Annexure - (I)

Facility Safety Guidelines & Standard Operating Procedures at CAMB

Learning real science can be fun and exciting, but hazards might also be lurking in many lab situations. A robust set of general laboratory safety rules is essential to avoiding disasters in the lab. International organizations like **ISO** (International Organization for Standardization) and **CLSI** (Clinical and Laboratory Standards Institute) have devised various standards specific to laboratories. Two ISO standards are specific to medical laboratories:

I. **ISO 15189** - Medical laboratories' particular requirements for quality and competence. Geneva: International Organization for Standardization.

II. **ISO/IEC 17025** - General requirements for the competence of testing and calibration laboratories. Geneva: International Organization for Standardization.

These standards are not a tool merely to meet accreditation requirements or provide quick fixes for individual mistakes. Instead, laboratories implementing these standards strive to:

- *Create systems that are as failure resistant as possible, will catch mistakes before they become a problem, and reduce errors by getting things right the first time.*
- *Identify opportunities for improvement at all times.*
- *Involve and empower their staff/ researchers by involving them in solving problems and implementing solutions.*

Ideally, these standards should be implemented at **CAMB**; however, at the minimum, some basic rules and regulations must be followed to provide our scientists with a healthy and safe work environment. This document is *intended for supervisors, lab in-charges, managers, and researchers primarily responsible for maintaining laboratories under their supervision as safe, healthy workplaces and ensuring that applicable health, safety, and environmental regulations are followed.*

Besides, every lab in charge/manager should ensure to keep the following manuals available in the lab all the time for employees and students, which may include the laboratory's policies, systems, programs, procedures, and instructions to the extent necessary to ensure the quality of the test results:

- QA/QC Manual
- Standard Operating Procedures (SOPs) Manual
- Training Manual
- Safety Manual

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Centre for Applied Molecular Biology,
University of the Punjab, Canal Bank Road
Thokar Niaz Baig, Lahore-53700

A. General Lab Safety

The following general rules relate to almost every laboratory and cover what you should know in the event of an emergency, proper signage, safety equipment, safely using of laboratory equipment, and basic common-sense rules.

- Ensure you are ***fully aware of your facility's/building's evacuation procedures.***
- Make sure you know where your ***lab's safety equipment - including first aid kit(s), fire extinguishers, eye wash stations, and safety showers - is located and how to use it properly.***
- Know ***emergency phone numbers*** to use to call for help in case of an emergency.
- ***Lab areas containing carcinogens, radioisotopes, biohazards, and lasers*** should be properly ***marked with the appropriate warning signs.***
- Be sure to read all fire alarm and safety signs and follow the instructions in the event of an accident or emergency.
- ***Open flames should never be used in the laboratory*** unless you have permission from a qualified supervisor.
- ***Never chew gum, drink, or eat in the lab.***
- ***Laboratory glassware should never be utilized as food or beverage containers.***
- Each time you use glassware, be sure to check it for chips and cracks. ***Notify your lab supervisor of any damaged glassware so it can be properly disposed of.***
- ***Never use lab equipment that you are not approved or trained by your supervisor to operate.***
- ***After using an instrument, enter the relevant details into the instrument log book.***
- ***Place glassware/small instruments in their allocated area after use.***
- If an ***instrument or piece of equipment fails during use or isn't operating properly, report the issue to the in-charge right away.*** Never try to repair an equipment problem on your own.
- ***If you are the last person to leave the lab, make sure to lock all the doors and turn off all ignition sources.***
- ***Do not work alone in the lab.***
- ***Never leave an ongoing experiment unattended.***
- ***Never lift any glassware, solutions, or other types of apparatus above eye level.***

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Centre for Applied Molecular Biology,
University of the Punjab, Canal Bank Road
Thokar Niaz Baig, Lahore-53700

- ***Never smell or taste chemicals and never pipette by mouth.***
- Make sure you always ***follow the proper procedures for disposing of lab waste.***
- ***Report all injuries, accidents, and broken equipment or glass right away,*** even if the incident seems small or unimportant.
- If you have been injured, yell out immediately and as loud as you can to ensure you get help.
- In the ***event of a chemical splashing into your eye(s) or on your skin, immediately flush the affected area(s) with running water for at least 20 minutes.***
- If you notice any unsafe conditions in the lab, let your supervisor know as soon as possible.

B. Housekeeping Safety

Laboratory housekeeping rules apply to most facilities and deal with the basic upkeep, tidiness, and maintenance of a safe laboratory.

- Always ***keep your work area(s) tidy and clean.***
- ***Every researcher must clean/arrange his/her sitting/research bench after work.***
- Only ***materials you require for your work should be kept in your work area.*** Everything ***else should be stored safely*** out of the way.
- Only ***lightweight items should be stored on top of cabinets, heavier items should always be kept at the bottom.***
- ***Solids should always be kept out of the laboratory sink.***
- ***Equipment that requires air flow or ventilation*** to prevent overheating ***should be kept clear.***

C. Dress Code Safety

As per laboratory dress codes, all scholars/employees should wear such clothes which could prevent accidents or injuries in the lab.

- ***Always tie back hair that is chin-length or longer.***
- Make sure that ***loose clothing or dangling jewelry is secured, or avoid wearing them.***
- ***Footwear should cover the foot completely, never wear sandals or open-toed shoes.***
- ***Never wear shorts or skirts in the lab.***
- When working with Bunsen burners, lighted splints, matches, etc., acrylic nails are not allowed.

