كلية دبي الطبية للبنات
DUBAI MEDICAL COLLEGE FOR GIRLS

DMCG Laboratory Manual

Effective from September 2023

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Objective: Following are the aims of laboratories:

- To make the teaching and learning process more effective, more interactive, less time consuming
- Introduce students to various techniques used in the healthcare field for preventive medicine, diagnostics, and therapeutics.
- Introduce students to various techniques used in the healthcare field for research.
- Create and maintain a lab environment which is safe i.e., in compliance with international safety standards.

LABORATORY FACILITIES in DMCG

DMCG possesses well-equipped laboratories for each discipline.
There are 7 laboratories and one museum in DMCG premises for biomedical teaching. Currently, all of these laboratories are utilized by students of both colleges i.e. DMCG and DPCG.

Location	Laboratory
Dubai Medical College for Girls	1. Biochemistry Lab
	2. Pathology Lab
	3. Pathology Museum
	4. Anatomy Lab
	5. Parasitology & Histology Laboratory
	6. Physiology Lab
	7. Pharmacology Lab
	8. Microbiology Laboratory

LIST OF LABORATORIES				
LOCATION	**Name of Laboratory**	**Objectives**	**CAPACITY (students/ session)**	**Area (m^2)**
DMCG- Ground Floor- Block C	Microbiology Laboratory	**This lab provides students with facilities to:** •Practically demonstrate the various techniques involved in microbiological manipulation, cultivation, and identification of microorganisms in biological samples. •Perform different methods of sterilization and determine the mode of action of disinfectants and antibiotics as well as demonstrate the sterility test for pharmaceutical products. •Perform staining techniques to reveal the different bacterial compounds.	30	60.5
DMCG- Ground Floor- Block B	Biochemistry Laboratory	**This lab provides students with facilities to:** • Identify laboratory diagnostics chemical tests of various diseases in humans. • Attain knowledge of all types of biochemical analysis.	30	60.5
DMCG- Ground Floor- Block D	Anatomy Laboratory	**This lab provides students with facilities to:** • Recognize typical structure and functions of various parts of the human body. • Identify functions of the human body in their applications for the diagnosis and management of various diseases.	35	70
DMCG- Ground Floor- Block A	Physiology Laboratory	**This lab provides students with facilities to:** • Get knowledge about functions of various organs, including the composition of body fluids, particularly blood, concerning deviation from the standard/normal conditions that occur in various diseases affecting humans.	30	60.5
DMCG- Ground Floor- Block B	Pathology Laboratory	**This lab provides students with facilities to:** • Know diseases, which affect humans. • Carry out histopathological studies. • Correlate typical microscopic structure of the human cell, including cell biology	30	60.5

		and various organs of the human body, with the alterations in various diseases afflicting humans.		
DMCG, (Block C), Ground floor	Pharmacology-Laboratory	•Correlate the didactic teachings with its practical applications. •Integrate the teaching of basic pharmacology into clinical cases. • Provide incentive students for self-development of the knowledge on the therapeutic status of the drugs. •Develop the professional skills needed in pharmacy practice.	30	60.5
DMCG (Block D), Ground floor	Parasitology & Histology Laboratory	•Carry out Histological and Parasitology studies. •Correlate normal microscopic structure of the human cell, including cell biology and various organs of the human body with the alterations that occur in various diseases afflicting human body. •Study different parasites and their life cycles causing diseases.	30	60.5
DMCG (block B first floor)	Pathology museum	• To study the gross morphology of pathological specimens.	30	-

