تجمع جدة الصحي الأول
Jeddah First Health Cluster
مستشفى الملك عبدالعزيز
King Abdulaziz Hospital

CBAHI ACREDITED

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COLLEGE of AMERICAN PATHOLOGISTS

Laboratory Service Manual 2025

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Approved by: Dr. Sherif Elhalily

This manual will be reviewing every two years or if needed

Table of contents

Foreword

King Abdul-Aziz laboratory test Directory has been developed to be available for all of our clinicians, nurses and health care providers.

Please feel free to contact us at JED_KAH_Laboratory@moh.gov.sa when unanswered questions regarding specimen requirements, test availability, and specimen handling arise.

We would like to thank all section heads and seniors for their effort and time in revising the laboratory tests belong to their departments.

The staff of King Abdul-Aziz Laboratory is committed to providing with accurate information and continuous service. We will strive to exceed your expectations and provide you with quality assured medical service.

Mission, Vision, Values

1. **Mission:**
   KAAH & the affiliated PHCCs are committed to reaching excellence in healthcare provision based on human-centered care and the best evidence-based practices, and to promote preventive medicine through community participation.
2. **Vision:**
   KAAH & the affiliated PHCCs aspire to become a leading medical institution in providing integrated healthcare that contributes to promoting quality of individuals life, in order to achieve the goals of the Kingdom's Vision 2030.
3. **Values:**
   - Humanity
   - Empowerment
   - Sustainability
   - Excellence
   - Transparency

Contact Information

Phone: 012 - 6375555

e-mail: jed-kah-laboratory@moh.gov.sa

Location: KSA-Jeddah, Al-Mahjar Street

Working Hour:

- **Operating hours**
  - **Core lab**
    - Chemistry: 24 hours/ 7 days
    - Hematology: 24 hours/ 7 days
    - Hormon: Sunday to Thursday (08:00am to 04:00 pm)
      TDM test 24 hours /7 days
    - ER lab: 24 hours/ 7 days
  - **Blood Bank:** 24 hours/ 7 days
  - **Microbiology:** 24 hours from Sunday to Thursday
    (08:00am to 04:00 pm)

CLINICAL CONSULTATIONS

- The Medical Laboratory Director provides for intra-laboratory consultations and clinical consultations regarding the ordering of appropriate tests and the medical significance of laboratory data.
- The Medical Laboratory Director or designee are accessible through:

Mob: Dr Sherif Elhalily 0590073584

LAB Phone: 012 6375555

- Or by electronic consultations, as needed.

Department	Email	Mobile No.	Physician
Medical director/Chemistry/ Special Chemistry	selhalily@moh.gov.sa	0590073584	Dr. Sherif
Blood Bank	aymanmm@moh.gov.sa	0546765376	Dr. Ayman
Hematology	hiabahmed@moh.gov.sa	0568815714	Dr. Hisham
Serology	haldoubi@moh.gov.sa	0548880870	Ms. Huria
Histopathology	rmohd-al-basam@moh.gov.sa	0504523280	Dr.Reem
Microbiology	halghamdi51@moh.gov.sa	0557044994	Dr.Huda
Parsitology	bisaleh@moh.gov.sa	0560825876	Dr.Buthainah

Test Ordering / Requesting:

Most of the laboratory tests are ordered electronic through the laboratory information system (LIS) (Oasis Plus). In Oasis+ physician must order all lab tests.

SPECIMEN PRIORITY:

When entering test requests into the Hospital Information System (HIS), the entry determines the priority given to perform the test once the specimen is in the laboratory.

STAT:

- This priority specifies that the specimen must be analyzed immediately. STAT priority should be used in severe (life threatening situations) only.
- STAT priority specimens must be placed by nurses in the STAT collection category only e.g. specified racks for ER specimens. Failure to do so frequently results in a missed collection. STAT specimens are processed in automated machines using STAT racks. Reports are released from HIS automatically to the ordering location when a result is approved by the department.

GUIDE TO BLOOD COLLECTION TUBES

Most laboratory tests are performed on anti-coagulated whole blood, Plasma, or serum.

Plasma: Draw a sufficient amount of blood with the indicated anticoagulant to yield the necessary collection tube by inverting 6-10 times immediately after collection. If required separate plasma from cells by centrifugation within 20-30 minutes.

Serum: Draw a sufficient amount of blood to yield necessary serum volume. Allow blood to clot at Room temperature i.e., 25°C + 5 °C, then separate serum from clot by centrifugation within 30-45 minutes.

Whole Blood:

- A number of tests have special tube requirements and/or handling conditions (refer to Alphabetical Listing of Tests) for special requirements
- Please note that evacuated blood tubes with **Lavender** and **Green** tops must be filled at least 3/4 or more with blood or the ratio of anticoagulant to blood will be too high and test results may be affected.
- **Blue** and **Gray** top tubes containing a liquid anticoagulant must be filled to the level determined by the tube vacuum to consider the blood: anticoagulant ratio.
- Allow the blood to fill the tube to its own level, usually approximately 1 cm from tube stopper
- Fill all tubes until the vacuum is exhausted and blood ceases to flow. For accurate results, fill the tubes to the marked line to ensure the correct blood anticoagulant ratio is attained and invert the tubes gently 6 to 10 times immediately after venipuncture.

Multiple type blood collections:

When multiple evacuated tubes are used, the order of draw is important for obtaining accurate results as there is a risk of contaminating a subsequent tube with the additive from the tube just collected.
Please observe the following order of draw:

Order of Draw	Color	Additives	Invert	Laboratory use
1 	**Blood Culture Bottles**	Bacterial growth medium & activated charcoal	Invert gently to mix	For Septicemia & Toxemia Aerobic bottle must be collected first then Anaerobic.
2 	**Light blue**	3.2% buffered Sodium citrate anticoagulant	3-4 Times	For PT (INR), PTT, and other coagulation studies
3 	**Red**	No additives- Plain	Not required	For Chemistry, Hormone, Serology, Immunology, Virology & Molecular testing
4 	**Yellow**	Gel separator and clot activator	5 Times	Chemistry, Hormone, Serology, Immunology, Virology & Molecular testing
5 	**Green**	Sodium heparin or Lithium heparin	8-10 Times	For Plasma in determination of Chemistry
6 	**Lavender**	K2 EDTA	8-10 Times	For Hematology testing, Hemoglobin A1C
7 	**Grey**	Sodium Fluoride	8-10 Times	Stat Glucose Lactic Acid Level – MUST be put on ice.

NOTE: *Only blood cultures, glass non additive tubes or plastic tubes without clot activator may be collected before the coagulation tube (light blue)* ***CLSI, Collection of Diagnostic Venous Blood Specimens, 7th ed. Standard GP41, April 2017***

Specimen Collection Procedure:

❖ Test/procedure request:

- ✓ Which tests are requested?
- ✓ Which specimens are to be collected?
- ✓ Which containers are required to collect the specimens?
- ✓ When the specimens are to be collected?
- ✓ What is collection order of tubes?

❖ Patient preparation

- ✓ Patient preparation refer to each test available in each section in this manual.

❖ Patient Identification:

- ✓ Positive patient identification is necessary to maintain accurate specimen identification and avoid serious errors that could jeopardize patient care.
- ✓ The patient's identification is verified by verbally asking conscious, coherent patients their name, which must match the name on the requisition, the computer printed label and the patient identification bracelet. Full name should be used, not just the family name. Please note age and sex of patient as confirmatory information.
- ✓ All Inpatients, must wear patient identification wrist or ankle bracelets. The name and medical record number on the identification bracelet must match the name and medical record number on the requisition or computer printed label.
- ✓ Outpatient identification is carried out before phlebotomy in withdrawal room by positive patient identification for conscious patient or asking his relative or accompanying person. Patient barcodes issued from reception area should match the answer information of identification. Identification of patients to whom serology tests are requested must be by verifying their identity by identify cards.

❖ Phlebotomy Process:

Phlebotomy process or blood drawing is one of the invasive procedures in health care. Drawing blood from patients using the proper procedure is a key element in the accuracy of the laboratory test results. Every step in the process is important to maintain a good specimen quality. Non- professional blood extraction can lead to results error, patient injury or infection, staff injury and inconveniency in repeating the test. Hemolysis, contamination, and wrong labeling are the most errors occur during this process. These can be eliminated or minimized by applying the following procedure according to the WHO guidelines:

1. Ask the patient his full name to insure the patient identity with the request form or printed barcode label.
2. Wash your hand with soap and water and dry it with towels. Alcohol hand rub can be used if hands are clean

3. Wear a well fitted gloves. For admitted patient's other personal protection equipment should be used such as gown and mask as needed.

4. Examine the patients forearm for visible, straight and clear vein. Although there are variations, median cubital vein usually is most easy to puncture. Do not use an area where there is diverting veins as this may cause hematoma. Do not use an existing peripheral access site (IV) or central line, this cause inaccurate results. Use the other arm.

5. Apply the tourniquet 4-5 finger widths above the puncture site, do not over-tight it.

6. Disinfect the site with 70% alcohol swab for 30 Seconds. Apply the swab to the skin in the firm but gentle pressure from the center to outward (2 cm around). Let the alcohol to dry for 30 seconds. Do not use iodine-based disinfectant on the blood culture bottle with rubber.

   a. **Note:** Allowed the alcohol to dry completely is important to minimize sample hemolysis.

   b. Do not touch the puncture site after disinfection as this may cause skin contamination. If you touch it, clean it

7. According to the size of the vein, chose the best needle gauge.

   a. **Note:** too small needle causes hemolysis while too large needle causes hematoma.

8. Place your finger below the puncture site, let the patient to fist his hand once and insert the needle at 30 degrees then slightly deeper.

   a. **Note:** too small needle causes hemolysis while too large needle causes hematoma.

9. Follow the proper order of tubes to avoid additives contamination. If you are using syringe and not vacuum tubes, place the tube in the rake before piercing the stopper with the needle to avoid needle-stick injury. Do not press the plunger of the syringe, as this will cause hemolysis.

10 Remove the tourniquet before needle withdraw or if it has been in place for 1 minutes.

11 Apply gentle pressure with a clean gauze without bending the patients arm as to the next patient. this may cause hematoma.

12 Label all tubes properly and discard the wrong un needed tubes immediately.

a **Note:** never label the tube before blood extraction to avoid wrong identification.

13 Discard the used gloves in black bag and needles in sharp container, do not recap the needle just discard it

14 Wash your hand, then move.

Blood Culture Procedure

Technique is important to prevent contamination of the blood resulting in inaccurate results. The following are the basic tips to prevent contamination of blood collection

Step 1 — Prepare Blood Culture Bottle

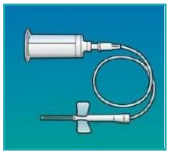
- Disinfect bottle tops with 70% isopropyl alcohol (alcohol pad)
- For adults, collect 10-20 cc and 1-3 cc for a child for each blood culture set
- divide blood into two blood culture bottles, one for aerobes and one for anaerobes

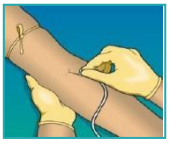
Step 2 — Skin Preparation

- clean puncture site with alcohol followed by chlorhexidine (CHG) and allow to dry
- Allow the disinfectant to dry.

DO NOT palpate the vein after disinfecting the skin, prior to inserting the needle)

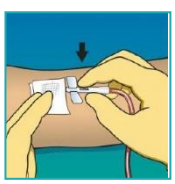
Step 3 — Blood Collection





- Draw blood using a sterile safety syringe and needle, or safety butterfly, designed to attach to a vacationer holder and dispense the appropriate amount of blood into the bottles.
- Ensure that the Luer end of the tubing is attached to the Vacationer holder.
- Perform venipuncture
- **Select aerobic bottle first**. Hold the bottle upright.
- Push and hold Vacationer holder over top of vial to puncture septum. Collect blood to desired fill level on vial. Monitor to ensure proper blood flow and fill level
- Remove holder from vial and immediately push and hold onto second vial. Collect blood to desired fill level on second vial

Step 4 — Removal

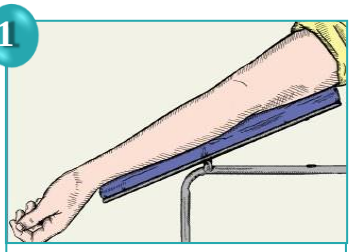


- Place gauze pad or cotton ball on the venipuncture site
- After venipuncture and inoculation of bottles, engage safety device on needle or butterfly and immediately dispose of collection materials in a sharps container

Venipuncture Procedure

Vacationers are utilized using the specific needle gauge. Syringes should be avoided as much as possible to prevent hemolysis.

