiving the samples to determine whether they have additional packaging or shipping requirements. Details can be found at <a href="http://www.cdc.gov/ncidod/srp/specimens/shipping-packing.html">http://www.cdc.gov/ncidod/srp/specimens/shipping-packing.html</a></p> <p><b>Types of Samples for aerosolized release</b>  <b>Air:</b> Collect routine air sample with gel filter and/or impingers.  <b>Water:</b> Collect a minimum of 100 ml, if possible.  <b>Wipe Samples:</b> Synthetic, non-cotton (Dacron/Rayon) wipes pre-moistened with a nutrient solution, buffer solution, or deionized (DI) water are good for small sample areas of nonporous surfaces. Check with designated Laboratory Response Network (LRN) laboratory to coordinate methods and buffer solutions.  <b>Swab Samples (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with sterile 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.</p>
<b>Laboratory Analysis</b>	<p>Several approaches may be used in diagnosing acute RVF. Serological tests such as enzyme-linked immunoassay (the “ELISA” or “EIA” methods) may demonstrate the presence of specific antibodies to the virus. The virus itself may be detected in blood during the virus multiplication (viremia) phase of illness or post-mortem tissues by a variety of techniques including virus propagation (in cell cultures or inoculated animals), antigen detection tests, and polymerase chain reaction (PCR).          CDC Bioterrorism Preparedness and Response Program: 404-639-0385</p>
<b>Decontamination/Cleanup</b>	<p><b>Decon/Cleanup Planning:</b> A site specific disinfection/decon plan should be developed and approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account: <b>1)</b> the nature of the agent (purity, chem-phys properties), release scenario, etc.; <b>2)</b> the extent of agent contamination including the amount and possible pathways that have or can spread the agent (<b>NOTE: Isolate any area contaminated with agent.</b>); and <b>3)</b> the objective of disinfection/decon (e.g., reuse or disposal of lab or treatment equipment, clothing or bedding or surfaces with patients’ excreta, sputum, and/or blood). Depending on the incident, EPA might have to provide assistance or materials to decon healthcare facilities, subways, other public areas, and private homes and buildings, in addition to farmland, if animals were infected. <b>NOTE: Crisis exemptions for decontaminating agent used may be obtained from EPA Office of Prevention, Pesticides, and Toxic Substances.</b></p> <p><b>Decon Methods</b>  <b>Methods used on surfaces, non-medical equipment and other items:</b> Disinfect and decontaminate using a dilute (0.5% sodium hypochlorite) household bleach solution or other disinfectant. To create a dilute bleach solution, combine 1 part regular household bleach (5% sodium hypochlorite) to 9 parts water to yield a 0.5% sodium hypochlorite solution. Wearing protective clothing, gently cover the affected area, equipment or item with a paper towel and apply disinfectant solutions. If practicable, start at the perimeter and work towards the center of the area, equipment or item; allow sufficient contact time (30 min) with the disinfectant solution to kill the virus. Carefully remove the paper towel and then reapply the disinfectant solution to the area and carefully clean again with another paper towel.  <b>Methods used on reusable medical equipment:</b> The surfaces of reusable medical equipment should be cleaned and then subjected to disinfection with a surface contact time specified by a SME. If available and practicable, autoclaving will also kill the viruses.</p> <p><b>Decon Effectiveness:</b> Decon is considered successful if post-decon sampling shows no evidence of RVF. Samples (air/surface) are taken in previously contaminated areas.  <b>Clean-up Adequacy Verification:</b> This type of sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow reoccupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present (use aggressive and grid sampling).</p>
<b>Waste Disposal</b>	<p>Waste generated from weaponized RVF should be chemically disinfected, autoclaved, incinerated and tested to be sure the weaponized RVF virus was killed. Store waste in sealed containers that are appropriately labeled as a Bio-Safety Level 3. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early in the process. RVF is subject to DOT regulations and the CDC’s Select Agent Program requirements. See <a href="http://www.cdc.gov/od/sap">www.cdc.gov/od/sap</a>.</p>

Report any release of WMD to the National Response Center 1-800-424-8802.

# NRT Quick Reference Guide: Brazilian Hemorrhagic Fever (BzHF)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (Arenaviridae) <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 4  <b>Warning:</b> This virus is highly infectious and causes severe human disease. Responders should only risk exposure if deemed absolutely necessary by Subject Matter Experts (SMEs) and the use of Personal Protective Equipment and infection control practices deemed adequate by SMEs are rigorously observed.  <b>Description:</b> The Sabia virus, the causative agent of BzHF, is an enveloped RNA virus that is transmitted by rodents. This virus is spread through contact with urine, saliva, blood, or feces of infected hosts (e.g., rodents). Airborne transmission and contact with contaminated surfaces is also possible. If weaponized, this virus may be highly aerosolizable.  <b>Infectivity/Lethality:</b> High/High.  <b>Persistence/Stability:</b> Persistence of these organisms in the environment is not well documented. Extreme caution should be exercised.  <b>Incubation Period:</b> 7-16 days.  <b>Person-to-Person Transmission:</b> Possible by coming in contact with infected persons and bodily fluids.  <b>Treatments:</b> Quarantine of infected individuals is needed to protect caregivers and other patients; treatment is supportive.</p>									
Release Scenarios	<p><b>Air/Aerosolization:</b> Devices designed to detect aerosolized BzHF are not available. Thus, airborne releases of BzHF are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for aerosolization and effectiveness of decon.  <b>Soil/Surfaces:</b> BzHF will most likely pose a surface hazard.  <b>Water:</b> The viral particles could potentially survive for long periods of time in untreated water.  <b>Other:</b> Depending upon the threat, rodent control might be necessary.</p>									
Health Effects	<p><b>ONSET</b></p> <p><b>SIGNS/ SYMPTOMS</b></p> <p><b>EXPOSURE ROUTES</b></p>	<p>Symptoms may occur within 7-16 days.</p> <p>Initial signs and symptoms include fever, eye redness, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.</p> <p><b>Inhalation:</b> Inhalation is the primary route of exposure in the event of a bioterror attack. With BzHF, inhalation of tiny viral particles from rodent feces, blood, urine, saliva, etc. can serve as a route of exposure.  <b>Skin:</b> Direct contact with rodent feces, blood, urine, saliva, bites, etc. can serve as a route of exposure. Transmission can occur through contact with infected persons and their bodily fluids. Infection through cracks in skin and through conjunctiva can occur.  <b>Ingestion:</b> Can occur from eating contaminated food or drinking contaminated water.  <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients.</p>								
Effect Levels	<p><b>Specific Effect Levels Are Unknown.</b> <i>Lethality</i> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. <i>Arenaviridae</i> are highly lethal. <i>Infectivity</i> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <i>infective dose</i> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. Responders should not assume that an infective dose estimate represents a safe level. For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>									
Personal Safety	<p><b>CONCERNS</b></p> <p><b>MEDICAL SURVEILLANCE</b></p> <p><b>FIRST AID/ DECON</b></p> <p><b>PPE</b></p>	<p>Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plan (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for BzHF; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.</p> <p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients; otherwise treatment is supportive.  <b>During Incident:</b> Conduct medical monitoring; use PPE as designated by the HASP; document PPE levels used; observe for fever and other signs and symptoms as listed under Health Effects, and ensure medical attention is provided as soon as possible if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.</p> <p>Contaminated PPE, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, add household bleach to water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.</p> <p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.aspx">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.aspx</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, rodent control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>
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Field Detection	<p>Since there is no field detection, BzHF is only identified once patients present with symptoms.</p>									

## BzHF (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

Sampling for Confirmatory Results	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., elevator buttons, mail, corners of hallways, baseboards, areas of rodent nesting or tracks, light switches, door knobs) due to foot traffic or ventilation systems. The local rodent population will also need to be sampled. If point of release or aerosolization of BzHF is unconfirmed, use a statistically-based sampling method.</p> <p><b>Note: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs.</b> More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's <i>Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan</i> TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a>.</p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state (e.g., feces, aerosol, fluid) of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (FBI or CID) to ensure chain-of-custody. BzHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. BzHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times. Be careful not to place the samples directly on chemical ice used for cooling the shipping container.</p> <p><b>Air:</b> Collect air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of BzHF may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
Laboratory Analysis	<p>BzHF is highly infectious and requires Bio-Safety Level-4 (BSL-4) precautions, virologic diagnosis, immunoassay, and viral culture which requires 3-10 days.</p>
Decontamination/Cleanup	<p><b>Decon/Cleanup Planning:</b> Virus-specific information will need to be developed prior to decontamination and cleanup.</p> <p><b>Decon Methods:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before clean up. Physical inactivation of the virus is accomplished by heating. BzHF is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®. Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Decon Methods for Natural Outbreak:</b> Look for obvious signs of rodent infestation, and remove rodents and exercise rodent control. <b><i>Under no circumstances should a vacuum cleaner or a broom be used.</i></b> Using a HEPA and Chlorine filter Air Purifying Respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After cleanup/decon mop, clean, etc. with bleach solution. Wash gloves with soap and water before removing and disposing of them.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable BzHF in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting BzHF on the surfaces and in the air.</p>
Waste Disposal	<p>Untreated waste should be appropriately labeled. Waste generated from BzHF should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the BzHF virus was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. BzHF is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: Dengue Hemorrhagic Fever (DHF)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (<i>Flaviviridae</i>) <b>Bio-Safety Level:</b> 3  <b>Description:</b> Dengue Hemorrhagic Fever (DHF) is caused by one of four closely related but distinct serotypes of the genus <i>Flavivirus</i>. All dengue viruses are transmitted to humans by the bite of infected <i>Aedes aegypti</i> mosquitoes. Infected humans may infect the mosquito and continue the cycle. Symptoms in an individual may become more severe with subsequent DHF infections.  <b>Incubation Period:</b> Symptoms appear rapidly after a 4-7 day incubation period. The incubation period can be up to 14 days.  <b>Person-to-Person Transmission:</b> No.  <b>Treatments:</b> Once diagnosed, supportive care only.  <b>Infectivity/Lethality:</b> 2-5%, if treated.  <b>Infective Dose:</b> Unknown.  <b>Persistence/Stability:</b> Stable in mosquito vectors in the United States.</p>																				
Release Scenarios	<p><b>Air/Aerosolization:</b> Airborne threat has not been clearly demonstrated.  <b>Soil/Surfaces:</b> Persistence and stability of DHF on surfaces is not well known.  <b>Water:</b> Not an ingestion threat, but surface water control may be necessary to mitigate the mosquito population.  <b>NOTE:</b> Keep in mind that DHF could be engineered to become more viable in the environment. As such, decisions regarding PPE, sampling, and decon <b>should not be made without verifying if the virus was naturally-occurring or weapons-grade.</b></p>																				
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Field Detection	None. Mosquito surveillance and monitoring.																				

## DHF (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

Sampling for Confirmatory Results	It is unlikely that EPA will be performing any vector or human samples. Refer to <a href="http://www.bt.cdc.gov/labissues">www.bt.cdc.gov/labissues</a>
Laboratory Analysis	Unequivocal diagnosis of dengue infection requires confirmation by a reference laboratory, either by isolating the virus or detecting specific antibodies. For virus isolation, a serum specimen should be collected within 5 days after onset of fever. If the virus cannot be isolated, a serum specimen is needed at least 6 days after onset of symptoms to make a specific antibody diagnosis by enzyme-linked immunosorbent assay (ELISA). NOTE: Most tests for anti-dengue antibodies are non-specific among the flaviviruses. These include West Nile and St. Louis encephalitis viruses. Commercial kits may vary in sensitivity and specificity; therefore critical results may need confirmation by a reference laboratory. CDC Bioterrorism Preparedness and Response Program: 404-639-0385
Decontamination/Cleanup	<b>Decon/Cleanup Planning:</b> Depending on the incident, EPA might have to provide assistance or materials to decon healthcare facilities, subways, other public areas, and private homes and buildings. Additionally, tick and insect control might be necessary. Subject matter experts in this area are available at CDC and USDA/APHIS. <b>NOTE:</b> <i>Crisis exemptions for decontaminating agent used may be obtained from EPA Office of Prevention, Pesticides, and Toxic Substances.</i> <b>Decon Methods:</b> Routine decontamination procedures with biocides (e.g., rubbing alcohol; 1 part household bleach to 9 parts water) would be adequate for this agent. <b>Decon Effectiveness:</b> Routine follow-up housekeeping procedures and precautions would be adequate for this agent.
Waste Disposal	In general, waste generated from DHF should be chemically disinfected, autoclaved or incinerated and tested to be sure the DHF virus was killed. Store waste in sealed containers that are appropriately labeled as a Bio-Safety Level 3. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early in the process. DHF is subject to DOT regulations and the CDC's Select Agent program requirements. See <a href="http://www.cdc.gov/od/sap">www.cdc.gov/od/sap</a> .

Report any release of WMD to the National Response Center 1-800-424-8802.

# NRT Quick Reference Guide: Ebola and Marburg Hemorrhagic Fevers

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (<i>Flaviviridae</i>) <b>Bio-Safety Level:</b> 4  <b>Description:</b> These are RNA, enveloped viruses whose origin, locations, and natural habitat are unknown. There are two members of the filovirus family: Ebola and Marburg. Ebola has four subtypes: Ivory Coast, Sudan, Zaire, and Reston. Reston infects only nonhuman primates. Airborne spread among humans has not been clearly demonstrated. Bats could be a virus carrier.  <b>Incubation Period:</b> 2-21 days (Ebola); 5-10 days (Marburg).  <b>Person-to-Person Transmission:</b> Yes, via direct contact with bodily fluids and objects contaminated with bodily fluids.  <b>Treatments:</b> Supportive treatment only.  <b>Infectivity/Lethality:</b> High/High-60-90%.  <b>Infective Dose:</b> Unknown.  <b>Persistence/Stability:</b> Unstable; difficult to remain viable outside of host.</p>									
Release Scenarios	<p><b>Air/Aerosolization:</b> Ebola and Marburg could cause an inhalation threat. Aerosolization might be a consideration. Although airborne transmission is not well known, airborne releases of Ebola and Marburg are likely to be identified only after exposed persons become ill.  <b>Soil/Surfaces:</b> Persistence and stability of Ebola and Marburg on surfaces is not well known.  <b>Water:</b> Ebola and Marburg could be a water threat in underdeveloped areas.  <b>Other:</b> Ebola and Marburg can infect others through direct contact with bodily fluids and objects contaminated with bodily fluids.  <b>NOTE:</b> Keep in mind that Ebola and Marburg could be engineered to become more viable in the environment. As such, decisions regarding PPE, sampling, and decon should not be made without verifying if the virus was naturally-occurring or weapons-grade.</p>									
Health Effects	<p><b>ONSET</b></p> <p><b>SIGNS/ SYMPTOMS</b></p> <p><b>EXPOSURE ROUTES</b></p>	<p>Symptoms may occur 2-21 days (Ebola) or 5-10 days (Marburg) after exposure.</p> <p>Initial signs and symptoms appear abruptly. They include significant fever, fatigue, dizziness, muscle aches, sore throat, loss of strength, and exhaustion, and can mimic malarial symptoms.</p> <p><b>Inhalation:</b> Airborne threat has not been clearly demonstrated; however, caution should be exercised when the type of agent has not been clearly identified.  <b>Skin:</b> Direct contact with blood and/or secretions of infected persons and objects or equipment that have been contaminated with infected blood and/or secretions may pose a threat.  <b>Ingestion:</b> Through inadvertent ingestion of bodily fluids.  <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients.</p>								
Effect Levels	<p>Unknown.</p>									
Personal Safety	<p><b>CONCERNS</b></p> <p><b>MEDICAL SURVEILLANCE</b></p> <p><b>FIRST AID/ DECON</b></p> <p><b>PPE</b></p>	<p>Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plans (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for Ebola and Marburg; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.</p> <p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Ribavirin, though not FDA approved, has been used for treatment with some success; plasma is also used during convalescent-phase; otherwise treatment is supportive.  <b>During Incident:</b> Conduct medical monitoring; observe for fever and other signs and symptoms as listed under the Health Effects section above, and ensure medical attention is provided as soon as possible, if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible, if necessary.</p> <p>For skin decon, use warm soapy water, taking care not to abrade the skin. Contaminated PPE, clothing, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, dilute household bleach with water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution.</p> <p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC's <i>Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents</i>: <a href="http://www.bt.cdc.gov/documents/app/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documents/app/Anthrax/Protective/10242001Protect.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, vermin control (e.g., bats), medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>
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Field Detection	<p>No field detection methods are available.</p>									

