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Introduction to Clinical Pharmacy and Essentials of Nutrition

PCP 413

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SCHEDULE I

TITLE: **MEASUREMENT OF BLOOD PRESSURE WITH MERCURY, MANAUL AND DIGITAL SPHYGMOMANOMETER**

AIM: TO MEASURE THE ARTERIAL BLOOD PRESSURE WITH THE USE OF MERCURY, MANAUL AND DIGITAL SPHYGMOMANOMETER.

INTRODUCTION

Sphygmomanometer is an instrument for measuring blood pressure. It consists of an inflatable rubber cuff, which is wrapped around the upper arm and is connected to an apparatus that records pressure, usually in terms of the height of a column of mercury or on a dial. An arterial blood pressure reading consists of two numbers, which typically may be recorded as x/y. The x is the systolic pressure, and y 1s the diastolic pressure. Systole refers to the contraction of the ventricles of the he when blood is forced from the heart into the pulmonary and systemic arterial circulation, and diastole refers to the resting period, when the ventricles expand and receive another supply of blood from the heart the atria. At each heartbeat, blood pressure is raised to the systolic level, and, between beats, it drops to the diastolic level. As the cuff is inflated with air, a stethoscope is placed against the skin at the crook of the arm. As the air is released, the first sound heard marks the systolic pressure; as the release continues, a dribbling noise is heard. This marks the diastolic pressure, which is dependent on the elasticity of the arteries.

MATERIALS

1. Mercury, manual or digital sphygmomanometer

2. Stethoscope

3. Human subject

METHOD

Get the subject seated stable (5-10 minutes) in an appropriate position (the arm at the heart

Level)

2. Match the size of the blood pressure cuff (newborn, infant, child, standard adult, large adult, or thigh) to the size of the subject's arm.

3. Ensure silent and comfortable rest of at least 5 min (with back support, if seated) before and during blood pressure measurement

4. Center the bladder of the cuff over the brachial artery with its lower edge within 2.5 cm of the antecubital fossa. This leaves enough space to apply the stethoscope head beneath it, without touching the cuff and generating background noise.

5. Inflate the cuff and listen to Korothkoff sound until none is heard. Inflate more up to 10 mmHg beyond the last sound.

6. Deflate the cuff slowly. To be precise (within 2 mmHg), the observer should hear at least one Korothkoff sound at each 2 mmHg gradation of the mercury column. The heart rate of Subject therefore dictates the correct deflation rate, generally 2--3 mmHg.

7. Take several blood pressure readings on each occasion.

8. Listen over the brachial artery with the bell of the stethoscope, and minimize pressure exerted on the skin, leaving no lasting indentations. Too much pressure directly over the artery will likely cause overestimation of systolic blood pressure and underestimation of diastolic blood pressure.

READINGS

No	Systolic			Diastolic			Average systolic	Average diastolic
1	1	2	3	1	2	3		
2								
Mean Reading							X_1=	X_2 =

EXERCISE

1. Calculate the mean and standard deviation of systolic and diastolic pressure

2. What is the percentage of subjects with systolic value higher than 140 mmHg

3. What is the percentage of subjects with diastolic value higher than 90 mmHg

5. What are the precautions that should be taken to enhance accuracy of results?

6. What is your general observation of the results obtained?

SCHEDULE II

TITLE: MEASUREMENT OF OXYGEN SATURATION

AIM: TO MEASURE THE ARTERIAL OXYGEN SATURATION USING A PULSE OXIMETER

MATERIALS

1. Pulse oximeter
2. Human subject

INTRODUCTION: Oxygen saturation can be measured with a pulse oximeter. It's a piece of non-invasive technology that is worn over the finger. To calculate the present ratio of oxygenated to deoxygenated hemoglobin, light wavelengths are measured. In medicine, using pulse oximetry has become routine procedure. It's frequently considered the sixth essential sign. Therefore, medical professionals need to understand the uses and constraints of pulse oximetry. They ought to understand the fundamentals of oxygen saturation as well. Pulse oximetry can be used in any clinical situation where hypoxemia might happen. These environments include operating rooms, postoperative recovery areas, endoscopy suites, sleep and exercise labs, oral surgery suites, cardiac catheterization suites, conscious sedation facilities, labor and delivery wards, interfacility patient transfer units, altitude facilities, aerospace medicine facilities, and even the homes of the patients.

METHOD

When getting ready to use the pulse oximeter, the most crucial thing to remember is to position the monitor so that light may pass through to the detector. Before placing the pulse oximeter, take into account a number of parameters. Patients should take off their nail polish and wipe their finger with a prepared alcohol solution. Look for anything else on the finger, like more pigmentation. For instance, light passing through tattoos may be blocked. It has also been demonstrated that high-intensity ambient light affects the precision of pulse oximetry data. The pulse oximeter's rubber shield should be in place before to application in order to help minimize ambient light input. Conduct the measurement in both arms (left and right)

READING

No	Patient			Patient		
1						
2						
3						

EXERCISE

1. Factors that affects pulse oximeter reading
2. lists factors that can affect accuracy of pulse oximeter reading
3. CASE STUDY

SCHEDULE III

TITLE: DETERMINATION OF BODY MASS INDEX

AIM: TO DETERMINE THE BODY MASS INDEX OF ADULT SUBJECTS

INTRODUCTION

Measurement of weight and height can be done separately or using a combined instrument. The weight of and individual in itself may not have any clinical importance. But when correlated with the height produce meaningful health interpretation.

Body Mass Index (BM) is a parameter calculated from a person's weight and height. BMI is a fairly reliable indicator of body fatness for most people. BMI does not measure body fat directly, but research has shown that BMI correlates to direct measures of body fat. This is an inexpensive and easy-to perform method of screening for weight categories that may lead to health problems. BMI is used as a screening tool to identity possible weight problems for adults. However, BMI is not a diagnostic tool. Calculating BMl is one of the best methods for population assessment of overweight and obesity. Because calculation requires only height and weight, it is inexpensive and easy to use for clinicians and for the general public. The use of BMI allows people to compare their own weight status to that of the general population.

Calculation of BMI

BMI is calculated the same way for both adults and children. The calculation is based on the following formula:

Measurement Units	**Formula and Calculation**
Kilograms and meters (or centimeters)	Formula: weight (kg) / [height (m)]* With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Since height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters. Example: Weight 68 kg, Height= 165 cm (1.65 m) Calculation: 68 + (1.65) = 24.98

Interpretation of BMI

For adults 20 years and older, BMI is interpreted using standard weight status categories that are the same for all men and women.

