Laboratory Information Guide — Specimen Processing

Adopted: 11/07/03	Revised: 3/2/18	Approved:

Parrish Medical Center Department of Pathology and Clinical Laboratory Services is accredited by the College of American Pathologists (CAP) and the American Association of Blood Banks (AABB). Quality-focused and patient-oriented, the laboratory serves to set the standards that other laboratories across the country strive to meet. The laboratory's contribution to total patient care is its commitment to provide timely, accurate diagnostic information to the physicians of Parrish Medical Center.

Physician Office Laboratory Services are available. Arrangements for this service can be made by contacting the Laboratory Administrative Director.

Hours of Operation, Delay Notification Policy

The general laboratory operates 24-hours-per day, 7-days-per week. Personnel and facilities are available for performance of STAT testing at all hours. Routine and urgent testing is performed primarily on first and second shift. Certain routine testing is saved and performed in batches periodically through the week. Third shift personnel are provided for STAT testing only. Please confine requests for testing on third shift to STAT testing only.

CYTOLOGY operates from 7:00 a.m. to 4:00 p.m., Monday through Friday.

OUTPATIENT work is accepted at:

Parrish Medical Center	**Parrish Healthcare Center @ Port St. John**	**Parrish Healthcare @ Port Canaveral**
951 N. Washington Titusville, FL 32796 Phone: 321-268-6134	5005 Port St. John Pkwy Port St. John, FL 32927 Phone: 321-636-9393 (Ext 8015)	390 Challenger Road Port Canaveral, Florida 32920 Phone: 321-633-8640 Fax: 321-633-8641
Monday– Friday 06:30a to 06:00p Saturday 07:00a to Noon	**Monday–Thursday 07:00a to 04:00p Friday 07:00a to Noon**	**Monday– Friday 08:00a to 05:00p Sunday-Saturday 8:00a to 1:00p**

Parrish Health & Fitness	**Parrish Healthcare Center in Titusville**
2210 Hwy 50 Titusville, FL 32780 Phone: 321-268-6721	250 Harrison Street Titusville, FL 32780 Phone: 321-268-6764 (Ext 8353)
Monday–Thursday 06:30a to 03:00p Friday 06:30a to Noon	**Monday – Friday 07:00a to 04:00p**

Pathologists are available 8 a.m. to 4 p.m., Monday–Friday, and rotate call 24 hours per day, 7 days per week.
Administrators are available from 7 a.m. to 11 p.m., Monday–Friday, and rotate call 24 hours per day, 7 days per week.
Section Chiefs are available 7 a.m. to 3 p.m., Monday–Friday on-site. Weekends they are available by phone.
The laboratory will notify nursing units in critical care areas, such as ICU and ED, whenever instrument problems or other unforeseen events may potentially delay result reporting.

Physician Orders: Formats

Physician orders for testing may be in any of the following formats:

- Completed Parrish Medical Center outpatient requisition
- Prescription from a physician
- Faxed requisition or prescription
- Phoned verbal orders confirmed with subsequent faxed to 321-268-6149 or original hard copy *(Verbal orders must be confirmed with a hard copy of the physician order, please see laboratory policy #4010-32 "Verbal Requests" for complete documentation instructions.)* When the written request is not sent, the verbal order with documentation of follow-up action will be maintained by the laboratory.
- Standing orders (H*onored for the length of time specified by the physician up to a maximum of one year. See Laboratory policy #4010-37 "Laboratory Standing Order" for complete instructions.)*

NOTE: Faxed or verbal orders maybe disseminated to other PMC collection sites, i.e., Port St. John Diagnostic Center. (Express Lab, when necessary)

Filing Requisitions

Separate files are maintained for outpatient and client requisitions. For immediate retrieval, outpatient requisitions for the current month and one previous month are available in the main laboratory's front office. Client requisitions for the current month and two previous months are maintained by the reference-billing clerk.

Outpatient and Client Services

Patients must register with admitting before outpatient lab work can be done or can be pre-registered by calling 321-268-6107, unless the patient's physician is a laboratory client. Results/reports are mailed to the physician's office, with the exception of fax and/or phone requests. Please consult the information below concerning results, fasting requirements, STAT listings, specimen collection and handling, etc. The individual test listing will also provide specific information concerning test collection. Physician Office Laboratory Services are available. Prior arrangements must be made to setup client services, such as various home health agencies, the initial setup is made by contacting the Lab Administrative Director or Lab Operations Manager. Upon appropriate setup, specimens with the accompanying Lab requisition can be dropped off for testing. See the "Specimen Acceptability" section for further details.

Preadmission Laboratory Testing

Preadmission testing may be completed up to 120 hours prior to admission and should be drawn at least 24 hours prior to surgery. Blood bank testing (outpatient transfusions, transfusions requested for elective surgery) should be ordered no later than 24 hours before the patient procedure is scheduled. The detection of unexpected antibodies or availability of blood products may affect the laboratory's ability to fill orders placed fewer than 24 hours in advance. Specimens are collected for preadmission testing in the perioperative area.

Fasting

• Serum Carotene (**Fasting Required**)	• Lipid Panel (**Fasting Required**)	• GGT (**Fasting Preferred)**
• Cryoglobulins (**Fasting Required**)	• Triglycerides (**Fasting Required**)	• D-Xylose (**Fasting Preferred)**
• Glucose Tolerance Test (**Fasting Required**)	• Basic Metabolic Panel (**Fasting Preferred)**	• Glucose (**Fasting Preferred)**
• Serum Gastrin (**Fasting Required**)	• Comprehensive Metabolic Panel (**Fasting Preferred)**	
• Lactose Tolerance (**Fasting Required**)	• Lipoprotein electrophoresis (**Fasting Preferred)**	
• B12 (**Fasting Preferred**)	• Folate (**Fasting Preferred**)	

Reference Testing

Reference laboratory services are retained by Parrish Medical Center for testing that requires special instrumentation and for low-volume testing. Most reference testing is not available on a STAT basis. Laboratories selected to perform reference testing are carefully evaluated for service quality by Parrish Medical Center pathologists and medical staff.

Result Availability Results are delivered via regular U. S. mail, courier, fax, or phone.