1

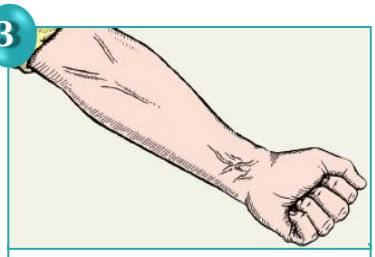


Position the patient so that he/she is comfortable.

2

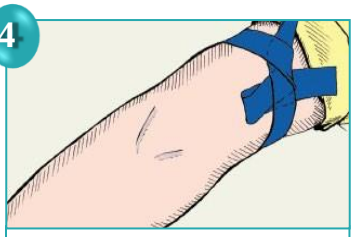
Select venipuncture site.

3



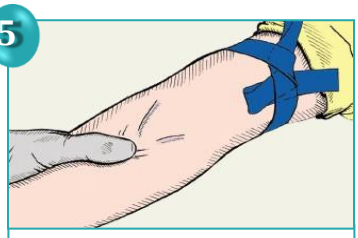
Have the patient close the hand, but not tightly

4



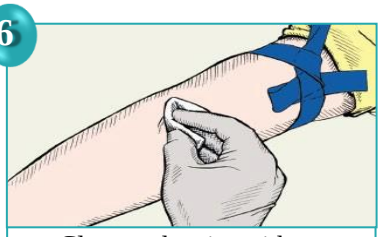
Apply the tourniquet 3 inches above the puncture site.

5



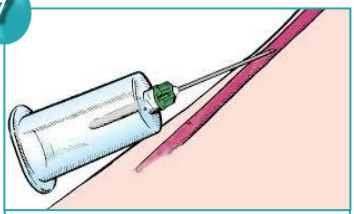
Immobilize the vein by pressing below the venipuncture site.

6



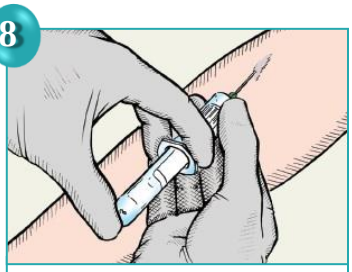
Cleanse the site with an alcohol wipe in a circular motion

7



Position the needle parallel to the path of the vein at a 10-20 ^{o} angle to the arm

8



Continue to fill the required tubes in the appropriate order.

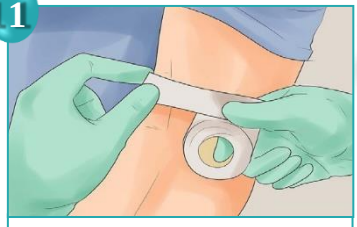
9

Gently rotate each tube 5 – 10 times to help mix the additive.

10

Place a cotton ball or gauze pad above the venipuncture site

11



Bandage the area.

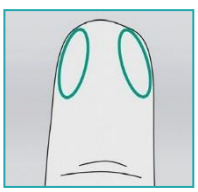
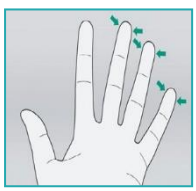
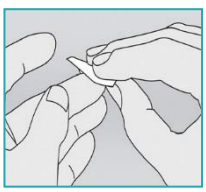
Quick tips

Application of tourniquet for longer than 1 minute may cause hemoconcentration or hemolysis, which may result in variation of test values.

Capillary Puncture Procedure

Micro collection by skin puncture involves many of the same steps as venipuncture. Finger sticks are done either because of a specific physician/patient request or because it is not possible to obtain blood by venipuncture

1. Perform the prior steps 1-2 in Venipuncture Collection Procedure
2. Choose a finger that is not cold, cyanotic, or swollen. If possible, the stick should be at the tip of the third or fourth finger of the non-dominant hand.
3. Cleanse the site vigorously with an alcohol-moistened cotton ball
4. Open a new sterile skin puncture device, the puncture should be made across the fingerprints to produce an large, round drop of blood
5. Hold the patient's finger firmly and press to activate the lancet to make the puncture.
6. Wipe away the first drop of blood with a gauze pad
7. Apply moderate pressure, encompassing puncture area to obtain a drop of blood. Release this pressure immediately, to allow re-circulation of the blood
8. Drops of blood should be allowed to flow freely into the collector top and down the walls of the tube
9. Apply a clean gauze pad to puncture site, using slight pressure and elevation until the bleeding has stopped.


Infant Heel stick Procedure

The heel-stick method for drawing capillary blood is the most common way to draw newborns' blood. It is used to collect blood for newborn screening tests, usually before the baby leaves the hospital. Heel puncture is generally performed on infants less than one year old.

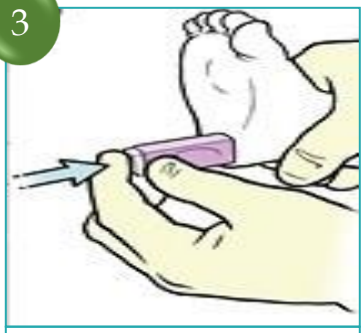
1

Select
the site for puncture

2

clean the site
vigorously with
alcohol

3



place the blade slot area of the Quick heel lancet

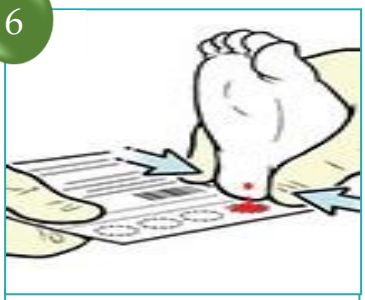
4

Using a clean gauze pad wipe away the first drop of blood

5

Apply moderate pressure, to obtain a drop of blood.

6



Drops of blood should be allowed to flow freely into the collector top

7

Apply a clean gauze pad to puncture site,

8

Bandage the area.

Collection of Urine Specimen

Random or spot specimen

- Portion of any voided urine is collected in a clean container.
- Majority of urine specimens submitted for urinalysis are random specimens.
- Composition of random voided specimens may vary widely; however, if rules for handling the specimens are observed, the variance will be minimized.

Mid-stream Urine specimen

- A clean catch or midstream specimen is preferred for urine culture.
- specimens are collected in a sterile specimen cup or container
- The patient shall urinate a small amount into the toilet, and start collecting the urine in the specimen container after 2 or 3 seconds.
- The patient should first void a small amount of urine which is discarded. Some of the routine should then be collected in a clean container before voiding is completed
- The specimen should be capped, labeled, and refrigerated until courier pickup time.
- If delays are anticipated in sending the specimen to the laboratory, a portion of the specimen should be aliquot into gray urine culture transport tube (Boric acid) should any culture work also desired or indicated.

- Mix the contents thoroughly after each addition of urine if a preservative is used.
- At the end of the collection period (approximately the same time the following day), empty bladder completely.
- Include the last urine specimen in the total collection.
- Send the specimen immediately to the laboratory.

Collection of a Stool Specimen

- Stool specimen should be collected early in the illness and prior to antibiotic therapy. Collect specimen in a clean container with a tight fitting lid.
- Specimen should be free of contaminants such as urine or water.
- Label container with patient name, date of birth, date and time of collection, and name of ordering physician.
- Empty bladder completely so that stool sample is not contaminated with urine.
- Deliver to the laboratory within one hour of collection.

Collection of Semen Specimen

Before Collection:

- Do not ejaculate for at least four (4) days before collection.

Collection instructions:

- Collect a sample in the sterile container provided by your physician.
- **DO NOT** collect the sample in a condom. Condoms contain a powder that destroys sperm.
- Ensure the entire semen sample is collected.
- Securely fasten the cover.

Collection of Respiratory Specimen

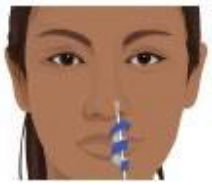
- ## Upper respiratory tract

- ### Nasal Swab

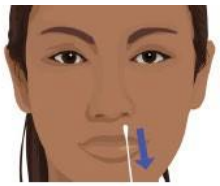
  - Nasal swabs are useful for the investigation of carriage of Staphylococcus, including MRSA

1. Insert the entire collection tip of the swab provided (usually ½ to ¾ of an inch, or 1 to 1.5 cm) inside the nostril

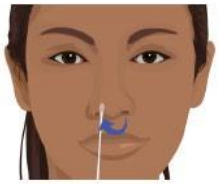
2.Firmly sample the nasal wall by rotating the swab in a circular path against the nasal wall at least 4 times



3. Take approximately 15 seconds to collect the specimen. Be sure to collect any nasal drainage that may be present on the swab



4.Repeat in the other nostril using the same swab



5. Place swab, tip first, into the transport tube provided

Nasopharyngeal specimen (NP) /Oropharyngeal (OP)

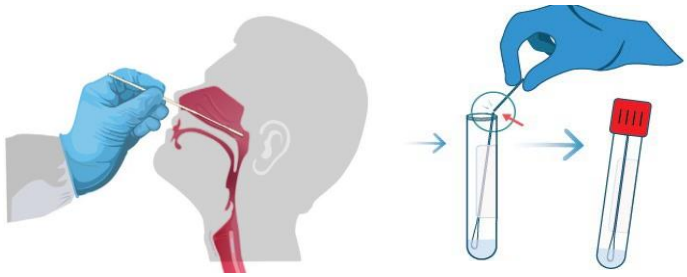
Use only synthetic fiber swabs with thin plastic or wire shafts that have been designed for sampling the nasopharyngeal mucosa. Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and may inhibit molecular tests. CDC recommends collecting only the NP specimen, although an OP specimen is an acceptable specimen type. If both NP and OP specimens are collected, combine them in a single tube to maximize test sensitivity and limit use of testing resources

instructions for collecting an NP specimen (performed by a trained healthcare provider):

- Tilt patient's head back 70 degrees.
- Gently and slowly insert a minitip swab with a flexible shaft (wire or plastic) through the nostril parallel to the palate (not upwards) until resistance is encountered or the distance is equivalent to that from the ear to the nostril of the patient, indicating contact with the nasopharynx.
- Gently rub and roll the swab.
- Leave swab in place for several seconds to absorb secretions.
- Slowly remove swab while rotating it. Specimens can be collected from both sides using the same

swab, but it is not necessary to collect specimens from both sides if the minitip is saturated with fluid from the first collection.

- If a deviated septum or blockage create difficulty in obtaining the specimen from one nostril, use the same swab to obtain the specimen from the other nostril.
- Place swab, tip first, into the transport tube provided



instructions for collecting an OP specimen (performed by a trained healthcare provider):

- Insert swab into the posterior pharynx and tonsillar areas.
- Rub swab over both tonsillar pillars and posterior oropharynx and avoid touching the tongue, teeth, and gums.
- Place swab, tip first, into the transport tube provided.

a. Lower respiratory tract

Sputum

- The sputum specimen obtained should be the result of a deep cough, thick of nature and not saliva.
- Collect an early morning specimen BEFORE breakfast.
- **DO NOT** use mouthwash, brush teeth, or gargle before collecting the sputum specimen.
- The patient should cough the sputum directly into the sterile container provided.
- Replace the container lid and close securely.

Tracheal aspirate

- Does not need to be screened like sputum; perform gram stain along with routine cultures; lab should report if specimen is purulent (>25 WBC/LPF)

Bronchial alveolar lavage (BAL) and mini-BAL

- Obtained by bronchoscopy or with use of a special catheter(mini-BAL); requires prompt transport to the laboratory for processing; not acceptable for anaerobic cultures; fluid should be concentrated for optimal yield for stains and cultures; consider quantitative bacterial cultures to guide interpretation with
  $>10^4$ CFU/mL considered significant

Collection of Genital Tract Specimens

Female

Cervix:

- Wipe the cervix clean of vaginal secretions and mucus.
- Rotate a sterile swab, and obtain exudates from the endo-cervical glands.
- If no exudate is seen, insert a sterile swab into the endo-cervical canal, and rotate the swab.

Urethra:

- Collect specimens 1 hour or more after patient has urinated.
- Collect the discharge with a sterile swab.
- If discharge cannot be obtained, insert a urethrogenital swab 2 to 4 cm into the endourethra, gently rotate the swab, and leave it in place for 1 to 2 seconds. Withdraw the swab, and submit it in the appropriate transport system for culture.

Vagina:

- a) For bacterial vaginosis, use a speculum without lubricant. Collect secretions from the mucosa high in the vaginal canal with sterile pipette or swab.

Male

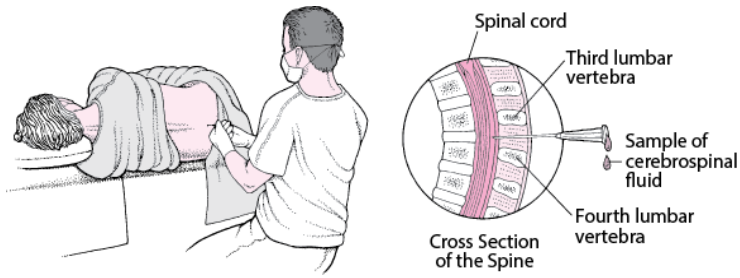
Urethra:

- Collect specimens at least 2 hours after the patient has urinated.
- Insert a thin urethrogenital swab 2 to 4 cm into the endo-urethra, gently rotate it, leave it in place for 1 to 2 seconds.
- Withdraw the swab, and submit it in the appropriate transport system for culture.

