



LABORATORY SERVICES INFORMATION MANUAL

2020-2021

The specimen collection procedures and requirements in this manual are excerpted from current approved policies and procedures.

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HOURS OF SERVICE

ANATOMICAL AND SURGICAL PATHOLOGY

The Pathology Office is open between the hours of 0730 and 1700 Monday through Friday. Should a Pathologist's consultation be needed outside of these hours, or on holidays or weekends, a 24-hour on-call schedule has been established. The Hospital operator and the Laboratory can be called to contact the pathologist on call. The pathologist on call can be paged through the online paging system.

CLINICAL LABORATORY

The Clinical Laboratory provides diagnostic testing, transfusion services and support services 24 hours a day, 365 days a year.

PHLEBOTOMY AND SPECIMEN COLLECTION

INPATIENT

The Nursing staff provides inpatient specimen collection unless laboratory collection is requested. If a nurse has attempted to collect a specimen twice, the Laboratory can be contacted to perform phlebotomy.

The Laboratory provides inpatient phlebotomy and phlebotomy support services on a STAT and Routine basis for all clinical departments twenty-four hours a day, seven days a week.

OUTPATIENT

Phlebotomy is provided in the Outpatient Draw Station Monday through Friday from 0730 to 1700. The Draw Station is located at 3030 Children's Way, Medical Offices Building (MOB).

Phlebotomy services are also provided at authorized collection sites. Contact Laboratory Patient Services at 858-966-8600 for a copy of the authorized draw site list and hours. Specimens collected at these draw sites are picked up by the Rady Children's Hospital contract couriers and delivered to Rady Children's Lab for processing.

TEST ORDER ENTRY

INPATIENTS

The Epic electronic medical record (EMR) system is used to request tests.

Surgical pathology, cytology and bone marrow examinations are ordered using Epic. Special instructions, including requests for frozen section interpretation must be communicated to the histology lab (ext. 225041) or to a pathologist. Surgical pathology, cytology and bone marrow specimens are not to be transported via the pneumatic tube system and must be delivered manually.

Blood Gas Requisitions are used for ordering Blood gas analysis on arterial, venous and capillary samples. In addition to providing the proper patient identification, each Blood Gas requisition must include:

- Source of the blood sample (i.e., arterial, venous, capillary)
- FI02
- The temperature of the patient and source (i.e., rectal, axillary, oral).

Universal Requisition – The Universal Requisition is used during Trauma, Code, or computer downtime situations and when laboratory tests are not orderable in Epic EMR. During computer downtime, the Universal Requisition may also be used as a Laboratory reporting mechanism.

The Laboratory will not accept requisitions with incomplete patient demographics or specimen documentation. Requisitions have designated spaces for the following information (NOTE: minimum required information is in **bold**):

- **Patient's First and Last Names**
- **At least one unique identifying number**, such as Date of Birth, Medical Record Number, Finance Number, Trauma or Medical Code name
- **Patient's Location**
- **Date and time of collection**
- **Initials of the collector**
- **Test(s) requested**
- Attending Physician(s)
- Priority of the test ordered: STAT or ROUTINE
- Source of specimen i.e., blood, urine, CSF
- Method of collection, i.e. line, heelstick, catheter, LP
- Code, Trauma, and Cardiac Surgery designations

TEST ORDER ENTRY

OUTPATIENTS

Laboratory Request Form (Requisition Form) - Physician clients of RCHSD Laboratory are provided with Laboratory Request Forms that contain the physician or practice name and address. Each requisition is numbered with a unique identification number. This number also appears on the specimen labels supplied on each requisition so that they are positively linked.

For RCHSD Physicians who have access to the Epic EMR and are able to enter complete patient demographics into the computer system, the minimum required information is in **bold** below. For physicians who do not have access to Epic EMR, all of the information listed below is required.

- **Patient's First and Last Name, Date of Birth, Sex, and SSN**
 - Parent or Guardian Name, Address, Telephone number, and SSN
 - Insurance information and copies of insurance cards
 - **ICD-10 Diagnosis Codes** for the tests ordered or appropriate narrative diagnoses and/or symptoms
 - **Test(s) requested**
 - **Date and time of collection**
 - **Source of specimen**
-

Physician Prescriptions – Those physicians who do not have preprinted Laboratory Request forms may use a prescription form to order laboratory tests. The following information is required on the prescription. The Patient Services staff will call the physician's office to obtain missing information before reporting patient results.

- Preprinted Physician Identification information.
- Date order written
- Date and time of collection of specimen
- Patient's First and Last names
- Patient's Date of Birth
- ICD-10 Diagnosis Codes for the tests ordered or appropriate narrative diagnoses and/or symptoms
- Physician's signature

SPECIMEN IDENTIFICATION REQUIREMENTS

Specimens received by the Laboratory must be accurately labeled. Specimens without complete patient identification affixed to the specimen will be rejected and a new specimen will be requested. Only those specimens that cannot be readily recollected (i.e., CSF, tissue) may be exempt from this requirement and only when approved by the Laboratory Medical Director or designee.

Specimen labels must be affixed to the specimen and provide the following information:

INPATIENT SPECIMENS

- Patient's First and Last Names
- Medical Record Number
- Patient's Location
- Date and Time the specimen was collected.
- Initials of the person obtaining the specimen. NOTE: Blood Bank specimens for compatibility testing must include the initials of the staff member collecting the specimen and also initials of a second staff member as a witness who verifies the patient's identification. The initials of both staff members must be on the label that is placed on the specimen tube. Corrections are not permitted. Specimens for compatibility testing may not be shared with other laboratory testing. This includes the following tests
 - Type and Screen
 - Blood Bank Hold
 - Transfusion Reaction Workup
 - Neonatal Blood Bank Workup
- Source of specimen if other than blood (i.e. CSF, urine)

UNDER EMERGENCY CONDITIONS (i.e., CODE/TRAUMA), THE SPECIMEN LABEL MUST INCLUDE:

- Patient's Name (i.e. TRAUMA, ALLIGATOR)
- Medical Record Number
- Blood Bank specimens for compatibility testing must include the initials of the collector plus the initials of a witness who verified patient identification and the date and time of the collection.

OUTPATIENT SPECIMENS

- Patient's last and first names or last name and first initial
- Medical Record Number (when available)
- Date and time the specimen was collected
- Initials of the collector. Blood Bank specimens also require the initials of a witness.
- Source of the specimen if other than blood (i.e., CSF, urine, swab-left eye, swab-right foot etc.)

TESTING PRIORITIES

The Pathology Department is committed to the expeditious reporting of all tests results. Certain clinical situations will at times require special attention. In order for the Laboratory to respond appropriately to these situations, personnel with direct patient contact must accurately designate the appropriate testing priority for each specimen.

CODES / TRAUMAS / CARDIAC SURGERY

<u>Test</u>	<u>Code/Trauma Turnaround Times*</u>
CBC	< 15 minutes
HGB & HCT	< 15 minutes
BLOOD GAS	< 15 minutes
ELECTROLYTES	< 30 minutes
ALBUMIN	< 30 minutes
TYPE & SCREEN	<50 minutes

STAT

STAT specimens will be collected when there is an available phlebotomist provided there are no pending collections of higher priority. For in-house performed tests, Stat specimens are processed and analyzed upon receipt, following those with CODE, TRAUMA, and CARDIAC SURGERY priority.

<u>Test</u>	<u>STAT Turnaround Times*</u>
CBC	< 60 minutes
HGB & HCT	< 30 minutes
BLOOD GAS	< 15 minutes
ELECTROLYTES	< 60 minutes
ALBUMIN	< 60 minutes
TYPE & SCREEN	< 60 minutes

ROUTINE

<u>TEST</u>	<u>Routine Turnaround Times*</u>
CBC	< 3 hours
HGB & HCT	< 3 hours
ELECTROLYTES	< 3 hours
ALBUMIN	< 3 hours
TYPE & SCREEN	< 2 hours

* Turnaround times are calculated from the time of specimen receipt in the laboratory to time of report. Blood Bank turnaround times are calculated from the time the specimen is received in the blood bank computer system.

CRITICAL RESULTS

The critical results defined below have been approved by the Director of Pathology and the Medical Staff Executive Committee. Verified critical results are called by telephone within 10 minutes to a licensed caregiver (physician, RN, nurse practitioner, physician's assistant, respiratory therapist, licensed vocational nurse, and authorized ordering clinician). Critical results are not communicated via voicemail. **Exception:** Critical results for Cardiovascular Surgery Patients are not called. The Cardiovascular Surgery Team receives results on the laboratory report printer in that area when they are verified.