- **STAT** reports on inpatient testing are available within our Lab Information Systems (LIS)1 hour of order time. Results will be broadcast as soon as they are verified. Outpatient STAT reports will be available within 1 hour of specimen arrival in the lab and will be faxed/phoned to the ordering physician. *Special instructions (For example, "Please call with results") should be written on the laboratory requisition or entered in the "comments" portion of the computerized requisition. Please include fax numbers and/or phone numbers on the requisition to expedite special requests*.
- **URGENT** reports on inpatient testing will be available within 4 hours of order time. Urgent reports for outpatient testing will be available within 4 hours of specimen arrival in the lab.
- **ROUTINE** reports will in most cases be available within 8 hours of specimen collection, though this time may vary for outpatient and reference testing.

Result Reporting

- **Reports are delivered** via LIS, regular U. S. mail, courier, fax, or phone.
- **Specimens demonstrating suspicious erroneous results** will be recollected for confirmation before reporting.
- **Inpatient reports** are scheduled to print daily. Cumulative Discharge (CUMDIS) reports are delivered to Health Information Services daily. Discharged Summary Reports are printed for inpatients that have been discharged. These reports are generated as test results are verified for the discharged patient. Discharge summary reports are sent to Health Information Systems.
- **Outpatient and client reports** are a scheduled report that prints daily. These reports are sorted and sent daily to the ordering physician via inter-hospital mail, US Postal Service, fax, or hand carrier.
- **Reference laboratory** results are reported as testing is completed and reports are received from off-site testing facilities, according to ordering category above (Routine, Urgent, or STAT). Certain doctors, as requested, have their reports "autofaxed" to their office.
- **All laboratory results are archived periodically.** Past results not immediately available in computer system can be accessed through archives.
- **Critical Values**—See next section

Critical Values

- **Critical values indicate a potentially dangerous condition and require immediate action.** These results are confirmed before being reported. It is the policy of Parrish Medical Center laboratory to call the ordering physician, RN or LPN with critical results. **If a physician does not wish to be contacted with a critical value**, this information must be documented by the ordering physician on the

patient's chart or outpatient's requisition.

- **Outpatient Critical values** will be called to the physician's office during office hours by the laboratory staff. **After office hours, the physician will be contacted directly by laboratory technical staff.** See Laboratory Policy #4010-70**, "**Outpatient Critical Test Results", for details.
- **Inpatient Critical values** will be called to the patient's RN. The RN is then responsible for contacting the physician as required. Documentation of the verbal report is recorded in LIS by laboratory personnel and includes date, time, and physician or RN notified.
- **Verbal reports must be read back by the receiver and the read back confirmed by the sender**

CRITICAL VALUE LIST: The following is the critical values established at Parrish Medical Center:

Test	**Critical Value**	
Absolute Neutrophil Count (ANC#)	$\leq$ 0.50 Th/mm^3	
Acetaminophen	Greater than 150 ug/ml @ 4 hours post-ingestion Greater than 50 ug/ml @ 12 hours post-ingestion	
AFB Stain	Positive for AFB	
Alcohol, Blood	**Low**: none	**High**: 0.3 gm/dl or greater
Bacterial Contamination on Transfused Platelets	Positive Bacterial Contamination on Transfused Platelets	
Bilirubin, Total	**Low**: none	**High**: 15 mg/dl or greater Newborn to 1 yr)
Blood Culture	Positive	
Blood Urea Nitrogen (BUN)	**Low**: none	**High**: 100 mg/dl or greater
Calcium (Serum, plasma)	**Low**: 7 mg/dl or less	**High**: 13 mg/dl or greater
Carbamazepine	**Low**: none	**High**: 20 ug/ml or greater
Carbon Dioxide (CO2 Serum, plasma)	**Low**: 15 mmol/L or less	**High**: 40 mmol/L or greater
CSF Culture, Stain, or Serological Testing (Includes send-out reports)	Positive	
CSF Gram Stain, Fungal Stain	Positive	
Digoxin	**Low**: none	**High**: 2.5 ng/ml or greater
Direct Antiglobulin Test (DAT) on Cord Blood	Positive	
Glucose (Serum, plasma) During glucose tolerance testing: if the glucose result from the draw following a critical result returns to normal, the results can be faxed to the physician office with the comment "Results faxed to physician office."	**Low**: 50 mg/dl or less	**High**: 450 mg/dl or greater Exception: Glucose Tolerance. See explanation to the left.
Glucose in Newborns (age 0-3 days)	**Low: <40mg/dl**	
Hematocrit	**Low**: 20% or less; preop 30%	**High**: 60% or greater (Adults)
Hemoglobin Newborn(age 0-3 days) Adults	**Low**: **< 20** 7 gm/dl or less; preop 10 gm/dl	**High**: 20 gm/dl or greater
Joint Fluid	Positive Gram Stain and/or Culture	
Lithium		**High**: $\geq$1.7 mmol/L
Magnesium	**Low**: $\leq$1.5	**High**: $\geq$5.0
Malarial Smear	Positive	
Phenobarbital	**Low**: none	**High**: 55 ug/ml or greater
PC02		**High: >46**
pH Newborn(age 0-3 days) Adults	**Low:** **< 7.3** **< 7.35**	**High:** **>7.55**
PO2 Newborn(age 0-3 days) Adults	**Low:** **< 50** **< 60**	
Phenytoin (Dilantin)	**Low**: none	**High**: 30 ug/ml or greater
Phosphorus	**Low**: 1 mg/dl or less	**High**: none
Platelet Count	**Low**: 30,000/mm^3 or less	**High**: none

Test	Critical Value	
Potassium 0 – 2 Days old 2 Days – 1 yr old Older than 1 yr Adult (no hemolysis)	**Low**: 3.4 mmol/L or less 3.3 mmol/L or less 2.9 mmol/L or less 3.0 mmol/L or less	**High**: 7.1 mmol/L or greater 7.1 mmol/L or greater 6.4 mmol/L or greater 6.0 mmol/L or greater
Pregnancy Test on Pre-Op Specimen	Positive	
PT INR	**Low**: none	**High**: ≥5.0
PTT	**Low**: none	**High**: 125 seconds or greater
Salicylate	**Low**: none	**High**: 30 mg/dl or greater
Sodium	**Low**: 120 mmol/L or less	**High**: 160 mmol/L or greater
Tacrolimus	**Abnormal High**	
Theophyline	**Low**: none	**High**: 25 ug/ml or greater
Troponin i		**High: >0.08**
Troponin T During cardiac marker monitoring, the first critical troponin will be called. Subsequent critical values do not need to be called.	**Low**: none	**High**: >0.1 ng/ml
Urine Ketones in Newborns	Present	
Urine Glucose in Newborns	Present	
Valproic Acid	**Low**: none	**High**: 150 ug/ml or greater
ERWBC	**Low: <3.0 Th/mm^3**	**High: none**

