Activities and Controls								
Phase	**Activity/Practice/Procedure**	**Potential Hazard(s)**	**Control Type**	**Recommended Control**	**BSL**	**Special Considerations**	**Source of Control Recommendation**	**Chapter/ Page #**
1) Specimen receipt	Package receipt and transfer of packages to testing area	Leaking specimen container	Eng	Submit specimens to the laboratory in transport bags that isolate the patient requisition from specimens	2		MMWR Safe Work	p13
1) Specimen receipt	Package receipt and transfer of packages to testing area	Leaking specimen container	A/WP	Limit transport bags to one patient to prevent misidentification and cross-contamination	2		MMWR Safe Work	p13
1) Specimen receipt	Moving specimen by pneumatic tube system	Breakage or leakage of specimen/Contamination of PTS	A/WP	Establish SOPs for use and decontamination of the pneumatic tube system (PTS). Limit specimen size, volume, weight, and container types sent through the tube system, if warranted (applies particularly to cytology specimens and certain types of urine containers). Protect requisition forms by a separate pouch, or enclose them in a separate secondary bag to prevent contamination. Ensure that zip-lock bags contain specimens from only one patient. Wear gloves when opening PTS carriers containing patient specimens. Decontaminate the outside of tube carriers before returning them to patient-care areas.	2		MMWR Safe Work	p15
1) Specimen receipt	Moving specimen by pneumatic tube system	Breakage or leakage of specimen/Contamination of PTS	Eng	Place all specimens sent through a PTS in a sealed zip-lock bag. Test bags (ensure they are leak proof under the conditions in the PTS). Place absorbent wadding between patient bags.	2		MMWR Safe Work	p15
1) Specimen receipt	Moving specimen by pneumatic tube system	Contaminated pneumatic tube carrier	A/WP	Handle contaminated pneumatic tube carriers in accordance with standard precautions. Disinfect contaminated carriers with bleach solution or other disinfectant following the protocol recommended by manufacturer and approved by hospital's infection control committee if the system is in use in a hospital. Develop a system to track and analyze incidents of improperly closed carriers, cracked tubes, loose caps, and leaking containers (increases in documented events may indicate need to clarify or strengthen PTS-use policies or improve specimen collection practices; could identify defective carriers and/or container lot numbers).	2		MMWR Safe Work	p15
1) Specimen receipt	Moving specimen by pneumatic tube system	Problem with PTS	A/WP	Establish a facility hotline for immediately reporting problems with the PTS. Establish an emergency PTS shutdown plan, including roles and responsibilities; include implementation of an alternative specimen transport plan.	2		MMWR Safe Work	p15
1) Specimen receipt	Transportation of clinical specimen to hospital laboratory when Ebola (EVD) is a concern	Spill	Eng	Place specimen in a durable, leak-proof secondary container for transport within the hospital.	2	Hospital with potential Ebola (EVD) specimen	CDC Ebola	p16
1) Specimen receipt	Transportation of clinical specimen to hospital laboratory when Ebola (EVD) is a concern	Spill/Container breakage	A/WP	Do not use a pneumatic tube system.	2	Hospital with potential Ebola (EVD) specimen	CDC Ebola	p16
1) Specimen receipt	Transportation of clinical specimen to hospital laboratory when Ebola (EVD) is a concern	Contamination of specimen container	A/WP	Disinfect the outside of specimen containers with EPA-registered hospital disinfectant prior to removal from room.	2	Hospital with potential Ebola (EVD) specimen	CDC Ebola	p16

2) Specimen handling	Opening specimen package and specimen accessioning (including specimen container labeling and paperwork handling)	Leaking specimen container	A/WP	Request a new specimen if a container is broken or has spilled its contents. These containers are unacceptable for culture because the contents may have become contaminated.	2		MMWR Safe Work	p13
2) Specimen handling	Opening specimen package and specimen accessioning (including specimen container labeling and paperwork handling)	Leaking specimen container	A/WP	Visually examine containers for leaks upon arrival and before placing on rockers, in centrifuges, in racks, in closed-tube sampling (cap-piercing probe) systems, in automated aliquot stations or automated slide preparation systems, or on conveyor belts.	2		MMWR Safe Work	p13
2) Specimen handling	Receipt of sputum containers in the testing area	External contamination or leaking	A/WP	Consider all sputum containers as coming from patients with tuberculosis or pneumonia. If leaking or contaminated, consider rejecting and requesting another specimen if feasible. Change and discard gloves after disinfection and cleanup (1:10 bleach solution or appropriate disinfectant)	2		MMWR Safe Work	p14
2) Specimen handling	Receipt of blood culture bottles in the testing area	External contamination or leaking	A/WP	Consider all blood culture bottles as coming from patients potentially infected (e.g., with human immunodeficiency virus [HIV] or hepatitis). If leaking or contaminated, carefully disinfect the outside of the tubes or bottles before inserting into blood culture instruments. Change and discard gloves after cleanup and decontamination of immediate area.	2		MMWR Safe Work	p14
2) Specimen handling	Receipt of stool containers in the testing area	External contamination or leaking	A/WP	If leaking or contaminated, reject if feasible and request a new specimen. Otherwise, disinfect outside of the container before culturing the contents and change and discard gloves before proceeding.	2		MMWR Safe Work	p14
2) Specimen handling	Receipt of viral specimens in the testing area	External contamination or leaking	A/WP	If leaking or contaminated, consider discarding before opening. Contact the supervisor for instructions on whether or not to continue processing, and be prepared to notify the submitter and request another specimen.	2	Virology	MMWR Safe Work	p14
2) Specimen handling	Receipt of specimens in the testing area	External contamination or leaking	A/WP	Consider all specimen containers as potentially contaminated. Wipe off visible contamination using towel or gauze pad moistened with acceptable decontaminant (such as 1:10 dilution of household bleach or established laboratory disinfectant). Ensure label and bar code are not obscured before advancing specimen for analysis.	2		MMWR Safe Work	p14
2) Specimen handling	Receipt of specimens in the testing area	Loose cap	A/WP	Grasp tube or outside of the specimen container, not the stopper or cap, when picking up tubes or specimen. Ensure tops are tightly secured before advancing for analysis or storage.	2		MMWR Safe Work	p14
2) Specimen handling	Handling dry ice (solidified carbon dioxide)	Frostbite	A/WP	Avoid contact with skin and eyes. Never handle with bare hands. Always wear insulated gloves and safety glasses. Wear laboratory coat.	2	Chemical hazard	MMWR Safe Work	p21
2) Specimen handling	Handling dry ice (solidified carbon dioxide)	Explosion	A/WP	Never place into glass or sealed containers. Do not dispose of dry ice in sewers, sinks, or toilets.	2	Chemical hazard	MMWR Safe Work	p21