Collection of Cerebrospinal fluid (CSF)

Preparing for lumbar puncture

- If possible, three tubes (1 ml each) of CSF should be collected for microbiology, chemistry, and cytology.
- The kit for collection of CSF should contain:
  - Skin disinfectant: 70% alcohol swab and povidone-iodine
  - Sterile gloves
  - Be sure to check the expiration date.
  - Sterile gauze
  - Surgical mask
  - Adhesive bandage
  - Lumbar puncture needle
  - 22 gauge/89 mm for adults
  - 23 gauge/64 mm for children
  - Sterile screw-cap tubes
  - Syringe and needle
  - Transport container



Lumbar puncture procedure

1. Follow all appropriate biosafety precautions
2. Ensure that the patient is kept motionless during the lumbar puncture procedure, either sitting up or lying on the side, with his or her back arched forward so that the head almost touches the knees in order to separate the lumbar vertebrae during the procedure Disinfect the skin along a line drawn between the crests of the two ilia with 70% alcohol and povidone-iodine to clean the surface and remove debris and oils. Allow to dry completely.
3. Position the spinal needle between the 2 vertebral spines at the L4-L5 level and introduce into the skin with the bevel of the needle facing up.
   . Accurate placement of the needle is rewarded by a flow of fluid, which normally is clear and colorless.
4. Remove CSF (1 ml minimum, 3-4 ml if possible) and collect into sterile screw-cap tubes. If 3-4 ml CSF is available, use 3 separate tubes and place approximately 1ml into each tube.
5. Withdraw the needle and cover the insertion site with an adhesive bandage. Discard the needle in a puncture-resistant, autoclavable discard container.
6. Remove mask and gloves and discard in an autoclavable container.
7. Wash hands with antibacterial soap and water immediately after removing gloves.
8. Transport the CSF to a microbiology laboratory within 1 hour for culture and analysis

Other Specimen Collection

Microbiological Specimen to be cultured

- Whenever possible, specimens should be obtained before antimicrobial agents have been administered.
- Request forms accompanying specimens to be tested for antibiotic activity should contain the name(s) of the antibiotic(s) being administered.

Abscess, Tissue & Skin Lesions

- Generally, syringe aspirate, biopsy are the preferable than swab specimen
- **DO NOT** freeze Specimen and **DO NOT** add formalin.
- Disinfect surface with 70% alcohol (may be followed by 10% Povidine iodine or 2% tincture iodine (remove tincture iodine after procedure with alcohol to prevent tissue burns).
- Collect abscess material with syringe and/or remove tissue aseptically.
- Always transport tissue, biopsy, and aspirate in sterile leak-proof container, you may add 2-3 ml of 0.85% sterile normal saline to keep specimen moist.
- For open lesions/abscesses aspirate material from under the margin of the lesion/abscess is collected when possible.
- If a swab must be used, debride the wound and disinfect surface, then pass the swab deep into the base of the lesion and rotate it firmly (but gently) to sample the fresh boarder and transport in Stuart's transport media.
- If anaerobic culture is ordered the specimen must be collected & transported in an anaerobic transport medium for proper processing.

Pus Samples/ Wound Swabs

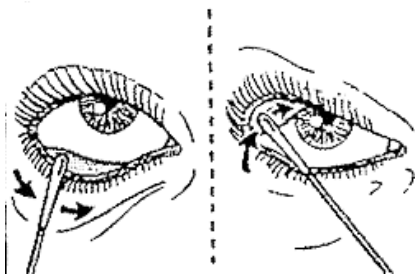
- Wound swabs should only be taken when signs of clinical infection are present. Deep rather than superficial swabs give more accurate representation of bacteria/fungi if present.
- Please indicate clearly on the request form and the swab, the site of the wound to facilitate interpretation of culture results.

Screening for MDR organisms (VRE, CRE and C.diff)

- Perianal, swab the perianal area (3) times by rotating the moistened swab gently but firmly

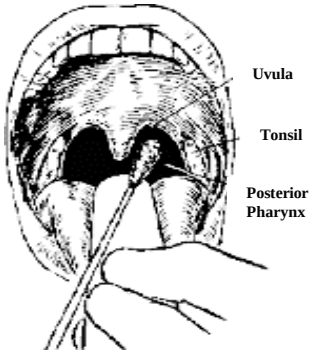
Eye Swab

- Sit or lay the patient with head well-supported and with the chair at an appropriate height to ensure safety for the patient and the nurse.
- Ask the patient to look up and gently pull down the lower lid exposing the conjunctiva.
- Gently sweep the swab stick along the lower fornix, from inner to outer canthus, taking care not to touch the eyelids. Place swab immediately into bacterial medium container, then ask patient to close the eye for a few seconds. This will ensure safe technique of swab taking and avoid damage to the cornea.
- Repeat the procedure to the other eye if necessary to comply with investigatory request, wash hands in between to minimize the risk of contamination to the other eye. A separate swab is required for each eye.



Throat Swab (posterior pharyngeal swab)

- Hold tongue away with tongue depressor.
- Locate areas of inflammation and exudate in posterior pharynx, tonsillar region of throat behind Uvula.
- Avoid swabbing soft palate.
- Do not touch tongue.
- Rub the affected area back and forth with cotton or Dacron swab



❖ Specimen Labeling:

- ✓ Verify with each requisition, that the barcode must match the patient's identification wrist (ankle) bracelet.
- ✓ Always label each specimen immediately before leaving the patient (at bedside).
- ✓ Never pre-label blood specimen tubes before drawing blood.
- ✓ Never give the specimen to someone else to label, it must be labeled by the person collecting the specimen.
- ✓ Re-verify that the identification information on the labeled specimen matches the patient's identification wrist (ankle) band.

❖ Required Specimen Label Information:

- ✓ Patient Name, Age and Sex
- ✓ Medical Record Number
- ✓ Date and Time of collection should be recorded on the specimen particularly in clinical tests requiring follow up at different time intervals.
- ✓ Specimen Source (if other than blood).
- ✓ Number of Containers Submitted (if other than blood).

❖ Specimen Transportation to the lab and its sections:

➢ Internal transport of laboratory specimens from the lab phlebotomy:

- ✓ Internal transport of laboratory specimens from the lab phlebotomy area samples will be transported to the lab sections every hour by the phlebotomist's staff in container. Except for the samples that need to transport immediately after collection like (Blood cultures, Ammonia, and Creatinine for X-ray Section, etc.)

➢ Internal transport of laboratory specimens from hospital sections:

- ✓ Charged nurses from all Hospital locations deliver samples to Laboratory sections. *For cross match, the request and the sample should be sent with a nurse from the department.* All specimens are acknowledged for receipt in the corresponding sections.
- ✓ All patient specimens should be contained in a tightly closed, on-leaking container and placed in a Zip-Lock bag for transport with a biohazard logo on it.
- ✓ The request should be placed inside the outer pocket of the Plastic bag to prevent contamination if leakage or breakage occurs.
- ✓ The person collecting a specimen is responsible for removing any contamination of the outside of the primary specimen container with a disinfectant before sending it to the laboratory.
- ✓ Specimens need special care:
  - ✓ Ammonia needs to transport in Ice and to be sent immediately after collecting the blood.
  - ✓ Lactate in the Gray Tube (Fluoride Oxalate) and transport to the lab immediately after collecting the blood.
  - ✓ Cold Agglutin needs to transport on Ice and be sent immediately after collecting the blood.
  - ✓ CSF specimens need to transport to the laboratory immediately after collecting the specimen and should be delivered hand by hand to lab staff (chemistry, hematology, microbiology and histopathology).

- ✓ Transport of lab specimens from other healthcare facilities (Incoming).
- ✓ All specimens must be properly packaged and labeled to indicate the general nature of the materials transported (e.g. diagnostic or biohazard).
- ✓ All specimens to be transported and submitted must have an appropriate label and should be contained in a leakproof bag or container which will prevent leakage and damage during transportation.
- ✓ Blood, urine, tissue, and stool samples must be transported to Receiving Laboratory with a temperature range of 5 C° to 20C°

➢ Health care facilities sample transport:

- ✓ All incoming specimens will be packaged in a cooler box having a biohazard logo and accompanied by a packaging (transport) list, which will be verified upon receiving the specimens. Upon the arrival of the specimens from the Primary Health Care, and other healthcare facilities all specimens should be visually checked for the physical condition of the specimens such as hemolysis. Document in the system and then follow the criteria for specimen rejection. Any discrepancy between the specimens received and the packaging list will be investigated by Laboratory Staff.
- ✓ Problems such as samples not transported in the correct temperature requirement (5 C to 20 C), mislabeled samples, and others that are identified during specimen transportation should be communicated with the concerned Primary Health Care Clinics and should be documented in the Email, and fill Specimen Rejection form
- ✓ The communication and notification, of specimen rejection should be monitored and evaluated on a monthly basis.
- ✓ An in-service training for specimen handling and transportation will be recommended for the Primary Health Care Clinics Staff for frequently submitting improper specimens.

➢ Transport of laboratory specimens from the Clinical Laboratory & Blood Bank to other Health care facilities (outgoing):

- ✓ All specimens must be properly packaged and labeled to indicate the general nature of the materials transported.
- ✓ The ordering physicians must fill the right forms with all the needed information and the specimen must be delivered to the send-out office before 10 Am during working days.
- ✓ The laboratory packages and ships infectious material in accordance with the applicable national, federal, state (or provincial), and local laws and regulations. Also termed "etiologic agents" Infectious materials are now classified into categories:
- ✓ Category A substances are capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure occurs such as microorganisms. (e.g. Bacillus anthracis, Clostridium botulinum, Yersinia pestis, Foot and mouth disease virus)
- ✓ Category B (diagnostic/clinical specimen known to harbor, or have a high probability of harboring an infectious agent) substances are not in a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure occurs. Most laboratory specimen falls under Category B.
- ✓ There are specific ways to pack samples for transport depending on temperature requirements (frozen,

refrigerated, and room temperature).

Frozen samples (-20 to -30 C)

The amount of dry ice depends on the distance of the journey; it must be enough to keep the sample frozen until it will be delivered to the reference laboratory. Make sure that each sample is secured by sealing it with parafilm to avoid spillage. Place the sample in a sample container and fill it with water. Make sure that all samples are labeled properly; label the sample container according to the sample inside. And store the sample in the freezer ready for transport. You can freeze the sample up to 2 days to ensure that the sample will not be thawed during transport.

Refrigerated samples (2 to 8 C)

Secured each sample with para-film and put it in an individual leak-proof plastic bag to eliminate spill during transportation then put all the samples in a second plastic bag. Cover the samples with white 0pads to maintain the required temperature and place it in a cooler box with ice packs. Make sure that there are enough ice packs to keep the samples in a refrigerated state (2-8 degrees). Documents can be put inside the transport box together with the samples as long as it is properly placed in a leakproof plastic bag.

Samples Transported in Room temperature (22 to 25 C)

Samples must be sealed properly with a para-film and secured it in an individual leakproof plastic bag to eliminate any spills then placed in a second plastic bag and wrap it with a white pad. Place the wrapped samples in a cooler box. Documents can be put inside the transport box together with the samples as long as it is properly placed in a leakproof plastic bag.

❖ SPECIMEN REJECTION CRITERIA

- Criteria for specimen acceptability and handling of suboptimal specimens will be clearly defined.
- All rejected samples will be discarded and the concerned ward nurse will be informed of the reason for sample rejection and documented in LIS System.

➢ Reasons for rejection (General reasons):

- Mislabeled Specimens any specimen with an incorrect patient label, which is described as a label in which either or both of the two patient identifiers is incorrect or a specimen with no label affixed to it.
- Specimens for Blood Bank testing with any type of mismatched, incorrect, or missing information must be redrawn.
- Specimen improperly collected and/or preserve (Clotted, hemolyzed, contaminated, etc.)
- Specimen sample volume not sufficient for the requirement of the test protocol.
- Specimen container contaminated by the specimen (i.e., infectious hazard).
- Patient not properly prepared for test sample requirements.
- Specimens received without two patients' identifiers.
- Specimens received without collection time when required and/or collector's employee number.