Specimen Acceptability *Specimens will only be accepted under the following circumstances:*

- **Specific medically necessary tests have been ordered.** *(Ambiguous orders **must** be confirmed before testing can be performed, for additional information on ordering tests not considered medically necessary, please consult the section below titled "Medicare/Medicaid ABN")*
- **Requisition is complete,** and includes the following information:

1. Patient first and last name
2. Patient date of birth
3. Name, address, and phone number of ordering physician or physician extender
4. Test(s) to be performed
5. Source of non-blood samples and specimen description if applicable (IE. **Right Arm Wound**)
6. Time and date of collection
7. Special Instructions; i.e. fax numbers and other contact information and instructions such as "please call with results" *(More information can be found in the section called "Result Reporting/Availability" below.)*
8. Diagnosis is REQUIRED on outpatient requisitions
9. Insurance information on Outpatient and Reference Lab Requisitions must be completed

- **Specimen is properly labeled; labeling requirements for each department are observed. The following listing summarizes all information necessary for proper labeling and lists individual department requirements. In general, all specimens must be labeled with items 1-5 listed below.** ***For specimens that are not to be spun, a "non-barcoded specimen label will be placed across the top of the tube". **This is the minimum labeling that will be accepted. Departmental requirements may still apply.** ***Re-collectable specimens that are unlabeled and/or mislabeled will be REJECTED. The person or service responsible for submitting the rejected sample will be notified, and the sample will be recollected. NON re-collectable specimens will require the person who collected the specimen to come to the laboratory, properly identify the specimen and verify patient identification matches specimen label with a circle around the MR# on the label. See below for more information about specimen recollection. Manufacturer barcodes present on collection containers must not be obscured during the labeling process.***

1. Patient first and last name
2. Patient account number and medical record number (inpatients) **or** date-of-birth (outpatient)
3. Date and time of collection
4. Initials of person collecting sample
5. Confirm that the labeled specimen's patient information matches the patient's armband by circling the unit number (Medical record number) on the specimen label, per nursing protocol.
6. Source of non-blood samples
7. Blood Culture Bottles: the bar code label on the bottle must not be obscured. Also, affix patient information labels in such a way

that a window is left to view the media/blood mixture inside the bottle.

8. Label each specimen in such a way that the contents of the specimen container can easily be viewed.
9. Label containers on the body of the container rather than the lid.
10. Cytology specimens should be submitted with a separate request for tissue examination.
11. Pathology specimens should be submitted with a separate request for tissue examination.
12. Microbiology specimens must be accompanied by documentation of the specimen source and specimen description if applicable (IE. **Right Arm Wound**).

- **Specimen rejection criteria; Specimen must be collected appropriately for testing ordered** *(Many procedures require strict adherence to collection and handling protocols such as the use of anticoagulated tubes, containers that protect specimens from light, or preservation via freezing. If collection instructions and materials are used inappropriately, the specimen may require recollection. Complete instructions for specimen collection, handling, and shipment can be found in the individual test listing or by calling the laboratory.)*

  1. Collection and processing instructions have been observed
  2. Shipping temperatures and general handling procedures have been observed
  3. Specimen has been collected in appropriate labeled container and is delivered in a labeled biohazard bag or other appropriate secondary carrier
  4. Timing of collection and handling are appropriate
  5. Age of specimen is appropriate
  6. Optimum collection times vary from test to test
  7. Specimens are packaged so as to prevent leakage or gross exterior contamination. Laboratory personnel have been instructed to reject such specimens, as they pose a risk to anyone who handles the sample container
  8. Specimens delivered on or in potential sharps (such as slides for microscopic evaluation): slide must be intact

- **Specimen quality is preserved according to the requirements for each test** *(Please consult the individual test listing for information regarding specimen quality.)*

- **Specimen is of sufficient volume or quantity to perform ordered testing** *(Please consult the individual test listing for information regarding specimen quantity.)*

Unacceptable Specimens and/or Requisitions, Recollection and Pending Orders

Laboratory staff will inspect each incoming specimen and requisition according to the above criteria. If a specimen is found to be unacceptable, the patient, inpatient floor, and/or ordering physician will be notified that specimen recollection is indicated. Incomplete outpatient requisitions and orders pending collection will be maintained in the laboratory and may be distributed to other collection sites as necessary. (Upon receipt of the outstanding sample, the requisition will be entered and processed as normal.) The date and time the recollected specimen is received will be documented on the requisition and in LIS. **Specimen recollections will be performed/resolved by the original collecting site, unless arrangements are made with another collection site in advance of the patient's arrival.** Action taken with regard to specimen recollection will be recorded on the hard copy requisition, computerized requisition, or prescription.

The ordering physician will be notified if laboratory personnel are unable to resolve issues involving pending orders, incomplete requisitions, and/or specimen recollection. Pending orders will be held for seven days. After seven days, the pending order requisition will be marked that the sample was not received. The requisition is then processed according to normal procedure. Stepwise description of the handling of unacceptable specimens will be documented on laboratory discrepancy or Parrish Medical Center variance reports, as indicated.

Cases involving unacceptable specimens that cannot be recollected (such as catheterized urine, body fluids, cord blood specimens, cultures, and tissues) will be reviewed by a laboratory administrator and/or pathologist. Disposition of such specimens will be determined according to the joint decision of the laboratory administrator or pathologist and the patient's physician.

Entering Requisitions

- Laboratory personnel will enter each **outpatient** and client requisition into the LIS system and verify its accuracy and completeness, as well as specimen labeling and integrity. Once entered into the computer, another person rechecks each computerized requisition for errors. Outpatient and client requisitions are made part of the patient's permanent Parrish Medical Center medical record. "Client" requisitions come from physician offices and other non-Parrish Medical Center organizations that have an account established with this facility. A list of current accounts, the "CLOUT Entry Manual," is kept in the laboratory.

