

Specimen Collection

GENERAL GUIDELINES

Generally, the specimen requirements are written in a format that specifies the requested volume, storage temperature, and any special handling notes. The requested volume is an amount sufficient to allow at least two performances of the assay either singly or in duplicate. The minimum volume allows one single analysis including instrument dead volume. Storage temperature is specified as room temperature (15 - 30°C), refrigerated (2 to 10°C) or frozen (-20°C or colder). When temperature is not indicated, the sample may be stored and shipped in the most convenient manner for the client.

For panels or multiple assay requests, the sample should be submitted with the physician's priority of determination on the Test Request Form. Tests will be performed in the order of that priority. If the volume is insufficient to run all the tests requested, our Client Services department will contact the physician.

INTRODUCTION

The quality of any laboratory test result is dependent on many variables, the first of which begins with you. Your care, skill, and knowledge when preparing the patient and specimen are essential to the provision of the highest quality standards for testing and services. The patient must first be properly prepared so that the best possible specimen can be collected. Next, the actual collection of the specimen must be completed. Then, the specimen should be properly processed, packaged and transported to the laboratory in a timely manner and under environmental conditions that will not compromise the integrity of the specimen. After all of these activities take place, a quality analysis can be performed. The specimen collection and handling process can be completed by you and your staff, or by referring your patient to a Quest Diagnostics Patient Service Center. Please contact the laboratory for clarifications, if needed, prior to specimen collection.

Specific specimen requirements for each test are listed in the General Test Listing section of this directory. Specimen requirements include information such as specimen volume, collection and transport containers as well as transport temperature. If additional information is needed for the interpretation of the test results or there are specific instructions for patient preparation, they are listed along with specimen requirements. It is critical that an adequate specimen volume is submitted for analysis. The volume requested in this directory is enough for initial analysis as well as for any confirmatory tests that must be performed. If an inadequate specimen is submitted, we may not be able to perform the initial test or required confirmatory procedures.

If repeat or confirmatory tests cannot be performed, the report will indicate that the specimen quantity submitted was "QNS" (Quantity Not Sufficient) for additional testing. When serum or plasma is to be submitted for analysis, it is good practice to collect a volume of blood that is 2 to 2.5 times the volume of serum or plasma needed for the test. As an example, if 4 mL of serum or plasma is needed for a test, collect 8 to 10 mL of blood. When an inappropriate specimen or unclear test request has been submitted, you will receive notification with instructions for resolving the problem.

HEALTH AND SAFETY PRECAUTIONS

Specimens must be handled in a safe manner and according to applicable legal requirements or guidance. Information on safe specimen handling may be obtained from the U.S. Occupational Safety and Health Administration (OSHA) and the Centers for Disease Control and Prevention (CDC). In handling human specimens, the goal is to protect health care workers and ancillary staff such as transportation as well as the general public from exposures to blood and to other potentially infectious body fluids. Besides following other specimen preparation procedures included in this directory, customers should, prior to sending a specimen to Quest Diagnostics, ensure that there is no leakage from or visible contamination outside the specimen container and that there are no needles or other sharps in the package that could cause injury or pathogenic exposure to anyone handling or opening the package and inner containers. Quest Diagnostics reserves the right to refuse to accept any transports that pose a safety hazard to its employees.

PATIENT PREPARATION

Many tests require that the patient be prepared in some specific way to ensure useful results. The best analytical techniques provide results that are only as meaningful as the quality of the specimen that has been submitted for analysis. Our goal is to provide you with the most useful diagnostic information possible. If you have questions about patient preparation for any test, please consult the General Test Listing section in this directory or call Client Services for further assistance.

Fasting requirements

For the majority of tests performed on serum, plasma or whole blood, a fasting specimen is preferred. Non-fasting specimens often contain fat particles that can interfere with many analytical procedures.

Patient age

It is helpful to indicate patient age and blood type so that appropriate reference ranges can be assigned for reporting purposes. On occasion, patient age will assist the technologists in choosing the appropriate initial sample dilution for the assay.

Pediatric Specimens

Pediatric color-coded Vacutainer® tubes are provided to facilitate special handling. Special small conical tubes with screw caps are provided to prevent evaporation of small volume samples. These tubes will hold up to 1.5 mL of specimen. Standard Quest Diagnostics, Nichols Institute (SJC), CA specimen transfer tubes should be used for larger volume samples. For urine specimens, use Quest Diagnostics, Nichols Institute (SJC), CA urine vials.

We generally request 1 tube per test to avoid delays in processing and to expedite turnaround time. To minimize specimen volume requirements for small children, however, only one tube is required even when multiple tests are ordered.

For pediatric specimen tubes, wrap the label around the tube just below the screw cap so the ends of the label adhere to each other and the information stipulated above can be read.

Specimen Collection

Bright orange, self-adhesive “Pediatric Sample” labels are provided. Please place one of these labels in a blank area of the Test Request Form. The Test Request Form, properly filled out and labeled, should be folded and inserted in the pediatric specimen bag.

LABELING SPECIMENS

Each specimen submitted must have a requisition label. This label must include your account number, laboratory number and the patient’s name. Be sure that the label is securely attached. Use a ballpoint pen. Do not use a felt tip pen.

Each specimen submitted must be labeled with the patient’s name, written exactly as it appears on the test requisition (e.g., “Doe, John”), and date of collection. When using an electronically generated Quest Diagnostics test requisition, place the label lengthwise on the tube. When submitting a specimen in a transfer tube, also indicate specimen type on the label, e.g., serum, plasma, urine, etc. When ordering tests in a series (e.g., growth hormone stimulation, glucose tolerance, multiple-site renin specimens):

1. Use one Test Requisition
2. Label each specimen with the patient’s name, date and time or site (if applicable)
3. Write the number of specimens on the Test Requisition
4. Submit all specimens within a series together in one specimen bag

PACKAGING SPECIMENS

1. Ensure that all specimen container caps and lids are properly tightened to prevent leakage.
2. Complete the “Patient Information” and “Insurance Information” sections. Legibly print patient information and indicate with a check (in Field #13 on the sample physician requisition) which party will be responsible for payment in the “Bill To” section of the requisition. Enter the ICD9 diagnosis codes (in Field #35) that reflect the patient’s diagnoses and provide medical justification for the tests ordered. Complete the billing information.
3. Indicate the patient’s full name on the labels in the lower portion of the test requisition.
4. Collect the specimen(s) in proper transport container. (Refer to the General Test Listing section for more information.)
5. Remove the label from the test requisition and affix to the specimen transport container. Place on the container so that the label does not cover the handwritten patient name on the container.
6. Fold the top copy (original) of the test requisition in half widthwise (top to bottom) with the patient’s name and bar code facing out. Retain the second copy for your files.
7. The specimen bag has two pouches. Place the specimen(s) in the rear pouch (printed side) and the test requisition in the front pouch (unprinted side) with the bar code visible in the bottom corner of the bag.
8. FROZEN specimens must be placed in a separate specimen bag along with a separate test requisition. Frozen specimens cannot be split for multiple tests. If more than one test is ordered on a single frozen sample, we will call you to decide which test you want performed before testing can proceed.
9. Remove the protective strip and seal the specimen bag. The protective strip must not obstruct the bar code. This will protect the test requisition from leakage and ensure that the patient information can be entered directly into the laboratory computer by laser reading the bar code.
10. If the specimen has already been classified as an “infectious substance,” inform Quest Diagnostics prior to or at time of courier pick-up so that proper transport arrangements can be made.
11. Any updates to these guidelines (or to the specimen transport supplies) will be communicated through your local Quest Diagnostics sales representative or courier.

PROPER SPECIMEN PACKING HELPS TO EXPEDITE YOUR ORDER.

STORING AND SECURITY OF SPECIMENS

Maintain specimens at room temperature or on cool packs, unless otherwise noted under the “Transport Temperature” or other specimen requirement in the General Test Listing section.

Quest Diagnostics will provide a “lock box” for specimens awaiting pick-up by a Quest Diagnostics courier. However, customers are responsible for the security of specimens prior to pick-up by a Quest Diagnostics courier.

TRANSPORTING SPECIMENS

Please follow the guidelines in the General Test Listing for placing specimens in the proper containers and preparing to submit them to Quest Diagnostics for testing. The following is applicable to transporting specimen packages to Quest Diagnostics, whether transported by a Quest Diagnostics courier or by a commercial carrier (e.g., UPS, commercial airlines). Please note that if you do not submit specimens through a Quest Diagnostics courier, the commercial transport of specimens (including by the Postal Service) is subject to various regulations or carrier requirements for documenting the contents of any package and for packaging and labeling. Anyone submitting specimens to Quest Diagnostics is responsible for compliance with these regulations or requirements. The outline of transportation requirements below should not be substituted for seeking expert or legal advice about regulatory compliance when applicable, especially when transporting what the U.S. Department of Transportation (DOT) considers “infectious substances” or other “hazardous material.” In some cases, employees must be trained on their knowledge of these regulations. Quest Diagnostics cannot be responsible for that training.

Specimen Collection

Needles, Sharps or Medical Waste

Do not send any needles or other breakable medical equipment. Sending medical waste as a diagnostic specimen violates the law and may create a health hazard. Properly discard of used needles or other sharps prior to transport. Please note for tests requiring the submission of syringes, the needle must be removed from the syringe and discarded and the syringe capped before sending to the laboratory.

Transportation Bag

Specimen containers should be placed in a transportation bag with the proper specimen labeling and the paperwork in the side pocket. In all cases, use of appropriate containers and packaging for specimens is important as leaking packages may pose a health hazard.

SHIPPING

1. Transported by Quest Diagnostics courier:
 - a. Place specimen containers in a Quest Diagnostics requisition bag.
 - b. Follow any other guidance provided by Quest Diagnostics for submitting specimens.
2. Transported by Commercial Carrier (e.g., FedEx, Commercial Airline) or Postal Service (the person packaging the specimens for shipment must be trained and certified):
 - a. Diagnostic Specimens:
 - i) package and document according to carrier's instructions, including any requirements for dry ice or accompanying material, e.g., alcohol;
 - ii) if by air carrier, follow any additional packaging and documentation requirements according to carrier's instructions and/or those issued by the International Air Transport Association (IATA), including Packing Instruction 650;
 - iii) if by U.S. Postal Service, package and document according to Postal Service instructions.

Because some parts of the U.S. DOT regulations (49 CFR Parts 171-180) may apply depending upon whether it is transported by air or ground, and the carriers may account for the DOT rules in their instructions, check with your carrier or transportation expert about application of the DOT rules prior to submitting.

- b. Infectious Substances (see note below – the person packaging the specimens for shipment must be trained and certified):
 - i) use infectious substance label, package and document according to carrier's instructions, including any requirements for dry ice or accompanying material, e.g., alcohol;
 - ii) if by air, follow any additional packaging and documentation requirements according to carrier's instructions and/or those issued by the IATA, including Packing Instruction 602 (note that not all air carriers will accept infectious substances);
 - iii) if by U.S. Postal Service, label, package and document according to Postal Service instructions (note that the Postal Service may not accept certain types of specimens).

Packages originating outside of the United States must meet any applicable legal requirements of the country of origin and the U.S. Customs and/or CDC requirements for entry into the United States.

INFECTIOUS SUBSTANCE

Starting in 2003, both DOT and IATA changed their rules for classifying specimens for transport. Under the new rules, most specimens for clinical testing may be classified as diagnostic specimens; only certain specimens with a higher potential to transmit severe, disabling or fatal diseases must be declared and packaged as "infectious substances." Those wishing to transport infectious substances should check with the DOT, CDC or public health authorities to determine the Risk Group of the specimen and, correspondingly, how the specimen should be packaged for transport.

For example a Risk Group 4 specimen will need to be packaged as a DOT or IATA "infectious substance." In addition, some air carriers may not consider some specimens in other Risk Groups as suitable for air transport.

The proper packaging of specimens will expedite the timely receipt and processing by Quest Diagnostics. Quest Diagnostics and its affiliates will not be responsible for any liability attributable to the shipper's improper actions or failure to comply with any applicable legal requirements. Quest Diagnostics reserves the right to refuse to accept any transports that do not meet legal requirements.