HEMATOLOGY

	UNITS	LOW	HIGH	NICU	
				LOW	HIGH
Hemoglobin	g/dL	<7.0	>22.0	<10.0	>22.0
Hematocrit	%	<20	>60	<30	>65
Platelets	μL	<50,000 ¹	>1,000,000	<100,000	>1,000,000
WBC	μL	<2,000 ²	>30,000	<4,000 ³	>30,000
Abs. neutrophil count	μL	N/A	N/A	<500	N/A
PT (without anticoagulant therapy)	Sec	N/A	>23.0	N/A	>23.0
INR (without anticoagulant therapy)	N/A	N/A	>2.0	N/A	>2.0
PT (with anticoagulant therapy)	Sec	N/A	>37.6	N/A	>37.6
INR (with anticoagulant therapy)	N/A	N/A	>3.6	N/A	>3.6
APTT (without anticoagulant therapy)	Sec	N/A	>50	N/A	>50
APTT (with anticoagulant therapy)	Sec	N/A	>130 ⁴	N/A	>130
PFA	Sec	N/A	>185	N/A	>185

1. ECMO: Call platelets < 100,000/uL
Hem/Onc: Call platelets < 10,000/uL
2. All inpatient and outpatient areas EXCEPT Hem/Onc and NICU: Call WBC < 2,000/μL, *first hemogram only*.
Hem/Onc inpatients and outpatients: There are no low WBC critical values.
3. NICU: WBC critical value is *always* < 4,000/uL.
4. Not critical for ECMO

CHEMISTRY / BLOOD GAS

	UNITS	LOW	HIGH	NICU	
				LOW	HIGH
Ammonia, Plasma	μmol/L	N/A	>100	N/A	>100
Bilirubin, Total	mg/dL	N/A	>15 (≤6 mos.)	N/A	>15
Calcium, Serum	mg/dL	<7	>12	<7	>12
CO ₂ Total, Serum	mmol/L	<10	>40	<10	>40
Creatinine, < 24 mos.	mg/dL	N/A	>1.5 or 50% increase from previous		
Creatinine, 2-11 yrs.	mg/dL	N/A	>2.0 or 50% increase from previous		
Creatinine, >12 yrs.	mg/dL	N/A	>3.0 or 50% increase from previous		
Glucose, CSF	mg/dL	<35	N/A	<25	N/A
Glucose, Serum ¹	mg/dL	<60	>500	<50	>250

CHEMISTRY / BLOOD GAS

	UNITS	LOW	HIGH	NICU	
				LOW	HIGH
Ionized Calcium	mmol/L	<0.80	>1.59	<0.90	>1.59
Lactic Acid	mmol/L	N/A	N/A	N/A	>5.0
Magnesium, Serum	mg/dL	<1.0	>4.0	<1.0	>3.0
Phosphorus, Serum	mg/dL	≤1.0	N/A	≤1.0	N/A
Potassium, Serum	mmol/L	<2.5	>6.0	<3.0	>6.0
Sodium, Serum	mmol/L	<125	>160 ²	<125	>150
SGPT (ALT)	U/L		>100 (Trauma only)		
T4, Total	μg/dL	N/A	>20	<5	>20
Troponin I	ng/mL		≥0.3		
TSH	μIU/mL	<0.1	>20.0	<0.1	>10.0
1. Outpatients: Call Glucose results <50 mg/dL					
2. ICU: Not called if last four within 48 hrs are >160.					
	UNITS	LOW	HIGH	NICU	
				LOW	HIGH
Arterial Blood Gas					
PCO ₂	mmHg	<20	>60	<15	>70
PO ₂	mmHg	<60	N/A	<40	N/A
pH		<7.20	>7.60	<7.25	>7.60
Venous Blood Gas					
PCO ₂	mmHg	<25	>65	<20	>75
PO ₂	mmHg	N/A	N/A	<25	N/A
pH		<7.15	>7.55	<7.15	>7.55
Capillary Blood Gas					
				858	
PCO ₂	mmHg	<15	>60	<15	>70
PO ₂	mmHg	<35	>100	N/A	N/A
pH		<7.25	>7.60	<7.20	>7.60

TOXICOLOGY

TEST	UNITS	VALUE
Acetaminophen	μg/mL	>30
Carbamazepine	μg/mL	>15
Digoxin	ng/mL	>2.5
Ethanol	mg/dL	>13.0
Phenytoin	μg/mL	>25
Phenobarbital	μg/mL	>50
Gentamicin	μg/mL	Peak: >15 Trough: >2.5
Salicylate	mg/dL	>30
Tobramycin	μg/mL	Peak: >15 Trough: >2.5
Vancomycin	μg/mL	Peak: >45 Trough: >15
Valproic Acid	μg/mL	>150
Drug Screen		Any positive

OTHER TESTING

Urine Microscopy – Wet Mount	Positive for spermatozoa
Pregnancy tests, serum and urine	Positive and Equivocal (5.0-25.0 mIU/ml)
Blood Bank	Positive antibody screen when patient has no history at RCHSD and is in operating room or emergency room
	Positive hemolytic or bacterial contamination transfusion reaction or reported by the blood vendor
Molecular Diagnostics (PCR)	Positive HSV Positive CMV, CSF Positive <i>B. pertussis</i> and <i>B. parapertussis</i>
Microbiology and Serology	Positive cultures of normally sterile body fluids (e.g., blood, bone marrow, synovial fluid, CSF, pleural, peritoneal, or pericardial fluid) ¹
	Positive cultures of normally sterile internal parenchymal organs (e.g., lung, kidney, spleen, liver, pancreas, brain)
	Positive gram stain of normally sterile body fluid or tissue ¹
	Positive blood parasite films ¹
	Positive culture of organisms implicated in myonecrosis in soft tissue cultures
	Positive HIV
¹ Only positive CSF gram stains and blood cultures are called to the Emergency Department.	

BLOOD BANK

1. **Requests for blood, blood products and routine immunohematology** are ordered via the Epic EMR, Universal Requisition (during Epic downtime), or Laboratory Request Form (Outpatients). The total volume required in mL or full units and any special requirements (see 7 below) must be indicated.
2. **Non-routine immunohematology, special testing, and antibody identification** are ordered using a Universal Requisition or ordered via the Epic EMR using the test code “Other Reference Test” and are sent to the San Diego Blood Bank, American Red Cross, or Blood Centers of Wisconsin.
3. **Verbal orders** will not be accepted except in extreme life-threatening situations. Indicate when blood products will be needed and special requirements (i.e., amount of product, Irradiated, CMV Negative, Phenotype Compatible, etc.). Verbal orders must be immediately followed by Epic order entry or Universal Requisition.
4. **Labels on Blood Bank specimens** must meet minimum patient identification requirements. Addressograph labels or computer-generated labels are preferable in all situations. Labels that are placed on the specimen tube for compatibility testing (type & screen, blood bank hold, transfusion reaction workup or neonatal workup) must include:
 - Patient’s first and last names
 - Unique identifier (i.e., medical record number or date of birth).
 - Initials of the person collecting the specimen
 - Initials of a witness to the collection who verified that the name and unique identifier on the specimen match the patient’s ID band
 - Date and time of collectionLabels should be placed lengthwise on the specimen tube so as to cover the manufacturer's white label without obscuring the contents of the tube.
5. **Specimen Rejection** – Hemolyzed, improperly labeled specimens for compatibility testing, compatibility specimens shared with other laboratory testing and specimens missing either the patient’s full name and/or unique identifier will be rejected and a new order and specimen will be requested.
6. **Frequency** - Specimens for compatibility testing for patients over 4 months old must be collected at RCHSD Main Campus every 3 days and/or with each new admission. Day Zero is the day of collection. Results of specimens collected at a RCHSD satellite facility are not acceptable at RCHSD Main Blood Bank.
7. **Special Requirements** – Leukocyte-reduced packed cells and platelets are considered CMV SAFE and are issued to all patients (except autologous blood). All cellular products at RCHSD are pre-storage leukocyte reduced. All special requirements must be specifically ordered by a physician. Follow the “Guidelines for Ordering Blood and Blood Products for Patients 4 Months or Less” and the “Guidelines for Ordering Blood and Blood Products for Patients Over 4 Months.”
 - Irradiated blood products are administered to neonates less than 4 months of age.
 - Irradiated blood products are available upon request when clinically indicated for immunocompromised patients.
 - CMV seronegative blood is used for low birth-weight infants (< 1 kg).
 - CMV seronegative and irradiated blood products are available upon request when clinically indicated for severe congenital immunodeficiency.
 - Phenotype-matched blood is available on request for patients with rare anemias, thalassemia and sickle cell disease who have a red cell phenotype or genotype on file. Patients without red cell phenotypes will be given the most common phenotype match (C neg, E neg and K neg) until a phenotype or genotype is obtained. Please call Blood Bank for new patients who do not have a red cell phenotype or genotype on file.

BLOOD BANK (cont'd)

- Washed red blood cell products are administered to neonates less than 4 months of age **and** weigh less than 4 kg for the following procedures
 - Non-pump, pump stand-by, chest closure or chest washout/exploration or Major open belly surgery
 - Patients in renal failure with a current critical K+ level
 - Washed red blood cells are also available upon request when clinically indicated for patients with severe allergic reactions, patients in renal failure with a *current* elevated K+ level for routine transfusion only, patients with genetic IgA deficiency and for patients with *Streptococcus pneumoniae*-associated hemolytic uremic syndrome.
 - Washed red blood cells will not be administered to neonates <4 months of age and < 4kg for normal routine transfusion or for patients of any age or weight on ECMO
8. **Autologous and Directed Donations** – A physician's order is required for autologous and/or directed blood product donations. Persons desiring to make a directed donation should consult with the patient's physician. Autologous and directed donations must be coordinated through the San Diego Blood Bank Special Procedures Scheduling Department at 877-659-2001.
9. **Second Blood Type and Previous History** – A second blood type or previous history at RCHSD Blood Bank is required prior to issuing type-specific blood and blood products. ABO group and Rh type verification must be made from a specimen collected at a different time than the original type and screen or neonatal workup. Verification samples (ABO2) can be as small as 1 drop of whole blood and do not require double initials. Until the ABO Group and Rh Type are verified, only Group O Negative red blood cells and Group AB plasma and platelets can be issued. If O Negative red blood cells, Group AB plasma and/or platelets are unavailable, a verification sample will be requested by the Blood Bank prior to issuing products. If a verification sample is not obtained, a *Deviation from Standard Protocol* waiver must be signed by the transfusing or ordering physician.
10. **Transfusion Reactions** must be immediately reported to the Blood Bank. In the event of a transfusion reaction, the following steps must be taken:
- Stop the transfusion immediately
 - Keep IV Line Open
 - Notify Attending Physician
 - Notify Blood Bank (ext. 227713) with the exact adverse reactions
 - Fill out a reaction report in the Epic Blood Administration Doc Flow Sheet
 - Return completed Transfusion Record and blood unit, including tubing and filter, to the Blood Bank
 - Collect a post-reaction blood sample (3 ml EDTA-Lavender Top) and send to Blood Bank. The specimen label on the tube must be initialed by the collecting nurse and a witness.
 - Collect the first post-reaction urine and send to Blood Bank labeling with a demographics label
11. **Deviations and Waivers** - The Medical Director of the Transfusion Service or Pathologist on call must approve any and all deviations from standard operating procedures. The ordering physician must also be notified and acknowledge the notification by signing the *Waiver Required* section in the top right hand corner of the Transfusion Record hardcopy. The following are conditions that will require a waiver signed by the physician:
- Emergency issue of uncrossmatched blood products
 - Incompatible crossmatch issued
 - Unidentified antibody encountered
 - CMV untested component issued to patient requiring CMV Negative products
 - Non-irradiated component issued to patient requiring Irradiated products

- Non-sickle cell tested component issued to patient requiring sickle cell negative products
- Incompatible plasma product issued or no verification (ABO2) sample obtained prior to issue of type specific plasma products
- Rh Positive platelets issued to Rh Negative Patient
- Any other planned or unplanned deviation from Standard Operating Procedure

CHEMISTRY

Requests: Chemistry tests are ordered via the Epic EMR, Universal Requisition (during Epic downtime), or Laboratory Request Form (Outpatients).