➢ Reasons for rejection for pathology section:

1. The specimen will be rejected for one or more of the following reasons indicated below.
2. Complete the shaded area below on site in Anatomic Pathology after rectifying the problem ASAP.
3. If you have any future enquiries, please contact the Laboratory on Ext:1212.
4. The specimen and/or requisition is not or inadequately labeled as to patient identification or incorrect requisition completed.
5. Identifying information on the specimen and the requisition do not match.
6. The specimen is unaccompanied by a requisition.
7. The doctor's name and/or number are missing from the requisition.
8. Sufficient clinical data are not stated- (Consult Pathologist before rejection).
9. The specimen received is not normally processed in the Histopathology Laboratory, e.g., swab, blood, gallstones, etc.
10. A routine histology specimen has been sent without formalin or formalin has leaked from the container. {if left unrefrigerated over six hours unsuitable for histological examination}
11. Collection time and Time of specimen insertion in formalin should be mentioned in requisition.
12. Referral slides from another institution, arriving unlabeled or unaccompanied by a corresponding pathology report and request form signed by the requisition physician.
13. A cytology/tissue biopsy specimen, anatomic site is not stated.
14. A cytology fluid specimen has leaked from its specimen container resulting in loss of the specimen. Such specimen can be discarded and physician informed.
15. A cytology fluid specimen has not been promptly delivered to the laboratory and left unrefrigerated. Such specimen can be discarded and physician informed.

16. The specimen container has been grossly contaminated and poses a hazard to the laboratory staff, as occurs with improperly closed specimen containers. Such specimen can be discarded and physician informed.
17. Cytology slides received broken beyond repair.

❖ Corrective action taken when rejecting a specimen/test result:

1. Immediately notify the ward, the clinician or the requesting physician regarding reasons of rejections & wrote that in the system.
2. Record in the Oasis with reason and the name of notified person.
3. Weekly monitoring by section senior of pre analytical, and post analytical rejection.

❖ Critical Values

If the test results that fall into critical range are immediately notified by telephone to the ordering physician, or other personnel delegated to receive this information of critical values.
Note: established critical value ranges may be found in the MD-LB General-006.

❖ Quality and Quantity of samples

- Always work with medical staff if there is any question about how much blood should be taken.
- All laboratory tests have a minimum volume required and use these guides to know how much blood will be needed for the tests ordered. If there is a risk of too much blood being removed in one draw, let the medical staff know immediately before collection so any order adjustments can be done if possible.
- Specimen Integrity**:** Should be maintained in the following conditions till the specimen is processed.

✓ **Improperly / Incompletely labeled:**

The lack of required information on labels other than the “two identifiers” will necessitate holding of the specimen until the lacking information is completed. Please see “Required Specimen Label Information”, for required information. The Laboratory will not correct improperly labeled specimens

✓ **Inadequate Requisitions:**

All information on the hard copy requisitions must be complete. Incomplete requisitions with associated specimens other than lack of the two identifiers or one of them will be held until the deficiency is corrected. Manual requisitions may be returned to originator for correction.

✓ **Specimen Relabeling:**

- Only the person who obtained a specimen may re-label it for data other than the two identifiers.
- Specimens will not be returned for relabeling. Personnel must correct it in the Laboratory.
- Under special circumstances the specimen may be returned to the sender by messenger for sealed blood evacuation tubes only.
- Lab staff are not responsible for relabeling specimens under any conditions.
- All label corrections will be documented by the Laboratory.
- Blood Transfusion Service specimens can never be relabeled under any circumstances.

➢ Specimens Which Can not Be Re-Collected (Suboptimal Specimens):

- The best practice is to recollect the specimen. However, they may be circumstances when recollection is not possible or practical (for specimens that are impossible or difficult to recollect, such as cerebrospinal fluid, tissue specimens) and if the ordering physician refuse to recollect the sample The suboptimal result will be highlighted in the reported results with the full responsibility of the treating physician and it will be informed to the ordering physician or head nurse and he must sing on the Sub-optimal form for approval.
- The final report should have the following comment: the condition of the specimen will affect the result and it's released with the full responsibility of the treating physician and will be informed to the ward .
- Staff should fill the Sub-optimal Specimen Form Appendix III (MD-LB General-005).

❖ **For more details refer to MD-LB General-005**

Patient / Donor Adverse Reaction to Phlebotomy

Adverse reactions from blood collection can occur and personnel collecting blood specimens must know what can occur and how best to manage the reactions. Here we address some adverse reaction and what should be done to address these reactions.

- **Hematoma:** Blood can leak out of a vein and under the skin during venipuncture, this can cause discomfort and pain and can complicate further collections from that site.
  - ✓ As soon as a hematoma is noted, remove the needle and tourniquet and apply pressure at the site for a minimum of 3 minutes.
  - ✓ Check the site and if the hematoma has stopped forming.
  - ✓ Put on a bandage or gauze with tape and inform the patient of the hematoma.
  - ✓ The bandage should remain in place for a minimum of a half hour.

- **Arterial puncture:** If the blood pulses into the collection system or fills collection tubes rapidly and is bright red, an artery has been punctured. If no hematoma is forming and the patient is not under any noted duress.
  - ✓ Check the site before applying a bandage to ensure the artery has sealed and notify the patient that the site needs to have a bandage on it for an hour and not to use the arm for lifting anything over 5 pounds for the day.
  - ✓ Let the patient know there may be more discomfort at the site than if the draw was a venipuncture draw.

- **Nerve Damage:** If a nerve has been pierced or cut, the patient will feel pain or numbness or a shocking sensation as discussed in c. If the patient continues have these symptoms.
  - ✓ ask for one of our on-site pathologists to meet with the patient or get the patient to ED (Emergency Department).
  - ✓ ask the staff there to examine the patient for nerve damage.
  - ✓ The patient may need to be seen by his or her doctor to follow-up.
  - ✓ Comfort the patient and let them know we cannot feel for nerves and this is a rare out-come of venipuncture

- **Pain:** Since nerves are very close to veins and arteries, there is some risk a nerve maybe pierced by a needle during blood collection. The patient will complain that he/she feels an electric shock going up his/her arm.
  - ✓ Immediately remove the needle from the patient's arm and put pressure on the site.
  - ✓ Ask the patient if the sensation has stopped. If so, try to redraw at another site if the patient is willing.
  - ✓ Explain to the patient that a nerve was touched by the needle and that was what he/she felt.
  - ✓ Ask them to let us know if they have any more numbness, weakness, or shocking sensations at the first site.

- **Bleed:** Patients with some liver disease, vascular diseases, clotting disorders, or medications may complicate normal clotting post a blood collection. Hot temperatures outside may cause a site to re-bleed because the veins dilate to cool the body.
  - ✓ Always check the site after holding it and keeping the patient sitting and their arm slightly bent.
  - ✓ If the bleeding has not stopped, continue to apply pressure.
  - ✓ If bleeding still continues, ask pathologist to look at the site and ask the patient if they have

any bleeding issues.

- ✓ The patient may need to be taken to ED to evaluate the bleeding. He/she may need to see his/her own doctor to evaluate the bleeding.
- ✓ Commonly, if the site is held at least 5 minutes, the bandage is kept in place for one hour and the patient does not lift objects over 5 pounds for that same period, the site should seal and not re-bleed.
- ✓ The patient may have more bruising than usually because of the causes mentioned and this should be explained to the patient.

♦Allergy: Some patients may have itching or burning at the collection site. Rashes or hives may form near the site. Our equipment does not have any latex, which has been a common allergy among some patients.

- ✓ If these symptoms or signs are severe or the patient is having difficulty breathing, stop the collection immediately and get the patient to ED.
- ✓ If the patient passes out call a RRT Alert or stops breathing call a Code BLUE Alert and get emergency care to the patient.
- ✓ CPR should be started immediately in anaphylactic shock.
- ✓ If the reaction is mild, have the patient see his or her physician immediately or take him or her to ED or contact the nursing house supervisor for an exam.

♦**Phlebitis is inflammation of a vein:** Thrombophlebitis is due to one or more blood clots in a vein that cause inflammation. Thrombophlebitis usually occurs in leg veins, but it may occur in an arm. The thrombus in the vein causes pain and irritation and may block blood flow in the veins. Phlebitis can occur in both the surface (superficial) or deep veins.

1. Superficial phlebitis affects veins on the skin surface. The condition is rarely serious and, with proper care, usually resolves rapidly. There is usually a slow onset of a tender red area along the superficial veins on the skin. A long, thin red area may be seen as the inflammation follows a superficial vein.
   - ✓ This area may feel hard, warm, and tender. The skin around the vein may be itchy and swollen.
   - ✓ The area may begin to throb or burn.
   - ✓ A low-grade fever may occur.
   - ✓ Sometimes phlebitis may occur where a peripheral intravenous line was started. The surrounding area may be sore and tender along the vein.
   - ✓ If an infection is present, symptoms may include redness, fever, pain, swelling, or breakdown of the skin.
   - ✓ Sometimes people with superficial phlebitis also get deep vein thrombophlebitis, so a medical evaluation is necessary.
   - ✓ Avoid these areas for blood collection and have the patient seek medical care if the symptoms persist.
2. Deep Vein Thrombosis affects the larger blood vessels deep in the legs. Large blood clots can form, which may break off and travel to the lungs. This is a serious condition called pulmonary embolism and must be treated immediately by a doctor.

♦**Vasovagal reaction:** A reflex of the involuntary nervous system that causes the heart to slow down (bradycardia) and that, at the same time, affects the nerves to the blood vessels in the legs permitting those vessels to dilate (widen). As a result the heart puts out less blood, the blood pressure drops, and what blood is circulating tends to go into the legs rather than to the head. The brain is deprived of

oxygen and the fainting episode occurs. The vasovagal reaction is also called a vasovagal attack.

- ✓ Stop collection immediately and help control the patient to prevent injury.
- ✓ If the patient is moving to the floor, verbally call out for help and gently help the patient to the floor.
- ✓ Call ED (Emergency Department), call the doctor the off-site location to help evaluate the patient.
- ✓ If the patient does not revive quickly or has any other adverse reactions, call a RRT Alert and get emergency care to the patient.

Anxiety/fear: Patients, especially children under the age of 12 or mentally disabled persons, may show anxiety and/or fear when they present for blood collection.

- ✓ Take the time to explain to the patient exactly what will happen at the patient's level of understanding.
- ✓ Ask care givers to assist with calming the patient. Then seek out help to hold the arm still during collection and make sure you let the patient know each step you are doing and what he/she will be feeling.
- ✓ Use a focus point for the patient to look at while you draw like a caregiver, a stuffed animal, some stickers, or something else in the room away from the site of collection.
- ✓ Remain calm and comforting and put yourself in the patient's position to help guide you in the collection.
- ✓ If the patient refuses, notify medical staff immediately and wait for their direction before trying to draw the patient. Seek out caregiver/family member helps as possible.

Minor adverse reactions e.g. dizziness, nausea

- ✓ Make the patient as comfortable as possible
- ✓ Instruct the patient to breathe deeply and slowly
- ✓ Instruct the patient to lean forward and place his head down between his or her knees
- ✓ Offer water, juice or snacks – often these symptoms are related to low blood sugar or fasting a. If the patient is having a glucose tolerance test at the time of the reaction stop the procedure and contact the referring physician or a pathologist

Brief fainting episodes (loss of consciousness)

- ✓ Remove needle and tourniquet, if performing phlebotomy
- ✓ Call for assistance
- ✓ Position the chair to most flat position possible (with assistance)
- ✓ Remain with the patient while they are unconscious
- ✓ If patient does not recover consciousness in 5-10 seconds, consider episode to be major event and follow guidelines below
- ✓ When the patient recovers consciousness, follow minor adverse reaction guidelines above

In summary, appropriate actions include:

- ✓ Checking that the tourniquet is providing sufficient venous engorgement
- ✓ Removing collection system and starting again at a different site
- ✓ Obtaining support from a more experienced practitioner.
- ✓ Ask for help if you are unsure and keep the patient's safety foremost in your decision making.

Laboratory Services

Microbiology

Location

Located at ground floor

Laboratory Services

The microbiology section provides full services of Gram's staining & culturing of various specimens from in-out patients as well as organism's identification and antimicrobial susceptibility and Screening for MDR organisms.

1- Identification of any isolated organism in patient's sample.
2- Using the routine conventional method and the automated machines.
3- Differentiate between pathogenic, colonized, and non-pathogenic organisms.
4- Sensitivity pattern for the isolated pathogenic organisms using three alternative methods: E-test, and automated machines E.G. Microscan and Pheonix.
5- Play active role in infection control in the hospital and ASP.
6- The microbiology play active role in the antibiotic report to help for the proper antibiotics selection.
7- The microbiology lab make the antibiogram yearly.
8- Detect of antimicrobial resistance by molecular tech. with automated machines E.G Gene expert.

Specimen Transport:

All specimens for Microbiology should be treated as a source of biohazard infection.
Always fallow PPE
Make sure that the specimen is properly labeled
Delay in transportation may result in death of fastidious organisms, overgrowth of contaminants and / or change in bacterial quantity.