2) Specimen handling	Handling dry ice (solidified carbon dioxide)	Asphyxiation	A/WP	When transporting dry ice, place the container in the trunk of the car or truck bed, and leave the car windows open for fresh air circulation. To dispose, allow the dry ice to sublimate or evaporate to the atmosphere in a well-ventilated area where CO2 vapor cannot build up.	2	Chemical hazard	MMWR Safe Work	p21
2) Specimen handling	Specimen paperwork handling	Contamination of paperwork	A/WP	Copy information on the forms or written matter onto another form and discard original into the biohazard waste container.	2		MMWR Safe Work	p27
3) Testing process	Working with bacterial cultures	Contains high-risk pathogens	A/WP	Continue work in a BSC if the following are observed: 1) Slowly growing, tiny colonies at 24–48 hours with Gram stain showing gram-negative rods or gram-negative coccobacilli 2) Slow growth in blood culture bottles (i.e., positive at ≥48 hours), with Gram stain showing small gram-negative rods or gram-negative coccobacilli 3) Growth only on chocolate agar 4) Rapid growth of flat, nonpigmented, irregular colonies with comma projections and ground-glass appearance 5) Gram stain showing boxcar-shaped, gram-positive rods with or without spores.	2	Bacteriology	MMWR Safe Work	p8
3) Testing process	Subculturing blood culture bottle	Needle stick—percutaneous inoculation	Eng	Safer sharps; retractable needles; puncture-resistant sharps container	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Needle stick—percutaneous inoculation	A/WP	No recapping; immediate disposal into sharps container	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Needle stick—percutaneous inoculation	PPE	Gloves; gown or lab coat	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Aerosols—inhalation	Eng	BSC or splash shield	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Aerosols—inhalation	A/WP	Work inside BSC or behind splash shield	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Aerosols—inhalation	PPE	Face protection if not in BSC; gloves; gown or lab coat with knit cuffs	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Splash—direct contact with mucous membranes	Eng	BSC or splash shield	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Splash—direct contact with mucous membranes	A/WP	Work inside BSC or behind splash shield	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Subculturing blood culture bottle	Splash—direct contact with mucous membranes	PPE	Face protection if not in BSC; gloves; gown or lab coat	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Centrifugation	Aerosols—inhalation	Eng	BSC; removable rotors; safety cups; O-rings on buckets; plastic tubes; splash shield	2		MMWR Safe Work	p11
3) Testing process	Centrifugation	Aerosols—inhalation	A/WP	Spin in BSC, or load and unload rotor in BSC; check O-rings and tubes for wear; no glass tubes; wait for centrifuge to stop before opening	2		MMWR Safe Work	p11
3) Testing process	Centrifugation	Aerosols—inhalation	PPE	Face protection if not in BSC; gloves; gown or lab coat with knit cuffs	2		MMWR Safe Work	p11
3) Testing process	Performing Gram stain	Aerosols from flaming slides	Eng	Slide warmer	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Performing Gram stain	Aerosols from flaming slides	A/WP	Air dry or use slide warmer	2	Bacteriology	MMWR Safe Work	p11

3) Testing process	Performing Gram stain	Aerosols from flaming slides	PPE	Lab coat; gloves (optional)	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Preparing AFB smear only	Aerosols from sputum or slide prep	Eng	Work in BSC; sputum decontaminant; slide warmer	2	Mycobacteriology ; TB	MMWR Safe Work	p11
3) Testing process	Preparing AFB smear only	Aerosols from sputum or slide prep	A/WP	Use slide warmer in BSC; dispose of slide in tuberculocidal disinfectant	2	Mycobacteriology ; TB	MMWR Safe Work	p11
3) Testing process	Preparing AFB smear only	Aerosols from sputum or slide prep	PPE	Lab coat; gloves	2	Mycobacteriology ; TB	MMWR Safe Work	p11
3) Testing process	Catalase testing	Aerosols— mucous membrane exposure	Eng	BSC; disposable tube	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Catalase testing	Aerosols— mucous membrane exposure	A/WP	Work in BSC or perform in disposable tube	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	Catalase testing	Aerosols— mucous membrane exposure	PPE	Lab coat; gloves; eye protection	2	Bacteriology	MMWR Safe Work	p11
3) Testing process	AFB culture work-up	Aerosols—inhalation	Eng	BSL-3 laboratory optimal; BSL-2 laboratory with BSC minimal	2	Mycobacteriology ; TB	MMWR Safe Work	p11
3) Testing process	AFB culture work-up	Aerosols—inhalation	A/WP	All work in BSC using BSL-3 practices (BSL-2 practice plus restricted access, all work performed in a BSC (additional PPE), and decontamination of all waste before disposal)	2	Mycobacteriology ; TB	MMWR Safe Work	p11
3) Testing process	AFB culture work-up	Aerosols—inhalation	PPE	Solid-front gown with cuffed sleeves; gloves; respirator if warranted	2	Mycobacteriology ; TB	MMWR Safe Work	p11
3) Testing process	Specimen processing	Aerosolization/Splash/Spl atter	Eng	Ideally, all specimens in a BSL-2 or higher facility are to be processed in a BSC adhering to safe BSC practices.	2		MMWR Safe Work	p13
3) Testing process	Specimen processing	Aerosolization/Splash/Spl atter	A/WP	If a BSC is unavailable in the laboratory, the laboratorian processing intake specimens must wear a laboratory coat and gloves, employ an effective splash shield, and continue to follow universal precautions.	2		MMWR Safe Work	p13
3) Testing process	Specimen processing	Aerosolization/Splash/Spl atter	A/WP	If using a 4-foot-wide BSC for inoculating plates and preparing smears, limit to one employee at a time	2		MMWR Safe Work	p13
3) Testing process	Specimen processing	Aerosolization/Splash/Spl atter	PPE	Minimal PPE for the general setup area is gown and gloves	2		MMWR Safe Work	p13
3) Testing process	Specimen processing	Aerosolization/Splash/Spl atter	PPE	Surgical-type mask is recommended but optional if the BSC is used	2		MMWR Safe Work	p13
3) Testing process	Performing Gram stain	Exposure to irritating, toxic, or carcinogenic stains	A/WP	Use eye protection (safety glasses or chemical splash goggles) and disposable gloves during staining or preparing stains.	2	Bacteriology	MMWR Safe Work	p14
3) Testing process	Performing Gram stain	Aerosolization, skin, and environmental exposure to live organisms	A/WP	Use eye protection (safety glasses or chemical splash goggles) and disposable gloves during staining. Place contaminated waste in a biohazard bag for disposal.	2	Bacteriology	MMWR Safe Work	p14
3) Testing process	Servicing or shipping equipment	Equipment contamination	A/WP	Examine equipment contaminated with blood or other potentially infectious materials before servicing or shipping, and decontaminate as necessary. Contact manufacturer for decontamination process. If not possible, label equipment with biohazard symbol and second label specifically identifying which portions remain contaminated. Convey information to all affected employees and servicing representatives before handling, servicing, or shipping so that appropriate precautions will be taken.	2		MMWR Safe Work	p15