SUPPLIES

Certain supplies necessary to draw and submit specimens for analysis by Quest Diagnostics are provided to customers as part of our testing services. Type and quantity of items must correlate to the number of specimens submitted to Quest Diagnostics for testing. Specimen collection devices supplied by Quest Diagnostics are to be used only for the collection of specimens for processing by Quest Diagnostics. Such supplies are not to be used to store or dispose of biological materials, including sharp instruments, or for any activity not connected with the collection of specimens for processing by Quest Diagnostics.

Specimen Collection

SERUM, PLASMA OR WHOLE BLOOD COLLECTION

Draw blood in the color-coded Vacutainer® tube indicated in the alphabetical test listing. For serum or plasma, draw approximately 2 1/2 times the requested volume. For serum, allow the blood to clot sixty minutes and separate by centrifugation. For plasma and whole blood, completely fill the Vacutainer whenever possible to eliminate dilution from the anticoagulant or preservative and immediately mix the blood by gently and thoroughly inverting the tube five to ten times. Separate plasma by centrifugation. Transfer the serum, plasma or whole blood to a plastic transport tube (see Pediatric Specimen Tubes below). To prevent injury and exposure to potentially infectious material, do not ship frozen serum, plasma, or whole blood received in glass tubes or SST (glass or plastic).

The color-coded Vacutainer tubes on the inside cover are recommended unless otherwise indicated in the alphabetical test listing. Color-coded pediatric Vacutainer tubes are provided to facilitate special handling.

Most blood specimens can be obtained using routine phlebotomy techniques; however, there are some exceptions. The use of a tourniquet can cause stress and is not recommended in some cases. The patient's posture either sitting, standing or lying down, or the time of day relative to the patient's sleep cycle can be important factors in some tests. Whenever specific issues of this nature are important, they will be listed as part of the specimen requirements or patient preparation for the individual tests in the General Test Listing section.

WHOLE BLOOD

Collect whole blood according to instructions provided for the individual test. Thoroughly mix the blood with the additives by gently inverting the tube eight times (four times in the case of light blue-top (sodium citrate) tubes. Maintain the specimen at room temperature or on cool packs before submitting to our laboratory unless instructed otherwise by the specimen requirements. Never freeze whole blood unless specifically instructed in the specimen requirements.

If you store cool packs in the freezer, be sure to allow enough time for them to warm to refrigerator temperature before placing whole blood specimens near them. To minimize the risk of hemolysis, do not place whole blood specimens in direct contact with cool packs.

PLASMA

Plasma contains fibrinogen and other clotting factors when separated from the red blood cells. Evacuated tubes used to collect plasma specimens contain anticoagulant and, frequently, a preservative. The additive in each tube is specified on the label and tube stoppers are color coded according to the additive present. Consult the individual test specimen requirements to determine the correct additive/tube to use. Indicate that the specimen is plasma on the plastic screw-cap vial for transport and test requisition.

Centrifugation: When plasma is required, or when not using a serum gel separator tube, follow these instructions:

1. Draw 12 mL of whole blood for each 5 mL of serum or plasma needed. Collect in an appropriate collection tube.
2. Centrifuge for at least 15 minutes at 2200-2500 RPM.
3. Pipette the serum or plasma into a clean plastic screw-cap vial and attach the label. Do not transfer red cells to the vial. Screw cap on firmly to prevent leakage.

SERUM

Please check individual specimen requirements for restrictions. When using a serum separator tube, follow these instructions:

1. Perform venipuncture as with any other blood collection device.
2. Invert the tube gently no more than eight times. Further inversion may cause alterations in sample integrity.
3. Do not remove the stopper at any time. Do not centrifuge immediately after drawing blood. Allow the blood to clot in an upright position for at least 30 minutes but not longer than 1 hour before centrifugation.
4. Centrifuge for at least 15 minutes at 2200-2500 RPM within one hour of collection.
5. Transfer the serum to a plastic screw-cap vial for transport to the laboratory.

Note: Do not use serum separator tubes for therapeutic drug monitoring or toxicological analysis. The plastic serum separator material extracts lipophilic substances (most drugs), resulting in a falsely low drug concentration result. Instead, collect the specimen in a plain red-top tube containing no anticoagulants or preservatives. Transfer the serum with a pipette to a plastic vial for transport to the laboratory. Serum should be clear and free from all red cells.

FROZEN SERUM OR PLASMA SPECIMENS

Serum or plasma specimens need to be frozen only if specifically stated in the specimen requirement. However, in these cases, it is essential to freeze the specimen as soon as it is separated from the cells. Always freeze specimens in plastic tubes unless specifically instructed otherwise.

Lay the tube at a 45° angle to avoid tube breakage caused by expansion during freezing. Do not freeze plastic Serum Separator Tubes. An exception is a specimen submitted in a PPT tube; the plasma can be frozen and transported in the original tube.

Extreme cold may cause ordinary plastic labels to become brittle and detach from the specimen tube. Use clear tape to secure label to specimen transport tube.

Note: If more than one test is requested on a frozen specimen, split the sample prior to freezing. Use a separate test requisition when submitting a frozen specimen; frozen and non-frozen specimens must not be submitted on the same test requisition. Indicate on specimen container and test requisition if specimen is plasma or serum.

If more than one test is ordered on a single frozen sample, we will call you to choose which test you want performed before testing can proceed.

Specimen Collection

COMMON CAUSES OF UNACCEPTABLE SERUM OR PLASMA SPECIMENS AND INACCURATE TEST RESULTS:

Hemolysis

Hemolysis occurs when the membrane surrounding red blood cells is disrupted and hemoglobin and other intracellular components escape into the serum or plasma. Hemolyzed serum or plasma varies in color from faint pink to bright red, rather than the normal straw color. Grossly or moderately hemolyzed specimens may be rejected and even slight hemolysis may alter certain test results.

Hyperbilirubinemia

Icteric serum or plasma varies in color from dark to bright yellow, rather than the normal straw color. Icterus may affect certain determinations. Upon receipt of such specimens, we may request a new sample to assure results of diagnostic value.

Turbidity (Lipemia)

Turbid, cloudy or milky serum (lipemic serum) may be produced by the presence of fatty substances (lipids) in the blood. Bacterial contamination may also cause cloudy serum. Moderately or grossly lipemic specimens may alter certain test results.

A recent meal may produce transient lipemia; therefore, we recommend that patients fast 12-16 hours before a blood specimen is obtained.

Radioisotope Interference

Diagnostic procedures or therapy involving radioactive compounds may invalidate radioisotope assays. Obtain specimens for anticipated radioisotope assays before administering isotopes to the patient.

STOOL COLLECTION

1. Carefully read the specimen requirements.
2. Collect timed specimens in a pre-weighed, well-sealed container (available from the laboratory upon request).
3. Determine weight of total sample.
4. Mix contents of timed sample well to obtain a homogeneous mixture.
5. Remove the required aliquot to a screw-cap plastic container and seal well.
6. Record the total weight and collection time of the sample on both the sample container and the test requisition. Do not send the entire collection unless instructions for specific test indicate otherwise.
7. For instructions for stool cultures, refer to the Microbiology section in this directory.

URINE COLLECTION

Many urine chemistry tests require a 24-hour collection. Record on the test request form any medications that the patient is receiving. If a preservative is required, it is important that the designated preservative be in the urine collection container at the start of the collection. When the 24-hour urine output is less than 1 liter, 4 grams of boric acid can be used when boric acid is the specified preservative or 10 mL of 6N HCl can be used when HCl is specified. The patient (or responsible individual) should be cautioned that the preservative may be toxic and caustic, and not to spill or discard the preservative.

On the day of the collection, discard the first morning urine void, and begin the collection after this void. Collect all urine for the next 24 hours so that the morning urine void on the second day is the final collection. Measure and record this volume on the test request form and on the urine transport vial (see Pediatric Specimen Tubes below). Transfer the requested volume into the labeled urine transport vial. Do not send the entire urine collection.

Random Urine

The normal composition of urine varies considerably during a 24-hour period. Most reference values are based on analysis of the first morning voided urine. This specimen is preferred because it has a more uniform volume and concentration, and its lower pH helps preserve the formed elements.

To reduce contamination, the specimen submitted for urinalysis should be a clean catch "mid-stream" sample.

Submit a first morning voided specimen whenever possible. Urine for pregnancy testing should be first morning void, or a random specimen with a specific gravity of at least 1.010. Note the time of collection of the specimen on the test requisition and on the label of the container. For urine chemistry tests, the 24-hour urine collection is the usual standard. For some of these tests, there are dietary restrictions that must be observed. For others, there are drug that must be avoided prior to obtaining the specimen. This information is included as part of the specimen requirements for the individual tests in the General Test Listing section.

Note: Specimens for Urinalysis must be submitted in a yellow/red swirl-top preservative tube. See Urinalysis test for specific information.

If a frozen specimen is required, freeze the urine immediately after collection. Pack in dry ice for transport to the laboratory. (See section on FROZEN SPECIMENS.)

Urine for culture

See Microbiology section for specific instructions.

24-Hour Urine

Because proper collection and preservation of 24-hour urine specimens are essential for accurate test results, patients should be carefully instructed in the correct procedure.

Specimen Collection

Important Note: For those analyses requiring the addition of 6N HCl, add the acid at the start of collection. Have the patient collect each voiding in a smaller container and carefully pour the urine into the 24-hour container to avoid any possible acid burns to the patient (make sure the patient understands the hazard presented by the acid preservative). Be sure to mix urine thoroughly before removing the aliquot.

Follow these instructions if someone other than the patient is to collect the urine:

1. Unless the physician indicates otherwise, instruct the patient to maintain the usual amount of liquid intake, but to avoid alcoholic beverages.
2. During the collection period, place the 24-hour urine container (with appropriate preservatives, if applicable) provided by Quest Diagnostics in a refrigerator or cool place to prevent growth of microorganisms and possible decomposition of urine constituents. (See specimen requirements for the individual tests in the General Test Listing section for any information on required preservatives.)
3. Have the patient empty his/her bladder in the morning into the toilet (not to be included in the 24-hour collection). Write the date and time of voiding on the container label.
4. Collect the patient's next voiding and add it as soon as possible to the 24-hour container.
5. Add all subsequent voidings to the container as in (4). The last sample collected should be the first specimen voided the following morning at the same time as the previous morning's first voiding.
6. Mix the contents of the container gently but thoroughly. Examine to ensure that the contents appear homogeneous.
7. Measure and note the total volume of urine.
8. Transfer the required aliquot to the plastic screw-cap plastic containers provided by Quest Diagnostics.
9. Record the total 24-hour urine volume on the specimen container and on the Test Requisition (Field 7 on the sample physician requisition) before sending to the laboratory.
10. If required, refrigerate the aliquot until it can be sent to the laboratory. For frozen specimens, freeze before packing in dry ice for transport. (See section on FROZEN SPECIMENS.)
11. Ensure the lid is properly tightened to prevent leakage.

Follow these instructions if the patient is to collect the urine:

Important Note: For those analyses requiring the addition of 6N HCl, add the acid to the 24-hour container at the start of collection. Have the patient collect each voiding in a smaller container and carefully pour the urine into the 24-hour container to avoid any possible acid burns to the patient (make sure the patient understands the hazard presented by the acid preservative). Be sure to mix urine thoroughly before removing the aliquot.

Give the patient the clean, labeled container provided by Quest Diagnostics, and instruct patient not to remove any preservatives (powder, liquid or tablet) that may be in the container. Alert the patient that preservatives are hazardous chemicals and are not to be ingested.

- Unless the physician indicates otherwise, instruct the patient to maintain the usual amount of liquid intake, but to avoid alcoholic beverages.
- Instruct the patient to carry out steps 3-5 above and return the 24-hour collection to your office for specimen pick-up.

DRUG TESTING

Urine specimens for drug testing must be collected and submitted with no preservative.