The standard weight status categories associated with BMI ranges for adults are shown in the following table

BMI (kg/m^2)	**Weight status**

Below 18.5	Underweight
18.5-24.9	Normal weight
25.0-29.9	Overweight
30.0 and above	Obese

MATERIALS

1. Dual weight and height balance

2. Human subject

METHOD

1. Position the equipment on a flat surface ground
2. Ensure the subject is barefooted and in upright position
3. The head should be positioned with the face lacing direct front
4. Use a flat ruler to determine the position which the topmost part of the head makes with the graduated height scale
5. Record your results

RESULTS

READING	WEIGHT (KG)	HEIGHT (METRE)	H^2
1			
2			

CALCULATION

1. What was average weight of the subjects?

2. Determine the Body Mass Index of the subjects

3 Determine the average BMI of the subjects

4. How would you describe the BMI and ABMI of the subjects?

SCHEDULE IV

TITLE: DETERMINATION OF BLOOD SUGAR LEVEL

AIM: TO DETERMINE BLOOD SUGAR USING GLUCOMETER (DIGITAL)

INTRODUCTION

A glucose meter (or Glucometer) is a medical device for determining the approximate concentration of glucose in the blood. It is a Key element or home blood glucose monitoring (HBGM) by people with diabetes mellitus or hypoglycemia. A small drop of blood, obtained by pricking the skin with a lancet, placed on a disposable test strip that the meter reads and uses to calculate the blood glucose level. The meter then displays the level in mg/dl or mmol/L

Since approximately 1980, a primary goal or the management or type I diabetes and type 2 diabetes mellitus has been achieving Closer-to-normal levels or glucose in the blood for as much of the time as possible. The benefits include a reduction in the occurrence rate and severity of long-term complications from hyperglycemia as well as a reduction in the short-term, potentially life-threatening complications of hypoglycemia

MATERIALS

1. Methylated spirit
2. Lancet
3. Test stip.
4. Glucometer
5. Cotton wool.
6. Human subject
7. Hand gloves

PROCEDURE

1. Set out your glucometer, a test strip, a lancet and alcohol prep pad.

2. Wash your hands to prevent transfer of germs.

3. Turn on the glucometer and place a test strip in the machine when the machine is ready.

4. Watch the indicator for placing the blood to the strip.

5. Make sure the hand is dry and wipe the area on the fingertip you've selected with an alcohol prep pad (cotton wool) and wait until the alcohol evaporates.

6. Pierce the finger tip on the soft, fleshy part and obtain a drop of blood.

7. Drop the blood drop on the tip of the strip on the glucometer

8. Calculate the blood sugar reading

READING

READING	BLOOD SUGAR(MG/DL)	BLOOD SUGAR (MMOL/L)
1		
2		

EXERCISE

1. What are the precautions to take in doing this experiment?
2. How would you describe the result obtained?
3. What is the difference between lasting blood sugar and random blood sugar measurements?
4. What are the peculiarities of each of them?
5. What is the relevance of 2- hour post prandial blood glucose measurement?
6. What are the implications of hypoglycemia and hyperglycemia?

SCHEDULE V

TITLE: QUALITATIVE TEST FOR PREGNANCY

AIM: TO DETERMINE THE PREGNANCY STATUS OF VOLUNTEER SUBJECTS (FEMALE)

INTRODUCTION

Pregnancy test attempts to determine whether a woman is pregnant. Markers that indicate pregnancy related hormones are found in urine and blood. Pregnancy test requires that sampling is done to confirm the presence of these substances. The first of these markers to be discovered, Human Chorionic Gonadotropin (hCG), was discovered in 1930 to be produced by the trophoblast cells of the fertilized ovum (blastocyst). While hCG is a reliable marker of pregnancy, it cannot be detected until after implantation. This results in false negatives if the test is performed during the very early stages pregnancy. Obstetric ultrasonography may also be used to detect pregnancy. Most chemical tests for pregnancy look for the presence of the beta subunit of hCG or human chorionic gonadotropin in the blood or urine. HCG can be detected in urine or blood after implantation, which occurs six to twelve days after fertilization. Quantitative blood (serum beta) tests can detect hCG levels as low as 1 mlU/ml, while urine test strips have published detection thresholds of 10 mlu/mL to 100 mlU/ml, depending on the brand. Qualitative blood tests generally have a threshold of 25mlU/mL, and so are less sensitive than some available home pregnancy tests. Most home pregnancy tests are based on lateral-flow technology.

MATERIALS

1. Early morning urine sample or serum sample

2. RDT Pregnancy test Strip

3. Urine Bottle

4. Stop watch

5. Hand gloves

6. Nose mask

METHOD

1. Collect the fresh sample of urine from the patient- preferably early morning urine- in clean urine bottle.

2. Dip the stick into the sample. Do not dip beyond the level mark 'max’

3. Allow the stick to stay tor few seconds- watching the movement or the specimen.

4. Remove and allow to stay for few minutes (5mins)

INTERPRETATION

1. Only the upper band seen - **negative**.

2. Only the lower band or no band- **invalid**

3. Both upper and lower band appeared - **positive**

READING

READING	RESULT
1	
2	

EXERCISE

a. What number of samples was tested positive?

b. What number of samples was tested negative?

c. What was the number of invalid results?

d. What are the precautions taken in this test?

SCHEDULE VI

TITLE: QUALITATIVE TEST FOR MALARIA (RDT)

AIM: TO TEST FOR MALARIA PARASITE IN HUMAN VOLUNTEER USING RAPID DIAGNOSTIC TESTS (RDT)

INTRODUCTION

Microscopy still remains the gold standard for the diagnosis of malaria because of the following advantages: demonstrate the parasites, identification of the species and quantification of the parasites.

National policy on malaria allows for symptomatic diagnosis of malaria in children less than five years. Children above five years and adults must be confirmed through laboratory investigation which could be through either microscopy or Rapid Diagnostic Tests (RDT).

Because of some disadvantages of the microscopy- labor intensive, time consuming and skill requirement which may be difficult to get in view of urgency required in determining malaria status, hence the use of RDTS.

Example: pare sight F test.

MATERIALS

1. Malaria test Device.

2. Blood sample

3. Lancet

4. Hand gloves

5. Ethanol' Methylated spirit

6. Cotton wool

7. Sample pipette

METHOD

1. Clean middle or ring finger with gauze (cotton wool) containing ethanol and allow to dry

2. Squeeze the end of the finger tip and pierce with a sterile lancet

3. Wipe away the first drop of blood with sterile gauze/ cotton wool

4. Take a sample pipette, while gently squeezing the tube, immerse the open end in the blood drop and then gently release the pressure to draw blood into the sample pipette up to the guide line.

5. Add whole blood (5ul) into sample in sample well by squeezing Sample pipette

6. Add two drops of (60ul) of assay buffer into Assay Buffer Well

7. Read the test result in 20 minutes.

INTERPRETATION

1. Positive reaction: the presence of two colour bands indicate a positive result
2. Negative reaction: the presence of one band within the result Window indicates a negative result
3. Invalid result: The test is invalid if the control line(C) did not appear. The test could be repeated using a new strip.

