Three Phases of the Laboratory Testing Process

- Pre-analytical phase occurs prior to analysis
- Analytical phase occurs during analysis
- Post-analytical phase occurs after analysis
- Also known as examination phases

Quality Laboratory Results

- The most fundamental responsibility of the laboratory is to ensure the quality of test results
  - Want to report accurate patient values
  - Results are used to rule out disease, make a diagnosis, and monitor treatment
- The laboratory must detect and prevent potential errors during each phase of analysis

Pre-Analytical Phase

- Begins when the test is ordered and ends when testing begins
- Most errors that can affect laboratory test results occur in the pre-analytical phase
- Important to understand the effects of pre-analytical errors on specimen integrity
  - Poor quality sample = poor quality result

What types of specimens are analyzed by the laboratory?
Types of Specimens

- Blood – venous, capillary, arterial
- Urine – voided, clean-catch, catheterized
- Other body fluids – cerebrospinal, synovial, pleural, pericardial, amniotic, semen
- Tissue, sputum, feces, bone marrow, saliva, nails, hair
- Culture – all of the above specimen types using sterile collection devices (except feces)

What collection tubes and containers are used?

Specimen Collection Tubes, Containers, and Devices

- Blood collection tubes
  - Used to obtain whole blood, plasma or serum
- Leak-proof and screw-cap containers
  - Used to collect non-blood specimens
  - May be sterile
- Other - swabs, syringe
- Transport media or preservatives are used if necessary

Which of the blood collection tubes contains serum?

Components of the Pre-Analytical Phase

- Patient test ordered
- Specimen collection
- Specimen handling and transport
- Specimen processing
- Specimen acceptability and rejection criteria
Patient Test is Ordered

- The correct test must be ordered on the correct patient
- The test order/request form must include:

<table>
<thead>
<tr>
<th>LABORATORY REQUISITION</th>
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<tbody>
<tr>
<td>Patient Name:</td>
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<tr>
<td>Hospital Number (Medical Record Number):</td>
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<td>Date of Birth:</td>
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<td>Date of Testing Required:</td>
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<td>Test Status:</td>
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<td>Test Name:</td>
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Specimen Collection

- All specimens must be collected and labeled according to procedure
- For each test ordered, the required tube or container type, specimen volume and handling requirements should be reviewed BEFORE the specimen is collected
  - Where can you find this information?

Specimen Collection

Does the laboratory collect all patient specimens?

Who is responsible for specimen collection errors?

Specimen Collection

- Specimens are collected by laboratory personnel, other healthcare professionals, and patients
- The laboratory is responsible no matter who collects the specimen
- A critical part of specimen collection is correct patient identification and proper labeling

Specimen Label

- The label on the specimen must have:
  - Labels must be on the collection tube or container
    - NOT on the lid or biohazard bag

Information on Requisition and Label MUST Match

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MLS 407 Clinical Laboratory Operations – Introduction to the Pre-Analytic Process Unit
Pre-Analytic Process Video PowerPoint Handout
Specimen Handling and Transport

- Proper handling and transport of specimens to the laboratory maintains specimen integrity
- Handling and transport requirements may include:
  - Time limits for testing
  - Specific temperatures
  - Avoiding light exposure
  - Transport systems or preservatives

Specimen Processing

- Processing of the specimen prior to testing may require centrifugation and preparation of aliquot tubes

Specimen Processing

- After centrifugation, specimens are examined for errors or conditions that may cause invalid results

Specimen Acceptability and Rejection Criteria

- Prior to testing, each specimen is evaluated for acceptability based on:
  - Test ordered and procedure
  - Labeling and source
  - Quantity and quality
  - If testing will be delayed, the specimen may be stored per conditions stated in procedure

Specimen Acceptability and Rejection Criteria

- If unacceptable, the specimen may be rejected and/or the test cannot be performed unless recollected
- A few examples:
  - Improperly labeled specimen
  - Wrong specimen type or container for test ordered
  - Quantity not sufficient
  - Outside of stability time for testing
  - Compromised specimen (clotted, hemolyzed)