TABLE 3B
MICROBIOLOGY BIOSAFETY

Agent	BSL		Specimen Exposure Risk	Recommended Precautions for Level A Laboratories	
	Specimen Handling	Culture Handling			
Bacillus anthracis	2	2	Blood, skin lesion exudates, CSF, pleural fluid, sputum, and rarely urine and feces	BSL2: Activities involving clinical material collection and diagnostic quantities of infectious cultures.	BSL3: Activities with high potential for aerosol or droplet production
Brucella spp.[1]	2	3	Blood, bone marrow, CSF, tissue, semen and occasionally urine	BSL2: Activities limited to collection, transport and plating of clinical material.	BSL3: All activities involving manipulations of cultures
Clostridium botulinum[2]	2	2	Toxin may be present in food specimens, clinical material (serum, gastric and feces), and environ-mental samples (soil, surface water). **TOXIN IS EXTREMELY POISONOUS!**	BSL2: Activities with materials known or potentially containing toxin must be handled in a Biological Safety Cabinet (Class II) with a lab coat, disposable surgical gloves, and a face shield (as needed).	BLS3: Activities with high potential for aerosol or droplet production.
Francisella tularensis[3]	2	3	Skin lesion exudates, respiratory secretions CSF, blood, and urine. Tissues from infected animals and fluids from infected arthropods.	BLS2: Activities limited to collection, transport and plating of clinical material.	BLS3: All activities involving manipulations of cultures
Yersinia pestis[4]	2	2	Bubo fluid, blood, sputum, CSF, feces, and urine	BSL2: Activities involving clinical material collection and diagnostic quantities of infectious cultures	BSL3: Activities with high potential for aerosol or droplet production
Smallpox[5]	4	4	Lesion fluid or crusts, respiratory secretions, or tissue.	BSL4: Specimen collection/transport	
VHF[6]	4	4	Blood, urine, respiratory and throat secretions, semen, and tissue.	BSL4: Specimen collection/transport	

1. Laboratory acquired brucellosis has occurred by "sniffing" cultures; aerosols generated by centrifugation; mouth pipetting; accidental parenteral inoculations; and sprays into eyes, nose, and mouth; and finally by direct contact with clinical specimens.
2. Exposure to toxin is the primary laboratory hazard since absorption can occur with direct contact with skin, eyes, or mucous membranes, including the respiratory tract. The toxin can be neutralized by 0.1M sodium hydroxide. *C. botulinum* is inactivated by 1:10 dilution of household bleach. Contact time is 20 min. If material contains both toxin and organisms, the spill must be sequentially treated with bleach and sodium hydroxide for a total contact time of 40 minutes.
3. Laboratory acquired tularemia infection has been more commonly associated with cultures than with clinical materials/animals. Direct skin/mucous membrane contact with cultures; parenteral inoculation; ingestion; and aerosol exposure have resulted in infection.
4. Special care should be taken to avoid the generation of aerosols.
5. Ingestion, parenteral inoculation, and droplet or aerosol exposure of mucous membranes or broken skin with infectious fluids or tissues are the primary hazards to laboratorians.
6. Respiratory exposure to infectious aerosols, mucous membrane exposure to infectious droplets, and accidental parenteral inoculation are the primary hazards to laboratorians.