READING

TEST	REMARK
1	
2	

EXERCISE

1. Find the proportion of sample with positive results
2. Number of valid results
3. What precautions taken in carrying out this test

SCHEDULE VII

TITLE: MEASUREMENT OF RESPIRATORY RATE

AIM: TO DETERMINE THE RESPIRATORY RATE IN HUMAN VOLUNTEERS

INTRODUCTION

The number of breaths a person takes in a minute is known as their respiration rate. The rate is often determined when an individual is at rest and is as simple as counting how many times the chest rises in a minute to determine how many breaths the person takes. With fever, disease, and other medical conditions, respiration rates may rise. It's critical to assess respiration and determine whether an individual is experiencing any breathing difficulties. An adult's typical resting breathing rate is between 12 and 16 breaths per minute.

METHOD

1. Sit down and try to relax.
2. It's best to take the respiratory rate while sitting up in a chair or in bed.
3. Measure the breathing rate by counting the number of times your chest or abdomen rises over the course of one minute or over 30 minutes and multiply by two (2) or over 15 minutes and multiply by four (4).
4. Record this number

READING

READING	RESULT
1	
2	
3	
4	

SCHEDULE VIII

TITLE: MEASUREMENT OF PULSE RATE

AIM: TO DETERMINE THE PULSE RATE IN HUMAN VOLUNTEERS

INTRODUCTION:

The number of times the heart beats per minute, or heart rate, is measured by the pulse rate. The arteries dilate and constrict in response to the blood flow as the heart pumps blood via them. In addition to determining heart rate, taking a pulse can reveal the following: Heart rhythm and pulse intensity

Adults in good health typically have a pulse that beats between 60 and 100 times per minute. Exercise, illness, injury, and emotions can all cause the pulse rate to fluctuate and even rise. In general, the heart rates of females above the age of 12 tend to be faster than those of males. You feel the pulse of the heart by applying pressure to the arteries, which are found near the skin's surface at specific locations on the body, while the heart pumps blood through them. You can feel the pulse at the wrist, on the inside of the elbow, or on the side of the neck. Taking a pulse at the wrist is the most convenient method for most people. To avoid obstructing blood flow to the brain, exercise caution when applying pressure to the lower neck. Never apply pressure to the pulses on either side of the lower neck simultaneously.

MATERIALS:

1. A watch that has a second hand
2. A chart to record the pulse measurement
3. A pen.

METHOD: Wash your hands-this will help to prevent cross-infection. Explain what you are about to do. This will help the patient to understand what is about to happen and will make it easier for them to co-operate.

READINGS

READING	RESULT
1	
2	
3	
4	

SCHEDULE IX

TITLE: DETERMINE BODY TEMPERATURE IN HUMAN VOLUNTEER

AIM: TO DETERMINE BODY TEMPERATURE IN HUMAN VOLUNTEER SUBJECT

INTRODUCTION

Thermometer an instrument used to measure the degree of hotness (in reference to normal temperature). The one used in human is called clinical thermometer.

Thermometers are calibrated in either degrees Fahrenheit (^{0}F) or degrees Celsius (^{0}C), depending on the custom or the region. Temperatures in the United States are often measured in degrees Fahrenheit, but the standard in most other countries is degrees Celsius.

The use of glass thermometer is still being widely used in Nigerian clinical settings although. American Academy of Pediatrics (AAP) recommends against the use of glass thermometers with mercury which can break and mercury is poisonous. Electronic thermometers are the most recommended type.

There are three main areas where the probe can be placed: mouth, rectum, or armpit.

Mouth- Place the probe under the tongue and close the mouth. Breathe through use the lips to hold the thermometer tightly in place. Leave the thermometer in the mouth for 3 minutes or until the device beeps. Clean with methylated spirit after each use

Rectum- this method is for infants and small children who are not able to hold a thermometer safely in their mouth. Place petroleum jelly on the bulb of a rectal thermometer. Place the small child face down on a flat surface or lap. Spread the buttocks and insert the bulb end about 1 inch into the anal canal. Be careful not to insert it too far. Struggling can push the thermometer in further. Remove after 3 minutes or when the device beeps. Clean with methylated spirit after each use.

Armpit-- place the thermometer in the armpit, with the arm pressed against the body. Wait for 5 minutes before reading. Clean with methylated spirit after each use

MATERIALS

1. Clinical thermometer
2. Methylated spirit
3. Cotton wool/alcoholic swab
4. Human volunteer

PROCEDURE

1. Swab the thermometer with cotton wool already treated with methylated spirit and allow to dry

2. Oral temperature shall be determined using clinical thermometer by placing the probe under the tongue and close the mouth. Breathe through the nose, and use the lip to hold the thermometer tightly in place. Leave the thermometer in the mouth for 3 minutes.

3. Armpit: Place the thermometer in the armpit, with the arm pressed against the body. Wait for 5 minutes before reading.

READINGS

Reading	**Oral/Mouth**	**Armpit**
1		
2		

EXERCISE

1. Compare the results obtained in both mouth and armpit measurements

2. What are the precautions taken to obtain good readings?

3. What are the information obtained from your result that have clinical relevance?

SCHEDULE X

TITLE: URINALYSIS (PHYSICAL AND CHEMICAL EXAMINATION)

AIM: TO TEST FOR PHYSICAL AND CHEMICAL CONSTITUENTS OF URINE

INTRODUCTION

A urinalysis is a group of physical, chemical, and microscopic tests. The tests detect and/or measure several substances in the urine, such as byproducts of normal and abnormal metabolism, cells, cellular fragments, and bacteria.

Urine is produced by the kidneys, two fist-sized organs located on either side of the spine at the bottom of the ribcage. The kidneys filter wastes out of the blood, help regulate the amount of water in the body, and conserve proteins, electrolytes, and other compounds that the body can reuse. Anything that is not needed is eliminated in the urine, traveling from the kidneys through ureters to the bladder and then through the urethra and out of the body. Urine is generally yellow and relatively clear, but each time a person urinates, the color, quantity, concentration, and content of the urine will be slightly different because of varying constituents.

Many disorders may be detected in their early stages by identifying substances that are not normally present in the urine and/or by measuring abnormal levels of certain substances. Some examples include glucose, protein, bilirubin, red blood cells, white blood cells, crystals, and bacteria.

There are three ways to analyze urine:

One is a visual exam, which checks the color and clarity. If your pee has blood in it, it might be red or dark brown. Foam can be a sign of kidney disease, while cloudy urine may mean you have an infection.

A microscopic exam checks for things too small to be seen otherwise. Some of the things that shouldn't be in your urine that a microscope can find include: Red blood cells, white blood cells, bacteria and Crystals (clumps of minerals, a possible sign of kidney stones)

The third part of urinalysis is the dipstick test, which uses a thin plastic strip treated with chemicals. It's dipped into your urine, and the chemicals on the stick react and change color if levels are above normal. Things the dipstick test can check for include:

- Acidity or pH- If the acid is abnormal, you could have kidney stones, a urinary tract infection (UTI), or another condition.
- Protein- This can be a sign your kidneys aren't working right. Kidneys filter waste products out of your blood.
- Glucose- A high sugar content is a marker for diabetes.
- White blood cells- These are a sign of infection or inflammation, either in the kidneys or anywhere else along your urinary tract.

