

Lec/5

What is a hazard?

A hazard is anything that has the potential for causing harm to humans, animals, plants and the environment, regardless of the probability of it happening. A hazard might be:

- A physical situation (eg a fire or an explosion)
- An activity (eg pipetting or using a centrifuge)
- Or a material (eg a biological agent or toxin, dangerous chemicals, asphyxiating gases).

How should the hazard be assessed?

The hazard should be assessed in the local context of the laboratory. For example, if a pathogen is spread by a vector that cannot survive at the laboratory's location, it may not be considered a hazard to the surrounding community, whereas the same pathogen at a location where the vectors can survive would be.

What information should be considered in identifying the hazards?

Hazard identification should include information from:

1. Group experience and knowledge
2. External or specialized expertise not found in the facility (e.g. experts on vaccines and prophylaxis for, or treatment of, the human diseases caused by pathogens handled)
- 3 Surveys of previous accidents/reviews of previous incidents
4. Hazardous materials data

Standard Operating Procedures (SOPs) shall be developed as appropriate to cover:

1. General Safety:

- a. General laboratory safety
- b. Fire safety
- c. Electrical safety
- d. Radiation safety
- e. Chemical safety
- f. Use of gasses
- g. Hot and cold work
- h. Equipment under pressure
- i. Laboratory animal care and use
- j. General housekeeping, eg storage and tidiness

2. Maintenance of accurate inventories of pathogens and toxins

- a. Identification and logging of pathogens and toxins
- b. Restricted access to pathogens and toxins
- c. Effective physical security measures (locks, alarms, access controls, etc...)
- d. Sample identification
- e. Storage of pathogens and toxins according to risk levels, ie segregated storage
- f. Determination of what materials should be controlled
- g. Determination of what information needs to be kept

3. Change

The management It is important to ensure that all changes associated with the design, operation and maintenance of the facility are properly documented and subject to a new hazard identification and risk assessment

4. Good Microbial Technique

- a. Animal handling
- b. Centrifugation
- c. Needles and Sharps
- d. Correct use of vacuum pumps
- e. Culture, purification, and storage techniques
- f. Minimization and containment of aerosols
- g. Pipetting
- h. Sonication and other forms of cell/tissue disruption
- i. Use of biosafety cabinets
- j. Use of disinfectants:
 - i. Spill control
 - ii. Routine decontamination
 - iii. Hand washing
 - iv. Showering

5. Inactivation of Biological Agents and Toxins

- a. Personnel
- b. Clothing and PPE
- c. Glassware
- d. Equipment
- e. Cultures and associated materials
- f. Spill clean-up materials and equipment
- g. Possibly infectious organisms, toxins and contaminated materials
- h. Paper and plastic waste

- i. Needles, syringes and sharps
- j. Wastewater, including from sinks and showers
- k. Air
- l. Filters and air handling systems

The Biological Risk Management Handbook

- m. Discarded equipment
- n. Animals exposed to pathogens or toxins
- o. Animal carcasses and bedding
- p. Facilities

6. Clothing and Personal Protective Equipment (PPE)

- a. Criteria for PPE selection
- b. Identification and outfitting of those requiring PPE
- c. Training in criteria for PPE selection, SOPs and competences
- d. Routine maintenance and checking of PPE
- e. Replacement schedule for PPE and inventory management, including for surge

Needs

- f. Documentation of and training in the hazards associated with working in PPE
- g. Cleaning of PPE and validation of decontamination

7. Occupational Health

- a. Baseline medical and assessment of medical fitness for assigned work
- b. Vaccines and prophylaxis
- c. Information on human symptoms for handled pathogens and toxins
- d. Routine medical monitoring and surveillance
- e. Procedures in case of potential exposure

- f. First aid SOPs
- g. Wallet cards
- h. Contact lists for medical care specialists

8. Emergency Response and Contingency Plans

- a. Acquired, or potential, infection
- b. Other emergency evacuation of personnel from high containment area
- c. Natural disasters
- d. Fire
- e. Flood
- f. Breach of Security
- g. Explosion
- h. Theft of pathogens or toxins
- i. Unexpected virulence of organism
- j. Facility or equipment failure
- k. Failure of disinfection
- l. Loss of power and water
- m. Major spillage or aerosol release
- n. Environmental release
- o. Terrorism, sabotage or vandalism
- p. Adverse media attention