



AL-Mustaqbal University College

Medical laboratory Techniques Department

Clinical Biochemistry

Laboratory Quality Control



Lecturer : M. Sc. Salam Mohammed Naser



Laboratory Quality Control

Accurate diagnosis of the disease is the main key to obtaining the appropriate treatment for the patient, and consequently the speed of recovery. Hence the importance of laboratories and medical examinations, which are the first steps that the patient takes on his way to recovery. Doctors require a set of medical tests that allow him to learn what is going on in the patient's body; And based on the results of the examinations prescribe the appropriate treatment.

Laboratory Quality Control

The laboratory's quality control program is designed to detect, reduce and correct deficiencies in a laboratory's internal analytical process. Analysis operations inside the laboratories, before the end of the process of issuing results to patients, in order to improve the quality of the results announced by the laboratory.

Laboratory quality control material is usually run at the beginning of each shift, after an instrument is serviced, when reagent lots are changed, after calibration, and whenever patient results seem inappropriate.



DR. MANAL ELSAYED ABDELAZIZ
B.Sc.Pharm, CPHQ, DTQM, CLSSGB
TeamSTEPPS Master Trainer

**QUALITY CONTROL IN
LABORATORY**

Quality Assurance

- Quality Assurance – QA is defined as the overall program that ensures that the final results reported by the laboratory are correct.



Quality Control

- ❑ Quality control is a measure of precision, or how well the measurement system reproduces the same result over time and under varying operating conditions.
- ❑ Quality Control – QC refers to the measures that must be included during each assay to verify that the test is working properly.





Types of quality control

- 1. Internal Quality Control (IQC):** which denotes the set of procedures carried out by laboratory personnel to continuously evaluate laboratory work so that high-quality results are produced by the laboratory.
 - How can IQC be done:-This can be done using a sample of the concentration information to assess the quality of the device and reagents

Types of quality control

2- External Quality Control (EQC): It is a system for evaluating an objective laboratory performance by an external agency. This assessment is retrospective but its aim is to improve IQC. For example, the American system CAP.

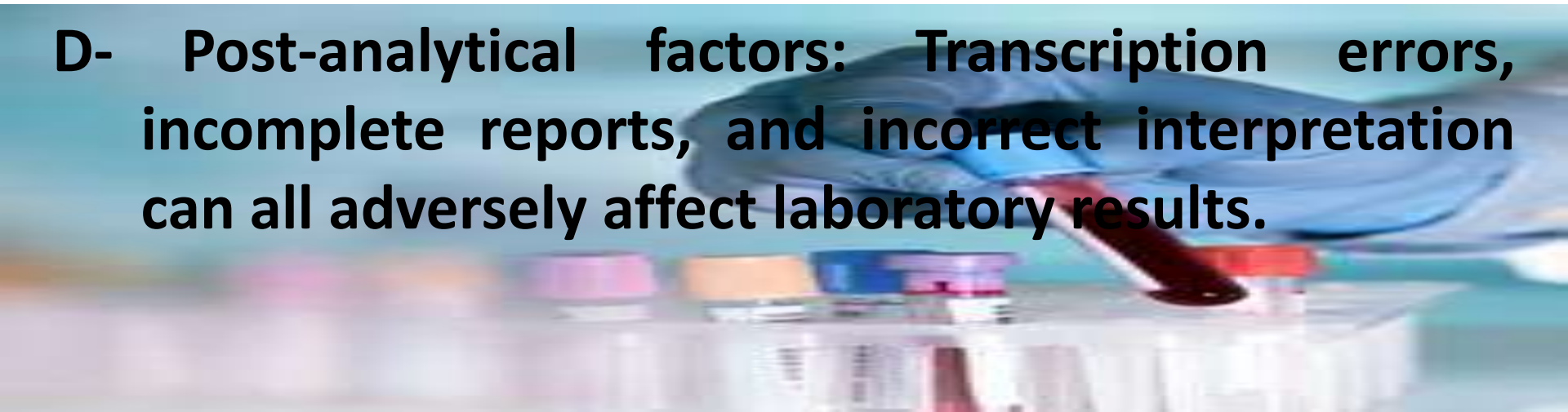


Factors affecting laboratory quality

- A. Samples:** This is the single most important single factor. Correct sample selection, correct method, sufficient quantity, proper transportation to the laboratory, and sample preparation prior to testing are critical factors.
- B. The human element (analysts):** The quality of the resulting laboratory results is directly proportional to the commitment, training and motivation of the technical staff.

