

**LABORATORY HANDBOOK
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ABBREVIATIONS

Listed are abbreviations used throughout the manual

VACUTAINERS USED FOR BLOOD COLLECTION

B - 7 ml Blue Top Tube - citrate anticoagulant

b - 3 ml Blue Top Tube - citrate anticoagulant

GN - 5 or 10 ml Green Top Tube – either sodium or lithium heparin anticoagulant, sterile - Requirement of sodium or heparin is indicated.

GY - 5 or 10 ml Gray Top Tube – sodium fluoride glycolytic inhibitor, sterile

L - 5 ml Lavender Top Tube - EDTA anticoagulant

l - 2 ml Lavender Top Tube - EDTA anticoagulant

R - 5 or 10 ml Red Top Tube – no preservative, sterile

r - 2 ml Red Top Tube – no preservative

TAN - 3 ml Tan Top Tube – EDTA anticoagulant

AVAILABILITY

E - Test performed on an emergency (STAT) basis

D - Test is performed daily

S, M, Tu, W, Th, F, Sa - indicates day(s) of the week on which test is performed.

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AND LABORATORY MEDICINE**

**PROFESSIONAL, ADMINISTRATIVE AND SUPERVISORY
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LABORATORY TELEPHONE NUMBERS

CENTRAL LABORATORY ANATOMIC PATHOLOGY

Autopsy Reports	5712
Cytopathology	5713
Neuropathology	4145
Surgical Pathology Reports	5708, 5709

LABORATORY MEDICINE

Accession Area	4079, 4080, 4081, 4082
Blood Bank	4093
Chemistry	4079, 4080, 4081, 4082
Hematology	4079, 4080, 4081, 4082
Immunovirology	6654
Microbiology	3455
Molecular Diagnostics	3339, 6544
Serology	4079, 4080, 4081, 4082
Urinalysis	4079, 4080, 4081, 4082

SPECIAL-FUNCTION LABORATORIES

Biochemical Genetics	5278
Blood Gas Laboratory	5753
Cellular Immunology	5066
Cytogenetics	4480
Molecular Genetics	3170

GENERAL INFORMATION

I. SERVICES AVAILABLE

The Department of Pathology & Laboratory Medicine provides services in Anatomic and Clinical Pathology. Pathologists are available for consultation and may be reached at any time through a posted and distributed on-call Schedule.

II. ORDERING LABORATORY TESTS

All requisitions must be completely and properly filled out. Be sure that the patient's nameplate is correct, particularly in respect to name, hospital number and location and that the nameplate imprint is fully legible. On all outpatient requests include the physician's hospital number and the IDC-9 code for the tests ordered. Please press firmly with a ball-point pen so that all copies of multiple-part requisitions are legible.

The patient's location must be indicated on the request slips by using the authorized codes.

Make sure that the specimen itself, as well as the request form, is identified with the patient's name and hospital number.

Use the proper requisition form in ordering each laboratory test. The miscellaneous form should be used only for those uncommonly performed tests not named on other forms. The requisition form needed for each test is included in the general test list.

III. COLLECTION OF BLOOD SPECIMENS

The Phlebotomy Team makes routine daily rounds beginning at 4:00 AM. Request slips for blood to be drawn by the phlebotomists on the 4:00 AM round must be in the laboratory by 11:00 PM the preceding evening. Phlebotomy rounds are also made throughout the hospital beginning at 9:00 AM, 12 noon, 2:00 PM, 5:00 PM, and 9:30 PM. On these later rounds the phlebotomists will accept request slips for blood collection upon their arrival on the unit. Tests with a STAT priority are not drawn by the Phlebotomy Team.

IV. BIOHAZARD SPECIMENS – Universal Precautions

All specimens are treated as potential biohazards. Any specimens which contain blood, urine or other body fluid on the outside of the container will be rejected. Request slips similarly contaminated will also be rejected

V. TRANSPORT OF SPECIMENS TO PATHOLOGY

Each specimen (or group of specimens from one patient) must be placed in its own "zipper", biohazard plastic bag for transport. . Put the requisition in the pocket of the bag, NOT in the bag with the specimen.

VI. ACCESSION AREA

- The Accession Area (C-118) is the area to which specimens should be directed for all Chemistry, Hematology, Clinical Microscopy (Urinalysis, other fluids), Microbiology, Toxicology, Molecular Diagnostics and Serology tests.
- Specimens for the Blood Bank must be taken directly to the Blood Bank (C-109).
- Surgical specimens and Cytology specimens must be taken directly to the E level, E-161 and E-149, respectively.
- Specimens for other laboratories should be delivered according to the instructions given by the particular lab.

VII. LABORATORY REPORTS

Laboratory results are available in EPIC and Logician as soon as the test has been completed by the technologist.

Between 2:00 and 6:00 AM the laboratory posts patient reports for all inpatients who have had laboratory work during the previous day. At this posting all previous laboratory reports generated since the last cumulative report are removed from the charts.

Three types of laboratory reports will be found on the patients' charts:

INTERIM – (Inpatient charts only) Printed on paper with the words “INTERIM LABORATORY REPORT” in the right-hand margin. Printed daily for the first six hospital days and includes in cumulative fashion all lab work for the first six hospital days or for the six days following issuance of a cumulative report.

CUMULATIVE – (Inpatient charts only) Printed on paper with a right-hand red and white striped border and the words “CUMULATIVE LABORATORY REPORT” in that border. Printed on the seventh, fourteenth, twenty-first, etc., hospital day; contains in cumulative fashion all lab work up to the time of printing.

FINAL – (Outpatient charts only) Printed on paper with a right-hand solid red border and the words “FINAL LABORATORY REPORT” in that border.

The only type of report printed for outpatients. It is not a cumulative report.

REMEMBER: Test results may not (or will not) be available when the following obstacles are encountered:

1. The specimen is not obtained.
2. The specimen is not sent to the laboratory.
3. The specimen submitted is unsuitable.
4. The patient's name, medical record, financial number, or location is not provided to the laboratory or is not correct.

VIII. REJECTION OF REQUEST FORMS AND SPECIMENS

Request forms and specimens may be rejected by the laboratory resulting in the requested test(s) not being performed. Rejection may occur for any of the following reasons:

1. Patient I.D. on the specimen does not agree with patient I.D. on the request slip.
2. Patient's I.D. is not legible, is incomplete, or incorrect.
3. For outpatients, the doctor's identification number is missing.
4. No diagnosis or ICD 9 code is indicated for outpatients.
5. Wrong request form is used.
6. Date or time is missing or incorrect.
7. Specimen is delayed in transport to lab.
8. Test requested is not legible.
9. Specimen is damaged, deteriorated or otherwise unsuitable for the test requested.
10. Specimen is incorrect for the test requested.
11. Specimen amount insufficient for the test (QNS).
12. Specimen is unlabeled or incompletely identified.
13. Request form or specimen is otherwise inappropriate.
14. For **Blood Bank** specimens - More than one label is applied to a specimen tube submitted for crossmatch (ONLY THE TYPENEX LABEL MAY BE APPLIED TO THIS TYPE OF SAMPLE TUBE).
15. The person drawing a specimen for crossmatch has not signed and dated the sample tube label.

IX. REFERENCE VALUES - Reference values for tests are printed on the reports.

X. AVAILABLE EMERGENCY TESTS

While the tests listed here are available at all times, including nights, weekends, and holidays, the tests are to be ordered on an emergency basis only when true emergencies exist.

THE AVAILABLE STAT TESTS

BLOOD BANK

- | | |
|--|-------------------------------------|
| 1. ABO group and Rh type | 4. Direct Coombs test |
| 2. Antibody screening and identification | 5. Issuance of blood and components |
| 3. Crossmatch | 6. Transfusion reaction work-up |

THE AVAILABLE STAT TESTS

CHEMISTRY

1. Acetaminophen
2. Acetone, serum
3. Albumin
4. Alcohol
5. Amylase, serum, urine, and body fluids
6. Bilirubin, total and direct (babies)
7. Calcium
8. CO₂ content
9. Chloride
10. Creatinine
11. Glucose
12. Lactic acid
13. Magnesium
14. Osmolality, urine and serum
15. Phenobarbital
16. Phenytoin (Dilantin)
17. Phosphorus
18. Potassium, urine and serum
19. Salicylates
20. Sodium, urine and serum
21. Total protein
22. Urea nitrogen

HEMATOLOGY

1. CBC
2. Sickledex
3. Platelet count
4. Reticulocyte count (Pediatrics only)
5. Fibrinogen
6. APTT
7. Prothrombin time
8. D-dimer
9. Thrombin time

SPINAL AND BODY FLUIDS

1. Cell count and differential
2. Glucose
3. Lactic acid
4. Total protein
5. Cell count on DPL (diagnostic peritoneal lavage fluid)

OTHER

1. Urinalysis
2. Pregnancy test – qualitative, urine or blood

Results of most emergency tests are normally available within one hour or less of receipt of the specimen. DPL and STAT CBC results are usually available within less than 25 min.

XII. CRITICAL VALUES

It is the policy of the laboratory to telephone to the patient care units certain laboratory test results that are considered to be life-threatening.

Critical Laboratory Values for University Hospital are:

CHEMISTRY

	LOW	HIGH
Acetone	--	Positive
Bilirubin (newborns)	--	>12.0 mg/dL
Calcium	<6.0 mg/dL	>13.5 mg/dL
Digoxin	--	>2.6 ng/mL
Glucose	<40 mg/dL	>600 mg/dL
Glucose (newborns)	<30 mg/dL	>300 mg/dL
Lithium	--	>2.0 meq/L
Phenobarbital	--	>60 mg/mL
Potassium	<2.5 meq/L	>5.8 meq/L
Potassium (newborns)	<2.5 meq/L	>7.0 meq/L
Salicylates	--	>70 mg/dL
Sodium	<120 meq/L	>160 meq/L

HEMATOLOGY

	LOW	HIGH
Hematocrit	<15%	>65%
Hemoglobin (blood)	<5 gm/dL	--
WBC count	<2000/ μ L	>50,000/ μ L
Platelets	<20,000/ μ L	>1,000,000/ μ L
Prothrombin time	--	>35 sec.
APTT	--	>60 sec.
Fibrinogen	<100 mg/dL	

OTHER

Positive blood cultures
Positive CSF gram stain
Positive CSF culture
Positive Coombs Test on Cord Blood
Reactive and weakly reactive serologic tests for syphilis (pediatric and obstetric patients only)
Urines positive for ketone bodies in newborns
Urines positive for glucose in newborns

XIII. RETESTING OF SPECIMENS

Specimens sent to Chemistry are saved for seven days. If a Chemistry test result is questioned, the physician may contact the Chemistry Supervisor or a Laboratory Medicine physician and request a repeat test on the same specimen. The ability of the laboratory to comply with this request will depend on the stability of the particular analyte and the quantity of the original specimen. As part of the same retesting program, specimens sent to Hematology are saved for two days and sent to Serology are saved for four days.

XIV. USE OF OUTSIDE LABORATORIES

Specimens received by the laboratory for tests not performed in-house are sent by the laboratory to referral laboratories under contract to us. Please note that submission of a specimen directly to a referral laboratory by any party other than the U.H. Laboratory is not authorized and the cost of any test performed through such a channel will be paid for by the sender. **Tests sent to outside laboratories may need approval by a pathologist.**

XV. POINT-OF-CARE TESTING

Prior authorization by the Department of Pathology and Laboratory Medicine must be obtained before point-of-care testing of any type is performed at any site in University Hospital. No point-of-care testing may be done without this authorization.

The following tests when performed by physicians fall under the College of American Pathologists laboratory accreditation program:

- Amniotic fluid pH
- Vaginal pool fluid smears for ferning
- Vaginal wet mount microscopy
- Gastric biopsy urease
- Urine dipstick
- Post-coital mucous examination
- Fecal leukocytes
- Nasal smear for eosinophils
- Pinworm examination
- Potassium hydroxide (KOH) preparations
- Synovial fluid for crystals
- Urine sediment microscopy
- Occult blood, fecal and gastric
- Semen analysis, Qualitative

A written procedure must be available for each of these procedures in the area where they are performed and must have been signed by the pathologist director of Point of Care Testing at UMDNJ – The University Hospital.

XVI. PROBLEMS

Should a problem arise, a supervisor is on duty in the laboratory at all times and pathologists are on call in both Anatomical and Clinical Pathology.

BLOOD BANK

ROOM C109 EXT. 4093, 4094, 4095

1. REQUEST FOR TYPE & CROSSMATCH OR TYPE-AND-SCREEN

- a. Complete the Blood Component Order form. Specify the number of units of blood component or red cells being requested for transfusion and the indication.
- b. Prepare the transfusion request form using the patient's addressograph plate. Ensure all information is legible. In an emergency, when the plate is not available, the information may be handwritten [Print]. The patient's full name, (last name, first name, middle initial) medical record number, and location must be included.
- c. Check the patient's name and medical record number on the transfusion request against the hospital-issued wristband. If the patient is lucid, ask the patient his/her name.
- d. When requesting type-and-screen for potential red cell transfusion, requests require transfusion bands (Typenex bands). Typenex bands used by the Trauma Unit are yellow; all other Typenex bands are white.