- Nursing service personnel will enter each **inpatient** requisition into the LIS system. It is the responsibility of Nursing service personnel to verify the accuracy of all inpatient orders entered into the computer. Inpatient requisitions are part of the patient's permanent Parrish Medical Center medical record, and must be written and signed by the ordering physician.

- All samples accepted for testing will be entered into the LIS lab module*(Called "receiving"),* and will be assigned a unique alphanumeric identifier. This code is comprised of the collection date, a department designation or prefix, and a test number based upon a daily or yearly numbering wheel. (Example: 1130:H136 specimen collected on 11/30;Hematology test # 136) The time that the

specimen arrives in the laboratory is termed the "receive time" and is recorded on the computerized LIS requisition.

STAT Testing

- STAT testing is performed as ordered 24 hours per day, 7 days per week. Tests that can be ordered STAT are on the following list. Results should be available on STAT **outpatient** tests within 1 hour of receiving the specimen in the laboratory. Results should be available on STAT **inpatient** tests within 1 hour of entering the orders in LIS. To order STAT testing, mark the STAT block on the written requisition or enter "S" at the priority prompt on the LIS requisition. Please confine STAT requests to emergency situations in which results will directly impact the treatment of acutely ill patients.
- Policy has been established to aid in the evaluation of priority. Priority will be given to requests from ICU, coronary care, surgery, PACU, and ED over those from the remainder of the hospital.
- Unfortunately, not every test can be performed on a STAT basis. Occasions requiring the STAT performance of testing not included in the STAT list may arise when no one is on site that can perform the test. In these instances, the lab administrator or pathologist on call may be consulted.
- **Tests that may be ordered STAT are listed in the columns below**

Acetaminophen	Carbamazepine	LDH	Rhogam Workup
Acetone/Ketone	CBC/CBCD	Lipase	Salicylate
Alcohol	CK	Magnesium	Sickle Cell Screen
ALT	Creatinine	Mononucleosis screening	Theophylline
Ammonia	Digoxin	Malarial Smears (see indiv test listing)	Transfusion Reaction Workup
Amylase	Direct Antiglobulin Test (DAT/Coombs)	Osmolality	Type and Rh
Antibody Screen	Drug Screen	Phenobarbital	Type and Screen
AST	Electrolytes (Na, K, Cl, CO2)	Phenytoin/Dilantin	Uric Acid
Bilirubin	D-Dimer	Phosphorus	Urinalysis
Blood Culture Draws	Fibrinogen	Platelet Count	Urine Potassium
Body Fluid Testing	Glucose	PT	Urine Sodium
BUN	Gram Stain	PTHIO	Valproic Acid
Calcium	HCG, Qualitative	PTT	
CSF Testing	HCG, Quantitative	Troponin	
Calcium, Ionized	Hepatic Function Panel	Type and Crossmatch	

Medicare/Medicaid ABN

Patients receiving testing paid for by Medicare or Medicaid are required to sign an Advance Beneficiary Notice (ABN) for those tests that Medicare deems medically unnecessary. The Registration Department will provide a list of tests which may require an ABN signature. The ABN is considered to be part of the Medicare/Medicaid requisition and is made part of the patient's permanent Parrish Medical Center medical record. Please feel free to contact the laboratory if you have questions about ABN forms.

Autopsies

Post-mortem examinations require a physician's request and a properly signed Autopsy Permit. Nursing supervisor is responsible for notifying the contract pathologist according to established autopsy protocol as soon as the permit is signed. Nursing supervisor arranges for an off site autopsy and off site location. The pathologist encourages that the off site autopsy location (funeral homes) to provide facilities that meet the standards expected for accredited autopsy rooms.

Blood Bank Testing

- Requests should be submitted at least 24 hours in advance of scheduled procedures to allow for delays caused by unexpected pretransfusion test results or potential availability problems.
- Uncrossmatched blood may be released during extreme emergencies at the request of the patient's physician. The physician must sign blood bank emergency release documentation forms. Each emergency release will be reviewed by the pathologist.
- To obtain blood products, an RN, LPNII or physician must provide patient name, medical record and account numbers, and the blood product desired.
  - Requests for in-house patients can be sent through the pneumatic tube or presented to Blood Bank in person.
  - Requests for off-site Infusion and Dialysis Centers must be faxed and products will be delivered in coolers by trained volunteers.
- All blood products are leukoreduced
- Only type O red cells will be issued until the blood type has been confirmed by a second specimen from a separate venipuncture.
- Outpatient orders require two full tubes.

Blood Specimen Collection

- The following **color-coded collection tubes** are recommended unless otherwise indicated in the individual test listing. Volume requirements vary according to test. Some tubes are available in several volumes: please consult individual test listing for specific tube/volume/anticoagulant requirements.

Black glass tube Used for ESR collection ONLY
Gray Potassium oxalate and sodium fluoride anticoagulant
Green/with gel (mint) Lithium heparin anticoagulant
Green with no gel (shamrock) Sodium heparin (send outs only)
Blue 3.2% Sodium Citrate 1.8 ML used for coagulation testing, must be filled to the appropriate "fill line" on tube
Blue Greiner (white ring on top) 3.2% Sodium Citrate 2ML Must use these for Plavix testing fill to the arrow on tube
Lavender Sodium or potassium EDTA anticoagulant
Pink Potassium EDTA used for cross matches and antibody identification testing.
Pink with black center 6ml K3E EDTA K3 tube used for PTHIO procedures only (in operating room)
Red/Plain Red (small 4ML and Lg 10ML) No preservative or anticoagulant clot activator present to speed clotting
Gold/SST or "Tiger top" (Small 4ML and Lg 10ML) No preservative or anticoagulant; clot activator present to speed clotting, contains gel to separate cells and serum during centrifugation
Royal Blue EDTA Acid washed tube containing EDTA
Royal Blue(red on label) no additive Acid washed tube with no additive or anticoagulant clot activator tube
Yellow, Sol A or B ACDB anticoagulant send outs only
Quantiferon (R)-TB Gold contains 3 1ML tubes special instructions and is an indirect test for *M. tuberculosis* infection