3) Testing process	Specimen aliquotting and pipetting	Aerosolization/Splash/Splatter	PPE	Remove caps behind a bench-fixed splash shield or wear additional PPE appropriate to protect from splashes and aerosols.	2		MMWR Safe Work	p15
3) Testing process	Specimen aliquotting and pipetting	Aerosolization/Splash/Splatter	A/WP	Place gauze pad over cap then slowly pry or push cap off with an away-from-body motion. Never reuse a gauze pad (doing so might contribute to cross-contamination). Several manufacturers market safety devices to help remove caps from tubes and to break open ampoules.	2		MMWR Safe Work	p15
3) Testing process	Specimen aliquotting and pipetting	Aerosolization/Splash/Splatter	Eng	Use automated or semiautomated pipettes and safety transfer devices.	2		MMWR Safe Work	p15
3) Testing process	Working with blood cultures	Splash	Eng	Use splash guards	2	Bacteriology	MMWR Safe Work	p16
3) Testing process	Working with bacterial cultures	Inhalation	A/WP	Do not sniff bacterial cultures growing on artificial media	2	Bacteriology	MMWR Safe Work	p16
3) Testing process	Flaming loops and needles	Aerosolization	A/WP	Do not use open flame burners anywhere in the laboratory. Use disposable loops and needles or use electric incinerators for metal wire devices.	2	Bacteriology	MMWR Safe Work	p16
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	Do not sweep your arms into or out of the cabinet. Move arms in and out slowly, perpendicular to the face opening.	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	Install the BSC in the laboratory away from walking traffic, room fans, and room doors.	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	Do not block the front grill where downflow of air is conducted, or the rear grill where air is removed from the cabinet.	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	Let the blowers operate at least 4 minutes before beginning work to allow the cabinet to “purge.”	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	At the beginning and end of the day, with the blower running, disinfect all surfaces with a 1:10 dilution of household bleach, and remove residual bleach with 70% alcohol, or use another disinfectant appropriate for the organisms encountered.	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	Do not use open flames inside the cabinet. First choice: disposable loops; second choice: electric furnaces.	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	To decontaminate the BSC before maintenance, engage a BSC certification technician to use either formaldehyde gas, hydrogen peroxide vapor, or chlorine dioxide gas when the BSC is not in use.	2		MMWR Safe Work	p18
3) Testing process	Centrifuging	Aerosolizing	A/WP	Open sealed rotors or safety cups on high-speed and ultracentrifuges in a BSC, particularly when respiratory pathogens are manipulated. Where safety cups or sealed rotors cannot be used, place centrifuges in a containment device or BSC designed for this purpose.	2		MMWR Safe Work	p18
3) Testing process	Working in a BSC	Aerosolization/Splash/Splatter	A/WP	Collect medical waste generated inside the BSC in bags or sharps containers. Seal these before removal and place in medical waste containers outside the BSC.	2		MMWR Safe Work	p18
3) Testing process	Working with bleach solutions (sodium hypochlorite)	Irritation, corrosion, and release of chlorine gas	A/WP	Do not autoclave bleach solutions. Never mix different chlorine solutions or store them with cleaning products containing ammonia, ammonium chloride, or phosphoric acid.	2	Chemical hazard; Bleach	MMWR Safe Work	p19

3) Testing process	Working with liquid gases (cryogens) including liquid nitrogen and liquid helium	Contact burns and freezing	A/WP	Always wear eye protection (face shield over safety goggles). Do not allow any unprotected skin to contact uninsulated piping, hoses, tongs, spargers, specimen box storage racks, or other metal objects because these become extremely cold when exposed to liquid nitrogen. When filling cryogenic dewars, wear long-sleeved shirts or laboratory coats, long trousers (preferably without cuffs which could trap the liquid), closed shoes (never sandals or open shoes), and insulated cryogloves labeled as appropriate for use with cryogenic liquids. Do not tuck pant legs into shoes or boots. Wear loose-fitting thermal gloves with elbow-length cuffs when filling dewars. Never place gloved hands into liquid nitrogen or into the liquid nitrogen stream when filling dewars. Use special cryogenic liquid tongs when retrieving items from liquid nitrogen. Do not insert a hollow tube into the liquid nitrogen because liquefied gas may spurt from the tube.	2	Chemical hazard	MMWR Safe Work	p23
3) Testing process	Working with liquid gases (cryogens) including liquid nitrogen and liquid helium	Asphyxiation	A/WP	Do not store dewars or nitrogen containers in a confined space. If enclosed spaces must be used, install oxygen monitors.	2	Chemical hazard	MMWR Safe Work	p23
3) Testing process	Working with liquid gases (cryogens) including liquid nitrogen and liquid helium	Explosion	A/WP	Move dewars carefully. Do not drop, tip, or roll containers on their sides. Do not plug, remove, or tamper with any pressure relief device. Keep vents open at all times. Always use special ultralow-temperature containers to hold liquid nitrogen.	2	Chemical hazard	MMWR Safe Work	p23
3) Testing process	Working with liquid gases (cryogens) including liquid nitrogen and liquid helium	Cryotube explosion	PPE	When removing cryotubes and ampoules from nitrogen tanks, wear ANSI-specification, impact resistant face shield, heavy gloves, and a buttoned laboratory coat.	2	Chemical hazard	MMWR Safe Work	p24
3) Testing process	Working with liquid gases (cryogens) including liquid nitrogen and liquid helium	Cryotube explosion	Eng	Place cryotubes and ampoules onto gauze or paper toweling in an autoclavable, heavy-walled container immediately after removal from the nitrogen tank, and close the lid of the heavy-walled container quickly. If an explosion occurs, autoclave the entire vessel. Use plastic cryotubes rated for liquid nitrogen temperatures.	2	Chemical hazard	MMWR Safe Work	p24
3) Testing process	Working with ultraviolet (UV) light	Skin cancers, corneal scarring, and skin burns	A/WP	UV lamp must never be on while an operator is working in BSC	2		MMWR Safe Work	p25

3) Testing process	Working with ultraviolet (UV) light	Skin cancers, corneal scarring, and skin burns	PPE	• Wear UV safety glasses when performing routine lamp maintenance or when potential exists for direct or indirect] (reflected light) exposure. Make sure the protective eyewear is rated for UVC protection. • Wear gloves, long-sleeved laboratory coat, and full-face shield when working with UV view boxes lacking protective filter shields. • In areas where UV light is used, display placards stating "Caution, Ultraviolet Light, Wear Protective Eyewear."	2		MMWR Safe Work	p25
3) Testing process	Working with vacuum devices	Implosion	A/WP	• Check for racks, chips, and scratches in vacuum flasks • When infectious agents or blood or blood products are being handled, use of plastic flasks if possible	2		MMWR Safe Work	p25
3) Testing process	Working with vacuum devices	Implosion	Eng	Use implosion guards made of plastic mesh or plastic boxes with suction flasks	2		MMWR Safe Work	p25
3) Testing process	Working with vacuum devices	Aerosolization	Eng	• Use vacuum-assisted aspiration traps consisting of one or two suction flasks plumbed together in series with an in-line HEPA filter (e.g., Vacushield Vent Device, Pall Life Sciences, Port Washington NY, or equivalent device) to prevent contamination of the vacuum pump or house vacuum system. • When using a dedicated vacuum pump, consider including a suction flask containing coarse Drierite (W.A. Hammond Drierite Co., Ltd, Xenia, OH) or an equivalent desiccant to remove moisture from the air, thereby protecting the pump. • Use aspiration devices in a BSC to contain any aerosols.	2		MMWR Safe Work	p25
3) Testing process	Working with vacuum devices	Aerosolization	PPE	• Wear a disposable laboratory coat and gloves to protect from infectious droplets.	2		MMWR Safe Work	p26
3) Testing process	Working with vacuum devices	Aerosolization	A/WP	• When a culture aspiration is complete, allow the BSC blower to run for 5 minutes to purge any airborne aerosols; decontaminate the work surfaces in the normal manner. • Replace the in-line HEPA filters every 6 months or when they become wet or noticeably blocked.	2		MMWR Safe Work	p26
3) Testing process	Handling glass and breakable objects	Breakage	A/WP	• Never pick up broken glass with gloved or bare hands. Use forceps, disposable plastic scoops, tongs or hemostats to pick up broken glass • Dispose of the broken glass into a sharps container.	2		MMWR Safe Work	p26