# Ebola and Marburg Hemorrhagic Fevers (side 2)

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Sampling for Confirmatory Results</b></p>	<p><b>Sampling Location and Planning:</b> If this is a weaponized aerosol release, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic/ventilation systems (e.g., elevator buttons, mail, corners of hallways, baseboards, light switches, and door knobs). If point of release or aerosolization is unconfirmed, then use a statistically-based sampling method.  <b>NOTE:</b> These are general guidelines and do not replace need for a site specific sampling plan that should be reviewed and approved by appropriate Subject Matter Experts (SMEs) and/or through ICS channels. More specific sampling procedures/guidance for biowarfare agents can be found at the ert.org website in “<b>Sampling Requirements for Chemical and Biological Agent Decontamination Efficacy.</b>” (LLNL, March 2001).</p> <p><b>Sampling Concerns:</b> If this is a weaponized aerosol release, different detection/analytical equipment and sampling techniques will be highly site-specific and depend on: <b>1)</b> the characteristics of the terrorist agents; <b>2)</b> the type of contaminated surfaces (porous vs. nonporous, etc.); <b>3)</b> the phases/purposes of sampling (initial identification vs. post-decon surface sampling); and <b>4)</b> the sampling procedures of the analytical laboratory. Before obtaining samples, clearly identify and coordinate with laboratory to be used (not all laboratories can handle all types of media, etc.). Basic Ordering Agreements (BOAs) for laboratory sampling analysis have been established with contract labs. Contact ERT for details. Coordinate with investigative units (CID/FBI). Ensure there is a plan for appropriate chain-of-custody.</p> <p><b>Air:</b> Collect routine air samples with gel filters.  <b>Water:</b> Collect a minimum of 100 ml, if possible.  <b>Wipe Samples:</b> Sterile, synthetic (Dacron/Rayon) wipes pre-moistened with a sterile buffer solution or deionized (DI) water are good for small sample areas of nonporous surfaces. Check with designated Laboratory Response Network (LRN) laboratory to coordinate methods and buffer solutions.  <b>Swab Samples:</b> Sterile, synthetic, macrofoam swab pre-moistened with a sterile buffer solution or DI water are most useful for hard to reach nonporous surfaces. Do not use dry swabs.</p> <p><b>Sample Packaging and Shipping:</b> Packaging and transporting samples are subject to various regulations established by DOT, CDC, USPS, OSHA, and IATA. It is also important to consult with the analytical laboratory receiving the samples to determine whether they have additional packaging or shipping requirements. Details can be found at <a href="http://www.cdc.gov/ncidod/srp/specimens/shipping-packing.html">http://www.cdc.gov/ncidod/srp/specimens/shipping-packing.html</a></p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Laboratory Analysis</b></p>	<p>Three kinds of tests are used: <b>(1)</b> tests that detect antibody to Ebola or Marburg viruses, which prove that the patient has been infected; <b>(2)</b> tests for viral antigen (substances that stimulate antibodies), which prove that the patient is currently suffering an acute infection; and <b>(3)</b> special tests for viral genomic RNA. Electron microscopy has also been useful in diagnosis of Ebola and Marburg virus infections.          CDC Bioterrorism Preparedness and Response Program: 404-639-0385</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Decontamination/Cleanup</b></p>	<p><b>Decon Planning:</b> Site specific decon/cleanup plan should be developed and approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account <b>1)</b> the nature of agent contamination (purity, chem-phys properties), how it entered the facility, etc.; <b>2)</b> the extent of agent contamination including the amount and possible pathways that have or could have spread the agent; and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment/removal/packaging of other items such as clothing, bedding, etc. for decon and disposal. Depending on the incident, EPA might have to provide assistance or materials to decon healthcare facilities, subways, other public areas, and private structures. <b>NOTE:</b> <i>Crisis exemptions for the disinfecting or decontaminating agent used may be obtained from EPA Office of Prevention, Pesticides, and Toxic Substances.</i></p> <p><b>Disinfection/Decon Methods</b>  <b>Methods used on surfaces, non-medical equipment and other items:</b> Disinfect and decontaminate using a dilute (0.5% sodium hypochlorite) household bleach solution or other disinfectant. To create a dilute bleach solution, combine 1 part regular household bleach (5% sodium hypochlorite) to 9 parts water to yield a 0.5% sodium hypochlorite solution. Ebola virus is also susceptible to 2% glutaraldehyde* or 5% peracetic acid*. Marburg virus is also susceptible to a 2% glutaraldehyde* or 2% formaldehyde*. Wearing protective clothing, gently cover the affected area, equipment or item with a paper towel and apply disinfectant solutions. If practicable, start at the perimeter and work towards the center of the area, equipment or item; allow sufficient contact time (30 min) with the disinfectant solution to kill the virus. Carefully remove the paper towel and then reapply the disinfectant solution to the area, and carefully clean again with another paper towel.  <b>Methods used on reusable medical equipment:</b> The surfaces of reusable medical equipment should be cleaned and then subjected to disinfection with a surface contact time specified by a SME. If available and practicable, autoclaving will also kill the viruses. <b>*NOTE:</b> <i>These disinfectants can be hazardous when used in very pure or high concentrations.</i></p> <p><b>Decon Effectiveness:</b> Decon is considered successful if post-decon sampling shows no evidence of Ebola or Marburg in samples (air/surface) taken in previously contaminated areas.  <b>Clean-up Adequacy Verification:</b> This type of sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow reoccupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present (use aggressive and grid sampling).</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Waste Disposal</b></p>	<p>Waste generated from Ebola and Marburg should be chemically disinfected, autoclaved, incinerated and tested to be sure the Ebola or Marburg virus was killed. Store waste in sealed containers that are appropriately labeled as a Bio-Safety Level 4. Keep in mind that in some states and localities, waste management will vary. Waste may be considered municipal waste, medical waste, or an infectious substance and require special handling for disposal. Therefore, it is important to contact the state or local regulatory agency early in the process. Ebola and Marburg are subject to DOT regulations and the CDC's Select Agent program requirements. See <a href="http://www.cdc.gov/od/sap">www.cdc.gov/od/sap</a>.</p>

Report any release of WMD to the National Response Center 1-800-424-8802.

# NRT Quick Reference Guide: Glanders and Melioidosis

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Bacteria (<i>Burkholderia mallei</i> and <i>B. pseudomallei</i>) <b>Bio-Safety Level:</b> 3 <b>CDC Class:</b> B</p> <p><b>Description:</b> Glanders is primarily an equine disease caused by the bacteria, <i>Burkholderia mallei</i>. Most cases occur in horses, mules, or donkeys. Rarely, humans may become infected after contact with infected animals. Glanders is manifested in humans in four ways: localized, pulmonary, bloodstream, and chronic. Bloodstream infections can be fatal within 7-10 days. Weaponized <i>B. mallei</i> is a threat because it can re-aerosolize. Melioidosis, which is caused by <i>B. pseudomallei</i>, infects either by inoculation of skin, inhalation, or ingestion of contaminated food or water. Fatalities result in people with comorbidities.</p> <p><b>Incubation Period:</b> 1-14 days for <i>B. mallei</i>; 1-21 days for <i>B. pseudomallei</i>, although reactivation of previously asymptomatic infection can occur after months or years.</p> <p><b>Duration of Illness:</b> Varies; can be acute or chronic.</p> <p><b>Person-to-Person Transmission:</b> Through inhalation, possible by skin contact, if abraded.</p> <p><b>Treatments:</b> Antibiotics available. Systemic disease will be more difficult to treat successfully.</p> <p><b>Infectivity/Lethality:</b> Highly communicable among animals; human infection is rare for <i>B. mallei</i> but common for <i>B. pseudomallei</i>.</p> <p><b>Persistence/Stability:</b> <i>B. mallei</i> survives in water for up to 30 days; <i>B. pseudomallei</i> survives in water for over 3 years and in moist soils for up to 2 years.</p>																
Release Scenarios	<p><b>Air/Aerosolization:</b> Aerosolization is a consideration with both weaponized <i>B. mallei</i> and <i>B. pseudomallei</i>. Aerosolization or inhalation might occur in a laboratory setting.</p> <p><b>Soil/Surfaces:</b> While <i>B. mallei</i> is not believed to be persistent in soil, <i>B. pseudomallei</i> is persistent in some soils. <i>B. mallei</i> requires an animal reservoir for sustained transmission to humans and it is non-motile, which likely decreases its ability to persist and remain pathogenic in environments. <i>B. pseudomallei</i> does not require an animal reservoir, is motile, and is persistent in the environment. Persistence may be based on environmental conditions. Therefore, decontamination might be precautionary and standard hospital-approved disinfectants are adequate for cleaning (e.g., dilute bleach solution).</p> <p><b>Water:</b> Unknown</p> <p><b>NOTE:</b> Both <i>B. mallei</i> and <i>B. pseudomallei</i> can be engineered to become more viable in the environment. Decisions regarding PPE, sampling, and decon should not be made without verifying if the bacteria was naturally-occurring or weapons-grade.</p>																
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Field Detection	There are no field detection capabilities available. For accurate determination, cultures are needed.																

## Glanders and Melioidosis (side 2)

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Sampling for Confirmatory Results</b></p>	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic or ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc.). If point of release or aerosolization is unconfirmed, use a statistically-based sampling method. <b>NOTE: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate Subject Matter Experts (SMEs).</b> More Specifically EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA's "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan" TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a></p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (EPA Homeland Security Division (HSD)/ FBI) to ensure chain-of-custody. To contact the EPA HSD, call the National Response Center (1-800-424-8802) and ask them to notify the appropriate EPA HSD office within the EPA Region where the incident occurred. Samples should be packaged in an air-tight container and stored at 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. Both <i>B. mallei</i> and <i>B. pseudomallei</i> samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit during shipment.</p> <p><b>Types of Samples:</b> Air, soil, water.</p> <p><b>Air:</b> Collect routine air samples with gel filter, Anderson sampler (check with lab for appropriate filter medium), or impinger.</p> <p><b>Water:</b> Collect a minimum of 100 ml in a sterile container.</p> <p><b>Soil Samples:</b> For the localized areas where soil deposition of <i>B. mallei</i> and <i>B. pseudomallei</i> may occur (e.g., via aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be obtained.</p> <p><b>Wipe and Swab Sampling:</b> Sterile macrofoam swabs moistened with sterile 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.</p> <p><b>Dairy Production and Livestock:</b> Upon confirmation of either a <i>B. mallei</i> or a <i>B. pseudomallei</i> outbreak, contact USDA at 202-720-5711 and the National Center for Infectious Diseases at 404-639-1711 (after hours call the Directors Emergency Operations Center at 770-488-7100) immediately, since these organisms are zoonotic (transmissible between animals and humans).</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Laboratory Analysis</b></p>	<p><b><i>B. mallei</i> and <i>B. pseudomallei</i> are highly infectious in laboratories and require Bio-Safety Level 3 (BSL-3) precautions.</b></p> <p><b>Environmental Samples:</b> Environmental samples/swabs must be supported by clinical samples (human or veterinary) to verify the presence or absence of <i>B. mallei</i> or <i>B. pseudomallei</i>.</p> <p><b>Laboratory Information:</b> For Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support, contact the Batelle security 24-hr control center; 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for analytical laboratory support. During a WMD response, contact the ERT 24-hr # 732-321-6660.</p> <p><b>CDC Bioterrorism Preparedness and Response Program:</b> 404-639-0385</p> <p><b>USDA Ames Iowa Lab:</b> 515-663-7388 (culture); 515-663-7563 (serology).</p> <p><b>USDA 24-hour Emergency Operations Center:</b> 202-720-5711.</p> <p>Contact the receiving lab for specific collection and shipping procedures. After the lab receives the sample, it will take 1-4 days for the culture to provide accurate results.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Decontamination/Cleanup</b></p>	<p><b>Decon/Cleanup Planning:</b> Determine whether actual decon actions are necessary or whether natural attenuation can adequately reduce or eliminate the hazard. <i>B. mallei</i> and <i>B. pseudomallei</i> are relatively hardy, common, and may persist for many hours to even days in cool, moist, confined, shaded areas. If people cannot avoid the contaminated area for the hours to days required for natural attenuation, decon will be needed. <i>B. mallei</i> can survive freezing and thawing and can survive for several weeks in milk, water, urine or damp soil. <i>B. pseudomallei</i> loses 80 to 90% viability upon freezing. Decontamination is easily accomplished by common methods and agents (see below). Pasteurization is effective treatment for contaminated dairy products. The decon plan should address: <b>1)</b> the physical state of the agent, how it entered the site, etc.; <b>2)</b> the extent of contamination including the amount of possible pathways that have or could have spread the agent; and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment, removal and packaging of other items such as clothing, bedding, etc., for decon and disposal. If the decon solution has killed the organism, disposal in the local wastewater system is possible, but permission to do so will be the decision of the local municipality.</p> <p><b>Decon/Cleanup Methods:</b> Decon materials for both <i>B. mallei</i> and <i>B. pseudomallei</i> include, but are not limited to, <b>1)</b> a dilute household bleach solution (1 part bleach to 9 parts water); <b>2)</b> gaseous chlorine dioxide; <b>3)</b> 70% ethanol; or <b>4)</b> iodine/alcohol solutions, glutaraldehyde and paraformaldehyde. Gently cover any spills with decon solution-soaked paper towels.</p> <p><b>Note:</b> Decon products may have unique health and safety or PPE requirements (e.g., the use of bleach may result in chlorine gas).</p> <p><b>Note:</b> Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontamination agents used.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective if post-decon sampling shows no evidence of growth in culture. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting <i>B. mallei</i> and <i>B. pseudomallei</i> on the surfaces and in the air.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Waste Disposal</b></p>	<p>Untreated waste should be appropriately labeled. Waste generated from <i>B. mallei</i> and <i>B. pseudomallei</i> should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the <i>B. mallei</i> and <i>B. pseudomallei</i> bacteria were inactivated or killed. Store waste in sealed containers that are appropriately labeled as a Bio-Safety Level 3. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. <i>B. mallei</i> and <i>B. pseudomallei</i> are subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

Report any release of WMD to the National Response Center 1-800-424-8802

# NRT Quick Reference Guide: Lassa Fever

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response  
Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (Arenaviridae) <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 4  <b>Warning:</b> This virus is highly infectious and causes severe human disease. Responders should only risk exposure if deemed absolutely necessary by Subject Matter Experts (SMEs) and the use of Personal Protective Equipment (PPE) and infection control practices deemed adequate by SMEs are rigorously observed.  <b>Description:</b> The Lassa virus, the causative agent of Lassa fever, is an enveloped RNA virus that is transmitted by rodents. This virus is spread through contact with urine, saliva, blood, or feces of infected hosts (e.g., rodents). Airborne transmission and contact with contaminated surfaces is also possible. If weaponized, this virus may be highly aerosolizable.  <b>Infectivity/Lethality:</b> High/High.  <b>Persistence/Stability:</b> Persistence of these organisms in the environment is not well documented. Extreme caution should be exercised. Of the Arenaviridae fevers, Lassa may be more persistent.  <b>Incubation Period:</b> 7-21 days.  <b>Person-to-Person Transmission:</b> Yes.  <b>Treatments:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Ribavirin has been used with some success; otherwise treatment is supportive.</p>										
Release Scenarios	<p><b>Air/Aerosolization:</b> Aerosolization is a consideration with Lassa. Persons with Lassa fever can infect others by releasing respiratory droplets from coughing/sneezing/breathing on others. Devices designed to detect aerosolized Lassa in the field are not available. Thus, airborne releases of Lassa are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for aerosolization and effectiveness of decon.  <b>Soil/Surfaces:</b> Lassa will most likely pose a nonporous surface hazard.  <b>Water:</b> The viral particles could potentially survive for long periods of time in untreated water.  <b>Other:</b> Depending upon the threat, rodent control might be necessary.</p>										
Health Effects	ONSET	Symptoms may occur within 7-21 days.									
	SIGNS/ SYMPTOMS	Initial signs and symptoms include fever, eye redness, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.									
	EXPOSURE ROUTES	<p><b>Inhalation:</b> Inhalation is the primary route of exposure for Lassa. With Lassa, inhalation of tiny viral particles from rodent feces, blood, urine, saliva, etc. can serve as a route of exposure.  <b>Skin:</b> Direct contact with rodent feces, blood, urine, saliva, bites, etc. can serve as a route of exposure. Transmission can occur through contact with infected persons and their bodily fluids. Infection through cracks in skin and through conjunctiva can occur.  <b>Ingestion:</b> Exposure can occur from eating contaminated food or drinking contaminated water.  <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients and the agent itself.</p>									
Effect Levels	<p><b>Specific Effect Levels Are Unknown.</b> <i>Lethality</i> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. Arenaviridae are highly lethal. <i>Infectivity</i> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <i>infective dose</i> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. Responders should not assume that an infective dose estimate represents a safe level. For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>										
Personal Safety	CONCERNS	Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plan (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for Lassa; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.									
	MEDICAL SURVEILLANCE	<p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Ribavirin, though not FDA approved, has been used with some success; otherwise treatment is supportive.  <b>During Incident:</b> Conduct medical monitoring; use PPE as designated by the HASP; document PPE levels used; observe for fever and other signs and symptoms as listed under Health Effects, and ensure medical attention is provided as soon as possible if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided immediately.</p>									
	FIRST AID/ DECON	Contaminated PPE, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, add household bleach to water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.									
	PPE	<p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table>		PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>
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<p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, rodent control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>											
Field Detection	Since there is no field detection, Lassa is only identified once patients present with symptoms.										

## Lassa (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

Sampling for Confirmatory Results	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., elevator buttons, mail, corners of hallways, baseboards, areas of rodent nesting or tracks, light switches, door knobs) due to foot traffic or ventilation systems. The local rodent population will also need to be sampled. If point of release or aerosolization of Lassa is unconfirmed, use a statistically-based sampling method.</p> <p><b>Note:</b> These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs. More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's <i>Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan</i> TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a>.</p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state (e.g., feces, aerosol, fluid) of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (FBI or CID) to ensure chain-of-custody. Lassa samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. Lassa samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times. Be careful not to place the samples directly on chemical ice used for cooling the shipping container.</p> <p><b>Air:</b> Collect air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of Lassa may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
Laboratory Analysis	<p>Lassa is highly infectious and requires Bio-Safety Level-4 (BSL-4) precautions, virologic diagnosis, immunoassay, and viral culture which requires 3-10 days.</p>
Decontamination/Cleanup	<p><b>Decon/Cleanup Planning:</b> Virus-specific information will need to be developed prior to decontamination and cleanup.</p> <p><b>Decon Methods:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before clean up. Physical inactivation of the virus is accomplished by heating. Lassa is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®. Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Decon Methods for Natural Outbreak:</b> Look for obvious signs of rodent infestation, and remove rodents and exercise rodent control. <b><i>Under no circumstances should a vacuum cleaner or a broom be used.</i></b> Using a HEPA and Chlorine filter Air Purifying Respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After cleanup/decon mop, clean, etc. with bleach solution. Wash gloves with soap and water before removing and disposing of them.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable Lassa in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting Lassa on the surfaces and in the air.</p>
Waste Disposal	<p>Untreated waste should be appropriately labeled. Waste generated from Lassa should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the Lassa virus was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. Lassa is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: Lymphocytic Choriomeningitis Virus (LCMV)

Report any release of WMD to the National Response Center 1-800-424-8802. For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (Arenaviridae) <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 4</p> <p><b>Warning:</b> This virus is highly infectious and causes severe human disease. Responders should only risk exposure if deemed absolutely necessary by Subject Matter Experts (SMEs) and the use of Personal Protective Equipment (PPE) and infection control practices deemed adequate by SMEs are rigorously observed.</p> <p><b>Description:</b> The lymphocytic choriomeningitis virus (LCMV) is an enveloped RNA virus that is transmitted by rodents. This virus is spread through contact with urine, saliva, blood, or feces of infected hosts (e.g., rodents). Airborne transmission and contact with contaminated surfaces is also possible. If weaponized, this virus may be highly aerosolizable.</p> <p><b>Infectivity/Lethality:</b> High/High.</p> <p><b>Persistence/Stability:</b> Persistence of these organisms in the environment is not well documented. Extreme caution should be exercised.</p> <p><b>Incubation Period:</b> 8-13 days.</p> <p><b>Person-to-Person Transmission:</b> Possible by coming in contact with infected persons and bodily fluids.</p> <p><b>Treatments:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Corticosteroids; otherwise treatment is supportive.</p>									
Release Scenarios	<p><b>Air/Aerosolization:</b> Devices designed to detect aerosolized LCMV are not available. Thus, airborne releases of LCMV are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for aerosolization and effectiveness of decon.</p> <p><b>Soil/Surfaces:</b> LCMV will most likely pose a non-porous surface hazard.</p> <p><b>Water:</b> The viral particles could potentially survive for long periods of time in untreated water.</p> <p><b>Other:</b> Depending upon the threat, rodent control might be necessary.</p>									
Health Effects	ONSET	Symptoms may occur within 8-13 days.								
Health Effects	SIGNS/ SYMPTOMS	Initial signs and symptoms include fever, eye redness, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.								
Health Effects	EXPOSURE ROUTES	<p><b>Inhalation:</b> Inhalation is the primary route of exposure in the event of a bioterror attack. With LCMV, inhalation of tiny viral particles from rodent feces, blood, urine, saliva, etc. can serve as a route of exposure.</p> <p><b>Skin:</b> Direct contact with rodent feces, blood, urine, saliva, bites, etc. can serve as a route of exposure. Transmission can occur through contact with infected persons and their bodily fluids. Infection through cracks in skin and through conjunctiva can occur.</p> <p><b>Ingestion:</b> Exposure can occur from eating contaminated food or drinking contaminated water.</p> <p><b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients.</p>								
Effect Levels	<p><b>Specific Effect Levels Are Unknown.</b> <i>Lethality</i> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. <i>Arenaviridae</i> are highly lethal. <i>Infectivity</i> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <i>infective dose</i> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. Responders should not assume that an infective dose estimate represents a safe level. For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>									
Personal Safety	CONCERNS	Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plan (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for LCMV; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.								
Personal Safety	MEDICAL SURVEILLANCE	<p><b>Baseline:</b> Annual physical and respiratory function exams.</p> <p><b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Corticosteroids; otherwise treatment is supportive.</p> <p><b>During Incident:</b> Conduct medical monitoring; use PPE as designated by the HASP; document PPE levels used; observe for fever and other signs and symptoms as listed under Health Effects, and ensure medical attention is provided as soon as possible if necessary.</p> <p><b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.</p>								
Personal Safety	FIRST AID/ DECON	Contaminated PPE, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, add household bleach to water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.								
Personal Safety	PPE	<p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.aspt.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.aspt.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, rodent control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>
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Field Detection	Since there is no field detection, LCMV is only identified once patients present with symptoms									

