

Subject: Biosafety and Biosafety Levels/Lec 4

Biosafety

Biosafety and Biosafety Levels:

There are four biosafety levels (**BSLs**), each level has specific controls for containment of microbes and biological agents. The primary risks that determine levels of containment are infectivity, severity of disease, transmissibility, and the nature of the work conducted. Origin of the microbe, or the agent in question, and the route of exposure are also important.

Each biosafety level has its own specific controls procedures that are required for:

- ☐ Laboratory practices
- ☐ Safety equipment
- ☐ Facility construction

Routes of Exposure

Route of exposure is the way a microbe gains access to a living organism.

There are four main routes of exposure

- ☐ Percutaneous, through broken or damaged skin
- ☐ Inhalation
- ☐ Mucous membranes of the eyes, nose, and mouth
- ☐ Ingestion

Standard Microbiological Practices (SMP)

Standard microbiological practices are those practices that are common to all laboratories. These practices may include

- ☐ Not eating, drinking, or applying cosmetics in the lab

- Washing hands after working with infectious materials and before leaving the lab
- Routinely decontamination of work surfaces.

The biosafety levels range from BSL-1 to BSL-4. Each biosafety level builds on the controls of the level before it. Every microbiology laboratory, regardless of biosafety level, follows the standard microbiological practice.

Classification of biohazardous microbes on biosafety levels depends on these factors:

1. Pathogenicity of the organism.
2. Mode of transmission and host range of the organism. These may be influenced by existing levels of immunity in the local population, density and movement of the host population, presence of appropriate vectors, and standards of environmental hygiene.
3. Local availability of effective preventive measures. These may include: prophylaxis by immunization or administration of antisera (passive immunization); sanitary measures, e.g. food and water hygiene; control of animal reservoirs or arthropod vectors.
4. Local availability of effective treatment. This includes passive immunization, post-exposure vaccination and use of antimicrobials, antivirals and chemotherapeutic agents, and should take into consideration the possibility of the emergence of drug-resistant strains.