2. TO DRAW BLOOD SAMPLE FOR THE BLOOD BANK:

- a. **At the patient's bedside**, the person drawing the sample must PRINT the patient's name (last name, first name, middle initials, if used), medical record number, location, and date in the blank space of the Typenex band and sign or initial the blank space.
- b. Peel off this portion and attach it to the pink top tube that is to be used for the collection of the sample. **DO NOT USE A SECOND LABEL**. Specimens with more than one label will be rejected.
- c. Snap the Typenex band securely around the patient's wrist. Attach the free end of the band to the sample tube.
- d. Carefully cut through the band with scissors so as to separate the Typenex wristband from the series of Typenex numbers attached to the tube.
- e. **Draw 6 ml of blood in the labeled PINK top tube.**
- f. Place one of the removable Typenex numbers on the request slip.
- g. Check the request form information against the patient's wristband, the label on the sample, and the Typenex band. The information on all should match. If the information matches, sign or initial the request form to document that all checks were made and that the information matches.
- h. Rubber band the Typenex number and the completed request form to the pink top tube. Place in a Ziploc bag and deliver directly to the Blood Bank.
- i. **Do NOT label the tubes after you leave the patient's bed.**

- j. Specimen tubes will be rejected when: The tube is unlabeled or double labeled, the tube label is illegible or otherwise unclear, is written over, first and last names are reversed or misspelled, middle initial is missing when present on the request form, the request form is blank or incomplete, or the information is inaccurate.
- k. For major elective procedures for which more than six (6) units of red cells or irradiated blood products are requested and/or if red cell antibodies are present, the request and sample must be sent to the Blood Bank at least one full day in advance of surgery.
- l. **REQUESTS FOR REPEAT TRANSFUSIONS MUST BE ACCOMPANIED BY A FRESH SPECIMEN EVERY 72 HOURS.** Use a new Typenex wristband each time a fresh specimen is submitted. The old band must be removed when a new one is attached to the patient.
- m. The sample and requests for Type-and-Screen will be held 72 hours. In the event blood is needed, call the Blood Bank. The cross matches will be started immediately provided, the patient was typed and screened within less than 72 hours and cross-matched blood will be available in less than 10 minutes.
[Exception; Patients with red cell antibodies or for special blood types if not in inventory]
NOTE: Routine blood typing or anti body screening as done in an out patient setting does not require Typenex number. Patient's name, medical record number, date and location must be on the label and request form. Label on blood sample and request form must carry the signature of the person drawing the sample.
- n. **Pre Admission Testing (PAT):**
 - i. Blood sample may be drawn at the time of the PAT testing. Request Type and screen. Indicate the date of surgery.
 - ii. If blood is needed for surgery (see Maximum surgical blood order schedule) request cross match with number of units required and indicate date of surgery.
 - iii. If sample submitted is more than 72 hours before surgery and the patient does not have any red cell antibodies, the patient should be admitted 2 hours before surgery and a pink top 6 ml blood sample must be sent to the Blood Bank ASAP. Follow Typenex wristband procedure.
 - iv. Patients who have antibodies (surgeon will be notified) and those with a history of blood transfusion or pregnancy in the past three months must have a blood specimen drawn 48-72 hours before the scheduled surgery.
 - v. For blood samples drawn less than 72 hours before surgery, follow Typenex and wrist band procedure. No additional sample is required at the time of surgery.

REQUEST FOR EMERGENCY BLOOD TRANSFUSION

- **Send a properly labeled blood sample and a request form indicating the number of units needed. Mark the request "STAT". Notify the Blood Bank by telephone or intercom in advance that an emergency exists.**
- In life-threatening situations, a physician may direct the Blood Bank to immediately release uncross matched type O red cells or Type specific red cells.

The ordering physician must follow this with an Emergency Transfusion Request Form (which states that he/she directed such release and that he/she accepts full responsibility for the transfusion).

SAMPLE FOR NEONATAL TRANSFUSION

- Send a cord blood sample and the mother's blood sample for typing and for neonatal compatibility testing.
- Compatibility testing is done once/hospital stay on infants less than four months old provided that there are no irregular antibodies present in the mother's serum.

3. ISSUANCE OF BLOOD & BLOOD PRODUCTS

- a. Individuals picking up blood and components must present a release form showing the patient's full name, medical record number, date, and type and number of components requested. The identifying information on the release form and blood unit must be checked. If all information matches, the pick-up person must sign a receipt for the blood.
- b. Individuals may pick up blood for only one patient at a time. Only one unit will be issued at one time, with the exception of blood for the operating room, emergency room, and medical and surgical ICU.
- c. Blood should not be picked up until the transfusion is to be actually started. Never store blood in refrigerators on the patient care units.

4. RETURN & STORAGE OF UNUSED BLOOD

- a. Blood taken from the Blood Bank and not used must be returned within one-half hour of issue. Blood issued in portable coolers and not used must be returned within three hours of issue.
- b. Once an infusion set is connected, the unit of blood cannot be returned.

5. CANCELLATION OF TRANSFUSION REQUEST

- a. Notify the Blood Bank immediately if transfusion or surgery is canceled so that the blood may be used for other patients.
- b. Cross-matched blood will be kept on reserve for 24 hours from the time of intended transfusion. Blood will then be released for issue to other patients, unless the physician requests that it be held for a longer time.

6. PROCEDURE FOR ADMINISTRATION OF BLOOD:

- a. The crossmatch sticker or applicable blood component sticker will be applied to the top of the blood or blood component bag and two copies of the Blood Transfusion Record form rubber banded will accompany blood released from the Blood Bank. Infusion should be started within thirty (30) minutes after release of blood from the Blood Bank.
- b. Only a physician or an IV certified nurse may start infusion of blood.

- c. Matching Identification – TO BE DONE AT PATIENT’S BEDSIDE by two people.
- d. The identity of the patient receiving the blood and the information on the blood or blood component must be matched. Two individuals are required to check that all of the information matches. Both individuals must sign the transfusion record form to document that two individuals checked for all information and all information of the patient and blood unit matches.
- e. In addition, the patient, if lucid, should be asked his/her name. Ask what is your name, **not** “are you Mr. Smith”

The following items (a through f) **must be checked by two individuals** (physicians or nurses) prior to transfusion:

PROCEDURE FOR ADMINISTRATION OF BLOOD

	Patient’s Chart	Hospital Wristband	Donor Blood Unit	Transfusion Record Form
a. Patient’s Full Name	X	X	X	X
b. Patient’s Hospital Number	X	X	X	X
c. Donor Blood Unit Number			X	X
d. Patient & Donor ABO and Rh Blood Unit	X		X	X
e. Typenex Wristband Number		Patient’s Typenex wristband	X	X
f. Acceptable Expiration Date			X	X

- g. **Do NOT** transfuse if any discrepancy is noted. Resolve any discrepancies immediately. Notify the Blood Bank immediately should any discrepancy be found.
- h. If all information matches and is found acceptable, the two persons doing the pretransfusion check will certify by signing the Cross matched Blood Transfusion Record that all required criteria match.
- i. Take and record the baseline vital signs (temperature, BP, pulse, respirations) immediately before starting the transfusion.
- j. No drugs or solutions may be added to the blood. When a “Y” recipient set is used, the only solution, which may be infused through the other arm of the set, is normal saline (0.9% sodium chloride).

- k. USE OF FILTERS in Administering Blood and Blood Products
- For Routine administration of blood components or red cells use a standard 170 μ filter.
 - When leuko-reduced blood is indicated and requested, in the absence of leuko-reduced blood in the Blood Bank inventory, a leuko-reduction filter to be used at the bedside will be provided.
 - Indications for the use of leuko-reduced blood: (Indicated for cellular components only)
 1. When the patient has a history of multiple nonhemolytic febrile reactions
 2. H/O chronic blood transfusions
 3. Reduce the risk of alloimmunization. (HLA)
 4. CMV negative blood. Pre storage leuko-reduced units are also CMV safe. When CMV negative blood or cellular components are requested, pre-storage leuko- reduced CMV safe blood will be provided.
 5. Bedside leuko-reduction filter: use one leuko-reduction filter per red cell unit. For single donor non leuko-reduced plateletpheresis, use one bedside leuko- reduction filter per one plateletpheresis or one filter for 6-12 platelet concentrates.
- l. If everything is in order, start the transfusion.
- m. During the first 15 minutes of blood administration in non-emergent cases the blood should be given slowly (25 drops/min.). The physician or a designated registered nurse must be in the immediate vicinity to observe the patient for untoward reactions. Adjust to the desired rate of flow after the first 15 minutes. The time allowed for transfusion of a unit of blood must not exceed 4 hours. For transfusions, which are to be given more slowly, the units may be split. Arrange through the Blood Bank. (Units may also be split for pediatric patients.)
- n. Obtain and record the patient's vital signs after 15 minutes, 30 minutes, one hour and every hour until the transfusion is completed and one hour after completion of transfusion.

7. SIGNS AND SYMPTOMS OF AN ADVERSE REACTION

Chills	Headache	Pain at the infusion site
	Flushing	
Cyanosis	Flank pain	Substernal pain
Nausea	Urticaria (hives)	Palpitations
Generalized bleeding	Fever (increase of >2° F, >1° C)	Oliguria/anuria
Backache		
Respiratory distress or shortness of breath	Hemoglobinemia/ Hemoglobinuria	Hypertension/ Hypotension

8. SHOULD AN ADVERSE REACTION OCCUR:

- a. Stop the transfusion, but keep the needle open with a slow drip of 0.9% saline.
- b. Notify the patient's physician and the Blood Bank.
- c. Repeat the matching identities step given above. Determine that there is no discrepancy.
- d. Taking care to avoid hemolysis, draw a full pink top tube of blood from the opposite arm. Samples must be drawn as soon as possible. Label as above.
- e. Immediately send these tube to the Blood Bank along with a completed Request for Investigation of Transfusion Reaction form.
- f. Send the blood bag and infusion set to the Blood Bank. [**Note:** For hives, itching or urticaria, clamp the blood tubing, administer 0.9% saline to keep vein open. Resume transfusion when patient is asymptomatic following Benadryl administration.] **Note: Do not exceed the 4 hour limit from originally entering the unit.**
- g. A post transfusion urine sample must be obtained to examine for hemoglobinuria.

9. POST-TRANSFUSION PROCEDURE

- a. When the transfusion is completed, the Cross matched Blood Transfusion Record should be completed indicating the date, time and amount of the transfusion, (enter estimated volume or as one unit, $\frac{1}{2}$ unit, $\frac{1}{4}$ unit, $\frac{1}{3}$, $\frac{2}{3}$ or $\frac{3}{4}$ unit), whether or not the blood was warmed, and the type of filter (if leukoreduction filter or microaggregate filter used), vital signs at the time the transfusion is complete and signed by the RN completing the transfusion.
- b. **One copy of the completed Transfusion Record form must be charted and the second copy returned to the Blood Bank.**

10. SPECIAL REQUIREMENTS

- **Warming Of Blood**
Blood may be warmed by using an approved blood warmer. (Baxter, Fenwal)
- **Autologous and Directed Blood Donations**
 - NJ State law requires that, when blood transfusion is anticipated during an elective surgical procedure, the patient must be offered transfusion options such as autologous and/or directed donation.
 - Arrangements must be made through the Blood Bank, preferably four to six weeks prior to the anticipated date of transfusion
 - All blood donations are collected at a blood center accessible to the donor(s). Consult the Blood Bank for more information
- **Irradiation of Blood Components**
Irradiation of cellular blood components (red cells, granulocytes, and platelets) will prevent graft-versus-host disease (GVHD) in susceptible patients.
(Acellular components such as fresh frozen plasma or cryoprecipitate have not been implicated in GVHD).

Indications;

1. Allogeneic bone marrow or peripheral-blood-progenitor-cell transplantation recipients or potential recipients.
2. Ablative therapy in preparation for an autologous marrow transplant;
3. Congenital immunodeficiency syndrome;
4. In uteri transfusion or a neonate who has had a previous intrauterine transfusion, a neonate undergoing exchange transfusion or use of extracorporeal membrane oxygenation;
5. Premature infant weighing less than 1200 grams;
6. HLA matched platelets.
7. Component to be transfused has been donated by a blood relative of the recipient;
8. When the recipient has Hodgkin's disease;
9. Marrow suppression with an absolute lymphocyte count of less than 500/ μ l.

NOTE: Allow 24-48 hrs. for availability of irradiated products.

TRANSFUSION SERVICE PRODUCTS

BLOOD/COMPONENT	INDICATIONS & DOSE	TIME REQUIRED
<i>Red Blood Cells (RBC)</i>	<ul style="list-style-type: none"> ➤ Symptomatic anemia ➤ Large volume blood loss. (>15% of total blood volume) One unit RBC raises the Hb one gram and the Hct 3%	<p>Non-emergency: If type & screen done and negative for antibodies - available in 10 min.</p> <p>Pre-operative: Request by noon on the day before surgery.</p> <p>Same day surgery: 2 hr. from the time specimen is received, if previously tested in PAT.</p> <p>Emergency: O blood type or type specific or one hr. 15 min. required .for complete testing and cross-match compatible unit.</p>
<i>RBC leukoreduced</i>	Repeated febrile, non-hemolytic transfusion reactions and as CMV safe When CMV negative blood is requested.	< 2 hours
<i>*RBC irradiateand/or leukoreduced</i>	Irradiated to prevent GVDH. Immune suppressed bone marrow transplant recipients. Potential bone marrow recipients, family members who are directed blood donors to the patient, neonates.	Need 24-48 hr. notice; in an emergency 4-6 hr notice.
<i>*Washed RBC</i>	IgA deficiency with anti-IgA	Need 24 hr. notice
<i>*Frozen, thawed RBC</i>	Patients with rare antibodies.	Need 24 hr. notice
Fresh Frozen Plasma (FFP)	Massive transfusion, coumadine reversal with bleeding. Bleeding with PT & APTT at 1½ times reference range. TTP, delayed Vit. K reversal (one ml of FFP provides one unit of coagulation factor activity in adults).	30 min for thawing. Call ahead to cut waiting time for thawing.

BLOOD/COMPONENT	INDICATIONS & DOSE	TIME REQUIRED
Platelets: available as one adult dose, single donor plateletpheresis (All Plateletpheresis units are leukoreduced, and CMV safe)	Thrombocytopenia $\leq 10,000$ without bleeding, post-op bleeding with platelet count $\leq 50,000$ DOSE: one adult therapeutic dose = one plateletpheresis unit or up to 6 platelet concentrates Provides $>40,000$ platelets/adult dose	10-15 min if in Blood Bank stock.
Platelets *Plateletpheresis, irradiated	To prevent GVHD. See RBC, irradiated for indications	Need 24 hr. notice Emergency 4-6 hr. notice
Cryoprecipitate One unit has 80 IU of Factor VIII & 150 mg of fibrinogen	Fibrinogen deficiency with bleeding, factor XIII & vWF deficiency, hemophilia A. Source of fibrinogen & labile clotting factors	15 min for thawing. Call ahead to cut waiting time for thawing.
Rh immune globulin (IM injection)	Prevent Rh immunization. Submit an Rh immune globulin request form.	5 min .after RHIG work-up is complete.
Autologous and Directed (Designated) Donation	Arrangements must be made through the Blood Bank, preferably four to six weeks prior to the anticipated date of transfusion. All donations are collected at a local blood center. State law requires that, whenever it is anticipated that blood transfusion may be needed during an elective surgical procedure, the patient be offered the options of autologous and directed donations. Autologous donation is not recommended for patients who are not likely to need transfusions.	

Products Available through the Blood Bank/Transfusion Service:

*NOTE: The time required for blood products that are not routinely stored in the Blood Bank depends on product availability and travel time from our suppliers.

Specimen Requirements: All Blood Bank tests require a 6 ml pink top tube properly labeled.