Specimen Collection and Handling

Urine Chemistry Tests

Urine Chemistry Preservatives and Requirements

Test Name	Test Code				Transport Temperature			Preservative		
	Random Urine with Creatinine	Random Urine without Creatinine	24-Hour with Creatinine	24-Hour without Creatinine	Room Temperature	Refrigerated	Frozen (-15 to -20°C)	6N HCl	Boric Acid	Acid Washed Container*
Alcohol, Ethyl, QL		2128X ⁽¹⁾			A	A	P			
Aldosterone			19552X			P	A		P	
Aluminum		6024X		14451X	A	P	A			
Amino Acids Screen, QL		684X					R			
Amino Acids Screen, QN	36183X						R			
Amino Acid, Single, QN, Specify			36190X				R			
Amylase	8464X				P	A	A			
Antimony	264X				P	A	A			R
Arsenic	270X			36433X		P	A			R
Beryllium	6057X				P	A	A			
Beta-2 Microglobulin		4944X				A	P			
Bismuth	6060X			37967X		P	A			R
Cadmium	672X		36434X			P	A			R
CAH Panel, Neonatal	10046X						R			
Calcium	1633X		1635X	11313X	P	A	A	P	A	
Calcium, Pediatric	11216X				P	A	A	P		
Catecholamines	5244X		39627X	318X	P	A	A	P		
Catecholamines and VMA			39626X	8061X	P	A	A	P		
Chloride	1645X	14520X	368X	11314X		P	A			
Chromium	11278X		10944X		A	A	P			R
Citric Acid	11004X		4616X	11315X		A	P			
Cobalt		37513X		14761X		A	P			R
Collagen Cross-Linked N-Telopeptide	36167X		36421X			P	A			
Copper	15319X	8573X		365X	P	A	A			R
Cortisol, Free—LC/MS/MS			11280X			A	P	A	P	
Creatine			592X				R			
Creatinine	8459X		381X		P	A	A	A	A	
Creatinine Clearance ⁽³⁾			7943X		P	A	A	A		

*Acid washed containers are available from your local laboratory.

Refer to entries in General Test Listing for more specific instructions.

- (1) Plastic container with tight lid
 (2) Preserve at pH 6-8 with Sodium Hydroxide
 (3) Serum sample and patient height and weight required

R = Required

A = Acceptable

P = Preferred

Grey = Not Available/
Not Applicable

Specimen Collection and Handling

Test Name	Test Code				Transport Temperature			Preservative		Acid Washed Container*
	Random Urine with Creatinine	Random Urine without Creatinine	24-Hour with Creatinine	24-Hour without Creatinine	Room Temperature	Refrigerated	Frozen (-15 to -20°C)	6N HCl	Boric Acid	
Cyclic Adenosine Monophosphate (Cyclic AMP)		225X					R	R		
Cyclic Adenosine Monophosphate (Cyclic AMP) Nephrogenous	37555X ⁽⁴⁾						R	R		
Cystine, QN	401X						R			
Delta Aminolevulinic Acid	6301X		219X		P	A				
Heavy Metals ⁽⁵⁾	7507X			36438X	P	P	A			R
Heavy Metals Comprehensive Panel ⁽⁵⁾	14573X			37081X		P	A			R
Homocysteine, Total	26318X						R			
Homovanillic Acid (HVA)	6346X		39527X	530X	P	A	A	P		
17-Hydroxycorticosteroids			15202X			P	A	A	P	
5-Hydroxyindoleacetic Acid (5HIAA)	1648X		39625X	523X		A	A	P		
Hydroxyproline, Free			685X			P	A	P	A	
Hydroxyproline, Total			535X			P	A	P	A	
Immunofixation (IFE)		213X				P	A			
Iron				17515X		P	A			
Kappa Light Chains ⁽⁶⁾		34811X				P				
Kappa/Lambda Light Chains, QN ⁽⁶⁾		34318X		17300Z		P				
17-Ketosteroids			15201X			P	A	A	P	
17-Ketosteroids, Fractionated			4932X				R			
Lambda Light Chains ^{(6), Total}		35208X				P				
Kidney Stone Formation, Diagnostics Panel ⁽⁷⁾			36088X				R			
Kidney Stone Formation, Therapeutic			37364X				R			
Lead	601X			36440X		P	A			R
Lipase		731X			A	P	A			
Magnesium	6179X		625X	11322X	A	P	A	P		
Magnesium, Pediatric patient	11220X				A	P	A	P		
Mercury	637X			36411X		P	A			R

*Acid washed containers are available from your local laboratory.

Refer to entries in General Test Listing for more specific instructions.

(4) Requires 5 mL of EDTA plasma

(5) Refer to specific listing for the analytes tested

(6) Refrigerated - stable for 72 hours

(7) Thymol required

R = Required

A = Acceptable

P = Preferred

□ = Not Available/
Not Applicable

Specimen Collection and Handling

Test Name	Test Code				Transport Temperature			Preservative		
	Random Urine with Creatinine	Random Urine without Creatinine	24-Hour with Creatinine	24-Hour without Creatinine	Room Temperature	Refrigerated	Frozen (-15 to -20°C)	6N HCl	Boric Acid	Acid Washed Container*
Metanephrines, Fractionated				641X	P	A	A	P	A	
Metanephrines, Fractionated, LC/MS/MS	14961X			14962X	P	A	A	P	A	
Methylmalonic Acid			34877X			A	P			
Microalbumin	6517X	17674C	15281C	4555X	P	A	A			
Microalbumin ⁽⁸⁾ , Intact, HPLC	17102X		17105X	17104X			R			
Molybdenum	10486X				P	A	A			
Myoglobin	661X						R			
Nickel	5215X			36443X		P	A			R
Nicotine Metabolite Screen		14464X			P	A	A			
Organic Acid Full Panel-QN	38067X						R			
Osmolality		678X			A	P	A			
Oxalic Acid	1673X		682X	11318X	P	A	A	P		
Oxalic Acid, Pediatric	11222X				P	A	A	P		
Phosphate/Phosphorus, Inorganic	1696X		719X	11319X		P	A	P		
Phosphate, Pediatric patient	11215X				P	A	A	P		
Porphobilinogen ⁽⁹⁾	6239X			726X		A	P			
Porphyrins, Fractionated ⁽⁹⁾	36592X		729X			P	A			
Potassium	8347X	14521X	734X	11316X	A	P	A	A	A	
Protein, Total and Protein Electrophoresis	8525X		750X			P	A			
Protein, Total-Urine	1715X		757X		A	P	A			
Selenium	8829X				P	A	A			R
Sodium	8514X	14522X	838X	11317X		R				
Specific Gravity	3190X				P	A				
Testosterone			874X				R			
Thallium	8835X			37124X		P	A			R
Tin		6325X			P	A	A			
Urea Nitrogen				973X		P	A			
Uric Acid	1744X		907X	11321X	P	A	A			
Uric Acid, Pediatric	11217X				R					
Urinalysis with Reflex to Microscopy	7909X				P	A				
Vanadium ⁽⁹⁾	6350X				P	A	A			
Vanillylmandelic Acid (VMA) ⁽¹⁰⁾	1710X		39517X	934X	P	A	A	P		
Volatiles, Qualitative		7935X			A	P	A			
Zinc	6353X			946X	P	A	A			R

*Acid washed containers are available from your local laboratory.

Refer to entries in General Test Listing for more specific instructions.

(3) Serum sample and patient height and weight required

(8) Collect specimen at the end of patient's work shift

(9) Protect from light

(10) Drug or dietary restrictions may apply

R = Required

A = Acceptable

P = Preferred

Grey = Not Available/
Not Applicable

Specimen Collection

COAGULATION TESTING

General Drawing Instructions

1. 3.2% citrate plasma, shipped frozen, is the only acceptable sample type. All other anticoagulants (heparin, EDTA, oxalate) are NOT acceptable.
2. Proper blood to anticoagulant ratio is required:
 - a. VACUTAINER® tubes must be filled to completion to ensure the proper 9:1 blood to anticoagulant ratio is achieved.
 - b. Routine collection requires 4.5-mL blood added to 0.5-mL sodium citrate. For patients with normal hematocrits, no adjustment is necessary. If the patient has a known hematocrit above 55%, adjust the amount of anticoagulant in the collection tube before drawing the blood according to the NCCLS guidelines below:

NCCLS Guidelines:

$$\text{Anticoagulant vol. [x]} = \frac{100 - \text{hematocrit}}{595 - \text{hematocrit}} \times \text{total vol. of anticoagulated blood required} *$$

Example:

Patient hematocrit = 60%

$$\frac{100 - 60}{595 - 60} \times 5.0 = 0.37 \text{ mL sodium citrate}$$

* 5 mL for standard drawing tube

3. To avoid contaminating the sample with tissue thromboplastin or heparin, follow the guidelines below. These substances may alter results.
 - a. The venipuncture must be clean, with no trauma.
 - b. Hemolyzed samples are not acceptable.
 - c. The first 5 mL of blood drawn from a patient should not be used for coagulation testing.
 - d. If drawn through an indwelling catheter, flush with 5 mL of saline and discard the first 5 mL of blood collected before collecting the specimen for coagulation testing. Blood should not be collected from heparinized lines.
4. Mix the sample gently by inverting the tube gently at least but not more than four times immediately after filling.
5. Process the sample as soon as possible (within 60 minutes). Spin down the specimen at a speed and time required to produce platelet poor plasma (<5,000 - 10,000/uL). This can be accomplished by centrifuging at 1500 x g for 15 minutes.
6. Preparing samples for shipping:
 - a. Transfer plasma into a plastic tube using a plastic Pasteur pipette. Do not use glass tubes or glass Pasteur pipettes as glass can activate the clotting cascade.
 - b. Label each tube "plasma." Submit a plasma aliquot for each and every coagulation assay requested (one tube for each test). If possible, submit one additional plasma aliquot for repeat and/or test additions.
 - c. If you are requesting other tests that require serum, please label these tubes as "serum".
7. Ship samples for testing on dry ice. Samples must remain frozen in transit.
8. We highly recommend quick-freezing the sample to keep coagulation factors intact. This can be achieved by one of the following methods:
 - a. Freeze with liquid nitrogen
 - b. Freeze in a mixture of dry ice and methanol.
 - c. Freeze in a -70°C freezer

Platelet Poor Plasma for Lupus Anticoagulant Testing

Perhaps the most important step in the diagnosis of the lupus anticoagulant (LA) is appropriate specimen collection and processing. It is imperative that the laboratory take extra precautions in preparing platelet poor plasma (PPP). The more platelet free the sample, the greater the sensitivity of most test systems to the presence of LA.

Ideally, PPP should have a platelet count of less than 10 x 10⁹ per liter (<10,000 /uL). Although the sample collection process described above should yield PPP, the following double-spin technique can also be used:

1. Spin down specimen at 1500g for 15 minutes.
2. Transfer the plasma to a plastic tube with a plastic Pasteur pipette, staying away from the buffy coat layer. Spin down the plasma portion again at 1500g for 15 minutes. With another plastic Pasteur pipette, transfer the plasma to another plastic tube, staying clear of the bottom of the tube where the platelets lie. Alternatively, the plasma may be filtered using a 0.2 micron filter.
3. Transfer plasma into a plastic tube using a plastic Pasteur pipette. Do not use glass tubes or glass Pasteur pipettes as glass can activate the clotting cascade.
4. Label each tube "plasma." Submit a plasma aliquot for each and every coagulation assay requested (one tube for each test). If possible, submit one additional plasma aliquot for repeat and/or test additions.

Specimen Collection

INFECTIOUS DISEASE TESTING

Microbiology

Quest Diagnostics Nichols Institute offers a complete spectrum of diagnostic microbiology services. Please use tight sealing sterile containers or tubes of transport medium that will maintain viability, prevent drying out of the specimen/swab, and prevent overgrowth of nonpathogenic microorganisms. It is important to label the container with the patient's name and source. The inoculated containers should show no leakage.

General Considerations:

1. Whenever possible, specimens should be obtained before antibiotics or other antimicrobial agents have been administered.
2. Clinical material should be collected in leak-proof specimen containers that are tightly sealed.
3. Material should be collected where the suspected organism is most likely to be found and with as little external contamination as possible (this is particularly important for draining lesions).
4. The stage of the disease is sometimes an important consideration in the successful isolation of the causative agent.
5. Specimens should be of sufficient quantity to permit completion of all tests ordered.
6. Provisions should be made for the prompt delivery of the specimen to the laboratory.
7. Most clinical material can be held for several hours in a refrigerator before culturing if it cannot be processed immediately. This is particularly true with the following specimen types: urine, sputum, and material on swabs taken from a variety of sources. DO NOT refrigerate body fluids such as CSF or blood.
8. Specimens for *Neisseria gonorrhoeae* isolation MUST be submitted on appropriate isolation plates (Martin-Lewis or Neigon agar plates). Do not refrigerate inoculated plates.
9. All stools for Ova and Parasite exam require preservation in a formalin fixative immediately within one hour after collection.
10. Soft and liquid stools also require PVA fixative to maintain the integrity of the trophozoites for the performance of the trichrome stain. Please order O&P with Trichrome Stain.
11. Collect one stool for culture/O&P per day. From hospitalized patients, stool cultures/O&P exams should not be performed if the length of stay is greater than 3 days and the admitting diagnosis is gastroenteritis.

