



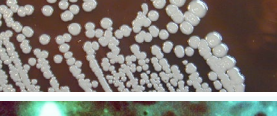


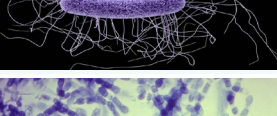
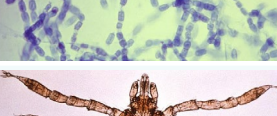
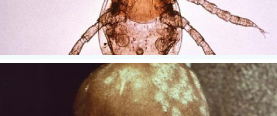





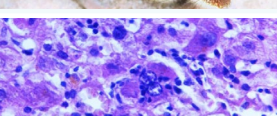

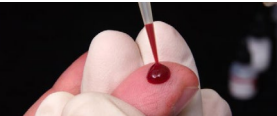


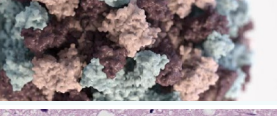
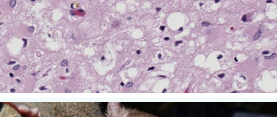







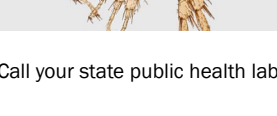



CLINICAL LABORATORY BIOLOGICAL EXPOSURE MONITORING GUIDE

Disease (Organism/Agent)	Notes	Exposure Risks and Routes of Transmission in the Laboratory Setting ⁸	Incubation Period	Symptoms (Will depend on route of transmission)
 Anthrax, Woollorter's disease (<i>Bacillus anthracis</i>)	1, 5*, 8, 14	Direct and indirect contact of broken skin with cultures and contaminated laboratory surfaces, accidental parenteral inoculation, exposure to infectious aerosols. LD50 is 2,500-55,000 for spores and will depend on the route of exposure. < 10 spores necessary for cutaneous anthrax infection.	Typically 1-6 days, with a range up to 60 days	Cutaneous: painless sore with black eschar. Inhalational: Fever and chills, chest discomfort, body aches. Gastrointestinal: Fever, chills, swelling of neck and neck glands, sore throat, painful swallowing, stomach pain, fainting, abdominal swelling. Injection anthrax: Fever, chills, blisters or bumps that may itch, painless skin sore with black eschar, swelling around sore.
 Blastomycosis (<i>Blastomyces dermatitidis</i>)	3, 14	Accidental parenteral inoculation with infected tissues or cultures of yeast form. Pulmonary infections from inhalation of conidia from mold-form cultures.	3 weeks - 3 months	Flu like symptoms, fever, cough, night sweats, myalgia (muscle pain) and arthralgia (joint pain), weight loss and anorexia, chest pain, fatigue.
 Brucellosis, Undulant fever, Malta fever, Mediterranean fever (<i>Brucella abortus, B. suis, B. melitensis</i>)	1, 5, 14	<i>Brucella spp.</i> have a very low infectious dose and are easily aerosolized. Ingestion, inhalation, accidental parenteral inoculation or contact with broken skin or mucosa. Direct exposure to samples or cultures (outside containment). ID is 10-100 organisms by aerosol or subcutaneous exposure.	5 days - 5 months	Initial symptoms: fever, sweats, malaise, anorexia, headache, pain in muscles, joint, and/or back, fatigue. Chronic symptoms: recurrent fevers, arthritis, swelling of the testicle and scrotum area, swelling of the heart (endocarditis), neurologic symptoms (in up to 5% of all cases), chronic fatigue, depression, swelling of the liver and/or spleen.
 Glanders (<i>Burkholderia mallei</i>)	1, 5*, 14	Ingestion, inhalation, accidental parenteral inoculation, and contact with broken skin or mucosa with cultures and infected tissues, purulent drainage, blood and sputum. There is increased risk for individuals with diabetes.	1-14 days	Fever with chills and sweating, muscle aches, chest pain, muscle tightness, headache, nasal discharge, light sensitivity (sometimes with excessive tearing of the eyes), ulceration at the site of localized infection, lymphadenopathy, abscess formation.
 Melioidosis, Whitmore's disease (<i>Burkholderia pseudomallei</i>)	1, 5*, 14	Ingestion, inhalation, inoculation, and direct contact via skin abrasions and mucous membranes.	1 day - years	Localized: Localized pain or swelling, fever, ulceration, abscess. Pulmonary: Cough, chest pain, high fever, headache, anorexia. Bloodstream: Fever, headache, respiratory distress, abdominal discomfort, joint pain, disorientation. Disseminated: Fever, weight loss, stomach or chest pain, muscle or joint pain, headache, seizures.
 Psittacosis (<i>Chlamydia psittaci</i>)	1, 14	Infectious aerosols in the handling, care, or necropsy of naturally or experimentally infected birds, mice and eggs.	5-14 days	Abrupt onset of fever and chills, headache, muscle aches, nonproductive cough, splenomegaly, rash.
 Botulism (<i>Clostridium botulinum</i> toxin)	1, 5*, 13	Exposure to toxin, and especially associated with activities that have high potential for aerosol or droplet formation. 0.7-0.9 µg of inhaled aerosolized toxin is likely enough to kill a 70 kg / 150 lb person.	6 hours - 10 days	Double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, difficulty breathing, thick-feeling tongue, dry mouth, muscle weakness.
 C. diff (<i>Clostridioides difficile</i>)	1, 14	Infectious aerosols are the most likely route of laboratory-associated infections (LAI) and could serve as a reservoir for vegetative cells and spores.	2-3 days	Severe diarrhea, fever, stomach tenderness or pain, loss of appetite, nausea.