- Nitrites- This means that there is an infection with certain kinds of bacteria.
- Bilirubin- If this waste product, which is normally eliminated by your liver, shows up, it may mean your liver isn't working properly.
- Blood- in your urine. Sometimes this is a sign of infections or certain illnesses.

MATERIALS

1. Dipstick
2. Urine sample bottle
3. Freshly collected urine sample

METHOD

Sample collection

One to two ounces of urine is collected in a clean container. A sufficient sample is required for accurate results.

Urine for a urinalysis can be collected at any time. In some cases, a first morning sample may be requested because it is more concentrated and more likely to detect abnormalities.

A urine sample will only be useful for a urinalysis if taken to the healthcare provider's office or laboratory for processing within a short period of time. If it will be longer than an hour between collection and transport time, then the urine should be refrigerated or a preservative may be added.

Dip the whole length of the strip into the urine and hold for 1-2 minutes. Withdraw and read within five minutes.

READING

TEST	CHARACTERISTICS	RESULT
PHYSICAL	Colour	
	Odour	
CHEMICAL	Ph	
	Specific gravity	
	Protein	
	Etc	

SCHEDULE XI

TITLE: MEDICAL TERMS AND ABBREVIATIONS

AIM: TO UNDERSTAND THE MEANING OF VARIOUS MEDICAL TERMS AND ABBREVIATIONS

INTRODUCTION:

Medical terminology is language that is used to describe anatomical structures, processes, conditions, medical procedures, and treatments. Most medical terms adhere to a fixed structure of a prefix, a root, and a suffix. These word components are assembled like building blocks to create a vast vocabulary.

- **Prefix:** When included, the prefix appears at the beginning of a medical term and usually indicates a location, direction, type, quality, or quantity.
- **Root:** The root gives a term its essential meaning. Nearly all medical terms contain at least one root. When a prefix is absent, the term begins with a root.
- **Suffix:** The suffix appears at the end of a term and may indicate a specialty, test, procedure, function, disorder, or status. Otherwise, the suffix may simply define whether the word is a noun, verb, or adjective.
- **Combining vowel:** A combining vowel (usually the letter "o") may be added between word parts to aid in pronunciation.

Breaking a word down into its component parts should help readers ascertain the meaning of an unfamiliar term. For example, hypothermia has the prefix hypo- (meaning below normal), the root therm (heat or warmth), and the suffix -ia (condition).

HEAD

BRAIN	**Encephala**
EAR	**oto**, **aur**
EARDRUM	**tympan**, **myring**
EYE	**ophthalm**, **ocul**
FACE	**Faci**
NOSE	**Rhin**
SKULL	**Crani**

TONGUE	**Lingu**
TOOTH	**odont**, **dent**

Heart and Circulatory System	
aorta	**aort**
arteries	**arteri**
blood	**hem**, **sangu**
blood vessels	**angi**
heart	**cardi**
veins	**ven**, **phleb**

BONES AND MUSCLES

ARM	**brachi**
BACK	**dorsa**
BONE	**oste**
FOOT	**pod**, **ped**
MUSCLE	**myo**
RIB	**cost**
SHOULDER	**scapul**
WRIST	**Carp**

Digestive System	
appendix	**Append**
colon	**Col**
esophagus	**esophag**
intestine (usually small)	**Enter**
kidney	**ren**, **neph**
liver	**Hepat**
stomach	**Gastr**

OTHER COMMON ROOTS

CANCER	**Carci**
DRUG	**Chem**
ELECTRIC	**Electr**
HEAT	**Therm**
KNOWLEDGE	**Gnos**
LIFE	**Bi**
PRESSURE	**Bar**
RETURNED SOUND	**Echo**

Compound Words

A medical word may include multiple roots. This frequently occurs when referencing more than one body part or system. For example, cardio-pulmo-nary means pertaining to the heart and lungs; gastro-entero-logy means the study of the stomach and intestines.

Combining Forms

A combining vowel is used when a root is followed by another word part that begins with a consonant. A combining vowel (usually the letter "o") is added after the root (e.g., neur-**o**-logy) to aid pronunciation. The root and vowel together (e.g., neur-o) are called the combining form. For simplicity, the word part tables do not include combining vowel options.

Prefixes

A prefix modifies the meaning of the word root. It may indicate a location, type, quality, body category, or quantity. Prefixes are optional and do not appear in all medical terms.

Common prefixes:

Size	
large	**macro-**, **mega(lo)-**
small	**micro-**
Number	
half	**semi-**
half (one side)	**hemi-**
one	**mono-**, **uni-**
two | three | four	**bi-** | **tri-** | **quad(ri)-**
equal	**equi-**

many	**poly-**
Level	
above normal	**hyper-**
below normal	**hypo-**
normal/good	**eu-**
Time or Speed	
before	**pro-**, **pre-**, **ante-**
after	**post-**
back/backward	**retro-**
again	**re-**
fast	**tachy-**
slow	**brady-**
new	**neo-**
time, long time	**chron-**

Location or Relationship	
away from	**ab-**
above	**supra-**
around	**peri-**
across	**trans-**
between	**inter-**
out of, outside	**ex-**, **ec(t)-**
self	**auto-**
through, completely	**dia-**
together	**con-**
toward	**ad-**
within, inside	**end(o)-**
Function or Quality	
against	**anti-**, **contra-**

bad	**mal-**
cause	**eti-**
without	**a-**, **de-**
abnormal, bad	**dys-**

Suffixes

Medical terms always end with a suffix. The suffix usually indicates a specialty, test, procedure, function, condition/disorder, or status. For example, "-itis" means inflammation and "-ectomy" means removal.

Alternatively, the suffix may simply make the word a noun or adjective. For example, the endings -a, -e, -um, and -us are commonly used to create a singular noun (e.g., crani-um).

Although the suffix appears at the end of the term, it often comes first in the definition. For example, appendicitis means inflammation (-itis) of the appendix.[4] Accordingly, it is sometimes helpful to read unfamiliar medical terms from right to left.

Occasionally, medical terms are composed of only a prefix and a suffix. For example, apnea includes the prefix a- (without) and suffix -pnea (breathing).

Common suffixes (letters in parentheses are not always present):

Basic Noun and Adjective Suffixes	
(noun form)	**-a**, **-e**, **-um**, **-is**
causing	**-genic**
condition	**-ia**, **-ism**, **-sis**, **-y**
specialty	**-iatry**, **-iatrics**, **-ics**

specialist	**-ian**, **-ist**
structure	**-um**, **-us**
small, little	**-ula, -ulum, -ulus**
study of	**-logy**
pertaining to	**-ac**, **-ar(y)**, **-(e/i)al**, **-ic(al)**, **-ior**, **-ory**, **-ous**, **-tic**
Tests and Procedures	
removal of	**-ectomy**
image/record	**-gram**
recording instrument	**-graph**
process of recording	**-graphy**
cut in	**-otomy**
visual examination	**-scopy**
opening	**-stomy**
Pathology or Function	

blood (condition of)	**-emia**
breathing	**-pnea**
inflammation	**-it is**
condition or disease	**-osis**
deficiency	**-penia**
disease	**-pathy**
excessive flow	**-rrhag(e/ia)**
mass, tumor	**-oma**

Plural Forms

Adding an “s” or “es” to the end of a word is often the straightforward method to make a word plural in English and many modern Romance languages. In medical terminology, however, things are a little more complicated. The plural form of each word is based on the last two letters of the singular suffix.