Recommendations for Collecting Blood Cultures

1. For each septic episode, draw 2 to 3 separate sets within a 24-hour period, spaced as far apart as possible (a minimum of 30 minutes between sets).
2. Specific recommendations for initial cultures:
 - a. Suspected sepsis: 2 separate sets before antimicrobial therapy is started; spaced a minimum of 30 minutes apart.
 - b. Bacterial endocarditis: 3 separate sets before therapy.
 - c. Fever of unknown origin (FUO) (3 weeks of documented fever without an obvious cause): 2 separate sets initially, then 2 sets the next day just before the expected fever spike.
3. Except as noted above for FUO, wait at least 72 hours from the time of first set for identification and sensitivity results before obtaining additional cultures.
4. If cultures are still negative after 72 hours and the clinical condition warrants, draw a maximum of 3 more blood cultures over the next 24 hours. Wait another 72 hours for results.

SPECIMEN COLLECTION AND HANDLING

Blood Culture Collection Procedure

Materials Required:

- Gloves
 - Syringe
 - Alcohol preps
 - Betadine preps (A second alcohol prep can be substituted for the betadine prep for allergic patients and whenever betadine is not available.)
1. Locate vein for venipuncture site and put on gloves.
 2. Using an alcohol prep, clean a 2-3" area centered around the venipuncture site.
 3. Let dry for one minute. The drying action kills the microorganisms on the skin surface.
 4. Using a betadine prep* and spiral pattern, clean a 2-3" area centered around the venipuncture site. THIS AREA SHOULD NOT BE TOUCHED AGAIN.
 5. Allow the betadine prep to dry for one minute.
 6. Remove the caps from one aerobic blood culture bottle and one anaerobic blood culture bottle. Clean each rubber septum with an alcohol prep.
 7. Prepare the 20 mL syringe and perform the venipuncture, drawing 20 mL in adult patients. A smaller draw volume, 1-3 mL, is sufficient for pediatric patients. Pediatric blood culture bottles are available.
 8. Inject 1/2 of the collected blood into each blood culture bottle without changing syringe needles. If less than 3 mL of blood is drawn, place all into aerobic bottle.
 9. Cleanse venipuncture site with alcohol prep, as some patients are sensitive to iodine. Immediately transport blood culture bottles to the lab. Avoid exposing bottles to extreme heat or cold.

Note: A separate fee will be charged for each blood culture bottle.

Specimen Collection

Viral and Chlamydial Tests

Viral and Chlamydial Cultures:

- Viral Chlamydial Transport Medium (VCM). IMPORTANT: After sample collection, refrigerate culture specimens until pick up.
- DNA Probe:
- GEN-PROBE® PACE® 2 Collection Kit (male or female); stable at ambient temperatures until printed expiration date.

Collection from normally sterile sites Aerobic Culture

Specimen collection from normally sterile sites requires a needle puncture or a surgical procedure. Decontamination of the skin must be performed prior to the collection of specimens such as blood, cerebrospinal fluid and other normally sterile body fluids.

To decontaminate the site effectively, first clean the puncture site with a povidone-iodine preparation or alternate disinfectant to remain on the skin for at least one minute. Then clean the site with 70% alcohol and wait for the alcohol to air dry. After the puncture site has been disinfected, avoid any finger probing unless fingers have also been disinfected.

Blood Collection (used for Brucella culture)	Specimens for blood cultures must be submitted in blood bottles. After removing the protective cardboard covering, decontaminate the diaphragm tops of two bottles by swabbing with iodine followed by alcohol to remove iodine. Allow alcohol to air dry. After collection of the blood specimen, inject approximately 10 mL into each of the two bottles. Swirl bottles gently to mix, but do not vent. Keep at room temperature (15-30°C) until sent to the laboratory.
Cerebrospinal Fluid (used for the culture of mycobacteria, fungi, bacteria, or bacterial antigen testing)	Submit a separate sterile screw-capped tube containing at least 0.75 mL of cerebrospinal fluid for each test ordered. For microbiological analysis, it is best to submit the second or third tube drawn. Do not send the collection tube.
Other Sterile Body Fluid	Follow standard procedures and obtain the specimen by aspiration. Transport the specimen in aerobic or anaerobic transport kits or blood culture bottles depending on clinical condition. Specimens may be submitted in sterile containers for aerobic culture only.

Collection from nonsterile site

Sputum Specimens	For routine sputum specimens, collection in the early morning is recommended. Patient should gargle with water before collection. The most suitable specimen is the expectoration obtained after a deep cough. Collect specimen in a leakproof sterile screw-capped container, such as the sterile urine container available from Quest Diagnostics Nichols Institute.
Urine Specimens	<p>All patients should void the first part of the specimen into the toilet, then collect the remainder of the specimen in a sterile container. Urine samples for routine culture must be transported in the urine transport tubes provided by Quest Diagnostics Nichols Institute.</p> <p>Urine samples for mycobacteria or fungus culture may be submitted in a sterile screw cap container. Keep urine refrigerated.</p> <p>To obtain a clean catch sample of urine from a female patient, a thorough cleansing of the periurethral area is essential before specimen collection. Wash the area with a disinfectant, thoroughly rinse with clean water, and make all efforts to avoid any contact until urination is complete.</p> <p>For a male patient, a thorough cleansing of the glans penis with disinfectant followed by a complete rinse with clean water is required.</p> <p>For in-dwelling catheters, obtain the specimen with a needle and syringe. Select a puncture site 1-2 inches distal to the meatus and clamp below the puncture site. Cleanse the area to be punctured with 70% alcohol. Aspirate exactly 5 mL of urine with a sterile needle and syringe. Deliver this volume directly into a sterile urine transport tube available from Quest Diagnostics Nichols Institute. Specimens obtained from the collection bag are not suitable for analysis. Foley tips will not be accepted.</p> <p>For cytoscopic or suprapubic aspiration, follow standard procedure and obtain the specimen by aspiration. Transport the specimen in anaerobic transport tubes available from Quest Diagnostics Nichols Institute. Keep urine refrigerated.</p>
Stool Culture	Collect stool without contaminating with urine. Select portions of stool containing pus, blood or mucus and immediately mix into modified Cary-Blair transport media. Stool samples will not be accepted unless they are submitted in transport media. Frozen specimens are not acceptable. Note: Stools for <i>C. difficile</i> are not acceptable in Cary Blair transport and must be refrigerated or frozen at -70° C or below.

Specimen Collection

Anaerobic Culture

Specimens from the following sites are acceptable when submitted in appropriate transport media including the anaerobic transport tubes available from Quest Diagnostics Nichols Institute.

- Transtracheal aspirations
- Suprapubic urines from percutaneous suprapubic bladder, nephrostomy tube or suprapubic catheter
- Genital specimens from cul-de-sac aspiration, culdocentesis, percutaneous aspiration, placenta, fallopian tube, or prostatic or seminal fluid
- Surgical specimens
- Exudates, aspirated pus from deep wounds or abscesses
- Body fluids - normally sterile

Specimens from the following sites are not acceptable:

- Throat and nasopharyngeal swabs
- Sputum and bronchoscopy specimens
- Feces and rectal swabs except for *C. difficile* Cultures
- Voided or catheterized urines
- Specimens from sites contaminated with intestinal contents such as colostomy sites, draining pilonidal sinus and traumatic perforation of the bowel
- Superficial wounds
- Vaginal or cervical swabs

Mycobacteria Culture	Blood: Refer to the database for current specimen requirements.
Bronchial Wash	Collect 3 mL of bronchial washings into a sterile container that seals tightly, or submit a bronchial brush in a sterile container with sterile saline. Do not send collection containers.
CSF	Collect 1 mL CSF (minimum) in a sterile plastic conical tube, tightly sealed. Tubes supplied in spinal fluid collection kits are not designed for specimen transport. To avoid leakage, transfer fluid aseptically into a sterile plastic conical tube.
Gastric	Collect a fasting early-morning specimen. Use sterile saline. Adjust to neutral pH (7.0-7.5) with 100 mg sodium carbonate immediately following collection. 4% NaOH is an acceptable substitute for sodium carbonate. Gastric samples cannot be accepted unless they have been adjusted to neutral pH.
Sputum	Collect sputum using a sputum collection kit. Remove and cap the conical tube. Seal tightly to leakage and send the conical tube to the laboratory. A first morning specimen consisting prevent of 5-10 mL of sputum is preferred. Do not send saliva. Specimens sent in 70% alcohol are not acceptable.
Urine	Collect the first morning urine specimen, up to 50 mL. Send in a sterile plastic container that seals tightly.
Bone Marrow	Collect as much as possible into an SPS or heparin blood collection tube.
Body Fluids	Submit at least 10-15 mL in a leakproof sterile container. Collect bloody specimens into a SPS blood collection tube (yellow-top). Do not use ACD as an anticoagulant for culture submission.
Tissue Biopsy Sample	Submit 1 gram of tissue, if possible, in a sterile container without fixative or preservative. Keep moist with a small quantity of sterile saline or nutritive broth. Collect aseptically and avoid indigenous microbiota. Select caseous portion if available. Refrigerate. Do not freeze.
Lymph Node	Submit node or portion in a sterile container without fixative or preservative. Collect aseptically and avoid indigenous microbiota. Refrigerate. Do not freeze.
Skin Lesion Material	Submit biopsy specimen in sterile container without fixative or preservative. Swabs in transport medium are acceptable only if biopsy sample material or aspirate is not obtainable. For a cutaneous ulcer, collect the biopsy sample from the periphery of the lesion, or aspirate material from under the margin of the lesion. If the infection was acquired in Africa, Australia, Mexico, South America, Indonesia, New Guinea, or Malaysia, note this on the test request form; as <i>Mycobacterium ulcerans</i> may require prolonged incubation.
Culture for Fungi	Collect specimens from the following sites using a culture swab transport medium system: mouth, nose, nasopharynx, ear, eye, wound, vagina, cervix, or urethra. Use a sterile plastic container for respiratory secretions, body fluids, tissue, bone marrow, CSF, urine, hair, skin, nail, contact lens fluid and/or contact lenses. Refer to the database for the current collection method for blood. Store and transport specimens at 4°C. Dermatological specimens may be shipped at 15-30°C.

Specimen Collection

Mycoplasma/Ureaplasma Cultures

General considerations: All specimens must be transported in the multi-microbe transport media (VCM supplied at your request). Samples submitted without suitable transport media will not be accepted. Refrigerated stability for all mycoplasma/ureaplasma cultures is 48 hours. Specimens transported and stored at -70°C are stable indefinitely. Freezing is preferred if transport time is expected to exceed 24 hours. It is preferable to vigorously agitate the swab in the transport media for 30 seconds, and express the material from the swab into the transport media. Discard the swab. Inhibitory agents may be present in the material of the swab tip or shaft. If viral cultures are requested, submit a separate sample according to the standards outlined in the virology section.

Mycoplasma pneumoniae

Collect tracheal aspirate, sputum, throat or nasopharyngeal swabs and submit in the multi-microbe transport medium (VCM) supplied upon request. Refrigerate (48-hr stability) or freeze at -70°C (indefinite stability; transport on dry ice; do not thaw). Freezing is preferred if transport time is expected to exceed 24 hours.

Ureaplasma urealyticum and *M. hominis*

Collect tracheal aspirates from newborns to detect pneumonia caused by ureaplasma urealyticum. Submit in multi-microbe transport medium (VCM) supplied upon request. Refrigerate (48-hr stability) or freeze at -70°C (indefinite stability; transport on dry ice; do not thaw). Freezing is preferred if transport time is expected to exceed 24 hours. Adult genital specimens include: vaginal, cervical or urethral swabs, amniotic fluid, CSF, urine or semen submitted in multi-microbe transport refrigerated or frozen as detailed above.

Nucleic Acid Tests (bDNA, PCR, TMA, Genotyping, etc.)