3) Testing process	Handling glass and breakable objects containing infectious substances	Breakage	A/WP	• Wear appropriate gloves for this procedure • Cover the broken container and spilled infectious substance with a cloth or with paper towels. • For the routine BSL-2 laboratory, pour a disinfectant or a fresh 1:10 household bleach solution over the covered area and leave for a minimum of 20 minutes (It would take 23 minutes to clear the air of airborne M. tuberculosis from a spill at 99% removal efficiency if the room had 12 room air changes per hour, and 35 minutes for this removal with 99.9% efficiency). • Clear away cloth or paper towels and the broken material into biohazard sharps receptacles. Handle fragments of glass with forceps, not gloved hands.	2		MMWR Safe Work	p27
3) Testing process	Pipetting with Pasteur pipettes	Sharp/cut	A/WP	• Substitute plastic or evaluate the procedure to determine if a newer or better technique is now available. • Before handling a glass Pasteur pipette, examine the top of the pipette to see if it is broken or cracked. • Dispose of used Pasteur pipettes in leak- and puncture-resistant containers.	2		MMWR Safe Work	p27
3) Testing process	Pipetting	Aerosolization	PPE	Wear gloves, eye protection, and a laboratory coat with knit cuffs when pipetting and to perform pipetting operations in a BSC	2		MMWR Safe Work	p28
3) Testing process	Pipetting with Serologic pipettes	Aerosolization	A/WP	• When expelling the last drops of fluid, place the pipette tip against the inside wall of tubes, flasks, or other vessels and gently expel. • Because vigorous pipetting (rapid aspiration of fluid into the pipette) can generate aerosols within pipettes and some aerosols can travel through the cotton plug and contaminate the pipetting device, decontaminate pipette bulbs regularly and whenever they become contaminated. If present in the pipette, replace HEPA filters regularly and whenever they become wet.	2		MMWR Safe Work	p29
3) Testing process	Pipetting with serologic pipettes	Aerosolization	A/WP	Instead of dispersing cell clumps by drawing fluids into and out of the pipette to homogenize specimens and cell suspensions or “pipette mixing” culture dilutions, use closed cap vortex mixing. If pipette mixing is required, keep the pipette tip below the surface of the fluid and do not eject the entire fluid volume from the pipette.	2	Virology	MMWR Safe Work	p29

3) Testing process	Pipetting with mechanical pipettes	Aerosolization/Splash/Splatter	A/WP	• Touch pipette tips to the inside of the well or tube before pressing the delivery plunger. Never direct the pipetting stream into the middle of the well. • Exercise care when ejecting used tips into discard containers. • Use aerosol-resistant pipette tips. • Use commercial plastic-backed bench paper in BSCs and on laboratory work benches to contain or absorb contamination from falling drops. • When faced with the inevitability of a falling drop, lower the tip of the pipette and allow the drop to fall a short distance onto an absorbent towel.	2		MMWR Safe Work	p29
3) Testing process	Pipetting with mechanical pipettes	Contamination of the pipette barrel	A/WP	• Do not extend the barrel of the pipette into a reagent, sample or discard container. If normal length tips cannot reach the fluid in the tube, use extended reach pipette tips to prevent barrel contamination. • Disinfect mechanical pipettes regularly following the manufacturer's instructions or with a 1:10 household bleach dilution followed by 70% alcohol to remove as much bleach as possible.	2		MMWR Safe Work	p29
3) Testing process	Opening culture tubes, shell vials, microcentrifuge tubes, specimen vials, and other containers	Aerosolization/Splash/Splatter	A/WP	Because thin films sometimes form in the neck and breaking or popping this film produces aerosols and microdroplet splatter, recap and centrifuge containers with thin films in the neck whenever possible. When not possible, place gauze or another absorbent material over the opening and insert a pipette into the flask to disrupt the film.	2		MMWR Safe Work	p29
3) Testing process	Opening microcentrifuge and other plug-topped tubes	Aerosolization/Splash/Splatter	A/WP	• Use screw-cap microcentrifuge tubes if possible • Subject microcentrifuge tubes to a quick "pulse" centrifugation before they are opened. • Open microcentrifuge tubes in a BSC whenever possible. • When opening plug-seal microcentrifuge tubes, cover the top of the tube with absorbent material (e.g., alcohol-moistened gauze) to catch any splatter that might occur.	2		MMWR Safe Work	p30

3) Testing process	Opening serum vials of freeze-dried (lyophilized) material	Dispersion into the atmosphere of fine dry powders	A/WP	• Move vial and suggested diluent to a BSC. • Use a hemostat to remove the aluminum crimp from the vial. Discard the crimping material into the sharps container. • Cover the stopper with a moistened gauze pad, and carefully lift the edge of the stopper and allow air to slowly enter the vial. Do not disturb the contents of the vial. • Once the vacuum has been released, remove the stopper completely and place it upside down on absorbent paper. • Add the appropriate amount of diluent to the vial using a sterile pipette. • Replace the stopper and allow the vial contents to hydrate for several minutes. • Discard the gauze, stopper, and absorbent paper with other contaminated materials. • Using a pipette, transfer the contents of the vial to an appropriate container • Discard the original vial with other contaminated materials. • Do not use needle and syringe methods for removing infectious agents from serum vials.	2		MMWR Safe Work	p30
3) Testing process	Opening serum vials of freeze-dried (lyophilized) material	Dispersion into the atmosphere of fine dry powders	PPE	Wear gloves and laboratory coat.	2		MMWR Safe Work	p30
3) Testing process	Opening glass ampoules of freeze-dried (lyophilized) material	Dispersion into the atmosphere of fine dry powders	A/WP	• For ampoules containing infectious materials, cover the score line with gauze moistened with disinfectant; then break as usual using the safety ampoule breaker. • Place the ampoule breaker into a beaker containing a 1:10 bleach solution after removing the ampoule.	2		MMWR Safe Work	p30
3) Testing process	Opening glass ampoules of freeze-dried (lyophilized) material	Sharp/cut	A/WP	Use safety ampoule breakers.	2		MMWR Safe Work	p30
3) Testing process	Using ultrasonic device	Aerosolization	A/WP	• Use the lowest effective power setting to minimize aerosol generation. • Cover bath sonicators while the device is in use. • Properly decontaminate articles destined for ultrasonic cleaning before cleaning to prevent aerosolization of infectious agents. • Always conduct organism lysis and homogenization procedures in closed containers. • Change bath fluids frequently.	2		MMWR Safe Work	p30