Factors affecting laboratory quality



- C- Analytical factors:** The quality of reagents, chemicals, glassware, dyes, environments and cultures, the use of standard procedures and reliable equipment all influence laboratory results. Failure to consider a sufficient number of microscopic fields leads to false negative results.
- D- Post-analytical factors:** Transcription errors, incomplete reports, and incorrect interpretation can all adversely affect laboratory results.
- 

☆ Source of errors in laboratory practice ☆

1- Pre -analytical Laboratory Errors:-

- ❖ Taking the wrong or incomplete name of the disease.
- ❖ The analysis read incorrectly, which leads to the preparation of the wrong tubes to withdraw the sample.
- ❖ Taking the analysis sample without checking its own conditions such as semen or fat.
- ❖ Exchange urine and stool samples (the patient's name must be written on the cup itself, not the lid).



☆ Source of errors in laboratory practice ☆



1-Pre -analytical Laboratory Errors:-

- ❖ Not observing the correct ratio between blood and anticoagulant
- ❖ Drawing a broken blood sample (Hemolysis).
- ❖ Delayed withdrawal of the eye, which exposes the blood to clot inside the syringe.
- ❖ Drawing an incomplete blood sample, especially in tests that require a specific amount of blood, such as prothrombin.
- ❖ Wrong choice of the anti-coagulant material, for example, pulling his eye, coagulation test on my own.



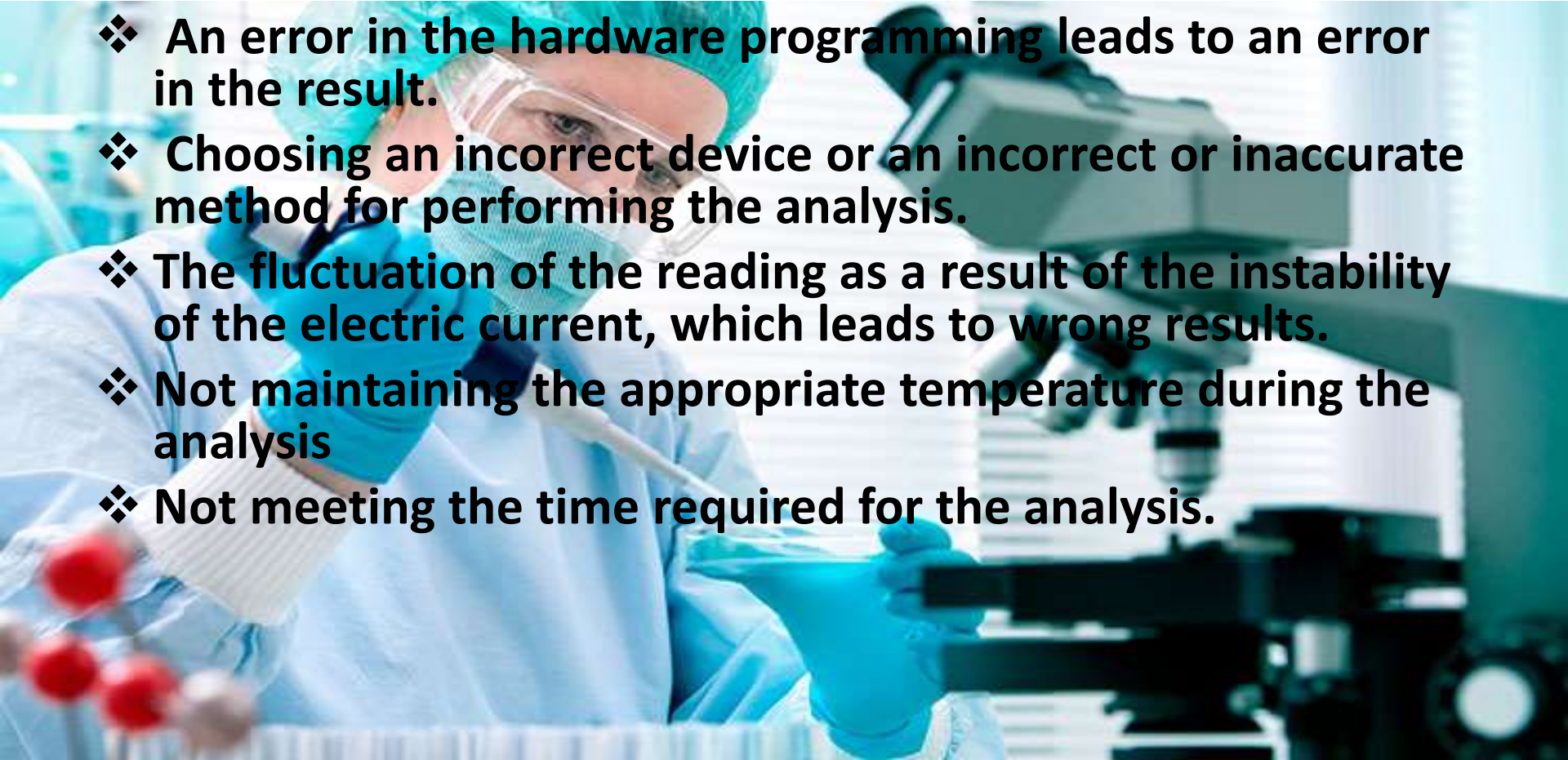
☆ Source of errors in laboratory practice ☆