**UH GUIDELINES FOR MAXIMUM SURGICAL BLOOD ORDER
SCHEDULE FOR ELECTIVE SURGICAL PROCEDURES [RBC]**

Please note that the indicated number of units of red cells will be issued for the procedure listed unless the Blood Bank is notified by the requesting attending, by phone or on the request form with justification for additional units requested.

[NSR: No specimen required. T&S: Type and Screen. Numbers in Cross match column indicates units cross matched]

<u>Service</u>	Procedure	Cross match
<u>General and Vascular Surgery</u>	Amputation of limb (A/K OR B/K)	T&S
	Aneurysm, abdominal	5
	Appendectomy	T&S
	Breast: Biopsy	NSR
	Mastectomy, simple or modified	NSR
	Mastectomy, radical	NSR
	TRAM	2
	Bypass, vascular: Aorta-iliac or aorta-femoral	5
	Femoral-popliteal	3
	Carotid endarterectomy	2
	Cholecystectomy, with or without CBDE	T&S
	Colectomy: Subtotal	2
	Total or abdominal-perineal (AP)	3
	Colostomy, revision or closure	T&S
	Embolectomy	2
	Esophagectomy	4
	Gastrectomy, subtotal or total, with or without vagotomy	2
	Gastroplasty, Mason (Gomez)	T&S
	Gastrostomy	T&S
	Hemorrhoidectomy	NSR
	Hepatectomy	6
	Liver Transplant	10
	Hernia repair, all types	T&S
	Hodgkins or Lymphoma staging	T&S
	Laporatomy, exploratory	T&S
	Pancreatectomy, partial or radical	6
	Parathyroidectomy	T&S
	Parotidectomy	NSR
	Pilonidal cyst or sinus resection	NSR

	Procedure	Cross match
	Renal transplant	2
	Shunt (portal hypertension)	6
	Skin Graft, split thickness	T&S
	Splenectomy	1
	Sympathectomy	T&S
	Thyroidectomy	T&S
	Tracheostomy	T&S
	Vagotomy and pyloroplasty	T&S
	Varicose vein stripping	T&S
<u>Neurosurgery</u>	Aneurysm, cranial	2
	Anterior cervical diskectomy, with or without fusion	T&S
	Carotid endarterectomy	2
	Carpal tunnel release	NSR
	Cordotomy	T&S
	Crainectomy for synostosis (child)	1
	Craniotomy: For AV malformation	2
	For STA MCA or PICA bypass	2
	For intracranial hematoma	2
	For tumor	2
	Hypophysectomy	2
	Laminectomy, lumbar for disk	T&S
	Laminectomy, cervical thoracic or lumbar for decompression	2
	Anterior thoracolumbar decompression and/or fusion	4
	Laminectomy, cervical, thoracic or lumbar, for tumor	4
	Lumbar or cervical fusion, posterior	2
	Lumbar peritoneal shunt	2
	Child	T&S
	Meningomyelocele repair	1
	Peripheral nerve surgery other than carpal tunnel, tarsal tunnel and ulnar nerve transposition	T&S
	Stereotactic brain biopsy	NSR
	Syringoperitoneal shunt	2
	Child	1
	Tarsal tunnel release	NSR
	Ulnar nerve transposition	NSR

	Procedure	Crossmatch
	Fontan Procedure	4
	Hernia repair, all types including primary hiatus	T&S
	Recurrent hiatus	2
	Lobectomy pulmonary	2
	Patent ductus arteriosus repair	1
	Pericardectomy	4
	Peumonectomy	2
	Tetraology of Fallot Repair	3
	Tracheostomy	T&S
	Valve replacement	4
	Ventricular Septal defect repair\	3
	Wolf-Parkinson white Procedure	2
	Yag Laser Bronchoscopy	2
<u>Orthopedic Surgery</u>	Amputation (A/K or B/K)	T&S
	Arthrotomy	T&S
	Arthroscopy	NSR
	Cervical fusion	2
	Cervical laminectomy (disk)	T&S
	Fracture, open reduction: Hip	2
	Femur	2
	Tibia	T&S
	Forearm	T&S
	Fusion, lumbar or thoracolumbar	2
	Hand surgery	NSR
	Hip arthroplasty first operation	2
	Subsequent operations	4
	Hip disarticulation	4
	Hip pinning	2
	Knee arthroplasty	T&S
	Laminectomy, lumbar	T&S
	Meniscectomy	NSR
	Osteotomy or bone biopsy: Femur	2
	Tibia	T&S
	Removal of knee pin	T&S

	Procedure	Crossmatch
<u>Plastic Surgery</u>	Cleft palate repair	T&S
	Debridement and skin graft	2
	Mammoplasty: Augmentation	NSR
	Reduction	T&S
	Mastectomy, subcutaneous, with implants	T&S
	Otoplasty	NSR
	Rhinoplasty	NSR
	Skin flap	T&S
<u>Obstetrics-Gynecology</u>	Abortion, spontaneous, or termination during first or second trimester	T&S
	Abruptio Placenta	2
	Cervical conization	NSR
	Cesarean section	
	Uncomplicated	T&S
	Known or suspected placenta previa	4
	After trial of forceps	T&S
	Cesium implant	T&S
	Deliveries, multiple (vaginal or abdominal)	T&S
	Delivery accompanied by marked anemia (Hb <10 gms) or shock	2
	Ectopic pregnancy	2
	Examination under anesthesia (EUA) for known or suspected placenta previa	2
	High risk labor	T&S
	Hysterectomy: Vaginal	T&S
	Vaginal with pelvic floor repair	T&S
	Abdominal	T&S
	Abdominal with salpingo-oophorectomy	T&S
	Radical	4
	Laparoscopy	T&S
	Malpresentation of fetus	T&S
	Maternal Hemoglobin <8mg/dl	T&S
	Oophorectomy and ovarian wedge resection	NSR
	Pelvic lymph node dissection	3
	Placental abnormality, accreta, increta, percreta, placenta previa, vasa previa	4
	Salpingo-oophorectomy	T&S

	Procedure	Crossmatch	
	Sickle Cell Anemia & Gestation	T&S	
	Trauma	T&S	
	Tubal ligation	NSR	
	Tuboplasty	NSR	
	Vaginal birth after C section	T&S	
	Vaginectomy	2	
	Vulvectomy, total or radical	2	
<u>Urology</u>	Adrenalectomy	2	
	Cystectomy	4	
	Cystolithotomy	NSR	
	Cystoscopy	NSR	
	Ileal Loop	T&S	
	Kidney biopsy, open	T&S	
	Meatotomy	NSR	
	Nephrectomy	2	
	Nepyhrolithotomy or pyelolithotomy		
	First operation	2	
	Subsequent operations	4	
	Orchiectomy	NSR	
	Penile implant	T&S	
	Prostatectomy: Transurethral	T&S	
	Suprapubic	2	
	Perineal	2	
Radical	4		
Renal artery repair	5		
Retroperitoneal lymph node dissection	2		
TUR (Bladder Tumor)	T&S		
Ureterolithotomy	T&S		
Ureterostomy	T&S		
Uretero-vaginal or vesical-vaginal fistula repair	T&S		
Urethroplasty	NSR		
Vesicopexy (All)	T&S		
Vesicostomy (All)	T&S		

01/25/06 RK, BP

CLINICAL MICROBIOLOGY LAB

ROOM B111 EXT. 3455

ROUTINE MICROBIOLOGY LABORATORY HOURS: Daily 8:00 AM to 11:00 PM.
EMERGENCY (STAT) GRAM STAINS: AVAILABLE 24 HOURS DAILY
DELIVER SPECIMENS (routine and stat including emergency Gram stains): to C118.
QUESTIONS & SPECIAL REQUESTS (e.g., prior approvals, stat requests, etc.):
 Between 8:00 AM to 4:00 PM call Microbiology supervisor at EXT. 3455
 Between 4:00 PM to 8:00 AM call Night supervisor at EXT. 4080

CONDITION OF SPECIMENS: Under *no* circumstances will specimens arriving in an unsanitary condition (e.g., with infectious material on the outside of the container, on the plug, etc.) be accepted in the Microbiology Lab. All specimens must be submitted in containers with tight fitting, securely closed lids.

LABELING OF SPECIMENS AND LABORATORY REQUEST FORMS: All specimen containers must be labeled with the patient's name, hospital number, clinical unit, source and date. The Microbiology request slips must be **COMPLETELY FILLED OUT** including time specimen was taken and physician's signature and beeper number. A provisional diagnosis is of utmost importance. Often extra procedures can be employed to more fully assist in confirming the diagnosis when the laboratory knows, at least roughly, what to look for. An important diagnosis may be missed without this information.

Do not include requests for non-microbiological tests with specimens for microbiology. For example, stool guaiac or fats must be requested on a Urine, CSF, And Body Fluids Order Form (UH-0141) with a separate specimen; pneumocystis must be requested on a Cytopathology request with a separate specimen and sent to Cytology (E-149).

GRAM STAINS:

- Aerobic, anaerobic, fluid, tissue or non-gel swab specimens are all acceptable for Gram stain.
- Swab collected specimens must be in aerobic (non-gel) transport media
- ***Two aerobic transports (2 swabs each)*** are required for *STAT* Gram stain requests received between 10 PM and 8 AM.
- Dry swabs are ***not acceptable*** for Gram stain or culture.

GRAM STAIN CATEGORIES & SPECIMEN CONTAINERS

GRAM STAIN CATEGORIES	SPECIMEN SOURCE	CONTAINER
GRAM STAIN ALWAYS INCLUDED WITH CULTURE REQUESTS and GRAM STAIN ALWAYS PERFORMED STAT All positive results will be called to floor	<ul style="list-style-type: none"> ▪ CSF 	Spinal fluid kit tube #2
NONSTAT GRAM STAIN ROUTINELY PERFORMED WITH CULTURE REQUEST (no prior approval for non-Stat necessary); STAT GRAM STAIN PERFORMED ONLY ON PHONE REQUEST FROM CLINICAL UNIT (exception: written requests from operating rooms are accepted)	<ul style="list-style-type: none"> • STERILE BODY FLUIDS except blood (ie., joint, pleural, peritoneal, pericardial, etc.) • LOWER RESPIRATORY • TISSUE • WOUNDS 	<p>Sterile tube (red top vacutainer); fluid preferred, non-gel transport swabs accepted</p> <p>Sterile container</p> <p>Transport Jar or Transport vial</p> <p>In Transport Media (fluid preferred, non-gel swabs accepted)</p>
GRAM STAIN <i>NOT ROUTINE</i> BUT MAY BE PERFORMED ON PHONE REQUEST FROM DOCTOR; STAT GRAM STAIN REQUEST MUST BE CALLED IN BY DOCTOR WHEN GRAM STAIN FIRST REQUESTED	<ul style="list-style-type: none"> • GENITAL & GC ONLY • STOOL • UPPER RESPIRATORY (e.g., ear, eye, nose, throat) <p style="text-align: center;">URINE</p>	<p>Transport swabs</p> <p>Stool in white plastic container or Rectal swab in transport media</p> <p>Swab in transport media</p> <p>Vacutainer Urine Collection System</p>
GRAM STAIN CAN NOT BE PERFORMED	<ul style="list-style-type: none"> • BLOOD • BONE MARROW • CATHETER TIPS • GRP B STREP SCRIN (vag/rectal) • SPECIMENS COLLECTED IN BROTH (ie. blood culture bottle) 	

GRAM STAIN AND / OR CULTURE
SPECIMEN TRANSPORT CONTAINERS & SPECIAL INSTRUCTIONS

CULTURE and / or GRAM STAIN SOURCE or TYPE	CONTAINER	SPECIAL INSTRUCTIONS
ANAEROBES (includes aerobic culture & Gram stain)	Aspirate material with needle & syringe, then <i>gently</i> inject material into anaerobic transport vial or collect using swab transports (both aerobic double swab non-gel plus anaerobic single swab gel transport required). Aspirate preferred over swab.	Not done on specimens where anaerobes are part of the normal flora or superficial skin source. Do not expose to air. Take promptly to Microbiology lab; when microbiology is closed deliver directly to laboratory supervisor (C118).
TISSUE / BIOPSY (aerobic & anaerobic bacteriology, fungal and AFB culture included on all tissue specimens)	Transport Jar or Transport vial	Transport immediately
BLOOD (Always includes recovery of routine yeast [fungus]. Fungus culture done only when filamentous mould suspected – must call Micro supervisor for approval.	Blood culture bottles Adults and older children Aerobic & Anaerobic Neonates and ≤2yr Pediatric bottle only Isolator tube Pediatric isolator ≤2yr	Friction cleanse venipuncture site rubbing vigorously for 60 sec with Frepp alcohol Scrub, followed by disinfection with Sepp iodine tincture applied in concentric circles; wait one min and then draw blood. Inject 8-10 ml into each bottle. Patient >40&<80 lbs inject 4-5 ml into each bottle. For OPTIMAL RESULTS draw 2 sets of bottles, from two separately prepared sites. Do NOT draw more than 2 sets of blood cultures in any 24 hr period.
BODY FLUIDS except CSF	Sterile tube (red top vacutainer) or anaerobic transport vial	Sterile tube (red top vacutainer) DO NOT USE BLOOD CULTURE BOTTLE
BONE MARROW	Pediatric Isolator tube	Aerobic Bacteriology, Fungal and AFB culture performed on all specimens
BORDETELLA PERTUSIS (includes culture & PCR)	Collect 2 nasopharyngeal swabs. 1 st swab - inoculate plate 2 nd swab -prepare 2 slides	Obtain Regan-Lowe media from Micro lab prior to specimen collection. Deliver stat directly to Micro.