Standard quantitative assay: 1 mL frozen PPT-potassium EDTA plasma (white-top tube); 0.5 mL minimum

Ultrasensitive assay: 2.0 mL frozen PPT-potassium EDTA plasma (white-top tube); 0.6 mL minimum

Expanded range assay: 2.5 mL frozen PPT-potassium EDTA plasma (white-top tube); 1.0 mL minimum

Centrifuge blood within 2 hours of collection and freeze without removing the plasma. Do not thaw. Alternatively, submit EDTA (lavender-top tube) or ACD (yellow-top tube) frozen plasma that has been removed from cells and frozen within 2 hours of collection. Avoid repeated freezing and thawing. Note that specimens collected in ACD anticoagulant will have results that are 15% lower than those collected in EDTA, owing to the dilution effect of the liquid anticoagulant.

Parasitology

Ova and Parasite Studies

A series of three specimens submitted on separate days within a 10 day period is usually recommended. Collect stool without contamination by urine. Immediately, within one hour maximum, mix amount of stool indicated by fill line into both a modified PVA and 10% formalin containers. These transport tube sets are available upon request. Transport and store at room temperature. Do not freeze. Note: specimens should be obtained prior to or at least 7 days after radiologic studies involving barium sulfate. Unpreserved specimens will not be accepted.

Malaria/Blood Parasite Studies

Blood smears should be prepared within 24 hours after collection. Both thin (prepared as for hematology examination with a feathered edge) and thick (3 small drops pooled together- the size of a dime) smears should be submitted in a slide carrier. Submit several of each and include a backup EDTA tube of whole blood for each exam requested. These slides must be air dried without applying heat or fixing by any method.

Miscellaneous

***Clostridium difficile* Toxin, EIA or tissue culture, Stool**

Collect fresh stool in sterile, leakproof container without media, serum, preservative, or metal ion. For patients requiring the use of diapers, first line the diaper with clean plastic to prevent absorption. Then transfer 2 g or 2 mL of the stool specimen from the plastic-lined diaper to the sterile container. Do not submit the diaper itself. Do not use VCM or equivalent. Do not use any media, preservative, or additive. Freeze at -70°C or refrigerate. Freezing is preferred if transport time is expected to exceed 24 hours. Stable for 3 days refrigerated, longer if frozen.

***Neisseria gonorrhoeae* Probe (GenProbe)**

Swab only

Use GenProbe Specimen Collection Kit for urethral specimens or GenProbe Specimen Collection Kit for cervical specimens. Only female endocervical or male urethral specimens are acceptable. Store at room temperature (15-30°C) or refrigerated. (2-10°). Do not freeze. Stable up to a week.

Specimen Collection

Molecular Microbiology

Borrelia burgdorferi DNA Assays, Tick or Whole Blood

Tick: Submit deer tick in 70% ethanol or in wet tissue. Ship refrigerated.

Whole blood: Collect 4-7 mL whole blood in ACD solution (yellow-top) or in lavender top EDTA tube. Gently mix well. Avoid hemolysis. Stable at up to 3 days room temperature and stable up to 5 days refrigerated. Do not freeze. Transport to lab for testing in less than 48 hours preferred.

CSF or synovial fluid: Submit 1-2 mL in sterile leakproof polypropylene container (sterile conical tube) and ship refrigerated.

Chlamydia trachomatis PCR

Swab: Use AMPLICOR® CT/NG Specimen Preparation Kit or VCM or equivalent. Remove mucous/exudate and discard. Use new swab to collect columnar and squamo-columnar cells. Do not use collection swabs with wooden or aluminum shafts. Insert swab tip into the transport tube and snap shaft/handle at score line to break. Discard shaft. Leave the swab in the transport media. Stable 48 hours at room temperature. Stable up to 7 days refrigerated.

Urine: Submit 10-50 mL of first catch urine, undiluted, in sterile polypropylene container. Do not use preservative or media. Stable up to 24 hours at room temperature. Stable up to 7 days refrigerated.

Chlamydia trachomatis/Neisseria Gonorrhoea, TMA

Swab: Follow instructions in the Aptima™ Combo 2 Assay Unisex Swab Specimen Collection Kit for Endocervical and Urethral Swab Specimens package insert. In females, to ensure collection of cells infected with *C. trachomatis*, columnar epithelial cells lining the endocervix should be obtained. To that effect, excess mucus should be removed prior to sampling. Collection container: Tube in the unisex swab specimen collection kit.

Urine: Urine must be submitted in Aptima Combo 2 Assay Urine Specimen Collection tube within 24 hours of collection. The patient should not urinate for at least one hour prior to collection. Direct patient to provide a first-catch urine (20-30 mL or the initial urine stream) into a urine preservative-free collection cup. Larger volumes of urine may result in specimen dilution and less test sensitivity. Transfer 2 mL urine into the Aptima collection tube using the disposable pipette. The correct volume has been added when the urine fluid level is between the black lines within the clear pan on the urine transport tube.

Cytomegalovirus DNA by Real-Time PCR

Plasma: Collect 1 mL plasma, stable refrigerated 8 days or frozen 1 month.

Whole Blood: Collect 1-2 mL whole blood in lavender-top EDTA or PPT. Heparin is not acceptable. Gently mix by inverting. Avoid hemolysis. Do NOT freeze. Stable up to 24 hours at room temperature or 8 days refrigerated.

CSF, Amniotic Fluid: Submit 1-2 mL in a sterile, leak proof, polypropylene container (sterile conical tube). Ship refrigerated.

Eptein-Barr Virus DNA by Real-Time PCR

Plasma: Collect 1 mL plasma. Stable refrigerated 8 days or frozen 1 month.

Whole Blood: Collect 1-2 mL whole blood in lavender-top EDTA or PPT tube. Heparin is not acceptable. Gently mix by inversions. Do not freeze. Stable up to 24 hours at room temperature or 8 days refrigerated.

CSF: Submit 1-2 mL in a sterile, leak proof, polypropylene container (sterile conical tube). Ship refrigerated.

Hepatitis C Viral RNA Qualitative and Quantitative PCR Assays

Plasma: Collect blood in sterile tubes containing EDTA anticoagulant; either 0.15% solution v/v final EDTA K2 (standard EDTA tube) or 9 mg spray-dried EDTA K2 (Plasma Preparation Tube or PPT tube with plasma separator-gel, preferred.) Blood collected in tubes containing ACD anticoagulant are acceptable but will yield results approximately 15% lower when compared to EDTA tubes due to the dilution effect of the 1.5 mL of anticoagulant used in the tube. Blood collected in tubes with heparin anticoagulant are unsuitable for this test. Store whole blood at room temperature and separate plasma from cells within 2 hours of collection. Transfer plasma to sterile, plastic, screw-capped, aliquot tubes and store at -18°C or colder. Do not clarify plasma by filtration or further centrifugation. Avoid repeated freezing and thawing of specimen. Note: If blood is collected in a PPT tube, centrifuge within 2 hours of collection as before, but it is not necessary to transfer the plasma to aliquot tubes. Following centrifugation, a gel barrier maintains separation of plasma from cellular components during specimen transport and storage, and unlike standard VACUTAINER® Brand blood collection tubes, the PPT tube is plastic and hence the plasma can be shipped and stored frozen in the original tube.

Serum: Collect blood in sterile tubes with no anticoagulants; serum separator tubes (SST's) are recommended. Allow blood to clot at room temperature and separate serum from cells within 2 hours of collection. Transfer serum to sterile, plastic screw-capped, aliquot tubes and store at -18°C or colder. Avoid repeated freezing and thawing of specimen.

Specimen Collection

Hepatitis C Viral RNA bDNA Assays

Plasma: Collect blood in sterile tubes containing EDTA anticoagulant; either 0.15% solution v/v final EDTA K3 (standard EDTA tube) or 9 mg spray-dried EDTA K3 (Plasma Preparation Tube or PPT tube with plasma separator-gel, preferred). Store whole blood at room temperature and separate plasma from cells within 2 hours of collection. Transfer plasma collected in standard EDTA tubes to sterile, plastic, screw-capped, aliquot tubes and store at -18°C or colder. Do not clarify plasma by filtration or further centrifugation. Avoid repeated freezing and thawing of specimen. Note: If blood is collected in a PPT tube, centrifuge within 2 hours of collection as before, but it is not necessary to remove the plasma and transfer to aliquot tubes. Following centrifugation, a gel barrier maintains separation of plasma from cellular components, during specimen transport and storage, and unlike standard VACUTAINER® Brand blood collection tubes, the PPT tube is plastic and hence the plasma can be shipped and stored frozen in the original tube.

Serum: Collect blood in sterile tubes with no anticoagulants; serum separator tubes (SST's) are recommended. Allow blood to clot at room temperature and separate serum from cells within 2 hours of collection. Transfer serum to sterile, plastic, screw-capped, aliquot tubes and store at -18°C or colder. Avoid repeated freezing and thawing of specimen.

Hepatitis C Viral RNA Genotype, LiPA

Plasma: Collect blood in sterile tubes containing EDTA anticoagulant; either 0.15% solution v/v final EDTA K2 (standard EDTA tube) or 9 mg spray-dried EDTA K3 (Plasma Preparation Tube or PPT tube with plasma separator-gel, preferred). Store whole blood at room temperature and separate plasma from cells within 1 hours of collection. Transfer plasma collected in standard EDTA tubes to sterile, plastic, screw-capped, aliquot tubes and store at -18°C or colder. Do not clarify plasma by filtration or further centrifugation. Avoid repeated freezing and thawing of specimen.

Note: If blood is collected in a PPT tube, centrifuge within 2 hours of collection as before, but it is not necessary to remove the plasma and transfer to aliquot tubes. Following centrifugation, a gel barrier maintains separation of plasma from cellular components, during specimen transport and storage, and unlike standard VACUTAINER® Brand blood collection tubes, the PPT tube is plastic and hence the plasma can be shipped and stored frozen in the original tube.

Serum: Collect blood in sterile tubes with no anticoagulants; serum separator tubes (SST's) are recommended. Allow blood to clot at room temperature and separate serum from cells within 2 hours of collection. Transfer serum to sterile, plastic, screw-capped, aliquot tubes and store at -18°C or colder. Avoid repeated freezing and thawing of specimen.

Hepatitis C Viral RNA by TMA

Plasma: Collect blood in sterile tubes containing EDTA anticoagulant; either 0.15% solution v/v final EDTA K2 (standard EDTA tube) or 9 mg spray-dried EDTA K2 (Plasma Preparation Tube or PPT tube with plasma separator-gel, preferred.) Blood collected in tubes containing ACD anticoagulant are acceptable but will yield results approximately 15% lower when compared to EDTA tubes due to the dilution effect of the 1.5 mL of anticoagulant used in the tube. Blood collected in tubes with heparin anticoagulant are unsuitable for this test. Store whole blood at room temperature and separate plasma from cells within 2 hours of collection. Transfer plasma to sterile, plastic, screw-capped, aliquot tubes and store at -18°C or colder. Do not clarify plasma by filtration or further centrifugation. Avoid repeated freezing and thawing of specimen.

Note: If blood is collected in a PPT tube, centrifuge within 2 hours of collection as before, but it is not necessary to transfer the plasma to aliquot tubes. Following centrifugation, a gel barrier maintains separation of plasma from cellular components during specimen transport and storage, and unlike standard VACUTAINER® Brand blood collection tubes, the PPT tube is plastic and hence the plasma can be shipped and stored frozen in the original tube.

Serum: Collect blood in sterile tubes with no anticoagulants; serum separator tubes (SST's) are recommended. Allow blood to clot at room temperature and separate serum from cells within 2 hours of collection. Transfer serum to sterile, plastic screw-capped, aliquot tubes and store at -18°C or colder. Avoid repeated freezing and thawing of specimen.

HIV-1 DNA Qualitative PCR Assay

Whole blood: Collect 4-7 mL whole blood in ACD solution (yellow-top) or in lavender top EDTA tube. Gently mix well. Avoid hemolysis. Stable at up to 3 days room temperature and stable up to 5 days refrigerated. Do not freeze. Transport to lab for testing in less than 48 hours preferred.

HIV-1 RNA Quantitative and Qualitative PCR Assay

Plasma only; no serum.