- **Tube volume and labeling** varies from less than 1 milliliter to 10 or more milliliters. Please use the tube that corresponds to the test volume required. Allow evacuated tubes to fill naturally. In many cases, such as is the case with citrated blue top tubes for coagulation testing, tubes may appear to fill partially. Look on the manufacturer's label for a line or mark indicating the proper fill volume. DO NOT OVERFILL THESE TUBES. ***For specimens that are not to be spun, a "non-barcoded specimen label will be placed across the top of the tube". See coagulation testing, below.
- **Vacutainer Tubes**: There are two types of vacutainer tubes, regular stopper and hemogard safety stoppers. Apply the bar code label to the hemogard tube directly below the cap. On the stopper tubes, 10 and 7ml (100mm length), the bar code label is positioned at the bottom of the stopper or 2 inch below the top of the tube. On the 5ml (75mm length) regular stopper vacutainer tubes the bar code label is placed at the top of the tube.
- **Microtainer**: Labeling the microtainer sample is done using a small label for each container submitted. The transport container is also labeled with a small label.
- **Phlebotomy technique** to a great extent determines specimen quality. The following items are listed as a supplement only and should not be relied upon as a sole source. For more information, please call Parrish Medical Center laboratory.
  1. Identify the patient and explain the procedure to the patient
  2. Properly apply tourniquet and palpate the vein
  3. Cleanse the area (do not re-palpate unless absolutely necessary)
  4. Puncture the skin cleanly and enter the vein with the bevel of the needle facing up
  5. Collect/fill tubes as indicated, mixing appropriately
  6. Release tourniquet, remove needle, apply pressure to the site and bandage as indicated
  7. Label specimens at the bedside
- **Indwelling catheter/port/line** access for blood collection can be used as an alternative to venipuncture. Physicians and/or nursing personnel are required to perform both line installation and subsequent access procedures. Please feel free to call the lab for tubes or other supplies if this option is selected for blood collection. AT LEAST 10 CC OF BLOOD MUST BE DISCARDED PRIOR TO COLLECTION OF BLOOD FOR TESTING to prevent specimen contamination with IV fluids, drugs, or other materials that may be present in the tubing.
- **Coagulation testing** requires citrated plasma, collected in a light blue-top tube. Blue top tubes are calibrated to draw a specific volume of blood, and if not over- or under-filled will maintain a proper ratio of blood drawn to citrated anticoagulant. To avoid contamination with tissue thromboplastins or heparin,

  1. The venipuncture must be clean, with no trauma
  2. Hemolyzed specimens are unacceptable for testing and will have to be recollected
  3. The first 5 milliliters of blood collected should not be used for coagulation testing
  4. If drawn through an indwelling catheter or port, the first 10 milliliters of blood drawn must be discarded before the specimen for coagulation testing can be obtained to eliminate the possibility of heparin contamination

- The specimen should be mixed gently immediately after collection to prevent clotting; do not shake. Clotted specimens are unacceptable for testing and will have to be recollected. ***For specimens that are not to be spun, a "non-barcoded specimen label will be placed across the top of the tube". Centrifuge the specimen at 3000 rpm (1600 g) for 10 minutes or at 4000 for 4 minutes in Hetich 32A within 60 minutes of collection. Separate and freeze only for tests that are not stable for >4 hours
- **For other testing on blood specimens,** please consult the individual test listing for more information about specimen collection. Feel free to call Parrish Medical Center laboratory at 321-268-6134 if there are further questions.

Blood Cultures

During a disease process of bacterial origin, bacteria may enter the blood stream. Blood cultures detect septicemia. If the patient is undergoing antimicrobial therapy, blood cultures with antimicrobial devices (ARD) should be ordered. Standard blood cultures may be ordered if the patient is not undergoing antimicrobial therapy

- **Blood Culture Collection Instructions:** Follow general venipuncture procedure with the following addendum:

1. Cleanse the site using the Chlorapreп Frepp from the blood culture kit. Holding the scrub in a horizontal position, pinch once to break the ampule, depress against venipuncture site to saturate the sponge, and scrub area vigorously for 30 seconds.
2. Allow to dry (30-seconds) before performing venipuncture
3. Prepare the blood culture bottles by removing the plastic caps and *cleansing the rubber stopper with alcohol prep*
4. If it becomes necessary to repalpate the venipuncture site after decontamination is complete, the phlebotomist's finger must be decontaminated according to the above procedure. The venipuncture site should not be touched unless absolutely necessary after it has been decontaminated.
5. Obtain an appropriate volume of blood for each bottle according to the chart below. An aerobic and anaerobic bottle should be inoculated at each collection, with the exception of the peds plus (pink label) bottle. The peds plus bottle can be used alone if necessary.

BLOOD CULTURE COLLECTION SUPPLIES

Blood Culture Bottle or Other Item	Purpose	Volume of blood required
Silver Label Aerobic ARD bottle—Bactec Gold Label Anaerobic ARD bottle—Bactec	Use when patient is undergoing antimicrobial (antibiotic) therapy.	3-10 ml blood per bottle (optimal 8-10ml)
Blue label Aerobic bottle—Bactec Yellow label anaerobic bottle—Bactec	Use when patient is not taking antibiotics	3-10 ml blood per bottle (optimal 8-10ml)
Pink label Pediatric bottle—Bactec Peds Plus	Use when less than 2 ml blood is obtained; pediatric or adult	0.5 to 5 ml blood per bottle (optimal 1-3ml)
ChloraPrep One Step blood culture prep kit must include 2% iodine	Clean and decontaminate venipuncture site	N/A

***Special Considerations*:**		
Adult- 16-20cc of blood per venipuncture. If it is impossible to draw the required amount aliquot as follows:		
Amount Per Venipuncture	**Amount in Bactec Plus Aerobic Vial**	**Amount in Bactec Plus Anaerobic Vial**
16-20cc	Split equal between aerobic and anaerobic vials.	Split equal between aerobic and anaerobic vials.
13-16cc	8cc	Remaining blood
10-12cc	5cc	Remaining blood
5-9cc	Entire blood amount	0

- **Receiving Blood Culture Specimens in the Lab:**

  Labels are printed with the microbiology number and are placed on each bottle over the lab label. A microbiology label is to be placed on the hard copy of the requisition and then is delivered along with the extra labels and bottle to the Microbiology Department.