Line Draws: Specimens obtained by the Nursing Service from indwelling or intravenous catheters must be immediately transferred into the container appropriate for the tests requested. Failure to do so immediately may compromise or invalidate testing. When a phlebotomist is present, they will assist with this service. For the proper container selection, refer to the [Laboratory Test Dictionary](#) or call the Laboratory 858-966-5413 for assistance.

Processing Time: Whole blood collected in red top tubes requires at least 30 minutes clotting time before processing. For STAT chemistry testing, use heparinized green top tubes whenever appropriate.

Special Requirements:

- **Fasting specimens** require that the patient not eat or drink anything except water for 8 to 12 hours before the specimen is obtained.
- **Urine samples** submitted for analysis frequently have requirements with respect to the time of collection or to the type of preservatives added.

Collection Instructions for Timed Urine Specimens

NOTE: Drugs and foods that interfere with catecholamine, VMA, metanephrine, and 5-HIAA determinations are listed in Appendix A.

1. Verify specimen requirements to determine if a preservative or refrigeration is required. If a preservative is required, call the Laboratory at 858-966-5413 to obtain a large collection container. Collection containers without preservatives are available on nursing units.
2. Have patient void at the beginning of the collection period. Discard the first voided sample and record the start time.
3. Transfer all urine voided up to and including the sample at the end of the collection period to the collection container. Record the end of collection time.
4. Urine for tests that do not require a preservative must be refrigerated or stored on ice throughout collection.

Collection Instructions for Random Urine Specimens

Note: Drugs and foods that interfere with catecholamine, VMA, metanephrine, and 5-HIAA determinations are listed in Appendix A. The first morning urine is the most concentrated and, though useful for quantification of certain chemical constituents, it is undesirable for cytologic interpretation.

1. Refer to the specimen requirements in the [Laboratory Test Dictionary](#) or call the Laboratory at 858-966-5413 to confirm.
2. Transport the specimen to the Laboratory as soon as possible after collection.

SWEAT CHLORIDE SPECIMEN COLLECTION

Inpatients: Sweat chloride testing is available Monday-Friday. Specimen collection is performed by Respiratory Services.

Outpatients: Sweat chloride testing is available by appointment, Monday-Friday. Call 858-966-8184 or 858-966-5982 to make an appointment.

GLUCOSE TOLERANCE TESTS

1. **Inpatients:** Call extension 5009 to schedule testing at least 24 hours in advance.
2. **Outpatient** testing is available Tuesday-Friday by appointment only. Call 858-966-6776 to make an appointment.

CYTOLOGY

Requests: An order in EPIC (LAB00594 Cytology) must be placed by the ordering physician.

Cervical, vaginal, oral cavity, buccal mucosa, etc.: Place slide(s) IMMEDIATELY in a 2 oz. bottle of 95% ethanol fixative. DO NOT AIR DRY. Fixative containers may be obtained from the Histology Laboratory, at 858-966-1700, extension 225041 or from the main laboratory at 858-966-5413.

Sputum: Have the patient cough (not spit) directly into an appropriately labeled clean urine container. Forward the specimen and requisition to the Laboratory immediately.

Fluids: Bronchial washings, bronchial aspirations, peritoneal fluids, ascites fluids, pleural and pericardial fluids, joint fluids, cyst aspirations, urine, etc. Bring the specimen directly to the Laboratory immediately after it has been obtained. If bacteriologic studies are also desired on the specimen, order the culture in Epic and be sure to submit both the Microbiology labels and the Surgical Pathology requisition.

Needle aspirations of tumors, etc.: Contact a pathologist and/or technologist in advance at 858-966-5914.

Cerebrospinal fluid: Deliver all requisitions and fresh specimens immediately to the Laboratory.

Tzanck preparations permit the presumptive cytologic diagnosis of Varicella or Herpes virus infection. The smear is made from the base of a skin vesicle. Specimen collection is the responsibility of the attending physician and/or his/her designee. Tzanck smear kits with slides, alcohol and scalpel blade are available from histology at 858-966-1700, extension 225041 or from the clinical lab at 858-966-5413.

1. Wipe the lesion selected for study with alcohol and allow to air dry for one minute.
2. Label the frosted side of a clean dry slide with the patient's name and date. Make two slides for each site of collection.
3. Open or remove the crust from the vesicle or with a scalpel blade.
4. Scrape the base of the lesion gently with the edge of the scalpel blade and then smear scraping material several times on to a glass microscope slide.
5. Immediately immerse the slides in 95% alcohol and transport them to the laboratory in this fixative.

Nasal Cytogram collections are performed by Respiratory Services. Call 858-966-8184 to schedule this collection. Testing is performed Monday through Friday.

Ciliary Motility specimen collection is performed by Respiratory Services. Call 858-966-8184 to schedule this collection. Testing is performed between the hours of 0800-1600 Monday through Friday.

Slide interpretation is available within 24 hours following receipt of the specimen (excluding weekends and holidays). For interpretations after 4:30 pm, and on weekends and holidays, please contact the pathologist on call.

ELECTRON MICROSCOPY

Electron Microscopy is performed on tissue and fluid specimens submitted for ultra-structural analysis.

Request: An order in EPIC (LAB8 Pathology Tissue) must be placed by the ordering physician.

Clinical History is essential for proper workup and interpretation of each specimen. If the patient has had tissue specimens examined at another hospital, please notify the Pathology office at 858-966-5914 so that these slides can be obtained.

Tissue Fixation

1. Both tissue and fluids should be placed immediately in fresh paraformaldehyde glutaraldehyde or Trump's fixative. This is the most critical step in assuring proper fixation. The volume of glutaraldehyde should be at least 10 times that of the specimen. Call 858-966-1700, ext. 225041 to obtain the appropriate containers and fixative.
2. Large tissue samples should be trimmed to approximately 1-2 mm blocks with a thickness no greater than 1 mm. However, the tissue should not be "minced" into smaller blocks, as this induces artifact.
3. Fresh EM fixative (paraformaldehyde glutaraldehyde) can be obtained from the Electron Microscopy Laboratory, the main Operating Room, and from the Histology laboratory. The fixative will turn cloudy when it expires and should be kept refrigerated.
4. Regular processing for ultrastructural evaluations usually takes 2-3 working days. This procedure can be shortened in cases where rapid diagnosis is essential. Specimens coming in the latter part of the week are held over until the following working Monday for processing.
5. Archives of digital images from electron microscopy are maintained in the Pathology Department.
6. Questions regarding specimen fixation and handling should be referred to the Electron Microscopy Laboratory. Normal operating hours are 0800-1500 Monday through Friday (holidays excepted). Further questions may be addressed to the Pathologists at 858-966-5914.

HEMATOLOGY and COAGULATION

Requests

Hematology and Coagulation tests are ordered through the Epic EMR, Universal Requisition, or Laboratory Request Form.

Specimen Containers

Lavender (Purple) top sample tubes are used for routine Hematology tests. Light Blue top sample tubes are used for routine Coagulation tests. Tubes are available in the sizes listed below. Choose the size tube that is appropriate for the specimen requirement(s) for the test(s) ordered. The ratio of anticoagulant to blood is crucial for accurate coagulation results. **DO NOT OVERFILL OR UNDERFILL THESE TUBES.** For collection requirements, refer to the [Laboratory Test Dictionary](#) or call the Laboratory 858-966-5413 for assistance.

<u>CONTAINER SIZE</u>	<u>BLOOD VOLUME</u>
Lavender Top Microtainer	0.4 to 0.5 mL
Lavender Top Tube (3 mL)	1.0 to 3.0 mL
Light Blue Top Tube (2 mL)	1.8 mL +/-10% (1.62 to 1.98)
Light Blue Top Tube (3 mL)	2.7 mL +/-10% (2.43 to 2.97)

Collection Instructions for Coagulation Studies (Light Blue Top Tubes)

1. The preferred method of specimen collection for coagulation studies is a properly performed venipuncture. Fingerstick or heelstick collections are not acceptable because the presence of tissue fluids from the procedure interferes with the testing.
2. The specimen may be collected directly into 2.7 or 1.8 mL vacutainer tube or into a syringe and then transferred immediately into a 2.7 or 1.8 mL vacutainer tube. Special Coagulation Factor Studies require special tubes, anticoagulant and transportation. Call the Laboratory at 858-966-8600 when these tests are ordered.
3. The collection tubes must be inverted several times immediately after filling to ensure adequate mixing with the anticoagulant. Failure to mix properly may result in clotting of the specimen.
4. Tubes must be properly filled. Insufficient specimen will result in a greater dilution of the specimen by the anticoagulant, and result in falsely elevated clotting times. Too much specimen may overpower the anticoagulant resulting in clotting of the specimen.
5. The specimen should be transported to the Laboratory within one hour of collection.
6. SPECIAL INSTRUCTIONS FOR SPECIMENS COLLECTED FROM AN INDWELLING LINE: If collecting specimens for coagulation studies from an indwelling line, current coagulation testing standards require that six times the volume of the line is cleared before drawing samples for coagulation testing. Depending upon the type of line used, dead-volumes can range from 0.7 to 2.0 mLs. This means that the volume of blood needed to be drawn off before sampling can range from 4.2 mLs to 12 mLs.