- ❖ Not writing the name of the patient on the tube containing blood after the sample is drawn.
- ❖ Storing the sample in the wrong conditions (eg wrong temperature) Insufficient amount of the sample for the examination.
- ❖ Taking a wrong sample that does not fit the analysis, for example, taking a sample from a vein for a blood gas analysis.
- ❖ An eye that was taken at an inopportune time, such as an unscheduled sampling of the cortisol hormone.



2-Analytical Laboratory Errors

- ❖ **Error in choosing the appropriate wavelength or filter for analysis.**
- ❖ **An error in the hardware programming leads to an error in the result.**
- ❖ **Choosing an incorrect device or an incorrect or inaccurate method for performing the analysis.**
- ❖ **The fluctuation of the reading as a result of the instability of the electric current, which leads to wrong results.**
- ❖ **Not maintaining the appropriate temperature during the analysis**
- ❖ **Not meeting the time required for the analysis.**





2-Analytical Laboratory Errors

- Dilution of the samples and not calculating the dilution in the final result.
- Inaccuracy in handling pipettes and fluid withdrawal tools (automatic pipes).
- Use of unclean or not dry tubes or instruments during the analysis.
- Read the result in a cuvette that has been contaminated with fingerprints or the eyepiece has air bubbles.
- Not conducting a quality control assessment of the equipment's condition every specific period.
- Using expired chemicals.

3- Post -analytical Laboratory Errors

- Errors in writing numerical results (especially results with decimal numbers)
- An error in writing the normal rate of analysis (which varies according to age and gender)
- Exchange data in place of each other, especially in complete analyzes such as complete urine and blood picture
- Recording results in wrong units
- Writing the patient's name or the doctor's name incorrectly
- Writing a wrong comment on the result of the analysis