Specimen Handling

- Blood specimen collection instructions can be found in the section above entitled "Phlebotomy Technique." Serum and/or plasma samples should be centrifuged and physically separated from the red blood cells as soon as possible, *not to exceed two hours from the time of collection, unless otherwise directed for the individual test*. However, anticoagulated (plasma) specimens must often be left as whole blood (uncentrifuged) unless otherwise directed for the individual test. **PLEASE CONFIRM THE SPECIMEN HANDLING REQUIREMENTS FOR EACH TEST PRIOR TO COLLECTION.**
- Being certain of specimen requirements maximizes the quality of the specimen and the results determined from testing the specimen. This certainty also reduces the likelihood that the specimen will need to be recollected.
- **Samples that must be protected from light** should be submitted in an amber container, an amber transport bag, or wrapped in foil.
- **Chilled specimens** are required for analytes that are thermolabile and tests that require inhibition of blood cell metabolism. The sample must be in direct contact with the coolant, but should be separated from any fluid by a waterproof bag to prevent contamination and label degradation. Crushed ice or a mixture of ice and water is suitable coolant. (Large ice cubes alone are not suitable). The coolant must surround the specimen. After collection, the specimen should remain in the coolant until it is centrifuged, and then should be placed back in the coolant after centrifugation/separation according to the requirements of the test. Specimens that must be chilled may also be placed in the refrigerator to await shipment or testing. Generally, chilled or refrigerated specimens must be maintained between 2 and 8 degrees Celsius.
- **Frozen specimens** are required for many tests performed in the laboratory. In most cases, serum and/or plasma specimens must be centrifuged and aliquoted prior to freezing. When required, freezing must be initiated as soon as possible to maximize the quality of both specimen and results. Consult individual test listing for specific requirements. Generally, frozen specimens must be maintained at 0 degrees Celsius or colder. Occasionally, samples must be maintained at supercold temperatures. In these cases, store/ship the specimen in dry ice.

- **Room Temperature specimens** should not be refrigerated or frozen but should be maintained at room temperature. If centrifugation is indicated, room temp specimens should be spun in a non-refrigerated centrifuge.

Blood Specimen Processing

- **Prior to centrifugation**, serum specimen collection tubes (**Plain red-top, gel separator, clot-activator, royal blue trace element serum tube, etc)** must be allowed to clot. **Clotting times vary according to the type of serum tube and the anticoagulant status of the patient.** In most cases, a plain red top tube takes approximately 20-30 minutes to clot. Clot activator tubes takes approximately 5-15 minutes to clot. Clotting time may be longer for patients on anticoagulation therapy. Serum tubes spun before clotting is complete may not separate properly and may damage laboratory instrumentation. Please allow specimens to clot completely before being centrifuged. Centrifugation of gel-separator tubes more than once will adversely affect the results determined from the specimen. If it becomes necessary to respin a gel-separated specimen, separate the serum into a labeled aliquot tube and centrifuge the aliquot away from the gel. Please see the paragraph in the Centrifugation section below entitled, "gel tubes.
- **Plasma specimens** ***(Citrated blue top, Heparinized green top, etc*****)** may be centrifuged within one minute of collection. Some anticoagulated specimens, however, must be submitted as whole blood. Please consult individual test requirements for details.
- **At Centrifugation** NOT ALL TUBES ARE CENTRIFUGED. PLEASE CONSULT TEST LISTING FOR CENTRIFUGATION REQUIREMENTS BEFORE YOU SPIN SPECIMENS
- **Serum samples** ***(red top, red clot activator, royal blue no additive*****)** are centrifuged at 3000 for 10 minutes. The upper serum layer must be free of visible red blood cells. If there are red blood cells visible, re-centrifuge.
- **Platelet-free plasma samples** for coagulation testing ***(Light Blue top Citrated tubes***) are spun for 10 minutes or at 4000 for 4 minutes in Hethich 32A.
- **Plasma samples**, not for coagulation testing ***(green top, lavender top EDTA, pink top EDTA, royal blue EDTA***) are spun for 10 minutes (+/- 5 minutes). The upper plasma layer must be free of visible red blood cells. If there are red blood cells visible in the upper plasma layer, re-centrifuge at 4000 for 4 minutes in Hethich 32A, or at 5000 for 3 minutes in Hethich EBA 280.
- **Gel tube (*red, gold and yellow gel separator*)** samples must be clotted before being centrifuged. After centrifugation, visually inspect any gel separator barrier to ensure that it is intact and forms an even seal over the cell layer. If there are red cells visible in the upper serum layer or the gel tube, transfer the contaminated serum to a plastic aliquot tube, re-centrifuge for 10 minutes, and transfer the newly spun serum into a clean (properly labeled) plastic tube for shipment. Never re-centrifuge the original gel tube, as this can alter test results. If it becomes necessary to respin a gel-separated specimen, separate the serum into a labeled aliquot tube and centrifuge the aliquot away from the gel. GEL TUBES ARE NOT ACCEPTABLE FOR ALL TESTS, please consult individual tests for specimen requirements.
- **Separation of Non-Gel Tubes**- Serum/plasma samples must be physically separated from cellular elements for many tests. Ensure that centrifuged specimens are visually free of red cells in the upper serum/plasma layer. A plunger type filter may then be inserted into the tube through the serum/plasma layer to a position just above the red blood cell layer. The serum/plasma should then be aliquoted into a properly labeled clean plastic tube for storage or shipment. In some cases, it is permissible to ship the original tube with the capped filter in place.
- **Separation of Gel Tubes -** Gel tubes do not need to be aliquoted for shipment after centrifugation unless the gel seal is poor or the specimen needs to be respun. In most cases, the capped original tube can be submitted for testing after centrifugation.

Urine Specimens

- **Specimens for urinalysis and culture** should be submitted in properly labeled, clean, sterile container with a tight fitting lid. Chemical preservatives are not required for random urinalysis. The specimen should be free of fecal contamination or other foreign materials. The volume of urine required for testing varies and can be confirmed by looking up the individual test. Catheterized urine collections are usually performed by physicians or nursing personnel. Clean catch midstream urine specimens can be obtained using a clean catch midstream collection kit and the following instructions:
  1. Wash hands
  2. Break the sterile seal of the urine container, open the container, and place both the container and the outer flat surface of the lid on the counter. Be careful not to touch any of the container's inside surfaces
  3. Open all three towelette packages
  4. **Females**: Hold the labia open with one hand. With the first towelette, gently wash the vulva front to back on one side. Repeat on the other side with the second towelette. Gently wash the center of the vulva front to back with the third towelette. **Males**: (Circumcised) Wash the head of the penis from the center out with each towelette in turn.
  5. **Males**: (Uncircumcised) hold the foreskin back and wash the head of the penis from the center outward with each towelette in turn.
  6. While holding the labia apart or the foreskin back, begin to void into the toilet.
  7. Bring the open container into the urine stream and fill approximately ½ full.
  8. Close the specimen container and label it.
- **Collection guidelines for urine cultures from Indwelling Catheters**

Requests for urine culture with indwelling catheter will be collected by an RN. Following collection guidelines below. Urine for culture should not be collected from the urine bag.

