Sample Collection
Primary sample collection:

- **Blood:**
  Principle: lab test results are only as good as the specimen & the specimen is only as good as the method by which it is collected, handled & processed.

- **Material:**
  Following material should be readily available in the specimen collection section:
  - Disposable syringes and needles (of bore size 19, 20 and 21) or vacutainer system.
  - Disposable lancets
  - Gauze pads or adsorbent cotton
  - Tourniquet
  - 70% (v/v) ethanol (or isopropanol)
  - Clean and dry wide mouth bottles (50 ml and 100 ml)
  - Sterile wide mouth bottles (100 ml)
Patient preparation:

Following instructions are given to the patient:

1. The day before sample collection, the patient should not drink intoxicating substance, esp. alcoholic drink and eat tobacco.

1. **Fasting sample**: Ask patient to undergo over night fast (no food, only water) and take breakfast after blood collection. Ask patient to break the fast and take food if any illness occur or worsen during fast.

2. **Postprandial sample**: Ask patient to take usual lunch and come after 2 hours.

3. The patient must rest for at least 15 minutes before the blood collection.

4. Patient should have basic information about venipuncture.

5. For postprandial blood collection, it is necessary for the patient to report to the laboratory, 15 minutes before the scheduled blood collection time.
**Laboratory request form:**
The laboratory request form should provide the following information.

- Patient full name, age and sex.
- Identification number
- List of required specific tests
- Urgent test: only those tests that are required for the immediate care
- Name of the physician ordering the test.

**Positioning the patient:**

- The patient should be made to sit comfortably in a chair and should position his arm on a slanting armrest, extending the arm straight from the shoulder & it should not bend at the elbow.
- If the patient wants to lie down, let the patient lie comfortably on the back. The patient should extend the arm straight from the shoulder. For support, a pillow may be place under the arm.
Requirement of blood collection:
1. Collection tubes.
2. Sterilized syringes and needle.
3. Spirit or 70% ethanol.
4. Cotton

Blood collection:
➢ Compare the requisition form and labeling the tubes.
➢ Selecting vein site:
   For most venipuncture procedures on adults, veins located in the arm are used. The median cubital vein is the one used for the patient.
   If the venipuncture of this vein is unsuccessful, one of the cephalic or basilic veins may be used. The blood however, usually flows more slowly from these veins.
Selecting vein site:

- Median cubital vein
- Basilic vein
- Cephalic vein
Applying the tourniquet:

A tourniquet will increase venous filling, which makes the veins more prominent and easier to should never be left on the arm for more than 2 minutes because a tourniquet prevents the blood from flowing freely and the balance of fluids and blood elements may get disrupted.
Cleansing the area:
Spirit or 70% ethanol is used for cleansing and the area is allowed to dry prevent possible hemolysis of the blood specimen. If the skin is touched after it has been cleansed, the procedure must be repeated.

Inspecting the needles and syringes:
The appropriate needle is attached to the syringe. the cover of the needle must not be removed. when ready for used, examine the needle especially the tip and check for any blockage by pressing the piston.
Performing the venepuncture:
1. The patient’s arm is gripped tightly and thumb of another hand is used to draw skin taut.
2. The vein is penetrated (position needle at 30° to 40° angle)
3. After blood has been drawn, the patient should release the fist and the tourniquet is also released.
4. A cotton ball is held firmly over the venipuncture site as soon as the needle is removed.
5. After removing the needle the collected blood is dispensed in the appropriate tubes.
6. The blood in the anticoagulated tube is mixed carefully and blood collected in the tube.
7. The tubes covered with stoppers.
8. After venipuncture the needle should be removed from the syringe and disposed by using needle destroyer.
1. Needle, holder, evacuated tube.

2. Twist and remove the white section.

3. Screw the needle into the holder.

4. Remove the covered section needle shield and perform venepuncture by using a tourniquet.
5. The tube into holder & remove tourniquet against
6. Apply a soft pressure with thumb against the flange.

7. Gently invert to tube to mix additives with blood
8. Destroy the needle and discard it.
1. Introduce the vacutainer needle with the level up at 15°-30 angle to the skin & parallel to the vein.

1. Push the appropriate vacutainer tube into the holder with gently pressure in order to puncture the cap.
3. The tube will automatically fill with blood.