 Coccidiomycosis, Valley Fever (<i>Coccidioides immitis, C. posadasii</i>)	3, 14	Inhalation of spores. Rarely, contact with broken skin can cause cutaneous infection.	1-3 weeks	Fatigue, cough, fever, shortness of breath, headache, night sweats, muscle aches or pains, rash on upper body or legs.
 Q fever (<i>Coxiella burnetii</i>)	1, 5, 9, 14	Inhalation of infectious aerosols. Accidental parenteral inoculation. Exposure to experimentally or naturally infected animals, their tissues, or body fluids. ID by inhalation is ~10 organisms.	9-39 days	Acute: Fever, chills, myalgia, arthralgia, headache, pneumonia, hepatitis.
 Dermatophytosis, Ringworm (<i>Microsporum, Epidermophyton and Trichophyton</i>)	3, 14	Contact with skin, nail lesions, contact with contaminated surfaces.	4-14 days after skin comes in contact with fungus	Ringworm can affect skin on almost any part of the body as well as fingernails and toenails. The symptoms of ringworm often depend on which part of the body is infected, but they generally include itchy skin, ring-shaped rash, red, scaly, cracked skin and hair loss.
 Encephalitis, EEE (Eastern Equine Encephalitis virus)	2, 5, 6, 12	Inhalation of infectious aerosols, accidental parenteral inoculation. Exposure to infected animals and mosquitoes in the lab.	1-10 days	Sudden onset of headache, high fever, chills, and vomiting; severe cases may progress to disorientation, seizures, or coma.
 Ebola virus disease, EVD (Ebola virus)	2, 5*, 12	Direct contact of infectious material with mucous membranes, accidental parenteral inoculation.	2-21 days	Fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal pain, unexplained hemorrhage.
 STEC/VTEC disease (Toxicogenic <i>Escherichia coli</i>, Shiga toxin-producing/Verotoxinogenic)	1, 12	Accidental ingestion. Low infectious dose (~10-100 organisms).	1-10 days	Severe stomach cramps, diarrhea (often bloody), vomiting, fever, hemolytic-uremic syndrome (HUS).
 Tularemia, Rabbit fever, Deer-tick Fever (<i>Francisella tularensis</i>)	1, 5*, 14	<i>Francisella spp.</i> have a very low infectious dose and are easily aerosolized. Direct contact with infectious material on mucous membranes, accidental parenteral inoculation, ingestion, exposure via aerosols.	1-14 days; typically within 3-5 days	All entry route symptoms include fever. Pneumonic: Cough, chest pain, difficulty breathing. Oropharyngeal: Sore throat, mouth ulcers, tonsillitis, swollen lymph nodes. Glandular & Ulceroglandular: Skin ulcers and regional lymph node swelling. Oculoglandular: Inflammation of eye and lymph node near ear. Typhoidal: No localizing symptoms.
 Hantavirus Pulmonary Syndrome, HPS (Hantavirus)	2, 12	Direct contact of infectious material with mucous membranes, accidental parenteral inoculation, ingestion, exposure via aerosols and animal bites in the lab.	1-8 weeks	Fatigue, fever, muscle aches, headaches, may also have dizziness, chills, abdominal pain, nausea, vomiting, diarrhea. Acute respiratory distress syndrome (ARDS) can develop 4-10 days later.
 Hepatitis disease (Hepatitis B and C viruses)	2, 8 (Hep B only), 13	Parenteral inoculation, droplet exposure of mucous membranes, contact exposure with broken skin.	(Hepatitis B) 2-5 months (Hepatitis C) 2-12 weeks	Fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, jaundice, joint pain, clay-colored bowel movements.
 Histoplasmosis (<i>Histoplasma capsulatum</i>)	3, 14	Inhalation of spores (conidia); not transmitted from person to person.	Typically 3-17 days for acute disease	90% of infections are asymptomatic or result in a mild influenza-like illness. Most people spontaneously recover 2-3 weeks after onset of symptoms, although fatigue may persist longer. High-dose exposure can lead to severe pulmonary disease.
 AIDS (Human Immunodeficiency virus)	2, 14	Parenteral inoculation, droplet exposure of mucous membranes, contact exposure with broken skin.	2-4 weeks for symptoms; years to develop AIDS	Flu-like illness, fatigue, swollen lymph glands, sore throat.
 Tuberculosis (<i>Mycobacterium tuberculosis</i>)	1, 10, 14	<i>M. tuberculosis</i> has a very low infectious dose and are easily aerosolized. Laboratory-generated aerosols. Accidental needle sticks and sharps injury. Note: Other <i>Mycobacterium</i> species such as <i>M. africanum</i> , <i>M. bovis</i> , and <i>M. microti</i> also can cause disease in humans.	4-6 weeks	Pulmonary: Cough, fever, fatigue, night sweats, weight loss. Extrapulmonary: Symptoms will vary depending on disease progression and dissemination.