## LCMV (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

Sampling for Confirmatory Results	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., elevator buttons, mail, corners of hallways, baseboards, areas of rodent nesting or tracks, light switches, door knobs) due to foot traffic or ventilation systems. The local rodent population will also need to be sampled. If point of release or aerosolization of LCMV is unconfirmed, use a statistically-based sampling method.</p> <p><b>Note:</b> These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs. More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's <i>Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan</i> TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a>.</p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state (e.g., feces, aerosol, fluid) of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (FBI or CID) to ensure chain-of-custody. LCMV samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. LCMV samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times. Be careful not to place the samples directly on chemical ice used for cooling the shipping container.</p> <p><b>Air:</b> Collect air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of LCMV may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
Laboratory Analysis	<p>LCMV is highly infectious and requires Bio-Safety Level-4 (BSL-4) precautions, virologic diagnosis, immunoassay, and viral culture which requires 3-10 days.</p>
Decontamination/Cleanup	<p><b>Decon/Cleanup Planning:</b> Virus-specific information will need to be developed prior to decontamination and cleanup.</p> <p><b>Decon Methods:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before clean up. Physical inactivation of the virus is accomplished by heating. LCMV is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®. Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Decon Methods for Natural Outbreak:</b> Look for obvious signs of rodent infestation, and remove rodents and exercise rodent control. <b><i>Under no circumstances should a vacuum cleaner or a broom be used.</i></b> Using a HEPA and Chlorine filter Air Purifying Respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After cleanup/decon mop, clean, etc. with bleach solution. Wash gloves with soap and water before removing and disposing of them.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable LCMV in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting LCMV on the surfaces and in the air.</p>
Waste Disposal	<p>Untreated waste should be appropriately labeled. Waste generated from LCMV should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the LCMV was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. LCMV is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: Tick-Borne Encephalitis (TBE)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response  
Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

<b>Agent Characteristics</b>	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (<i>Flaviviridae</i>) <b>Bio-Safety Level:</b> 3  <b>Description:</b> Tick-Borne Encephalitis (TBE) is a human viral infectious disease involving the central nervous system. Ticks act as both the vector and reservoir for TBE. Humans are infected with TBE through tick bites and possibly through consumption of raw milk from goats, sheep, or cows.  <b>Incubation Period:</b> the incubation period ranges from 2-28 days, with a median of 7-8 days.  <b>Person-to-Person Transmission:</b> No.  <b>Treatment:</b> Once diagnosed, supportive care only.  <b>Infectivity/Lethality:</b> Low.  <b>Infective Dose:</b> Unknown.  <b>Persistence/Stability:</b> Stable in tick vectors.</p>									
<b>Release Scenarios</b>	<p><b>Air/Aerosolization:</b> Airborne threat has not been clearly demonstrated.  <b>Soil/Surfaces:</b> Persistence and stability of TBE on surfaces is not well known.  <b>Water:</b> Not an ingestion threat in potable water.  <b>Other:</b> It may be important to de-tick farms in the event of a release of TBE. TBE would only be detected after symptoms present in patients.  <b>NOTE:</b> Keep in mind that TBE could be engineered to become more viable in the environment. As such, decisions regarding PPE, sampling, and decon should not be made without verifying if the virus was naturally-occurring or weapons-grade.</p>									
<b>Health Effects</b>	<p><b>ONSET</b></p> <p><b>SIGNS/ SYMPTOMS</b></p> <p><b>EXPOSURE ROUTES</b></p>	<p>Symptoms may occur within 7-10 days after exposure.</p> <p>Initial signs and symptoms include significant fever, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.</p> <p><b>Inhalation:</b> N/A  <b>Skin:</b> Contact with vector through tick bites  <b>Ingestion:</b> Possibly from consumption of raw milk from goats, sheep, or cows.</p>								
<b>Effect Levels</b>	Unknown.									
<b>Personal Safety</b>	<p><b>CONCERNS</b></p> <p><b>MEDICAL SURVEILLANCE</b></p> <p><b>FIRST AID/ DECON</b></p> <p><b>PPE</b></p>	<p>Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plans (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only. Care should be taken to protect from tick bites using repellent (DEET) on the outside of PPE.</p> <p>Pre-exposure: annual exams/ensure proper respiratory function. During Exposure: Wear PPE as designated by the HASP. Set up a medical monitoring plan, documenting PPE levels used, exposure incidents (did anyone get sick, etc.), antibiotics used, etc. Post exposure: Monitor responders for signs/symptoms and treat accordingly.</p> <p>Decon <i>outer</i> PPE with very dilute 0.05% bleach solution. Decon skin with warm soapy water (0.05% bleach solution may be used, but this could irritate the skin). Supportive treatment only.</p> <p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC <i>Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents</i>: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> <li>Protect from mosquito bites using DEET.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> <li>Protect from mosquito bites using DEET.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, tick control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> <li>Protect from mosquito bites using DEET.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> <li>Protect from mosquito bites using DEET.</li> </ul>
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<b>Field Detection</b>	None. Tick surveillance and monitoring.									

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<b>Sampling for Confirmatory Results</b>	It is unlikely that EPA will be performing any vector or human samples. Refer to <a href="http://www.bt.cdc.gov/labissues">www.bt.cdc.gov/labissues</a>
<b>Laboratory Analysis</b>	During the first phase of the disease, the most common laboratory abnormalities found are a low white blood cell count (leukopenia) combined with a low platelet count (thrombocytopenia). Liver enzymes in the serum may also be mildly elevated. After the onset of neurological disease during the second phase, an increase in the number of white blood cells in blood and cerebrospinal fluid (CSF) is usually found. The virus can be isolated from the blood during the first phase of the disease. However, specific diagnosis usually occurs during the second phase of the disease since it depends on detection of specific IgM antibodies in either blood or CSF. CDC Bioterrorism Preparedness and Response Program: 404-639-0385
<b>Decontamination/Cleanup</b>	<p><b>Decon/Cleanup Planning:</b> Depending on the incident, EPA might have to provide assistance or materials to decon healthcare facilities, subways, other public areas, and private homes and buildings. Additionally, tick and insect control might be necessary. Subject matter experts in this area are available at CDC and USDA/APHIS. <b>NOTE:</b> <i>Crisis exemptions for decontaminating agent used may be obtained from EPA Office of Prevention, Pesticides, and Toxic Substances.</i></p> <p><b>Decon Methods:</b> Routine decontamination procedures with biocides (e.g., rubbing alcohol; 1 part household bleach to 9 parts water) would be adequate for this agent.</p> <p><b>Decon Effectiveness:</b> Routine follow-up housekeeping procedures and precautions would be adequate for this agent.</p>
<b>Waste Disposal</b>	In general, waste generated from TBE should be chemically disinfected, autoclaved or incinerated and tested to be sure the TBE virus was killed. Store waste in sealed containers that are appropriately labeled as a Bio-Safety Level 3. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early in the process. TBE is subject to DOT regulations and the CDC's Select Agent program requirements. See <a href="http://www.cdc.gov/od/sap">www.cdc.gov/od/sap</a> .

Report any release of WMD to the National Response Center 1-800-424-8802.

# NRT Quick Reference Guide: Venezuelan Hemorrhagic Fever (VzHF)

Report any release of WMD to the National Response Center 1-800-424-8802.  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (Arenaviridae) <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 4  <b>Warning:</b> This virus is highly infectious and causes severe human disease. Responders should only risk exposure if deemed absolutely necessary by Subject Matter Experts (SMEs) and the use of Personal Protective Equipment (PPE) and infection control practices deemed adequate by SMEs are rigorously observed.  <b>Description:</b> The Juanarito virus, the causative agent of VzHF, is an enveloped RNA virus that is transmitted by rodents. This virus is spread through contact with urine, saliva, blood, or feces of infected hosts (e.g., rodents). Airborne transmission and contact with contaminated surfaces is also possible. If weaponized, this virus may be highly aerosolizable.  <b>Infectivity/Lethality:</b> High/High.  <b>Persistence/Stability:</b> Persistence of these organisms in the environment is not well documented. Extreme caution should be exercised.  <b>Incubation Period:</b> 7-16 days.  <b>Person-to-Person Transmission:</b> Possible by coming in contact with infected persons and bodily fluids.  <b>Treatments:</b> Quarantine of infected individuals is needed to protect caregivers and other patients; otherwise treatment is supportive.</p>									
Release Scenarios	<p><b>Air/Aerosolization:</b> Devices designed to detect aerosolized VzHF are not available. Thus, airborne releases of VzHF are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for aerosolization and effectiveness of decon.  <b>Soil/Surfaces:</b> VzHF will most likely pose a surface hazard.  <b>Water:</b> The viral particles could potentially survive for long periods of time in untreated water.  <b>Other:</b> Depending upon the threat, rodent control might be necessary.</p>									
Health Effects	ONSET	Symptoms may occur within 7-16 days.								
	SIGNS/ SYMPTOMS	Initial signs and symptoms include fever, eye redness, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.								
	EXPOSURE ROUTES	<p><b>Inhalation:</b> Inhalation is the primary route of exposure in the event of a bioterror attack. With VzHF, inhalation of tiny viral particles from rodent feces, blood, urine, saliva, etc. can serve as a route of exposure.  <b>Skin:</b> Direct contact with rodent feces, blood, urine, saliva, bites, etc. can serve as a route of exposure. Transmission can occur through contact with infected persons and their bodily fluids. Infection through cracks in skin and through conjunctiva can occur.  <b>Ingestion:</b> Exposure can occur from eating contaminated food or drinking contaminated water.  <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients.</p>								
Effect Levels	<p><b>Specific Effect Levels Are Unknown.</b> <i>Lethality</i> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. <i>Arenaviridae</i> are highly lethal. <i>Infectivity</i> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <i>infective dose</i> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. Responders should not assume that an infective dose estimate represents a safe level. For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>									
Personal Safety	CONCERNS	Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plan (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for VzHF; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.								
	MEDICAL SURVEILLANCE	<p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients; otherwise treatment is supportive.  <b>During Incident:</b> Conduct medical monitoring; use PPE as designated by the HASP; document PPE levels used; observe for fever and other signs and symptoms as listed under Health Effects, and ensure medical attention is provided as soon as possible if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.</p>								
	FIRST AID/ DECON	Contaminated PPE, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, add household bleach to water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.								
	PPE	<p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.aspx">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.aspx</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, rodent control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>
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Field Detection	Since there is no field detection, VzHF is only identified once patients present with symptoms.									

## VzHF (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

Sampling for Confirmatory Results	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., elevator buttons, mail, corners of hallways, baseboards, areas of rodent nesting or tracks, light switches, door knobs) due to foot traffic or ventilation systems. The local rodent population will also need to be sampled. If point of release or aerosolization of VzHF is unconfirmed, use a statistically-based sampling method.</p> <p><b>Note: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs.</b> More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's <i>Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan</i> TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a>.</p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state (e.g., feces, aerosol, fluid) of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (FBI or CID) to ensure chain-of-custody. VzHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. VzHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times. Be careful not to place the samples directly on chemical ice used for cooling the shipping container.</p> <p><b>Air:</b> Collect air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of VzHF may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
Laboratory Analysis	<p>VzHF is highly infectious and requires Bio-Safety Level-4 (BSL-4) precautions, virologic diagnosis, immunoassay, and viral culture which requires 3-10 days.</p>
Decontamination/Cleanup	<p><b>Decon/Cleanup Planning:</b> Virus-specific information will need to be developed prior to decontamination and cleanup.</p> <p><b>Decon Methods:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before clean up. Physical inactivation of the virus is accomplished by heating. VzHF is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®. Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Decon Methods for Natural Outbreak:</b> Look for obvious signs of rodent infestation, and remove rodents and exercise rodent control. <b><i>Under no circumstances should a vacuum cleaner or a broom be used.</i></b> Using a HEPA and Chlorine filter Air Purifying Respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After cleanup/decon mop, clean, etc. with bleach solution. Wash gloves with soap and water before removing and disposing of them.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable VzHF in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting VzHF on the surfaces and in the air.</p>
Waste Disposal	<p>Untreated waste should be appropriately labeled. Waste generated from VzHF should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the VzHF virus was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. VzHF is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: Smallpox

<b>Agent Characteristics</b>	<b>Agent Classification:</b> Biological <span style="float: right;"><b>Type:</b> Orthopox Virus (<i>Variola Major</i>)</span> <b>Description:</b> Brick-shaped double-stranded DNA virus. There are four categories of smallpox disease: <b>1)</b> Ordinary-type which accounts for > 90% of cases and has a mortality rate of 10-30%; <b>2)</b> Flat-type (malignant) which accounts for 2-5% of cases and has a mortality rate of >70-96%; <b>3)</b> Hemorrhagic-type smallpox which accounts for <3% of cases and has a mortality rate of >98%; and <b>4)</b> Modified-type smallpox which occurs most often in previously vaccinated persons and is manifested by fewer lesions and an accelerated clinical course as compared to Ordinary-type smallpox. It is almost never fatal.	
	<b>Incubation Period:</b> 7-19 days <b>Duration of Illness:</b> 1-3 weeks <b>Person-to-Person Transmission:</b> Yes (30% transmissibility) <b>Mortality Rate:</b> 30% (Ordinary)	<b>Infectivity/Lethality:</b> High/Moderate <b>Infective Dose:</b> Unknown, probably 10-100 organisms <b>Persistence/Stability:</b> <u>Outdoor release:</u> inactive in approximately 2 days; <u>Indoor release:</u> active for periods up to 2 weeks. Heating and humidity makes less stable.
<b>Release Scenarios</b>	<b>Air/Aerosolization:</b> Smallpox can be aerosolized for a bioterror event and can be released in aerosol form in an indoor or outdoor environment. Infected persons can transmit the virus to others. The most frequent mode of transmission is direct person-to-person contact via direct deposit of infective droplets from coughing and close face-to-face contact. Smallpox is less likely to spread as an aerosol through indirect contact. If smallpox is released into the outdoor air and not caught by BioWatch at its initial release, smallpox will only be identified once patients present with symptoms. In an outdoor release, smallpox virus typically will be fully inactive within 2 days. In an indoor release, smallpox may be more problematic because smallpox can persist for up to two weeks on surfaces. <b>Soil/Surfaces:</b> Stability of smallpox is weakened with heating/humidity. In an outdoor release, naturally-occurring smallpox virus should be inactive within two days. In an indoor release smallpox can persist for up to 2 weeks on clothing and certain surfaces. <b>Water:</b> Unknown potential for contamination of food items and water. <b>Note:</b> Smallpox can be engineered to become more viable in the environment. As such, decisions regarding PPE, sampling, and decon should not be made without verifying if smallpox was naturally-occurring or weapons-grade.	
	<b>Onset</b> Symptoms occur within 7-19 days after exposure.	
<b>Health Effects</b>	<b>Signs/Symptoms</b> High fever, malaise, aching pains, headaches, and a rash that develops in the mouth and throat. The rash then covers the body and produces raised bumps. These bumps become pustules that are raised, round, and firm. The pustules form a crust and then a scab. Scabs fall off and leave scars. Patients are most infectious first week after appearance of rash (in mouth/throat) and not contagious when all scabs have fallen off. <a href="http://www.bt.cdc.gov/agent/smallpox/diagnosis/riskalgorithm/index.asp">http://www.bt.cdc.gov/agent/smallpox/diagnosis/riskalgorithm/index.asp</a>	
	<b>Exposure Routes</b> <b>Inhalation:</b> While the most frequent mode of transmission is direct person-to-person contact via direct deposit of infective droplets into the nose, mouth, throat, mucosal membranes or lungs through coughing and close contact, airborne transmission has been documented. <b>Skin:</b> Can become infected from contact with contaminated clothing and bodily fluids. <b>Ingestion/Eyes:</b> Keratitis (inflammation of the cornea) is associated with smallpox.	
<b>Effect Levels</b>	<b>Lethality</b> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. Smallpox is highly lethal. <b>Infectivity</b> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <b>infective dose</b> is the number of organisms required to cause disease in an exposed person. Smallpox has a high infectivity. <b>Note:</b> Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. OSCs should not assume that an infective dose estimate represents a safe level. Fifty percent of people exposed to 10 to 100 organisms may become infected with smallpox; many of those infected (about 30%) will die if untreated.	
<b>Health and Safety</b>	<b>Concerns</b> Under ICS, check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Safety Plans. The PPE levels listed below are general suggestion only and are appropriate only for smallpox; they do not provide protection for the other chemicals that workers may be exposed to during response/recovery operations. For more info on PPE and health and safety decision-making, please see <a href="http://www.ert.org/products/Smallpox1.pdf">http://www.ert.org/products/Smallpox1.pdf</a> , The OSHA/NIOSH interim CBRN guidance document, EPA's Respiratory Protection Program Draft. January 2005, or EPA's Medical Surveillance Program Implementation Plan Draft. January 2005. EPA documents available on <a href="http://www.epaossc.org/qrg">www.epaossc.org/qrg</a> . Responders should be trained to Hazardous Waste and Emergency Operations (HAZWOPER) standards and attend an on-site training briefing. Responder training shall meet the requirements specified in 29 CFR 1910.120 (q) (6).	
	<b>Medical Surveillance</b> <b>Pre-Exposure:</b> Annual exams/ensure proper respiratory function; ideally, responders would be vaccinated against smallpox. <b>During Exposure:</b> Vaccinate immediately. Wear PPE as designated by the Health and Safety Plan. Set up a medical monitoring plan documenting PPE levels used, exposure incidents, apparent infections, medications used, etc. <b>Post Exposure:</b> Monitor responders for signs/symptoms and treat accordingly.	
	<b>First Aid/Decon</b> Decon outer PPE with 0.05% bleach solution. Decon skin with warm soapy water (0.05% bleach solution may irritate skin) for 10-15 minutes. A decon shower is recommended as the final step in personal decontamination. Vaccinations are effective within three days of exposure. <i>With respect to specifics (e.g., value of mechanical scrubbing, contact time of decon solution, and need to rinse completely) OSCs should check with the EPA National Decon Team Subject Matter Experts at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</i>	
	<b>PPE</b> <b>Response to an uncontrolled incident involving the release of smallpox:</b> dermal – hooded, protective coverall for hazardous particulate (Tyvek® or equivalent), inner and outer disposable gloves, and boots; respiratory protection – NIOSH-approved, CBRN, positive-pressure self-contained breathing apparatus (SCBA). <b>Response to a controlled incident when release has stopped:</b> dermal – same protection; respiratory protection – NIOSH-approved, Powered Air-Purifying Respirator (PAPR) that provides a protection factor of 1000 (e.g., tight-fitting full-faced PAPR; OSHA recently proposed an assigned protection factor of 1,000 for certain designs of hood/helmet-style PAPRs) that is CBRN-approved, when available, and fitted with P100 filters. <b>Medical Responders decontaminating incoming victims at the site or hospital:</b> Same as response to controlled incident.	
<b>Field Detection</b>	The BioWatch Program helps detect aerosol releases of bioagents. In the absence of release detection, smallpox is only identified once patients present with symptoms. Certain buildings may have Autonomous Detection Systems (ADS) that continually test for bioagents (e.g., anthrax) using air samples and PCR.	
<b>Sampling</b>	<b>Sampling Location Plans:</b> Start with an area thought to be free of contamination and work in concentric circles towards and away from the initial point of contamination. Be concerned about other contaminated areas due to foot traffic/ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc.). If point of release or aerosolization is unconfirmed use a statistically-based sampling method. <b>Note:</b> These are general guidelines and do not replace need for a site specific sampling plan that should be reviewed and approved by appropriate SMEs and/or through ICS channels. More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA and TetraTech "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plans" TDD: S05-0302-004 and "Sampling Requirements for Chemical and Biological Agent Decontamination Efficacy," (LLNL, March 2001).	
	<b>Concerns:</b> Different detection/analytical equipment and sampling techniques will be highly site-specific and depend on: <b>1)</b> the characteristics of the terrorist agents; <b>2)</b> the type of contaminated surfaces (e.g., porous v. nonporous); <b>3)</b> the phases/purposes of sampling (initial identification v. post-decon surface sampling); and <b>4)</b> The sampling procedures of the analytical laboratory. <b>Note:</b> Before obtaining samples clearly identify and coordinate with laboratory to (over)	