Plasma: collect blood in sterile tubes containing EDTA anticoagulant (lavender-top) or PPT (white-top) tubes. ACD anticoagulant tubes are acceptable but will yield results approximately 15% lower than EDTA tubes because of a dilution of 1.5 mL. Separate plasma from the cells by centrifugation within 2 hours after collection, transfer to separate plastic screw-capped vials, and ship frozen. Do not freeze PPT tubes.

CSF: Submit 1-2 mL in sterile leakproof polypropylene container (sterile conical tube). Store sample refrigerated or frozen.

Specimen Collection

HIV-1 RNA bDNA Assays

Plasma only; no serum.

Plasma: collect blood in sterile tubes containing EDTA anticoagulant (lavender-top) or PPT (white-top) tubes. ACD anticoagulant tubes are acceptable but will yield results approximately 15% lower than EDTA tubes because of a dilution of 1.5 mL. Separate plasma from the cells by centrifugation within 2 hours after collection, transfer to separate plastic screw-capped vials, and ship frozen. Do not freeze or refrigerate PPT tubes.

Herpes Simplex Virus Assay, PCR

CSF or amniotic fluid: Submit 1-2 mL in sterile leakproof polypropylene container (sterile conical tube) and ship refrigerated.

Human Papillomavirus (HPV), Capture, Digene

Cytobrush: Use Digene Cervical Sampler Kit (Digene Cervical Brush and Specimen Transport Hybrid Medium). Collect exfoliated cervical cells from the endocervical and transformation zone PRIOR to any application of acetic acid for colposcopic exam. Check for presence of blood, which may interfere with the test and result in a falsely negative report. Store refrigerated, at room temperature or frozen.

Stable up to 2 weeks at room temperature, or longer if frozen.

Cytc PreservCyt Solution, "ThinPrep": Collect cervical specimen according to package instructions using the cytobrush provided. A minimum volume of 4 mL is required to perform the HPV DNA test. Specimens having less than 4 mL after processing for the PAP Test may have insufficient material for the HPV DNA test, which could produce a falsely negative HPV DNA result. Stable up to 3 weeks at room temperature or refrigerated. Do NOT freeze.

Biopsy, Cervical, Fresh: Obtain section up to 5 mm in cross section and place in HPV transport medium (Digene Specimen Collection Set). Do not use VCM or equivalent. Freeze.

TriPath SurePath™ Solution: Following Pap smear slide preparation, forward the cell pellet fraction in labeled 15 mL conical centrifuge tube to the lab. Cell pellet fraction is stable for 30 days at 2-30 degrees C. Before sending the cytorich fractions, add 2 mL fresh, uninoculated SurePath™ medium (Cytorich® preservative) to each centrifuge tube containing cytorich preserved cells in 0.8 mL water (0.8 mL of 1 mL cytorich fraction remaining after slide preparation) and vortex for 5 x to resuspend the cells. Store at 2-30 degrees C until testing.

Mycobacteria, PCR

CSF: Submit 1-2 mL in sterile leakproof polypropylene container (sterile conical tube) and ship refrigerated.

Tissue: Collect aseptically as much as possible, up to 2 grams. Specimen must be kept moist with transport media; either saline, broth or buffer. Ship refrigerated.

Fluids: Collect aseptically, as much as possible, up to 150 mL. Keep refrigerated. Swabs from any source are not acceptable for this test.

Sputum: Collect first morning specimen for three consecutive days preferred. Use standard tube-in-cylinder collection kit or submit in sterile, plastic container with leak-proof cap. Keep refrigerated.

Bronchial Wash: Collect 2-7 mL of bronchial washings from a first morning collection. Transfer into a sterile container and ship refrigerated.

Whole blood: Collect 4-7 mL whole blood in ACD solution (yellow-top) or in lavender top EDTA tube. Gently mix well. Avoid hemolysis. Stable at up to 3 days room temperature and stable up to 5 days refrigerated. Do not freeze. Transport to lab for testing in less than 48 hours preferred.

Urine: Collect 5-6 mL of first void or random clean catch urine. Transfer specimen to a sterile screw cap container and ship refrigerated or frozen.

Neisseria gonorrhoeae, PCR

Male Urine: Collect 10-50 mL of the first-catch urine (first part of the stream) into a clean polypropylene container without preservatives. The patient should not urinate within 2 hours of collection. Seal the container.

Note: female urines are not accepted for NG PCR. Consider ordering TMA.

Swab: Use AMPLICOR CT/NG Specimen Preparation kit or VCM or equivalent. Remove cervical mucus/exudates and discard. Use new swab to collect columnar and squamo-columnar cells. Do not use collection swabs with wooden or aluminum shafts. Insert swab tip into the transport tube and snap shaft/handle at score line to break. Discard shaft and leave the swab in the transport media. Stable 48 hours at room temperature and 7 days refrigerated.

Varicella Zoster Virus (VZV) DNA, Qualitative Real-Time PCR

Whole Blood: Collect 1-2 mL whole blood in lavender-top EDTA or PPT tube. Heparin is not acceptable. Gently mix by inversion. Do not freeze. Stable 24 hours at room temperature and 8 days refrigerated.

CSF: Submit 1-2 mL in sterile leakproof container (sterile conical tube) and ship refrigerated.

Swab: Submit dry or in VCM medium or equivalent.

Brochial Alveolar Lavage/Brochial Wash: Submit 1-2 mL in sterile, leakproof container (sterile conical tube) and ship refrigerated.

Specimen Collection

SEROLOGY

Introduction

Most acute infections elicit a predictable immune response. There are some important exceptions, however:

1. Some superficial infections may fail to induce an antibody response despite significant illness.
2. Infections in immunocompromised individuals, including certain healthy infants, may not result in a significant antibody response.
3. Acute infections and immunizations may be thwarted in the presence of passively acquired antibody, circumventing the production of new patient antibody (e.g., transplacental IgG antibody may prevent the production of antibody to the measles vaccine if administered to infants too early).

Antibodies in the IgM class usually appear early in the infection before the appearance of the IgG class. The presence of IgM antibody is usually transient and suggests current or recent and not necessarily primary infection. Recurrent or reactivated infections have occasionally elicited an IgM response primarily among the herpes virus group (CMV, HSV, EBV). IgM antibody usually appears 7-10 days after a primary infection and reaches maximum levels within 2-3 weeks. The duration of the IgM response is variable, depending on the infecting organism and the patient. Interpretation of a positive IgM result must be made with caution and in conjunction with clinical findings.

IgG antibody usually appears after the initial IgM response and reaches peak levels 3-4 weeks later. IgG antibody may persist for life. Individuals who have a mild infection or are treated early in the course of the disease may revert to an apparent negative IgG status over time. The detection of IgG antibody suggests past exposure, infection or immunization to the organism. With many diseases like rubella or measles, in the absence of a current or recent infection, the presence of IgG is consistent with immunity to the disease.

Antibody/serology tests are designed to detect multiple or specific classes of immunoglobulins (e.g., total antibody vs. specific IgG or IgM).

Specimen Collection and Handling

Serum: Collect blood in a red-top or serum separate tube (SST).

Cerebrospinal Fluid (CSF): CSF will be accepted only for serologic testing for certain organisms that are associated with neurological diseases. Please see the General Test Listing section in this directory for specifics.

Collect blood-free CSF as directed in the Specimen Collection and Handling section of this directory. Refrigerate at 4°C until transported to the lab. You may need to collect a serum sample at the same time for serologic diagnosis of central nervous system diseases.

Other Body Fluids: Fluids other than serum and CSF are not acceptable for serologic testing.

VIROLOGY

To expedite specimens to the lab and avoid delays in processing, it is essential to provide complete information with each specimen:

- Patient Name & Age
- Date of Collection
- Specimen Source
- Clinical Symptoms or Suspected Diagnosis
- Test(s) Requested by Numerical Order Code and Test Name

Pack only one specimen per specimen bag for transport.

General Notes:

1. Use the correct specimen collection kit for the test methodology requested. Do not use wooden swabs, that may inhibit chlamydia. Do not use calcium alginate swabs, which may inhibit chlamydia and herpes virus. After collection, break swab tips off into tubes of media.
2. Collect the specimen aseptically.
3. Collect the specimen from the appropriate site within several days of onset of clinical symptoms.
4. Unless otherwise noted, viral and chlamydia culture specimens are stored and preferably transported refrigerated up to 3 days from date of collection.
5. Viruses vary in stability and some cannot be frozen. These viruses can be frozen only if the specimen is transported in VCM or equivalent: Varicella / Herpes zoster, RSV, measles, CMV. Do not freeze specimens for these viruses if collected in any transport media besides VCM or equivalent. Stability is limited to 3 days maximum.
6. Specimen Rejection Criteria:
 - Specimens not in MCV or equivalent, stored/transported frozen for Varicella /Herpes zoster, RSV, measles, CMV
 - Specimens in viral transport medium with penicillin for Chlamydia culture
 - Diapers
 - Dry swabs
 - Gel-based Swabs
 - Specimens with insufficient volume to perform test requested
 - Blood collected in isolator tubes or any type of cell lysing system, BacTec or bacterial blood culture bottles
 - Penile or semen specimen for HPV analysis
 - Specimens not collected or transported according to instruction or specification
 - Leaking specimens or specimens sent with needles

VCM or equivalent = Viral-Chlamydial-Mycoplasma transport medium (green-cap) available from client supplies

Specimen Collection

Chlamydia Culture	<p>Swab (cervix, urethral, rectal, conjunctiva, vaginal): Do NOT use wooden or cotton swabs. Use sterile swab to remove mucous or exudate and discard. Use fresh sterile dacron swabs to obtain columnar/ cuboidal epithelial cells. Use VCM or equivalent. May freeze at -70°C (dry ice) in VCM or equivalent up to 5 days.</p> <p>Urine: Culture methodology is not recommended for this specimen type. Use nucleic acid amplification methodology such as PCR or TMA.</p> <p>Chlamydia DFA (Direct Fluorescent Antibody) Test Slide: Use specimen collection kit for Chlamydia trachomatis Direct Test (Slide). Store at room temperature or refrigerate. Stable up to a week.</p>
Chlamydia Probe (GenProbe)	<p>Swab only: Use GenProbe Specimen Collection Kit for Urethral/Conjunctival specimens or GenProbe Specimen Collection Kit for Cervical specimens. Only female endocervical, male urethral or conjunctival swabs are acceptable. Store at room temperature or refrigerated. Stable up to a week. Do not freeze.</p>
Viral DFA (Direct Fluorescent Antibody, Slide Test)	<p>Slide: Obtain cellular material with sterile swab and transfer to clean glass slide in a circle smaller than 15-mm diameter or use cytospin preparation. (Provide 2 slides with one circle each or 1 slide with two circles for Influenza A&B. Provide 3 slides with one circle each or 1 slide with 3 circles for Parainfluenza 1, 2, 3). Store at room temperature. Stable up to one week.</p> <p>Swab: Collect cellular material aseptically. May use VCM or equivalent. Store refrigerated.</p>
Gastrointestinal EIA	<p>Adenovirus: Collect fresh stool in sterile, leakproof container without media, serum, preservative, or metal ion. For patients requiring the use of diapers, first line the diaper with clean plastic to prevent absorption. Then transfer 2 g or 2 mL of the stool specimen from the plastic-lined diaper to the sterile container. Do not submit the diaper itself. Cap securely. Do not use VCM or equivalent. Do not use any preservative, media, or additive. Swabs are not acceptable. Store refrigerated. Stable up to 3 days. Store frozen for longer stability.</p> <p>Rotavirus: Collect stool specimens as for Adenovirus EIA. Do not use VCM or equivalent. Swabs are acceptable if not placed in VCM or equivalent. Store refrigerated. Stable up to 3 days. Store frozen for longer stability.</p>
All Viral Cultures	<p>“Source” information is required by CAP and federal regulations. The source or anatomic site of the specimen submitted for culture determines the type(s) of virus isolated. Clinicians may also indicate specific virus(es) to include in the culture. The following are routinely isolated: Adenovirus, Cytomegalovirus, Enterovirus, Herpes simplex virus, Influenza A & B, Parainfluenza 1, 2, & 3, Respiratory syncytial virus, Varicella/ Herpes zoster.</p> <p>The following are non-routine, requiring specific request: Measles and Mumps.</p> <p>It is preferable to store and immediately transport specimens refrigerated. If delay is unavoidable and the specimen is collected in VCM or equivalent transport medium, storing and transporting at -70°C (dry ice) is acceptable for almost all viruses. If the transport medium used is not VCM or equivalent, do not freeze specimens for Varicella/Herpes zoster, RSV, Measles, or CMV. Whole blood or bone marrow are NOT transported in VCM or equivalent and cannot be frozen (see below).</p>
Biopsy/Autopsy Tissue	<p>Obtain each specimen with a separate set of sterile instruments and place in separate tubes of VCM or equivalent. If VCM or equivalent is not available, place in separate sterile containers and add TSB. At the very least, use sterile normal saline. Do not add fixative. Tissues in VCM or equivalent may be frozen (-70°C/dry ice) for up to 5 days.</p>
Blood	<p>Collect in sodium heparin (adults 7.5-10 mL whole blood, pediatrics 3-7.5 mL). Do not use VCM or equivalent. Do not freeze. Note: for CMV, do not use culture; Collect whole blood in EDTA for PCR.</p>
Bone Marrow	<p>Collect 0.3 mL of aspirate or core biopsy of approximately 1.5 x 0.3 cm size. VCM - Viral-Chlamydial-Mycoplasma transport medium (green-cap) available from client supplies. Cap tightly.</p>
Bronchoalveolar lavage	<p>Wedge bronchoscope into subsegmental bronchus; insert four 50 mL boluses of sterile saline into the suction port with immediate return suction after the insertion of each sample. Submit 5-10 mL in a sterile container.</p>
Cervix	<p>Remove mucous with sterile swab and discard. Use fresh sterile swab to obtain cellular material. Use VCM or equivalent. May freeze at -70°C (dry ice) for longer stability.</p>
Conjunctiva	<p>Use sterile swab to remove any exudate or mucous, then discard. Use normal sterile saline to pre-moisten a sterile swab, then firmly rub over the palpebral conjunctiva. Use VCM or equivalent. May freeze at -70°C (dry ice) for longer stability.</p>