 Meningococcal disease, Meningitis (<i>Neisseria meningitidis</i>)	1, 8, 14	Manipulating suspensions or isolates outside of containment (e.g., biological safety cabinet). Parental inoculation, droplet exposure to mucus membranes, infectious aerosol and ingestion are primary hazards. Sterile site isolates are considered greater risk.	2-10 days, typically 3-4 days	Sudden onset of fever, intense headache, nausea, vomiting, stiff neck, and photophobia. Petechial rash with pink macules or vesicles may occur.
 Norovirus disease (Norovirus)	2, 12	Hand to mouth transmission from contaminated materials and surfaces, and aerosol generating activities with contaminated samples.	12-48 hours	Diarrhea, vomiting, nausea, stomach pain, fever, headache, body aches.
 Creutzfeldt-Jakob disease (CJD) / Transmissible spongiform encephalopathies (TSEs) (Prions)	4, 12	Needle sticks and sharps injury from high risk specimens. Brain and other central nervous system tissues are the highest risk. Lower infectivity specimens include lymphoid tissues, spleen, gut, bone marrow, and blood. Blood and other bodily fluids, except for CSF, are not considered infectious and require no special precautions.	Unknown	Progressive mental deterioration that soon becomes associated with progressive unsteadiness and clumsiness, visual deterioration, muscle twitching (myoclonus), a variety of other neurological symptoms and signs, and is often associated with a characteristic periodic electroencephalogram.
 Rabies disease (Rabies virus)	2, 8, 14	Transmitted through direct contact (such as through broken skin or mucous membranes in the eyes, nose, or mouth) with saliva or brain/nervous system tissue from an infected animal. Inhalation of aerosolized rabies virus is a potential non-bite route of exposure.	3-12 weeks, depending on exposure site, virus type, existing immunity	Initial symptoms similar to flu including general weakness, fever, or headache. Later symptoms include cerebral dysfunction, anxiety, confusion, and agitation, then eventually delirium, abnormal behavior, hallucinations, hydrophobia, and insomnia. Once clinical signs appear, the disease is nearly always fatal.
 Salmonellosis (<i>Salmonella spp.</i>)	1, 11, 14	Manipulating suspensions or isolates which can create aerosols or splash potential.	6-72 hours	Gastroenteritis with nausea, vomiting, abdominal cramps, diarrhea, fever, chills, possible headache, blood in the stool.
 Shigellosis (<i>Shigella spp.</i>)	1, 14	<i>Shigella spp.</i> have a very low infectious dose and are easily aerosolized. Manipulating suspensions or isolates which can create aerosols or splash potential. ID is 10-200 organisms.	1-7 days	Watery diarrhea, abdominal cramping, nausea, vomiting, fever, and blood or mucus in the stool.
 COVID-19 (SARS-CoV-2)	2, 8, 13	Exposure to laboratory-generated aerosols including procedures with a high likelihood of generating aerosols or droplets.	2-14 days	Fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea, vomiting, diarrhea.
 Smallpox (Variola Major virus) Alastrim (Variola virus)	2, 5*, 8, 13	Mucus membranes, broken skin, ingestion, parenteral inoculation of droplet or fine-particle aerosol inhalation. Note: Currently eradicated globally.	7-17 days	Becomes associated with progressive unsteadiness and clumsiness, visual deterioration. Progresses to profuse rash on the body that will fill with fluid and have a dent in the center.
 Venezuelan Equine Encephalitis, or Encephalomyelitis VEE (Venezuelan Equine Encephalitis virus)	2, 5, 7, 12	Exposure to laboratory-generated aerosols. Needle sticks and sharps injury.	1-6 days	Muscle twitching (myoclonus), a variety of other neurological symptoms and signs.
 West Nile virus disease (West Nile virus)	2, 12	Inhalation of infectious aerosols, accidental parenteral inoculation. Exposure to infected animals and mosquitoes in the lab.	2-6 days, but can range 2-14 days	70-80% of infections are subclinical or asymptomatic. Symptoms can include headache, weakness, myalgia, or arthralgia; gastrointestinal symptoms and a transient maculopapular rash also are commonly reported. Rarely, cardiac dysrhythmias, myocarditis, pancreatitis, and hepatitis have been described in patients with WNV disease.
 Plague (Bubonic Plague, Black Death) (<i>Yersinia pestis</i>)	1, 5*, 14	Direct contact with cultures and infectious materials and inhalation of infectious aerosols or droplets, accidental autoinoculation, ingestion.	1-7 days, 1-4 for primary pneumonic plague	Often associated with a characteristic periodic electroencephalogram.

