Ask the Experts

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Do you have a biosafety question and you’re not sure who to ask? Send your questions to the “Ask the Experts” column and I’ll get them answered for you. Drawing from my own experience or that of other experts in the field, we’ll try to compile a thorough and comprehensive answer to your question. Please e-mail your questions to jkeene@globalbiohazardtechnologies.com or Co-Editor Barbara Johnson at barbara_johnson@verizon.net or Co-Editor Karen B. Byers at karen_byers@dfci.harvard.edu.

We will be relocating to a new building soon where each research group will have its own tissue-culture laboratory. The laboratories are designed and operated as a BSL-2, but the researchers want to designate some of its space as BSL-2+. Because they are working with HIV, they will be using different personal protective equipment (PPE) in the BSL-2+. Is this appropriate?

First, there is no such thing as a “BSL-2+” or “BSL-2 enhanced” laboratory. The Biosafety in Microbiological and Biomedical Laboratories (BMBL) does not include these classifications in the description of Biosafety Level 2 requirements (U.S. Department of Health and Human Services [DHHS], 2009). The correct terminology is BSL-2 with BSL-3 practices, and was coined in the 1980s during the height of the HIV/AIDS epidemic when not much was known about the methods of HIV transmission or about the potential for laboratory-acquired infections. This terminology was developed to minimize potential occupational exposures in the laboratory in facilities that did not have true BSL-3 containment laboratories, but were required to deal with blood and other materials that might be contaminated with the HIV virus. That said, the difference between BSL-2 practices and BSL-3 practices is very simple. In BSL-2 the organism can be manipulated on the open bench when the procedures are not likely to result in aerosols or splashes, but must be performed in containment, such as a biosafety cabinet (BSC), sealed centrifuge cups, etc., if expected to result in potential aerosols. In BSL-3 practices, ALL work with the agent must be performed in containment.

The BMBL states in Section IV, Biosafety Level 3, paragraph D.14: “Enhanced environmental and personal protection may be required by the agent summary statement, risk assessment, or applicable local, state, or federal regulations. These laboratory enhancements may include, for example, one or more of the following: an anteroom for clean storage of equipment and supplies with dress-in, shower-out capabilities; gas-tight dampers to facilitate laboratory isolation; final HEPA filtration of the laboratory exhaust air; laboratory effluent decontamination; and advanced access control devices, such as biometrics” (DHHS, 2009).

The term “BSL-3 enhanced” is reserved for those laboratories that may be using agents of potential agricultural significance. The BMBL Appendix D, Section III, provides the USDA requirements for containment of significant potential agricultural pathogens (DHHS, 2009).

With regard to required PPE in BSL-2 laboratories, the PPE is determined based on the risk assessment. Additional PPE is not considered an enhancement to the laboratory. In BSL-3, back-closing laboratory coats/gowns and gloves are to be used. Shoe covers are not needed in either of these types of laboratories.

We must always remember that these laboratories, either BSL-2 or BSL-3, are not contaminated spaces and there is no need to be concerned about possible contaminated surfaces within the laboratories unless the researcher fails to follow the appropriate procedures for routine housekeeping and for removing the outer gloves inside the BSC and then wanders around the laboratory touching things with his/her potentially contaminated outer gloves. At either level, the outer gloves must be removed inside the BSC, and then the inner gloves are removed in the laboratory before washing hands at the dedicated hand-washing sink near the exit. This procedure prevents potential contamination of the surfaces outside the containment laboratory by potentially contaminated gloves.

Several ways are appropriate for handling a dual-use facility. If both the HIV work and other BSL-2 work must be done in the same laboratory, a sign should be posted indicating that the appropriate PPE is that of the strictest requirement for the work being done. That is, if HIV work is being done and specific PPE is required for that work based on the risk assessment, then the PPE for the entire laboratory is what is required for the HIV work. If no HIV work is being done, then the PPE may be less stringent but must be what is required for the level of potential exposure and potential risk to the personnel.

If you can designate one laboratory for HIV work and others for non-HIV work, then the doors should be posted with the required PPE and biosafety procedures to be followed for the specific work being done.

Reference