CULTURE and / or GRAM STAIN SOURCE or TYPE	CONTAINER	SPECIAL INSTRUCTIONS
CSF (Stat Gram stain routine for all culture requests)	Spinal Fluid Kit tubes, set of 3 tubes.	Tube #2 containing minimum of 5 ml. Deliver as soon as possible; DO NOT REFRIGERATE.
DIRECTIGEN (Always includes bacterial culture)	Spinal Fluid Kit tubes, set of 3 tubes.	Tube #2 containing minimum of 5 ml. Deliver as soon as possible; DO NOT REFRIGERATE.
EAR	Swab(s) in aerobic transport media	
FUNGAL STUDIES	Consult laboratory Director	Indication of diagnosis on request is extremely important
Cryptococcal Antigen (Positive specimens will be titered; cryptococcal antigen will be substituted for all India Ink requests)	1 ml spinal fluid in spinal fluid tube	If spinal fluid can not be obtained send a red top tube of blood. DO <u>NOT</u> send spinal fluid in a vacutainer tube.
GENITAL CULTURES (GENERAL WORKUP will include Gram stain when requested.) GC Culture	2 swabs in transport media swab in gel transport	Indicate if for: STREP GRP B SCREEN GC ONLY GENERAL WORKUP
LEGIONELLA URINE ANTIGEN TEST	Urine in leakproof container	
<i>MYCOBACTERIA</i> STUDIES		See separate table next page
PARASITES	Fresh stool in white plastic container	Parasitology examinations are sent to a referral laboratory. Specimens containing oil, barium, or urine will not be accepted for examination.
Amebiasis and Giardiasis Cestodes and Helminths	Fresh stool in white plastic container	Consult lab. Two to three fresh stools on consecutive days
Cryptosporidium	Fresh stool in white plastic container	
Pinworm	Pinworm Paddle	Collect early morning prior to

CULTURE and / or GRAM STAIN SOURCE or TYPE	CONTAINER	SPECIAL INSTRUCTIONS
	(sticky paddle)	bathing. Two to three specimens on consecutive days
SPUTUM (INDUCED SPUTUM – Adult: processed for Gram stain only, no culture)	5-10 ml sputum in Sputum Collection System.	A specimen with >25 epithelial cells/lpf is considered a <i>Poor Quality</i> specimen, contaminated with saliva, unacceptable for culture and will be rejected. Floor will be notified.
STOOL & RECTAL SWABS Routine Enteric Pathogens	Stool in white plastic container Rectal swab - transport media	GRAM STAIN: not routine, contact supervisor for all requests (Gram stains on these specimens performed to determine the presence of neutrophils.) ROUTINE SCREEN includes Shigella, Salmonella, Campylobacter & E coli O157:H7. Culture for any other suspected pathogens must be specifically ordered e.g. Yersinia or Vibrio)
Clostridium difficile (Toxin A/B EIA assay)	White plastic container	Only diarrheic stools accepted. If test is positive, no further specimens are accepted for five days.
THROAT Culture Rapid A Antigen	Swab in transport media Non-gel transport media with double swabs	Screen done for group A, C & G beta hemolytic Strep only. Contact the laboratory for unusual requests. Deliver immediately to micro lab.
URINE	Vacutainer Urine Collection System	GRAM STAIN: not routine, contact supervisor for all requests MIDSTREAM CLEAN CATCH: Instruct patient on proper cleansing of genitalia. SUPRAPUBIC or STRAIGHT CATHETER: indicate on the request slip if the specimen has been obtained in this way; the presence of any colony count is significant in these specimens. FOLEY CATHETER TIP - not accepted for culture. Urine - Not acceptable specimen for GC culture

CULTURE and / or GRAM STAIN SOURCE or TYPE	CONTAINER	SPECIAL INSTRUCTIONS
WOUND (Gram stain routine for all culture requests)	Swab(s) in aerobic transport media. When anaerobic culture requested add swab in anaerobic gel transport	The specimen should be taken in a manner so that surface contamination does not occur.

MYCOBACTERIA TESTING *
SPECIMEN TRANSPORT CONTAINERS & SPECIAL INSTRUCTIONS

MYCOBACTERIA STUDIES	CONTAINER	SPECIAL INSTRUCTIONS
Blood	Myco/F Lytic Broth	Available only from Microbiology Lab 8A.M. to 4 P.M. Patient must be suspected to be HIV positive.
Bone Marrow	Pediatric Isolator tube	Same tube used for bacteriology, fungal and AFB cultures
CSF	5-10 ml if possible in spinal fluid tube	Less than 1 ml is unsatisfactory. <u>DO NOT</u> use vacutainer tubes
Gastric Lavage	Sterile Container	Collect upon awakening. Transport <i>immediately</i> to laboratory. Specimen must be neutralized since gastric acid can destroy AFB.
Feces	Stool specimen in white plastic container	Adults: Only AFB smear positive specimens will be cultured. Pediatrics: All specimens will be processed for smear and culture.
Pleural Fluid	100 ml if possible in sterile drainage bottle	Less than 10 ml is unsatisfactory.
Sputum	Sputum Collection System 5-10 ml volume	Collect 3 specimens no closer than 8 hours apart, at least 1 early morning. Volume <u>not more</u> than 10 ml each (5 ml minimum recommended). Only 3 smear positive specimens will be cultured. Subsequent specimens will only be processed for smears to monitor response to therapy.

MYCOBACTERIA STUDIES	CONTAINER	SPECIAL INSTRUCTIONS
Tissue	Sterile container with small amount of added sterile saline	Deliver immediately to the laboratory.
Urine	Sterile container, 40 ml minimum	Collect 3 to 5 first voided morning urine specimens. Smears are not done. 24 hr. collection is not accepted.

*Amplified nucleic acid probe for *Mycobacterium tuberculosis* complex is routinely performed the first time lower respiratory specimens are positive for acid-fast organisms.

SPECIMENS WITH SPECIAL CRITERIA FOR PERFORMANCE:

(conditions when microbiology tests WILL NOT BE DONE:)

- CSF - Latex agglutination tests for bacterial antigens in spinal fluid are done ONLY when the CSF WBC count is elevated or organisms are seen on Gram stain. (This restriction does not apply to neonates.)
- Stool - routine culture for enteric bacterial pathogens in patients who have been hospitalized for more than three days.
- Parasites - diarrheic specimens for parasites in patients who have been hospitalized for more than three days.
- Stool for Ova & Parasites containing barium, mineral oil, bismuth, or any other nonabsorb-able anti-diarrheal compound.
- *Bordetella pertussis* culture not sent on Regan-Lowe media (swab transport not acceptable).
- Repeat test request within 24 hour period of any identical specimen type except sterile body fluids and blood cultures.
- Request for anaerobic culture from swab specimen sent in non-anaerobic collection system.
- Any specimen for culture or Gram stain not in sterile container or culture transport device (with the exception of stool).
- Request for VRE culture within 6 days of previous VRE culture from identical specimen type.
- Catheter tips for AFB culture (blood specimen should be collected instead)
- Swab collected specimens (except laryngeal) for AFB testing.
- Stat Gram stain for swab specimens received between 10PM and 8AM which do not come with **2 transport devices** (either one aerobic and one anaerobic or two aerobic).
- Gram stain from swab specimen where only a gel-transport swab is received.
- Gram stain only requests from the following specimens: blood, bone marrow, catheter tips, vaginal/rectal swabs for Group B Strep screen, or any specimen collected in broth (ie. blood culture bottle).

- Rapid Strep A or Flu A/B from swab specimens where only a gel-transport swab is received.

Exceptions to these rules must be approved by the Director or a supervisor in Microbiology

RESISTANT ORGANISMS

1. All methicillin resistant *Staphylococcus aureus* (MRSA) strains and vancomycin resistant enterococci are flagged on the culture report.
2. All vancomycin resistant enterococci are called to the nursing units.

TURN-AROUND TIME FOR MICROBIOLOGY REPORTS:

1. Routine specimen (i.e, sputum, throat, urine): 48 hours.
2. Blood cultures and all sterile body fluid specimen (e.g. spinal fluid) results are called to the floor as soon as positive.
 - Spinal fluid cultures are kept 72 hours before declaring them negative.
 - All other sterile body fluid specimens are kept 5 days before declaring them negative.
 - Blood cultures are checked on a continual basis. All negative blood cultures are discarded on the fifth day.
3. All positive AFB smears are called to the floor. Amplified nucleic acid probe will be performed on all 1st time positive smears of lower respiratory specimens, of patients not yet on anti-tuberculosis therapy, with a turnaround of 48 to 72 hours. AFB cultures take 2-6 weeks to grow. Positive cultures are tested by DNA probe for *Mycobacterium tuberculosis*, *M. avium* and *M. gordonae* within a few days of positivity. All other *Mycobacteria* spp. are sent to an outside reference laboratory for identification. *M. tuberculosis* susceptibility testing usually takes an additional 1-2 weeks after the isolate identification.
4. Fungus cultures are kept for four weeks before declaring them negative.
5. Feces for *Salmonella*, *Shigella*, *Campylobacter*, *Escherichia coli* O157:H7 and *Yersinia* may take from two to five days before results can be reported. Whenever a culture is positive the floor is called immediately.
6. *Bordetella pertussis* cultures are held 5 days before declaring them negative.
7. Any culture result considered to be life-threatening or important epidemiologically will be called to the floor.

MOLECULAR DIAGNOSTICS

ROOMS : MSB C- 553 UH C – 112 EXT. 3339;

Laboratory Hours: Daily 8.00 a.m. to 4.00 p.m.

All tests performed in the Molecular Diagnostic Laboratory are Nucleic Acid based tests that use DNA and/or RNA as test material. The tests are useful for both qualitative and quantitative analysis as well as genotyping and subtyping of pathogens.

1. Each specimen must be accompanied by the Molecular Diagnostics lab requisition form #3 (UH 0146) and the appropriate test box must be checked.
2. Requests must have all relevant information filled in. Tests sent for HIV genotyping must have the specific information on the form.
3. Please call the lab for information on “special collection tubes”.

INFECTIOUS DISEASES:

Type of test	Specimen required	Turnaround Time (days)
Chlamydia Trachomatis and/or Neisseria gonorrhoeae (by PCR)	<u>Female specimen:</u> Cervical swab in Special collection tube. <u>Male specimens:</u> Urine, urethral swab	5-7 days
Cytomegalovirus Quantitative (by PCR)	5 – 7 ml. blood in Lavender-top (EDTA) tube, Broncho-alveolar lavage, spinal fluid	10-14 days
Enterovirus Qualitative	Spinal fluid, nasopharyngeal, throat, or rectal swab collected in special tube, tissue	5-7 days
Hepatitis B Virus Quantitative (by realtime PCR)	5-7 ml. Blood in Red-top tube.	7-14 days
Hepatitis C Virus Qualitative (by PCR)	5 – 7 ml. blood in Lavender-top (EDTA) tube, must reach the lab within 4 hours of collection	7-14 days
Hepatitis C Virus Quantitative range 100-1,000,000 IU/mL (by realtime PCR)	5 – 7 ml. blood in Lavender-top (EDTA) tube, must reach the lab within 4 hours of collection	7-14 days
Hepatitis C Virus Genotype (by PCR & invader technology)	5 – 7 ml. blood in Lavender-top (EDTA) tube, must reach the lab within 4 hours of collection	10-14 days

Type of test	Specimen required	Turnaround Time (days)
Herpes Simplex Virus I and II qualitative (by realtime PCR)	Swab of lesion collected in special collection tube, biopsies, spinal fluid	7-10 days
Human Papilloma Virus, subtyping of High risk only (by hybridcapture technology)	Cervical swab in Special collection tube, biopsies, preserve-cyt specimen sent for Pap smear.	10-14 days
Human Papilloma Virus - Subtyping of low and/or high risk groups (by hybridcapture technology)	Cervical swab in Special collection tube, biopsies, preserve-cyt specimen sent for Pap smear.	10-14 days
Human Immunodeficiency Virus (HIV-1) RNA Quantitation Range 48-10,000,000 viral copies (by PCR)	5 – 7 ml. blood in Lavender-top (EDTA) tube, must reach the lab within 4 hours of collection	5-7 days
Human Immunodeficiency Virus (HIV-1) proviral DNA Qualitative (by PCR)	5 – 7 ml. blood in Lavender-top (EDTA) tube, must reach the lab within 4 hours of collection	10-14 days
Human Immunodeficiency Virus Genotype and viral load for Antiretroviral drug resistance	5 – 7 ml. blood in Lavender-top (EDTA) tube, must reach the lab within 4 hours of collection. SPECIFIED PATIENT INFORMATION MUST BE INCLUDED ON THE REQUEST FORM	10-21 days
JCV Polyoma Virus Qualitative (by realtime PCR)	5 – 7 ml. blood in Lavender-top (EDTA) tube, CSF, urine	7-10 days
Methicillin Resistance for <i>Staphylococcus aureus</i> from Positive blood cultures (by realtime PCR)	Done as a reflex test for all blood cultures found to have gram positive cocci in clusters.	Daily
Methicillin Resistance for <i>Staphylococcus aureus</i> from Nasopharyngeal swabs (by realtime PCR)	This test is limited to patients in the adult ICU at this time.	Daily
Respiratory Viral Panel for identification of RSV, Influenza A& B, Parainfluenza, Adenovirus and metapneumovirus	Nasopharyngeal swab collected in special collection tube, nasopharyngeal washes	3-7 days

For information on special collection tubes please call ext. 6544 or 3339.

ONCOLOGY

Deletions in Chromosome 1p For oligodenerogliomas (by PCR/loss of heterozygosity)	Fresh tumor, paraffin block. MUST BE ACCOMPANIED BY 5-7 ML OF PERIPHERAL BLOOD IN LAVENDER TOP (EDTA), and A HISTOLOGY SLIDE.	7-14 days
Microsatellite Instability (MSI) For colorectal cancer (done by microsatellite instability electrophoresis)	Fresh tumor or paraffin block MUST BE ACCOMPANIED BY 5- 7 ML OF PERIPHERAL BLOOD IN LAVENDER TOP (EDTA), and A HISTOLOGY SLIDE.	7-14 days

For information on special collection tubes please call ext. 6544 or 3339.

AUTOPSY SERVICE

POSTMORTEM EXAMINATION

At NJMS and University Hospital housestaff are particularly encouraged to seek autopsy consent for the following cases:

- Deaths in which autopsy may help to explain unknown and unanticipated medical complications
- All deaths in which the cause of death is not known with certainty.
- Cases in which autopsy may help to allay the concerns of the family regarding the death and to provide reassurance to them regarding same.
- Deaths of patients who have participated in clinical trials (protocols) approved by institutional review boards.
- Natural deaths that are subject to but waived by a forensic medical jurisdiction such as:
 - All obstetric deaths. (Deaths occurring within 24 hr. of delivery must be cleared by the medical examiner.)
- Deaths resulting from high-risk infectious or contagious diseases.
- All neonatal and pediatric deaths.
- Deaths of patients of any age where it is believed that autopsy would disclose a known or suspected illness that also may have a bearing on survivors or on recipients of transplant organs.

Autopsies are usually performed during the ordinary working day upon receipt of a legal autopsy permit. Autopsies can and will be performed at any time necessary to meet the legitimate requirements attendant upon a particular case. Arranging for an autopsy at odd hours will require certain procedural changes; therefore, please inform the Pathology Service as soon as possible of the specific case and problem. The Pathology Service will notify the attending physician responsible for the case as to the time when the autopsy will begin so that arrangements to attend it may be made. It must be emphasized that an autopsy represents a major consultation to the requesting service. As such, although the Pathology Service will have read the chart before performing the autopsy, the most advantageous situation will be when a responsible and informed attending physician discusses the case with the responsible pathologist. At such time particular areas of concern, whether of major or minor importance, can be ascertained before the autopsy and accordingly sought for in a proper fashion.