## NRT Quick Reference Guide: Smallpox (cont'd)

<b>Sampling</b>	<p><b>Concerns (cont'd)</b> be used, as not all laboratories can handle all types of media. Basic Ordering Agreements (BOAs) for laboratory sampling analysis have been established with contract labs. Contact EPA ERT for details; coordinate with investigative units (EPA CID/FBI); ensure plan for appropriate chain-of-custody.</p> <p><b>In the case of Smallpox</b>, environmental sampling may be used for forensic analysis and to verify that decon efforts were successful (lengthy persistence of infectious materials in the environment would not be anticipated if smallpox were naturally-occurring). Swab and wipe sampling and air monitors should be used.</p> <p><b>Types of Samples:</b> <b>1) Wipe Samples:</b> Synthetic, non-cotton (Dacron/rayon) wipes pre-moistened with a nutrient solution, buffer solution, or deionized (DI) water. Good for small sample areas of nonporous surfaces. Coordinate methods and buffer solutions with designated Laboratory Response Network (LRN) laboratory. <b>2) Swab Samples:</b> Synthetic, moistened, cotton sterile or macrofoam swab moistened with buffer solution (PBST) or DI. Most useful for hard to reach nonporous surfaces. Rayon and polyester swabs are not as efficient as cotton/macrofoam swabs in spore recovery. Do not use dry swabs. <b>3) HEPA Vacuum Sampling:</b> Collect samples in a HEPA sock designed to fit into an inlet nozzle of a vacuum cleaner. Good for screening and determining the extent and location of contamination in large areas. Used on both porous and nonporous surfaces. For example sampling method see: <a href="http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp">http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp</a>. <b>4) Air:</b> Collect routine air sample with gel filter, petri dishes and/or impactors. <b>5) Water:</b> Collect at least 100mL. <b>6) Chip/bulk samples:</b> Collect actual pieces of contaminated surface for extraction analysis.</p> <p><b>Sample packaging and shipping:</b> Packaging and transporting samples are subject to various regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult with the analytical laboratory receiving the samples to determine additional packaging or shipping requirements. Details can be found at <a href="http://www.cdc.gov/od/ohs/biosfty/shipregs.htm">www.cdc.gov/od/ohs/biosfty/shipregs.htm</a> or <a href="http://www.cdc.gov/od/sap/">http://www.cdc.gov/od/sap/</a> or <a href="http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf">http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf</a></p>
<b>Laboratory Analysis - BSL-3</b>	<p><b>Laboratory Information:</b> Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support contact Battelle Security 24-hour control center at: 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for Analytical Lab Support During a WMD response; for access, please contact the ERT 24-hour number: 732-321-6660</p> <p><b>CDC Laboratory Response Network Labs</b>          CDC Bioterrorism Preparedness and Response Program: 404-639-0385.  <a href="http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp">http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp</a></p> <p><b>Electron Microscopy:</b> specimens taken from pustular fluid and scabs are examined under the microscope and identified according to the size, shape, and characteristics of the virion. This procedure may not distinguish cowpox and monkeypox from smallpox.</p> <p><b>Culturing:</b> To distinguish monkeypox from smallpox, the virus is grown in cell culture or on a chorioallantoic egg membrane for biologic assays.</p> <p><b>Restriction Fragment Length Polymorphisms:</b> RFLP analyzes a heritable difference in DNA fragment length and fragment number; used to identify strains by their characteristic fragment size and length pattern.</p> <p><b>Polymerase Chain Reaction (PCR):</b> Uses samples directly obtained from environment and grown from culture; amplifies DNA and compares the sequences to standard sequences of smallpox.</p>
<b>Decon</b>	<p><b>Decon Planning:</b> Site specific decon/cleanup plans should be developed and approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account: <b>1)</b> the nature of contamination including purity, chemical/physical properties, how it entered the facility, etc.; <b>2)</b> the extent of contamination including the amount and possible pathways that have or could have spread the agent (it is advisable to isolate the contaminated area); and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment, removal, and packaging of other items such as clothing and bedding for decon and disposal. Depending on the incident, EPA may provide assistance or materials to decon healthcare facilities, subways and other public areas, and private homes and buildings. Although smallpox is believed to be inactivated 2 days after outdoor release, indoor release is considerably more problematic as the active virus can persist for two weeks. Due to public concern and perception, it may be necessary to implement the most conservative decon approach.</p> <p><b>Note:</b> Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontaminating agents used.</p> <p><b>Decon Methods:</b> <i>OSCs should check with the EPA National Decon Team Subject Matter Experts regarding specific decontamination parameters, as well as specifics on the use of readily available commercial items such as standard bleach, at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</i> <b>Methods used on surfaces:</b> Surfaces that can spread disease by fomite contact (i.e., contact with inanimate objects found in patient rooms, ambulance cars, etc.) should be cleaned and subjected to low-to intermediate-level disinfection with EPA-registered chemical germicides according to label instructions (e.g., hypochlorite for at least 10 minutes). Sodium hypochlorite is the standard used for clean-up; however, the following chemicals can be used if sodium hypochlorite is not decontaminating properly: 40% ethyl alcohol, 30% isopropyl alcohol, 100ppm benzalkonium chloride, 0.12% ortho-phenylphenol and 75ppm iodophor. Also, use a vacuum cleaner equipped with a HEPA filter for cleaning carpeted floors or upholstered furniture. Full vacuum cleaner bags can be placed in another closable container and discarded as a routine solid waste. <b>Heat:</b> The smallpox virus can be destroyed within 6 hours under conditions where there is a high temperature (31°-33°C) and high humidity (80%). The presence of UV light expedites viral demise. <b>Fumigation:</b> Not indicated for environmental control of smallpox because there is no evidence to support air space decontamination of rooms, facilities, or vehicles. <b>Reusable Equipment:</b> The surfaces of reusable medical equipment should be cleaned and then subjected to either low or intermediate-level disinfections with hypochlorite and quaternary ammonia, with surface contact of at least 10 minutes. Medical instruments should be sterilized or subjected to high-level disinfection depending on their intended use per the Spaulding Classification. See Smallpox Response Plan, March 20, 2003, Guide D and F. <b>Textiles/Bedding:</b> Textiles and fabrics from patients and their immediate contacts should be handled with minimum agitation to avoid contamination of air, surfaces, and persons. Textiles and clothing should be bagged or contained at the point of use in accordance with OSHA regulation and should not be sorted prior to laundering. Wet textiles should be bagged first and then placed in leak-proof containers. Reusable fabric laundry bags commonly used for laundry transport can be laundered along with clothing and other fabrics. The use of water-soluble bags minimizes contact before washing. If laundry is transported to an off-site facility, the procedures used for transporting and safe handling of contaminated textiles off-site will be adequate for these situations. Laundry should be labeled in such a way that laundry staff should be prompted to wear appropriate PPE and handle potentially contaminated laundry with minimum agitation. The laundry area in healthcare facilities should be set at negative air pressure as per normal operating standards, and be physically separate from the areas where clean laundry is dried, folded, and packed for transport and distribution. Textiles and fabrics believed to be contaminated can be laundered using routine protocols for healthcare facilities such as 160°F washing with detergent and bleach, and hot air-drying. Chlorine bleach use during hot-water washing provides an additional safety measure. Laundry can also be autoclaved for proper decon.</p> <p><b>Note:</b> for more info on decon, please see: <a href="http://www.ert.org/products/Smallpox1.pdf">http://www.ert.org/products/Smallpox1.pdf</a></p> <p><b>Decon Effectiveness:</b> <b>Process Verification sampling:</b> Decon is considered successful if post-decon sampling shows no evidence of smallpox. Samples (air/surface) should be taken in previously contaminated areas. Biological indicators should be used to verify whether conditions necessary to destroy the virus have been achieved. <b>Cleanup Adequacy Verification:</b> This type of sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present (use aggressive and grid sampling).</p>
<b>Waste/Disposal</b>	<p>All currently approved methods of medical waste decontamination can be expected to inactivate poxviruses. Waste generated from the cleanup generally will be regulated as medical waste; however, in some states and localities, waste management will vary. For instance, smallpox waste may be considered municipal waste, medical waste, or infectious substances with special requirements for handling and disposal depending on the state. Contact the state or local regulatory agency to determine waste classification and ensure proper waste management. Smallpox is subject to DOT regulations and the CDC's Select Agent program requirements. See <a href="http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf">http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf</a>. Wastewaters from contaminated sites should be pre-treated prior to disposal in accordance with medical waste regulations of the state or locality.</p>

# NRT Quick Reference Guide: Anthrax

<b>Agent Characteristics</b>	<b>Agent Classification:</b> Biological <span style="float: right;"><b>Type:</b> Bacteria (<i>Bacillus anthracis</i>), many strains</span>	
	<b>Description:</b> Naturally-occurring, rod-shaped Gram-positive, sporulating microorganism. Most commonly occurs in wild and domestic animals (e.g., cattle and antelopes). Can occur in humans when exposed to infected animals or infected animal tissue (cutaneous anthrax), or when exposed to aerosolized anthrax spores (inhalation anthrax).	
<b>Release Scenarios</b>	<b>Incubation Period:</b> 1-7 days, up to 60+ days <b>Duration of Illness:</b> 3-5 Days <b>Person-to-Person Transmission:</b> No	<b>Infectivity/Lethality:</b> Moderate/High <b>Infective Dose: LD50:</b> 8000-50,000 spores (estimated) <b>Persistence/Stability:</b> Spores Highly Persistent/Stable; >40 years in soil.
	<b>Air/Aerosolization:</b> In a bioterror event, anthrax will most likely be aerosolized in the form of a white powder. Powders of <i>B. anthracis</i> with characteristics such as high spore concentration, uniform particle size, low electrostatic charge, etc. are considered “weapons-grade.” In an aerosol release of anthrax, re-aerosolization is a consideration depending upon the size, purity, and chemical and physical properties of the manufactured anthrax. An aerosol release of anthrax will most likely occur indoors, though an outdoor release of anthrax is possible. An anthrax aerosol release would have the potential to travel many km before dissipating. Most recently, anthrax has been used to contaminate postal facilities by mailing letters containing anthrax powder. <b>Soil/Surfaces:</b> Spores are resistant to adverse environmental conditions and may remain viable for years in soil or in dried or processed hides of animals. Anthrax spores may remain viable in soil for 40+ years, which is a threat to the animal population. Anthrax spore viability on certain surfaces is not well-known, but it does grow readily on laboratory media. <b>Water:</b> Anthrax is a probable water threat. <b>Other:</b> Anthrax is naturally occurring and can cause disease in humans through contact with contaminated animals or products; this includes eating contaminated meat products.	
<b>Health Effects</b>	<b>Onset</b>	Symptoms may occur within 1-7 days and up to 60 days after an inhalation exposure.
	<b>Signs/Symptoms</b>	<b>Inhalation anthrax:</b> Fever, malaise, fatigue, cough, chest discomfort, stridor (noisy breathing), respiratory distress, dyspnea (shortness of breath), and cyanosis (bluish discoloration of the skin). <b>Cutaneous anthrax:</b> Raised itchy bump to vesicle which progresses to painless ulcer (1-3cm) with black area in the center. Swollen lymph nodes and flu-like symptoms. <b>Ingested anthrax:</b> Flu-like symptoms, nausea, loss of appetite, vomiting, fever, abdominal pain, and severe diarrhea.
	<b>Exposure Routes</b>	<b>Inhalation anthrax:</b> Inhalation anthrax occurs when bacterial spores are inhaled, and may be fatal without treatment. No naturally-occurring cases in US since 1976. <b>Cutaneous anthrax:</b> Most common manifestation of naturally occurring anthrax; 95% of skin infections occur when bacteria enters a cut on the skin upon handling contaminated objects; 20% of untreated cases are fatal. <b>Ingestion:</b> Least common manifestation of naturally occurring anthrax; caused by consumption of poorly cooked contaminated meat. Intestinal anthrax has two forms: upper and lower gastrointestinal tract infections, and a high rate of mortality.
<b>Effect Levels</b>	Lethality reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. Anthrax is highly lethal. <b>Infectivity</b> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <b>infective dose</b> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. <b>Responders should not assume that an infective dose estimate represents a safe level.</b> For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. “Lethal Dose 50%”). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Fifty percent of the people exposed to 8,000 to 50,000 spores may become infected with anthrax; if untreated anthrax can be lethal to 95% of those infected.	
<b>Health and Safety</b>	<b>Concerns</b>	Under ICS, check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Safety Plans. The PPE levels listed below are general suggestions only and are appropriate only for anthrax; they do not provide protection for the other chemicals that workers may be exposed to during response/recovery operations. For more info on PPE and health and safety decision-making, please see <a href="http://www.ert.org/products/Anthrax.pdf">http://www.ert.org/products/Anthrax.pdf</a> , the OSHA/NIOSH interim CBRN guidance document, the NRT Anthrax TAD: <a href="http://www.nrt.org">www.nrt.org</a> , the EPA’s Respiratory Protection Program Draft January 2005 or the EPA’s Medical Surveillance Program Implementation Plan Draft January 2005. EPA documents are available at <a href="http://www.epaosc.org/arg">www.epaosc.org/arg</a> . Responders should be trained to Hazardous Waste and Emergency Operations (HAZWOPER) standards and attend an on-site training briefing. Responder training shall meet the requirements specified in 29 CFR 1910.120 (q) (6).
	<b>Medical Surveillance</b>	<b>Pre-Exposure:</b> Annual exams to ensure proper respiratory function; ideally, responders are vaccinated against anthrax. <b>During Exposure:</b> Wear PPE as designated by the Health and Safety plan. Treat any accidental exposures with the antibiotics Ciprofloxacin and/or Doxycycline. Set up a medical monitoring plan, documenting PPE levels used, exposure incidents and outcome, antibiotics used, etc. <b>Post Exposure:</b> Monitor responders for signs/symptoms and treat accordingly.
	<b>First Aid/Decon</b>	Decon outer PPE with very dilute 0.05% bleach solution. Decon skin with warm soapy water (0.05% bleach solution may irritate skin) for 10-15 minutes. Antibiotic available and effective (Ciprofloxacin, Doxycycline). Vaccine is effective. <i>With respect to specifics (e.g., value of mechanical scrubbing, contact time of decon solution, and need to rinse completely) OSCs should check with the EPA National Decon Team Subject Matter Experts at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</i>
	<b>PPE</b>	<b>Response to an uncontrolled incident involving the release of anthrax spores:</b> dermal – hooded, protective coverall for hazardous particulate (Tyvek® or equivalent), inner and outer disposable gloves, and boots; respiratory protection – NIOSH-approved, CBRN, positive-pressure self-contained breathing apparatus (SCBA). <b>Response to a controlled incident when release has stopped:</b> dermal – same protection; respiratory protection – NIOSH-approved, Powered Air-Purifying Respirator (PAPR) that provides a protection factor of 1000 (e.g., tight-fitting full-faced PAPR; OSHA recently proposed an assigned protection factor of 1,000 for certain designs of hood/helmet-style PAPRs) that is CBRN-approved, when available, and fitted with P100 filters. <b>Medical Responders decontaminating incoming victims at the site or hospital:</b> Same as response to controlled incident.
<b>Field Detection</b>	The BioWatch Program helps detect aerosol releases of bioagents. Certain buildings, such as postal facilities may have autonomous detection systems (ADS) that continually test for anthrax using air samples and PCR. <b>Immunoassay Tests (smart tickets):</b> These assays are intended for rapid detection of anthrax and for screening environmental samples. Each ticket employs patented immuno-chemistry tests for specific biological agents. Features rapid identification, minimum operator training and sample preparation, response time in 5-15 minutes. <b>Note:</b> Immunoassay tests should not be used alone, but should be confirmed with samples analyzed by culturing at LRN lab.	
<b>Sampling</b>	<b>Sampling Location Plans:</b> If release was limited to a letter or container, start with an area thought to be free of contamination and work in concentric circles towards or away from the initial point of contamination. Be concerned about other contaminated areas due to foot traffic/ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc). If point of release or aerosolization is unconfirmed, then use a statistically-based sampling method. Note: These are general guidelines and do not replace need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs and/or through ICS channels. <i>More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA and (over)</i>	