LIST OF EQUIPMENT				
Equipment	**Purchase Year**	**Quantity**	**Research (Usage in %)**	**Teaching (Usage in %)**
Pharmacology Laboratory **Lab Supervisor: Prof. Tasneem**				
Oven	NA	1	0	100
Transducer Amplifier	NA	1	0	100
Tissue Bath. (Double Heated).	NA	1	0	100
Rat tail catcher	NA	1	0	100
Thermocirculator	NA	1	0	100
Hot plate	NA	1	0	100
Halstrup walcher	NA	2	0	100
Samsung 56 inch TV	NA	1	0	100
Computer	NA	16	0	100
Microbiology Lab **Lab Supervisor: Prof. Magda**				
Refrigerator	NA	1	0	100
Incubator	NA	1	0	100
Eye wash	NA	1	0	100
Computer with printer	NA	1	0	100
Elisa system reader and washer	NA	1	0	100
Water bath	NA	1	0	100
Electric Balance	NA	1	0	100
Microtome	NA	1	0	100
Hot air oven	NA	1	0	100
Microscope Olympus	NA	11	0	100
Microscope Nikon	NA	4	0	100
OPTIKA Digital Microscope	NA	4	0	100
Smart TV (Skyworth)	NA	1	0	100
Auto clave	NA	1	0	100
Refrigerator	NA	1	0	100
Glucometer	NA	1	0	100
Hemocytometer Complete	NA	17	0	100

LIST OF EQUIPMENT				
Equipment	**Purchase Year**	**Quantity**	**Research (Usage in %)**	**Teaching (Usage in %)**
Bioelectrical impedance analysis		1	0	100
Pathology Lab **Lab Supervisor: Dr. Mariam Shadan**				
Microscope With camera	NA	1	0	100
Huawei smart board	NA	1	0	100
Multihead Microscope	NA	1	0	100
Microscope (Olympus)	NA	23	0	100
Biochemistry Lab **Lab Supervisor: Prof. Nagla**				
Computer	NA	1	0	100
Spectrophotometer (Jenway)	NA	1	0	100
Spectrophotometer (Labtron England)	NA	1	0	100
Homogenizer	NA	1	0	100
Refrigerated Centrifuge Machine	NA	1	0	100
Thermal Cycler	NA	1	0	100
Water Bath	NA	1	0	100
Incubator	NA	1	0	100
Freezer -86	NA	1	0	100
Ice Maker	NA	1	0	100
Electrophoresis system	NA	1	0	100
Small centrifuge	NA	1	0	100
Physiology Lab **Lab Supervisor: Dr. Aprajita**				
Huawei smart board	NA	1	0	100
Patient couch	NA	1	0	100
Universal Oscillograph (four channel)	NA	2	0	100
Universal Oscillograph (two channel)	NA	2	0	100
Student Oscillograph (two channel)	NA	1	0	100
Isolated preamplifier	NA	2	0	100
ECG machine	NA	1	0	100
Water bath	NA	1	0	100

LIST OF EQUIPMENT				
Equipment	**Purchase Year**	**Quantity**	**Research (Usage in %)**	**Teaching (Usage in %)**
Hct centrifuge machine	NA	1	0	100
Biopack system (CVS and Resp Physiology experiments)	NA	1	0	100
Auscultation simulator (Life form system)	NA	1	0	100
Spirometer	NA	1	0	100
Diacheck-C1 coagulometer 4	NA	4	0	100
Computers	NA	6	0	100
Haemoglobinometer (sahle)	NA	22	0	100
HCT Reader	NA	7	0	100
Sphygmomanometer	NA	5	0	100
Stethoscope	NA	5	0	100
Hammers	NA	5	0	100
Tuning fork	NA	5	0	100
Visual Activity Chart	NA	5	0	100
Color Vision Chart	NA	5	0	100
Anatomy Lab **Lab Supervisor: Prof. Shefaa**				
Freezer for dead bodies	NA	1	0	100
Big container for cadaver	NA	2	0	100
Small container for body parts	NA	3	0	100
Stretcher	NA	6	0	100
Smart Board (Huawei)	NA	1	0	100
X-ray screen Fixed	NA	3	0	100
X-ray Screen portable	NA	8	0	100
Medical Portable privacy screen	NA	11	0	100
Hydraulic Stretcher trolley	NA	1	0	100
Scissors	NA	3	0	100
Forceps	NA	6	0	100
Knives	NA	8	0	100
Articles Tray	NA	1	0	100
Skeleton	NA	3	0	100