PROCEDURE RELATING TO COUNTY MEDICAL EXAMINER'S CASES

All deaths occurring within 24 hours after admission or 24 hours after surgery are reportable to the Office of the Medical Examiner. Permission for autopsy is not to be sought until said cases are released by the Medical Examiner.

All deaths due to homicide, suicide, accident, poisoning, intoxication and those occurring under suspicious and doubtful circumstances, regardless of the length of hospitalization,

must be immediately reported to the Medical Examiner's Office (Telephone No. 643-6554).

PROCEDURE RELATING TO PERMISSION AUTOPSIES

Permission for autopsy obtained between the hours of 6:30 AM and 3:00 PM must be brought directly and immediately to the Registrar's Office (C-480) (Ext. 4962). The Registrar will obtain administrative approval and deliver the completed permission form to the Office of the Pathology Service. The chart should likewise be delivered to the Registrar so as to accompany the completed permission form. No autopsy will be performed without availability of the patient record.

Permission obtained between 3:00 PM and 6:30 AM and on holidays and weekends must be taken to the Nursing Office (D202 ext. 5676). The chart should accompany the permission. The Nursing Office will inform the Registrar who will follow-up the next morning. The Registrar will deliver the autopsy permission and chart to the Pathology Service. If it becomes necessary for an autopsy to be performed after 3 PM, the Nursing Office will contact the Pathology resident on call (the nursing supervisor will perform the duties of the Registrar in reference to the autopsy).

PERMISSION FOR AUTOPSIES

Consent for the performance of an autopsy may only be granted in the following order of relationship:

1. The spouse (even if legally separated but not divorced)
2. *Children (over 18 years of age) of the patient
3. *Grandchildren (over 18)
4. *Parents of the patient
5. *Brothers or sisters
6. *Nieces or nephews

*All relatives of equal rank must give consent (i.e., both father and mother, all living children).

If there are no surviving relatives, a permit may be signed by a friend, lodge officer, or other person assuming responsibility for burial.

A maximum period of 24 hours after death is allowed under the New Jersey State Law for a death certificate to be signed. If an autopsy permission is still being sought in a particular case, the death certificate should still be signed to comply with this state law. Since the person or persons authorizing a funeral director to remove a body are almost always the same individuals who can grant the autopsy permission, there should be no inadvertent losing of an autopsy permission. The Registrar is fully prepared to handle the administrative problems in such a case and to assist the doctor in preventing such a loss. Again, if the Pathology Service is aware of the particular case, we can assist in preventing such a mistake from happening.

Bodies may be removed after 4:30 PM, with the assistance of the Nursing Department, if a death certificate has been signed.

REGULATIONS FOR SIGNING THE DEATH CERTIFICATE

1. Generally, the physician who was charged with the patient's care must sign the death certificate.
2. When a certificate requires a signature at a time when the regular physician is off duty, it must be signed by the covering physician.
3. In permission autopsy cases, the house staff physician is responsible for signing the death certificate. The final diagnosis may be obtained from the pathologist.
4. Death certificates will be signed by the Medical Examiner in those cases involving the Office of the Medical Examiner.

POLICY ON FETAL EXAMINATION

FETUS 20 WEEKS GESTATION AND OVER:

A fetus 20 weeks gestation or over is considered a stillbirth, and must have a fetal death certificate filed. If the fetus is the product of an outside delivery, the mother has a positive toxicology, or the pregnancy meets other reporting requirements for the medical examiner, the medical examiner must be called. If the case is released back to the hospital by the medical examiner, this must be documented in the records. An autopsy consent must be obtained if the fetus is to have an in-house autopsy; Pathology will not perform an autopsy without the consent. However, the placenta may be examined. All fetuses 20 weeks gestation and over should be sent to the morgue and are handled as any other death in terms of burial. In cases with poorly documented clinical dates, a cutoff maximum foot length of 3.4 cm will be applied to determine gestational age.

FETUS UNDER 20 WEEKS GESTATION:

A fetus that is under 20 weeks gestation does not require a fetal death certificate, should be sent to Surgical Pathology and can be examined as a surgical specimen without consent required. Fetuses of under 20 weeks are disposed of as surgical tissues. Fetal age is determined by good clinical documentation, ie a **reliable** last menstrual period date or ultrasound confirmation. The gestational age and method of determining such should be stated on the requisition to surgical pathology. If the clinical dating is unreliable, foot length is the best determinant of age. (Weight, is not used in NJ.) Foot length should be performed and recorded prior to submission of the fetus. A maximum foot length of 3.4 cm is acceptable for Surgical Pathology examination, assuming no contradictory clinical evidence suggests a fetus is 20 weeks or more.

CYTOPATHOLOGY

ROOM E-149 EXT 5713

LABORATORY HOURS: Monday-Friday, 8 AM – 4 PM

FEMALE GENITAL TRACT

1. Use the white requisition history form, “REQUEST FOR CYTOLOGY EXAMINATION”. The Gynecologic area of the form should be completed by the physician and must include:
 - Patient’s name, address, age, hospital number, and location.
 - Menstrual history and date of last menstrual period.
 - Clinical findings and diagnosis.
 - History of previous abnormal PAP smears.
 - History of previous treatment, particularly hormonal therapy, cautery, surgery, radiation, chemo-hormonal therapy, etc., even if not applied to the genital tract.
 - Source – cervical, endocervical, or vaginal.
2. Patient should not douche within 48 hours prior to the taking of the smears.
3. Obtaining smears at the time of menses should be avoided.

PROCEDURE FOR MAKING SMEARS:

1. Print patient’s last name and first initial and date, on frosted end of slide.
2. Have fixative (95% alcohol or spray cytology fixative, available from cytology, room E-149) ready for immediate application to slides after smears are made.
3. Using no lubricant (water may be used), insert the speculum before palpating uterus.
4. Following exposure of cervix by speculum, obtain sample. If two slides are used, obtain and immediately fix each sample separately. If two specimens (i.e. endocervical brush and Ayre spatula – use plastic not wooden spatulas) are to be spread on the same slide, wait until both samples are obtained and then spread the material from both applicators on the slide and fix immediately to avoid air drying artifact. **NOTE:** Do not use cotton swabs as the cotton absorbs many of the cells.
5. Spread the material uniformly across the entire nonfrosted surface of the slide and fix **IMMEDIATELY** by placing slides in coplan jar of 95% alcohol or by spraying the slides with Cytofixative spray. **Hold the spray fixative container twelve inches from the slide to fix.**
6. Allow a few minutes for fixative to set. Place smears in folders with history form attached and send to the Cytology Laboratory (UH E149).

PROCEDURE FOR THIN PREP PAP TEST SPECIMEN COLLECTION

Endocervical brush/Spatula Protocol:

1. Obtain an adequate sample from the ectocervix using a plastic spatula.
2. Put the spatula into the PreservCyt Solution vial and swirl the spatula ten times.

3. To obtain an adequate sampling from the endocervix use an endocervical brush and insert the brush into the cervical os until only the bottommost fibers are exposed. Slowly rotate $\frac{1}{4}$ or $\frac{1}{2}$ turn in one direction. DO NOT OVER-ROTATE.
4. Put the brush into the same PreservCyt Solution as was used for the spatula. Rotate the brush ten times while pushing the brush against the vial wall. Swirl the brush vigorously to further release material.
5. Tighten the cap of the vial so that the torque line of the cap passes the torque line on the vial.
6. Label the vial with the patient's full name and medical record number. Deliver the vial and the completed cytology request form to the Cytology Laboratory (UH E-149).

Broom-Like Device Protocol:

1. To obtain an adequate sampling from the cervix using a broom-like device insert the central bristles of the broom into the endocervical canal deep enough to allow the shorter bristles to fully contact the ectocervix. Push gently and rotate the broom in a clockwise direction five times.
2. Rinse the broom in the PreservCyt Solution vial by pushing the broom into the bottom of the vial ten times forcing the bristles apart. Swirl the broom vigorously to further release material.
3. Tighten the cap of the vial so that the torque line of the cap passes the torque line on the vial.
4. Label the vial with the patient's full name and medical record number. Deliver the vial and the completed cytology request form to the Cytology Laboratory (UH E-149).

PROCEDURE FOR HORMONAL EVALUATION:

For hormonal evaluation please submit the material from the lateral vaginal wall. Contact lab for details.

NON-GYNECOLOGICAL SPECIMENS:

1. Use the Cytopathology form; the physician should complete the Non-Gyn area of this form and include:
 - Patient's name, address, age, unit number, and location.
 - Date specimen is taken.
 - Clinical findings (stated briefly).
 - X-ray findings.
 - Name of attending staff physician and resident physician.
 - Attach the form to the specimen container.
2. Label the container with the patient's name and medical record number.
3. During laboratory working hours, immediately deliver specimens, without additives unless otherwise instructed, to the Cytology Laboratory (UH E149). Specimens obtained when the laboratory is closed should be collected as instructed. Add an equal amount of 50% ethanol to the specimen and refrigerate until the earliest possible time of delivery to the laboratory (UH E149).

4. Specimens sent to Cytopathology are for cytology ONLY. If several different tests are requested, please divide the specimen accordingly and SEND ONLY THE ALIQUOT FOR CYTOLOGY to Cytopathology (UH E149).
5. All smears made for cytology studies such as direct breast smears, oral smears, etc. must be immediately fixed either by adding fixative (spray) or by placing smears into a coplan jar containing 95% ethanol.
6. Written instructions for the collection and preparation of bronchial, gastric, colonic, urine, body fluids, etc. are available from the CYTOLOGY LABORATORY.

PROCEDURE FOR SPUTUM SPECIMEN

1. ORAL CLEANLINESS IS A PREREQUISITE.
2. Instruct patient to EAT NO FOOD after midnight prior to obtaining specimen.
3. Immediately before specimen collection, the patient must clean his teeth (remove dentures) and rinse mouth thoroughly.
4. Have the patient relax, cough deeply without drawing from nasal passages, and expectorate material into sputum cup containing cytology fixative (Carbowax/alcohol solution).
5. Twenty-four hour sputum specimens are not acceptable. A total of three SATISFACTORY specimens should be obtained on three different days (consecutive, if possible).

NOTE: Only induced sputum specimens will be processed for *Pneumocystis carinii*.

PROCEDURE FOR COLLECTION OF GASTRIC WASHING

1. The patient must fast overnight, but keep well hydrated with water during the night and, especially, one hour before the procedure.
2. In cases of obstructive gastric retention, the gastric content should be aspirated, a continuous suction should be left overnight and the patient hydrated with intravenous fluids. This initial gastric aspirate should not be used for cytology.
3. Gastric washings should precede the barium swallow. If barium has been given to the patient, a delay of at least one week is needed before satisfactory washing is possible.
4. Pass Levine tube to about the 70 to 75 cm mark. No lubricants other than glycerin should be used. The passage can be facilitated if the tube is moistened and placed in ice. Be sure the tube is placed in the stomach, not the airway.
5. Repeated rinses of Ringer's solution are injected under maximum pressure, aspirated and discarded until the return is clear.
6. Then 500 ml. of fresh Ringer's solution is injected under maximum pressure and reaspirated while the abdomen is vigorously massaged.
7. The aspirated fluid should be placed in a container in ice and sent immediately to the laboratory to be processed.
8. When the fiber-gastroscope is used instead of N/G tube, lavage method is essentially similar to the above.

PROCEDURE FOR BODY FLUID SPECIMENS

1. Upon tapping the source of fluid, 100 to 200 cc of material is placed in a clean container (bottle or vial). Immediately deliver the specimen to the Cytopathology

Laboratory (UH E-149) when the laboratory is open. If the aspiration is done after 4:00 PM on weekdays, or on weekends or holidays, place the fluid in the refrigerator until it can be delivered to the laboratory and processed. **Do not add fixative to body fluid specimens.**

2. Adequate clinical information should accompany this material.

PROCEDURE FOR CEREBROSPINAL FLUID SPECIMENS

1. The collection procedure should be performed in a way to avoid a bloody tap or the aspiration of solid material.
2. The second or third tube collected should be sent to the Cytopathology Laboratory. The specimen should be delivered to the lab immediately.
3. If the tap is done when the laboratory is closed, add an equal volume of fixative (Shandon Carbowax or 50% alcohol) to the specimen and refrigerate until delivered to the laboratory.

PROCEDURE FOR FINE NEEDLE ASPIRATION AND PREPARATION OF CYTOLOGIC MATERIAL

1. Make thin smears from the aspirated material and fix immediately in 95% alcohol (for PAP stain).
2. If there is enough material air dry at least 1 to 2 smears (for Romanowsky stain).
3. Flush the syringe and needle with saline or carbowax and empty into a clean specimen container for a cell block.
4. Promptly send the specimen(s) and a cytology request form to the cytology laboratory.

NOTE: Please call 2-5713 with questions regarding FNA preparation.

Cytotechnologist assistance is provided ONLY for immediate assessment of specimen adequacy. This must be scheduled at least one half day in advance.

PROCEDURE FOR BRUSHING SPECIMENS (Bronchial, esophageal, bile duct, etc.)

1. The cellular material is obtained by vigorously brushing the lesion.
2. The brush is used to spread the sample onto glass slides which have the patient's name printed on the frosted end in pencil. Press the brush against the slide and roll across the slide only once. Fully frosted slides may be used but extreme care must be used not to be overly aggressive with the brush on the slide; use the frosted side of the slide.
3. Fix the slides IMMEDIATELY in a coplan jar of 95% ethyl alcohol.
4. Wash the brush well in carbowax fixative.

PROCEDURE FOR SUSPECTED RAPE CASES

The examining physician will bring vaginal smears directly to the Cytology Laboratory to be examined for the presence of spermatozoa. The smears should be properly identified with the patient's name and should be given directly to the supervisor of the Cytology Laboratory by the examining physician. The examining physician should also make his/her own identifying mark on the slides. If the smears are made when the cytology

laboratory is closed, the examining physician should retain the slides placed in 95% ethanol until such time as he/she can submit them for examination.