Appropriate Dispatch Times for Specimens Are Listed Below:

- Immediately (do not refrigerate)
- CSF specimens (accepted any time day/night)
- All specimens submitted for anaerobes.
- Blood cultures.
- Sterile body fluids (other than CSF & urine)
- Gastric aspirate.
- All genital specimens.
- Stool for cultures.
- Tissues
- **Within two hour of specimen collection:**
- Sputum.
- Swabs in transport media (relatively stable to be batched and sent hourly).
- Urine (should be refrigerated if not sent immediately within 2 hours, for up to 24 hours).

Redundant Specimens:

When multiple specimens from the same source are submitted, the best quality specimen will be processed. The duplicate specimens will be held and comment entered in the computer.
If cultures taken from the same site on sequential days show no evidence of significant change from the previous cultures they will be reported as such.
Sensitivity testing will be performed at intervals of 48 hours for blood, CSF and sterile body fluids cultures, five days for remaining specimens.

Critical Values:

The following critical values are phoned to the ordering physician or nurse in charge plus infection control department for (MDRO/ alert organisms/ or patient can't be allocated in hospital).
Inpatient reports are phoned to attending nursing staff when the physician is unable to be reached and later reported electronically: in the following cases.
All positive Gram Stains from blood culture, sterile body fluids (excluding urines), CSF.

1. Positive rapid antigen detection by latex agglutination tests for Group B Streptococcus, Haemophiles influenzae b, Neisseria meningitides. (On CSF)
2. Positive result of acid-fast bacillus stain in any specimen.
3. Positive stool culture for Salmonella, Shigella
4. New emerging multi-resistant bacteria & Pan-resistant bacteria.
5. Positive detection of *Clostridium perfringens*
6. Pseudomonas, *Neisseria gonorrhoeae* or coliforms isolated from eyes.
7. Group A streptococci in tissue

Gram Stain:

gram stains of CSF and sterile body fluids are performed on request.
gram stains on all specimens (sputum, tracheal aspirates, bronco alveolar lavage, all tissues and surface wounds) except urine must be specifically requested.
It is necessary to send a separate request slip or order for Gram stain if a culture is also requested.

Histopathology

Location

Located at ground floor

Laboratory Services

1. Routine reporting to surgical pathology specimen including major resection, tru-cut and endoscopic biopsies.
    a. Frozen section diagnosis.
    b. Examination of cytology specimen fluids, F.N.A. and Pap smears.
2. (Provided that cytology specimen (PAP smears) is conducted once weekly)
3. Provide opinion on all referral cases/slides.
4. Special services as immunohistochemistry have been started in the histopathology, where necessary; the consultant histopathologist will apply this technique when the appearances on routinely stain section are not conclusive and where immunohistochemistry is expected to be helpful in reaching a diagnosis. Please be patient with us, not pressurize the pathologist for early results.

Cytology

Scope of cytopathology services.

1. Identification of malignant cells.
2. Identification of infectious diseases.
3. Identification of certain disease.

Reporting &Turnaround Time

✓ Pathology reports will be signed out as turnaround time schedule.

Exceptions:

1. Specimens received late in the day which require additional fixation before sectioning and processing.
2. Specimens that require regrossing or decalcification.
3. Specimens that require additional immunohistochemistry stains or special stains performed.

Consultation needed on difficult diagnosis cases.

Pathology reports are placed in the oasis system.

The final pathology report for tumor cases will include grading and staging of neoplasm according to standard classification schemes. (CAP cancer protocol).

The Report

1. The histopathology report is sent out typed on a form headed “HISTOPATHOLOGY”.
2. Whenever possible, a definite diagnosis is given; occasionally a list of differential diagnosis offered and on other occasions the clinician will be informed that a second opinion is being sought.
3. The report will be signed out in the Oasis including the date of release.

Specimen Delivery

1. All specimens should be forwarded to pathology department in sealed properly labeled, wide mouth containers, contain proper fixative.
2. Specimen should be delivered to the laboratory as soon as they are obtained. In order to monitor specimens delivered to the laboratory the date of accessioning and surgery should be matched with the date of delivery.
3. The general fixative in use is Normal Buffered formalin which is 10%. This solution is supplied by the laboratory. In case of prefilled containers are not available.
4. Specimens for frozen section must be sent fresh without fixative.
5. The specimens for routine histology must be put in wide containers with at least 10:1 of its own volume of formalin.
6. If there is more than one specimen from the same patient, put them separately in different labeled containers.
7. All specimen received must be registered in the Following way.
8. Specimen label and accompanying requisition must correlate.
9. If discrepancies occur the specimen and request form should be returned for correction.
10. An appropriate number label is attached to the Specimen and the corresponding request form and registered in our registration book.
11. When multiple specimens are received with a single request form, a manually allocated Roman Numerals is suffixed to the original accession number.
12. All relevant information is recorded in a Excel sheet
13. All report (copies) is filed consequently in order.
14. No request is destroyed or disposed off, but kept in the corresponding file.
15. Special Handling of Transmissible Spongiform Encephalopathies (TSE) Neuropathology tissues from suspected cases of Creutzfeldt-Jakob disease should be treated with formic acid. Paraffin blocks and slides prepared from formic-acid-treated tissue may be handled routinely. If tissue has not been treated with formic acid, it must be hand-processed and treated as containing potentially transmissible prions. Double gloves must be worn at all times when handling such tissue. All solutions, including water washes, must be collected and treated with equal volumes of fresh undiluted household bleach for 60 minutes before disposal. Disposables, glassware, tools, etc. must be handled according to the procedures employed in the autopsy room described elsewhere in this checklist. All scraps of paraffin and unused sections should be collected on a disposable sheet. The microtome may be wiped with bleach or NaOH solution. No special precautions are needed in handling intact glass slides once they have been cover slipped. Broken slides should be decontaminated and discarded. Paraffin blocks should be stored in a bag or box and labeled as infectious. Alternatively, the laboratory may reseal the cut surface of the blocks with paraffin.
16. Beyond normal working hours, all surgical pathology specimens should be kept in 10% NBF, and delivered to the lab within working hours.
17. All Cytopathology fluids, including CSF being delivered to Microbiology Laboratory must be refrigerated at 4℃, kept in the basket labeled Cytology, and delivered later to Anatomic Pathology during hours of operation.

Receiving Cytology Specimen

Pre-fixation of Smears:

1. Sample collected is gently thinly smeared on clean slide(s).
2. Immediate fixation with 95% alcohol. This is applied when using either Pap stain or H & E.
   a- Gynecologic/Non gyne smears.
3. Air dried smears: -this is applied when using diff quick.

PAP Smears:

The BD Sure Path collection vial send to the lab with complete cytology requisition include complete history and clinical data.

Cytology specimen Collection

PAP smear.

- Attached complete cytology requisition including Patient's age, LMP.
- The adequacy of PAP smear will be judged on
  a- Quantity of cellular material.
  b- Presence of endocervical material or sq. metaplasia
  c- Proper fixation of cells.

Sputum Samples:

- Essential for adequate sample.
- An early morning sputum, collected by deep cough sample after massage and send immediately to the lab with the attached fulfilled requisition.

Urine Samples:

- First morning voided urine specimen should be avoided.
- Voided urine should be obtained 3 – 4 hours after the patient has last urinated.
- 24 hours' collection is not acceptable source of urine samples.
- Fresh sample from a full bladder is preferable with minimum 30 ml is advised.
- Bring specimen immediately to the cytology section with proper requisition including full clinical data.

Breast Nipple Discharge:

- Slides should be labeled right and left if bilateral.
- Several smears showed obtain.
- Immediate immersion and send directly to the lab.

For FNA

- If syringe contain few cc of material do not smear all and keep some for cell block.
- If watery material or cystic lesion send the entire specimen for lab to be centrifuged and smears the sediment.
- Bring all needles to take any material inside.
- Check that the request is complete.
- Slides should be fixed immediately by immersion in Ethyl Alcohol 95% - 99%

Senior technologist will be in attendance in order to receive the specimen immediately after it has been collected from the patient. Any tissue remaining after the cytological smears will also be processed for routine histology as cell block.

Reasons for unsatisfactory aspirate.

1. Removal of needle before releasing negative pressure.
2. Small size lesion.
3. Fibrosis of the lesion.

Policy For Frozen Section

Procedure:

- The Pathology Department must be notified at least 24 hours before by the Surgical Services Department of any surgery requiring the Pathologist's presence for frozen section (FS) procedure.
- This notification must be on the specified consultation form with written approval from pathologist.

Communication or FS/Consultative Results:

- The Pathologist will communicate results of FS/consultations during a surgical procedure by either contact through the intercom system on his/her desk which leads directly into the surgical theater or , via direct contact with the surgeon mobile number.

Physical Management of Specimen

- The circulating nurse will receive the specimen from the scrub nurse in a sterile towel or container.
- Label the container or towel with the patient's information and proper specimen labelling.
- Fill out Pathology form and send with the specimen to the Pathology Department.
- The Pathologist will call the specific operating room with the results, using the intercom or directly through the sergeon mobile number.
- If the patient has any infectious disease a biohazard note should be stated clearly on the request form.
- Interpretation of frozen sections shall be completed within 20-40 minutes of the specimen arrival in Pathology.

Proper specimen labeling

- Proper identification should be on the specimen container and should include at least:
  - ✓ Patient’s full name
  - ✓ MRN- Medical Record Number.
  - ✓ Age (DOB)
  - ✓ Date obtained
  - ✓ Organ/Tissue

NOTE: Specimen should be rejected and not accessioned if they are improperly identified, incompletely labeled, or not accompanied by a requisition.

Specimen Requisition

- Specimen Requisition form should include:
  - ✓ Patient's full name
  - ✓ MRN- Medical Record Number
  - ✓ Date of birth
  - ✓ Name and bleep number of submitting physician
  - ✓ Date of specimen collection
  - ✓ Site of specimen
  - ✓ Type of specimen (incision, excision, resection)
  - ✓ Brief clinical history
  - ✓ Collection time.
  - ✓ Formalin time**.**

✓ Appropriate clinical data, when indicated.

For more details refer to MD-LB Pathology-001

Available Tests

Chemistry

ALT

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Albumin

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin), Fluid (sterile container)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Alkaline Phosphatase

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Amylase

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin), Urine: Random (midstream). Fluid: in sterile container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Ammonia

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: Avoid prolonged tourniquet, tube must be completely filled with blood, transport within 15 min, placed on ice.

AST

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Chemistry

Bilirubin Total

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Newborn ≥ 257 umol/l

Bilirubin Direct

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

BUN

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin), Urine: Random (midstream) Fluid: in sterile container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Calcium

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Any age ≤ 1.65 mmol/l
≥ 3.5 mmol/l

Cholesterol

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: Fasting 10-14 hours

Creatine Kinase (CK)

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Chemistry

CK-MB (mass)

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N.A

Creatinine

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin), Urine: Random (midstream) Specimen, Fluid (Sterile container)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N.A

Creatinine Clearance

Specimen: Timed urine collection 24 hrs. + Serum Sample
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: 24 hr Urine Collection Instructions; blood must be collected during period of urine collection.

GGT

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Note

for information about analytical method interference refer to MD/LB CHEMISTRY policy and MD/LB HORMONE policy, analytical method interference is available in each test method policy.
For tests reference interval refer to MD/LB CHEMISTRY/073

Chemistry

Chloride

Specimen: Serum: Serum: Vacutainer Yellow or Red top 5ml (No Additive), Green top 5 ml (Lithium Heparin)
Urine: Random (midstream) specimen (Sterile container)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Serum Any age ≤ 80 mmol/l
≥120 mmol/l

Glucose

Specimen: Serum: Vacutainer Yellow or Red top 5ml (No Additive), Green top 5 ml (Lithium Heparin) and Grey Top (NA fluoride)
Body Fluids: Sterile Container
CSF: Sterile Container
Urine: Random (midstream) specimen (Sterile container)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Urine: 24 hrs
Patient Prep: Fasting: Fasting for 6-8 hours
PP: 2hrs from the start of a wel balanced meal
Critical Value: Serum Adult ≤ 2.22 mmol/l
≥ 27.8 mmol/l
Child ≤ 2.56 mmol/l
≥ 24.72 mmol/l
New born ≤ 1.67 mmol/l
≥ 18.06 mmol/l

HDL-cholesterol

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
Patient Prep: Fasting 10-14 hours

HbA1C

Specimen: 3 ml blood in an EDTA tube (Lavender top)
Set Up 24/7
TAT Routine: 24 hrs
Patient Prep: N/A

Chemistry

Iron

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
Patient Prep: N/A

Inorganic phosphorus

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Lactate

Specimen: Blood full Na Fluoride tube (Grey top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: Avoid exercise of the hand or arm immediately before and during sampling. Venous specimens should be obtained without the use of a tourniquet or immediately after the tourniquet has been applied. Immediate Specimen's transported to the lab with ice..