Collection Instructions for Hematology (Lavender Top Tubes):

1. The specimen may be collected directly into 3.0 mL vacutainer tube or into a syringe and then transferred immediately into a 3.0 mL vacutainer tube or 0.5 mL microtainer.
2. The 3.0 mL collection tubes must be inverted several times and the microtainers gently shaken immediately after filling to ensure adequate mixing with the anticoagulant. Failure to mix properly may result in clotting of the specimen.

MICROBIOLOGY

Requests

Orders for Microbiology testing must include name, location, date of birth, anatomic source of the specimen, medical record #, finance #, date and time of collection, and any relevant comments such as organism expected.

- Label and deliver the specimen to the lab as soon as possible.
- Labels must be initialed, dated and timed by the individual who collects the specimen.

Universal (manual) requisitions for Microbiology tests must include the entire patient demographic and diagnostic information described under Test Requisitions in this manual. In addition, the following information should also be included:

1. Source of specimen (i.e., cyst fluid left arm, swab right eye, blood, urine, etc.)
2. Method of collection (Urines) i.e. Cath, Clean Catch etc.

Specimen Collection and Transport Guidelines

Transport: All samples for microbiologic evaluation must be transported to the laboratory immediately (Inpatient) or on the day of collection (Outpatient). Delay may result in the loss of fastidious organisms, particularly anaerobes. **Exception:** Stool specimens for Ova and Parasite exam may be held until all specimens are collected as long as the specimen is immediately placed in transport vials. Urgent Care specimens will be delivered via the next courier run.

Anaerobes: Specimens for anaerobic culture should be submitted in appropriate container described in the Table following this section. It is important to submit these specimens as indicated because anaerobic organisms are oxygen labile and rapidly lose viability if inappropriately transported. An appropriate sterile container is the syringe used to collect the sample with the needle removed and the syringe capped. **NOTE: NEVER SEND SYRINGE WITH NEEDLE ATTACHED**

Sample Volume: The largest possible sample from the potentially infected site must be submitted to the Laboratory as inadequate specimens may yield false negative results. When large sample volumes are available (i.e., body fluids, CSF, pus, bronchial washings, sinus washings), the sample may be submitted in an appropriate sterile container. If minimal sample is available, obtained, use an E-swab.

Antimicrobial Agents: Whenever possible, collect specimen before administering antimicrobial agents.

Throat cultures require special handling. Throat swabs must be submitted on a Culturette II swab.

- Calcium alginate tip or cotton tip swabs should NOT be used because they also interfere with the optimal performance of the Rapid Strep A test.

MICROBIOLOGY (cont'd)

Tissue Samples: Tissue samples submitted for microbiologic evaluation should be delivered intact to the Microbiology laboratory in a sterile container without fixative for handling and division. .

Other Collection Guidelines:

- Collect specimen with as little contamination from indigenous microbiota as possible to ensure that the sample will be representative of the infected site.
- Utilize appropriate collection devices. Use sterile equipment and aseptic technique to collect specimens to prevent introduction of microorganisms during invasive procedures.
- Clearly label the specimen container with the patient's name and identification number, specimen source, and the date and time of collection.
- Collect specimens in sturdy, sterile, screw cap, and leak proof containers with lids that do not create an aerosol when opened.

If you have any questions regarding Microbiology culture specimen collection or transport or would like to schedule training, please contact Microbiology at 858-966-7725.

Transport Media Guide

<u>Source</u>	<u>Culture Type</u>			
	AEROBIC	ANAEROBIC	MYCOBACTERIAL	FUNGAL
Blood	Peds Plus/F Bottle (Pink Top)	Plus Anaerobic/F Bottle* (Yellow Top)	Bactec Myco/F Lytic bottle	Peds Plus or Myco/F Lytic bottle
CSF	Sterile Container	Sterile Container	Sterile Container	Sterile Container
Urine	Sterile Container	N/A	Sterile Container	Sterile Container
Stool	Sterile Container or E-Swab	N/A	Sterile Container or E-Swab	Sterile Container or E-Swab
Abscess	Sterile Container	Sterile Container or E-swab	Sterile Container	Sterile Container
Throat	Culturette II Swab	N/A	Culturette II Swab	Culturette II Swab
Sinus Washings	Sterile Container	Sterile Container	Sterile Container	Sterile Container

***Never submit an anaerobic blood culture bottle without an aerobic bottle.**

MICROBIOLOGY (cont'd)

Transport Media Guide (cont'd)

<u>Source</u>	<u>Culture Type</u>			
	AEROBIC	ANAEROBIC	MYCOBACTERIAL	FUNGAL
Bronchial Washings/ Tracheal Aspirate	Sterile Container	N/A	Sterile Container	Sterile Container
Tissues	Send in Sterile Container to Microbiology for handling and processing if cultures are ordered.			
Body Fluids	Sterile Container	Sterile Container	Sterile Container	Sterile Container
Wounds	Culturette II or E-Swab	E-Swab	Culturette II or E-Swab	Culturette II or E-Swab

Collection Instructions

Culturette II and Mini-tip Culturette

1. Remove the sterile transport system from the wrapping.
2. Collect the specimen using both swabs of the Culturette II or the single swab of the Mini-tip Culturette.
3. Replace the swabs in the sterile transport system.
4. Label the swab holder, not the paper wrapping, with the patient's demographic information. This may be done for Inpatients by attaching the appropriate addressograph label to the swab holder.
5. Submit the swab holder and the appropriate requisition to the laboratory for processing.

Anaerobic Specimens (General Considerations)

- The best specimen for anaerobic culture is obtained using a needle and syringe.
- Tissue and biopsy samples are also very good specimens for anaerobic culture.
- When a swab must be used to collect a specimen, an E-swab is required. Special care must be taken to sample the active site of infection when a swab is used.

MICROBIOLOGY (cont'd)

Collection Instructions (cont'd)

Anaerobic Specimens (General Considerations, cont'd)

- Avoid extremes of heat or cold. If delays are unavoidable, hold the specimen at room temperature until processing.
- Transport time depends on the volume and nature of the specimen. Large volumes of purulent material and large pieces of tissue maintain the viability of anaerobes for several hours. Swabs (when necessary) and small volumes of aspirated material, biopsy samples, or curettings should be transported in an anaerobic transport device E-swab.

Blood Cultures

Select a different site for each culture drawn. Avoid drawing blood through indwelling intravenous or intra-arterial catheter unless blood cannot be obtained by venipuncture or unless the diagnosis of catheter sepsis is suspected.

Preparation - Culture Prep Kit II

1. Remove Chloraprep One-Step Frepp Applicator from kit. Hold in a horizontal position and pinch handle once to break ampule. Do not continue to squeeze.
2. Place sponge on selected venipuncture site and depress once or twice to saturate sponge. Clean the area by using repeated back and forth strokes for 30 seconds. Completely wet the area with antiseptic.
3. Allow area to dry for approximately 60 seconds. Do not blot or wipe away.
4. Remove protective dust covers and disinfect top of bottle with alcohol prep pad and allow top to dry. DO NOT use iodine on the septa (tops) of BACTEC bottles.

Sample Collection

1. Using a sterile syringe and needle, insert the needle into the vein and withdraw blood. Pull out the needle and cover the puncture site with sterile gauze. Apply pressure and put a bandage over the gauze.
2. Place a sterile blood transfer device over the glass neck of the Blood Culture bottle. Carefully remove the needle from the syringe and dispose in a sharps container. Attach syringe to the blood transfer device and allow the blood to transfer thru vacuum pressure.
3. When inoculating both anaerobic and aerobic blood culture vials, inoculate the anaerobic vial first to prevent the introduction of air into the vial.
4. Mix well to avoid clotting.
5. Use a new needle if vein is missed initially.
6. After phlebotomy, cleanse the site with 70% alcohol to remove remaining iodine, which can cause irritation in some patients.

Blood Volume Requirements

NOTE: The volume of blood is critical because the concentration of organisms in the majority of bacteremias is low, especially if the patient is on antimicrobial therapy. In infants and children, the concentration of microorganisms during bacteremia is higher than in adults; therefore less blood is required for culture.

Children and infants (1 to 5 ml of blood per venipuncture):

- Draw 0.5 to 3.0 ml per Peds Plus/F (aerobic) bottle.
- Draw 3.0 to 10.0 ml per Standard/F (anaerobic) bottle.

Adults (13.0 ml per venipuncture):

- Add 3.0 ml to Peds Plus/F (aerobic) bottle.
- Add 10.0 ml to Standard Anaerobic/F bottle.

