Roles of the Clinical Laboratories and biosafety

- **Duties of Clinical Laboratories:**

1. Rapid isolation, identification and diagnosis of microorganisms that caused disease to patient to help physicians in giving the appropriate treatment as soon as possible.
2. Help in diagnosis of physiological defects that lead to diseases (e.g. Diabetes) and discovering metabolic disorders.
3. Help in noticing outbreaks and new isolates during routine work.
4. Reference laboratories give advices and help for scientists and researchers.

- **Specifications of Laboratory Staff:**

1. Well practiced and trained with scientific education for this field.
2. Able to deal with patients and clinical samples (collection, labeling, saving and transporting samples.
3. Must be careful to avoid contamination mixing and confusion (of specimens from different patients and for different testes.
4. Professional clinical laboratory staff must be up-to-date or know about the recently information about standard levels, equipment, new approaches and technology.
5. Laboratory workers must follow biosafety levels in order to protect themselves and avoid spreading pathogen from contaminated samples, specimens and the first step is wearing laboratory coats.

- **Hazards of Clinical Laboratory Work**

Workers in clinical laboratories are subject to the following risks:

1. **Chemical Hazards.**

Chemicals can be harmful by inhalation, skin contact or by entering mouth. Chemicals like carcinogens, acids, bases or others should only handle under hood and never pipette by mouth, gloves and eye guards are necessary.

2. **Biological Hazards**

Microbiological hazard are the greatest hazards in clinical laboratories, not only to laboratory workers but also to anyone enters the laboratory, even visitors and cleaning workers. All specimens collected for microbiological studies must be assumed as dangerous and infectious, some countries do immunization for laboratory workers against certain infection (e.g. hepatitis B, rabies, *S. typhi* and poliovrus).

3. **Radiation Hazards:**

This type of hazards occurs only for radioactive workers mainly the technicians whom deal with radio-therapy for cancer patients. They should have monitor film badges and special gloves, coats and equipment and they should know decontamination process after accidents.

- **Biosafety Levels;**
  The following table shows Biosafety Levels (BSL):

BSL	Agents	Practices
1	Do not cause diseases: e.g. *Lactobacillus casei*	**BSL1**: Standard Microbiological Practices
2	Associated with human diseases and potentially hazardous, mode of transmission via ingestion and mucous membranes: e.g. *Salmonella typhi*, *E.coli* O157:H7 and *Staphylococcus aureus*	**BSL1:** plus **BSL2:** • Limited access • Biohazard warning signs • Sharp objects decontamination carefully in special containers.
3	Diseases with aerosol transmission and lethal consequences e.g. *Yersinia pestis.*	**BSL2** plus **BLS3:** • Controlled access • Decontamination of all wastes • Decontamination of lab clothing before laundering • Periodic checkup for workers serum
4	Dangerous agents with high risks of life-threatening disease, aerosol-transmitted lab infections. Or related to unknown agents e.g. *viral infections like Hemorrhagic fever viruses.*	**BLS3** plus **BLS4:** • Clothing change before entering • Shower on exit • All material decontaminated on exit

- **Prevention Advices for lab workers:**

1. No eating, drinking, cosmetic use, gum and smoking in the lab.
2. Tied hair, lab coat, and gloves, also covering exposed wounds.
3. Do not put objects like pencils in mouth and avoid touching phones.
4. Work place should be disinfected before and after work.
5. Avoid injuries by sharp objects (e.g. needles, broken glass).
6. Get rid of medical wastes.