LDH

Specimen: Serum: Vacutainer Yellow or Red top 5ml (No Additive), Green top 5 ml (Lithium Heparin)
CSF & Fluid: Sterile container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A.

Chemistry

Lipase

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Magnesium

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Any age ≤ 0.41mmol/l
≥ 2 mmol/l

Micro albumin / Creatinine ratio

Specimen: Urine: Random (midstream) specimens (sterile container)
Set Up 24/7
TAT Routine: 2 hrs
Patient Prep: N/A

Triglycerides

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
Patient Prep: Fasting 10-14 hours

Sodium

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin. Urine: Random (midstream) Specimens (sterile container), 24 hours urine Container, Fluid: in sterile container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr Urine: 24 hrs
Patient Prep: N/A
Critical Value: (Serum) Any age ≤ 120 mmol/l
≥ 160 mmol/l

Potassium

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin). Urine: Random (midstream) Specimens (sterile container), 24 hours urine container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr Urine: 24 hrs
Patient Prep: N/A
Critical Value: (Serum) Any age ≤ 2.8 mmol/l
≥ 6.2 mmol/l

Chemistry

Total Protein

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Urine: 24 hr Urine collection; timed or random (midstream) specimens for protein/creatinine ratio (sterile container)
Body Fluids: Plain Tube – Sterile Container
CSF: Sterile Container
Set Up 24/7
TAT Serum Routine: 2 hrs
Serum STAT: 1 hr
Urine: 24 hrs
Patient Prep: N/A

Troponin I-Hs

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) (main lab), 3 ml blood in an EDTA tube (Lavender top) (ER lab)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Male: > 0.02 µg/l
Female: > 0.012 µg/l

Uric acid

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

UIBC

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin)
Set Up 24/7
TAT Routine: 2 hrs
Patient Prep: N/A

Serum/ Urine Osmolarity (Calculated)

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin), random (midstream) urine.
Set Up Daily
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

HS CRP

Specimen: Vacutainer Yellow or Red top 5ml (No Additive) Green top 5 ml (Lithium Heparin).
Set Up Daily
TAT Routine: 1 hr
Patient Prep: N/A

ER lab chemistry services

- ✓ Na, K and chloride.
- ✓ Kidney function:
  - ✓ Urea, Creatinine.
- ✓ Uric acid.
- ✓ Cardiac enzymes:
  - ✓ CK.
  - ✓ CK – MB.
  - ✓ Troponin.
  - ✓ LDH
- ✓ Liver function test:
  - ✓ ALT.
  - ✓ Alkaline phosphatase.
  - ✓ AST
  - ✓ Bilirubin total and direct
  - ✓ Albumin
  - ✓ GGT
  - ✓ Total protein
- ✓ FBS – Post prandial sugar, random blood glucose
- ✓ Lactate, Amylase
- ✓ Calcium, magnesium, phosphorus
- ✓ HS CRP
- ✓ β-HCG

ER lab Hematology services

- ✓ CBC
- ✓ PT
- ✓ PTT
- ✓ Malaria Screening Test
- ✓ Sickle Cell

Turned around time:

One hour for all test.

Hormones and Tumors Markers

TSH

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

FT3

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

FT4

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

FSH

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Female: 2nd – 5th day of Menstrual Cycle
Male: N/A

LH

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Female: 2nd – 5th day of Menstrual Cycle
Male: N/A

Prolactin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Progesterone

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Female: 21st day of Menstrual Cycle
Male: N/A

E2

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Female: Mid cycle
Male: N/A

Hormones and Tumors Markers

Total Testosterone

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Total B-HCG

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Adrenal Function

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Cortisol (a.m.): sample should be collected between 8-9 a.m.
Cortisol (p.m.): collected after 5 p.m.

DHEAS

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Insulin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Fasting: Fasting for 6-8 hours
PP: 2hrs Following the meal

C-Peptide

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Fasting: Fasting for 6-8 hours
PP: 2hrs Following the meal

PTH

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Vitamin D (25-OH Vitamin D)

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Hormones and Tumors Markers

Ferritin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Vitamin B12

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Folate

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

AFP

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

CEA

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

CA-125

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

CA-19.9

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

CA-15.3

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Hormones and Tumors Markers

PSA (Total, Free)

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: Obtain specimens prior to procedures involving manipulation of the prostate

Thyroglobulin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT 3 days
Patient Prep: N/A

Amikacin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT Routine: 24 hrs
STAT: 1 hr
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak: 1-hour post-dose (30-60 minutes after infusion complete)
Critical Value: Peak > 35 ug/ml
Trough > 10.0 ug/ml

Aminophylline/ Theophylline

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Samling time: Trough (Pre-dose): Immediately before next dose
Peak: 4-8 hours post-dose (modified release preparations)
; 2 hours post-dose (rapid-release)

Carbamazepine

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak: 4-8 hours post-dose (longer with sustained-release forms)
Critical Value: >15 ug/ml

Digoxin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose; Or >6 hours post-dose Time to peak 1 hour (oral, plasma)
Critical Value: >2.4 ug/ml

Hormones and Tumors Markers

Gentamicin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak:1hour post-dose (30-60 minutes after infusion complete)
Critical Value: Peak >2.0 µg/ml
Trough >2.0 µg/ml

Phenobarbital

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak: 4 hours
Critical Value: >50 ug/ml

Phenytoin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak:3hrs (immediate-release)
12 hr (extended-release)
Critical Value: >30 ug/ml

Valproic acid

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak: 2 hours
Critical Value: >100 ug/ml

Vancomycin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up Daily
TAT Routine: 24 hrs
STAT: 2 hrs
Sampling time: Trough (Pre-dose): Immediately before next dose
Peak:1hr post dose(30-60 minutes after infusion complete)
Critical Value: Peak >50.0 µg/ml
Trough >10.0 µg/ml

Anti-Mullerian Hormone (AMH)

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT Routine: 7 days
Patient Prep: N/A

procalcitonin

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up 8am -4pm Sunday to Thursday
TAT Routine: 7 days
Patient Prep: N/A

Notes

For more details about specimen collection for drug dosing refer to MD/LB HORMONE/001

For more details about therapeutic drug monitoring reporting refer to md/lb hormone/006
tumor marker tests are assayed by dxi 800 beckman chemiluminescence immunoassay. patient results determined by assays using different manufacturers for methods may not be comparable

Hematology

CBC, Differential (WBC)/ Reticulocyte

Specimen: 2 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Critical Value:

WBC	Any age	≤ 0.5	k/µL
		≥ 40	k/µL
Absolute Neutrophil Count	Any age	≤ 0.5	%
Hemoglobin	Any age	≤ 7.0	k/µL
Hematocrit (PCV)	Any age	≤ 21.0	%
		≥ 65.0	%
Platelet Count	Any age	≤ 10,000	µL
		≥ 900,000	µL
		≤ 50,000 (L & D only)	µL
Slide Review / Diff.	Any age	* Presence of intracellular organisms (Malaria Parasite)	
		* Blast presence on peripheral smear	
Cell Count, all body fluids	Any age	* Blast or tumor cells	
		* Intracellular organisms	

CSF Cell count

Specimen: CSF in a Sterile white screw capped container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Any age WBC Count > 30 k/µL

Differential (for body fluids)

Specimen: Sterile white screw capped container
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A
Critical Value: Any age * Blast or tumor cells
* Intracellular organisms

Hematology

D- dimmer

Specimen: 2 ml Blood Trisodium citrate tube (3.2%, blue top)
Set Up 24/7
TAT Routine: 2 hrs
Patient Prep: N/A

ESR

Specimen: 2 ml Blood in EDTA Tube (Lavender top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Blood Film (PBS)

Specimen: 2 ml Blood in EDTA Tube (Lavender top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Malaria Screening Test

Specimen: 2 ml Blood in EDTA Tube (Lavender top)
Set Up 24/7
TAT Routine: 3 hrs
STAT: 1 hr
Patient Prep: Fresh sample

Mixing study (inhibitor Screening)

Specimen: 2 ml Blood Trisodium citrate tube (3.2%, blue top)
Set Up Sun – Thu; 8 AM - 4 PM
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: Fresh sample

PT & PTT

Specimen: 2 ml Blood Trisodium citrate tube (3.2%, blue top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: Fresh sample
Critical Value: PTT Any age ≥100 Sec.
PT INR Any age > 5.0 INR Sec.
Fibrinogen Any age < 100 Sec.

Hemoglobin Variants (Capillary Electrophoresis)

Specimen: 2 ml Blood in EDTA Tube (Lavender top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Sickling Test

Specimen: 2 ml Blood in EDTA Tube (Lavender top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: N/A

Hematology

BM Examination

Specimen: Bone marrow smear and biopsy
Set Up Routine working hours
TAT 2 days for aspirate and
3 days for biopsy
Patient Prep: NA

Coagulation Factors; V, VII, VIII, IX,

Specimen: 2 ml Blood Trisodium citrate tube (3.2%, blue top)
Set Up Tuesday every other week
TAT 2 weeks
Patient Prep: Fresh sample

Protein C, Protein S, AT-III, Lupus Anticoagulants and factor V Leiden

Specimen: 2 ml Blood Trisodium citrate tube (3.2%, blue top)
Set Up Tuesday every other week
TAT 2 weeks
Patient Prep: Fresh sample

HIT screening test

Specimen: 2 ml Blood Trisodium citrate tube (3.2%, blue top)
Set Up 24/7
TAT Routine: 2 hrs
STAT: 1 hr
Patient Prep: Fresh sample

HIT screening test

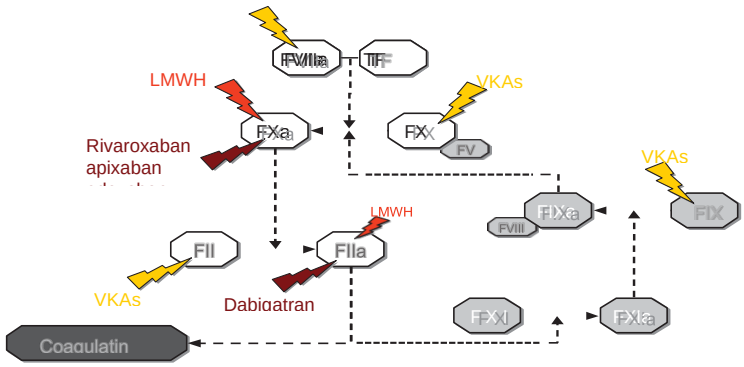
Specimen: 2 ml Blood in EDTA Tube (Lavender top)
Set Up 24/7
TAT Weekly (Tuesday)
Patient Prep: Fresh sample

Note:

Collection of blood coagulation testing through intravenous lines that have been previously flushed with heparin should be avoided, if possible. If the blood must be drawn through an indwelling catheter, possible heparin contamination and specimen dilution should be considered. When obtaining specimens from indwelling lines that may contain heparin, the line should be flushed with 5 ml of saline, and the first 5 ml of blood or 6-times the line volume (dead space volume of the catheter) be drawn off and not used for coagulation testing. For those samples collected from a normal saline lock (capped off venous port) twice the dead space volume of the catheter and extension set should be discarded.

Guidelines And Recommendations for Laboratory Assessment of The Direct Oral Anticoagulants (DOACS)

Anticoagulation control points.



- Regarding dabigatran and other potential FIIa direct oral inhibitors, most guidelines (i.e., 9/10) were in agreement by suggesting that the APTT may be a reliable screening test in patients taking this drug, especially when rapid and reliable information about the potential risk of over coagulation is needed. Additional or alternate recommendation for standard TT testing was provided by some guidelines. For a more accurate estimation of the anticoagulant effect, the dTT (or HTI, its commercial version) and ECT were suggested in 9/10 and 6/10 guide- lines, respectively.

- Regarding anti-FXa inhibitors, the PT was proposed as a reliable screening test in patients taking these drugs in 6/7 guidelines, especially when rapid and reliable information about the potential risk of over coagulation is needed, but with some notable exceptions. For example, the PT was not indicated for screening of patients taking apixaban according to the European Society of Cardiology (ESC), whereas this indication was limited to rivaroxaban (due to the lack of data on other DOACs) according to the European Heart Rhythm Association (EHRA) and the Australasian Society of Thrombosis and Hemostasis (ASTH).

- Interestingly, the American College of Chest Physicians (ACCP) and an Australian consensus document ruled out the use of the PT for assessing direct oral FXa inhibitors. For a more accurate estimation of the anticoagulant effect of anti-FXa inhibitors, all available guidelines (i.e., 8/8) were in agreement to use anti-FXa assays as the preferred means, although in three of five recommendations, data were lacking on some of the available anti-FXa inhibitors.