4. Release tourniquet in 1 minute.
5. Remove the needle & apply a cotton swab.

6. Destroy needle & drop into the sharps container.
## Anticoagulation bulbs or tubes for blood collection:

<table>
<thead>
<tr>
<th>Color</th>
<th>Anticoagulation</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>_______</td>
<td>For serum</td>
</tr>
<tr>
<td>Lavender</td>
<td>EDTA</td>
<td>Whole blood</td>
</tr>
<tr>
<td>Blue</td>
<td>Sodium citrate</td>
<td>Whole blood for ESR &amp; coagulation test</td>
</tr>
<tr>
<td>Green</td>
<td>Heparin</td>
<td>Plasma or whole blood</td>
</tr>
<tr>
<td>Gray</td>
<td>Sodium fluoride</td>
<td>Plasma for blood glucose</td>
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</tbody>
</table>
Blood sample collection tube
For multiple draws, the order of tube is as follows:
1) Blood culture vials
2) Coagulation tube sodium citrate (light blue)
3) Serum tube / clot activated / gel (red, gold, speckled top)
4) Heparin (green top)
5) EDTA (lavender top)
6) Royal blue tubes with EDTA
7) Tan top EDTA
8) Dark blue top for EDTA
9) White top k / EDTA (for HIV)
10) Oxalate / florid (gray top)
11) Other tubes with additive.
Note: there are other methods which are suitable to collect the blood of infant.

Example: finger puncture for premature or <3 month of age.

Heel stick: for infants less than 1 year old.

- **Other sample collection:**
  - **Urine:** collect mild stream urine in appropriate vacuuminised tube after releasing cap & removing vaccume.
  - **CSF:** collect CSF in appropriate vacuuminised tube after releasing cap & removing vaccume.
  - **Body fluid:** collect body fluid in appropriate vacuuminised tube after releasing cap & removing vaccume.
Storage and criteria for rejection in clinical laboratory
**Storage:**
Examined the samples are stored for at least 24 hrs for re-examination if required. All examined sample are store at 2-8°C in dark such storage is done in separate refrigerator. Samples are stored for one week at room temperature (15-25°C), after testing, with the exception of ESR, which are discarded after reporting. Additional requests may be added to the original request as follows:

- Reticulocyte count may be added following receipt of a CBC sample but must be requested within 6 hours of specimen collection to produce accurate results.
- Blood film analysis may be added following receipt of a CBC sample but must be requested within 12 hours of specimen collection to produce accurate results.
- Depending on the time of collection of the CBC and the stability of the assay, the following tests may be added to an CBC sample: IM, G6PD, Sickle screen, PK, HB_El.
- A Malaria screen can be added onto an CBC within 1 hour of collection. Fibrinogen and D-Dimers may be added following receipt of a coagulation sample but must be requested within 8 hours of specimen collection to produce accurate results.
AGED SAMPLE:

**Coagulation samples** must be less than 8 hours old. Samples greater than 8 hours old the clotting factors begin to deteriorate which lead to inaccurate results.

**INR/WTNR samples** must be less than 24hrs old.

**ESR** samples should be less than 8 hours old. Samples greater than 8 hours can lead to a false lowering of results.

**Reticulocyte** samples must be less than 6 hours old. Samples greater than 6 hours old can lead to an incorrect result.

**Flow Cytometry** samples for lymphocyte analysis must be less than 48 hours old and stored at room temperature. Samples for white blood cell precursor analysis must be taken in Sodium Heparin and RPMI and be less than 72 hours old and stored at room temperature.

**CBC**: EDTA samples must be <48hours

**Blood film preparation**: samples must be <12 hours old

**D-Dimer**: Request for D-Dimer received >8 hours post sample collection.
CRITERIA FOR THE REJECTION OF CLINICAL LABORATORY:

I. INTRODUCTION
The following is a general listing of common situations in which a specimen may be rejected for processing. Each individual functional laboratory area has an additional listing of rejection protocol depending on the specific testing criteria. For each general category a few examples are listed.

II. GENERAL LABORATORY
A. Improperly labeled specimens**
   1. Specimens not labeled
   2. Specimens labeled with the incorrect patient identification.
   3. Specimens, that do not match the patient information on the laboratory requisition.

**These specimens may be accepted after responsible individual according to the protocol makes proper identification for "Identification of Specimens" located in the Specimen Collection Manual.