LIST OF EQUIPMENT				
Equipment	**Purchase Year**	**Quantity**	**Research (Usage in %)**	**Teaching (Usage in %)**
Skelton picture	NA	1	0	100
Human body	NA	4	0	100
Plastinated Body	NA	3	0	100
Histology Lab **Lab Supervisor: Prof. Nadiah**				
Microscope With camera	NA	1	0	100
TV Samsung	NA	1	0	100
Microscope olympus	NA	22	0	100
Leica Microscope	NA	5	0	100
Pathology Museum **Lab Supervisor: Dr. Mariam**				
Jars with pathological specimen	NA	43	0	100

Measures for Laboratory Safety

1) Introduction:

Laboratories of DMCG are utilized to conduct practical in most of the subjects taught during study. Practical exercises in some subjects like chemistry, pharmacology, microbiology, pharmaceutics etc. are sometimes dangerous because they involve so many hazardous chemicals and pathogenic microorganisms. Therefore, extra precautions are needed in these labs to provide a safe and healthy environment during and after the practical. Some extra care is also needed for disposing of the waste materials left after the practical especially the bacterial culture and chemicals. To achieve the goal of health and safe environment in the College, certain rules have been framed by the College administration for the personnel (staff and students) working in these laboratories during practical.

Each laboratory is maintained and supervised by the assigned supervisor (given in the table above). Any safety incident, or complaint must be reported to the instructor at the time of teaching and to the supervisor.

2) Objectives of Laboratory Safety and Security

a. To take reasonable steps to provide a healthy environment in the College premises.

b. To take steps for the above purpose must comply with the U.A.E. laws.

c. To evaluate and validate the methods used to ensure a healthy and safe environment.

3) General Safety:

Personal Practices:

- To help prevent skin contact with corrosive, toxic, or hot liquids, laboratory protective clothing should cover your arms, main torso, legs, and feet. Do not wear sandals, or open toe shoes in the lab.
- Do not allow children in laboratories.
- Never pipette anything by mouth, instead use pipette filler/rubber bulb.
- Be aware of dangling jewelry, loose clothing, or long hair that might get caught in equipment.
- Never taste anything in the laboratory or put anything in your mouth.
- Avoid touching your face while working inside the lab.
- Contact lenses are not to be worn in the laboratory. Chemical vapors can become trapped between the eye and the contact lens, causing permanent damage.
- Never directly smell the source of any vapor or gas. Instead, waft the vapor or gas toward your nose with a cupped hand.
- The exhaust system of the lab should be switched on during practical.
- Perform all reactions in your assigned work hood, unless otherwise directed.

- The experiments in which toxic fumes are released should be carried out in Fuming Chamber.
- Never point at a test tube that is being heated towards you or those working around you.
- Keep the doors to the rooms where the study animals are kept closed.
- Decontaminate work surfaces as soon as processes are done and after they have been polluted by spills of animal material or feces.
- Dispose of animal waste and bedding properly in the designated waste bins and bags.
- After handling animals or animal tissues, remove your gloves and wash your hands before leaving areas where animals are kept.
- Use lab coats, gloves, and other personal protective clothing safely in the lab.
- Never work alone in the lab. If it is unavoidable, you must make someone aware of your location so that they can check on you periodically.
- Wash your hands properly before leaving the lab.
- In case of any accident, contact the lab safety in-charge as soon as possible.

Housekeeping:

- Clean up your work area before leaving the lab at the end of the day.
- Clean (if necessary) the glassware/equipment before starting the lab to avoid contamination.
- Keep the work area clear of all materials except those needed for your work. Extra books, purses, etc. should be kept away from equipment that requires air flow or ventilation to prevent overheating.

Electrical Safety:

- Adequate electrical outlets should be provided in the lab to prevent circuit overloading.
- Inspect power cords to be sure they are not frayed or have exposed wiring.
- Carefully place power cords so they don't come in contact with water or chemicals. Contact with water is a shock hazard. Corrosives and solvents can degrade the cord insulation.
- Keep flammable materials away from electrical equipment. The equipment may serve as a source of ignition for flammable or explosive vapors.
- If sparks are noticed while connecting electric equipment or if the cord feels hot, do not use this equipment until it can be serviced by an electrician.
- Do not run electrical cords along the floor where they will be a tripping hazard and be subject to wear. If a cord must be run along the floor, protect it with a cord cover.