Summary of international recommendations regarding urgent and routine assessment of DOACs

	Screening		Drug level assessment	
	Anti-FIIa drugs	Anti-FXa drugs	Anti-FIIa drugs	Anti-FXa drugs
ISTH [41]	APTT	PT	dTT[a]	Anti-FXa assay
ACCP [42]	TT	None	ECT	Anti-FXa assay
ESC [43]	APTT	PT[b]	dTT[a] or ECT	Anti-FXa assay[b]
EHRA [44]	APTT	PT[c]	dTT[a] or ECT	Anti-FXa assay[c]
Australian Consensus Document [45]	N/A[d]	N/A[d]	dTT[d]	Anti-FXa assay[d]
Government of South Australia [46]	APTT or TT	N/A	dTT[a]	N/A
ASTH [47]	APTT (and TT)	PT[c]	dTT[a]	Anti-FXa assay[c]
FCSA, SIMeL, SIBioC, and CISMEL [48]	APTT	PT	dTT[a] or ECT	Anti-FXa assay

BCSH [49]	APTT	PT	dTT[a] or ECT	Anti-FXa assay
SSTH [50]	APTT	N/A	dTT[a] or ECT	N/A

[a]dTT in this table is taken to mean either the commercial HTI assay or a suitable/comparable in-house dTT method. [b]Not indicated for apixa ban. [c]Not assessed for apixaban and edoxaban. [d]Not assessed for rivaroxaban and edoxaban. ACCP, American College of Chest Physicians; APTT, activated partial thromboplastin time; ASTH, Australasian Society of Thrombosis and Haemostasis; BSCH, British Committee for Standards in Haematology; CISMEL, Italian Committee for Standardization of Hematological and Laboratory Methods; dTT, diluted thrombin time; ECT, ecarin clotting time; EHRA, European Heart Rhythm Association; ESC, European Society of Cardiology; FII, factor II; FX, factor X; FCSA, Federation of Centers for Surveillance of Anticoagulation; ISTH, International Society on Thrombosis and Haemostasis; N/A, not available; PT, prothrombin time; SIBioC, Italian Society of Clinical Biochemistry and Laboratory Medicine; SIMeL, Italian Society of Laboratory Medicine; SSTH, Swedish Society on Thrombosis and Haemostasis; TH, thrombosis and hemostasis; TT, thrombin time.

Summary of test patterns for DOACs and conventional anticoagulants.

test	Anti-Xa DOACs (Rivaroxaban)	Anti-Xa DOACs (Apixaban)	Anti-IIa DOACs (Dabigatran)	VKAs	UFH	LMWH
PT/INR	++	(+)	+	++	–/+	–
aPTT	+	(+)	++	+	++	–/+
TT	–	–	++	–	++	+/–
Anti-Xa	++	++	–	–	++	++
dRVVT	++	++	++	++	–/++	–

APTT, activated partial thromboplastin time; DOACs, direct oral anticoaculants; dRVVT, dilute Russell viper venom time; LMWH, low-molecular-weight heparin; PT, prothrombin time; TT, thrombin time; VKAs, vitamin K antagonists; UFH, unfractionated heparin. UFH at therapeutic levels will not affect PT or dRVVT when these reagents contain a heparin neutralizer; however, excess UFH will affect these assays when neutralizer limits are exceeded

Laboratory Monitoring of Heparin Therapy

- **Recommended Laboratory Test**

  Currently, the Activated Partial Thromboplastin Time (aPTT) is the laboratory test most commonly used to monitor unfractionated heparin therapy. However, some patients receiving heparin but not demonstrating an adequate aPTT prolongation may require further laboratory evaluation for heparin resistance. **The AntiXa test can quantitatively determine** the plasma level of Unfractionated Heparin as well as Low Molecular Weight Heparin.

- **aPTT Therapeutic Range**

  Historically, the laboratory has recommended an aPTT prolongation of 1.5 – 2.5 times the MEAN normal reference interval. (The mean normal value is recalculated with each change in reagent lot number, approximately once per year.) The current mean normal is reported with each patient test result.
  Example: aPTT MEAN NORMAL = 28- 40 seconds(mean=34)
  Therapeutic Range = 51 – 81 seconds (1.5 – 2.5 x MEAN NORMAL)
  Recently, another method of determining the Heparin Therapeutic Range was developed utilizing a procedure derived from Brill-Edwards, et al, in which aPTT values and heparin levels are obtained from patients actually receiving heparin. Using linear-regression, a graph is prepared that correlates the aPTT in seconds to the heparin Anti-Xa units. The ranges established, are the time in seconds equivalent to 0.1 to 0.3 and 0.3 to 0.7 Anti-Xa units of heparin.

- **Therapeutic Range**: 0.1Units=47sec(aPTT), 0.3Units=64sec(aPTT), 0.7Units=98sec(aPTT).

- **Frequency of aPTT Monitoring:**
  - ✓ **Initiation Phase:** Upon initiation of heparin therapy, the aPTT test should be ordered every 6

hours until the result falls within the target therapeutic range. Whenever the heparin dosage is changed, the aPTT should be reevaluated every 6 hours until the desired therapeutic range is reached.

- ✓ **Stable Phase:** Following attainment of a stable aPTT prolongation within the therapeutic range, the aPTT test should be ordered once a day until heparin therapy is discontinued.

Specimen Collection

- The daily collection time should be standardized (preferably prior to 10 AM) to avoid any diurnal variation in aPTT results (despite constant heparin infusion rates).

- To avoid falsely prolonged aPTT results due to heparin contamination, specimens for monitoring heparin therapy should not be collected from the same extremity used for heparin infusion or from an indwelling catheter.

Important Notes:

- Prolongation of the aPTT does not necessarily indicate that the blood is effectively anticoagulated in vivo. A variety of conditions can complicate the administration and monitoring of unfractionated heparin therapy (liver disease, renal disease, obesity, aging, etc.).

- Patients receiving heparin but not demonstrating an adequate aPTT prolongation may experience heparin resistance.

- Patients with anti-phospholipid antibodies ("lupus anticoagulants") may exhibit a significant prolongation of the aPTT yet still be at increased risk of thrombosis. Specialized assays are required for heparin monitoring in patients with anti-phospholipid antibodies [as well as contact factor (factor XII, prekallikrein, HMW kininogen) deficiencies].

- The aPTT is NOT recommended for monitoring low molecular weight heparin, danaparoid or direct heparin inhibitors such as hirudin.

- Call lab for further recommendations on monitoring anticoagulation.

Sample Requirements for Inhibitor Screening Test:

- Discontinue Coumadin Therapy for 14 days.
- Discontinue direct thrombin inhibitors, fondaparinux and heparin 2 days prior to collection.
- Because the presence of these drugs in the specimen may interfere with the test results

BLOOD BANK AND TRANSFUSION SERVICE:

Blood Grouping (ABO/Rh)

Specimen: 2 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 30-40 min
Patient Prep: N/A

Antibody Titration

Specimen: 2 ml Blood in an EDTA Tube (Lavender top)
Set Up Sun – Thu; 8 AM - 2 PM
TAT 4 hrs
Patient Prep: N/A

ABO-Confirmation

Specimen: 2 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 1 hr
Patient Prep: N/A

Antibody Identification

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up Sun – Thu; 8 AM - 2 PM
TAT 4 hrs
Patient Prep: N/A

Acid Elution

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up Sun – Thu; 8 AM - 2 PM
TAT 4 hrs
Patient Prep: N/A

D weak

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up Sun – Thu; 8 AM - 2 PM
TAT 1 hr
Patient Prep: N/A

Antigen typing (RBC Phenotype)

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 1 hr
Patient Prep: N/A

Rh + K Phenotyping

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up Sun – Thu; 8 AM - 2 PM
TAT 1 hr
Patient Prep: N/A

Compatibility testing (cross match)

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 45 min
Patient Prep: N/A

Antibody screening

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 45 min
Patient Prep: N/A

BLOOD BANK AND TRANSFUSION SERVICE:

Direct Coombs test (DCT); Direct AHG Test (DAT)

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 45 min
Patient Prep: N/A

Transfusion reaction study

Specimen: 4.5 ml Blood in an EDTA Tube (Lavender top)
Set Up 24/7
TAT 45 min
Patient Prep: N/A

ANATOMIC PATHOLOGY

Small biopsies

Specimen: Tissue in a Histo container (In a ratio 1 sample to 10 Formalin)
Set Up 8am -3.30pm Sunday to Thursday
TAT 5working days -If the specimen requires special stains, deeper levels and regross- requires, immunohistochemistry and intradepartmental consultation- requires additional days
Patient Prep: N/A

Large specimens

Specimen: Tissue in a Histo container (In a ratio 1 sample to 10 Formalin)
Set Up 8am -3.30pm Sunday to Thursday
TAT 7 days If the specimen requires special stains, deeper levels and regross- requires additional days. -If the specimen requires immunohistochemistry and intradepartmental consultation- requires additional s
Patient Prep: N/A

Bone specimens

Specimen: Bone Tissue in a Histo container
Set Up 8am -3.30pm Sunday to Thursday
TAT variable depending on decalcification.
Patient Prep: N/A

Frozen section

Specimen: Fresh sample Tissue
Set Up 8am -3.30pm Sunday to Thursday
TAT 20 min to 40 minutes
Patient Prep: N/A

Cervical smear

Specimen: Cervical smear
Set Up 8am -3.30pm Sunday to Thursday
TAT 10 working days from processing if the samples requires repeat they may take additional days
Patient Prep: N/A

Non gynecology cytology

Specimen: Fluid in cyto container
Set Up 8am -3.30pm Sunday to Thursday
TAT 10 working days If the specimen requires special stains, repeat, intradepartmental consultation- requires additional days
Patient Prep: N/A

FNA

Specimen: Direct smear
Set Up 8am -12 every Tuesday
TAT 10 working days If the specimen requires special stains or repeat requires additional two days. If the specimen requires intradepartmental consultation- requires additional days
Patient Prep: N/A

MICROBIOLOGY AND TB

Intravascular Catheters (Arterial, CVP, Femoral, Jugular, Subclavian, Swan Gang, Ventricular , Hemovac drain and VP shunt tip) Culture

Specimen: Tip in Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Body Fluids (Ascitic and Bile, BAL, CSF, Continuous ambulatory peritoneal dialysis (CAPD), Cystic, Pericardial, Peritoneal, Pleural, Synovial) Culture

Specimen: Fluid in Sterile white screw capped container
Set Up Daily
TAT 3-5days;
Cystic fluid 4-5 working days
Patient Prep: Before administration of Antibiotics

Blood culture

Specimen: Blood in a special Blood culture bottle
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Bone marrow Culture

Specimen: Aspirate in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Swabs (Cervical, Ear, Eye, Groin, High vaginal, Mouth, Nasal, Nasopharyngeal, Peritoneal, Pus, Skin, Throat, Umbilical, Urethral discharge, Vaginal, Wound) Culture

Specimen: Sterile swab with transport medium
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Lymph node

Specimen: Tissue in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep

MICROBIOLOGY AND TB

Prostatic discharge Culture

Specimen: Secretion in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Pus aspirate Culture

Specimen: Aspirate in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Semen Culture

Specimen: Fluid in a Sterile white screw capped Container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Sinus aspirate Culture

Specimen: Aspirate in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Tissue biopsy (in sterile saline) Culture

Specimen: Tissue in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Urine (voided) Culture

Specimen: Urine in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Urine (with Foley's catheter) Culture

Specimen: Urine in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Urine (with suprapubic catheter)

Specimen: Urine in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

MICROBIOLOGY AND TB

MRSA Screening: Swabs (Axillary, Hair line, I.V. SITE, Nasal (one swab for both nostrils), Perineal, Tracheostomy site.