3) Testing process	Using water baths	Growth of bacteria, algae, and fungi	A/WP	• Clean regularly even if disinfectants are added to the water. • Add disinfectant such as a phenolic detergent, fungicides, or algaecides, to the water as needed. Avoid using sodium azide to prevent growth of microorganisms because it forms explosive compounds with certain metals. • Raise the temperature to 90°C or higher for 30 minutes once a week for decontamination purposes. • Immediately clean after a spill or breakage. • Empty and clean regularly to minimize organism buildup and the production of biofilms.	2		MMWR Safe Work	p31
3) Testing process	Using CO_2 incubators with water (humidification) pans	Growth of bacteria, algae, and fungi	A/WP	• Add disinfectant such as a phenolic detergent, fungicides, or algaecides, to the water as needed. Avoid using sodium azide to prevent growth of microorganisms because it forms explosive compounds with certain metals. • Raise the temperature to 90°C or higher for 30 minutes once a week for decontamination purposes. • Immediately clean after a spill or breakage. • Empty and clean humidification pans regularly to minimize organism buildup and the production of biofilms.	2		MMWR Safe Work	p31
3) Testing process	Using a centrifuge	Aerosolization	Eng	Use sealed rotors with aerosol containment ("O-rings") and gasketed safety cups.	2		MMWR Safe Work	p32
3) Testing process	Using a centrifuge	Aerosolization	A/WP	• Load and unload rotors in a BSC, particularly in virology and mycobacteriology sections. • Clean centrifuges at the end of each shift and immediately after a spill. • Never operate centrifuges with visible spills of blood or body fluid present. • Have a centrifuge spill kit containing a disinfectant compatible with the centrifuge materials, puncture-resistant gloves, tweezers or forceps, cotton, hemostats, broom, hand brush, and dustpan.	2		MMWR Safe Work	p32
3) Testing process	Using a centrifuge	Rotor failure	A/WP	• Follow manufacturer instructions for use and care of centrifuges and especially rotors. • Provide annual stress testing and a complete certified analysis of rotors. • Retire rotors after the manufacturers' recommended revolutions or years of service, whichever comes first, except where an annual stress test (from Magnaflux [Glenview, IL] or other professionally recognized analysis) proves an absence of structural flaws.	2		MMWR Safe Work	p32

3) Testing process	Using a centrifuge	Broken specimen tube	A/WP	If tube breaks within plastic screw-capped canister or bucket: • Turn the motor off and allow time for aerosols to settle before opening the centrifuge. • Remove the canister and place in a BSC. • Notify a supervisor or senior person in charge and other colleagues working in the area. • While wearing protective clothing, open the canister under the BSC. • Pour a 1:10 dilution of bleach or a noncorrosive disinfectant into the canister; let the canister soak in bleach or disinfectant solution for 20 minutes. Clean canister thoroughly. • Use forceps, cotton held in forceps, tongs, or hemostats to pick up broken glass. • Discard all nonsharp contaminated materials from canister into a red biohazard bag for biohazard waste disposal. • Swab or wipe unbroken capped tubes with the same disinfectant; then swab or wipe again, wash with water, and dry. If tube breaks in centrifuge that doesn't have individual canisters but does have a biohazard cover and sealed rotor, follow manufacturer's instructions for cleaning and decontamination.	2		MMWR Safe Work	p32
3) Testing process	Using an automated analyzer	Aerosolization/Splash/Spl atter	A/WP	• Always use instruments according to manufacturer instructions. • Ensure instrument safety shields and containment devices are in place at time of use. • Limit the amount of hand movement near the sample probe and liquid-level sensors. • Fill sample cups and aliquot tubes using mechanical devices; never decant them.	2		MMWR Safe Work	p33
3) Testing process	Using an automated analyzer	Contamination of hands	PPE	• Wear gloves and use gauze pads with impermeable plastic coating on one side on instruments for which the operator is required to wipe sample probes after sampling.	2		MMWR Safe Work	p33
3) Testing process	Using an automated analyzer	Sample tray spill	A/WP	• Handle sample trays and sample plates with caution, and cover them when not being sampled to prevent spillage.	2		MMWR Safe Work	p33
3) Testing process	Using an automated analyzer	Spill on or within instrument	A/WP	• Follow manufacturer instructions for routine cleaning and trouble-shooting specimen spills on or within an instrument, including the appropriate PPE and type of cleaning solution to be used. • When manufacturer instructions do not include spill containment and cleanup instructions, collaborate with the manufacturer to develop an SOP that will effectively protect the operator and maintain and extend the instrument's operational life.	2		MMWR Safe Work	p33

3) Testing process	Using a cell sorter	Aerosolization	A/WP	• Follow safety guidelines found in Schmid I, Lambert C, Ambrozak D, Marti GE, Moss DM, Perfetto SP. International Society for Analytical Cytology biosafety standard for sorting of unfixed cells. Cytometry Part A. 2007;6:414–37. • Add bleach to the waste receptacle so that a full receptacle would contain about 10% bleach.	2		MMWR Safe Work	p33
3) Testing process	Using an ELISA plate washer	Contamination of the plate	PPE	Handle ELISA plates with gloves at all times.	2		MMWR Safe Work	p33
3) Testing process	Using an ELISA plate washer	Contamination of plate washer and surrounding area	A/WP	Disinfect ELISA plate washers and the area around the washer each day of use.	2		MMWR Safe Work	p33
3) Testing process	Using an ELISA plate washer	Aerosolization/Splash/Splatter	Eng	Whenever possible, place aerosol containment covers over ELISA plate washers to minimize aerosol contamination of laboratory workers and the environment.	2		MMWR Safe Work	p33
3) Testing process	Using a bacterial identification instrument	Contamination	A/WP	• Clean or disinfect according to the manufacturer's directions or recommendations. • Include the routine and emergency cleaning procedure for each instrument in the safety component of the procedure manual.	2	Bacteriology	MMWR Safe Work	p33
3) Testing process	Using an antimicrobial susceptibility instrument	Contamination	A/WP	• Clean or disinfect according to the manufacturer's directions or recommendations. • Include the routine and emergency cleaning procedure for each instrument in the safety component of the procedure manual.	2	Bacteriology	MMWR Safe Work	p33
3) Testing process	Using a blood culture instrument	Contamination	A/WP	• Clean or disinfect according to the manufacturer's directions or recommendations. • Include the routine and emergency cleaning procedure for each instrument in the safety component of the procedure manual.	2	Bacteriology	MMWR Safe Work	p33
3) Testing process	Using a PCR instrument	Contamination	A/WP	• Clean or disinfect according to the manufacturer's directions or recommendations. • Include the routine and emergency cleaning procedure for each instrument in the safety component of the procedure manual.	2		MMWR Safe Work	p33
3) Testing process	Using a rapid test (kit)	Aerosolization	A/WP	Limit the use of rapid testing kits to a specific area of the laboratory to maximize efficiency of environmental controls that can prevent aerosol exposures when manipulating reagents, samples, and control organisms.	2		MMWR Safe Work	p33
3) Testing process	Using a rapid test (kit)	Spill/contamination	Eng	Use disposable, flexible, polyethylene film–backed, nonskid, highly absorbent surface liners to contain spills and minimize contamination of test kit materials and boxes.	2		MMWR Safe Work	p33
3) Testing process	Using a rapid test (kit)	Spill/contamination	A/WP	Wipe the outside of test kits with appropriate laboratory disinfectant before returning them to the storage area.	2		MMWR Safe Work	p33