MICROBIOLOGY (cont'd)

Body fluids/tissues

All specimens are obtained by the physician, either by aspiration with needle and syringe or by surgical excision. When collecting samples from a sterile site, care must be taken to avoid contamination with commensal microbiota. Common sources of body fluids/tissues are:

- Pleural fluid (Thoracentesis fluid, Empyema fluid)
- Ascites fluid
- Paracentesis fluid
- Peritoneal dialysis fluid
- Pericardial fluid
- Joint fluid, or synovial fluid
- Bone marrow aspiration or biopsy
- Bone biopsy
- Deep tissue biopsy

Catheter Tips

1. Before the removal of the catheter, the skin is decontaminated.
2. Short catheters (2-3 in.) are removed and severed aseptically at a point that was just inside the skin interface.
3. From long catheters (8-24 in.), two segments of about 2 in. each are collected, one from the skin interface and one from a section that was within the blood vessel.
4. Catheter segments are aseptically placed in sterile wide-mouthed containers for transport to laboratory. Indicate type of catheter on label and on request.

Cerebrospinal Fluid (CSF) **NOTE:** CSF specimens must be collected prior to antimicrobial therapy.

CSF obtained by lumbar puncture:

1. Clean the puncture site with antiseptic solution and alcohol before needle insertion to prevent introduction of infection.
2. Insert a needle with stylet at the L3-L4, L4-L5, or L5-S1 interspace. When subarachnoid space is reached, remove the stylet and spinal fluid will appear in the needle hub.
3. Slowly drain the CSF into sterile leak proof tubes. Three tubes are generally required for microbiology, hematology, and chemistry testing. The second tube drawn will generally go to microbiology and the last tube drawn will generally go to hematology. **NOTE:** Send the most turbid tube to Microbiology.
4. Submit a sufficient volume of fluid. Suggested volumes are 1 ml for bacterial culture, 2 ml for fungal culture, and 3 ml for mycobacterial culture.

CSF collected from Ommaya reservoir:

1. Clean the Ommaya reservoir site with antiseptic solution and alcohol prior to removal of Ommaya fluid to prevent introduction of infection.
2. Remove Ommaya fluid via the Ommaya reservoir unit and place in a sterile leak proof tube.

Ear Specimens

Middle ear

1. Effusion from the middle ear collected by tympanocentesis is the best specimen. A specially trained physician or otolaryngologist will collect the specimen using a syringe aspiration technique.
2. Place the contents of the syringe into an anaerobic transport system or a small, sterile container.

MICROBIOLOGY (cont'd)

Ear Specimens (cont'd)

External ear

1. Dried flakes and chunks of cerumen should be removed and discarded before collecting specimen for culture.
2. A thin-tipped sterile swab is introduced into the ear and used to collect exudative material without touching the walls of the uninflamed sections of the canal.
3. Place the swab in transport media (Culturette).

Eye Specimen

NOTE: Do not use the term "eye" for identifying a specimen. Specify what the specimen is, e.g., lid margin, conjunctiva, corneal scraping, and aqueous or vitreous fluid.

Conjunctiva

1. Obtain specimens before instillation of topical anesthetic.
2. Moisten a small, Dacron swab with nonbacteriostatic saline (unless exudate is present), and scrub swab over inferior tarsal conjunctiva and fornix of infected eye. An additional swab should be taken for Gram stain.
3. Place the swab in transport media (Culturette).

Other ocular specimens

Most specimens collected from the eye are collected by a specially trained physician or ophthalmologist. A variety of collection techniques are used to collect material from different parts of the eye including scrapings, paracentesis, and needle and syringe aspirations.

Fecal Specimens – Guidelines

- Do not contaminate with urine.
- Select portions containing pus, blood, or mucus.
- A 1 to 2 gram quantity is sufficient. If using liquid transport media, fill to raise the fluid volume to the line on the vial. Mix well and do not overfill.
- Collect samples before starting antibiotic therapy.
- Fresh samples must be received within 1 to 2 hours of passage
- Use Enteric transport medium for preserved specimens.
- Submit rectal swabs in stool transport medium (Cary-Blair, Amies, or Culturette).
- Submit duodenal, colostomy, or ileostomy contents fresh or in Enteric transport medium.

Stool Collection

Pass stool directly into a sterile, wide-mouth, leak proof container with a tight-fitting lid or pass stool into a clean, dry bedpan, and transfer stool into a sterile, leak proof container with a tight-fitting lid. Transport immediately to microbiology laboratory. If a stool cannot be transported to Microbiology within 1 hour of collection, place the stool in enteric transport medium and transport within 48 hours.

Rectal swabs

1. Pass the tip of a sterile swab approximately 1 inch beyond the anal sphincter.
2. Carefully rotate the swab to sample the anal crypts, and withdraw the swab.
3. Place the swab in transport medium (Culturette, Cary-Blair, or Amies) and transport immediately to the microbiology laboratory.

MICROBIOLOGY (cont'd)

Genital

Cervix

1. Do not use lubricant during procedure.
2. Wipe the cervix clean of vaginal secretions and mucus.
3. Rotate a sterile swab, and obtain exudate from the endocervical glands.
4. If no exudate is seen, insert a sterile swab into the endocervical canal, and rotate the swab.

Vagina

1. Use a speculum without lubricant.
2. Collect secretions from the mucosa high in the vaginal canal with sterile pipet or swab.

Vulva or Penile lesion

1. Clean the surface of the lesion with 0.85% NaCl. If there is a crust on the lesion, remove it.
2. Scrape the lesion until serous fluid emerges.
3. Wipe away fluid and debris with sterile gauze. (Try to avoid bleeding.)
4. Press the base of lesion until clear fluid is expressed.
5. Aspirate vesicular fluid with a 26- to 27-gauge needle OR unroof the vesicle and collect fluid with a sterile swab.

Urethra (female)

1. Collect specimens 1 hour or more after patient has urinated.
2. Stimulate discharge by gently massaging urethra against the pubic symphysis through the vagina.
3. Collect the discharge with a sterile swab.
4. If discharge cannot be obtained, wash external urethra with betadine soap and rinse with water.
5. Insert an urethrogenital swab 2 to 4 cm into the endourethra, gently rotate the swab, and leave it in place for 1 to 2 seconds before withdrawing.

Urethra (male)

1. Collect specimens at least 2 hours after the patient has urinated.
2. Insert a thin urethrogenital swab 2 to 4 cm into the endourethra, gently rotate it, leave it in place for 1 to 2 seconds, and withdraw it.

Rectal

1. Pass the tip of a sterile swab approximately 1 inch beyond the anal sphincter.
2. Carefully rotate the swab to sample the anal crypts, and withdraw it.

Respiratory - Lower

- Twenty-four hour sputum collections are not recommended for culture.
- If *Corynebacterium diphtheriae*, *Arcanobacterium haemolyticum*, *Bordetella pertussis*, *N. gonorrhoeae*, *Legionellae*, *Chlamydiae*, or *mycoplasmas* are suspected, the physician should contact the clinical microbiology laboratory prior to specimen collection because special techniques and/or media are required for the isolation of these agents.

Expectorated sputum

1. If possible, have the patient rinse mouth and gargle with water prior to sputum collection.
2. Instruct the patient not to expectorate saliva or postnasal discharge into the container.
3. Collect specimen resulting from deep cough in sterile screw cap cup.

Induced sputum

1. Using a wet toothbrush, brush the buccal mucosa, tongue, and gums prior to the procedure.
2. Rinse the patient's mouth thoroughly with water.

MICROBIOLOGY (cont'd)

Respiratory – Lower (cont'd)

3. Using an ultrasonic nebulizer, have the patient inhale approximately 20 to 30 ml of 3 to 10% NaCl.
4. Collect the induced sputum in a sterile screw cap cup.

Tracheostomy and endotracheal aspirations

Aspirate the specimen into a sterile sputum cup or Luken's trap.

Bronchial wash or bronchoalveolar lavage specimens are generally obtained before brushing or biopsy specimens to avoid excess blood in the recovered fluid, because blood may alter the concentration of cellular and noncellular components.

1. Inject sterile nonbacteriostatic 0.85% NaCl from a syringe through a biopsy channel of the bronchoscope.
2. Gently suction the 0.85% NaCl into a sterile screw cap container.

Bronchial brush specimens

Insert a telescoping double catheter plugged with polyethylene glycol at the distal end (to prevent contamination of the bronchial brush) through the biopsy channel of the bronchoscope. Submit the whole brush apparatus.

Bronchial biopsies

Obtain the biopsy sample through the biopsy channel of the bronchoscope, and transport it in a sterile container with a small amount of nonbacteriostatic sterile 0.85% NaCl.

Respiratory - Upper

Throat

1. Depress tongue gently with tongue depressor. NOTE: Do not obtain throat samples if epiglottis is inflamed, as sampling may cause serious respiratory obstruction.
2. Extend sterile swabs (two) between the tonsillar pillars and behind the uvula. (Avoid touching the cheeks, tongue, uvula, or lips).
3. Sweep the swabs back and forth across the posterior pharynx, tonsillar areas, and any inflamed or ulcerated areas to obtain sample.

Nasal Swabs

1. Insert a sterile swab into the nose until resistance is met at the level of the turbinates (approximately 1 in. into the nose).
2. Rotate the swab against the nasal mucosa.
3. Repeat the process on the other side.
4. Place the swabs in transport media. (Culturette)

Nasopharyngeal swabs

1. Carefully insert a flexible-wire calcium alginate-tipped swab through the nose into the posterior nasopharynx, and rotate the swab. Keep the swab near the septum and floor of the nose.
2. Place the swabs in transport media.

Sinus

1. Sinus aspirates are collected by a specially trained physician or an otolaryngologist using a syringe aspiration technique. Material will be obtained from maxillary, frontal or other sinuses.
2. Place the contents of the syringe into an anaerobic transport system or send the specimen in the capped syringe.

MICROBIOLOGY (cont'd)

Urine

- Never collect urine from a bedpan or urinal.
- Thoroughly clean the urethral opening (and vaginal vestibule in females) prior to collection procedures to ensure that the specimen obtained is not contaminated with colonizing microorganisms in this area.