Specimen: Urine in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Candida auris screening

Specimen: Swab in sterile swab
Set Up Daily
TAT 5 days
Patient Prep: NA

BD MAX (PCR) Enteric Bacterail Panel

Specimen: Stool in sterile Container
Set Up week days 08:00 am - 04:00 pm
TAT 3 hrs
Patient Prep: NA

C.diff detection

Specimen: Stool in sterile Container
Set Up week days 08:00 am - 04:00 pm
TAT 3 hrs
Patient Prep: NA

Stool Culture

Specimen: Stool in sterile Container
Set Up week days 08:00 am - 04:00 pm
TAT 5 days
Patient Prep: NA

RT-PCR CT/NG Detection

Specimen Urine in sterile Container
Set Up week days 08:00am - 04:00 pm
TAT 3 hrs
Patient Prep: NA

B-D-Glucan Antigen Level

Specimen: 5 ml blood in a Plain tube (Yellow or Red top)
Set Up week days 08:00 am - 04:00 pm
TAT 24 hrs
Patient Prep: NA

PARASITOLOGY

Occult blood in stool

Specimen: Stool in a Sterile white screw capped container
Set Up Sunday -Tuesday 8-4
TAT 2-3 hr
Patient Prep: N/A

Pregnancy Test

Specimen: Urine in a Sterile white screw capped container
Set Up Daily
TAT 3-5 days
Patient Prep: Before administration of Antibiotics

Semen analysis

Specimen: Semen in a Screw-capped red container
Set Up Mondays, Tuesdays and Wednesdays
TAT 2-3 days
Patient Prep: The sample should be collected after a minimum of 2 days and a maximum of 7 days of sexual abstinence.
Patient Prep: N/A

Stool analysis

Specimen: Stool in a Screw-capped red container; Specimens should be fresh up to 2 hours.
Set Up Sunday -Tuesday 8-4
TAT 2-3 hrs
Patient Prep: N/A

Synovial fluid (crystals)

Specimen: Urine/ Body Fluid in a Screw-capped red container; Avoid blood contamination.
Set Up Sunday -Tuesday 8-4
TAT 2-3 hrs
Patient Prep: N/A

Urine analysis

Specimen: Voided / catheterized urine, suprapubic aspirate, nephrostomy urine in a Screw-capped red container, use sterile screw-capped container (if culture also is requested).
Set Up Sunday -Tuesday 8-4
TAT 2-3 hrs
Patient Prep: N/A

IMMUNOLOGY

RPR

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8-4
TAT 48 hrs
Patient Prep: N/A

Syphilis Ab

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Every Thursday
TAT One week
Patient Prep: N/A

HBsAg

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8-4
TAT 48 hrs
Patient Prep: N/A

HIV

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8-4
TAT 48 hrs
Patient Prep: N/A

Hbe AB

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Every Wednesday
TAT One week
Patient Prep: N/A

HBsAg Confirmatory test

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up As needed
TAT One week
Patient Prep: N/A

HbsAB

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Every Wednesday
TAT One week
Patient Prep: N/A

HB c AB-Total

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Every Wednesday
TAT One week
Patient Prep: N/A

HB c AB- IgM

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Every Wednesday
TAT One week
Patient Prep: N/A

Hbe Ag

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Every Wednesday
TAT One week
Patient Prep: N/A

IMMUNOLOGY

HAV-IgM

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT one week
Patient Prep: N/A

HAV-Total

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT one week
Patient Prep: N/A

Thyroid Thyroglobulin

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT One week
Patient Prep: N/A

Thyroid Peroxidase Ab (TPO)

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT One week
Patient Prep: N/A

C-Reactive Protein (CRP)

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

RF

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

IgA

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

ASO

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

IgG

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

IgE

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

IMMUNOLOGY

IgM

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

C3

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

C4

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

Rubella IgG

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT one week
Patient Prep: N/A

Brucella

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

Widal

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 72 hrs
Patient Prep: N/A

Ceruloplasmin

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Sunday -Thursday 8am – 4 pm
TAT 48 hrs
Patient Prep: N/A

Toxoplasma (IgG & IgM)

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT one week
Patient Prep: N/A

Cytomegalovirus IgG

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up once a week
TAT one week
Patient Prep: N/A

Cytomegalovirus IgM

Specimen: 5 ml blood in a Plain tube (Yellow)
Set Up Monday every two weeks
TAT one week
Patient Prep: N/A

SEND OUT

COVID-19

Container: VTM
Volume: 2 ml
Specimen: Nasopharyngeal swab
Transportation: Biohazard bag
Receiving time: Daily 24/7
Receiving area: • Sunday to Thursday (Send out Section from 8:00 am to 4:00 pm Microbiology section: from 4:00 pm to 8:00 am.)
• Friday & Saturday: Micro section.: from 8:00 am to 4:00 pm core lab: from 4:00 pm to 8:00 am
Request: Hesn order
TAT 6 working hours
Patient Prep: N/A

Influenza (A, B, H1N1, H1, H3)

Container: VTM
Volume: 2 ml
Specimen: Nasopharyngeal swab
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Hesn order
TAT 6 working hours
Patient Prep: N/A

MERS Cov

Container: VTM
Volume: 2 ml
Specimen: Nasopharyngeal swab / Broncho alveolar- lavage/ Respiratory aspiration/ Sputum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section am
Request: Hesn order
TAT 10 working hours
Patient Prep: N/A

DENGUE (PCR)

Container: Plain tube (Yellow or Red top)
Volume: 3 ml x 3
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Hesn order
TAT 5 working days
Patient Prep: N/A

SEND OUT

Herpes Simplex 1/2 (HSV) PCR

Container: Sterile white screw capped Container
Volume: 500 µl
Specimen: CSF
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request should be signed by the doctor who takes the sample
TAT 5 working days
Patient Prep: N/A

Varicella zoster (VZV) PCR

Container: Sterile white screw capped container
Volume: Not less than 1ml
Specimen: CSF
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request should be signed by the doctor who takes the sample
TAT 5 working days
Patient Prep: N/A

Epstein Bar Virus PCR (EBV)

Container: Sterile white screw capped Container/ EDTA
Volume: 500 µl/ 2 ml
Specimen: CSF/ Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request should be signed by the doctor who takes the sample
TAT 2 working days
Patient Prep: N/A

Cytomegalo Virus PCR

Container: EDTA
Volume: 3 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request should be signed by the doctor who takes the sample
TAT 4 working days
Patient Prep: N/A

SEND OUT

HBV PCR

Container: EDTA tube (Lavender top)
Volume: 3 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday
8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request
TAT 4 working days
Patient Prep: N/A

HCV PCR

Container: EDTA tube (Lavender top)
Volume: 3 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday
8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request
TAT 4 working days
Patient Prep: N/A

HIV PCR

Container: EDTA tube (Lavender top)
Volume: 3 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday
8:00 am to 4:00 pm
Receiving area: Serology section
Request: Laboratory Test Request
TAT 4 working days
Patient Prep: N/A

ACTH

Container: EDTA tube (Lavender top)
Volume: 3 ml
Specimen: Plasma (Extracted at 9:00 am)
In ice.
Transportation: Biohazard bag
Receiving time: Sunday to Thursday
8:00 am to 4:00 pm
Receiving area: Send out section
Request: Laboratory Test Request
TAT 48 hours
Patient Prep: N/A

SEND OUT

DENGUE (IgM, IgG, NS1)

Container: Plain tube (Yellow or Red top)
Volume: 3 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Hesn order
TAT 2 working days
Patient Prep: N/A

Anti-Scl 70

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Anti-beta-glycoprotein (β2-GPI IgG-IgM)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Anti-Smith protein (SMD)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

SEND OUT

Anti-Cyclic Citrullinated Peptide Ab (CCP)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Anti-Cardiolipin –AB (IgG/ IgM)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Gliadin antibody IgG (AGA)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Anti-Tissue transglutaminase tTG IgG

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

SEND OUT

RF IgM

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Respiratory Syncytial Virus (RSV)

Container: VTM
Volume: 2 ml
Specimen: Nasopharyngeal swab
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Hesn order
TAT 6 working hours
Patient Prep: N/A

Extractable nuclear antigen antibody

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Aldosterone

Container: Plain tube (Yellow or Red top)/ EDTA
Volume: 3 ml
Specimen: Serum/ Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Laboratory test request
TAT 24 working hrs
Patient Prep: NA

SEND OUT

Common food allergens profile

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Common respiratory allergens profile

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Lymphocyte Subset (TBNK study)

Container: EDTA tube (Lavender top)
Volume: 2 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday and Tuesday 8:00 am to 10:00 am
Receiving area: Send out section
Request: Flowcytometry request
TAT 48 working hrs
Patient Prep: NA

Immunophenotyping (leukemia and lymphoma) Panel

Container: EDTA tube (Lavender top)
Volume: 2 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 10:00 am
Receiving area: Send out section
Request: Flowcytometry request
TAT 72 working hrs
Patient Prep: N/A

SEND OUT

C-Anti-neutrophil Cytoplasmic Ab (ANCA)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Whole Blood
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 5 working days
Patient Prep: N/A

Renin

Container: EDTA tube
Volume: 3 ml
Specimen: Plasma in Ice
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Laboratory test request
TAT 24 working hrs
Patient Prep: upright posture or supine posture

TB PCR, Culture

Container: Sterile white screw capped container
Volume: ====
Specimen: Pulmonary / Extrapulmonary (Tissue, Body fluids)
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 12:00 pm
Receiving area: Microbiology section
Request: Hesen order + TB. Unit request form + TB. Test Referral Form
TAT 24 hours for PCR & AFB, 6-8 weeks for culture
Patient Prep: N/A

Interferon-Gamma Release

Container: QUANTIFERON - TB GOLD PLUS TUBE SET
Volume: 1.2 ml x 4 tubes (Up to the marked line in the tube)
Specimen: Whole Blood
Transportation: Biohazard bag/ transport to the lab on the same day of sample collection
Receiving time: Sunday to Wednesday 8:00 am to 10:00 am
Receiving area: Send out section
Request: M.Tuberculosis Laboratory Request Form
TAT 24 hours for PCR & AFB, 6-8 weeks for culture
Patient Prep: N/A

SEND OUT

INNOLIA HCV Ab

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 10 working days
Patient Prep: N/A

Urea Breath Test

Container Breath test bags
Volume: Full bags
Specimen: Breathing
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 12:00 pm
Receiving area: Reception section
Request: Microbiology request form
TAT 5 Working days
Patient Prep: -Fasting 8 hours.
-The patient should not use antibiotic at least 3 weeks.
-Avoid use acidity medicines for at least 48 hours before testing

HIV Confirmatory

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Serology section
Request: Immunology test request
TAT 10 working days
Patient Prep: N/A

Antinuclear antibody ANA

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Whole Blood
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 9:30 am
Receiving area: Serology section
Request: Immunology test request
TAT 10 working days
Patient Prep: N/A

SEND OUT

Anti-Double strands DNA

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Whole Blood
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 9:30 am
Receiving area: Serology section
Request: Immunology test request
TAT 10 working days
Patient Prep: N/A

Tacrolimus

Container: EDTA tube (Lavender top)
Volume: 2 ml
Specimen: Whole Blood
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 9:30 am
Receiving area: Send out section
Request: Therapeutic drug monitoring (tdm)
TAT 7 working days
Patient Prep: N/A

Cyclosporine

Container: EDTA tube (Lavender top)
Volume: 2 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Wednesday 8:00 am to 9:30 am
Receiving area: Send out section
Request: Therapeutic drug monitoring (tdm)
TAT 7 working days
Patient Prep: N/A

anti-VIII, IX, Anti-Xa, and AT-III,

Container: Trisodium citrate tube (3.2%, blue top)
Volume: 3 ml
Specimen: Whole Blood
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 9:30 pm
Receiving area: Send out section
Request: EJH request form
TAT 48 hours
Patient Prep: N/A

SEND OUT

Insulin-like growth factor 1 (IGF-1)

Container: Plain tube (Yellow or Red top)
Volume: 3 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Laboratory test request
TAT 24 working hrs
Patient Prep: Fasting 8 to 10 hrs

Insulin-like growth factor binding protein 3 (IGF BP3)

Container: Plain tube (Yellow or Red top)
Volume: 3 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Laboratory test request
TAT 24 working hrs
Patient Prep: Fasting 8 to 10 hrs

Anti-Insulinoma-associated antigen 2 (Anti-IA2)

Container: Plain tube (Yellow or Red top)/ EDTA
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Immunology test request
TAT 5 working days
Patient Prep: NA

Insulinoma Autoantibodies (Anti-IAA)

Container: Plain tube (Yellow or Red top
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Immunology test request
TAT 5 working days
Patient Prep: NA

SEND OUT

Anti-glutamic acid decarboxylase (Anti-GAD)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum/ Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Immunology test request
TAT 5 working days
Patient Prep: NA

Thyrotropin Receptor Antibody (TRAB)

Container: Plain tube (Yellow or Red top)
Volume: 5 ml
Specimen: Serum
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Immunology test request
TAT 5 working days
Patient Prep: NA

Carbohydrate antigen 50 (CA50)

Container: Plain tube/ EDTA
Volume: 3 ml
Specimen: Serum/ Plasma
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 4:00 pm
Receiving area: Send out section
Request: Laboratory test request
TAT 24 working hrs
Patient Prep: NA

Yeast for ID & Sensitivity

Container Agar plate
Volume: ====
Specimen: Culture
Transportation: Biohazard bag
Receiving time: Sunday to Thursday 8:00 am to 12:00 pm
Receiving area: Microbiology section
Request: JRL request form
TAT 24 hours – 48 hours
Patient Prep: N/A

SEND OUT

Chromosomal Analysis

Container: Sodium Heparin tube
Volume: 3 ml
Specimen: Plasma
Transportation: Biohazard bag
Receiving time: Sunday 8:00 am to 10:00 am
Receiving area: Send out section
Request: Cytogenetics test request
TAT one month
Patient Prep: NA