4) Lab Techniques and procedures:

- Standard operating procedure must be referred to for understanding the procedures and operation techniques of the equipment/instrument in the laboratory.
- Students are allowed to use the equipment/instrument only if they are trained for using or in the presence of the instructor.
- Inspect all glassware before use. Repair or discard any broken, cracked, or chipped glassware in labeled appropriate containers.
- Never leave a lit Bunsen burner unattended. Always turn the Bunsen burner off when it is not in use.
- Never leave anything that is being heated unattended.
- Use tongs when holding objects in a flame.
- Never heat a closed container over a laboratory burner.
- Switch off the hot water bath & hot plate once the work is finished.
- Always close the centrifuge lid while operating and stay with the centrifuge until it is running safely without vibration.

- When using a separating funnel, always firmly hold the stopper when shaking and regularly vent the funnel by opening the stopcock. Gloves are recommended.
- Always protect yourself and your colleague from unexpected chemical splashes. Pressure may build in the funnel during mixing; therefore, chemicals may violently be expelled from the funnel.
- Always remove the stopper when the funnel is stored in the ring stand.
- When possible, avoid using sharps. Whenever needed, use extreme caution when using a needle and syringe or sharps. Used needles should never be removed, recapped, bent, broken, or clipped from disposable syringes. When possible, use safe needles.

- Treat the cadaver with **respect**. It is a privilege to be able to dissect a human cadaver. It is necessary to expose only those areas of cadaver that are being dissected. NO PHOTOGRAPHS are to be taken for the cadaver. Sharing photographs of cadavers on social media is a cybercrime. (It violates the privacy of the cadaver).

5) Food and Drink in the Lab:

- Eating and drinking is only allowed in the non-lab areas.
- Never hold or consume food and drinks in the chemical/biological refrigerators and storage areas.
- Refrain from smoking, gum chewing, applying cosmetics, or taking or applying medication inside the lab.
- Food, beverages, cups, and other drinking and eating utensils should not be stored in areas where hazardous chemicals are handled or stored.
- Plates, cups, and utensils for personal use should NOT be washed in sinks where chemical hazards can be found.
- Glassware used for laboratory operations should never be used to prepare or consume food or beverages.
- Laboratory refrigerators, ovens, and so forth should not be used for food storage or preparation.
- Laboratory water sources and deionized laboratory water should NOT be used as drinking water.

- Never wear gloves or laboratory coats outside the laboratory or in areas where food is stored and consumed.
- Always wash laboratory apparel separately from personal clothing.

6) Personal Protective Clothing:

PPE is also required in conjunction with other controls to mitigate the impact should an incident occur.

Body protection

To protect against accidental spill or contact, lab coats must be worn whenever working in the laboratory or clinical areas.

Eye and Face protection

Goggles are required for protection against liquid splashes, and chemical vapors.

Hand protection

Disposable nitrile or neoprene gloves are usually appropriate as protection from incidental splashes or contact with lab chemicals.