Specimen Collection

CSF	Collect aseptically. Submit 1-2 mL in sterile leakproof polypropylene container. Or add in equal proportion to VCM or equivalent (i.e., 1 mL CSF + 1 mL VCM or equivalent). May freeze at -70°C (dry ice) for longer stability, only if in VCM or equivalent.
Endocervical swab	Use a dacron/rayon swab or cleansing swab provided to remove mucus and exudate from the endocervix. Insert the swab into the endocervix, rotate, and remove. Discard. Insert a second swab into the cervical os to collect cells from the transitional zone. Rotate the swab for 10-30 seconds in firm contact with endocervical surfaces. Withdraw the swab without touching any vaginal surfaces. Place the swab in the Microtest (VCM) microbe transport tube (blue or red cap or equivalent), break off the excess, and cap tightly.
Endourethral swab	Patient should not have urinated for at least one hour. Insert a small wire-shafted dacron swab 2-4 cm into the endourethra. Gently rotate the swab. Wait 2-3 seconds. Withdraw the swab. Place the swab in the Microtest (VCM) microbe transport tube (blue or red cap or equivalent), break off the excess, and cap tightly.
Fluids (Bronchial lavage, nasal aspirate, sputum, pleural, peritoneal, etc.)	Collect aseptically. Submit in equal proportion to VCM or equivalent (i.e., 3 mL fluid + 3 mL VCM or equivalent). Do not freeze unless added to VCM or equivalent.
Lesion (vesicular)	Open the lesion, then use sterile swabs to collect fluid and cells from base of lesion. Use VCM or equivalent. May freeze at -70°C (dry ice) up to 5 days only if in VCM or equivalent.
Nasal aspirate	Use a suction apparatus or 5 cc syringe attached to a number 8 French catheter threaded 1-2 cm into the anterior nares to remove mucus, cells, and nasal fluid. Expel the aspirate into a sterile container.
Nasal wash	Use a sterile disposable pediatric ear syringe bulb containing 3-5 mL of sterile physiologic saline. For a child or infant, place the patient on his side. Gently press the upper nostril closed with finger pressure. Insert the tip of the syringe bulb into the lower nostril. Inject the saline into the open nostril and immediately aspirate the saline back into the bulb with a squeeze-release action. For an adult, have the patient close the epiglottis and tilt the head back. Instill the saline into each nostril. Collect the saline into a sterile container as the patient brings his head forward.
Nasal turbinate swab	Vigorously rotate 2 dacron swabs against the nasal turbinate bilaterally. Place the swabs into a VCM - Viral-Chlamydial-Mycoplasma transport medium (green-cap) available from client supplies, break off the excess, and cap tightly.
Nasopharyngeal	Insert flexible fine-shafted sterile swab into nostril to the posterior nasopharynx and gently rotate. Use a second sterile swab for the other nostril. Combine both into one tube of VCM or equivalent. May also combine with throat swab in one tube of VCM or equivalent. If in VCM or equivalent, may freeze at 70°C (dry ice) up to 5 days.
Rectal swab	Insert a dacron swab into the anal orifice 3-5 cm past the anal sphincter. Rotate the swab and withdraw. Place the swab in the VCM - Viral-Chlamydial-Mycoplasma transport medium (green-cap) available from client supplies; break off the excess. Cap tightly.
Sputum	Collect expectorate in response to a deep cough and place in a sterile container.
Stool	Collect feces in clean, dry container. Submit several grams undiluted in sterile leakproof container. Do not add fixative or preservative. May freeze at -70°C (dry ice) up to 5 days if in VCM or equivalent. EIA: Submit in a stool container - do not place stool into VCM - Viral-Chlamydial-Mycoplasma transport medium (green-cap) available from client supplies.
Throat	Rub one or two sterile swabs (pre-moistened with sterile normal saline) over the posterior wall of the pharynx. Use VCM or equivalent. May freeze at -70°C up to 5 days if in VCM or equivalent.
Throat wash	Have the patient gargle with 3-5 mL of sterile physiologic saline. Collect the saline in a sterile container.
Urine	Obtain fresh clean-catch urine in sterile leakproof container. Submit 2-10 mL. If VCM or equivalent is available, urine may be added in equal proportion (i.e. 3 mL urine + 3 mL VCM or equivalent). Do not freeze unless in VCM or equivalent.
Vesicle	Rupture the vesicle. Using a dacron swab, rub the fluid and cells from the base of the vesicle. Place the swab in a VCM - Viral-Chlamydial-Mycoplasma transport medium (green-cap) available from client supplies. Break off the excess and cap tightly. Sample several early stage cutaneous lesions if possible. Do not use local disinfection until after specimen collection.

Specimen Collection and Handling

GUIDE FOR SUBMISSION OF VIROLOGY SPECIMENS

DISEASE OR SYNDROME	POSSIBLE ETIOLOGY	RECOMMENDED SPECIMEN(S)	TESTS AVAILABLE	
			CODE	DESCRIPTION
Aseptic meningitis Encephalitis	Enterovirus	Autopsy or biopsy	2647X	Enterovirus Culture
	Coxsackie virus A	specimens in VCM;	2692X	Herpes Simplex virus Culture
	Coxsackie virus B	CSF; stool	2649X	Herpes Simplex virus Culture, w/reflex to Typing
	Echovirus	(if enterovirus is		HSV and VZV Culture only
	Enterovirus 71	suspected); throat	17495X	
	Poliovirus	washing or throat swab		
	Herpes simplex virus	in VCM		
	Influenza virus			
	(postinfectious)			
	Varicella-zoster virus			
	(postinfectious)			
Cystitis (acute hemorrhagic)	Adenovirus	Urine	38929X	Adenovirus Culture (for San Juan Capistrano, use test code 689X)
	Cytomegalovirus (CMV)	Throat washing or throat swab in VCM; urine; bone marrow	2627X	Cytomegalovirus Culture
	Enterovirus	Blood in lavender, yellow or green-top tube; biopsy tissue in VCM; stool; throat swab in VCM	2647X	Enterovirus Culture
	Herpes simplex virus	Blood in lavender, yellow or green-top tube; brain biopsy; CSF; throat swab; in VCM; vesicle fluid or swab in VCM	2692X 2649X	Herpes Simplex Virus Culture Herpes Simplex Virus Culture, w/reflex to Typing
Diarrhea Gastroenteritis	Adenovirus (children)	Stool	38929X	Adenovirus Culture (for San Juan Capistrano, use test code 689X)
	Echovirus		2647X	Enterovirus Culture (includes Echovirus)
	Rotavirus		706X	Rotavirus Rapid EIA
	(infants, young children, and the elderly; Rotavirus EIA)			
Eye disease	Adenovirus	Conjunctival or corneal swab in VCM	38929X	Adenovirus Culture (for San Juan Capistrano, use test code 689X)
	Cytomegalovirus (CMV)		2627X	Cytomegalovirus Culture
	Enterovirus type 70		2647X	Enterovirus Culture
	Herpes simplex virus		2692X	Herpes Simplex Virus Culture
	Varicella-zoster virus		2649X	Herpes Simplex Virus Culture, w/reflex to Typing
			17495X	HSV and VZV Culture only
Exanthem (rash or vesicles)	Coxsackie virus A	Nonvesicular rash:	2647X	Enterovirus Culture (includes Echovirus and some Coxsackie viruses)
	Echovirus	throat swab in vial	2692X	Herpes Simplex Virus Culture
	Herpes simplex virus	of VCM; stool	2649X	Herpes Simplex Virus Culture, w/reflex to Typing
			34290X	Herpes Simplex Virus, Direct IF
		Varicella-zoster virus	Vesicular rash: vesicular fluid and basal epithelial cells from vesicle in VCM	34290X
Genital infections: cervicitis, vulvovaginitis or genital lesions	Herpes Simplex virus	Endocervical or	2692X	Herpes Simplex Virus Culture
		endourethral swab in	2649X	Herpes Simplex Virus Culture, w/reflex to Typing
		VCM; vesicle fluid or		Herpes Simplex Virus, Direct IF
		swabs in VCM	34290X	(external lesions only)

Specimen Collection and Handling

DISEASE OR SYNDROME	POSSIBLE ETIOLOGY	RECOMMENDED SPECIMEN(S)	TESTS AVAILABLE	
			CODE	DESCRIPTION
Myocarditis Pericarditis	Coxsackie virus B Echovirus	Pericardial fluid; stool; throat swab in VCM NOTE: Virus is rarely isolated from pericardial fluid. In this case, antibody titers may provide more diagnostic information.	2647X	Enterovirus Culture
Respiratory disease	Adenovirus Cytomegalovirus (CMV) (immunodeficient patients) Enterovirus Herpes simplex virus Influenza virus Parainfluenza virus Respiratory syncytial virus (infants and young children)	Nasal turbinate specimen in VCM; nasopharyngeal wash or aspirate; sputum; throat swab in VCM	38929X 2627X 2647X 2692X 35945X 8357X 5291X 14860X 14867X	Adenovirus Culture (for San Juan Capistrano, use test code 689X) Cytomegalovirus Culture Enterovirus Culture Herpes Simplex Virus Culture Influenza Virus A&B Culture Rapid Method Influenza Virus Types A&B Direct IF Respiratory Syncytial Virus Direct IF Rapid Respiratory DFA Viral Screen w/Reflex to Identification Rapid Viral Respiratory Culture Screen w/Reflex to Identification
Urinary tract infection	Adenovirus Cytomegalovirus (CMV)	Urine	38929X 2627X	Adenovirus Culture (for San Juan Capistrano, use test code 689X) Cytomegalovirus Culture

Frozen Samples

Frozen samples must be submitted in plastic containers. Do not submit frozen samples in glass containers. If multiple tests are requested on frozen samples, submit a separate frozen sample for each test ordered so that each analyte is properly preserved. Do not freeze samples for viral culture at regular freezer temperature. Freeze at -70° C or lower.

The following are non-routine, requiring specific request: Measles and Mumps. It is preferable to store and immediately transport specimens refrigerated. If delay is unavoidable and the specimen is collected in VCM or equivalent transport medium, storing and transporting at -70° C (dry ice) is acceptable for almost all viruses. If the transport medium used is not VCM or equivalent, do not freeze specimens for Varicella/Herpes zoster, RSV, Measles, or CMV. Whole blood or bone marrow are NOT transported in VCM or equivalent and cannot be frozen.