## NRT Quick Reference Guide: Anthrax (cont'd)

<b>Sampling</b>	<p><b>Sampling Location Plans (cont'd)</b> TetraTech "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plans" TDD: S05-0302-004. See also NRT Anthrax TAD for method comparisons at: <a href="http://www.nrt.org/Production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A47AnthraxTAD/\$File/Anthrax%20TAD%20citable%209_17_04.pdf?OpenElement04.pdf?OpenElement">http://www.nrt.org/Production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A47AnthraxTAD/\$File/Anthrax%20TAD%20citable%209_17_04.pdf?OpenElement04.pdf?OpenElement</a></p> <p><b>Concerns:</b> Different detection/analytical equipment and sampling techniques will be highly site-specific and depend on: <b>1)</b> the characteristics of the terrorist agents; <b>2)</b> the type of contaminated surfaces (e.g., porous v. nonporous); <b>3)</b> the phases/purposes of sampling (initial identification v. post-decon surface sampling); and <b>4)</b> the sampling procedures of the analytical laboratory. <b>Note:</b> Before obtaining samples clearly identify and coordinate with laboratory to be used, as not all laboratories can handle all types of media. Basic Ordering Agreements (BOAs) for laboratory sampling analysis have been established with contract labs. Contact EPA ERT for details; coordinate with investigative units (EPA CID/FBI); ensure plan for appropriate chain-of-custody.</p>
	<p><b>Samples that test for re-aerosolization:</b> <b>1)</b> Wipe sampling of the air duct system (filters, areas of particulate deposition) if exposure occurred indoors. <b>2)</b> Sheep blood agar plates determine the presence of bacterial growth. <b>3)</b> Andersen Air Sampler &amp; Single Stage Impactors with settle plates capture airborne particulates on a series of agar plates based on their aerodynamic properties. <b>4)</b> Dry filter units (DFUs) are the most direct indicator of airborne anthrax spores. Check for the presence/install DFUs.</p> <p><b>Samples that can test Decon efficacy:</b> <b>1) Wipe Samples:</b> Synthetic, non-cotton (Dacron/rayon) wipes pre-moistened with a nutrient solution, buffer solution, or sterile water. Good for small sample areas of nonporous surfaces. Coordinate methods and buffer solutions with designated Laboratory Response Network (LRN) laboratory. <b>2) Swab Samples:</b> Synthetic, moistened, cotton sterile or macrofoam swab moistened with buffer solution (PBST) or sterile water. Most useful for hard to reach nonporous surfaces. CDC study shows that rayon &amp; polyester swabs are not as efficient as cotton/macrofoam swabs in spore recovery. Do not use dry swabs. <b>3) HEPA Vacuum Sampling:</b> collect samples in a HEPA sock designed to fit into an inlet nozzle of a vacuum cleaner. Good for screening and determining the extent and location of contamination in large areas. Used on both porous and nonporous surfaces. For sampling method please see: <a href="http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp">http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp</a></p>
	<p><b>Sample packaging and shipping:</b> Packaging and transporting anthrax samples are subject to various regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult and coordinate with analytical laboratory receiving the samples to determine packaging or shipping requirements. Details can be found at <a href="http://www.cdc.gov/od/ohs/biosfty/shipregs.htm">www.cdc.gov/od/ohs/biosfty/shipregs.htm</a> or <a href="http://www.cdc.gov/od/sap/">http://www.cdc.gov/od/sap/</a> or <a href="http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/000001202/ProtocolPackShip.pdf">http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/000001202/ProtocolPackShip.pdf</a></p>
<b>Laboratory Analysis - BSL-3</b>	<p><b>Laboratory Information:</b> Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support contact Battelle Security 24-hour control center at: 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for Analytical Lab Support During a WMD response; for access, please contact the EPA ERT 24-hour number: 732-321-6660</p> <p><b>CDC Laboratory Response Network Labs:</b> CDC Bioterrorism Preparedness and Response Program: 404-639-0385 <a href="http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp">http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp</a></p>
	<p><b>Culturing:</b> The sample is prepared for elution and plating, and inoculated onto sheep blood agar plates at LRN labs. The plates are incubated at 37°C for up to three days and examined for growth of possible anthrax colonies. Positive results with other assays such as PCR need to be confirmed with bacterial culturing.</p> <p><b>Polymerase Chain Reaction (PCR):</b> Amplifies DNA sequences and compares them to standard gene sequences for anthrax. PCR is a screening method that should not be used alone. It is useful for analyzing initial samples at sites with suspected contamination. Positive results should be confirmed with bacterial culturing. Field PCR systems are very selective, but do not work well with heterogeneous environmental samples (e.g., dust, soil). PCR has been shown to work best as a final confirmation of positive samples taken from plated colonies.</p>
<b>Decontamination</b>	<p><b>Decon Planning:</b> Site specific decon/cleanup plan should be developed and approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account: <b>1)</b> The nature of contamination including purity, spore size, chemical/physical properties, how it entered the facility, etc.; <b>2)</b> The extent of contamination including the amount and possible pathways that have or could have spread anthrax spores. It is advisable to isolate the contaminated area; and <b>3)</b> The objectives of decon, including decon of critical items for re-use and the treatment, removal, or packaging of other items for disposal. <b>Note:</b> Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontaminating agents used.</p>
	<p><b>Decon Methods:</b> OSCs should check with the EPA National Decon Team Subject Matter Experts regarding specific decontamination parameters, as well as specifics on the use of readily available commercial items such as standard bleach, at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</p> <p><b>Methods used on surfaces:</b> <b>1)</b> Source reduction steps, including HEPA vacuuming; <b>2)</b> Liquid Antimicrobial products such as bleach (sodium hypochlorite) to inactivate spores on hard non-porous surfaces. These products affect surfaces differently in terms of corrosiveness, staining, and residue. Mixing direction, application methods, and contact time should be followed precisely. Available Methods: sodium hypochlorite, aqueous chlorine dioxide, hydrogen peroxide/ peroxyacetic acid. <b>Note:</b> See bleach/vinegar procedure in Ricin TAD at <a href="http://www.ert.org">www.ert.org</a>.</p>
	<p><b>Fumigation:</b> Uses gas or vapor to decontaminate facilities in which there is evidence of aerosolization of spores (e.g., cases of inhalational anthrax). The history of usage of the agents as fumigants, materials compatibility, penetration capacity, method of removal at the end of fumigation, as well as their physical, chemical, and toxicological properties should be taken into account. Available Methods: chlorine dioxide, hydrogen peroxide, and paraformaldehyde. Each chemical has a specified range for the process variables (namely, temperature, relative humidity, concentration, and contact time) that must be followed.</p> <p><b>Other Decon:</b> <b>1)</b> Ethylene oxide sterilization is used to decontaminate items in an off-site sterilization chamber. <b>2)</b> Irradiation uses cobalt-60 and electron beam technologies to destroy anthrax in mail, and other paper goods at off-site locations. This procedure may destroy magnetic media. Irradiation and chemical sterilization may be useful in decontaminating items that are intended to be returned to owners. See NRT Anthrax Appendix C for facts comparisons. <a href="http://www.nrt.org/Production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A47AnthraxTAD/\$File/Anthrax%20TAD%20citable%209_17_04.pdf?OpenElement">http://www.nrt.org/Production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A47AnthraxTAD/\$File/Anthrax%20TAD%20citable%209_17_04.pdf?OpenElement</a> <i>The Brentwood, Trenton, and Capitol Hill remediation teams used Chloride Dioxide liquid and fumigation to decontaminate the site (ClO<sub>2</sub> at 750ppmv for 12 hours at a minimum of 75°F and 75% relative humidity). <b>Note:</b> for more info, please see <a href="http://www.ert.org/products/Anthrax.pdf">http://www.ert.org/products/Anthrax.pdf</a></i></p> <p><b>Decon Effectiveness:</b> Multi-agency, multi-disciplinary experts should be consulted for advice in developing a post-decon sampling strategy and establishing criteria for verifying decon effectiveness. Expert input is especially important if contamination is extensive. Rigorous environmental sampling should be done after decontamination and samples should be cultured in the lab. Targeted sampling should be done in areas known to be contaminated prior to decon as well as statistically relevant sampling in the decontaminated area. Vigorous air sampling after decon may also be appropriate if spores are likely to re-aerosolize. If fumigation is to be done, use of biological indicators in hard-to-reach areas may provide assurance that the fumigant adequately penetrated all of the contaminated areas.</p> <p><b>Clean-up Adequacy Verification:</b> There is currently no scientifically sound basis for determining a "safe" number of residual viable spores in a decontaminated area. For areas to be re-occupied or used by the general public EPA recommends that decontamination be continued until there is no growth of <i>B. anthracis</i> found on post-decon samples. Viable spores may remain, but that the risk of contracting anthrax in that area would be extremely low. In workplace situations, OSHA offers alternative criteria to the "no growth" decon goal, especially where PPE, special work practices, and engineering controls can be used to minimize the risk of disease. OSHA provides guidance on use of these alternative controls at: <a href="http://www.osha.gov/SLTC/etools/anthrax/transition_program.html">http://www.osha.gov/SLTC/etools/anthrax/transition_program.html</a>.</p>
<b>Waste/Disposal</b>	<p>Anthrax is not regulated under Subtitle C of the RCRA, but should be handled with caution. In some states and localities, waste management will vary; for instance, anthrax waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Contact the state or local regulatory agency to determine appropriate waste management practices. Anthrax spores are subject to DOT regulations and the CDC's Select Agent program requirements. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> or <a href="http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf">http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf</a> Wastewaters from contaminated sites should be pre-treated prior to disposal, using a chemical like 5.25 – 6.0 % sodium hypochlorite or another sterilization process.</p>

# NRT Quick Reference Guide: Plague

<b>Agent Characteristics</b>	<b>Agent Classification:</b> Biological <span style="float: right;"><b>Type:</b> Bacteria (<i>Yersinia pestis</i>)</span> <b>Description:</b> Small, Gram-negative coccobacillus that is found in rodents/fleas. There are three types of plague: <b>1)</b> bubonic (affects lymph nodes); <b>2)</b> septicemic (blood-borne); and <b>3)</b> pneumonic (transmission by aerosol). Pneumonic plague may occur secondarily to bubonic or septicemic plague. Naturally occurring forms of pneumonic plague are rare.	
	<b>Incubation Period:</b> 1-8 days (bubonic); 1-6 days (pneumonic) <b>Duration of Illness:</b> Dependent on form of illness and treatment <b>Person-to-Person Transmission:</b> pneumonic: yes; bubonic: no <b>Mortality:</b> Over 90% for pneumonic plague untreated within 24 hours of symptoms; lower for other forms	<b>Infectivity/Lethality:</b> High/Very High (untreated) <b>Infective Dose:</b> LD50: 100-1,000 organisms <b>Persistence/Stability:</b> Rapidly inactivated by sunlight; may persist in animal hosts and through person-to-person transmission
<b>Release Scenarios</b>	<b>Air/Aerosolization:</b> Pneumonic plague is considered to be the major biothreat. While persons with bubonic plague cannot infect others, persons with pneumonic plague can infect others within approximately 6 feet through release of respiratory droplets from coughing/sneezing/breathing. If not caught by the BioWatch program, airborne releases of plague are likely to be identified only after exposed persons become ill. The incubation period for pneumonic plague may be as long as 6 days (usually 1-3). In this time, there would be minimal risk of further environmental exposure from the original aerosol release. <i>Y. pestis</i> is sensitive to sunlight and heating, and does not survive long without a host. In a WHO analysis of a worst-case scenario, plague aerosol was estimated to be effective and infectious for as long as 1 hour without a host. Therefore, aerosolization may not be a major concern for environmental sampling/clean-up (except in patient rooms). See: <a href="http://www.osha.gov/SLTC/plague/controls.html">http://www.osha.gov/SLTC/plague/controls.html</a>	
	<b>Soil/Surfaces:</b> Under controlled conditions, <i>Y. pestis</i> maintains viability for extended periods (last measured at 5 days) after being suspended in solution, spread over a surface, and left to dry. Aside from this study there is little evidence to suggest that residual plague bacteria pose an environmental threat to the population following an aerosol release. <b>Note:</b> Contaminated surfaces are likely to have detectable <i>Y. pestis</i> DNA long after the bacteria themselves have perished. While the detection of <i>Y. pestis</i> DNA might be of forensic interest, it says little about potential human risk in the days following the initial release. <b>Water:</b> Plague may cause a water threat. Plague is difficult to detect in food. <b>Other:</b> Rodent and flea control may also be required if pneumonic plague originated from a population of these animals. <b>Note:</b> Plague could be engineered to become more viable in the environment. As such, decisions regarding PPE, sampling, and decon should not be made without verifying if plague was naturally-occurring or weapons-grade.	
<b>Health Effects</b>	<b>Onset</b>	Symptoms may occur 1-8 days (bubonic) or 1-6 days (pneumonic) after exposure. Treatment within 24 hours of appearance of pneumonic symptoms is critical.
	<b>Signs/Symptoms</b>	<b>Inhalation:</b> High fever, chills, headache, hemoptysis (coughing blood), toxemia (blood poisoning), dyspnea (shortness of breath), stridor (noisy breathing), and cyanosis (bluish discoloration of the skin). Death results from respiratory failure, circulatory collapse, and bleeding diathesis (tendency). <b>Skin:</b> Patients develop swollen, tender lymph nodes (buboes); fever; headache chills; and weakness. <b>Ingestion:</b> Buboes in the neck. <b>Eyes:</b> Most likely result in bubonic plague. See skin symptoms.
	<b>Exposure Routes</b>	<b>Inhalation:</b> Primary route of exposure for pneumonic plague. Transmission can take place if someone breathes in aerosolized bacteria or <i>Y. pestis</i> suspended in respiratory droplets in the cough of an infected person or animal. <b>Skin:</b> Bubonic plague is the most common form of plague. Exposure occurs when an infected flea bites a person or when materials contaminated with <i>Y. pestis</i> enter through a break in a person's skin. <b>Ingestion:</b> Very Rare; animal studies indicate that consumption of <i>Y. pestis</i> causes infection only in large doses. <b>Eyes:</b> Exposure to pneumonic plague through the eyes is possible.
<b>Effect Levels</b>	<b>Lethality</b> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. Plague is very highly lethal. <b>Infectivity</b> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <b>infective dose</b> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. OSCs should not assume that an infective dose estimate represents a safe level. For instance, for plague and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50 %"). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Fifty percent of people exposed to 100 to 1000 organisms may become infected with plague; most of those infected will die if untreated.	
<b>Health and Safety</b>	<b>Concerns</b>	Under ICS, check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Safety Plans. The PPE levels listed below are general suggestion only and are appropriate only for plague; they do not provide protection for the other chemicals that workers may be exposed to during response/recovery operations. For more info on PPE and health and safety decision-making, please see The OSHA/NIOSH interim CBRN guidance document, the EPA's Respiratory Protection Program Draft, January 2005 or the EPA's Medical Surveillance Program Implementation Plan Draft, January 2005. EPA documents available on <a href="http://www.epaosoc.org/qrg">www.epaosoc.org/qrg</a> . Responders should be trained to Hazardous Waste and Emergency Operations (HAZWOPER) standards and attend an on-site training briefing. Responder training shall meet the requirements specified in 29 CFR 1910.120 (q) (6).
	<b>Medical Surveillance</b>	<b>Pre-exposure:</b> Annual exams/ensure proper respiratory function. <b>During Exposure:</b> Wear PPE as designated by the Health and Safety plan. Set up a medical monitoring plan, documenting PPE levels used, exposure incidents (did anyone get sick, etc.), antibiotics used, etc. <b>Post exposure:</b> Monitor responders for signs/symptoms and treat accordingly.
	<b>First Aid/Decon</b>	Decon outer PPE with dilute (0.05%) bleach solution. Decon skin with warm soapy water (0.05% bleach may irritate skin) for 10-15 minutes. A decon shower may be recommended as the final step in personal decontamination. Antibiotics treatment: Streptomycin, Gentamicin, Tetracycline, or Doxycycline. Suspected pneumonic plague cases should be managed under droplet precautions and placed in isolation for at least 48 hours after initiation of antibiotic therapy, after which time they can be managed under standard precautions. Antibiotic treatment for 7 days may be warranted for people who have had direct close contact to plague patients. <i>With respect to specifics (e.g., value of mechanical scrubbing, contact time of decon solution, and need to rinse completely) OSCs should check with the EPA National Decon Team Subject Matter Experts at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</i>
	<b>PPE</b>	<b>Response to an uncontrolled incident involving the release of plague:</b> dermal – hooded, protective coverall for hazardous particulate (Tyvek® or equivalent), inner and outer disposable gloves, and boots; respiratory protection – NIOSH-approved, CBRN, positive-pressure self-contained breathing apparatus (SCBA). <b>Response to a controlled incident when release has stopped:</b> dermal – same protection; respiratory protection – NIOSH-approved, Powered Air-Purifying Respirator (PAPR) that provides a protection factor of 1000 (e.g., tight-fitting full-faced PAPR; OSHA recently proposed an assigned protection factor of 1,000 for certain designs of hood/helmet-style PAPRs) that is CBRN-approved, when available, and fitted with P100 filters. <b>Medical Responders decontaminating incoming victims at the site or hospital:</b> Same as response to controlled incident.
<b>Field Detection</b>	The BioWatch Program helps detect aerosol releases of bioagents. In the absence of release detection, plague is only identified once patients present with symptoms or an animal die-off from plague is confirmed. Certain buildings may have Autonomous Detection Systems (ADS) in the workplace that continually test for bioagents such as anthrax using air samples and PCR.	
<b>Sampling</b>	<b>Sampling Location Plans:</b> Start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic/ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc). If point of release or aerosolization is unconfirmed use a statistically-based sampling method. <b>Note:</b> These are general guidelines and do not (over)	