NEUROPATHOLOGY

ROOM C-525 EXT. 7167

The division of neuropathology is responsible for muscle biopsies and nerve biopsies. For either of these specimens the following general procedure should be followed:

1. It is recommended that the clinician discuss the case with the neuropathologist, Dr. Eun-Sook Cho (Ext. 4145) or Dr. Leroy Sharer (Ext. 4770), before the biopsy is taken. This allows the pathologist to inform the laboratory of any special procedures needed for that specimen.
2. The clinician should notify the Neuropathology Laboratory of the date and time of the biopsy at least one day prior to the procedure. Contact the Neuropathology Laboratory (Ext. 7167). **ONLY** with pre-arrangement, muscle and nerve specimens will be obtained directly from the operating room. In no case are specimens to be delivered to either the Accession Area (C118) or to the Surgical Pathology Laboratory. **NOTE:** Specimens will be accepted only between 9 AM and 2 PM Monday through Wednesday.
3. A written clinical history must accompany the specimen. This should include the results of pertinent laboratory work-up and the name and telephone number of the physician responsible for the case.

Detailed protocols giving guidelines for muscle and nerve biopsy sampling can be obtained from the neuropathology division.

SURGICAL PATHOLOGY SERVICE

ROOMS E-156 (Secretaries), 157, 161 (Lab.), 163 (Sign out)
Ext 5707, 5709

All tissue or foreign material removed from patients in the hospital must be sent to the Surgical Pathology Laboratory for examination, confirmation and diagnosis. A Surgical Pathology request form must accompany each specimen. The completed request form must include the patient's name, sex, age, location, hospital number, pre- and post-operative diagnostic impressions, source and type of tissue submitted and a brief clinical summary. The specimen container must also have the patient's name, medical record number and source and type and tissue submitted. The request form must be signed by the responsible physician and include a telephone extension or beeper number. Containers with radioactive specimens should be appropriately labeled (for example, sentinel lymph node #1, #2, #3 etc.) with appropriate "radioactive labels" as per ORSS guidelines.

When the **diagnoses** of lymphoma, liposarcoma, renal cell cancer, Ewing's sarcoma, synovial sarcoma or any other tumor with a known cytogenetic abnormality is suspected, the tissue must be brought to Surgical Pathology in the **fresh**, unfixed state.

Routine, small tissue specimens and biopsies (e.g. tonsils, skin biopsies, cervical biopsies, etc.) should be submitted in wide-mouthed containers in a 10% solution of buffered formalin. The containers with formalin may be obtained from the Histology Laboratory (UH E-161). Small biopsies removed after 4:00 PM or on weekends, may be brought to the Accession Area – C 118. Large tissue specimens and resected organs should be submitted undissected, in the fresh state, placed in plastic bags and kept moist with saline soaked sponges. Fresh specimens which cannot be sent immediately to Surgical Pathology (i.e. when removed at night or on a weekend) should be placed in formalin in the operating suite. If the specimen cannot be submitted within 24 hours, place the tissue in a large container of formalin. The proper volume is 20 volumes of formalin to 1 volume of tissue. A 100 gm spleen, for example, should be placed in a bucket with 2 liters of formalin. The tissue can then be stored at room temperature.

When a **RUSH** diagnosis is desired, print the word "RUSH" in large red letters on the front of the Surgical Pathology request form and this biopsy will be given priority. The laboratory staff **MUST** be notified when the RUSH specimen is brought to Pathology. A special type of RUSH processing is available for small biopsy specimens where same-day information is vital. Specimens of this nature should be brought to Surgical Pathology before 11:00 AM. Make direct communication with the pathologist in person or by telephone for RUSH cases. Slides will be available by 5:00 PM. Rush processing of this type may compromise diagnosis and further study; and should only be requested in

emergent situations. The physician's phone or beeper number must be on the request form.

FROZEN SECTION - for rapid diagnosis, is available only on fresh tissue specimens. This service should only be used where immediate operative decisions depend upon rapid diagnosis. The specimen for Frozen Section must be immediately hand carried to Surgical Pathology (E-161) in the fresh state. The request form must have the OR room number on it so that the surgeon can be notified of the diagnosis. Whenever possible, the Surgical Pathology Laboratory or the Pathologist should be notified before the tissue arrives. When the following diagnoses are suspected, the tissue must be brought

When a frozen section is needed at night or on weekends, the resident on call for surgical pathology must be notified in advance, if known, or as soon as the situation arises to avoid delays. The surgical pathology resident will notify the pathologist. The on-call roster for surgical pathology is available from the page operator.

RENAL BIOPSIES – must be preceded by telephone notification (ext. 2-5710 or 5711) and must be received in saline by 2:00 PM to insure appropriate handling. All renal biopsies must be accompanied by a completed Surgical Pathology request form and a Clinical Data Guide Sheet (available in the Histology Laboratory, E-157)

ELECTRON MICROSCOPY AND OTHER SPECIAL STUDIES. When EM or other special studies (e.g. analysis of liver tissue for copper or iron content, etc.) are needed for clinical or research purposes, the Anatomic Pathologist on call must be consulted in advance so that all necessary procedures that will insure the maximum viability (and therefore the proper handling) of the involved tissues will be in place. For EM studies specifically, fresh biopsy specimens must be placed into 4% paraformaldehyde fixative (available from the Histology Laboratory, E-157) immediately after removal from the patient. Tissues to be used for research purposes **MUST** be sent to Surgical Pathology first - the Pathologist will then make the determination as to what may be used in this regard so as to ensure there is enough tissue left for diagnostic purposes. **FLUORESCENT STUDIES** (skin, kidney, lung, etc.) - fibrinogen, C4, albumin and lambda and kappa light chains must be specifically requested. Place specimen in normal saline and deliver to room UH E161. A Direct Immunofluorescence Request Slip (UH-0123) specifying the presumptive diagnosis must be submitted with the specimen. Request for **IMMUNOHISTOCHEMICAL STUDIES** (UH-E-153) must be accompanied by a Surgical Pathology request form with appropriate patient and insurance information. Chromosome 1 p deletions in oligodendrogliomas is done by PCR/loss of heterozygosity by **Molecular Diagnostics** (MSB C-553). For this study 5-7 ml of peripheral blood collected in a lavender top tube (EDTA) is needed.

OUTSIDE CONSULTATIONS: Blocks and slides from outside institutions to be reviewed at UMDNJ must be accompanied by a Surgical Pathology request form with appropriate insurance information form and a copy of the Surgical Pathology report from the outside institution. The completed request form must include the patient's name, sex,

age, location, hospital number, pre- and post-operative diagnostic impressions, source and type of material submitted and a brief clinical summary.

SURGICAL PATHOLOGY REPORTS

Reports are available in Logician and EPIC computer systems. If the report is not in the computer, you may call the Pathology Office at Ext. 5709.

BLOOD GAS LABORATORY

ROOM E-432 EXT. 5753, 7137

SPECIMEN REQUIREMENTS: A minimum of 1 ml of whole blood in a pre-heparinized syringe or capillary tube is required in order to obtain blood gas analysis and co-oximeter results. All samples must be clearly identified with the patient's full name and hospital number. The blood gas request must be filled out completely. Immediately after drawing, place all blood gas samples in ice.

SAMPLE TURNAROUND TIME:

- a. Single sample (approximately 15 minutes) - The results appear in EPIC as soon as the test is completed.
- b. Multiple samples - As each sample is analyzed, the results appear in EPIC.

For detailed information regarding the blood gas sample collection and handling procedure, please call the Blood Gas Laboratory.

CYTOGENETICS

ROOM MSB F622 EXT. 4480

TEST	SPECIMEN	REQUIREMENTS
Chromosome analysis Routine, non-tumor	Amniotic fluid	15-25 ml in sterile conical centrifuge tube.
	Chorionic villi	10-30 mg of villi in culture medium
	Peripheral blood – child or adult	5 ml green* top tube (sodium heparin)
	Peripheral blood - baby	1-2 ml – green* top tube
	Skin, organ tissue, products of conception, placenta, or tumor	1-2 mm ² of tissue in culture medium or in sterile gauze moistened with water (do not submerge in liquid)
Chromosome analysis, high resolution	Peripheral blood	5 ml – green* top tube
Chromosome analysis, cancer	Bone marrow	1-2 ml of cellular marrow in green* top tube
	Peripheral blood – if blasts are present	5 ml – green* top tube
	Bone marrow biopsy, Lymph node, spleen, Tumor tissue	Biopsy (1-2 mm ²) in culture medium or in sterile gauze moistened with water (do not submerge in liquid)
FISH		
Rapid trisomy/ sex chromosome abnormality detection	Amniotic fluid	20-30 ml in sterile conical centrifuge tube.
	Peripheral blood	5 ml – green* top tube
Microdeletion studies	Peripheral blood	5 ml – green* top tube
Cancer gene fusion/ detection	Peripheral blood	5 ml – green* top tube
	Bone marrow	1-2 ml in green* top tube
Sex chromosome mismatch detection (after bone marrow transplant)	Peripheral blood	5 ml – green* top tube
	Bone marrow	1-2 ml in green* top tube
Her/2neu amplification	Tumor tissue	Inquire
ALL telomere analysis	Peripheral blood	5 ml – green* top tube

*Please note: sodium heparin green top tubes must be used for all cytogenetic tests.

MOLECULAR GENETICS

ROOM MSB F656 EXT. 4480

Appropriate clinical and billing information must be provided with the specimen.

TEST	SPECIMEN - must be received the same day as drawn
Alpha-1-Antitrypsin Deficiency	5 ml EDTA (lavender top) blood
Angelman Syndrome	5-10 ml EDTA (lavender top) blood
APC Gene (familial adenomatous polyposis)	5 ml EDTA (lavender top) blood
Ashkenazi Jewish Mutations – 8 genes: Tay Sachs, Canavan, Gaucher, Bloom, Fanconi	5 ml EDTA (lavender top) blood
Anemia, Familial Dysautonomia, Niemann-Pick, Mucopolidosis IV	
Azospemic Deletions on Y chromosome	5 ml EDTA (lavender top) blood
Breast Cancer Genes – BRCA1: 185 delta AG; 5382 ins C. and BRCA2: 6174 del T	5 ml EDTA (lavender top) blood
CGH – Comparative Genomic Hybridization	5-10 ml EDTA (lavender top) blood
Colon Cancer - see APC gene above	5 ml EDTA (lavender top) blood
Cystic fibrosis	10 ml EDTA (lavender top) blood
DNA Banking	10 ml EDTA (lavender top) blood
Duchenne Muscular Dystrophy Deletion Analysis	5 ml EDTA (lavender top) blood
Factor II (prothombin)	5 ml EDTA (lavender top) blood
Factor V Leiden	5 ml EDTA (lavender top) blood
Fragile X Molecular test	5-10 ml EDTA (lavender top) blood
Galactosemia	5 ml EDTA (lavender top) blood
Hereditary Hemochromatosis	5 ml EDTA (lavender top) blood
Homocysteine Gene – methylene tetrahydrofolate reductase (MTHFR)	5 ml EDTA (lavender top) blood
Leber's Hereditary Optic Neuropathy (LHON)	5 ml EDTA (lavender top) blood
Medium Chain Acyl CoA dehydrogenase deficiency	5 ml EDTA (lavender top) blood
MELAS Mitochondrial DNA mutation	5 ml EDTA (lavender top) blood
MERRF Mitochondrial DNA mutation	5-10 ml EDTA (lavender top) blood
Methylene Tetrahydrofolate Reductase (MTHFR) Homocysteine gene	5ml EDTA (lavender top) blood
Myotonic Dystrophy	5-10 ml EDTA (lavender top) blood
NARP Mitochondrial DNA mutation	5 ml EDTA (lavender top) blood
Prader Willi	5-10 ml EDTA (lavender top) blood
Prothrombin – Factor II	5 ml EDTA (lavender top) blood
Rh Factor D, C, E Genes	5 ml EDTA (lavender top) blood
Sickle Cell –	5 ml EDTA (lavender top) blood or amniotic fluid

BIOCHEMICAL GENETICS LABORATORY

ROOM MSB F628 EXT. 3738

The laboratory is open and accepts specimens Monday – Friday between 8 am and 4 pm.
Call laboratory for further information.

TEST	SPECIMEN
Amino Acids Quantitative	Small sodium heparin (green top) tube
Amino Acid Screening (qualitative)	10-20 ml random urine in clean container
Biotinidase	3-5 ml blood in red top tube
Carnitine	1-2 ml blood in red top tube
Galactokinase (whole blood)	Small sodium heparin (green top) tube
Gal-1-P (RBC)	Small sodium heparin (green top) tube
Gal- 1-P Uridyl Transferase quantitation	5 ml blood in sodium heparin (green top) tube
Gal- 1-P Uridyl Transferase Electrophoresis	Small sodium heparin (green top) tube
Methyl Malonate quantitation	Small sodium heparin (green top) tube and one ml of random urine
Mucopolysaccharides (MPS) quantitation	15 ml random urine
Mucopolysaccharides – TLC Differential (20 ml urine required)	20 ml urine
Organic acids - qualitative	10 ml random urine
Orotic Acid quantitation	10 ml random urine
Pyruvate Lactate	2 ml blood in gray top tube, mix, place in ice. Send to lab immediately (before 3 PM)

CALL LABORATORY FOR DETAILED INFORMATION

Patient Preparation is not required unless specified

AAQ6 & GCMSU can be requested as STAT in emergency situations

All STAT turnaround time: 24-48 hours

**CENTER FOR LABORATORY INVESTIGATION
FLOW CYTOMETRY**

DEPARTMENT OF PEDIATRICS/PATHOLOGY

ROOM MSB F-519 EXT. 7502

LABORATORY HOURS: MONDAY - FRIDAY, 8:00 AM to 6:00 PM

Instructions for specimen collection and handling are approximated here and should be confirmed with the laboratory when scheduling. All specimens should be labeled as follows and be accompanied by the following information.

1. Clearly label each tube with the patient's name and hospital number.+
2. Each specimen must be accompanied by a miscellaneous laboratory request form containing the following:
 - Patient's name, date of birth, gender and 12 digit hospital number and 16 digit billing number.
 - Name and extension or beeper number of the physician who obtained the specimen.
 - Name and room number of the office or physician who will receive the results.
 - List of the assays requested.
 - Diagnosis of the patient.
 - Time specimen obtained.
3. Specimen must be at room temperature and should not be more than eight hr. old.

NOTE: All of the above information must be present at the time the sample is delivered to the laboratory, otherwise the sample will be rejected and the physician notified.

GENERAL TEST LIST

The general test list contains the majority of tests which are performed on serum, plasma, and whole blood in the laboratories of University Hospital and New Jersey Medical School. Listed separately are requirements for the collection of blood bank, microbiology and virology specimens, tests done on urine, cerebrospinal fluid, and on body fluids, and specimens for special function laboratories. Listed below are the page numbers for the more commonly ordered specimen types. The meaning of abbreviations used on the following pages will be found in the Appendix.

