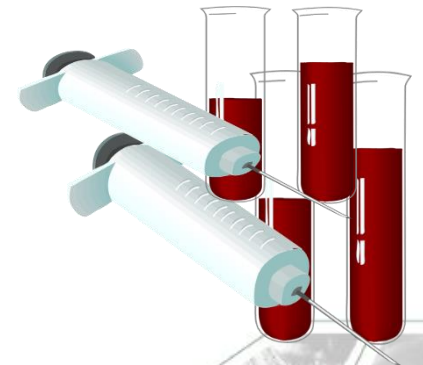


Unit V

Laboratory Test and Interpretation

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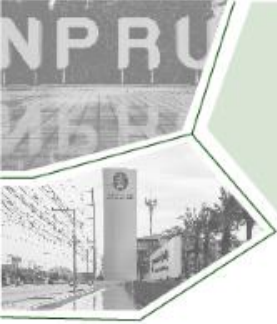


LEARNING OBJECTIVES OF THE TOPIC

At the end of the topic, the students will be able to

- ☐ Identify the common laboratory and diagnostic tests performed at Basic Medical Care level.
- ☐ Determine the interpretation of laboratory test results.





Scope of topic

The common laboratory tests are the following:

1. FBS,
 2. UA,
 3. CBC,
 4. Sputum Ex.,
 5. Stool Ex. and
- the current epidemic diseases such as
6. Flu test, and
 7. Covid-19 test





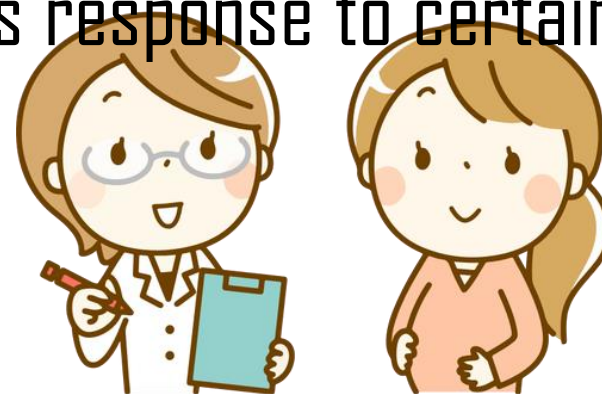
DEFINE LABORATORY TEST

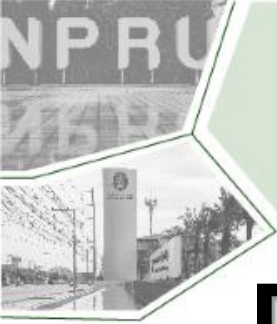
- Also called "*lab tests*" and these are the tools that provide information about the patient condition.
- Laboratory tests check a sample of PT. blood, urine, or body tissues.
- A technician, doctor or practitioner analyzes the test samples to see if PT. results fall within the normal range.



WHAT IS THE IMPORTANCE OF LABORATORY TEST AND INTERPRETATION?

- ☐ It is used as basic screening part of patient's health condition.
- ☐ It helps confirm a diagnosis or rule out a specific disease or condition
- ☐ Monitors patient's illness
- ☐ Provide valuable information about the patient's response to certain treatments
- ☐ Check your overall health.





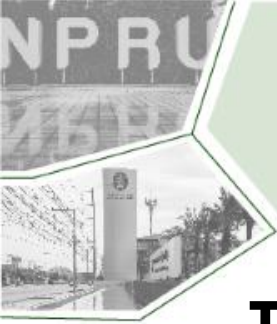
THE RESULTS & MEANING

Reference range

- Lab results are often shown as a set of numbers known as a reference range.
- A reference range may also be called “normal values”.

The lab results may also include one of these terms:

- **Negative or normal**, which means the disease or substance being tested was not found
- **Positive or abnormal**, which means the disease or substance was found
- **Inconclusive or uncertain**, which means there wasn't enough information in the results to diagnose or rule out a disease.