Clean-voided midstream urine

- Cleansing of the male genitalia does not improve detection of bacteriuria and is not necessary in circumcised males.
- Collect voided urine directly into a sterile container; do not use a urinal or bedpan for collection.

Catheter urine

- Indwelling catheters increase the risk of urinary tract infections; only closed system should be used. Avoid contamination during urine collection.
- A straight catheter (non-indwelling) is used by a physician or trained practitioner to obtain urine directly from the bladder.
- Urine from an ileal conduit must be collected after removal of the external device and insertion of a catheter into the cleansed stoma.
- Urine collected by suprapubic needle aspiration of the bladder avoids contamination associated with the collection of voided urine. This is the preferred method for infants and for patients for whom the interpretation of results of voided urine is difficult.
- *Foley catheter tips are unacceptable for culture.*

Female Clean Catch

Equipment Needed:

- Chux
- 3 pkg. Betadine swabsticks
- 20 cc syringe with sterile water in it
- Gloves (nonsterile)
- Sterile collection container.
- Grey Top Urine Tube (Outpatients).

Procedure:

1. Place patient on bedpan with Chux underneath.
2. Using 3 Betadine swabsticks, cleanse entire perineal area.
3. Spread labia apart; with 2 swabsticks cleanse urethral meatus and inner labia.
4. Press 2 more swabsticks on meatus, making a small circle from the meatus outward toward the labia. Repeat with 1 more swabstick.
5. Rinse with 20 cc of sterile water from syringe.
6. Allow patient to begin voiding into bedpan, and then catch 30 cc of urine in container. Allow patient to complete voiding.
7. Label specimen and send it to the laboratory along with the Order Entry labels or requisition.

NOTE: Female clean catch specimens should be collected as above. For collection of specimens from ambulatory patients and others who prefer not to use the bedpan, "Clean Catch Kits" should be made available. It is imperative that the patients understand the instructions for proper use of the "Clean Catch Kit" so that an acceptable specimen is obtained.

MICROBIOLOGY (cont'd)

Male Clean Catch

Equipment needed:

- 2 pkg. Betadine swabsticks
- Sterile 4 x 4 gauze pad saturated with sterile water
- 2 sterile collection containers
- Gloves (nonsterile)
- Chux.

Procedure:

1. With Chux under penis, cleanse end of penis using 2 swabsticks at a time. Push foreskin back, if necessary, and clean the glans well.
2. Rinse with sterile 4 x 4 gauze pad, leaving sterile wrapper under penis.
3. Place a sterile container adjacent to end of penis and instruct patient to begin voiding.
4. When the first container is about 1/3 full, change to second sterile container. Instruct patient to void middle part of urine (about 30 cc) into container.
5. Instruct patient to complete voiding in first container or into urinal.
6. Discard the first container.
7. Label the second container properly and send it to the laboratory along with the Order Entry labels or requisition.

NOTE: Outpatient specimens that cannot be delivered to the Microbiology Laboratory immediately should be refrigerated or placed into the Gray top urine tubes available from Patient Services.

Wounds/Abscesses

Burn specimens

The surfaces of burn wounds will become colonized by the patient's microbiota or by environmental organisms. When the organism load is large, infection of underlying tissue may occur, and bacteremia may ensue. Cultures of the surface alone are misleading; therefore, biopsies of deeper tissue are often indicated. Additionally, organisms may not be distributed evenly in the burn wound, so sampling of different areas of the burn is recommended.

1. Disinfect the surface of the burn with 70% alcohol.
2. Follow with an iodine solution (1 to 2% tincture of iodine or a 10% solution of povidine-iodine). Allow the disinfectant to dry prior to collecting the specimen.

Superficial wound

Syringe aspiration is preferable to swab collection.

1. Disinfect the surface of the wound with 70% alcohol and then with an iodine solution (1 to 2% tincture of iodine or a 10% solution of povidine-iodine). Allow the disinfectant to dry prior to collection.
2. Using a 3- to 5-ml syringe with a 22- to 23-gauge needle, a physician will aspirate the deepest portion of the lesion. If a vesicle is present, collect both fluid and cells from the base of the lesion.

Ulcers and nodules

1. Disinfect the surface of the wound with 70% alcohol and then with an iodine solution (1 to 2% tincture of iodine or a 10% solution of povidine-iodine). Allow the disinfectant to dry prior to collection.
2. Remove overlying debris.
3. Curette the base of the ulcer or nodule.
4. If exudate is present, collect it with a syringe or sterile swab.

Bite wounds

5. Aspirate pus from the wound, or obtain it at the time of incision, drainage, or debridement of infected wound. Do not culture fresh bite wounds, as infectious agents will likely not be recovered.

MICROBIOLOGY (cont'd)

Wounds/Abscesses (cont'd)

Deep wounds or abscesses

1. Disinfect the surface of the wound with 70% alcohol and then with an iodine solution (1 to 2% tincture of iodine or a 10% solution of povidine-iodine).
2. Aspirate the deepest portion of the lesion, avoiding contamination by the wound surface. If collection is done at surgery, a portion of the abscess wall should also be sent for culture.

Soft tissue aspirate

1. Disinfect the surface of the wound with 70% alcohol and then with an iodine solution (1 to 2% tincture of iodine or a 10% solution of povidine-iodine).
2. Aspirate the deepest portion of the lesion or sinus tract. Be careful to avoid contamination by the wound surface.

Punch skin biopsies

1. Disinfect the surface of the wound with 70% alcohol and then with an iodine solution (1 to 2% tincture of iodine or a 10% solution of povidine-iodine).
2. Collect a 3- to 4-mm sample with dermal punch.
3. Submit for culture in sterile container without formalin.

Needle Aspiration

Specimens obtained by a physician using needle aspiration should be transferred to a sterile, leak proof tube or anaerobic transport vial. Alternatively, and only if transferring it from the syringe will compromise the specimen, the physician should remove the needle, using a protective device to avoid injury, and cap the syringe with a sterile cap prior to transporting it to the laboratory.

If minimal sample is available, and only swabs can be obtained, they must be submitted in appropriate transport medium such as anaerobic transport tubes, Stuart's transport media, or Amies transport media. Transport all specimens to the laboratory within 30 minutes of collection (Inpatient and Clinic), and same day of collection (Physician Clients).

Transport Time / General Information

Source/Test	Transport Time	Comments	Special Requests
Abdominal Culture	Immediate	Includes gram stain, anaerobic culture	Fungal, AFB
Abscess Culture	Immediate	Includes gram stain, anaerobic culture	Fungal, AFB, viral
Blood Culture	Immediate		Fungal, AFB, Anaerobic cx
Body Fluid Culture	Immediate	Includes gram stain, anaerobic culture	Fungal, AFB, viral
Bone Marrow Culture	Immediate	Includes gram stain, anaerobic culture	Fungal, AFB, viral

Transport Time / General Information (cont'd)

Source/Test	Transport Time	Comments	Special Requests
Bronchial Culture	Immediate	Includes gram stain Rejected if more than two hours old	Fungal, AFB, viral, mycoplasma, ureaplasma, yeast screen, chlamydia
C.difficile	Immediate, refrigerate if over 2 hours	Fresh only no preservatives. Not performed on formed stool	
Chlamydia and GC SDA	Immediate. Refrigerate if transport delayed.	Non-clean catch urine, endocervical, urethral. Use Culturette	
Cryptosporidium	Within 2 hrs	Use O&P vials. Rejected if soaked into diaper or removed from toilet	Ova and Parasites
Cerebral Spinal Fluid Culture	Immediate	Gram stain included	Anaerobic, fungal viral culture, India Ink prep
Ear Culture	Immediate	Gram stain included	Yeast screen, fungal and anaerobe cultures on middle ear or tympanocentesis by request
Eye Culture	Immediate	Gram stain included	Yeast screen, fungal, Chlamydia culture
Fungal Culture	Immediate	Rejected if received in fixative	
Genital Culture	Immediate	Gram stain performed on male specimens only	Fungal culture, yeast screen, Chlamydia Culture, PCR
GC screen	Immediate	Limited to GC only	
Nose/Nasopharyngeal Culture	Immediate	Inappropriate for anaerobic culture	Yeast screen, MRSA B.pertussis, C.diphtheriae, N.meningitidis

Transport Time / General Information (cont'd)

Source/Test	Transport Time	Comments	Special Requests
Ova and Parasites	Within 72 hours in O&P transport vials. Immediately if fresh.	Clean, dry cup, bed pan, diaper, O&P vials. Rejected if soaked into diaper, removed from toilet, contaminated with barium or urine. Split between both vials.	
Respiratory Pathogen Panel	Immediate	Includes RSV A & B, Adenovirus, Coronavirus, Human Metapneumovirus, Human Rhinovirus/Enterovirus, Influenza A, Influenza B, Parainfluenza (1,2,3,4), Chlamydia pneumoniae, Mycoplasma pneumoniae, Influenza A&B, RSV PCR	
Rotavirus	Within 2 hrs	Rejected if from toilet.	Anaerobic culture, yeast
Sinus Culture	Immediate	Gram stain included.	fungal, AFB, viral culture Chlamydia.
Sputum Culture	Immediate	Rejected if >2 hrs old, saliva. Gram stain included. Inappropriate for anaerobic.	Yeast screen, fungal, AFB, viral, Chlamydia, Mycoplasma, Ureaplasma, Legionella
Strep Screen	Within 24 hrs	Limited to Group A, C, G and F beta strep and Arcanobacterium. Order STREP for Group A strep rapid antigen. Culture will be performed on negatives.	
Stool Culture	Immediate if unpreserved. Within 72 hours if preserved.	Inappropriate for anaerobic and AFB culture	Yersinia, viral, yeast, Vibrio culture
Tissue Culture	Immediate	Includes Gram stain and anaerobic culture.	Fungal, AFB, and viral Culture.
Tracheal Aspirate Culture	Immediate	Rejected if >2 hrs old, saliva. Gram stain included. Inappropriate for anaerobic.	Yeast screen, fungal, AFB, viral, Chlamydia, Mycoplasma, Ureaplasma, Legionella
Urine Culture	Immediate, refrigerate if transport delayed.	Rejected if >2 hrs old unless unless refrigerated or in Gray top preservative tube.	Yeast screen, fungal, AFB, CMV culture, gram stain.
Vaginal/Cervical Culture	Immediate	Inappropriate for anaerobic	Yeast screen, chlamydia
Viral Culture	Immediate	Use viral transport media. Does not include CMV.	CMV shell vial.
Wound Culture:	Immediate	Gram stain included. Anaerobe cultures performed on appropriate specimens.	Anaerobic, yeast screen, fungal, AFB culture.