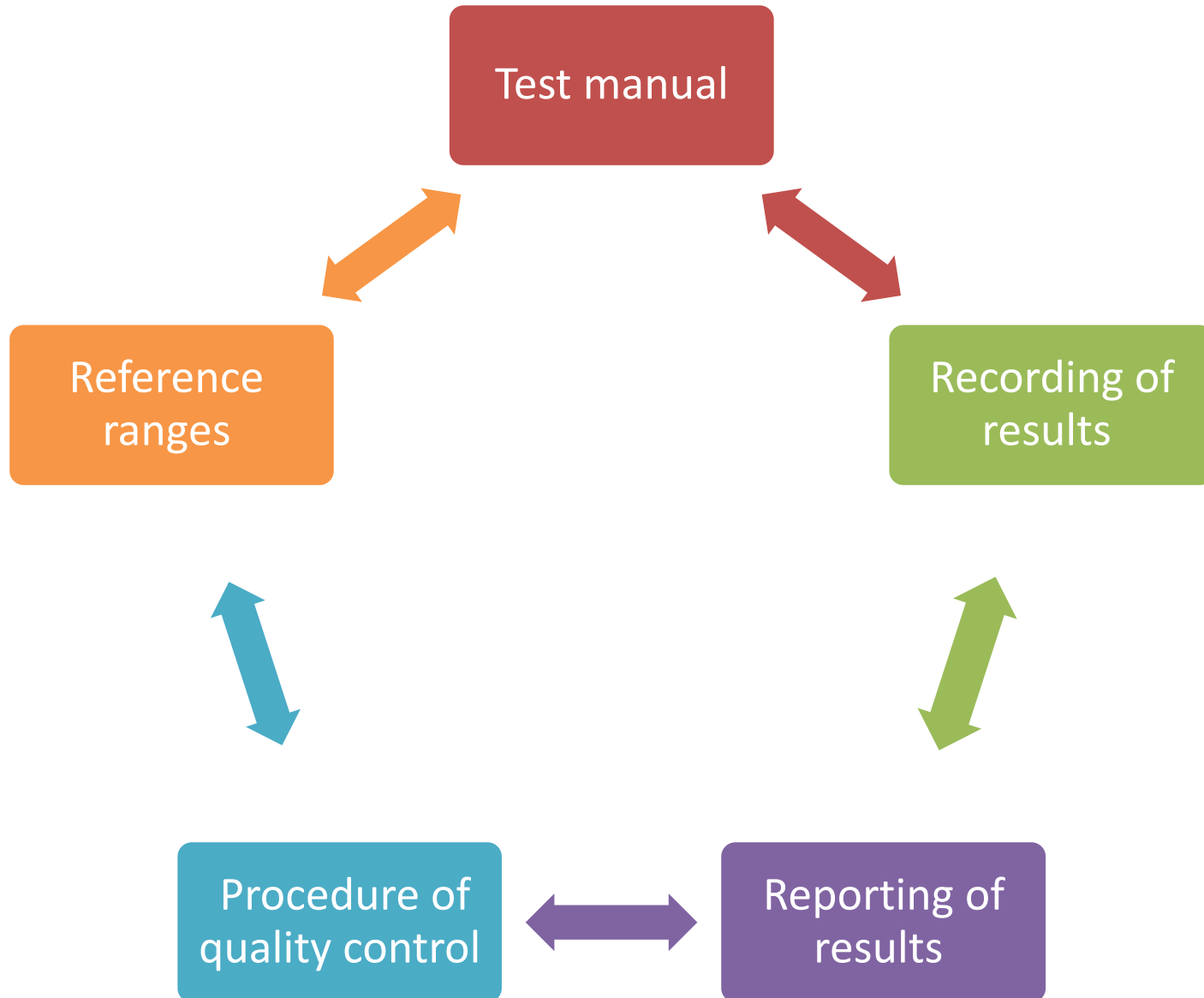


Standard Operating procedures

Each laboratory should have Standard Operating Procedure Manuals (SOPMs) which should include the following information about the laboratory:

- ✓ **Biosafety precautions.**
- ✓ **Collection, transport and storage of specimens.**
- ✓ **Criteria of rejection of samples.**
- ✓ **Processing of specimens.**
- ✓ **Maintenance of equipment.**

SOPMs



Thank you for listening

Questions??