TYPE OF SPECIMEN	PAGE NUMBER
Blood, serum, plasma	58 --
Body fluids	55
CSF	55
Urine	56-57
Blood Bank	12-26
Microbiology	27-34
Molecular Diagnostics (PCR)	35-37

BODY FLUID TESTS

Use Urine, CSF, and Body Fluids Order Form (UH-0141)

FLUID TYPE

SYNOVIAL FLUID

Examination includes appearance, WBC and RBC counts, differential and microscopic examination for crystals

Additional tests as needed.

SPECIMEN CONTAINER(S) NEEDED

One 5 ml green-top tube and one 5 ml red-top tube. (Deliver specimen as soon as obtained.)

Consult general test list for amount and container.

PLEURAL, PERITONEAL, or PERICARDIAL FLUID

Examination includes appearance RBC count, WBC count and differential.

Additional tests as needed.

Consult general test list for amount and container.

CSF EXAMINATION

Use Urine, CSF, and Body Fluids Order Form (UH-0141)

SPECIMEN for standard CSF examination (includes appearance, cell count, differential, protein, glucose, and lactate): Submit 3 lumbar puncture tubes, each containing 2-3 ml of fluid. Each patient care unit has lumbar puncture kits. The tubes included are usually pre-labeled #1, #2, #3 (if not, label as such). Use them in that order to collect the CSF.. Unless otherwise requested, tube #1 is used for chemistry, tube #2 for microbiology (when ordered), and tube #3 for cell count and differential. Microbiology requests must be on a separate microbiology form. Cytopathology requires an additional sample and request form when ordered.

URINE CHEMISTRY TESTS and URINALYSIS

TIMED COLLECTION OF URINE: Many of the analyses performed on urine specimens must be carried out on 24 hr. urine collections. If the urine collection is less than 24 hr., please mark the number of hours of urine collection on laboratory slip.

URINE CONTAINER: Urine containers for 24 hr. collections are available at the clinic or in Room C119. Return complete urine collection to the laboratory promptly.

CODES FOR PRESERVATIVE used in 24 hr. urine collection:

(N) - no preservative

(H) - 10 ml. Of 6 N HCl

(B) - 2 gm. Of boric acid

RANDOM urine specimens do not require any preservatives.

URINE TEST COLLECTION REQUIREMENTS

URINE TEST	AVAILABLE	CONTAINER REQUIRED	COLLECTION REQUIRED	FORM
AMYLASE	E	N	Random or Timed 2 or 24 hr	UH-0141
CALCIUM	D	N	24 hr	UH-0141
CHLORIDE	D	N	Random or 24 hr	UH-0141
CREATININE	D	N	Random or 24 hr	UH-0141
DRUG SCREEN 8	E	N	Random	Misc
Includes: amphetamines, barbiturates, benzodiazepine, cannabinoids, cocaine, methadone, opiates, phencyclidine	This is a screen for clinical purposes; positives are not confirmed by a second method.			
GLUCOSE	D	N	24 hr	UH-0141
HEMOSIDERIN	M-F	N	Random	UH-0141

URINE TEST	AVAILABLE	CONTAINER REQUIRED	COLLECTION REQUIRED	FORM
MAGNESIUM	D	N	24 hr	UH-0141
MICROALBUMIN	D	N	Random or 24 hr	
OSMOLALITY	E	N	Random specimen	UH-0141
PHOSPHORUS, INORG.	D	N	24 hr	UH-0141
POTASSIUM	E	N	Random or 24 hr	UH-0141
PROTEIN	D	N	Random or 24 hr	UH-0141
SODIUM	E	N	Random or 24 hr	UH-0141
UREA NITROGEN	D	N	24 hr	UH-0141
URIC ACID	D	N	24 hr	UH-0141
URINALYSIS	E	N	10 ml random	UH-0141

Includes: appearance of urine, pH, specific gravity, protein, glucose, ketone, bilirubin, blood, nitrite, urobilinogen, leukocyte esterase, and microscopic examination.

Submit the specimen in a Kovac tube

Send specimens for urinalysis to the laboratory immediately, as the test should be done within 1-2 hr. of specimen collection.

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
ACETAMINOPHEN	E	R or r	0.2 ml serum	UH-0140	0-30 µg/mL therap. range
ACETONE	E	R or r	0.1 ml serum	UH-0140	Negative
ACTIVATED PARTIAL THROMBOPLASTIN TIME (APTT)	E	B or b	Fill tube	UH-0140	24-39 min
ALANINE AMINO- TRANSFERASE, ALT	D	R or r	0.1 ml serum	UH-0140	0-35 u/L
ALBUMIN	E	R or r	0.1 ml serum	UH-0140	3.0-5.0 gm/dL
ALCOHOL (ethanol)	E	R	0.2 ml serum	UH-0140	Negative
Keep tube tightly stoppered					
ALKALINE PHOSPHATASE	D	R	0.1 ml serum	UH-0140	30-115 u/L
ALPHA-FETOPROTEIN Tumor marker	M - F	R	0.5 ml serum	UH-0140	0-15 ng/mL
ALT (ALANINE AMINO- TRANSFERASE,)	D	R or r	0.1 ml serum	UH-0140	0-35 u/l
AMIKACIN	D	R or r	0.2 ml serum	UH-0140	Peak 20-25 µg/mL
	Draw peak 30 min. after IV dose is completed. Draw trough immediately before next dose.				Trough 0-10 µg/mL
AMMONIA	E	GN	Fill tube	UH-0140	11-35 µmol/L
Specimen must be transported on ice					
AMYLASE	E	R or r	0.2 ml serum	UH-0140	28-100 u/L
ANA (antibodies)	M, W, F	R	1.0 ml serum	UH-0140	Titer Negative at 1:40
ANTI-CARDIOLIPIN ANTIBODIES	Thurs	R	1.0 ml serum	Misc	IgG = 0-10 U/mL IgM = 0-9 U/mL
ANTI-DNA ANTIBODIES	M, W, F	R	1.0 ml serum	UH-0140	Titer Negative at 1:10

TEST NAME	AVAILA BLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
ANTI-MITOCHONDRIAL ANTIBODIES	Once/ wk	R	1.0 ml serum	UH-0140	Titer Negative at <1:10
ANTINUCLEAR ANTIBODIES (ANA)	M,W, F	R	1.0 ml serum	UH-0140	Titer Negative at 1:40
ANTI-SMOOTH MUSCLE ANTIBODIES	Once/ wk	R	1.0 ml serum	UH-0140	Titer Negative at <1:20
ANTI-THROMBIN III	F	B	Fill tube	UH-0140	85-120%
ANTI-THYROGLOBULIN	Once/ wk	R	1.0 ml serum	Misc.	Titer Negative at <1:10
APTT	E	B or b	Fill tube	UH-0140	24-39 sec
AST (ASPARATATE AMINOTRANSFERASE)	D	R or r	0.1 ml serum	UH-0140	0-40 u/L
b HCG		See HCG, BETA SUBUNIT		UH-0140	
BILIRUBIN, DIRECT	E	R or r	0.1 ml serum	UH-0140	0-0.3 mg/dL
		Protect from light			
BILIRUBIN, TOTAL	E	R or r	0.1 ml serum	UH-0140	0-1.0 mg/dL
		Protect from light			

TEST NAME	AVAIL- ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
BMP – BASIC METABOLIC PANEL Includes:	E	R or r	0.2 ml serum	UH-0140	
Sodium					133-145 meq/L
Potassium					3.5-5.0 meq/L
Chloride					97-110 meq/L
Carbon Dioxide					23-30 meq/L
Glucose					70-109 mg/dL
Urea Nitrogen					5-25 mg/dL
Creatinine					0.8-1.5 mg/dL Male 0.7-1.2 mg/dL Female
Calcium					8.5-10.5 mg/dL
BNP	D	L or l	Fill tube	Misc	0 -100 pg/mL
BUN	E	R or r	0.2 ml serum	UH-0140	5-25 mg/dL
C3 COMPLEMENT	D	R or r	0.2 ml serum	UH-0140	90-207 mg/dL
C4 COMPLEMENT	D	R or r	0.2 ml serum	UH-0140	17-52 mg/dL
CA 125	Twice/wk	R	0.5 ml serum	Misc	0 – 35 u/mL postmenopause
CALCIUM, TOTAL	E	R or r	0.1 ml serum	UH-0140	8.5-10.5 mg/dL
CBC includes:	E	L or l	Fill tube	UH-0140	
Hemoglobin					14-18 gm/dL Male 12-16 gm/dL Female
Hematocrit					42-52 % Male 37-47 % Female
WBC					4500-11,000/ μ L

TEST NAME	AVAIL- ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE	
CBC cont'd						
Platelet count					130,000-400,000/ μ L	
RBC, MPV, MCV, MCH, MCHC, RDW					On report	
CBCD includes all components of CBC plus complete differential	E	L or l	Fill tube	UH-0140	On Report, see also CBC	
CEA	M,W,F	L	0.5 ml serum	UH-0140	0-3.0 ng/ml	
CHLAMYDIA TRACHOMATIS and/or NEISSERIA GONORRHOEAE by PCR	M-F	For cervical, urethral, and male urine.		UH-0140	Negative	
	Collection kits & instructions available in Chemistry C 119					
CHLORIDE	E	R or r	0.1 ml serum	UH-0140	97-110 meq/L	
CHOLESTEROL, TOTAL	D	R or r	0.1 ml serum	UH-0140	100-200 mg/dL	
CMP - (COMPREHENSIVE METABOLIC PANEL)	D		R or r	0.3 ml serum	UH-0140	See individual tests
Includes: Albumin, total protein, alk. phos, ALT, AST, total bili, calcium, Na, K, Cl, CO ₂ , BUN, creatinine, glucose						
CMV IGG ANTIBODY	Twice/ wk	R	1.5 ml serum	UH-0140	Negative	
CMV IGM ANTIBODY	Twice/ wk	R	1.5 ml serum	UH-0140	Negative	
CMV QUANTITATIVE by PCR	Once/ 2 wks	L	Fill tube	UH-0146	On report	

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
CO2 CONTENT	E	R or r	0.1 ml serum	UH-0140	23-30 meq/L
COOMBS TEST DIRECT & INDIRECT	D	R & L	Fill both tubes	UH-0102	Negative
CORTISOL	Twice/w k	R or r	0.2 ml serum	UH-0140	On report
CPK	D	R or r	0.2 ml serum	UH-0140	0-200 u/L
CPK MB	D	R	0.5 ml serum	UH-0140	0-6 ng/L
C-REACTIVE PROTEIN	M-Sa	R	1.0 ml serum	UH-0140	0-9 mg/L
C-REACTIVE PROTEIN High Sensitivity	D	R or r	1.0 ml serum	UH-140	0-3 mg/L
CREATININE	E	R or r	0.1 ml serum	UH-0140	0.8-1.5 mg/dL Male 0.7-1.2 mg/dL Female
CRYOGLOBULINS	BY APPT. ONLY	R	9 ml blood	UH-0140	Negative
	M, TU, F Call Chemistry (4080) for appt. & instructions.				
CYCLOSPORIN	D	L	Fill tube	UH-0140	
CYTOMEGALOVIRUS By PCR	Once/wk	L	Fill tube	UH-0146	On report
D-DIMER	E	B	Fill tube	UH-0140	90-500 ng/mL
DIGOXIN	D	R or r	0.1 ml serum	UH-0140	0.8-2.2 ng/mL

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
DRUG SCREEN (urine)	D		2 ml urine	UH-0141	Negative
This is a drug screen for clinical purposes; positives are not confirmed by a second method Includes: amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, methadone, opiates, and phencyclidine					
EBV IgG & IgM	Once/wk	R	1.0 ml serum	UH-0140	Negative
ELECTROLYTE PANEL	E	R or r	0.2 ml serum	UH-0140	See individual tests – Na, K, Cl, CO2
ENTEROVIRUS, Qualitative by PCR	CSF			UH-0146	
	Other specimens accepted: nasopharyngeal, throat or rectal swab collected in special collection tube.				
FACTOR II	M-F	B	Fill tube	UH-0140	60-140%
FACTOR V	M-F	B	Fill tube	UH-0140	60-130%
FACTOR VII	M-F	B	Fill tube	UH-0140	60-150%
FACTOR VIII	M-F	B	Fill tube	UH-0140	31-166%
FACTOR IX	M-F	B	Fill tube	UH-0140	74-176%
FACTOR X	M-F	B	Fill tube	UH-0140	64-169%
FACTOR XI	M-F	B	Fill tube	UH-0140	54-198%
FACTOR XII	M-F	B	Fill tube	UH-0140	45-183%
All factor assays are subject to approval by Laboratory Director					
FERRITIN	M-F	R or r	0.2 ml serum	UH-0140	30-400 ng/mL Male 13-150 ng/mL Female 14-60 yr 30-150 ng/mL Female >60 yr
FETAL HEMOGLOBIN	Once/w k	L	Fill tube	UH-0140	0.1-2.0%
FIBRIN SPLIT PRODUCTS	E	B *	Fill tube *	UH-0140	<5 µg/mL
* Special tube available in Hematology C117 .					
FIBRINOGEN	E	B or b	Fill tube	UH-0140	145-490 mg/dL

TEST NAME	AVAILABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
FLU A & B	D	Nasal washings or swab		MISC	NEGATIVE
FOLIC ACID (folate)	M-F	R	0.2 ml serum	UH-0140	4.2-19.9 µg/mL
FOLLICLE STIMULATING HORMONE (FSH)	M-F	R	0.5 ml serum	UH-0140	Follicular 4-13 miu/mL Luteal 2-13 miu/mL Midcycle 5-22 miu/mL Postmenop 20-140 miu/mL Male: 1-8 miu/mL
FTA	Once/week	R	1.0 ml serum		Non-reactive
Done only on specimens with a positive RPR; lab will do automatically on positive RPR					
G6PD SCREEN	Once/week	L	Fill tube	UH-0140	Negative
GAMMA GLUTAMYL TRANSFERASE	D	R or r	0.1 ml serum	UH-0140	Male: 11-51 u/L Female: 7-33 u/L
GENTAMICIN	D	R or r	0.2 ml serum	UH-0140	Peak 5-10 µg/mL Trough 0-2 µg/mL
	Draw peak 30 min. after IV dose is completed Draw trough immediately before next dose				
GLUCOSE	E	R or r	0.2 ml	UH-0140	70-109 mg/dL Fasting
		Grey top tube for glucose order only			
HAM TEST	M-F	Call Hematology lab for container.		UH-0140	Hemolysis absent