D. Personal Protection Safety

All lab personnel to protect themselves from various hazards should follow the basic hygiene rules and avoid any sort of contamination.

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Thokar Niaz Baig, Lahore-53700

- When performing laboratory experiments, ***you should always wear a Smock Or Lab Coat.***
- When ***working with equipment, hazardous materials, glassware, heat, and/or chemicals, always wear face shields or safety glasses.***
- When ***handling any toxic or hazardous agent, always wear the appropriate gloves.***
- ***Always wash your hands before leaving the lab.***
- ***After experimenting, you should always wash your hands with soap and water.***
- Be sure to ***keep your hands away from your body, mouth, eyes, and face while using lab equipment and chemicals.***

E. Chemical Safety

Since almost every lab uses some sort of chemicals so chemical safety rules are a must. Following these policies helps employees or students avoid spills and other accidents, as well as damage to the environment outside of the lab.

- ***All chemicals should always be clearly labeled with the name of the substance, its concentration, the date it was received, and the name of the person responsible for it.***
- Every ***chemical should be treated as*** though it were ***dangerous.***
- ***Do not allow any solvent to come into contact with your skin.***
- Before ***removing any of the contents from a chemical bottle, read the label twice.***
- ***Never take more chemicals from a bottle than you need for your work.***
- ***Don't put unused chemicals back*** into their original container.
- ***Chemicals or other materials should never be taken out of the laboratory.***
- ***Chemicals should never be disposed of in the sink.*** Ensure that all chemical waste is disposed of properly.
- A ***fume hood should be used for flammable and volatile chemicals.***
- If a ***chemical spill occurs, clean it up right away.***
- ***Dispose-off the reagents/chemicals/experiment leftovers to the specified container/waste boxes following the biosafety levels.***

F. Chemistry Lab Safety

Chemistry labs are one of the most common types, these basic chemistry lab safety rules are relevant to many scientists, dealing with the safe performance of common activities and tasks in the average chemistry lab includes:

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Centre for Applied Molecular Biology,
University of the Punjab, Canal Bank Road
Thokar Niaz Baig, Lahore-53700

- Before you start an experiment, ***make sure you are fully aware of the hazards of the materials you'll be using.***
- ***Exercise extreme caution while refluxing, distilling, or transferring volatile liquids.***
- Always ***pour chemicals from large containers into smaller ones.***
- ***Never pour back unused chemicals into the stock container.***
- ***Never tap flasks that are under vacuum.***
- ***Chemicals should never be mixed, measured, or heated in front of your face.***
- ***Water should not be poured into concentrated acid.*** Instead, ***pour acid slowly into the water while stirring constantly.*** In many cases, mixing acid with water is exothermic.

G. Electrical Safety

Like every other workplace, laboratories also contain electronic equipment. Electrical safety rules help prevent the misuse of electronic instruments, electric shocks, and other injuries, and ensure that any damaged equipment, cords, or plugs are reported to the appropriate authorities so they can be repaired or replaced.

- ***Last person leaving the lab should make sure to switch off all electronic devices except those directed by someone to keep on*** due to some research experiment, with due vigilance from other staff members.
- ***If any equipment such as Air Conditioner has to be kept on to maintain temperature etc., proper schedule or turning on/off and vigilance should be done under intimation to administration and gate incharge by the lab supervisors.***
- ***If in case, one is unable to switch off the device due to some fault/problem, report to the Lab Incharge or Gate Incharge to resolve the issue keeping in view the seriousness of the matter.***
- ***Before using any high-voltage equipment, make sure you get permission from your lab supervisor.***
- ***High-voltage equipment should never be changed or modified in any way.***
- Always ***turn off a high-voltage power supply when you are attaching it.***
- ***Use only one hand if you need to adjust any high-voltage equipment.*** It's safest to place your ***other hand either behind your back or in a pocket.***
- Make sure ***all electrical panels are unobstructed and easily accessible.***
- Whenever you can***, avoid using extension cords.***

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Centre for Applied Molecular Biology,
University of the Punjab, Canal Bank Road
Thokar Niaz Baig, Lahore-53700

H. Laser Safety Rules

Perhaps not as common as some of the other laboratory safety rules listed here, many laboratories do use lasers and it's important to follow some key rules of thumb to prevent injuries. In particular, accidents due to reflection are something that many employees may not think about. A clear set of rules for the use of lasers is essential to ensure that everyone is aware of all hazards and that the appropriate personal protective equipment is worn at all times.

- ***Even if you are certain that a laser beam is "eye" safe or low power, you should never look into it.***
- ***Always wear the appropriate goggles in areas of the lab where lasers are present.*** The most common laser injuries are those caused by scattered laser light reflecting either off the shiny surface of optical tables, the sides of mirrors, or off of mountings. Goggles will help you avoid damage from such scattered light.
- ***You should never keep your head at the same level as the laser beam.*** Always keep the laser beam at or below chest level.
- ***Laser beams should never be allowed to spread into the lab.*** Beam stops should always be used to intercept laser beams.
- ***Do not walk through laser beams.***

It is further suggested that all the relevant equipment related to the facility safety like Fire Extinguishers, First Aid Kits, etc. should be made available in the labs and access to the workers. A **Safety Officer** may be designated who should arrange routine training/drills for the staff and students, to manage the emergencies/disasters, if any.

Director
Centre for Applied Molecular Biology,
University of the Punjab Canal Bank Road,
Thokar Niaz Baig Lahore-53700