## NRT Quick Reference Guide: Plague (cont'd)

<b>Sampling</b>	<p><b>Sampling Location Plans (cont'd)</b> replace need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs and/or through ICS channels. More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA and TetraTech "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plans" TDD: S05-0302-004 and "Sampling Requirements for Chemical and Biological Agent Decontamination Efficacy," (LLNL, March 2001).</p>
	<p><b>Concerns:</b> Different detection/analytical equipment and sampling techniques will be highly site-specific and depend on: <b>1)</b> the characteristics of the terrorist agents; <b>2)</b> the type of contaminated surfaces (e.g., porous v. nonporous); <b>3)</b> the phases/purposes of sampling (initial identification v. post-decon surface sampling); and <b>4)</b> the sampling procedures of the analytical laboratory. <b>Note:</b> Before obtaining samples clearly identify and coordinate with laboratory to be used, as not all laboratories can handle all types of media. Basic Ordering Agreements (BOAs) for laboratory sampling analysis have been established with contract labs. Contact EPA ERT for details; coordinate with investigative units (EPA CID/FBI); ensure plan for appropriate chain-of-custody. Although there is little evidence to suggest that residual plague bacteria pose an environmental threat to the population following an aerosol release, environmental sampling will be done to check the success of the decontamination efforts. Swab sampling and air monitoring should be used. <b>Note:</b> Contaminated surfaces are likely to have detectable <i>Y. pestis</i> DNA long after the bacteria have perished. While the detection of <i>Y. pestis</i> DNA might be of forensic interest, it says little about potential human risk in the days following the initial release.</p>
	<p><b>Types of Samples:</b> <b>1) Wipe Samples:</b> Synthetic, non-cotton (Dacron/rayon) wipes pre-moistened with a nutrient solution, buffer solution, or deionized (DI) water. Good for small sample areas of nonporous surfaces. Coordinate methods and buffer solutions with designated Laboratory Response Network (LRN) laboratory. <b>2) Swab Samples:</b> Synthetic, moistened, cotton sterile or macrofoam swab moistened with buffer solution (PBST) or DI. Most useful for hard to reach nonporous surfaces. Rayon and polyester swabs are not as efficient as cotton/macrofoam swabs in spore recovery. Do not use dry swabs. <b>3) HEPA Vacuum Sampling:</b> Collect samples in a HEPA sock designed to fit into an inlet nozzle of a vacuum cleaner. Good for screening and determining the extent and location of contamination in large areas. Used on both porous and nonporous surfaces. For example sampling method please see: <a href="http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp">http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp</a> <b>4) Air:</b> Collect routine air sample with gel filter, petri dishes and/or impactors. <b>5) Water:</b> Collect a minimum of 100mL. <b>6) Chip/bulk samples:</b> Actual pieces of contaminated surface obtained for extraction analysis.</p>
<p><b>Sample packaging and shipping:</b> Packaging and transporting samples are subject to various regulations established by DOT, CDC, USPS, OSHA, and IATA. Details can be found at <a href="http://www.cdc.gov/od/ohs/biosfty/shippregs.htm">www.cdc.gov/od/ohs/biosfty/shippregs.htm</a> or <a href="http://www.cdc.gov/od/sap/">http://www.cdc.gov/od/sap/</a> or <a href="http://www.asm.org/ASM/files/">http://www.asm.org/ASM/files/</a></p>	
<b>Laboratory Analysis</b>	<p><b>Laboratory Information:</b> Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support contact Battelle Security 24-hour control center at 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for Analytical Lab Support During a WMD response; for access, please contact the ERT 24-hour number: 732-321-6660</p>
	<p><b>CDC Laboratory Response Network Labs</b>  CDC Bioterrorism Preparedness and Response Program: 404-639-0385,  <a href="http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp">http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp</a></p>
	<p><b>Staining of specimens:</b> A Gram stain of sample that is positive for plague may reveal Gram-negative bacilli or coccobacilli which might look like "safety pins." A Wright, Giemsa, or Wayson stain will show bipolar staining if plague is present, and direct fluorescent antibody testing may be positive.</p>
	<p><b>Passive Hemagglutination Antibody Detection Assay:</b> Documentation of seroconversion of paired human serum samples is accepted as confirmation of plague, but single positive serum samples should be considered as providing only presumptive evidence of <i>Y. pestis</i> infection. This test looks for plague by measuring titer levels of antibodies. This test takes anywhere from several days to several weeks for antibodies to develop.</p>
	<p><b>Direct Fluorescent Antibody Technique:</b> This technique uses a fluorescent tag attached to a plague-specific antibody which is added directly to a tissue or cell suspension for the detection of a specific antigen. Positive results should be considered presumptive and not confirmatory.</p>
	<p><b>Enzyme-linked immunosorbent assay (ELISA):</b> These assays are intended for rapid detection of plague. The lab technician will use an antibody, like IgG, that binds to plague to enable detection from the clinical sample. Positive results should be considered presumptive and not confirmatory.</p>
	<p><b>Culturing:</b> Plate onto Sheep Blood Agar, Brain Heart Infusion, MacConkey, or Eosin Methylene Blue agar plates. The plates are incubated for 48 hours at 28°C and 37°C and examined for "beaten-copper" colonies. Some automated or semi-automated bacterial identification systems may misidentify <i>Y. pestis</i>. Used for confirmatory analysis.</p>
<b>Decon</b>	<p><b>Polymerase Chain Reaction (PCR):</b> Amplifies DNA and compares the sequences to standard sequences for plague. Positive results should be considered presumptive and not confirmatory. The PCR method should not be used alone; samples should also be analyzed using microbiology techniques.</p>
	<p><b>Decon Planning:</b> Site specific decon/cleanup plan should be developed and approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account: <b>1)</b> the nature of contamination including purity, chemical/physical properties, how it entered the facility, etc.; <b>2)</b> the extent of contamination including the amount and possible pathways that have or could have spread the agent (it is advisable to isolate the contaminated area); and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment/removal/packaging of other items such as clothing and bedding for decon and disposal. Although some reports suggest that the bacteria may survive in soil or on surfaces for some time, there is little evidence to suggest environmental risk to humans in this setting, and thus there may be a minimal need for environmental decontamination. Depending on the incident, EPA may provide assistance or materials to decon healthcare facilities, subways, other public areas, and private homes and buildings. <b>Note:</b> Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontaminating agents used.</p>
	<p><b>Decon Methods:</b> <i>OSCs should check with the EPA National Decon Team Subject Matter Experts regarding specific decontamination parameters, as well as specifics on the use of readily available commercial items such as standard bleach, at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</i> <b>1) Methods used on surfaces:</b> Surfaces that can spread disease by fomite contact (i.e., contact with inanimate objects found in patient rooms, ambulance cars, etc.) can be cleaned and subjected to disinfection with EPA-registered chemical germicides according to label instructions (e.g., hypochlorite for at least 10 minutes). Sodium hypochlorite is the standard used for cleanup; however, other chemicals could be used if sodium hypochlorite is not decontaminating properly: 40% Ethyl Alcohol, 30% Isopropyl Alcohol, 100ppm Benzalkonium Chloride, 0.12% Ortho-Phenylphenol and 75ppm Iodophor. Use a vacuum cleaner equipped with a HEPA filter for cleaning carpeted floors or upholstered furniture. <b>Note:</b> There are reports that hospital disinfectants may not kill plague; therefore, surface sampling should be performed to confirm that decontamination was effective. <b>2) Reusable Equipment:</b> The surfaces of reusable medical equipment should be cleaned and then subjected to disinfection with a specified surface contact time. <b>3) Textiles/Bedding:</b> Textiles and fabrics from patients and their immediate contacts should be handled with minimum agitation to avoid contamination of air, surfaces, and persons. Textiles and clothing should be bagged or contained at the point of use in accordance with OSHA regulation and should not be sorted prior to laundering. Wet textiles should be bagged first and then placed in leak-proof containers. Reusable fabric laundry bags commonly used for laundry transport can be laundered along with clothing and other fabrics. The use of water-soluble bags is another option for minimizing contact before washing. Laundry should be labeled in such a way that laundry staff will be prompted to wear appropriate PPE and handle potentially contaminated laundry with minimum agitation. The laundry area in healthcare facilities should be set at negative air pressure as per normal operating standards, and be physically separate from the areas where clean laundry is dried, folded, and packed for transport and distribution. Textiles and fabrics believed to be contaminated can be laundered using routine protocols for healthcare facilities. 160°F washing with detergent and bleach, and hot air-drying. Chlorine bleach use during hot-water washing can provide additional measure for safety. Laundry can also be autoclaved for proper decon.</p>
	<p><b>Decon Effectiveness:</b> <b>1) Process Verification sampling:</b> Decon is considered successful if post-decon sampling shows no evidence of plague. Samples (air/surface) should be taken in previously contaminated areas. Biological indicators should be used to verify whether conditions necessary to destroy the bacteria have been achieved. <b>2) Cleanup.</b> <b>3) Adequacy Verification:</b> This type of sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will not be detected if still present (use aggressive and grid sampling). However, in the case of plague, as long as sick patients and exposed persons are monitored, tracked and treated, decon of patients rooms should be sufficient for disease control. After 2 days of treatment, a patient is normally not as infectious, and after 1 hour most of the released plague aerosols are inactivated. Decon is more of a precaution.</p>
	<p>Waste generated from plague should be autoclaved or incinerated and can be treated as medical and/or municipal solid waste. However, in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste, or infectious substances with special requirements for handling and disposal depending on the state. Contact the state or local regulatory agency to determine the appropriate waste management practices. Plague is subject to DOT regulations and the CDC's Select Agent program requirements. See <a href="http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/000001202/ProtocolPackShip.pdf">http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/000001202/ProtocolPackShip.pdf</a>.</p>
<b>Waste/Disposal</b>	

# NRT Quick Reference Guide: Argentine Hemorrhagic Fever (AHF)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological <b>Type:</b> Virus (Arenaviridae) <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 4  <b>Warning:</b> This virus is highly infectious and causes severe human disease. Responders should only risk exposure if deemed absolutely necessary by Subject Matter Experts (SMEs) and the use of Personal Protective Equipment (PPE) and infection control practices deemed adequate by SMEs are rigorously observed.  <b>Description:</b> The Junin virus, the causative agent of AHF, is an enveloped RNA virus that is transmitted by rodents. This virus is spread through contact with urine, saliva, blood, or feces of infected hosts (e.g., rodents). Airborne transmission and contact with contaminated surfaces is also possible. If weaponized, this virus may be highly aerosolizable.  <b>Infectivity/Lethality:</b> High/High.  <b>Persistence/Stability:</b> Persistence of these organisms in the environment is not well documented. Extreme caution should be exercised.  <b>Incubation Period:</b> 7-16 days.  <b>Person-to-Person Transmission:</b> Possible by coming in contact with infected persons and bodily fluids.  <b>Treatments:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Provide plasma during convalescent-phase; otherwise treatment is supportive.</p>									
Release Scenarios	<p><b>Air/Aerosolization:</b> Devices designed to detect aerosolized AHF are not available. Thus, airborne releases of AHF are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for aerosolization and effectiveness of decon.  <b>Soil/Surfaces:</b> AHF will most likely pose a surface hazard.  <b>Water:</b> The viral particles could potentially survive for long periods of time in untreated water.  <b>Other:</b> Depending upon the threat, rodent control might be necessary.</p>									
Health Effects	<p><b>ONSET</b></p> <p><b>SIGNS/SYMPOMS</b></p> <p><b>EXPOSURE ROUTES</b></p>	<p>Symptoms may occur within 7-16 days.</p> <p>Initial signs and symptoms include fever, eye redness, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.</p> <p><b>Inhalation:</b> Inhalation is the primary route of exposure in the event of a bioterror attack. With AHF, inhalation of tiny viral particles from rodent feces, blood, urine, saliva, etc. can serve as a route of exposure.  <b>Skin:</b> Direct contact with rodent feces, blood, urine, saliva, bites, etc. can serve as a route of exposure. Transmission can occur through contact with infected persons and their bodily fluids. Infection through cracks in skin and through conjunctiva can occur.  <b>Ingestion:</b> Exposure can occur from eating contaminated food or drinking contaminated water.  <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients.</p>								
Effect Levels	<p><b>Specific Effect Levels Are Unknown.</b> <i>Lethality</i> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. <i>Arenaviridae</i> are highly lethal. <i>Infectivity</i> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <i>infective dose</i> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. Responders should not assume that an infective dose estimate represents a safe level. For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>									
Personal Safety	<p><b>CONCERNS</b></p> <p><b>MEDICAL SURVEILLANCE</b></p> <p><b>FIRST AID/ DECON</b></p> <p><b>PPE</b></p>	<p>Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plan (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for AHF; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.</p> <p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients. Plasma is also used during convalescent-phase; otherwise treatment is supportive.  <b>During Incident:</b> Conduct medical monitoring; use PPE as designated by the HASP; document PPE levels used; observe for fever and other signs and symptoms as listed under Health Effects, and ensure medical attention is provided as soon as possible if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.</p> <p>Contaminated PPE, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, add household bleach to water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.</p> <p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, rodent control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>	PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>
PPE	CIRCUMSTANCES									
Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>									
Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul>									
Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.	<ul style="list-style-type: none"> <li>An aerosol-generating device was not used to create high airborne concentration.</li> <li>Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul>									
Field Detection	<p>Since there is no field detection, AHF is only identified once patients present with symptoms.</p>									

## AHF (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

Sampling for Confirmatory Results	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., elevator buttons, mail, corners of hallways, baseboards, areas of rodent nesting or tracks, light switches, door knobs) due to foot traffic or ventilation systems. The local rodent population will also need to be sampled. If point of release or aerosolization of AHF is unconfirmed, use a statistically-based sampling method.</p> <p><b>Note: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs.</b> More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's <i>Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan</i> TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a>.</p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state (e.g., feces, aerosol, fluid) of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (FBI or CID) to ensure chain-of-custody. AHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. AHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times. Be careful not to place the samples directly on chemical ice used for cooling the shipping container.</p> <p><b>Air:</b> Collect air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of AHF may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
Laboratory Analysis	<p>AHF is highly infectious and requires Bio-Safety Level-4 (BSL-4) precautions, virologic diagnosis, immunoassay, and viral culture which requires 3-10 days.</p>
Decontamination/Cleanup	<p><b>Decon/Cleanup Planning:</b> Virus-specific information will need to be developed prior to decontamination and cleanup.</p> <p><b>Decon Methods:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before clean up. Physical inactivation of the virus is accomplished by heating. AHF is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®. Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Decon Methods for Natural Outbreak:</b> Look for obvious signs of rodent infestation, and remove rodents and exercise rodent control. <b><i>Under no circumstances should a vacuum cleaner or a broom be used.</i></b> Using a HEPA and Chlorine filter Air Purifying Respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After cleanup/decon mop, clean, etc. with bleach solution. Wash gloves with soap and water before removing and disposing of them.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable AHF in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting AHF on the surfaces and in the air.</p>
Waste Disposal	<p>Untreated waste should be appropriately labeled. Waste generated from AHF should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the AHF virus was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. AHF is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: Bolivian Hemorrhagic Fever (BoHF)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<b>Agent Classification:</b> Biological <b>Type:</b> Virus (Arenaviridae) <b>CDC Class:</b> A <b>Bio-Safety Level:</b> 4 <b>Warning:</b> This virus is highly infectious and causes severe human disease. Responders should only risk exposure if deemed absolutely necessary by Subject Matter Experts (SMEs) and the use of Personal Protective Equipment (PPE) and infection control practices deemed adequate by SMEs are rigorously observed. <b>Description:</b> The Machupo virus, the causative agent of BoHF, is an enveloped RNA virus that is transmitted by rodents. This virus is spread through contact with urine, saliva, blood, or feces of infected hosts (e.g., rodents). Airborne transmission and contact with contaminated surfaces is also possible. If weaponized, this virus may be highly aerosolizable. <b>Infectivity/Lethality:</b> High/High. <b>Persistence/Stability:</b> Persistence of these organisms in the environment is not well documented. Extreme caution should be exercised. <b>Incubation Period:</b> 7-16 days. <b>Person-to-Person Transmission:</b> Yes. <b>Treatments:</b> Quarantine of infected individuals is needed to protect caregivers and other patients; otherwise treatment is supportive.									
	<b>Air/Aerosolization:</b> Persons with BoHF can infect others by releasing respiratory droplets from coughing/sneezing/breathing on others. Devices designed to detect aerosolized BoHF are not available. Thus, airborne releases of BoHF are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for aerosolization and effectiveness of decon. <b>Soil/Surfaces:</b> BoHF will most likely pose a surface hazard. <b>Water:</b> The viral particles could potentially survive for long periods of time in untreated water. <b>Other:</b> Depending upon the threat, rodent control might be necessary.									
Health Effects	ONSET	Symptoms may occur within 7-16 days.								
	SIGNS/ SYMPTOMS	Initial signs and symptoms include fever, eye redness, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures.								
	EXPOSURE ROUTES	<b>Inhalation:</b> Inhalation is the primary route of exposure in the event of a bioterror attack. With BoHF, inhalation of tiny viral particles from rodent feces, blood, urine, saliva, etc. can serve as a route of exposure. <b>Skin:</b> Direct contact with rodent feces, blood, urine, saliva, bites, etc. can serve as a route of exposure. Transmission can occur through contact with infected persons and their bodily fluids. Infection through cracks in skin and through conjunctiva can occur. <b>Ingestion:</b> Exposure can occur from eating contaminated food or drinking contaminated water. <b>Eyes:</b> Can be exposed through contact with bodily fluids of infected patients.								
Effect Levels	<b>Specific Effect Levels Are Unknown.</b> <i>Lethality</i> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. Arenaviridae are highly lethal. <i>Infectivity</i> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <i>infective dose</i> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. Responders should not assume that an infective dose estimate represents a safe level. For instance, for inhalation anthrax and other severe or lethal diseases, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.									
Personal Safety	CONCERNS	Check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Health and Safety Plan (HASP). Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE Levels listed are general suggestions only and are appropriate only for BoHF; they may not provide protection for the other chemicals that workers may be exposed to during response/recovery operation.								
	MEDICAL SURVEILLANCE	<b>Baseline:</b> Annual physical and respiratory function exams. <b>Treatments Available:</b> Quarantine of infected individuals is needed to protect caregivers and other patients; otherwise treatment is supportive. <b>During Incident:</b> Conduct medical monitoring; use PPE as designated by the HASP; document PPE levels used; observe for fever and other signs and symptoms as listed under Health Effects, and ensure medical attention is provided as soon as possible if necessary. <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.								
	FIRST AID/ DECON	Contaminated PPE, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, add household bleach to water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.								
	PPE	<b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp</a> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:50%; text-align: center;">PPE</th> <th style="width:50%; text-align: center;">CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>• Event is uncontrolled.</li> <li>• The type(s) of airborne agent(s) is unknown.</li> <li>• The dissemination method is unknown.</li> <li>• Dissemination via an aerosol-generating device is still occurring.</li> <li>• Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>• The suspected biological aerosol is no longer being generated.</li> <li>• Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.</td> <td> <ul style="list-style-type: none"> <li>• An aerosol-generating device was not used to create high airborne concentration.</li> <li>• Dissemination was by a letter, package, or other material that can be bagged, contained, etc.</li> </ul> </td> </tr> </tbody> </table> <p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (cleanup, decon, rodent control, medical, etc.), type of exposure (airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (chemical, physical, etc.).</p>		PPE	CIRCUMSTANCES	Pressure-demand SCBA with Level A protective suit.	<ul style="list-style-type: none"> <li>• Event is uncontrolled.</li> <li>• The type(s) of airborne agent(s) is unknown.</li> <li>• The dissemination method is unknown.</li> <li>• Dissemination via an aerosol-generating device is still occurring.</li> <li>• Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul>	Pressure-demand SCBA with Level B protective suit.	<ul style="list-style-type: none"> <li>• The suspected biological aerosol is no longer being generated.</li> <li>• Other conditions may present a splash hazard.</li> </ul>	Full-facepiece respirator with P100 filter or PAPR with HEPA filters. Disposable hooded coveralls, gloves, and foot coverings.
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Field Detection	Since there is no field detection, BoHF is only identified once patients present with symptoms.									