MICROBIOLOGY (cont'd)

Environmental Cultures

Environmental cultures must be collected by the Infection Control team or designated department and submitted to the lab at the request of the Infection control officers and/or Infectious diseases doctors. The quality of these samples is at the discretion of the infection control team. Lab is not involved in collection of such samples. Environmental samples (swabs, solutions etc.) will be evaluated for presence of designated organisms (bacterial or fungal elements) per established protocols.

Virology

1. Ordering: Virology tests are ordered via the hospital computer system or on a Laboratory Request Form.
2. Collection:
 - Stool and urine should be submitted in a labeled sterile screw top collection container.
 - Mucosal or skin surfaces and body cavities should be collected on a Dacron swab and placed in viral transport media, which can be obtained from the laboratory by calling 858-966-5413.
 - Tissue biopsies or lavage fluids obtained for viral culture should be collected in a sterile container.
3. Testing: Virology specimens are sent to Quest Diagnostics Nichols Institute.

NECROPSY

PROCEDURE FOR PATIENTS WHO HAVE DIED AT RADY CHILDREN'S HOSPITAL

1. A completed Rady Children's Hospital San Diego (RCHSD) Consent for necropsy must be obtained before a necropsy can be performed. The necropsy permit must include the decedent's name and medical record number, must describe any restrictions; and must be legibly signed and witnessed. An order for the necropsy must be entered in Epic under "Autopsy".
2. Individuals who may give consent for a necropsy include parents, and others designated by California State Law. For cases falling under the jurisdiction of the Medical Examiner, please refer to Appendix B.
3. Necropsies will be performed as expeditiously as possible. Individuals wishing to attend the necropsy should inform the pathologist and must be properly authorized.
4. The Pathology Department will maintain the RCHSD Death Log Book which contains the name and medical record number of the deceased, necropsy information, and the identification of individuals delivering the remains to the Laboratory, the name of the individual to whom the remains are released and the names of the Pathology Department personnel receiving and authorizing the release of the remains, and the date and time of each of these transactions. Death certificates are done electronically and completed through the Decedent Affairs office (extension 223771).
5. The Provisional and Final Anatomic Diagnosis reports will be issued in a timely fashion to the decedent's attending physician and medical record and a copy will be kept in the Pathology Office.
6. Following the completion of a necropsy the Department of Pathology will take responsibility for the release of the remains.
7. With the exception of Medical Examiner cases, the bodies (remains) of all patients dying in RCHSD will be transported by nursing personnel or their designee to the RCHSD Necropsy suite.
8. The RCHSD Pathology Department technical staff will take responsibility for receipt and disposition of the remains, the exception cases falling under Jurisdiction of the Medical Examiner (see Appendix B).
9. The RCHSD Death Log Book will be kept in the Necropsy suite adjacent to the body refrigeration unit.
10. The Pathology Department will not accept any personal belongings of deceased patients.
11. Bodies known to harbor infectious agents must be identified as "Reportable or Communicable Disease Precautions" (red tag).
12. Remains falling under the Jurisdiction of the Medical Examiner are not to be removed from the site of death and are not to be delivered to the RCHSD Necropsy Suite. The Medical Examiner's Office will collect the remains. Deaths that come under the Medical Examiner's Jurisdiction are listed in Appendix B.
13. An order in EPIC (LAB9 Autopsy) is made by the authorizing physician or designee.

NECROPSY (cont'd)

PROCEDURE FOR PATIENTS WHO DIE AT HOME OR AT ANOTHER HOSPITAL

The following guidelines are provided in the event that a Rady Children's Hospital San Diego (RCHSD) patient expires at another hospital or at home, and the physician would like to have a necropsy performed at RCHSD on that patient. Individuals wishing to attend the necropsy should inform the pathologist and must be properly authorized.

1. The Medical Examiner's Office must be contacted to determine that this is not a case under the jurisdiction of that office (see Appendix B). If the case is "waived" by the Medical Examiner's Office, the waiver number must be documented on the Necropsy Consent Form.
2. Obtain a signed and witnessed Necropsy Consent Form from the parent(s) or legal guardian of the deceased. You may utilize the referring hospital's necropsy consent, however, the document must clearly state that the necropsy is to be performed at RCHSD. The consent must also clearly indicate any limitations on the necropsy such as exclusion of the head or heart and lung evaluation. Also obtain a properly executed "Release of Remains Form".
3. Contact the RCHSD Pathology Department to notify the pathologists of your intent and to inform them of any special studies or handling requirements. Contact the pathologist on call if after hours or on a weekend.
4. Have the originating hospital make arrangements to have the deceased transported to RCHSD. The parent(s) or guardian should be consulted on which mortuary service is to be used. The identified mortuary service will be responsible for transporting the deceased, Necropsy Consent Form, Release of Remains Form and patient medical record (if available) to the Necropsy Suite of RCHSD.
5. After hours or on a weekend, please also contact the Nursing Supervisor at RCHSD to alert them that the deceased will be transported to RCHSD.
6. An order in EPIC (LAB9 Autopsy) is made by the authorizing physician or designee.
7. Upon completion of necropsy, the RCHSD Pathology Department will notify the appropriate mortuary service identified on the "Release of Remains Form" that the body of the deceased may be picked up.
8. The Provisional and Final Anatomic Diagnosis reports will be issued in a timely fashion to the decedent's attending physician and medical record and a copy will be kept in the Pathology Office. If you should have any questions, please contact the Pathology Department at 858-966-5914.

NEUROPATHOLOGY

This includes brain, muscle, nerve biopsies, and other tissue specimens relevant to neuropathology.

1. Please notify the Histology Laboratory as soon as possible in advance of the biopsy procedure to arrange for proper handling. Histochemistry studies usually require UNFIXED tissue. Clinical history is essential for proper workup of biopsies.
2. The completed "Pathology Services Requisition" must be submitted along with the specimen to the Laboratory. It is the responsibility of the attending/operating physician to complete this form.
3. If the patient has had pertinent tissue examined at another hospital, please notify Pathology at 858-966-5914 so that these slides can be obtained.
4. A biopsy procedure manual is available for review from the UCSD Neuropathology Laboratory (Phone: 619-543-5584).

Tissue fixation:

Muscle

1. The muscle biopsy, which normally measures approximately 1.0 x 2.0 x 0.5 cm, is placed on saline-soaked gauze in a Petri dish for enzyme histochemistry. Place the dish on ice.
2. A second, smaller specimen is placed immediately upon removal into paraformaldehyde glutaraldehyde fixative or Trump's fixative for electron microscopy.
3. Biopsies for motor end plate analysis must be stretched, properly oriented with the point of maximal stimulation indicated, and placed immediately on removal in fresh paraformaldehyde glutaraldehyde fixative or Trump's fixative.
4. Immediately deliver the muscle biopsies to the Histology Laboratory.

Nerve biopsies

1. The nerve should be handled as gently as possible to avoid artefactual distortions.
2. A nerve biopsy cylinder length 2 cm affords adequate tissue for paraffin sections, teased nerve fibers, and electron microscopy.
3. The entire specimen, without subdivision, should be placed immediately upon removal into fresh paraformaldehyde glutaraldehyde fixative or Trump's fixative.

NOTE: Fresh paraformaldehyde glutaraldehyde is available from the Histology Laboratory, the Electron Microscopy Laboratory, and the main Operating Room.

POINT OF CARE TESTING

In compliance with State and Federal guidelines, Pathology Department personnel along with RCHSD nursing and respiratory therapy staffs provide ongoing oversight and support to Point of Care testing programs throughout the hospital. At present, the following Point of Care testing programs have met applicable standards and are approved for operation at RCHSD.

Bedside Glucose Testing	CO-Ox Testing (Cath Lab)
Activated Clotting Time Testing	Blood Gas Testing
HbA1c Testing – Diabetes Clinic	Group A Strep – Emergency Dept.
HCG Testing - CCP, Emergency Dept., Surgery, Radiology	Urine Dipsticks
Fecal Occult Blood	
Influenza A/B – Urgent Care Areas	

All inquiries regarding the expansion of or introduction of Point of Care testing at RCHSD should be referred to the Point of Care Testing Specialist at 858-966-8956.

