Biosafety Practices & Principles
Biohazard

An agent of biological origin that has the capacity to produce deleterious effects on humans, i.e. microorganisms, toxins and allergens derived from those organisms; and allergens and toxins derived from higher plants and animals.
Introduction
Development of Biosafety Practices

- 1941 - Meyer and Eddie
  - 74 lab associated brucellosis infections in US

- 1949 - Sulkin and Pike
  - 222 viral infections (21 fatal)
  - Only 27% related to known accidents
Introduction
Development of Biosafety Practices

1951, 1965, 1976 - Sulkin and Pike

- Surveys for lab-associated infections
- More than 5,000 labs
- Cumulative total of 3,921 cases cited
- Most commonly reported:
  - Hepatitis
  - Tuberculosis
  - Typhoid
  - Venezuelan Equine Encephalitis
  - Brucellosis
  - Tularemia
Introduction

Development of Biosafety Practices

- 1951, 1965, 1976 - Sulkin and Pike
  - Fewer than 20% associated with known accidents
  - Exposure to infectious aerosols plausible (but unconfirmed) for >80% of reported cases
Introduction

Why Biosafety Practices?

Protection:
- workers
- “products”
- co-workers
- lab support personnel
- environment
Introduction

Chain of Infection

Reservoir of pathogen

Portal of escape

Transmission

Route of entry/infectious dose

Susceptible host

Incubation period

Risk Assessment

PPE

Immunization

Surveillance

Practices/Equipment
Principles

General Lab Requirements

- Knowledgeable supervisor
- Knowledgeable personnel
  - Aware of potential hazards
  - Proficient in practices & techniques
- Lab specific biosafety manual
Principles

General Lab Requirements

- Biosafety Levels (BSLs)
- Laboratory Practice and Technique
  - Standard Practices
  - Special Practices
- Safety Equipment (Primary Barriers)
- Facility Design and Construction (Secondary Barriers)
Principles
General Lab Requirements

- Biosafety cabinets (BSCs) - BSL 2/3
- Personal protective clothing
  - Gloves
  - Gowns
  - Eye and face protection
- Pipetting Devices
- Safety centrifuge cups and rotors
Biosafety

The application of combinations of laboratory practice and procedure, laboratory facilities, and safety equipment when working with potentially infectious microorganisms.
Principles

Biosafety Levels

- **BSL1** - agents not known to cause disease.
- **BSL2** - agents associated with human disease.
- **BSL3** - indigenous/exotic agents associated with human disease and with potential for aerosol transmission.
- **BSL4** - dangerous/exotic agents of life threatening nature.