THE RESULTS & MEANING

- The lab results are graded such as Albumin / Proteinuria
 - Negative, Absent
 - Trace (10 to 20 mg/dL),
 - 1+ (30 mg/dL),
 - 2+ (100 mg/dL),
 - 3+ (300 mg/dL), or
 - 4+ (1,000 mg/dL)

TIMOTHY S. LARSON, Concise Review for Primary-Care Physicians Evaluation of Proteinuria, (Mayo Clin Proc 1994; 69:1154-1158)
available from [https://www.mayoclinicproceedings.org/article/S0025-6196\(12\)65767-X/pdf](https://www.mayoclinicproceedings.org/article/S0025-6196(12)65767-X/pdf)





COMMON LABORATORY TESTS AND INTERPRETATION

1. Blood Sugar Test

Purpose: to determine the blood glucose levels and effectiveness of insulin administration

Specimen: fasting blood sugar or FBS (venous blood)
capillary blood glucose or CBG (capillary blood)

see the next page 



1. BLOOD SUGAR TEST

Results and Interpretation

FBS after meal < 180 mg/dl

	Normal values	Impaired fasting glucose (IFG)	
Fasting Blood Sugar (FBS)	< 100 mg/dl	100 – 125mg /dl	<p>➤ 126 mg/dl indicates diabetes mellitus or DM</p> <p>Source: Clinical Practice Guidelines for Diabetes 2017, Thailand</p>
Capillary Blood Glucose (CBG)	80 – 120 mg/dl		<p>< 80 mg/dl may indicate hypoglycemia</p> <p>> 120 mg/dl may indicate hyperglycemia</p>



1. BLOOD SUGAR TEST

- *Hypoglycemia* – also known as low blood sugar level that may result to symptoms like shakiness, loss of consciousness and confusion
- *Hyperglycemia* – an elevated blood sugar level may indicate diabetes mellitus
- *Diabetes mellitus* – also called "sugar diabetes" wherein a condition which the body is unable to regulate the use of glucose normally

COMMON LABORATORY TESTS AND INTERPRETATION



2. Urine Analysis (U/A)

Purpose: to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes.

Specimen: clean voided, midstream urine

Normal values: pale yellow or clear

COMMON LABORATORY TESTS AND INTERPRETATION

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2. Urine Analysis (U/A) (cont...)

Specific gravity

Normal value: 1.015 – 1.025

High specific gravity - may indicate potassium deficiency

Low- specific gravity - may indicate dehydration

PH

Normal values: 4.58– 8.0

<8 may indicate acidity

>4 may indicate alkalinity

> Protein

Normal value: negative

Trace: 1+ 2+ 3+

> 4+ damage to the kidneys

see the next page

COMMON LABORATORY TESTS AND INTERPRETATION

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2. Urine Analysis (U/A) (cont...)

Sugar/Glucose

Normal value: negative

1+

2+

3+

4+

> glucosuria

WBC

Normal value: negative

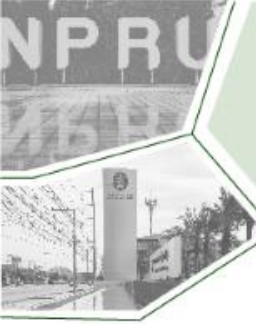
+ result may indicate
inflammation, infection
such as cystitis or
nephritis

RBC

Normal value: negative

+ result may indicate
urinary stones

see the next page



COMMON LABORATORY TESTS AND INTERPRETATION

2. Urine Analysis (U/A) (cont...)

Glycosuria – is a condition where a patient's urine contains more sugar or glucose that may indicate diabetes or damage to the kidneys



COMMON LABORATORY TESTS AND INTERPRETATION



3. COMPLETE BLOOD COUNT (CBC) AND DIFFERENTIAL COUNT₁

Purpose: to measure many different parts and features of the blood

Specimen: whole blood or venous blood

Results and Interpretation

	Normal values
White blood cell (WBC)	4.6 – 10.2 k/uL
Hematocrit (Hct)	37.7 -53.7 %
Hemoglobin (Hb)	12.2 – 18.1 gm/dl
Platelet count	142 – 424 k/uL