There are several exceptions. For example, “virus” is a Latin term without a plural form. “Viruses” is the accepted plural form. Elsewhere, the suffix “s” or “es” occasionally prevails in common usage. For example, the plural form of “hematoma” is “hematomas” rather than “hematomata.”

Common singular endings and corresponding plural endings:

Plural Forms[5]	
Singular	**Plural**
A	**Ae**
En	**Ina**
ex, ix, yx	**Ices**
is	**Es**
ma	**mata**
(a/i/y)nx	**(a/i/y)nges**
um	**A**
us	**I**

SCHEDULE XII

TITLE: CLINICAL INTERPRETATIONS OF LABORATORY VALUES

AIM: TO BE ABLE TO INTERPRET CORRECTLY LABORATORY VALUES

INTRODUCTION:

Laboratory testing involves the checking of blood, urine, and body tissue samples in order to see if the resulting lab values fall within the normal range. Lab values are used to determine a patient's overall health and well-being. There are many factors that can affect a patient's result and lab values but some of the most common factors are gender, age, race, the medicines taken, and the presence of any underlying condition(s)

Complete blood count is one of the most basic laboratory examinations to assess the overall health status of a patient. It can help diagnose infections, autoimmune disorders, anemia, and other blood diseases.

Electrolytes are minerals that are involved in some of the important functions in our body. Serum electrolytes are routinely ordered for a patient admitted to a hospital as a screening test for electrolyte and acid-base imbalances

Many diseases are evaluated using an ABG, including acute respiratory distress syndrome (ARDS), severe sepsis, septic shock, hypovolemic shock, diabetic ketoacidosis, renal tubular acidosis, acute respiratory failure, heart failure, cardiac arrest, asthma, and inborn errors of metabolism.

Clotting is what prevents excessive bleeding, the blood moving through your vessels shouldn't clot. If such clots form, they can travel through the bloodstream to the heart, lungs, or brain. This can cause a heart attack, stroke, or even death. Coagulation tests measure the blood's ability to clot, and how long it takes to clot. Testing can help assess the risk of excessive bleeding or developing clots (thrombosis) somewhere in your blood vessels. Coagulation tests are useful in monitoring people who take medications that affect clotting ability. Coagulation tests are also sometimes recommended before surgery.

Blood chemistry set is used to measure the amount of substances in the body. Glucose measures blood sugar and determines if the patient is within the criterion for diabetes. Uric acid is often an indication of kidney stones and a high BUN and creatinine suggest impairment in our kidney. In general, the basic chemistry helps us assess many conditions and give light to how the body's organs are working

FULL BLOOD COUNT:

Red Blood Cells (RBC):

- Normal: male = 4.6-6.2 x 10^6cells/mm3

Female = 4.2-5.2 x 10^6cells /mm3

- Actual count of red corpuscles

Hemoglobin:

- Normal: Male = 14-18 g/dl Female = 12-16 g/dl

- A direct measure of oxygen carrying capacity of the blood

* Decrease: suggests anemia

* Increase: suggests hemo-concentration, polycythemia

Hematocrit (aka packed cell volume):

- Normal: Males = 39-49% Female = 35-45%

- = the percentage of blood that is composed of erythrocytes

- Hct = RBC x MCV

* Low: in anemics or after acute heavy bleeding

* High: pt has thick and sludgy blood.

Mean Cell Volume (MCV):

- Normal: Male = 80-96; Female = 82-98

- = Hct / RBC

* Large cells = macrocytic: due to B-12 or folate deficiency

* Small cells = microcytic: due to iron deficiency

* Increased: caused by elevated reticulocytes

Mean Cell Hemoglobin (MCH):

- Normal: 27-33 pg/cell

- = % volume of hemoglobin per RBC

- = Hgb / RBC

* Increase: indicates folate deficiency

* Decrease: indicates iron deficiency

Mean Cell Hemoglobin Concentration):

- Normal: 31-35 g/dL

- = Hgb / Hct

* Decrease: indicates iron deficiency

Reticulocyte Count:

- Normal: 0.5-2.5% of RBC

- An indirect measure of RBC production

* Increase: during increased RBC production

Red Blood Cell Distribution Width (RDW):

- Normal: 11-16%

- Indicates variation in red cell volume

* Increase: indicates iron deficiency anemia or mixed anemia

- Note: increase in RDW occurs earlier than decrease in MCV therefore RDW is used for early detection of iron deficiency anemia

Platelet Count:

- Normal: 140,000 0 440,000/uL

- Due to high turnover, platelets are sensitive to toxicity

* Low: worry patient will bleed

* High: not clinically significant

White Blood Cell (WBC):

- Normal: 3.4 – 10 x 10^3cells/mm3

- Actual count of leukocytes in a volume of blood

- Can help confirm diagnosis. Can NOT diagnose based solely on WBC count!

* Increase: occur during infections and physiologic stress

* Decreases: marrow suppression and chemotherapy

- Differential = Seg/Band/Lymph/Mono/Eos/Baso

Shift to the left: implies the % of segs and bands (neutrophils) has increased. Often due to inflammation or infection

Note: differential must add up to 100%

- Neutrophils

Normal: 45-73%

Increase: mostly due to bacterial infection

- Eosinophils

Normal: 0-4%

Increase: due to parasitic infection and hypersensitivity reaction (drug/allergic rxn)

Absolute count = % Eos x WBC

- Basophils

Normal: 0-1%

Play a role in delayed and immediate hypersensitivity reactions

Increase: seen in chronic inflammation and leukemia.

- Lymphocytes

Normal: 20-40%

Increase: occurs in mono, TB, syphilis and viral infections

Decrease: HIV, radiation and steroids

- Monocytes

Normal: 2-8%

Increase: during recovery from bacterial infection, leukemia, TB-disseminated infxn

ELECTROLYTE UREA AND CREATININ

Sodium (Na):

- Normal: 136-145 mEq/L

- Major contributor to cell osmolality and in control of water balance

* Hypernatremia: greater than 145 mEq/L

Causes: sodium overload or volume depletion

Seen in: impaired thirst, inability to replace insensible losses, renal or GI loss

S/sx: thirst, restlessness, irritability, lethargy, muscle twitching, seizures, hyperrflexia, coma and death.