The laboratory will contact nursing to request an RN to collect a urine specimen for outpatients with indwelling catheters.

Contact nursing administration to request an RN to collect an outpatient urine specimen for culture from an indwelling catheter.

- Contact nursing administrative bed control supervisor at extension 6321 weekdays 0700 AM- 1500
- Contact nursing administrative supervisor at extension #6666 weekdays after 1500 or weekends

Collection guidelines:

1. Disinfect the catheter collection port with 70% alcohol.
2. Clamp catheter below port and allow urine to collect in tubing for 10-20 min.
3. Use needle and syringe to aseptically collect 5-10 ml of urine
4. Transfer to a sterile tube or container.

- **24-hour and Timed Urine Collections:** Preservatives, volume requirements, and collection/ handling instructions for 24-hour and timed urine collections vary; please consult the listing under each individual test for more specific information. Containers can be obtained by calling the laboratory at 268-6134. Some 24-hour urine tests may require the addition of preservatives before being sent out for testing. Specimen processing personnel will add preservatives as necessary to 24-hour urine jugs when they are returned to the lab after collection. An aliquot of the unpreserved 24-hour urine will be kept frozen in the lab in the event of additional test add-ons.

- In general, the first urine specimen of the collection period should be discarded. The entire volume voided thereafter (Until the end of the collection period) should be poured into the container and stored according to specimen handling instructions for each individual test. Specific requirements may apply. Please consult the individual test listing and/or collection information sheet prior to collection.

- For distribution of 24-hour urine containers for inpatients utilize the following protocol.

  - A request will print on the Chemistry Printer
  - The request will be handled by the personnel in specimen processing
  - Printed requests are NOT to be placed in the file – if you take one off the printer be sure to give it to someone in Specimen Processing.
  - The Specimen Processing tech will:
    1. Obtain the appropriate jug
    2. Call the auxiliary department (7194) for pickup. Be sure to tell them where they are to pickup the jug (desk or core lab)
    3. Write type of jug, date, and initial on the request and make a copy. Place original in the 24-Hour Urine Log Book located in the front office.
    4. Send the copy to the floor with the jug.
    5. Leave the jug with the paperwork at the front desk for pickup when it is staffed. (2^{nd} and 3^{rd} shift follow current practice for auxiliary pickup when the desk is not covered)

Microbiology Specimens

These include specimens for culture from a variety of sources. Included are swabs, blood cultures, tissue samples, body fluids, catheterized urines, etc. Additional instructions may apply; please confirm specimen requirements in the individual test listing prior to sample collection. Transport/storage temperatures may vary. Specimen source is required: please note the source on the requisition and on the specimen label. When ordering microbiological analyses in the LIS system, source codes are required. In some cases, specimen description is also required – If the specimen description is entered, be specific (IE. **Right Arm Wound**)

Wound and abscess cultures

1. Cleanse the area around the would before sampling
2. Surface Lesions (Wounds) must be sampled carefully. The surface lesion must be opened; the advancing edge of the lesion must be firmly sampled with a culturette swab. The representative specimen is at the advancing edge of the wound. Any pus should be expressed onto the swab, though pus alone is not a suitable sample as organisms present may be nonviable. A dry swab rubbed over the lesion is not a suitable specimen for culture as anaerobes commonly contaminate surface wounds. Surface lesions should not be cultured for anaerobic studies.
3. Deep wound cultures should be submitted in a E-Swab, standard culturette, or capped syringe (needle removed).Fluid or tissue is the preferred specimen.

- Sputum specimens for standard culture

1. The following instructions apply to any single sputum collection. For acid fast studies, three early morning sputum samples collected on successive days are optimal. The standard sputum volume is 5-10 milliliters. There is no advantage to collecting a larger volume of sample. Sterile sputum containers can be obtained by calling the laboratory at 321-268-6134.
2. Instruct the patient to rinse his/her mouth before providing the specimen.
3. Cover the patient's mouth and nose with a tissue or handkerchief and cough the specimen up from deep in the chest.

4. Hold the sterile specimen container at the edge of the lower lip and gently release the sputum from the mouth. Instruct the patient not to expectorate saliva or sinus drainage into the specimen container.
5. Label specimen according to the above guidelines

- Ear

1. Clean external ear surface
2. Obtain maximum specimen with a sterile culturette or other recommended transfer swab
3. Label specimen according to the above guidelines

- Nose

1. Swab anterior nares only
2. Use a sterile culturette or other recommended transfer swab
3. Label specimen according to the above guidelines

- Throat

1. Using a sterile tongue blade, depress the patient's tongue. The interior surface of the throat should be well exposed.
2. Use a sterile culturette or other recommended transfer swab
3. Sample the tonsillar area thoroughly, avoiding cheeks and teeth.
4. Label specimen according to above guidelines.

- Nasopharynx

1. Gently pass a sterile nasopharyngeal swab through the nostril and into the nasopharynx.
2. Allow the swab to remain in the nasopharynx a few seconds and gently withdraw.
3. Label according to the above guidelines.

- Genital

1. For GC, collect female endocervical or male urethral specimen on a sterile culturette or other recommended transfer swab. For cervical cultures, collect the inoculum through an inserted speculum, taking care not to touch the swab to the vaginal wall. For other genital cultures, submit inoculated culturette or other recommended transfer swab.
2. For gram stain studies, make slides at the patient's bedside by gently rolling an inoculated swab over the sterile surface of the slide. Do not rub the swab over the slide.
3. Label specimens according to the above guidelines.
4. Send specimens promptly to the laboratory.
5. Prenatal Group B Strep Cultures: **It is recommended not** to collect by speculum Vaginal and rectal sites are the preferred specimen.