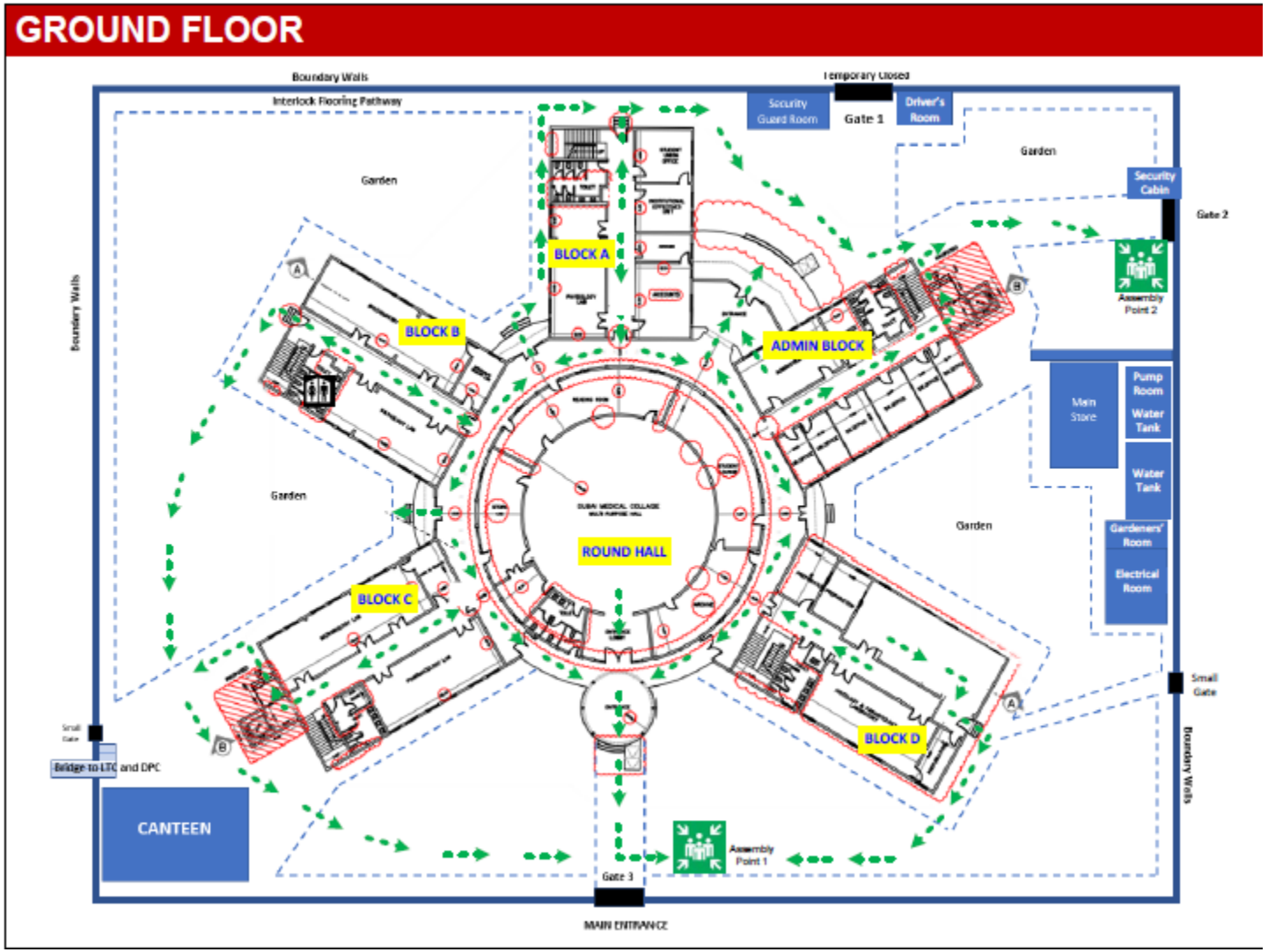
Evacuation Procedures:

The following procedures and information are important in the event it is necessary to evacuate a laboratory.

- Building evacuation may be necessary if there is a chemical release, explosion, natural disaster, or medical emergency.
- Be aware of the marked exits in your area and building.
- The evacuation alarm is a loud continuous siren or horn.
- Whenever the building evacuation alarm is sounded or when you are told to leave, walk quickly to the nearest marked exit, and ask others to do the same.
- Outside, proceed to a clear area that is at least 100 yards from the building. Keep walkways clear for emergency vehicles.

- To the best of your ability and without reentering the building, be available to assist EH&S in their attempts to determine that everyone has been evacuated safely.
- Do not return to the building until you are told to do so by the campus police or EH&S.