* Hyponatremia: ≤ 136

Causes: true depletion or dilutional

Occur in: CHF, diarrhea, sweating, thiazides

Signs: abnormal sensorium, depressed DTR, hypothermia and seizures

Symptoms: agitation, anorexia, apathy, disorientation, lethargy, muscle cramps and nausea

Potassium (K):

- Normal: 3.5-5.0 mEq/L

- Regulated by renal function

* Hypokalemia: less than 3.5 mEq/L

Indicates: true depletion of K or apparent depletion (shifting due to acid-base status, dextrose, insulin or beta agonist)

Causes: True deficit

Decreased intake (tea and toast, bulimia, alcoholism)

Increased output (vomiting, diarrhea, laxative abuse, intestinal fistulas)

Increased renal output (steroids, amphotericin, diruretics, cushings syndrome, licorice abuse)

Apparent deficit

Alkalosis, insulin, beta adrenergic stimulants

S/sx: Cardiovascular (hypotension, PR prolongation, rhythm disturbances, ST depression, decreased T waves), Metabolic (decreased aldosterone release, decrease insulin release, decreased renal response to ADH), Neuromuscular (areflexia, cramps, weakness) and/or Renal (inability to concentrate urine, nephropathy)

* Hyperkalemia: greater than 5.0 (panic > 6)

Causes: True excess

Increased intake (salt subs, drugs)

Endogenous (rhabdomyolysis, hemolysis, muscle crush injury, burns)

Decreased output (renal failure, NSAIDS, ACE, Heparin, TMP, k- sparing diuretics, adrenal deficiency)

Apparent excess

Metabolic acidosis

S/sx: cardiac rhythm disturbances, bradycardia, hypotension, cardiac arrest (severe) muscle weakness

NOTE: False K elevations are seen in hemolysis of samples!

Chloride (Cl):

- Normal: 96-106 mEq/L

- Chloride passively follows sodium and water

- Chloride increases or decreases in proportion to sodium (dehydration or fluid overload)

* Reduced: by metabolic alkalosis

* Increased: by metabolic or respiratory acidosis

Bicarbonate (HCO3):

- Normal: 24-30 mEq/L

- The test represents bicarbonate (the base form of the carbonic acid-bicarbonate buffer system)

* Decreased: acidosis

* Increased: alkalosis

BUN: Blood Urea Nitrogen

- Normal: 8-20 mg/dl

- May be a reflection of GFR and important in renal function

- May be used to assess or monitor hydrational status, renal function, protein tolerance and catabolism.

- Panic = > 100 mg/dl

* Increased: leads to……

o Pre-renal: decreased renal perfusion, dehydration, blood loss, shock, severe heart failure, increased protein breakdown, GI bleed, crush injury, burn, fever, steroids,

TCN, excessive protein intake

o Renal: acute renal failure, nephrotoxic drugs, glomerulonephritis, chronic renal failure, analgesic abuse

o Post-renal: obstruction

* Decreased:

Causes: malnutrition, profound liver disease, fluid overload (dilutional)

- BUN by itself is not really clinically significant. Look at it in correlation with SCr

Serum Creatinine (SCr):

- Normal: 0.7-1.5 mg/dl for adults and 0.2-0.7 mg/dl for children

- SCr is constant in patients with normal kidney function.

* Increase:

Indicates worsening renal function

Causes: aminoglycosides, amphotericin, cyclosporine, lithium, MTX, cimetidine, dehydration, renal dysfunction, urinary tract obstruction, excess catabolism, exercise, hyperprexia, hyperthyroidism.

BUN/SCr Relationship

- Normal ration is 10:1

- > 20:1 pre-renal causes of dysfunction

- 10:1-20:1 intrinsic renal damage

- 20:1 ration may be “normal” if both BUN and SCr are wnl.

Total Protein and Albumin:

- Total protein: normal = 5.5-9.0 g/dl

- Albumin: normal = 3.-5 g/dl

o Responsible for plasma oncotic pressure and give info re liver status

* Low:

Leads to fluid leakage (edema) in low areas (ex: ankles if standing) due to decrease in oncotic pressure

Cause: liver dysfunction

S/sx: peripheral edema, ascites, periorbital edema and pulmonary edema.

May effect Ca and medication levels (those bound to albumin)

Treatment: find underlying problem or give albumin

Serum Calcium (Ca):

- Normal = 8.5-10.8 mg/dl

- Corrected calcium = [(4-Alb) * 0.8mgdl] + apparent Ca

* Hypocalcemia: less than 8.5 mg/dl

Causes: low serum proteins (most common), decreased intake, calcitonin, steroids, loop diuretics, high PO4, low Mg, hypoparathyroidism (common), renal failure, vitamin D deficiency (common), pancreatitis

S/sx: fatigue, depression, memory loss, hallucinations and possible seizures or tetany

Lead to: MI, cardiac arrhytmias and hypotension

Early signs: finger numbness, tingling, burning of extremities and paresthesias.

* Hypercalcemia: more than 10.8 mg/dl

Cause: malignancy or hyperparathyroidism (most common), excessive IV Ca salts, supplements, chronic immobilization, Pagets disease, sarcoidosis, hyperthyroidism, lithium, androgens, tamoxifen, estrogen, progesterone, excessive vit D or thyroid hormone.

Acute (>14.5) s/sx: nausea, vomiting, dyspepsia and anorexia

Severe s/sx: lethargy, psychosis, cerebellar ataxia and possibly coma or death

Increased risk of digoxin toxicity

Phosphate (PO4):

- Normal: 2.6-4.5 mg/dl

* Hypophosphatemia: les than 2.6 mg/dl

Causes: increased renal excretion, intracellular shifting and decreased PO4 or vitamin D intake

Symptoms (no apparent until less than 2 mg/dl): neurological irritability, muscle weakness, paresthesia, hemolysis, platelet dysfunction and cardiac and respiratory failure.

* Hyperphosphatemia: greater than 4.5 mg/dl

Causes: decreased renal excretion (common), shift of PO4 extracellularly, increased intake of Vit D or PO4 products

S/sx: hypocalcemia and hyperparathyroidism. Renal failure may occur.

Magnesium (Mg):

- Normal: 1.5-2.2 mEq/L

- Primarily eliminated by the kidney

* Hypomagnesemia: less than 1.5 mEq/L

Causes: excessive losses from GI tract (diarrhea or vomiting) or kidneys (diuretics).

Alcoholism may lead to low levels

S/sx: weakness, muscle fasciculation with tremor, tetany, increased reflexes, personality changes, convulsions, psychosis, come and cardiac arrhythmia.

* Hypermagnesemia: more than 2.2 mEq/L

Caueses: increased intake in the presence of renal dysfunction (common), hepatitis and Addisons disease

S/sx: at 2-5 mEq/L = bradycardia, flushing, sweating, N/V, low Ca

at 10-15 mEq/L = flaccid paralysis, EKG changes

over 15 = respiratory distress and asystole.