Call your state public health laboratory for guidance towards potential biological exposure events:

Each facility should perform its own site specific risk assessment based on their facility needs to determine appropriate safety precautions. Organism risk group information may be obtained from ABSA Risk Group Database at <https://my.absa.org/riskgroups>. NOTES: "ID" = Infectious dose. "LD" = Lethal dose. (1) bacteria; (2) virus; (3) fungus; (4) prion; (5) select agent and (5*) Tier 1 select agent: any potential exposure to a select agent requires a completed CDC/APHIS Form 3 and any identified select agent requires a completed CDC/APHIS Form 4 (see www.selectagents.gov); (6) low pathogenic strain of South American EEE virus is select agent exempt; (7) VEE subtypes except for Subtypes IAB or IC may be select agent exempt if the agent is within the exclusion category; (8) vaccine is available: consult www.cdc.gov/vaccines for vaccine recommendations and www.selectagents.gov for medical surveillance requirements if select agents are involved; (9) vaccine not commercially available in the US - only through specialized immunization programs; (10) attenuated live BCG vaccine used in international countries, but not recommended in the US; (11) typhoid vaccine recommended for some travel; (12) Supportive care only; (13) Limited treatment options; (14) Antimicrobial treatment(s) available. Always consult current CDC and other healthcare treatment guidelines.

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