7) Emergency Evacuation plan of DMCG:



DMCG evacuation plan

8) Emergency Equipment:

Know the location and how to use the emergency equipment in the laboratory. In the event of an emergency asking someone to locate the emergency equipment or reading the instructions on how to use it may not be possible. Also, eye injuries may require finding emergency equipment without being able to see.

Emergency Showers

- An emergency shower may be used to suppress a fire or more commonly to decontaminate a person who has been exposed to chemicals.
- Remain under the shower for a least 15 minutes, then seek medical attention.
- Always keep the area under an emergency shower unobstructed.
- Electrical equipment in the area can also present an electrocution hazard.

Eyewashes

- Never hesitate to flush your eyes immediately if chemicals are splashed in them. A delay of seconds could cause damage.
- If chemicals are splashed into the eye, hold the eye lids open and flush with water continuously for at least 15 minutes.
- Hold the eyelid open and move the eye up and down and sideways to wash thoroughly behind the eyeball where chemicals could be trapped.
- Seek medical attention if required.

Fire Extinguisher

Fire extinguishers are a very important component of safe laboratory operation. Each laboratory should be equipped with the appropriate type for the expected fire emergency and be capable of immediate utilization.

1.Almost all lab areas are equipped with a carbon dioxide or an ABC dry chemical powder fire extinguisher.

a. The ABC extinguishers work well on a paper, chemical, or electrical fire.

b. The carbon dioxide extinguisher is good for chemical or electrical fire.

If you have been trained, only attempt to extinguish small fires, and always fight a fire from a position that allows escape.

3. To use a fire extinguisher, follow these four steps,

a. Pull the pin.

b. Aim the extinguisher nozzle at the base of the fire.

c. Squeeze the handle to release the extinguishing media.

d. Sweep the nozzle from side to side at the base of the fire starting at the front and working forward until it is out.

4. Remember the word PASS when using a fire extinguisher: **P**ull, **A**im, **S**queeze, and **S**weep.

Spill Equipment

Spill Equipment is the supply for cleaning up a minor chemical or biological spill that should be purchased and kept in the laboratory.

Supplies to have for a chemical spill include spill pillows, an inert absorbent such as vermiculite, a plastic (non-sparking) scoop, plastic bags to put the spilled material into, heavy gloves, goggles, and sodium bicarbonate or other base to neutralize acids.

Supplies to have on-hand for a biological spill include paper towels, plastic bags, and a container of 1:10 bleach solution.

9) LABORATORY FIRST- AID, SAFETY & TREATMENT OF BURNS

Laboratory work may be subject to hazards of many kinds, of which every person should be aware while working. Most of these hazards occur due to the ignorance and carelessness of students.

A First-aid box is kept in a readily accessible place in the laboratory.

Provision of First Aid box in Laboratories

Each laboratory has a first aid box for dealing with any injury, which may occur due to any accident happening in the lab. The first aid box is hung on any wall of the lab. where all the students have easy access. The first aid box contains the following.

S. No.	Description		
1.	Optrex	9.	Deep Heat Spray
2.	Savoy Burn spray	10.	Gauze Pads
3.	Savoy First aid spray	11.	Cotton bandage
4.	Silvadiazin ointment	12.	Plaster roll
5.	Jelonet	13.	Cotton
6.	Opsite Spray	14.	Resusci Face Shield
7.	Baneocin Powder	15.	First Aid Scissors
8.	Dettol		

Burns:

(1) **Caused by Dry Heat (i.e., by Flames, Hot Metal, etc.)**

(a) For very small burns, hold the burn in cold saturated (8%) sodium bicarbonate solution for some time, then cover freely with zinc oxide ointment (or failing this, with Vaseline) and bandage to exclude air.

(b) For large burns, do not put on oil or ointment, but always apply the acriflavine emulsion freely and without delay. If the burn is on the hand or arm, after applying the emulsion, cover the burn lightly with a layer of cotton-wool also soaked in the flamazine.

(2) **Scalds (by boiling water). Apply at once the flamazine.**

(3) **Acid Burns.** Wash immediately and thoroughly with cold water, and then with dilute (8%) sodium bicarbonate solution. If burn is severe, wash again with water and then apply the flamazine.

