Biosafety Overview

Biological safety, or biosafety, is the application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards. Biosafety defines the containment conditions under which infectious agents can be safely manipulated.

The objective of containment is to confine biohazards and to reduce the potential exposure of laboratory workers, persons outside of the laboratory and the environment to potentially infectious agents.

Primary Containment: The protection of personnel and the immediate laboratory environment through good microbiological laboratory technique and the use of appropriate safety equipment.

Secondary Containment: Protection of the environment external to the laboratory from exposure to infectious materials through a combination of facility design and operational practices.

Combinations of laboratory practices, containment equipment and special laboratory design can be made to achieve different levels of physical containment. Currently, four biosafety levels (BSL 1-4) define the levels of containment necessary to protect personnel and the environment.

Biohazard: Infectious or etiologic (disease causing) agents, potentially infectious materials, certain toxins and other hazardous biological materials. Biohazardous agents and materials are potentially hazardous to humans, animals and/or plants and may include bacteria, fungi, viruses, rickettsiae, chlamydiae, parasites, recombinant products, allergens and cultured human or animal cells.

Biosafety Level (BSL)

CDC and NIH have designated four different biosafety levels, BSL-1 to BSL-4. Microorganisms are categorized into a biosafety level. In addition, each biosafety level requires a different combination of laboratory practices and techniques, safety equipment, and laboratory facilities as recommended by the CDC and NIH in the publication "Biosafety in Microbiological and Biomedical Laboratories". These combinations of equipment and work practices are designed to minimize the risk of infectious disease when microorganisms are used in research.