## BoHF (side 2)

### THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION

<b>Sampling for Confirmatory Results</b>	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., elevator buttons, mail, corners of hallways, baseboards, areas of rodent nesting or tracks, light switches, door knobs) due to foot traffic or ventilation systems. The local rodent population will also need to be sampled. If point of release or aerosolization of BoHF is unconfirmed, use a statistically-based sampling method.</p> <p><b>Note: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate SMEs.</b> More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's <i>Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan</i> TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a>.</p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state (e.g., feces, aerosol, fluid) of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, and decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (FBI or CID) to ensure chain-of-custody. BoHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. BoHF samples should be packaged in an air-tight container and kept between 39–50° Fahrenheit at all times. Be careful not to place the samples directly on chemical ice used for cooling the shipping container.</p> <p><b>Air:</b> Collect air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of BoHF may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling (for nonporous surfaces):</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
<b>Laboratory Analysis</b>	<p>BoHF is highly infectious and requires Bio-Safety Level-4 (BSL-4) precautions, virologic diagnosis, immunoassay, and viral culture which requires 3-10 days.</p>
<b>Decontamination/Cleanup</b>	<p><b>Decon/Cleanup Planning:</b> Virus-specific information will need to be developed prior to decontamination and cleanup.</p> <p><b>Decon Methods:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before clean up. Physical inactivation of the virus is accomplished by heating. BoHF is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®. Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Decon Methods for Natural Outbreak:</b> Look for obvious signs of rodent infestation, and remove rodents and exercise rodent control. <b><i>Under no circumstances should a vacuum cleaner or a broom be used.</i></b> Using a HEPA and Chlorine filter Air Purifying Respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After cleanup/decon mop, clean, etc. with bleach solution. Wash gloves with soap and water before removing and disposing of them.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable BoHF in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting BoHF on the surfaces and in the air.</p>
<b>Waste Disposal</b>	<p>Untreated waste should be appropriately labeled. Waste generated from BoHF should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the BoHF virus was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. BoHF is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: Tularemia

<b>Agent Characteristics</b>	<b>Agent Classification:</b> Biological <span style="float: right;"><b>Type:</b> Bacteria (<i>Francisella tularensis</i>)</span>	
	<b>Description:</b> Gram-negative coccobacillus found in rodents, rabbits, hares, ticks, and biting flies. Tularemia is capable of surviving for weeks at low temperatures in water, moist soil, hay, straw or decaying animal carcasses. There are 6 clinical presentations of tularemia: <b>1)</b> pneumonic (most likely to be used in bioterror threat); <b>2)</b> typhoidal (likely to be used in bioterror threat); <b>3)</b> ulceroglandular (most common form); <b>4)</b> glandular; <b>5)</b> oculoglandular; and <b>6)</b> nose and mouth.	
<b>Release Scenarios</b>	<b>Incubation Period:</b> 1-10 days, up to 21, typically 3-5 days <b>Duration of Illness:</b> 2 or more weeks, dependent on treatment <b>Person-to-Person Transmission:</b> No <b>Mortality Rate:</b> 30-60% untreated, 2% treated.	
	<b>Infectivity/Lethality:</b> High/Moderate, if untreated <b>Infective Dose:</b> 1-50 organisms <b>Persistence/Stability:</b> Minimally Stable	
<b>Health Effects</b>	<b>Air/Aerosolization:</b> Tularemia can be weaponized for dry or wet aerosol dispersion. Reaerosolization is a consideration with weaponized tularemia, though it is thought to be unlikely. An aerosol release would likely be completely dispersed within a few hours after dissemination. However, because <i>F. tularensis</i> can survive for extended periods in cold, moist environments, it may be necessary to conduct environment sampling and decon large areas, even though available data to support the necessity of environmental sampling is limited. The area of initial release might be difficult to identify because symptoms take days to appear and low numbers of organisms can cause infection.	
	<b>Soil/Surfaces:</b> <i>F. tularensis</i> can live for weeks in cold, moist conditions. However, an aerosol release would likely be completely dispersed within a few hours and reaerosolization is thought to be unlikely. <b>Water/Food:</b> Water and food-borne transmission are possible. <b>Other:</b> Tularemia is naturally occurring. Animals can become infected with tularemia, decon of animal and insect vectors has not been considered because the threat is thought to be minimal. After exposure to tularemia, insect vectors are normally infectious for 14 days (flies) or their lifetime (ticks).	
<b>Effect Levels</b>	<b>Onset</b>	Symptoms typically occur within 3-5 days after exposure but may present within 1-10 days and up to 21 days after exposure.
	<b>Signs/Symptoms</b>	The primary clinical forms of tularemia vary in severity and presentation depending on virulence of the infecting organism, dose, and site of infection. An aerosol tularemia attack would result in an outbreak of illness 1-10 days later. Symptoms of tularemia include: sudden fever, chills, headaches, diarrhea, muscle aches, joint pain, dry cough, progressive weakness, pneumonia, ulcers of the mouth or skin, swollen lymph nodes, painful eyes, and sore throat. Inhalation of <i>F. tularensis</i> can produce chest pain, difficulty breathing, bloody sputum, and respiratory failure. Tularemia can be fatal without treatment and is an incapacitating disease in non-fatal cases.
	<b>Exposure Routes</b>	<b>Inhalation:</b> Tularemia has been weaponized for dry or wet aerosol dispersion by several state programs. Tularemia also exists naturally and can contaminate hay/soil. The organism is highly infectious by the inhalation route. <b>Skin:</b> Cutaneous infection occurs by insect bites from ticks and biting flies that feed on infected animals or come into contact with dead, infected animals. <b>Ingestion:</b> Eating/Drinking contaminated food/water. Large number of microorganisms required to establish infection ( $10^6$ - $10^8$ )
<b>Health and Safety</b>	<b>Lethality</b> reflects the relative ease with which an agent causes death in a susceptible population and can be represented quantitatively by the exposed population mortality rates. Untreated pneumonic/systemic tularemia can be lethal. <b>Infectivity</b> refers to how easily an agent can cause disease in a host. An agent is highly infective when few organisms can cause disease. An <b>Infective dose</b> is the number of organisms required to cause disease in an exposed person. Given the uncertainties regarding published infective doses for bioagents, it is important to examine what the infectivity numbers represent, including the routes of exposure and the animal species used for the lab studies. OSCs should not assume that an infective dose estimate represents a safe level. For instance, for Tularemia, the infective dose is the LD50 (a.k.a. "Lethal Dose 50%). The LD50 stands for the dose administered which kills half the exposed population, if untreated. Fifty percent of people exposed to 1 to 50 organisms may become infected with Tularemia. Tularemia is moderately lethal, therefore, many (about 30%) of those infected may die if untreated.	
	<b>Concerns</b>	Under ICS, check with your appointed Health and Safety Officer regarding PPE, Medical Surveillance, and Safety Plans. The PPE levels listed below are general suggestion only and are appropriate only for tularemia; they do not provide protection for the other chemicals that workers may be exposed to during response/recovery operations. For more info on PPE and health and safety decision-making, please see: The OSHA/NIOSH interim CBRN guidance document, EPA's Respiratory Protection Program Draft, January 2005 or EPA's Medical Surveillance Program Implementation Plan Draft, January 2005. EPA documents available at <a href="http://www.epaosc.org/grg">www.epaosc.org/grg</a> . Responders should be trained to Hazardous Waste and Emergency Operations (HAZWOPER) standards and attend an on-site training briefing. Responder training shall meet the requirements specified in 29 CFR 1910.120 (q) (6).
	<b>Medical Surveillance</b>	<b>Pre-Exposure:</b> Annual exams/ensure proper respiratory function; ideally, responders are vaccinated. <b>During Exposure:</b> Wear PPE as designated by the Health and Safety plan. Set up a medical monitoring plan to document PPE levels used, exposure incidents, apparent infections, antibiotics used, etc. <b>Post Exposure:</b> Monitor responders for signs/symptoms and treat accordingly.
	<b>First Aid/Decon</b>	Decon outer PPE with 0.05% bleach solution. Decon skin with warm soapy water (0.05% bleach solution may irritate skin). A decon shower is recommended as the final step in personal decontamination. Antibiotics available for supportive treatment and vaccinations are available. <a href="http://www.cidrap.umn.edu/cidrap/content/bt/tularemia/biofacts/tularemiafactsheet.html">http://www.cidrap.umn.edu/cidrap/content/bt/tularemia/biofacts/tularemiafactsheet.html</a> <i>With respect to specifics (e.g., value of mechanical scrubbing, contact time of decon solution, and need to rinse completely) OSCs should check with the EPA National Decon Team Subject Matter Experts at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841).</i>
<b>Field Detection</b>	<b>PPE</b>	
	Response to an uncontrolled incident involving the release of tularemia: dermal – hooded, protective coverall for hazardous particulate (Tyvek® or equivalent), inner and outer disposable gloves, and boots; respiratory protection – NIOSH-approved, CBRN, positive-pressure self-contained breathing apparatus (SCBA). Response to a controlled incident when release has stopped: dermal – same protection; respiratory protection – NIOSH-approved, Powered Air-Purifying Respirator (PAPR) that provides a protection factor of 1000 (e.g., tight-fitting full-faced PAPR; OSHA recently proposed an assigned protection factor of 1,000 for certain designs of hood/helmet-style PAPRs) that is CBRN-approved, when available, and fitted with P100 filters. <b>Medical Responders decontaminating incoming victims at the site or hospital:</b> Same as response to controlled incident.	
<b>Sampling</b>	<b>Field Detection</b>	
	The BioWatch Program helps detect aerosol releases of bioagents. In the absence of release detection, tularemia is only identified once patients present with symptoms or animal die-off from tularemia is confirmed. Certain buildings may have Autonomous Detection Systems (ADS) in the workplace that continually test for bioagents such as anthrax using air samples and PCR.	
<b>Sampling</b>	<b>Sampling Location Plans:</b> Start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about other contaminated areas due to foot traffic/ventilation systems (elevator buttons, mail, corners of hallways, baseboards, light switches, door knobs, etc). If point of release or aerosolization is unconfirmed then use a statistically-based sampling method. <b>Note:</b> These are general guidelines and do not replace need for a site specific sampling plan that should be reviewed and approved by appropriate SMEs and/or through ICS channels. More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA and TetraTech "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plans" TDD: S05-0302-004 and "Sampling Requirements for Chemical and Biological Agent Decontamination Efficacy." (LLNL, March 2001).	
	<b>Concerns:</b> Different detection/analytical equipment and sampling techniques will be highly site-specific and depend on: <b>1)</b> the characteristics of the terrorist agents; <b>2)</b> the type of contaminated surfaces (e.g., porous v. nonporous); <b>3)</b> the phases/purposes of sampling (initial identification v. post-decon surface (over)	

## NRT Quick Reference Guide: Tularemia (cont'd)

**Concerns (cont'd)** sampling); and **4)** The sampling procedures of the analytical laboratory. **Note:** Before obtaining samples clearly identify and coordinate with laboratory to be used, as not all laboratories can handle all types of media. Basic Ordering Agreements (BOAs) for laboratory sampling analysis have been established with contract labs. Contact EPA ERT for details; coordinate with investigative units (EPA CID/FBI); ensure plan for appropriate chain-of-custody.

### Types of Samples:

**1) Wipe Samples:** Synthetic, non-cotton (Dacron/rayon) wipes pre-moistened with a nutrient solution, buffer solution, or deionized (DI) water. Good for small sample areas of nonporous surfaces. Coordinate methods and buffer solutions with designated Laboratory Response Network (LRN) laboratory. **2) Swab Samples:** Synthetic, moistened, cotton sterile or macrofoam swab moistened with buffer solution (PBST) or DI. Most useful for hard to reach nonporous surfaces. Rayon and polyester swabs are not as efficient as cotton/macrofoam swabs in spore recovery. Do not use dry swabs. **3) HEPA Vacuum Sampling:** Collect samples in a HEPA sock designed to fit into an inlet nozzle of a vacuum cleaner. Good for screening and determining the extent and location of contamination in large areas. Used on both porous and nonporous surfaces. For example sampling method see <http://www.bt.cdc.gov/agent/anthrax/environmental-sampling-apr2002.asp> **4) Air:** Collect routine air sample with gel filter, petri dishes and/or impactors. **5) Water:** Collect at least 100mL. **6) Chip/bulk samples:** Collect actual pieces of contaminated surface for extraction analysis.

**Sample packaging and shipping:** Packaging and transporting samples are subject to various regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult with the analytical laboratory receiving the samples to determine additional packaging or shipping requirements. Details can be found at [www.cdc.gov/od/ohs/biosfty/shipregs.htm](http://www.cdc.gov/od/ohs/biosfty/shipregs.htm) or <http://www.cdc.gov/od/sap/> or <http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf>

**Laboratory Information:** Biological and Chemical Agent Analyses Contract Vehicles for EPA emergency lab support contact Battelle Security 24-hour control center at: 614-424-5909. US EPA has IAGs with Aberdeen and Dugway for Analytical Lab Support During a WMD response; for access, please contact the ERT 24-hour number: 732-321-6660

### CDC Laboratory Response Network Labs

CDC Bioterrorism Preparedness and Response Program: 404-639-0385  
<http://www.bt.cdc.gov/agent/anthrax/lab-testing/approvedlrntests.asp>

**Antigen Detection/Smart Tickets:** Technicians use antibodies that are known to bind to tularemia and mix the specimen and the antibodies to look for a reaction. This technique can provide rapid detection.

**Direct Fluorescent Antibody Stain:** First line of testing for tularemia identification. This technique uses a fluorescent-tag attached to an antibody that is added directly to a tissue or cell suspension for the detection of a specific antigen.

**Culturing:** Growth of tularemia in culture is the definitive means of confirming tularemia, but requires BSL-3 containment. Antibiotic-supplemented media are recommended for culture.

**Polymerase Chain Reaction (PCR):** The PCR method should not be used alone; samples should also be analyzed by culturing. Field PCR assays are very specific, but may be problematic with heterogeneous environmental samples. PCR has been shown to work best as a final confirmation with culture positive samples.

**Enzyme-linked immunosorbent assay (ELISA):** The lab technician will use an antibody that binds to Tularemia to enable detection from the clinical sample. ELISA is of limited use because antibody levels are generally not detected until two weeks after infection

**Microagglutination assay:** This assay can detect serum antibodies against *F. tularensis*. Serology is of limited use in acute infection because antibody levels are generally not detected until 10 days after infection.

**Decon Planning:** Site specific decon/cleanup plans should be developed and approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account: **1)** the nature of contamination including purity, chemical/physical properties, how it entered the facility, etc.; **2)** the extent of contamination including the amount and possible pathways that have or could have spread the agent (it is advisable to isolate the contaminated area); and **3)** the objectives of decon, including decon of critical items for re-use and the treatment, removal, and packaging of other items such as clothing and bedding, for decon and disposal. Depending on the incident, EPA may provide assistance or materials to decon healthcare facilities, subways and other public areas, and private homes and buildings. Although tularemia is believed to be inactivated 2 days after outdoor release, indoor release is considerably more problematic as the active virus can persist for two weeks. Due to public concern and perception, it may be necessary to implement the most conservative decon approach. **Note:** Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontaminating agents used.

### Decon Methods

OSCs should check with the EPA National Decon Team Subject Matter Experts regarding specific decontamination parameters, as well as specifics on the use of readily available commercial items such as standard bleach, at 513-487-2420 (after hours call 24-hour pager at 1-800-329-1841). **Methods used on surfaces:** Surfaces can be cleaned with 10% bleach solution for 10 minutes, then a 70% alcohol solution should be used to further clean the area and reduce the corrosive action of the bleach. Sodium hypochlorite, 40% ethyl alcohol, 30% isopropyl alcohol, 100ppm benzalkonium chloride, 0.12% orthophenylphenol and 75ppm iodophor can also be used for clean-up if the bleach or alcohol solution are not working properly. A vacuum cleaner equipped with a HEPA filter for cleaning carpeted floors or upholstered furniture should be used. Full vacuum cleaner bags can be placed in another closable container and discarded as a routine solid waste. **Reusable Equipment:** The surfaces of reusable medical equipment should be cleaned and then subjected to disinfection with a specified surface contact time. **Textiles/Bedding:** Textiles and fabrics from patients and their immediate contacts should be handled with minimum agitation to avoid contamination of air, surfaces, and persons. Textiles and clothing should be bagged or contained at the point of use in accordance with OSHA regulation and should not be sorted prior to laundering. Wet textiles should be bagged first and then placed in leak-proof containers. Reusable fabric laundry bags commonly used for laundry transport can be laundered along with clothing and other fabrics. The use of water-soluble bags minimizes contact before washing. Laundry should be labeled in such a way that laundry staff should be prompted to wear appropriate PPE and handle potentially contaminated laundry with minimum agitation. The laundry area in healthcare facilities should be set at negative air pressure as per normal operating standards, and be physically separate from the areas where clean laundry is dried, folded, and packed for transport and distribution. Textiles and fabrics believed to be contaminated can be laundered using routine protocols for healthcare facilities, e.g., 160°F washing with detergent and bleach and hot air-drying. Chlorine bleach use during hot-water washing can provide an additional safety measure. Laundry can also be autoclaved for proper decon.

**Decon Effectiveness:** **Process Verification sampling:** Decon is considered successful if post-decon sampling shows no evidence of Tularemia. Samples (air/surface) are taken in previously contaminated areas. Biological indicators should be used to verify whether conditions necessary to destroy the bacteria have been achieved. **Cleanup Adequacy Verification:** This type of sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present (use aggressive and grid sampling). As long as sick patients and exposed persons are monitored and treated, decon of patient rooms and the initial release area (if known) is sufficient. Environmental samples should be taken to verify the success of the decontamination effort.

**Waste/Disposal** Waste generated from tularemia can be autoclaved or incinerated and can be treated as medical and/or municipal solid waste. However, in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Contact the state or local regulatory agency to determine waste classification and ensure proper waste management. Tularemia is subject to DOT regulations and the CDC's Select Agent program requirements. See <http://www.asm.org/ASM/files/LEFTMARGINHEADERLIST/downloadfilename/0000001202/ProtocolPackShip.pdf>

# NRT Quick Reference Guide: Hantavirus

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Properties	<p><b>Agent Classification:</b> Biological    <b>Type:</b> Virus (Hantavirus) Viral Hemorrhagic Fever    <b>CDC Class:</b> C    <b>Bio-Safety Level:</b> 3</p> <p><b>Description:</b> Hantavirus is a highly infectious agent that is transmitted by the bite of infected rodents and aerosols from rodent urine, feces, saliva, and nesting materials. There are two primary disease types caused by hantaviruses: one type largely affects the pulmonary system (hantavirus pulmonary syndrome (HPS)), the other type affects the kidneys (renal form referred to as hemorrhagic fever with renal syndrome (HFRS)). Humans can contract the disease when they breathe in the aerosolized virus.</p> <p><b>Incubation Period:</b> HPS: range 4-42 days; HFRS: range 4-60 days.</p> <p><b>Person-to-Person Transmission:</b> Rare but has been reported.</p> <p><b>Infectivity/Lethality:</b> Infectivity presumed high; Lethality: HPS: 30-50%; HFRS: 1-15%.</p> <p><b>Treatment:</b> Symptomatic and antiviral medications available can be successful; immuno-compromised at greater risk.</p> <p><b>Persistence/Stability:</b> Stable in vectors and relatively stable in enclosed environments.</p>									
Release Scenarios	<p><b>Air:</b> Aerosolization is the primary route of exposure to hantavirus. Infection through aerosol transmission of hantavirus occurs from breathing in virus particles from stirred up rodent urine, droppings, blood, saliva, and nesting materials. Airborne releases of hantavirus are likely to be identified only after exposed persons become ill. Infection through cracks in skin and through conjunctiva can occur.</p> <p><b>Soil/Surfaces:</b> Stable in vectors and the environment.</p> <p><b>Water:</b> Stable in untreated water.</p> <p><b>Other:</b> Depending upon the threat, rodent control might be necessary.</p> <p><b>NOTE:</b> Hantavirus could be engineered to become more viable in the environment. Decisions regarding PPE, sampling, and decon should not be made without verifying if the virus was naturally-occurring or weaponized.</p>									
Health Effects	<p><b>ONSET</b></p> <p><b>SIGNS/SYMPOMS</b></p> <p><b>EXPOSURE ROUTES</b></p>	<p>Symptoms of HPS typically occur 1- 5 days after exposure. Symptoms of HFRS typically occur 1-2 weeks after exposure.</p> <p>Several forms of hantavirus disease exist. Hantavirus pulmonary syndrome is more common in the US and causes flu-like symptoms, trouble breathing, and can rapidly progress to pulmonary edema and respiratory failure with 50% fatality. The renal form causes flu-like symptoms (fever, muscle aches, headache, chills, dizziness, and a non-productive cough) with decrease in platelets, shock and kidney dysfunction.</p> <p><b>Inhalation:</b> Viral particles from stirred up rodent feces, blood, urine, saliva, and nesting materials. <b>Skin:</b> Rodent bite.</p>								
Effect Levels	<p><b>Lethality:</b> 30-50% from HPS; 1-15% from HFRS.</p> <p><b>Infectivity:</b> Presumed High (CDC Bio-Safety Level 3 with added precautions/Level 4 if aerosolized).</p> <p><b>Infective Dose:</b> Unconfirmed.</p> <p>Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>									
Personal Safety	<p><b>CONCERNS</b></p> <p><b>MEDICAL SURVEILLANCE</b></p> <p><b>FIRST AID/ DECON</b></p> <p><b>PPE</b></p>	<p>Check with the Health and Safety Officer regarding PPE, Medical Surveillance, and Safety Plans. Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE levels listed below are general suggestions only. Rodents can serve as the host for hantavirus, and at the same time serve as the host for fleas that carry plague; care should be taken to protect from flea bites using insect repellent (DEET or Permethrin) on the outside of PPE, and DEET on any exposed skin (Permethrin should be applied only to clothing or PPE).</p> <p><b>Baseline:</b> Annual physical and respiratory function exams. <b>During Incident:</b> Conduct medical monitoring; observe for any signs and symptoms and ensure medical attention is provided as soon as possible if necessary. <b>Post Incident:</b> Monitor for signs/symptoms of flu up to 45 days post incident. Draw serum sample if fever develops and notify public health authorities. Ensure hantavirus is considered, and ensure medical attention is provided as soon as possible.</p> <p><b>There is no human vaccine. Treatment consists of supportive care and use of antiviral medications; medical treatment is required.</b> Prior to entering medical facilities, it will be necessary to decon persons known to have been in recent direct contact with infected patients, aerosolized agents, or any of the hantavirus vectors. Decon contaminated clothing, equipment, and items with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, dilute household bleach with water (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon, taking care to avoid abrading the skin.</p> <p><b>Emergency Response to a Suspected Biological Incident:</b> The following recommendations are based on CDC <i>Interim Recommendations for the Selection and Use of Protective Clothing and Respirators Against Biological Agents</i>: <a href="http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp">http://www.bt.cdc.gov/documentsapp/Anthrax/Protective/10242001Protect.asp</a></p> <table border="1"> <thead> <tr> <th>PPE</th> <th>CIRCUMSTANCES</th> </tr> </thead> <tbody> <tr> <td>Pressure-demand SCBA with Level A protective suit.</td> <td> <ul style="list-style-type: none"> <li>Event is uncontrolled.</li> <li>The type(s) of airborne agent(s) is unknown.</li> <li>The dissemination method is unknown.</li> <li>Dissemination via an aerosol-generating device is still occurring.</li> <li>Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.</li> </ul> </td> </tr> <tr> <td>Pressure-demand SCBA with Level B protective suit.</td> <td> <ul style="list-style-type: none"> <li>The suspected biological aerosol is no longer being generated.</li> <li>Other conditions may present a splash hazard.</li> </ul> </td> </tr> <tr> <td>Full-facepiece respirator with P100 filter or PAPR with HEPA filters. 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Field Detection	<p>None. Hantavirus is only identified once patients present with symptoms or through laboratory verification.</p>									