Alkaline Phosphatase:

- Normal: ranges vary widely

- Group of enzymes found in the liver, bones, small intestine, kidneys, placenta and leukocytes (most activity from bones and liver)

* Increased: occurs in liver dysfunction

Aminotransferases (ALT and AST):

- ALT and AST are measure indicators of liver disease. Sensitive to hepatic inflammation and necrosis.

- Normal AST: 8-42 IU/L (found in liver, cardiac muscle, kidney, brain and lungs)

Increase: occurs after MI, muscle diseases and hemolysis.

- Normal ALT: 3-30 IU/L (enzyme found primarily in liver, also in muscle)

* Ratio of AST:ALT of 2:1 suggests ALD (alcoholic liver disease)

Lactate Dehydrogenase (LDH):

- Normal: 100-225 IU/L, but varies

* Increase: Due to hemolysis, Gilberts syndrome, Crigler-Najar syndrome or neonatal jaundice. Does NOT relate to liver disease.

Direct Bilirubin (Conjugated):

- Normal: 0.1-0.3 mg/d;

* Increase: associated with increases in other liver enzymes and reflect liver disease

URINALYSIS

Urine:

- Normal: should be clear yellow

* Cloudy: results from urates (acid), phosphates (alkaline) or presence of RBC or WBC

* Foam: from protein or bile acids in urine

- Side note: some medications will change color of urine

o Red-Orange: Pyridium, rifampin, senna, phenothiazines.

o Blue-Green: Azo dyes, Elavil, methylene blue, Clorets abuse

o Brown-Black: Cascara, chloroquine, senna, iron salts, Flagyl, sulfonoamides and nitrofurantoin

pH:

- Normal: 4.5-8

* Acidic urine: deters bacterial colonization

* Alkaline urine: seen with Proteus mirabilis or tubular defects.

Specific Gravity:

- Normal: 1.010 – 1.025

- Varies depending on the particles in the urine

- Good indicator of kidney's ability to concentrate urine

Protein content [in urine]:

- Normal: 0 - +1 or less than 150 mg/day

* Protein in urine: indication of hemolysis, high BP, UTI, fever, renal tubular damage, exercise, CHF, diabetic nephropathy, preeclampsia of pregnancy, multiple myeloma, nephrosis, lupus nephritis and others.

Microscopic analysis of Urine:

- Urine should be sterile (no normal flora)

- Few, if any, cells should be found

- Significant bacteriuria is defined by an initial positive dipstick for leukocyte esterase or nitrites. If more than 1 or 2 species seen, contaminated specimen is likely.

ARTERIAL BLOOG GAS (ABG)

pH: 7.35-7.45

- Acidemia (pH < 7.35) or Alkalemia (pH > 7.45).

Partial pressure of Oxygen (PaO2): 75-100mmHg

Partial pressure of Carbon dioxide (PaCO2) 35-45 mmHg

- The PaCO2 indicates whether the acidosis or alkalemia is primarily from a respiratory or metabolic acidosis/alkalosis. PaCO2 > 40 with a pH < 7.4 indicates a respiratory acidosis, while PaCO2 < 40 and pH > 7.4 indicates a respiratory alkalosis (but is often from hyperventilation from anxiety or compensation for a metabolic acidosis).

Bicarbonate (HCO3): 22-26mEq/L

Oxygen saturation (O2 Sat/SaO2): 95-100%

FULL LIPID PROFILE

HDL-C Value:
<40mg/dl (Risk for heart disease),
41-59 mg/dl (Good),
>60 mg/dl (Considered protective against heart disease)

LDL-C: <100mg/dl (optimal, considered protective),
100-129mg/dl (above optimal),
130- 159 (borderline high, Risk for heart disease),
160-189(high, Risk for heart disease),

>190 (very high)
TC- <200mg/dl – desirable;
200-239mg/dl borderline high;
240mg/dl Very high

TRIGLYCERIDE <150mg/dl (Considered protective against heart disease)
150-199mg/dl (borderline high, Risk for heart disease),
200-499mg/dl (high, Risk for heart disease),

CARDIAC BIO MARKERS

NT- Pro BNP: Normal: <75 years- <125pg/ml
Normal: >75years- <450pg/ml
High: >900pg/ml (sign of heart failure)

BNP: Normal- <100pg/ml; High- >100pgml

Troponin: Normal 0- 0.4ng/ml

CK-MB: 0- 4ng/ml

D-dimer: < 500 ng/mL

Myoglobin:

C-reactive protein (CRP): < 5 mg/L

HORMONAL PROFILE

Follicle-stimulating hormone (FSH):
1-10 IU/L (male), 1-10 IU/L (female, follicular/luteal)
5-25 IU/L (female, ovulation)
30-110 IU/L (post-menopause)

Estradiol:
1.5-5 ng/dL (male),
2-14 ng/dL (female, follicular),
2-16 ng/dL (female, luteal),
< 3.5 ng/dL (postmenopausal)

Progesterone: 70-280 (ovulation), ng/dL
Prolactin: < 14 ng/mL

Testosterone (male): 10-25 nmol/L

TSH
Thyroxine-binding globulin: 12-30 mg/L
Thyroid-stimulating hormone (TSH): 0.5-5 mIU/L
Total T4, adult: 4.9-11.7 mg/dL
Total T3: 0.7-1.5 ng/dL
Free T3: 1.7-3.7 pg/mL

Tumor markers

- Alpha fetoprotein: 0-44 ng/mL
- Beta human chorionic gonadotropin (HCG): < 5 IU/I
- CA19.9: < 40 U/mL
- Carcinoembryonic antigen (CEA): < 4 ug/L
- Prostatic acid phosphatase (PAP): 0-3 U/dL
- Prostate-specific antigen (PSA): < 4 ug/L

LIVER FUNCTION TESTS

- Albumin: 35-50 g/L
- Alkaline phosphatase: 50-100 U/L
- Alanine aminotransferase (ALT): 5-30 U/L
- Amylase: 30-125 U/L
- Aspartate aminotransferase (AST): 5-30 U/L
- Direct bilirubin: 0-6 µmol/L
- Gamma glutamyl transferase: 6-50 U/L
- Lipase: 10-150 U/L
- Total bilirubin: 2-20 µmol/L
- Total protein: 60-80 g/L
- Lactate dehydrogenase (LDH): 50-150 U/L

SCHEDULE XIII

TITLE: QUALITATIVE TEST FOR HEPATITIS (RDT)

AIM: TO CARRY OUT RDT FOR HEPATITIS AMONG TEST SUBJECTS

INTRODUCTION:

A crucial sign for HBV infection screening and laboratory detection is the hepatitis B surface antigen (HBsAg). Rapid diagnostic tests (RDTs) are easy, quick, and affordable alternatives to immunoassay-based procedures that show promise. As a result, these tests are an effective means of diagnosing and conducting widespread screening for HBV infection in a clinical context.