TEST NAME	AVAILABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
HCG, BETA SUBUNIT	D	R or r	0.5 ml serum	UH-0140	Male: <5 miu/L Nonpreg female: <5 miu/mL Pregnancy - Weeks post LMP 3-4 wk 9-130 miu/mL 4-5 wk 75-2600 5-6 wk 850-20,800 6-7 wk 4000-100,200 7-12 wk 11,500-289,000 12-16 wk 18,300-137,000 2nd trim 1400-53,000 3rd trim 940-60,000
HDL CHOLESTEROL	D	R or r	0.1 ml serum	UH-0140	Highest risk <25 mg/dL Average risk 45-60 Lowest risk >75
HEINZ BODY STAIN	M-F	L	Fill tube	UH-0140	Negative
HEMOGLOBIN A1C	M-F	L	Fill tube	UH-0140	4-6%
HEMOGLOBIN A2	Once/week	L	Fill tube	UH-0140	1.3-3.5%
HEMOGLOBIN ELECTROPHORESIS	M-F	L	Fill tube	UH-0140	100% HbA (normal levels of Hb F & Hb A2 are included with Hb A)
HEMOGLOBIN H INCLUSIONS	M-F	L	Fill tube	UH-0140	Negative
HEPARIN ASSAY	D	B	Fill tube	Misc	Unfractionated heparin – 0.3-0.7 IU/mL
HEPARIN INDUCED PLATELET AGGREGATION	M-F	R	Fill tube	Misc	Negative

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
HEPATITIS A IgM ANTIBODY	Twice/ wk	R or r	0.5 ml serum	UH-0140	Negative
	Done only when the AST is > 45 u/l				
HEPATITIS B CORE ANTIBODY	M-F	R or r	0.5 ml serum	UH-0140	Negative
HEPATITIS B SURFACE ANTIBODY	M-F	R or r	0.2 ml serum	UH-0140	Negative
HEPATITIS B SURFACE ANTIGEN	M-F	R or r	1.0 ml serum	UH-0140	Negative
HEPATITIS C ANTIBODY	D	R or r	0.2 ml serum	UH-0140.	Negative
HEPATITIS C VIRUS by PCR QUALITATIVE	Twice/ wk	L	Fill tube	UH-0146	On report
	Specimen must reach laboratory within 4 hours of collection.				
HEPATITIS C VIRUS by PCR QUANTITATIVE	Twice/ wk	L	Fill tube	UH-0146	On report
	Specimen must reach laboratory within 4 hours of collection.				
HEPATITIS C VIRUS GENOTYPE by PCR & reverse dot-blot hybridiz.	Once/ 2 wks.	L	Fill tube	UH-0146	On report
	Specimen must reach laboratory within 4 hours of collection.				
HERPES SIMPLEX – IgG AB 1 & 2	Twice/ wk	R	1.5 ml.	UH-0140	Negative
HIV ANTIBODY SCREEN	M-F	R	3 ml serum	UH-0140	Non-reactive
	Western Blot is done automatically if HIV Ab is detected by the screening test.				

TEST NAME	AVAILABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
HIV GENOTYPE & VIRAL LOAD for antiretroviral resistance	Once/2 wks	L	Fill tube	UH-0146 Specified patient information must be supplied.	On report
HIV (HIV-1) PROVIRAL DNA by PCR QUALITATIVE	Once/2 wks	L	Fill tube	UH-0146	On report
HIV (HIV-1) RNA QUANTITATION – VIRAL LOAD	Twice/wk	L	Fill tube	UH-0146	On report
		Range: 400-750,000 viral copies			
HIV (HIV-1) RNA ULTRASENSITIVE QUANTITATION – VIRAL LOAD	Twice/wk	L	Fill tube	UH-0146	
		Range: 50-75,000 viral copies			
HOMOCTSTEINE	D	R	1.0 ml serum	UH-0140	Male: 6.0-15.0 µmol/L Female: 5.0-12.4 µmol/L
HSV IgG AB TYPE 1 & 2 (HerpSelect™)	Twice/wk	R	1.5 ml.	UH-0140	Negative
HUMAN PAPILLOMA VIRUS subtype of high risk only (by hybridization)	Once/2 wks.	Cervical swab in special collection tube, biopsies, PreservCyt specimen sent for Pap smear		UH-0146	On report
HUMAN PAPILLOMA VIRUS subtype of high and/or low risk groups (by hybridization)	Once/2 wks.	Cervical swab in special collection tube, biopsies, preservCyt specimen sent for Pap smear		UH-0146	On report

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
IgA	Tu, Th	R or r	0.2 ml serum	UH-0140	70-380 mg/dL
IgE	Twice/ wk	R or r	0.2 ml	Misc	See report <16 yr. 0-100 iu/mL (adults)
IgG	Tu, Th	R or r	0.2 ml serum	UH-0140	691-1618 mg/dL
IgM	Tu, Th	R or r	0.2 ml serum	UH-0140	60-265 mg/dL
IMMUNOFIXATION Serum	Twice/w k	R	1.0 ml serum	UH-0140	On report
INHIBITOR SCREEN	M-Th	B	Fill 4 tubes	Misc	On report
INTERLEUKIN-2 RECEPTOR	Once/wk	L	Fill tube	UH-0140	1050-4830 pg/mL
IRON-BINDING CAPACITY (TIBC)	M-F	R	1.0 ml serum	UH-0140	250-400 µg/dL Male 250-445 µg/dL Female
IRON	M-F	R	0.5 ml serum	UH-0140	35-150 µg/dL
KLEIHAUER-BETKE STAIN	D	L	Fill tube	UH-0140	Negative for fetal cells
LACTIC ACID	E	GY or GN	1.0 ml plasma	UH-0140	0.5-2.2 meq/L
LAP SCORE (LEUKOCYTE ALKALINE PHOSPHATASE STAIN)	M-F	GN	Fill tube	UH-0140	Score of 32-138
LEAD	D	TAN	Fill tube	Misc.	<10 Mg/dL
LDH, TOTAL	D	R or r	0.2 ml serum	UH-0140	120-250 u/L
LDL CHOLESTEROL	D	R		UH-0140	60-100 mg/dL
	Calculated from Triglyceride, Cholesterol & HDL Cholesterol Direct measurement if triglyceride is > 400 mg/dl				

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
LIPASE	D	R or r	0.1 ml serum	UH-0140	0-60 u/L
LIPID PROFILE, includes: Cholesterol, HDL, LDL and triglycerides	D	R	0.2 ml serum	UH-0140	See individual tests
LITHIUM	E	R	0.2 ml serum	UH-0140	0.5-1.4 meq/L
LUTEINIZING HORMONE (LH)	M-F	R	0.2 ml serum	UH-0140	Midcycle 24-105 miu/mL Luteal <1-20 miu/L Postmenop 15-62 miu/L Male 2-12 miu/L
LYME DISEASE TOTAL ANTIBODY	Twice/ wk	R	1.5 ml serum	UH-140	Negative
LYMPHOCYTE SUBSETS	M-F	L	Fill tube	Misc.	On report
MAGNESIUM	E	R or r	0.1 ml serum	UH-0140	1.6-2.4 mg/dL
MALARIA SMEAR	D	L	Fill tube	UH-0140	Negative
MEASLES IGG AB (RUBEOLA)	Once/wk	R	1.5 ml serum	UH-0140	Non-immune
METHOTREXATE	M-F	R or r	0.2 ml serum	UH-0140	
MONOSPOT	M-Sat	R	1.0 ml serum	UH-0140	Negative
NAPA	D	R	0.5 ml serum	Misc	5-30 µg/mL
	Done automatically with procainamide				
OSMOLALITY	E	R or r	0.2 ml serum	UH-0140	280-295 mosm/k
PHENOBARBITAL	E	R or r	0.2 ml serum	UH-0140	15-40 µg/mL
PHENYTOIN		SEE DILANTIN			
PHOSPHORUS	E	R or r	0.1 ml serum	UH-0140	2.5-4.5 mg/dL

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
PLATELET AGGREGA- TION STUDIES		B - four	Fill tubes - 4	UH-0140	On report
	Prior consultation with Laboratory Medicine physician required. MUST be scheduled. Call Hematology lab to schedule patient for platelet aggregation study.				
PLATELET COUNT	E	L or l	Fill tube	UH-0140	130,000-400,000/ μ L
POTASSIUM	E	R or r	0.2 ml serum	UH-0140	3.5-5.0 meq/L
PREGNANCY TEST Qualitative	E	urine or R	1.0 ml urine or 1.0 ml serum	UH-0141 UH-0140	Negative
PROCAINAMIDE	D	R or r	0.2 ml serum	UH-0140	4-10 μ g/mL Therapeutic > 16 μ g/mL Toxic
PROLACTIN	M-F	R or r	0.2 ml serum	UH-0140	Males: 4.0-15.2 ng/mL Females: 4.8-23.3 ng/mL
PROSTATE SPECIFIC ANTIGEN (ABBOTT)	M,W,F	R or r	0.5 ml serum	UH-0140	0-4 ng/mL
PROTEIN C	Once/wk	B	Fill tube	UH-0140	60-140%
PROTEIN ELECTROPHORESIS	Tu, F	R	0.5 ml serum	UH-0140	On report
PROTEIN, TOTAL	E	R	0.2 ml serum	UH-0140	6.0-8.3 gm/dL
PROTEIN S ₂ functional	Once/wk	B	Fill tube	UH-0140	48-165%
PROTHROMBIN TIME (PT)	E	B or b	Fill tube	UH-0140	12.0-15.0 sec
QUANTIFERON TB GOLD	Once/wk	*	Fill	Misc.	Negative
	* Call lab for correct tube. Specimens accepted only between 8 AM and 5 PM Monday -Friday				
REPTILASE TIME	M-Th	B	Fill tube	UH-0140	11-20 sec

TEST NAME	AVAIL ABLE	TUBE	SPECIMEN	FORM	
RESPIRATORY SYNCYTIAL VIRUS ANTIGEN (RSV)	E	1-2 ml nasal washings. Collect in sterile, leak- proof container on ice.	Misc	Negative	
Deliver to lab immediately.					
RETICULOCYTE COUNT	E (peds) L or I M-F (adults)	Fill tube	UH-0140	0.5-2.0%	
RHEUMATOID FACTOR	M-Sa	R	1.0 ml serum	UH-0140	Negative
RISTOCETIN AB COFACTOR ASSAY	M-R	B - four	Fill tubes	Misc	On report
ROTAVIRUS ANTIGEN	M-Sat	At least 2 gm. of feces	Misc	Negative	
Refrigerate until delivered to lab.					
RPR	M-Sa	R or r	1.0 ml serum	UH-0140	Negative
RSV	D	Nasopharyngeal washing, aspirate or swab. Deliver to lab as rapidly as possible.		Negative	
RUBELLA SCREEN (IgG)	M,W, F	R	1.0 ml serum	UH-0140	Immune
RUSSELL'S VIPER VENOM TIME, DILUTED (DRVVT)	M-Th	B	Fill tube	Misc	28-44 sec
SALICYLATES	E	R or r	0.2 ml serum	UH-0140	Negative
SEDIMENTATION RATE (ESR)	D	L or I	Fill tube	UH-0140	Male 0-15 mm/hr Female 0-20 mm/hr
SICKLEDEX	E	L or I	Fill tube	UH-0140	Negative
SIROLIMUS	M-F	L or I	Fill tube	Misc.	

TEST NAME	AVAILABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
SODIUM	E	R or r	0.1 ml serum	UH-0140	133-145 meq/L
SUCROSE HEMOLYSIS TEST	M-F		Call Laboratory	UH-0140	No hemolysis
SYPHILIS SEROLOGY		See RPR (serum) or VDRL (CSF)			
T3 (TRIIODOTHYRONINE)	M-Sa	R	0.2 ml serum	UH-0140	0.5-1.4 ng/mL
T4 (THYROXINE)	M-Sa	R	0.2 ml serum	UH-0140	4.5-12.0 µg/dL
FREE T4	M-Sa	R	0.2 ml serum	UH-0140	0.7-1.9 ng/dL
TACROLIMUS	D	L	Fill tube	UH-0140	
TEGRETOL	E	R or r	0.2 ml serum	UH-0142	8-12 ug/mL
TESTOSTERONE	Twice/wk	R	0.5 ml serum	UH-0140	Adult male 280-800 ng/dL Adult female 6-82 ng/dL
THEOPHYLLINE	E	R or r	0.1 ml serum	UH-0140	10-20 µg/mL
THROMBIN TIME	E	B	Fill tube	UH-0140	14-22 sec
TOBRAMYCIN	D	R	0.5 ml serum	UH-0140	Peak 5-10 µg/mL Trough 0-2 µg/mL
	Draw peak 30 min. after IV dose is completed. Draw trough immediately before next dose.				
TOXOPLASMA ANTIBODIES IgG & IgM	Twice/wk	R	1.5 ml serum	UH-0140	Negative
TRANSFERRIN	T, Th	R or r	0.1 ml serum	UH-0140	210-360 mg/dL
TRIGLYCERIDES	D	R	0.1 ml serum	UH-0140	16-200 mg/dL
TROPONIN I	D	R	0.5 ml serum	UH-0140	<0.4 ng/mL

TEST NAME	AVAIL- ABLE	TUBE	SPECIMEN	FORM	REFERENCE RANGE
TSH	M-Sa	R	0.5 ml serum	UH-0140	0.27-4.2 μ IU/mL
UREA NITROGEN	See BUN			UH-0140	
URIC ACID	D	R or r	0.2 ml serum	UH-0140	2.3-7.7 mg/dL
VALPORIC ACID	D	R or r	0.2 ml serum	UH-0140	50-100 μ g/mL
VANCOMYCIN	D	R or r	0.2 ml serum	UH-0140	Peak 30-40 μ g/mL
	Draw peak 30 min. after IV dose is completed Draw trough immediately before next dose				Trough 5-10 μ g/MI
VARICELLA IGG AB	Once/ wk	R	1.5 ml serum	UH-140	Negative
VDRL	M-Sat	CSF	0.5 ml CSF	UH-0141	Non-reactive
	Done only on CSF; RPR done on serum				
VIRAL CULTURE		Contact Accession Area ext. 4080, 4081			
VITAMIN B12	M-F	R	0.2 ml serum	UH-0140	210-945 pg/mL
VON WILLEBRAND AG	M-F	B	Fill tube	Misc	50-160%

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