3) Testing process	Manipulating clinical specimen when Ebola (EVD) is a concern	Spill/Contamination	PPE	• Wear disposable gloves • Wear solid-front wrap around gowns that are fluid-resistant or impermeable • Wear surgical mask to cover all of nose and mouth • Wear eye protection such as a full face shield or goggles/safety glasses with side shields	2	Hospital with potential Ebola (EVD) specimen	CDC Ebola	p17
3) Testing process	Manipulating clinical specimen when Ebola (EVD) is a concern	Aerosolization/Splash/Splatter	Eng	• Use a certified Class I or certified Class II biosafety cabinet or other physical containment device. • When a BSC is not available or possible, then additional safety equipment should be used to contain any splashes or potential aerosols generated. • Use manufacturer-installed safety features for instruments that reduce the likelihood of exposure.	2	Hospital with potential Ebola (EVD) specimen	CDC Ebola	p17
3) Testing process	Testing clinical specimen with point of care (POC) instrument when Ebola (EVD) is a concern	Aerosolization/Splash/Splatter	Eng	• Place point of care (POC) instruments within an enclosure or behind a barrier to contain any splashes or potential aerosols that may be generated. • If placed inside a BSC, ensure that appropriate airflow is not compromised by overloading the inside of the BSC, or by blocking the front or back air intake grilles. Consider verifying inward airflow at the front opening of the BSC while instruments are operating. • When a BSC is not available or possible, use additional safety equipment to contain any splashes or potential aerosols generated, including a small benchtop BSC, a PCR workstation (e.g., "dead air box"), a plexiglass splash shield, or other physical containment device.	2	Hospital with potential Ebola (EVD) specimen	CDC Ebola	p17
5) Specimen disposal	Discarding urine remaining from culture activities	Biohazardous waste	A/WP	Discard down the sink drain or into the sanitary sewer.	2		MMWR Safe Work	p16
5) Specimen disposal	Discarding of feces and other non-urine specimens such as body fluids and respiratory specimens remaining from culture activities	Biohazardous waste	A/WP	Discard with medical waste, and autoclave if warranted by risk assessment.	2		MMWR Safe Work	p16
5) Specimen disposal	Discarding BSL-2 cultures and stocks of organisms	Biohazardous waste	A/WP	If decontamination is done on-site but remote from the microbiology department, place the discarded cultures and stocks into durable, leak proof containers that are secured when they are moved. Decontamination may be done by a medical waste treatment contractor's facility if the waste is placed into medical waste shipping containers and packaged in accordance with applicable regulatory standards.	2	Microbiology	MMWR Safe Work	p20

5) Specimen disposal	Discarding a select agent	Biohazardous waste	A/WP	Notify APHIS or CDC of final disposition of select agent or toxin such as Brucella spp., Coccidioides immitis, or Yersinia pestis using APHIS/CDC Form 4, "Report of the Identification of a Select Agent or Toxin." If autoclave is available on-site, destroy the select agent or toxin by on-site autoclaving. If a medical waste contractor is used for the facility, inactivate cultures containing the identified agent or toxin by completely immersing the open culture containers in a fresh 1:10 bleach solution overnight before discarding them into medical waste. If the medical waste contractor is registered with the Select Agent Program, the live cultures may be formally transferred to the contractor by using APHIS/CDC Form 2, "Request to Transfer Select Agents and Toxins."	2		MMWR Safe Work	p20
6) Waste handling	Decontamination	Biohazardous waste	A/WP	Have a decontamination facility or have a medical waste contract in place	2	Microbiology	MMWR Safe Work	p5
6) Waste handling	Autoclaving	Contact burns	A/WP	Do not touch the sides or back of older autoclaves. Always allow an autoclave unit to cool before opening. Stand back and open the door slowly to allow the excess steam to escape. Allow the contents to cool before handling. Always use thick, elbow-length, heat resistant, liquid-impervious gloves to remove hot items from the autoclave.	2		MMWR Safe Work	p21
6) Waste handling	Autoclaving	Aerosolization of dangerous materials	A/WP	Never autoclave materials that contain toxic agents, corrosives (e.g., acids, bases, phenol), solvents or volatiles (e.g., ethanol, methanol, acetone, chloroform), or radioactive materials.	2		MMWR Safe Work	p21
6) Waste handling	Autoclaving	Ineffective sterilization	A/WP	When decontaminating a bag of dry goods, such as bench paper or paper gowns, place 100 mL of water into the autoclave bag to facilitate steam production within the bag. Do not overfill bags or the autoclave unit; this might result in inadequate steam circulation, which could interfere with the sterilization process. After autoclaving, check the autoclave indicator tape to be sure the bars are black. If the indicator tape is not activated, resterilize the load. At least weekly, use a biological indicator such as Bacillus stearothermophilus spore strips (or equivalent) to ensure the autoclave is performing properly. Establish and follow a regular maintenance schedule for this equipment that evaluates seals, drains, and other critical aspects.	2		MMWR Safe Work	p21

6) Waste handling	Disposal of liquid wastes from vacuum-assisted aspiration traps	Biohazardous waste	A/WP	• Never pour infectious wastes down the sink. • Decontaminate liquid wastes from aspiration traps with bleach before disposal. • When using an aspiration trap attached to an individual vacuum pump, consider passing the vapors through an activated charcoal trap to protect the pump from chlorine vapor corrosion. • Change vacuum flasks when they are three-fourths full to prevent overfilling. Consider marking the maximum fill volume on the flask and adding a sufficient volume of bleach at the beginning of the day to produce a 1:10 bleach solution when the aspirated fluids reach the maximum fill mark. • Disinfect the hose by aspirating 10–50 mL of a freshly made bleach solution into the trap. Lift the hose to allow all the bleach to enter the trap. Wait 20 minutes, then remove the trap from the BSC. • Once decontaminated, the fluid is considered noninfectious and may be poured down the sanitary sewer.	2		MMWR Safe Work	p26
6) Waste handling	Disposal of liquid wastes from vacuum-assisted aspiration traps	Biohazardous waste	A/WP	• Virology laboratory: Bleach will reduce the phenol red dye in cell culture media, and the solution will go from red to colorless. If this color change does not occur, the fluid has not been decontaminated and sufficient bleach must be added to decontaminate the vessel.	2	Virology	MMWR Safe Work	p26
6) Waste handling	Disassembly of microtome/cryostat blades	Sharp/cut	PPE	Wear cut-resistant gloves during disassembly of potentially contaminated blade for cleaning and disinfection	2		MMWR Safe Work	p26
6) Waste handling	Disposing of used disposable sharp objects (disposable needles, syringes, scalpels, blades, pipettes, and similar objects)	Sharp/cut	A/WP	• Carefully place into properly labeled leak- and puncture-resistant containers made for disposal. • Replace sharps containers that are two-thirds to three fourths full. • Place materials to be decontaminated off-site into a medical waste shipping container, and secure for transport in accordance with applicable state, local and federal regulations	2		MMWR Safe Work	p27
6) Waste handling	Decontaminating used nondisposable sharp objects	Sharp/cut	A/WP	Place into a covered leak-resistant, hard-walled container for transport to a processing area for decontamination, preferably by autoclaving	2		MMWR Safe Work	p27
6) Waste handling	Disposing of clean, uncontaminated sharp objects (clean broken glassware, chipped clean pipettes, etc.)	Sharp/cut	A/WP	• Place into rigid, puncture resistant containers for disposal in the normal trash stream. • Tape containers shut to prevent accidental opening and potential injuries.	2		MMWR Safe Work	p27
6) Waste handling	Using an automated analyzer	Biohazardous waste	A/WP	• Consider effluents of clinical analyzers to be contaminated. Dispose of effluents according to state and local regulations.	2		MMWR Safe Work	p33
6) Waste handling	Disposing of a rapid test (kit)	Contamination	A/WP	Consider used testing kits to be contaminated and dispose of appropriately.	2		MMWR Safe Work	p33
1) Specimen receipt	Package receipt and transfer of packages to testing area	Leaking package	Eng	Place leaking package in plastic bag and transfer to a BSC	3	Ebola	APHL EVD	p2