Globally, chronic Hepatitis B virus (HBV) infection is the most common cause of hepatocellular carcinoma (HCC) and liver disease, with the majority of cases taking place in areas with low resources. Reducing hepatitis-related morbidity and mortality requires early detection. Ironically, the areas of the world with the highest prevalence of HBV (Africa, for example) also have the least developed laboratory infrastructure, which makes diagnosis difficult.

MATERIALS

1. Malaria test Device.

2. Blood sample

3. Lancet

4. Hand gloves

5. Ethanol' Methylated spirit

6. Cotton wool

7. Sample pipette

METHOD

1. Clean middle or ring finger with gauze (cotton wool) containing ethanol and allow to dry

2. Squeeze the end of the finger tip and pierce with a sterile lancet

3. Wipe away the first drop of blood with sterile gauze/ cotton wool

4. Take a sample pipette, while gently squeezing the tube, immerse the open end in the blood drop and then gently release the pressure to draw blood into the sample pipette up to the guide line.

5. Add whole blood (5ul) into sample in sample well by squeezing Sample pipette

6. Add two drops of (60ul) of assay buffer into Assay Buffer Well

7. Read the test result in 20 minutes.

INTERPRETATION

4. Positive reaction: the presence of two colour bands indicate a positive result
5. Negative reaction: the presence of one band within the result Window indicates a negative result
6. Invalid result: The test is invalid if the control line(C) did not appear. The test could be repeated using a new strip.

READING

TEST	REMARK
1	
2	

EXERCISE

4. Find the proportion of sample with positive results
5. Number of valid results
6. What precautions taken in carrying out this test

SCHEDULE XIV

TITLE: QUALITATIVE TEST FOR HIV 1/2 (RDT)

AIM: TO CARRY OUT RDT FOR HIV 1/2 AMONG TEST SUBJECTS

INTRODUCTION: The lateral-flow (immunochromatographic) and vertical-flow (immunofiltration) test formats, which identify the presence of HIV-1/2 antibodies and/or HIV p24 antigen, are included in the broad class of HIV-1/2 RDTs. RDTs are simpler to conduct than laboratory-based assays, in addition to being faster. With the right training, RDTs can be used to do HIV testing with excellent accuracy and reliability for both lay caregivers and medical professionals (1, 2). It is possible to keep most RDTs and the chemicals that go with them between 2 and 30 °C. They don't need to be carried out in a laboratory because they don't need any extra equipment. As a result, RDTs can be applied in both facility- and community-based contexts, including places with little infrastructure that handle a small volume of specimens per day.

MATERIALS

1. Malaria test Device.
2. Blood sample
3. Lancet
4. Hand gloves
5. Ethanol' Methylated spirit
6. Cotton wool
7. Sample pipette

METHOD

1. Clean middle or ring finger with gauze (cotton wool) containing ethanol and allow to dry
2. Squeeze the end of the finger tip and pierce with a sterile lancet
3. Wipe away the first drop of blood with sterile gauze/ cotton wool

4. Take a sample pipette, while gently squeezing the tube, immerse the open end in the blood drop and then gently release the pressure to draw blood into the sample pipette up to the guide line.

5. Add whole blood (5ul) into sample in sample well by squeezing Sample pipette

6. Add two drops of (60ul) of assay buffer into Assay Buffer Well

7. Read the test result in 20 minutes.

INTERPRETATION

7. Positive reaction: the presence of two colour bands indicate a positive result
8. Negative reaction: the presence of one band within the result Window indicates a negative result
9. Invalid result: The test is invalid if the control line(C) did not appear. The test could be repeated using a new strip.

READING

TEST	REMARK
1	
2	

EXERCISE

7. Find the proportion of sample with positive results
8. Number of valid results
9. What precautions taken in carrying out this test

SCHEDULE XV

TITLE: CARDIOPULMONARY RESUSCITATION (CPR)

AIM: UNDERSTANDING THE ABCs OF CARDIOPULMONARY RESUSCITATION (CPR)

INTRODUCTION: In the event of a respiratory or cardiac arrest, basic life support, or BLS, entails both rapid detection and urgent assistance of ventilation and circulation. Basic Life Support (BLS) aims to maintain tissue viability and supply oxygen to the brain and heart until appropriate medical or electrical intervention (also known as Advanced Cardiac Life Support, or ACLS) can restart spontaneous circulation. The primary survey A B C [D] is the focus of BLS. Airway [in order to make it open]- Breathe [to give ventilation and determine whether spontaneous breathing is present or absent]; Circulation [to determine whether there is no pulse and to apply chest compressions]-Defibrillation [may not be limited to ACLS any longer given the prevalence of Automated External Defibrillators. The timely start of appropriate rescue breathing and chest compressions in a patient experiencing cardiac arrest is critical for the efficacy of ACLS, particularly defibrillation. Survival will be poor if one link in the chain of survival is deficient, so all healthcare professionals must be able to administer optimal BLS! Timely and optimal BLS performance is the most effective and one major key to saving life!

MATERIALS

1. CPR MEDICAL MANIKIN
2. AMPU BAG/CRP FACE MASKS
3. AUTOMATIC EXTERNAL DEFRIBRILLATOR

METHOD:

- Check that the area is safe, then perform the following basic CPR steps:
- Call 911 or ask someone else to.
- Lay the person on their back and open their airway.
- Check for breathing. If they are not breathing, start CPR.
- Perform 30 chest compressions.
- Perform two rescue breaths.
- Repeat until an ambulance or automated external defibrillator (AED) arrives.

Step 1. Call 911

First, check the scene for factors that could put you in danger, such as traffic, fire, or falling masonry. Next, check the person. Do they need help? Tap their shoulder and shout, “Are you OK?”

If they are not responding, call 911 or ask a bystander to call 911 before performing CPR. If possible, ask a bystander to go and search for an AED machine. People can find these in offices and many other public buildings.

Step 2. Place the person on their back and open their airway

Place the person carefully on their back and kneel beside their chest. Tilt their head back slightly by lifting their chin.

Open their mouth and check for any obstruction, such as food or vomit. Remove any obstruction if it is loose. If it is not loose, trying to grasp it may push it farther into the airway.

Step 3. Check for breathing

Place your ear next the person’s mouth and listen for no more than 10 seconds. If you do not hear breathing, or you only hear occasional gasps, begin CPR.

If someone is unconscious but still breathing, do not perform CPR. Instead, if they do not seem to have a spinal injury, place them in the recovery position. Keep monitoring their breathing and perform CPR if they stop breathing.

CPR steps

Use the following steps to perform CPR:

Step 4. Perform 30 chest compressions

Place one of your hands on top of the other and clasp them together. With the heel of the hands and straight elbows, push hard and fast in the center of the chest, slightly below the nipples.

Push at least 2 inches deep. Compress their chest at a rate of least 100 times per minute. Let the chest rise fully between compressions.

Chest compressions



Adult



press down
2 inches



Child



press down
2 inches



Infant



press down
1.5 inches

Perform 30 chest compressions at a rate of 100 per minute, letting the chest rise between each