## Hantavirus (side 2)

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION**

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Sampling for Confirmatory Results</b></p>	<p><b>Sampling Location and Planning:</b> If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. Be concerned about likely contaminated areas (e.g., areas of rodent nesting or tracks) due to foot traffic. The local rodent population will also need to be sampled. If point of release or aerosolization of hantavirus is unconfirmed, use a statistically-based sampling method. <b>Note: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate subject matter experts (SMEs).</b> More specific EPA/NRT sampling procedures/guidance for biowarfare agents can be found in EPA's "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan" TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a></p> <p><b>Sampling Concerns:</b> Detection, analytical equipment, and sampling techniques will be highly site-specific and depend on: <b>1)</b> physical state of the agent; <b>2)</b> type of surfaces contaminated (e.g., porous vs. nonporous); <b>3)</b> the purpose of sampling (e.g., initial identification, extent of contamination, decon); and <b>4)</b> laboratory requirements for sampling. Identify and coordinate with the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (EPA Homeland Security Division (HSD)/FBI) to ensure chain-of-custody. To contact the EPA HSD, call the National Response Center (1-800-424-8802) and ask them to notify the appropriate EPA HSD office within the EPA Region where the incident occurred. Hantavirus samples should be packaged in an air-tight container and stored between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. Hantavirus samples should be packaged in an air-tight container and stored between 39–50° Fahrenheit at all times.</p> <p><b>Types of Samples:</b>  <b>Air:</b> Collect routine air samples with gel filter or impinger.  <b>Water:</b> Collect a minimum of 100 ml in a sterile container.  <b>Soil Samples:</b> For the localized areas where soil deposition of hantavirus may have occurred (i.e., aerosol or liquid droplets), a surface soil sample from a non-vegetated area to a depth of less than one inch should be taken.  <b>Wipe and Swab Sampling:</b> Sterile macrofoam swabs moistened with 1X phosphate-buffered saline supplemented with 0.01% Tween-20 (PBST). If this solution is not available, use sterile deionized water (DI). Do not use dry wipes or swabs.  <b>Environmental Samples:</b> Collect all suspected rodent nesting materials and fecal samples. Dust from infested homes should be collected with a moist wipe.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Laboratory Analysis</b></p>	<p>Hantavirus is highly infectious in laboratories and generally requires Bio-Safety Level-3 (BSL-3) precautions with possible enhanced/BSL-4 precautions if suspected of being weaponized.  <b>USDA Ames Iowa Lab</b> – USDA Ames Iowa Lab: 515-663-7388 (culture); 515-663-7563 (serology).  <b>USDA 24-hour Emergency Operations Center</b> – 202-720-5711.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Decontamination/Cleanup</b></p>	<p><b>Hantavirus is relatively hardy</b> and may persist for many hours to even days in cool, moist, confined, shaded areas. <i>Hantavirus can survive freezing and thawing and can survive for several weeks in water, urine, damp or dry soil.</i> Decontamination is easily accomplished by common methods and disinfectants such as dilute bleach solution (1 part bleach to 9 parts water), or dilute Lysol®. The decon plan should address: <b>1)</b> the physical state of the agent and how it entered the site if weaponized; <b>2)</b> the extent of contamination including consideration of possible pathways that have or could have spread the agent; and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment, removal and packaging of other items such as clothing, bedding, etc., for decon and disposal. Depending on the incident, EPA might be asked to provide assistance or materials to decon healthcare facilities, subways, other public areas and private homes and buildings. Additionally, rodent control might be necessary. If the decon solution has killed the virus, disposal in the local wastewater system is possible, but permission to do so will be the decision of the local municipality.  <b>NOTE:</b> Crisis exemptions from EPA Office of Pesticides might be necessary depending on decontamination agents used.</p> <p><b>Decon Methods:</b> Look for obvious signs of rodent infestation and decontaminate all nearby areas. Under no circumstances should a vacuum cleaner or a broom be used. Using a HEPA and chlorine filter air-purifying respirator (APR), spray with dilute bleach solution (add 1 part bleach to 9 parts water) and let the area soak for 5 to 30 minutes before removal of materials as the wetting action decreases aerosolization. Gently cover any spills with decon solution-soaked paper towels. After initial cleanup, wiping, mopping, etc, clean with bleach solution. Wash gloves with soap and water before removing and disposing of them.  <b>Vector Control:</b> Remove rodents and exercise rodent control.  <b>Methods used on surfaces:</b> Allow aerosols to settle; wearing protective clothing, gently cover any spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before cleanup. Physical inactivation of the virus is accomplished by heating. Hantavirus is susceptible to dilute sodium hypochlorite solutions (1 part household bleach to 9 parts water), 70% ethanol, or Lysol®.  <b>Reusable Equipment:</b> Surfaces of reusable equipment should be cleaned with disinfectant and then should be disinfected again.</p> <p><b>Verification of Decon/Cleanup:</b> Cleanup levels will be determined based upon site-specific factors and multi-agency agreements. Most likely, a clearance committee of SMEs will define cleanup goals. Decon is considered effective when post-decon sampling shows no evidence of viable hantavirus in samples. Cleanup verification sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present. Grid and aggressive sampling techniques should be used to maximize the possibility of detecting hantavirus on surfaces and in the air.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Waste Disposal</b></p>	<p>Waste generated from hantavirus should be autoclaved, chemically disinfected, fumigated, or incinerated based on laboratory confirmation information, and then tested to be sure the hantavirus was inactivated. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Store waste in sealed containers that are appropriately labeled. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. Hantavirus is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>

# NRT Quick Reference Guide: VHF: *Bunyaviridae*—Crimean-Congo Hemorrhagic Fever (CCHF)

Report any release of WMD to the National Response Center 1-800-424-8802  
For References, Please See: Key References Cited/Used\* in National Response  
Team (NRT) Quick Reference Guides (QRGs) for Biological Warfare Agents.

Agent Characteristics	<p><b>Agent Classification:</b> Biological    <b>Type:</b> Virus (<i>Bunyaviridae</i>)    <b>CDC Class:</b> C    <b>Bio-Safety Level:</b> 4  <b>Description:</b> Crimean-Congo Hemorrhagic Fever (CCHF) virus is a member of the Bunyaviridae family (similar to hantavirus). It has been isolated from goats, sheep, cattle, hares, hedgehogs, rodents, and a number of species of ticks associated with these mammals. Humans typically become infected by a tick bite, usually from tick regurgitation during removal from the skin, or from human contact with blood, tissue, or body fluids of infected humans and animals.  <b>Incubation Period:</b> 3-12 days.  <b>Person-to-Person Transmission:</b> Yes – via contact with body tissue or body fluids of infected humans.  <b>Infectivity/Lethality:</b> Infectivity in humans is low. Mortality rates are 30% for treated individuals, and can range from 9% to 50% for hospitalized patients.  <b>Persistence/Stability:</b> Stable in vectors.  <b>Treatments:</b> There is no human vaccine. Ribavirin, though not FDA approved, has been used for treatment with some success.</p>										
Release Scenarios	<p><b>Air/Aerosolization:</b> Airborne transmission appears to be a rare event but cannot be conclusively excluded.  <b>Soil/Surfaces:</b> Under moist conditions, CCHF has been found to survive up to 15 days at 39.2° Fahrenheit. Elevated temperatures and lower humidity may reduce CCHF survival time; however, extreme caution should be exercised.  <b>Water:</b> CCHF could be a water threat.  <b>Other:</b> Because CCHF would spread through person-to-person contact and tick bites, it is important to de-tick farms in the event of a release of CCHF. CCHF would only be detected after symptoms present in patients.</p>										
Health Effects	ONSET	Symptoms may occur 3-12 days after exposure.									
	SIGNS/ SYMPTOMS	Initial signs and symptoms include fever, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices like the mouth, eyes, or ears. Severely ill patients show shock, nervous system malfunction, coma, delirium, and seizures. Some types of CCHF infection are associated with renal (kidney) failure.									
	EXPOSURE ROUTES	<p><b>Inhalation:</b> Airborne transmission appears to be a rare event but cannot be conclusively excluded.  <b>Skin:</b> Direct contact with blood and/or secretions of infected person and objects or equipment that have been contaminated with infected secretions may pose a threat. Contact with the vector (e.g., tick bites) also may pose a threat.  <b>Ingestion:</b> Exposure through eating contaminated food is highly unlikely.  <b>Eyes:</b> Can be exposed through contact with body fluids of infected patients.</p>									
Effect Levels	<p><b>Lethality:</b> The mortality rate from CCHF is approximately 30%, with death occurring in the second week of illness. In those patients who recover, improvement generally begins on the ninth or tenth day after the onset of illness.  <b>Infectivity:</b> Human illness occurs infrequently, although animal infection may be more common.  <b>Infective Dose:</b> Unconfirmed.  Please contact the Centers for Disease Control and Prevention (CDC) for more information: (404) 639-3311.</p>										
Personal Safety	SITE-SPECIFIC CONCERNS	Check with the Health and Safety Officer regarding PPE, Medical Surveillance, and Safety Plans. Level of PPE may vary depending upon the circumstances of the site and the incident. The PPE levels listed below are general suggestions only. Since tick bites may pose a threat, care should be taken to protect from tick bites using insect repellent (DEET or Permethrin) on the outside of PPE, and DEET on any exposed skin (Permethrin should be applied only to clothing or PPE).									
	MEDICAL SURVEILLANCE	<p><b>Baseline:</b> Annual physical and respiratory function exams.  <b>During Incident:</b> Conduct medical monitoring; observe for any signs and symptoms and ensure medical attention is provided as soon as possible if necessary.  <b>Post Incident:</b> Monitor for signs/symptoms and ensure medical attention is provided as soon as possible if necessary.</p>									
	FIRST AID/ DECON	Using tweezers, remove the tick directly without wiggling it. If possible, save the tick in a bottle of rubbing alcohol. Clean the bite area with soap and water, and then swab the bite area with astringent or rubbing alcohol. Seek medical attention immediately. Decon contaminated clothing, equipment, and items with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite. To create a dilute bleach solution, combine water to household bleach (add 1 part bleach to 9 parts water) yielding a 0.5% sodium hypochlorite solution. Use warm soapy water for personal/skin decon.									
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<p><b>Other Workers:</b> PPE recommendations for workers other than emergency responders must be developed in the HASP for the specific scenario, as noted previously. PPE recommendations will vary by job type (e.g., cleanup, decon, tick control, medical), type of exposure (i.e., airborne or surface/liquid/soil hazard), and any additional site hazards that may need to be considered (e.g., chemical, physical). Where respiratory protection is required, the minimum recommended level of protection is N95 or PAPR with HEPA.</p>											
Field Detection	None. CCHF is only identified once patients present with symptoms or through laboratory verification.										

**CCHF (side 2)**

**THIS SECTION ADDRESSES THE COLLECTION OF SAMPLES FOR QUANTITATIVE CONFIRMATORY LABORATORY ANALYSIS FOR RISK ASSESSMENT AND CLEANUP VERIFICATION.**

<b>Sampling for Confirmatory Results</b>	<p><b>Sampling Location and Planning:</b> Contact CDC at (770) 488-7100 for guidance on collecting surface samples. If livestock or animals are present, contact USDA at 202-720-5711 or the appropriate State Department of Agriculture. If the initial point of contamination is known, start with an area thought to be free of contamination and work in concentric circles towards the initial point of contamination. The local animal population (e.g., goats, sheep, cattle, rodents) will also need to be sampled. If point of release of CCHF is unconfirmed, use a statistically-based sampling method. <b>Note: These are general guidelines and do not replace the need for a site-specific sampling plan that should be reviewed and approved by appropriate subject matter experts (SMEs).</b> More specific EPA/NRT sampling procedures/guidance for bio-warfare agents can be found in EPA's "Biological Sampling Procedures Booklet for Regional Counterterrorism Response Plan" TDD: S05-0302-004. See also NRT Anthrax TAD: <a href="http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement">http://nrt.org/production/NRT/NRTWeb.nsf/AllAttachmentsByTitle/A-47AnthraxTAD/\$File/Anthrax_TAD_72905.pdf?OpenElement</a></p> <p><b>Sampling Concerns:</b> Coordinate with CDC and the laboratory to be used before obtaining samples. Laboratories may not be able to analyze all types of media nor will they have the same detection levels. Prioritize sample types and locations for optimal results. For forensic sampling, coordinate with investigative units (EPA Criminal Investigation Division: (202) 564-2490; FBI: (202) 324-3000) to ensure chain-of-custody. CCHF samples should be packaged in an air-tight container and stored between 39–50° Fahrenheit at all times.</p> <p><b>Sample Packaging and Shipping:</b> The packaging and shipping of samples are subject to strict regulations established by DOT, CDC, USPS, OSHA, and IATA. Consult the analytical laboratory receiving the samples to determine if they have additional packaging or shipping requirements. CCHF samples should be packaged in an air-tight container and stored between 39–50° Fahrenheit at all times.</p> <p><b>Types of Samples:</b>  <b>Air, Water, and Soil Sampling:</b> Consult with CDC for CCHF-specific sampling protocol (770) 488-7100.  <b>Human Samples:</b> Samples from victims will be taken by CDC or State Health Departments.  <b>Tick Samples:</b> To be collected by the appropriate agency.</p>
<b>Laboratory Analysis</b>	<p>Laboratories may require Bio-Safety Level-4 precautions.  <b>USDA Ames Iowa Lab</b> – USDA Ames Iowa Lab: 515-663-7388 (culture); 515-663-7563 (serology).  <b>USDA 24-hour Emergency Operations Center</b> – 202-720-5711.</p>
<b>Decontamination/Cleanup</b>	<p><b>Decon/Cleanup Planning:</b> Contaminated objects are easily sterilized or disinfected by common methods and agents such as phenol- or formalin-based disinfectants. It is advisable to isolate the contaminated area. Responders should develop a plan that takes into account <b>1)</b> the vector; <b>2)</b> the extent of contamination including the amount and possible pathways that have or could have spread the virus; and <b>3)</b> the objectives of decon, including decon of critical items for re-use and the treatment/removal/packaging of other items. If laboratory analysis demonstrates that decontamination solution inactivates the virus, disposal in the local wastewater system is possible, but permission to do so will be the decision of the local municipality. Depending on the incident, EPA might have to provide assistance or materials to decon healthcare facilities, subways, other public areas, and private homes and buildings.</p> <p><b>Decon Methods</b>  <b>Vector Control:</b> Remove ticks from people, animals, livestock, and surrounding environment.  <b>Methods used on surfaces:</b> CCHF is susceptible to sodium hypochlorite (0.5% bleach, 1 part household bleach to 9 parts water), 70% ethanol, or 2% glutaraldehyde. Physical inactivation of the virus is accomplished by heating. Disinfect all objects including lab equipment that have made contact with the patient or patient's excreta, sputum, or blood. Wearing protective clothing, gently cover body fluid spills with paper towels and apply decon solutions starting at perimeter and working towards the center; allow sufficient contact time (30 min) before removing paper towels. Properly decontaminate PPE prior to removal using any decon solutions mentioned above.  <b>Reusable Equipment:</b> Wearing PPE, clean surfaces of reusable equipment and then subject equipment to disinfection with a specified surface contact time.</p> <p><b>Verification of Decon/Cleanup</b>  <b>Process Verification sampling:</b> Decon is considered successful if post-decon sampling shows no evidence of CCHF.  <b>Clean-up Adequacy Verification:</b> This type of sampling is conducted to verify that the originally contaminated environment has been sufficiently decontaminated to allow re-occupancy without the use of PPE. Using statistical and biased sampling principles, a percentage of previously contaminated surface areas must be sampled to offer a level of confidence that contamination will be detected if still present (use aggressive and grid sampling).</p>
<b>Waste Disposal</b>	<p>Untreated waste should be appropriately labeled. Waste generated from CCHF should be autoclaved, chemically disinfected, or fumigated and then tested to be sure the CCHF virus was inactivated. Store waste in sealed containers that are appropriately labeled as a BSL-4. Guidance on estimating the amount of waste and the nearest location for either incineration or land filling of the waste can be obtained from Dr. Paul Lemieux [phone: (919) 541-0962; Fax: (919) 541-0496]. Keep in mind that in some states and localities, waste management will vary; for instance, waste may be considered municipal waste, medical waste, or infectious substances with special requirements for handling and disposal depending on the state. Therefore, it is important to contact the state or local regulatory agency early on in the process. CCHF is subject to DOT regulations. See <a href="http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm">http://hazmat.dot.gov/training/rmgmt/guide_anthrax.htm</a> (this website has guidelines for transporting anthrax and other infectious substances).</p>