1) Specimen receipt	Package receipt and transfer of packages to testing area	Leaking package	PPE	Nitrile/latex gloves, lab coat, safety glasses	3	Ebola	APHL EVD	p2
1) Specimen receipt	Package receipt and transfer of packages to testing area	Leaking package	A/WP	Disinfect exterior of sealed plastic bag prior to transfer to testing area	3	Ebola	APHL EVD	p2
1) Specimen receipt	Package receipt and transfer of packages to testing area	Unexpected delivery	Eng	Immediately transfer to BSC	3	Ebola	APHL EVD	p2
1) Specimen receipt	Package receipt and transfer of packages to testing area	Unexpected delivery	A/WP	Deliver specimen in original category A packaging to testing area	3	Ebola	APHL EVD	p2
1) Specimen receipt	Package receipt and transfer of packages to testing area	Unexpected delivery	A/WP	Notify key staff of expected package delivery	3	Ebola	APHL EVD	p2
1) Specimen receipt	Package receipt and transfer of packages to testing area	Unexpected delivery	Eng	All category A Packages opened in certified class II BSC with safety blades	3	Ebola	APHL EVD	p2
2) Specimen handling	Transport of Specimens between testing areas [prior to testing process]	Breakage of the specimen container	Eng	Specimens should be transported in a clearly labeled, durable, leak-proof transport container directly to the specimen handling area of the laboratory.	3	Ebola	APHL EVD	p2
2) Specimen handling	Transport of Specimens between testing areas [prior to testing process]	Breakage of the specimen container	A/WP	Decontaminate all surfaces of transport container prior to reuse.	3	Ebola	APHL EVD	p2
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Minimize the number of workers handling the specimens	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	Eng	Work inside a certified class II BSC with the sash at the appropriate level.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Minimize unnecessary movements while working in the BSC. Follow acceptable BSC practices.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	PPE	Use BSL-3 practices that include the following PPE: fluid resistant back-closing gown, double gloves, N95 respirator and goggles or full face shield, (eyes and mucous membranes covered).	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Limit the traffic around the BSC.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	In the BSC, work over a Wex-Cide moistened plastic backed absorbent pad.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Use only pipette tips with barrier filters.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	Eng	Have a dedicated rigid waste container in the BSC.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	If making aliquot tubes: Wipe outside of primary and aliquot tubes before removing from BSC	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	No exposed skin inside the BSC.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Bring all necessary material into the BSC before starting to work.	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Use Wex-Cide (1oz/gal); contact time = 10 minutes	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Minimize use of sharps. Dispose of all pipette tips and sharps in the dedicated container in the BSC	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	Specimens, equipment, and all materials must be decontaminated before removing from BSC	3	Ebola	APHL EVD	p3
3) Testing process	Preparation of Specimens for testing	Aerosolization/Splash/Spl atter	A/WP	DO NOT set up any viral cultures	3	Ebola	APHL EVD	p3
3) Testing process	Trizol Inactivation	Accidental exposure	Eng	Perform in BSC	3	Ebola	APHL EVD	p4

3) Testing process	Trizol Inactivation	Accidental exposure	PPE	Use BSL-3 practices that include the following PPE: fluid resistant back-closing gown, double gloves, N95 respirator, goggles or full face shield, (eyes and mucous membranes covered).	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Accidental exposure	A/WP	Vortex inside BSC. Ensure microcentrifuge tube is tightly sealed	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Accidental exposure	A/WP	Prevent contact with skin, eyes and clothing	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Accidental exposure	A/WP	Wash exposed skin with soap and water immediately. Remove all contaminated clothing or shoes.	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Accidental exposure	A/WP	After Trizol inactivation, specimen is no longer infectious and may be handled using BSL-2 practices.	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Trizol reactivity	A/WP	Do not mix Trizol or Trizol waste with bleach or acids	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Trizol reactivity	A/WP	Do not use bleach or acids in BSC while Trizol in use.	3	Ebola	APHL EVD	p4
3) Testing process	Trizol Inactivation	Trizol reactivity	A/WP	If accidental mixture of Trizol and bleach/acid occurs, remove PPE, exit BSL-3 as soon as possible and notify Safety Officer and supervisor. Post Do Not Enter sign on BSL-3 suite. Do not enter BSL-3 for at least 1 hour.	3	Ebola	APHL EVD	p4
3) Testing process	Vortexing and Centrifuging	Aerosolizing	A/WP	Vortex inside the BSC. Ensure microcentrifuge tube is tightly sealed.	3	Ebola	APHL EVD	p5
3) Testing process	Vortexing and Centrifuging	Aerosolizing	Eng	Use sealed head rotor inside the BSC.	3	Ebola	APHL EVD	p5
3) Testing process	Vortexing and Centrifuging	Aerosolizing	Eng	Load and unload buckets in the BSC.	3	Ebola	APHL EVD	p5
3) Testing process	Vortexing and Centrifuging	Aerosolizing	A/WP	Specimens, equipment, and all materials must be decontaminated before removing from BSC	3	Ebola	APHL EVD	p5
3) Testing process	Post extraction BSC Decontamination	Contamination of BSC surfaces	A/WP	Wipe the inside of the BSC with disinfectant.	3	Ebola	APHL EVD	p5
3) Testing process	Post extraction BSC Decontamination	Contamination of BSC surfaces	A/WP	Remove all PPE and discard into medical waste stream	3	Ebola	APHL EVD	p5
3) Testing process	Post extraction BSC Decontamination	Contamination of BSC surfaces	A/WP	10% bleach disinfectant is used: contact time = 10 minutes followed by wiping down all surfaces in the BSC with 70% alcohol and allow to air dry.	3	Ebola	APHL EVD	p5
4) Specimen storage	After specimen inactivation completed and before removal of specimen from the BSC	Accidental transfer of contaminated material from the BSC.	A/WP	Wipe all tubes with disinfectant before removing from BSC.	3	Ebola	APHL EVD	p5
4) Specimen storage	After specimen inactivation completed and before removal of specimen from the BSC	Accidental transfer of contaminated material from the BSC.	A/WP	Place remaining specimen in Ziploc plastic bag. Disinfect exterior of bag before removing from BSC.	3	Ebola	APHL EVD	p5
4) Specimen storage	After specimen inactivation completed and before removal of specimen from the BSC	Accidental transfer of contaminated material from the BSC.	A/WP	Change gloves.	3	Ebola	APHL EVD	p5
4) Specimen storage	After specimen inactivation completed and before removal of specimen from the BSC	Accidental transfer of contaminated material from the BSC.	A/WP	Store specimen(s) in refrigerator inside BSL-3 suite	3	Ebola	APHL EVD	p5
4) Specimen storage	After specimen inactivation completed and before removal of specimen from the BSC	Accidental transfer of contaminated material from the BSC.	A/WP	Disinfectants for containers and work surfaces: Wex-Cide (1oz/gal) Contact time = 10 minutes	3	Ebola	APHL EVD	p5
4) Specimen storage	After specimen inactivation completed and before removal of specimen from the BSC	Accidental transfer of contaminated material from the BSC.	Eng	Dedicated waste bag for gloves and other waste	3	Ebola	APHL EVD	p5
5) Specimen disposal	Discarding tissue remaining from culture activities of BSL-3 infectious agents	Biohazardous waste	A/WP	Discard into medical waste and autoclave it.	3		MMWR Safe Work	p16