- Cerebrospinal, joint, or other sterile body fluids

1. Surgical preparation of puncture site is performed by a physician.
2. Optimum volume in adults is 0.4 to 5.0 ml
3. Optimum volume in children is 0.4 to 1.0 ml
4. Deliver immediately to the laboratory
5. Label specimens according to the above guidelines; record the collection order on individual tube labels i.e. "tube #1," "tube #2," "tube #3," etc. Collection order affects testing results and must be carefully noted to ensure accuracy.

- Urine -Please see the procedure above "Urine collection for urinalysis and culture"

- Feces

1. Collect specimen in a clean, plastic, screw-cap container.
2. Instruct patient to pass stool directly into the container.
3. Specimen should be free of water, urine, and toilet tissue contamination
4. Optimum quantity of specimen varies according to the test performed. Please consult individual test listing for details.
5. For ova and parasite examination, feces should not be more than one hour old. Deliver to the laboratory within one hour of collection.
6. Feces collected after an oil purge or barium administration is unsuitable for laboratory testing.
7. Rectal swabs are only suitable for culture when acute gastroenteritis is suspected.
8. Para Pack collection kit may be given to outpatients. Specimen should be received within 24-hours after collection **however, the medium will maintain the pathogenic bacteria for up to 96 hours while limiting overgrowth of normal flora**.

- Lavage or drainage: collect aseptically and transport to laboratory for processing as soon as possible after collection.
- Tissue samples, biopsies: collect aseptically and transport to laboratory for processing as soon as possible after collection.
- Blood Cultures are discussed separately above.

Collection of Specimens for Acid Fast Bacilli and Fungal Studies

- Sputum

  These specimens should be a series of three to five single early morning samples. A volume of 5 to 10ml is adequate for each sample. There is no advantage to collecting a larger sample.

  To collect the sputum, instruct the patient as follows:

  1. Rinse mouth with water before giving specimen
  2. Cover the mouth and nose with tissue or handkerchief and cough the specimen up from deep in the chest.
  3. Hold the specimen container to the lower lip and gently release the specimen from the mouth to the container.
  4. Place the specimen container in a holder and have collector replace the cap.

- Broncoscopy and Bronchial Brushings

  - These are useful specimens, not only for specimens collected at examination but also because the procedure itself causes the patient to produce sputum naturally for several days.

  - After the specimen is collected, it should be immediately sent to the laboratory. Cardiopulmonary notifies Microbiology and the technologist picks-up the specimen from the floor. If absolutely necessary, refrigerate the specimen after routine cultures are setup.

- Gastric Lavage

  - When sputum is difficult to obtain, gastric lavage can perhaps be performed. It might be indicated for patients with radiologic evidence of tuberculosis whose sputum is negative by other methods of examination, uncooperative patients who raise no sputum, patients who cannot expectorate because of other disorders, or young children from whom sputum is normally difficult to obtain.

  - The specimen should be collected early in the morning before the patient has eaten and preferably while the patient is still in bed. After the specimen is collected, send immediately to the laboratory and process within 4 hours.

- Urine

  Collection will follow a "Urine Clean Catch" procedure or a catheter specimen. The specimen should be collected either as single, early morning, voided midstream specimen, or as a total first morning specimen. Like the gastric lavage, urines are best collected and immediately processed. Refrigerate if necessary.

- Other Body Fluids

  Aseptically collected specimens such as pleural, pericardial, spinal, synovial, ascitic fluids, blood, and bone marrow must be sent to the laboratory immediately. Acid-fast bacilli are generally difficult to find in such specimens because they are so diluted by the larger volume.

- Tissues

  Pieces of aseptically collected tissue will be transported in a sterile container without preservatives or fixatives. If the piece of tissue is large enough, it will be processed in a tissue grinder prior to inoculation. Specimens need to be forwarded to the laboratory as soon as possible.

Microbiology Specimen Transportation and Preservation

- The simplest collection and transport device is a syringe; this method should be encouraged when appropriate. If a fairly large volume is collected in a syringe, anaerobic bacteria can survive for 24 hours at room temperature. Following collection, excess air is expressed, the needle is removed and syringe is capped and labeled and delivered to the laboratory.

Specimens such as sputum or urine require leak proof containers. Our department uses a sterile cup for these specimens.

- Many specimens are collected on swabs. For routine use, our department uses the modified Stuarts transport medium.
- For anaerobic transportation we utilize the E-Swab (Biology Systems)
- For FLU and RSV testing we utilize the mini-tip E-SWAB
- Specimens should be delivered to the laboratory as soon as possible after collection and certainly within 1 to 2 hours. Ideally, all specimens should be processed immediately; however, this is often not practical or possible. Urine specimens maybe held up to 24 hours refrigerated. Specimens collected on swabs and placed in transport media maybe held several hours at room temperature. Specimens that contain temperature sensitive organisms can be held several hours at room temperature.
- Cerebrospinal fluid and other body fluids collected by needle aspiration, feces, and specimens obtained in the operating room, should be processed immediately.

Cytology/Histology Specimens

- **A completed "Request for Tissue Examination," E-32** must accompany each specimen submitted for cytology or pathology procedures.
- Label specimens and complete manual requisitions according to general laboratory protocol.
- Patient history is required.
- Submit specimens in appropriately sized, sealed plastic container.
- **Certain tests require fresh specimens and others require specimens treated with fixatives or preservatives. Please refer to the Pathology section of this manual for detailed listings and requirements.**
- Please remove all instruments and sponges from specimen/specimen container prior to submission.
- Foreign Bodies: Submit these specimens to the lab in the same manner as routine surgical specimens. If the foreign body is required by a law enforcement agency for use in litigation, refer to policy 6600-6, procedure #105.
- Laboratory staff completes LIS test requisitioning after the specimens arrive in the laboratory.
- Testing is performed Monday through Friday. Please submit specimens no later than 4:00 P.M. for next day results. Specimens submitted on Saturday or Sunday will be processed for testing the following Monday.

Viral Specimens Guide: Call Microbiology 268-6333, ext. 7521 for information

Viral cultures require special transport media to ensure recovery of the organism. Please obtain transport media from the Microbiology department prior to sample collection. The source code is required to order viral cultures.