1 cubic milliliter (K/uL)= x 1,000 cell

see the next page

COMMON LABORATORY TESTS AND INTERPRETATION

3. COMPLETE BLOOD COUNT (CBC) AND DIFFERENTIAL COUNT₂

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White blood cell (WBC) 4.6 – 10.2 or 5 – 10 , k/ul

	Normal values
Neutrophils	55 – 70 %
Eosinophils	1 – 4 %
Basophils	0.5 – 1 %
Lymphocytes	20 – 40 %
Monocytes	2 – 8 %

leukocytosis: an increase number of white cells (>10,000 cubic meter) may indicate current infection or inflammation

leukopenia: a reduction in the number of white cells (<4,000 cubic meter) may indicate autoimmune disease or bone marrow failure

phagocytosis: may happen when white cells engulf microorganisms, or foreign cells of the body.

COMMON LABORATORY TESTS AND INTERPRETATION

3. COMPLETE BLOOD COUNT (CBC) AND DIFFERENTIAL COUNT₃

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Red blood cell (RBC) indices

	Normal values
MCV	80 – 94 μm^3
MCH	27 – 31 pg (pictogram)
MCHC	32 – 36 gm.%

COMMON LABORATORY TESTS AND INTERPRETATION

3. COMPLETE BLOOD COUNT (CBC) AND DIFFERENTIAL COUNT₄

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	Normal values
Red blood cell count (RBC)	$4.6 - 6.2 \times 10^6 / \text{mm}^3$
Hematocrit (Hct)	40 – 54 %
Hemoglobin (Hb)	13.3 – 18 %
Platelet count	$150 - 450 \times 10^3 / \text{mm}^3$

Increased: may indicate dehydration, pulmonary fibrosis

Decreased: hemorrhage, anemia, pregnancy, dietary deficiency

COMMON LABORATORY TESTS AND INTERPRETATION

4. Stool Exam (fecal analysis) / Stool for occult blood test

Purpose: to help diagnose certain conditions affecting the digestive tract

Specimen: uncontaminated stool

Normal values: negative



COMMON LABORATORY TESTS AND INTERPRETATION

5. Sputum Examination

5.1 Sputum gram stain

5.2 Sputum for Acid Fast Bacilli (AFB Test)

Purpose: for culture and sensitivity, effectiveness of TB treatment, lung infection

Specimen: uncontaminated sputum early in the morning

Normal values: negative

: tuberculosis (TB)

6. Rapid influenza diagnostic test, Flu Test

Purpose: to inspect an infection caused by influenza virus A or B

Specimen: nasal swab

Normal values: negative



COMMON LABORATORY TESTS AND INTERPRETATION

7. Covid-19 (corona virus disease 2019)

Purpose: to determine a current infection, antibody may reveal previous infection

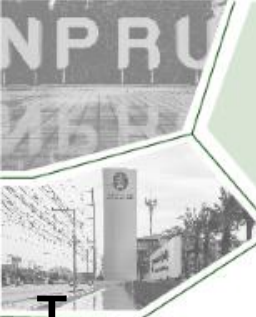
Specimen: nasal swab or venous blood

Normal values: negative



<https://www.shutterstock.com/th/image-photo/covid19-nasal-swab-laboratory-test-hospital-1670462338>



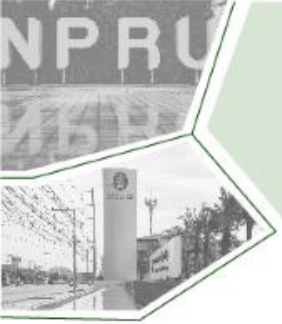


TOPIC SUMMARY

To conclude...

- ✓ Laboratory and diagnostic tests performed are essential for patients in order for them to receive appropriate treatment or care .
- ✓ In primary medical care context, the initial laboratory tests are included: FBS, UA, CBC, Sputum Ex., Stool Ex. and also the current epidemic diseases such as Flu test, and Covid-19 test.
- ✓ Interpretation of laboratory test results compared with normal range or grading style which can enable patients to understand more regarding their current condition.





Thank You!

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