5) Specimen disposal	Discarding BSL-3 cultures and stocks of organisms	Biohazardous waste	A/WP	Collect discarded cultures and stocks and seal in containers that are closed, leak proof, and posted with the universal biohazard symbol and the word "Biohazard." Autoclave the containers on-site (can use other on-site medical waste treatment technologies if they sterilize the organisms, have been properly validated, are recognized as medical waste treatment technologies by the appropriate state environmental regulatory agency).	3	Microbiology	MMWR Safe Work	p20
6) Waste handling	Waste autoclaving	External contamination of waste containers	A/WP	Disinfect outside of waste containers before removal from BSC and BSL-3.	3	Ebola	APHL EVD	p5
6) Waste handling	Waste autoclaving	External contamination of waste containers	A/WP	10% bleach disinfectant is used: contact time = 10 minutes	3	Ebola	APHL EVD	p5
6) Waste handling	Waste autoclaving	External contamination of waste containers	A/WP	Autoclave all PPE used in specimen handling waste and testing.	3	Ebola	APHL EVD	p5

New Activities and Controls								
Phase	Activity/Practice/Procedure	Potential Hazard(s)	Control Type	Recommended Control	BSL	Special Considerations	Source of Control Recommendation	Chapter/ Page #

References for "Source of Control Recommendation"		
Source of Control Recommendation	**Reference**	**Where the Reference Can Be Found**
APHL Checklist	APHL A Biosafety Checklist: Developing A Culture of Biosafety (April 2015)	http://www.aphl.org/AboutAPHL/publications/Documents/ID_BiosafetyChecklist_42015.pdf
APHL EVD	APHL Template for Public Health Laboratory Risk Assessment for Ebola Virus Disease (EVD) Testing	http://www.aphl.org/aphlprograms/preparedness-and-response/documents/aphl-template.pdf
BMBL-5	HHS/CDC/NIH Biosafety in Microbiological and Biomedical Laboratories 5th Edition	http://www.cdc.gov/biosafety/publications/bmbl5/
CDC Ebola	CDC Assessment Tool for Ebola Treatment Centers and Assessment Hospitals 5-18-2015 (v17)	See http://sos.ri.gov/documents/publicinfo/omdocs/minutes/1293/2015/41778.pdf for an example of where this can be found and its intended audience.
MMWR Safe Work	Centers for Disease Control and Prevention MMWR (Morbidity and Mortality Report) Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories	http://www.cdc.gov/mmwr/pdf/other/su6101.pdf
Sandia Risk	Sandia Report SAND2010-6487 Biosafety Risk Assessment Methodology (Susan Caskey et al., printed October 2010)	http://biosecurity.sandia.gov/BioRAM/Biosafety%20Risk%20Assessment%20Report.pdf

New References for "Source of Control Recommendation"		
Source of Control Recommendation	**Reference**	**Where the Reference Can Be Found**

Definitions	
Term	**Definition**
1) Specimen receipt	• Specimen transportation or shipment to laboratory (via package shipment, courier, pneumatic tube, or hand delivery) • Specimen (or specimen package) receipt in laboratory • Transfer of specimen (or specimen package) to testing area

2) Specimen handling	Includes:
	• Opening specimen package or secondary container
	• Specimen accessioning and preparation prior to testing, including:
	  • Specimen container handling during accessioning (scanning into a computer, recording on a log, etc.)
	  • Specimen container labeling
	  • Paperwork handling
	  • Transportation of specimen between testing areas prior to the testing process

3) Testing process	Includes: • Specimen aliquoting • Specimen (or specimen product) manipulations via reagent or mechanical means • Loading specimen (or specimen product) onto instruments • Unloading specimen (or specimen product) from instruments • Using instruments or other equipment • Servicing or moving instruments or other equipment • Moving/transporting specimen (or specimen product) during the testing process • Observing specimen (or specimen product), such as when observing bacterial cultures or using a microscope to look for cytopathic effect • Disinfection or decontamination that occurs during the course of testing (such as after using BSCs or instruments) • Cell culture/culture on nutrient plates of viruses or bacteria
4) Specimen storage	Moving a specimen (or specimen product) into or out of storage (such as refrigerators, freezers, or incubators)
5) Specimen disposal	stream
6) Waste handling	Handling and disposing of waste generated: • During specimen receipt • During specimen handling • During the testing process • During specimen storage • During specimen disposal • As a result of disinfection or decontamination activities

7) Specimen shipment from lab	Packaging and shipping a specimen from the laboratory being assessed to another laboratory (reference laboratory, state public health laboratory, CDC, etc.)
A/WP	Administrative and Work Practice Control
BSC	Biological Safety Cabinet
BSL-1	Biosafety Level 1
BSL-2	Biosafety Level 2
BSL-3	Biosafety Level 3
BSL-4	Biosafety Level 4
Eng	Engineering Control
N/A	Not Applicable
PPE	Personal Protective Equipment Control
Specimen	The clinical specimen collected from a patient or deceased individual
Specimen product	A product derived from a specimen such as: • Extracted RNA • Extracted DNA • Specimen modified by a reagent • Products grown from a specimen, such as colonies of bacteria in culture or cells infected with virus

Dropdown Key						
Phase		**Control Type**			**BSL**	
1) Specimen receipt		**Abbreviation**	**Description**		**Abbreviation**	**Description**
2) Specimen handling		A/WP	Administrative and Work Practice		1	Biosafety Level 1
3) Testing process		Eng	Engineering		2	Biosafety Level 2
4) Specimen storage		PPE	Personal Protective Equipment		3	Biosafety Level 3
5) Specimen disposal					4	Biosafety Level 4
6) Waste handling					N/A	Not Applicable
7) Specimen shipment from lab						

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