B. Improper Collection
1. Specimens collected with the improper preservative or anticoagulant.
2. Quantity of specimen insufficient to perform testing.
3. Specimens which are hemolyzed, lipemic or contain particulate matter. Individual testing protocol must be reviewed.
4. Specimens which are obviously or subsequently prove to be contaminated.
C. Delay in transit to the laboratory
1. Serum specimens not separated from the clot and left at room temperature or refrigerated for a time, which exceeds the protocol for the test requested.
2. Urine specimens left at room temperature for more than two hours.
3. Coagulation specimens more than four hours except for PT which is up to 24 hours.

D. Inappropriate specimens
1. Specimens collected from intravenous tubing.
2. Specimens collected from heparin locks.

E. Specimens inappropriately transported to the laboratory
1. Specimens not in compliance with Universal Precautions, (e.g. Not Bagged.)
2. Specimens leaking or grossly contaminated on the exterior portion of container.

NOTE: Irretrievable specimens, such as Cerebral Spinal Fluid (CSF), Operating Room specimens, cord blood, biopsy or specimens taken prior to antibiotic therapy will not be discarded. The responsible individual will be notified to come to the laboratory to decontaminate the sample so that processing can occur. The samples will be appropriately stored until the decontamination process commences.
III. CORE LABORATORY (CHEMISTRY AREA)
A. Random urine samples for urinalysis, which are stored for more than two hours at room temperature or four hours in a refrigerator. The laboratory requisition must indicate the time of collection.
B. Incorrect timing of collection for specimens submitted for antibiotic levels.
IV. CORE LABORATORY (HEMATOLOGY AREA)

A. Inadequate Specimens
1. Lavender vacutainers for Hematology analysis with less than 1 cc. in a 3 ml. tube.
2. Blue vacutainers for Coagulation studies which are less than 3/4 full.
3. Pediatric collections using Microtainer collection devices, which are less than the 1st line on the Microtainer.

B. The presence of clots in the vacutainers upon visual inspection.

C. Flow cytometry specimens that are refrigerated or exposed to cold temperatures.
V. BLOOD BANK

A. All Blood Bank specimens for CROSSMATCH will be rejected unless identified as follows:
   1. Patient's name and unit number
   2. Initials or signature of the individual obtaining the blood specimen.
   3. Date of the specimen

**NOTE:** See the procedure “Blood Bank Collection: Type and Screen/Type and Crossmatch” in the Specimen Collection Manual
VI. MICROBIOLOGY
A. Improper specimen source
1. Foley Catheter Tips
2. Swabs for AFB cultures (fluid or tissue required)
3. Urine, sputum, routine genital or oral lesions submitted for anaerobic culture.
4. Specimens contaminated with aerobic flora submitted for anaerobic culture.
5. Pooled 24 hour sputum, urine, or feces for AFB cultures

B. Improper specimen collection
1. Uncapped or unsterile collection container or swab
2. Dry swab, moisture ampule not crushed after collection.
3. Barium present in stool specimens for Ova and Parasite analysis
4. Improper transport medium or environment for all microbiological specimens
5. Specimens for Neisseria gonorrhoeae which have been refrigerated
6. Duplicate specimens collected within a 24 hour time period, except for blood cultures.

C. Swabs submitted for culture not identified as to source.
D. Improper transport
1. Urine specimens for culture left at room temperature for more than two hours or refrigerated for more than 24 hours.
2. Anaerobic cultures not transported in an anaerobic environment.
E. Frank saliva for routine bacterial culture
F. Pediatric Isolator™ blood cultures submitted for fungal and/or mycobacterial isolation which are less than ½ filled.
G. Specimens received without appropriate paperwork
1. Failure to complete sheet for titers performed at State Health Department or other reference laboratory.
2. Specimens for HIV antibody/antigen or Viral Load testing received without a signed consent form.
NOTE: Notification will be made to the physician and the specimens will be held for one month.
VII. REJECTION NOTIFICATION PROTOCOL
Upon receipt of an unacceptable specimen into the laboratory, the ordering physician will be notified. If he/she cannot be contacted, the primary nurse taking care of the patient is notified. In the event of a contaminated specimen, laboratory results of that contaminated specimen will NOT be communicated to the floor but a new specimen will be requested. The laboratory personnel will document into the LIS the name of the person contacted and the reason for rejection. The LIS will automatically capture the date and time of entry. This will also be recorded on the laboratory requisition which will be kept on file. The patient will be credited for the procedure which was not performed.