SURGICAL PATHOLOGY

1. An order in EPIC must be placed by the ordering physician. For surgical pathology tissue specimens select - (LAB8 Pathology Tissue) for Bone Marrow specimens select - (673) and for Cytology specimens select - (LAB000594)
2. If the patient has had pertinent tissue examined at another hospital, please notify the Pathology Office at 858-966-5914 so that these slides can be obtained for review.
3. For most routine specimens, final reports are typed and distributed within 72 hours or less after the specimen is received in the laboratory. Complicated specimens or those that require special studies or outside consultation may require additional time before the report can be finalized. Please call the pathology office at 858-966-5914 to speak to a pathologist for preliminary results.
4. Scheduling of all Frozen Sections is highly recommended in order to assist in accurate diagnosis. When the tissue has been removed from the patient and an Epic order is placed, the specimen should be delivered immediately to the Histology Laboratory. Tissue for frozen section must be fresh and not be placed in a fixative. Please put the tissue in either a container with no added fluid or on a saline moistened pad. All samples must be labeled appropriately.
5. Fresh specimens whether for frozen section, surface marker analysis, microbiologic culture, or for any other reason, need to be delivered immediately (<5 minutes) to the Histology Laboratory along with a completed requisition that specifies the desired special testing.
6. Fixation of tissue:
 - a) Routine small and medium-sized specimens: place in a jar with an adequate amount (10 times the volume of tissue) of 10% formalin.
 - b) Large Specimens: wrap in paper or plastic. Bring to the Histology Laboratory immediately, or refrigerate and contact the Histology Laboratory at 858-966-1700, extension 225041. For specimens obtained after 5:00 pm, weekends, or holidays, please contact the pathologist on call.
 - c) Kidney and Liver Needle Biopsies: Place on saline soaked Telfa and transport to Histology Laboratory immediately. If enzyme analysis, bacterial or viral cultures, immunofluorescent staining, or Electron Microscopy studies are desired, arrangements should be made in advance by calling 858-966-5914.
 - d) Nerve and Muscle Biopsies: Please refer to **NEUROPATHOLOGY**.
 - e) Suspected Glycogen Storage Disease: Specimen collection must be submitted fresh in order that appropriate biochemical studies can be done.
 - f) Bone Marrow:
 - i) Aspirates should be collected in purple top tubes, and delivered to the Laboratory along with completed requisitions.
 - ii) Biopsies should be immediately placed into 10% Neutral Buffered Formalin, and delivered to the Laboratory along with completed requisitions. Vials of formalin fixative may be obtained from the Histology Laboratory or Lab Support Services at 858-966-8600.
 - g) Lymph nodes: **FRESH UNFIXED SPECIMENS ARE PREFERRED DURING ROUTINE WORKING HOURS 0730-1700, NOTIFY A PATHOLOGIST IMMEDIATELY.** Lymph node biopsies frequently require special diagnostic procedures for which proper, expedient handling is essential.
 - h) Electron Microscopy: Please contact pathologist in advance.

SURGICAL PATHOLOGY (cont'd)

7. Dystrophin analysis in muscle biopsies is available through the University of Iowa. Minimum sample quantity is 5 mg net weight or approximately 0.5 x 0.5 x 0.5 cm of fresh tissue. Needle and open biopsy samples are acceptable.
8. Bacteriologic Studies: Ideally, a portion of the tissue should be separated in the Operating room from the major part of the specimen and submitted directly to the Microbiology Laboratory. Alternatively, a portion can be cut from unfixed tissue in the Surgical Pathology Laboratory. If separate specimens are not submitted to the Microbiology Laboratory, then please notify a pathologist if you wish him/her to submit tissue for microbiological studies.

URINALYSIS

Specimen Requirements

Source: Freshly collected urine. Specify collection method:

- Random voided specimen
- Catheter specimen
- Suprapubic specimen

Volume

- Complete Urinalysis: 10 to 12 mL of urine preferred
- As little as 0.5 mL can be analyzed using uncentrifuged urine for the microscopic examination, however larger volumes provide more meaningful results.

Patient Preparation: No special preparations are necessary.

Collection Instructions

Midstream Voided Specimen (Males)

1. Instruct the uncircumcised patient to withdraw foreskin to expose urethral meatus.
2. Begin urination and pass first portion into the toilet, the midportion into an appropriate container, and the excess into the toilet.
3. If the patient is uncooperative or too ill or weak, assist him as you carry out the same procedures.

Midstream Voided Specimen (Females)

1. Instruct patient to squat over bedpan or on toilet. Manually separate labia minora with one hand and keep them separated while voiding first portion of urine into bedpan or toilet.
2. Catch midportion of urine into appropriate container without contaminating lip or inside of container with the hand, inguinal, or perineal area.
3. Finish voiding into bedpan or toilet.
4. If the patient is uncooperative or too ill or weak, assist her as you carry out the same procedures.

Procedure for Infants and Small Children

1. Separate child's legs.
2. Pubic and perineal areas must be clean, dry, and free of mucus. Do not apply powders, oils, or lotions to skin.
3. Remove protective paper from the collection bag, exposing the hypoallergenic skin adhesive.
 - 3.1.Females:
 - 3.1.1. Stretch perineum to remove skin folds.
 - 3.1.2. Press adhesive firmly to skin all around the vagina. Be sure to start at the bridge of the skin separating the rectum from the vagina and work forward.
 - 3.2.Males:
 - 3.2.1. Fit bag over penis and press flaps firmly to perineum.
 - 3.2.2. Make sure entire adhesive coating is firmly attached to skin with no puckering of adhesive.
 - 3.2.3. Check container every 15 minutes.
 - 3.2.4. Retrieve collected specimen from patient and label it appropriately.
 - 3.2.5. Place specimen in cup, secure cap, label cup, and deliver to laboratory.

URINALYSIS (cont'd)

Volume Requirement

- Complete Urinalysis: 10 to 12 mL of urine preferred
- As little as 0.5 mL can be analyzed using uncentrifuged urine for a microscopic examination, however larger volumes provide more meaningful results.

Handling and Storage Instructions

If testing cannot be completed *within an hour after voiding*, the specimen should be refrigerated immediately following collection or transferred to a Gray top urine collection tube available from Patient Services.

Unacceptable Specimens (Criteria for Rejection)

- Specimens collected with cotton balls or diapers.*
- Specimens that have been at room temperature longer than one hour prior to analysis.
- Specimens that are contaminated by vaginal discharge, blood, or feces.

* Specimens collected with cotton balls are acceptable only for pH and specific gravity.

APPENDIX A

INTERFERING FOODS AND DRUGS

Please note that the food and drugs listed below will adversely affect the test results of catecholamine, VMA, metanephrine, and serotonin. Patients should NOT be allowed any of these foods or drugs during the time of collection of the specimen or 72 hours prior to that time.

(I) Increase (D) Decrease

CATECHOLAMINES

Aspirin
Bananas (I)
Carbon tetrachloride
Chloral hydrate (I)
Decaborane (D)
Demeclocycline (I)
Erythromycin (I)
Ethanol (I)
Formaldehyde (I)
Inderal (I)
Isoproterenol (Isuprel) (I)
Methyldopa (Aldomet)
Niacin (I)
Nicotine (I)
Nitroglycerin (I)
Quinidine (I)
Reserpine (I)
Riboflavin (I)
Syrosingopine (I)
Tetracycline (I)
Tosylete Bretylium (D)
Triamterene (Dyazide & Dyrenium) (I)

VMA

Anileridine (I)
Aspirin (I)
Dopa (D)
Morphine (D)

METANEPHRINES

Chlorpromazine (I)
Impramine (I)
Inderal (D)
Meglumine (D)
Monoamine Oxidase Inhibitors (I)
Phenacetin (I)
Phenothiazines (I)
Triamterene (D) (Dyazide & Dyrenium)
Vanillin (I)

5-HIAA (SEROTONIN)

Bananas, eggplant, pineapple, plums, walnuts
Acetanilide (I)
Glycerol guaiacolate (I)
Methenamine (D)
Phenothiazines (D)
Prochlorperazine (D)
Promethazine (D)

APPENDIX B

DEATHS UNDER JURISDICTION OF THE MEDICAL EXAMINER'S OFFICE INCLUDE (SECTION 10250 of the California Health and Safety Code):

1. Without medical attendance.
2. During continued absence of the attending physician (not within the period of 20 days prior to death).
3. Where the attending physician is unable to state the cause of death without an autopsy.
4. Where suicide is suspected.
5. Following an injury and/or accident.
6. Under such circumstances as to afford reasonable ground to suspect that the death was caused by the criminal act of another.

DEATHS IMMEDIATELY REPORTABLE TO THE MEDICAL EXAMINER'S OFFICE

1. All violent, sudden, unusual or unattended deaths.
2. Deaths wherein a physician has not attended the deceased in the 20 days prior to death.
3. Death related to, or following known or suspected, self-induced or criminal abortion.
4. Known or suspected homicide.
5. Known or suspected suicide.
6. Known or suspected accidental poisoning.
7. Death known or suspected as resulting in whole or in part from or related to accident or injury either old or recent.
8. Death due to drowning, fire, hanging, gunshot, stabbing, cutting, exposure, starvation, acute alcoholism, drug addiction, strangulation, or aspiration.
9. Where the suspected cause of death is Sudden Infant Death Syndrome.
10. Death in whole, or in part, occasioned by criminal means.
11. Death associated with a known or alleged rape or crime against nature.
12. Death in prison or while under sentence.
13. Death known or suspected as due to contagious disease and constituting a public hazard.
14. Death from occupational diseases or occupational hazards.
15. Death under circumstances as to afford a reasonable ground to suspect that the death was caused by the criminal act of another.
16. Any death reported by physicians or other persons having knowledge of death for inquiry by the coroner.

APPENDIX C

COLOR CODES FOR LABORATORY TEST TUBES

Lavender Top:	K ₃ EDTA
Light Blue Top:	Sodium Citrate
Yellow Top:	Acid Citrate Dextrose (ACD)
Light Green Top/Green Top:	Lithium Heparin or Sodium Heparin
Red Top:	No Additives
Gold Top:	Inert gel barrier material
Gray Top:	Na fluoride/potassium oxalate
Tan Top:	K ₂ EDTA