(4) **Caustic Alkali Burns**. The same as for acid burns, except that after thorough washing with water, wash with very dilute (e.g., 1%) acetic acid solution in place of sodium bicarbonate. Then continue as before.

(5) **Bromine Burns**. When experiments involving the use of liquid bromine are being performed, small bottles of petrol (B.P. 80- 100º) should be available on the bench. If bromine is spilt on the hands, immediately wash it off with an ample supply of petrol, when the bromine will be completely removed from the skin, (If subsequently, the skin which has been in contact with the petrol feels tender and "smarts" owing to the removal of the normal film of grease, cover gently with olive oil.

If petrol is not immediately available, wash under a steady stream of water for some time, and then wash with dilute (8%) sodium bicarbonate solution. Water followed by bicarbonate is not, however, as affective as petrol for removing the bromine which has already started to penetrate the skin.

Eye Accidents:

In all cases, the patient should see a doctor. Wash the eye in the eye wash fountain for 15-30 minutes.

Cuts:

If only a minor cut, wash well in 1% aqueous Chloramines-T solution or in 2% iodine solution. Remove dirt or glass, wash again, and apply sterilized dressing firmly bandaged to check bleeding.

For serious cuts, send at once for a doctor, and meanwhile endeavor to check bleeding whenever possible, e.g., in the case of a cut limb, by pressure immediately above the cut.

Most cuts that occur in the laboratory are caused either by glass tubing, condensers, or by test-tubes; and boiling tubes breaking. Such accidents in either case can be avoided by careful working.

Poisons:

Solid and Liquids.

(a) In the mouth but not swallowed. Spit out at once and wash the mouth out repeatedly with water.

(b) If swallowed.

(i) Acid generally (including oxalic) or alkalis, drink plenty of water to dilute the chemical. Then for acids, it should be followed by drinking a lot of lime water. Milk may then be given, but no emetics.

(ii) Salts of heavy metals. Give milk or white of egg.

(iii) Arsenic or Mercury Compounds. Give emetic without delay, e.g., one teaspoonful of mustard, or 1 tablespoonful of salt, in a tumbler of warm water.

Gas Poisoning:

Remove patient to fresh air, and loosen clothing at neck. If breathing has stopped, give artificial respiration until the doctor arrives.

To counteract chlorine or bromine fumes if inhaled in only small amounts, inhale ammonia vapor, or gargle with sodium bicarbonate solution. Afterwards drink warm dilute peppermint or cinnamon essence, to soothe the throat and lungs.

Electrical Shock:

Switch off, and treat for burns and shock.

Treatment of Fires:

Clothes. Laboratories should be equipped with a sufficient number of fireproof blankets, so that a blanket available at any point of the laboratory at a few seconds' notice.

The blanket when required should be wrapped at once firmly around the person whose clothes are on fire, the person is then placed in a prone position on the floor with the ignited portion upwards, and the blanket pressed firmly over the ignited clothes until the fire is extinguished.

Bench Fires:

The following methods should generally be used:

(1) Sand Buckets of dry sand for fire extinguishing should be available in the laboratory and should be strictly reserved for this purpose most of the fires on the bench may be quickly smothered by the ample use of sand.

(2) If a liquid, which is being heated in a beaker or a conical flask, catches fire, it is frequently sufficient to turn off the gas (or other source of heating) below and then at once to stretch a clean duster tightly over the mouth of the vessel. The fire quickly dies out from lack of air, and the (probably valuable) solution is recovered unharmed. Students should bear in mind that the majority of bench fires arise from one of two causes, both of which result from careless manipulation by the student himself. These causes are (1) the cracking of glass vessels, which are being heated whilst containing inflammable liquids, (2) the addition of unglazed porcelain to a heated liquid, which is "bumping" badly-with the result that the previously superheated liquid suddenly froths over and catches fire. Porcelain should never be added to a "bumping" liquid until the latter has been allowed to cool for a few minutes; and therefore, has fallen in temperature below its boiling point.