Acute/Convalescent Paired Sera

When both acute and convalescent samples are identified and sent together, they will be run in parallel and the base fee for two assays will be charged. Acute samples received earlier than their convalescent samples will be assayed for the single-test fee. A reduced fee of one-half of the base fee will be charged for repeating the acute assay in parallel with the convalescent sample if, when received, the convalescent sample contains the acute sample's identification number.

Repeat Determinations

Repeat determinations are performed at NO CHARGE whenever reported results do not, in the opinion of the physician, fit the clinical picture of the patient. If a repeat of the original test is desired, please contact the lab promptly before the sample is discarded.

Packaging STAT Specimens

Put the STAT specimen in a plastic specimen bag and place a STAT sticker on the bag. If the specimen is being transported frozen, tape the STAT label to the bag so that the label does not fall off when the bag is placed on dry ice.

Mark the STAT box on the Request Form and indicate the telephone number to call with results. Place the additional STAT sticker on top of the outermost bag or box, including any express carrier packaging.

Medicolegal Clinical Specimens

Continuity of possession must be documented in all phases of medicolegal specimen handling from the initial collection to the rendering of a report. A chain-of-custody form should be used to document the possession of such specimens. Chain-of-custody forms and other medicolegal supplies are available by contacting the Client Supplies Department.

Specimens should be sealed with security tape and labeled at the time of collection. The chain-of-custody form, which is a record of all persons having possession of the sample, should be started and a Request Form should be filled out with requested tests. Please be specific in your request and in the information you present. This will enable us to handle your specimen properly and thus provide you better service.

NOTE: An additional fee is required for this service in addition to the testing fee. If this is an autopsy specimen, clearly indicate on the request form next to the patient name.

Specimen Collection

ONCOLOGY TESTING

Every specimen submitted to Histopathology must be labeled with the paraffin block number corresponding to the information on the Test Request Form.

Paraffin Embedded Tissues

Submit formalin fixed, paraffin embedded tumor tissue, an H&E slide which corresponds to the tumor block submitted, and a copy of the pathology report. Complete a separate Test Request Form for each specimen being submitted, noting the fixative used in preparing the specimen (fixatives other than formalin may result in inaccurate test results.) Decalcified specimens are not recommended. When requesting a flow cytometry DNA histogram, select a block with a minimum of 20% malignant cells. All tumor blocks will be returned to the client after test completion. For submission of slides in lieu of paraffin blocks, see slide preparation requirements. Formalin-fixed paraffin-embedded tissue may be stored at room temperature indefinitely.

Paraffin Block Preparation

Trim tissue free of fat and necrotic tissue. Immediately place tissue pieces no larger than 20 x 20 x 5 mm in a cassette in 10 % neutral buffered formalin. Fix for a minimum of 4 hours (maximum 24 hours). Embed the fixed tissue in paraffin, ensuring the temperature does not exceed 60°C.

Slide Preparation

For immunohistochemistry assays (IHC) submit 10 slides (minimum 5 slides; with one 4-5 micron thick section on each slide. Ship all slides at ambient temperature. Charged "plus" slides must be used. Silane-prep slides are preferred.

Bone Marrow, Peripheral Blood, Lymph Nodes, and Body Fluids for Leukemia/Lymphoma Evaluation by Flow Cytometry

Please provide a brief clinical summary to accompany these specimens. The summary should include previous diagnoses, CBC results, and other appropriate information.

Procedure for Collecting and Shipping Peripheral Blood and Bone Marrow for Leukemia/Lymphoma Evaluation by Flow Cytometry

Peripheral Blood: Submit 5 mL of whole blood in sodium heparin (green top tube). The sample should be stored and shipped at room temperature. DO NOT FREEZE, REFRIGERATE, OR ADD FIXATIVES.

Bone Marrow: Submit 2 mL of bone marrow in sodium heparin (green top tube). The sample should be stored and shipped at room temperature. DO NOT FREEZE, REFRIGERATE, OR ADD FIXATIVES.

Procedure for Collecting and Shipping Tissue (other than Blood and Bone Marrow) for Flow Cytometric Phenotyping Studies

Surgically removed lymphatic tissue, bone marrow biopsy, or other tissue that is suspected to have a hematologic malignancy should be placed in a sterile, leak-proof transport container which contains a small amount of sterile RPMI-1640 tissue culture medium sufficient to cover the tissue. This medium is commercially available from a number of sources, including Sigma Chemical Company, Irvine Scientific Company, and Gibco. This medium should be clear pink or magenta. If the RPMI-1640 turns yellow or cloudy, it should be discarded. DO NOT FREEZE the tissue, fix the tissue, or allow the tissue to dry out at any time. Alternatively, wrap the tissue in a saline-soaked gauze and place in a sterile container. It should be noted that this alternative procedure for shipping tissue may result in decreased viability, especially in high grade lymphomas. The size of the tissue sample required for an adequate cell yield depends on a variety of factors. In general, a sample of at least 3 millimeters in diameter is needed (small peasized is preferred). In some cases, an adequate cell yield can be obtained from even smaller samples or even needle aspirates. The sample should be stored and shipped at 4°C or at room temperature.

Procedure for Collecting and Shipping Body Fluids (Cerebrospinal fluid, pleural fluids, etc) for Flow Cytometric Phenotyping Studies

Body fluids should be collected and shipped in a sterile, screw cap container. The volume of fluid necessary depends on the cell count. Usually 20 mL of pleural or peritoneal fluid is sufficient. If the body fluids, other than spinal fluid, are bloody, place the fluid in a sodium heparin (green-top) tube. The sample should be stored and shipped at room temperature or 4°C DO NOT FREEZE. Cerebrospinal fluids usually yield too few cells for analysis and are generally not recommended unless there is clear evidence of a high cell count (>100 cells/mL).

Bone marrow biopsies

Please submit the core biopsy and at least 4 unstained aspirate smears, along with a brief summary of the clinical findings and differential diagnosis. The specimen should also include a peripheral blood smear and the results of the most recent complete blood count and white blood cell differential. If the patient has a previous BM Biopsy evaluated at Quest Diagnostics or any other institution, include a diagnostic smear, core biopsy and the corresponding report.

Procedure for Collecting and Shipping Samples for Plasma-based Molecular Assays

Whole blood is preferred. To avoid contamination, the laboratory will separate the plasma upon arrival. Follow standard whole blood collection procedure. Collect 305 mL whole blood in an EDTA tube. Ship at room temperature or 4°C. Do not freeze. Record the draw time and date on the tube and ship immediately to maintain sample stability.

Plasma samples: collect blood in sterile tubes containing EDTA anticoagulant (lavender-top). Separate plasma from the cells by centrifugation transfer to separate, screw cap vials and ship frozen.

Shipping temperature:	<i>Whole blood</i>	<i>Plasma</i>
Room temp.	acceptable, stable 72 hours	unacceptable
Refrigerated	preferred, stable 72 hours	unacceptable
Frozen	unacceptable	acceptable, stable 2 years

Specimen Collection

HEMATOPATHOLOGY SPECIMEN REQUIREMENTS

Specimen	FLOW	Immunohistochemistry Send clinical history	Hematopathology Consultation Send clinical history, CBC, differential	PCR	RT-PCR (bcr-abl, RARA only)	Cytogenetics Chromosome FISH	Shipping
Peripheral blood	Green-, yellow- or lavender-top tube and 1 fresh smear	Not acceptable	1 fresh smear	Lavender-top tube 2-5 mL (1mL minimum)	Lavender-top tube 2-5 mL (1mL minimum)	Green-top tube 2-5 mL	Room temperature within 48 hours
Fresh bone marrow core biopsy	RPMI media 1 cm (length) No fixative	Place in 10% formalin	Place in 10% formalin	RPMI media 1 cm (length)	Not acceptable	RPMI media 1 cm (length) No fixative	Room temperature within 48 hours
Bone marrow aspirate	Green-top tube 2 mL and at least 1 fresh smear	Not acceptable	At least 5 fresh smears or green-top tube 2 mL	Lavender-top tube 2-5 mL (1mL minimum)	Lavender-top tube 2-5 mL (1mL minimum)	Green-top tube 2 mL (1mL minimum)	Room temperature within 48 hours
Fresh tissue biopsy	RPMI media 1 cm Place in (length) diced into fine pieces for optimal cell preservation	RPMI media 10% formalin	1 cm (length)	Place in 10% formalin sections no thicker than 0.5 cm	Not acceptable	RPMI media 1 cm (length)	Room temperature within 48 hours
Frozen tissue biopsy	Not acceptable	Call the laboratory	Call the laboratory	Snap frozen	Not acceptable	Not acceptable	Dry ice
Fixed paraffin	Not acceptable	0.5 X 0.5 X 0.5 cm formalin-fixed only	0.5 X 0.5 X 0.5 cm formalin-fixed only	0.5 X 0.5 X 0.5 cm (B5 unacceptable)	Not acceptable	Not acceptable (only acceptable for FISH, Her2 test)	Room temperature
Body fluids	Call the laboratory	Call the laboratory	Call the laboratory	Call the laboratory	Call the laboratory	Not acceptable	Room temperature within 48 hours

Yellow-top tube: Acid Citrate Dextrose (ACD) solution A or B - tube must be full — Green-top tube: Sodium Heparin — Lavender-top tube: EDTA — RPMI: tissue culture media (pink)
Send freshly prepared slides with the samples and a copy of the pathologist report.

Specimen Collection

IMMUNOHISTOCHEMISTRY TESTS

CPT Code(s): 88342
Specimen Container:

IHC Specimen Transport Box or slide folder

Preferred Specimen:

Formalin-fixed, paraffin-embedded tissue block or 3 unstained, positively-charged slides per marker

Instructions:

Please indicate on the histology request form the name of the marker(s) requested. A separate Surgical Pathology Immunohistochemical Request Form is also available that lists the markers that are performed.

Temperature:

Room temperature or refrigerated, stable indefinitely; or frozen (stability not established - do not reject)

Test Name	Test Code	Test Name	Test Code
ACTH, IHC with Interpretation	19124X	Calcitonin, IHC with Interpretation	19139X
ACTH, IHC without Interpretation	19284X	Calcitonin, IHC without Interpretation	19294X
Alkaline Phosphatase, Placental (PLAP), IHC with Interpretation	19260X	Calponin, IHC with Interpretation	19140X
Alkaline Phosphatase, Placental (PLAP), IHC without Interpretation	19392X	Calponin, IHC without Interpretation	19295X
Alpha 1-Antichymotrypsin (AAC), IHC with Interpretation	19122X	Calretinin, IHC with Interpretation	19142X
Alpha 1-Antichymotrypsin (AAC), IHC without Interpretation	19282X	Calretinin, IHC without Interpretation	19296X
Alpha 1-Antitrypsin (AAT), IHC with Interpretation	19123X	Cathepsin D, IHC with Interpretation*	19143X
Alpha 1-Antitrypsin (AAT), IHC without Interpretation	19283X	Cathepsin D, IHC without Interpretation*	19297X
Alpha-Fetoprotein, IHC with Interpretation	19126X	CD10, IHC with Interpretation	19150X
Alpha-Fetoprotein, IHC without Interpretation	19285X	CD10, IHC without Interpretation	19301X
Anaplastic Lymphoma Kinase 1 (ALK1), IHC with Interpretation	19127X	CD117 (c-kit), IHC with Interpretation*	11230X
Anaplastic Lymphoma Kinase 1 (ALK1), IHC without Interpretation	19286X	CD117 (c-kit), IHC without Interpretation*	19169X
B72.3, IHC with Interpretation	19128X	CD138, IHC with Interpretation	19170X
B72.3, IHC without Interpretation	19287X	CD138, IHC without Interpretation	19313X
bcl-2, IHC with Interpretation*	39584X	CD15, IHC with Interpretation*	15465X
bcl-2, IHC without Interpretation*	19130X	CD15, IHC without Interpretation*	19151X
bcl-6, IHC with Interpretation**	19131X	CD1a, IHC with Interpretation	19144X
bcl-6, IHC without Interpretation**	19268X	CD1a, IHC without Interpretation	19449X
BerEP4, IHC with Interpretation	19132X	CD20, IHC with Interpretation*	37566X
BerEP4, IHC without Interpretation	19289X	CD20, IHC without Interpretation*	19152X
BOB1, IHC with Interpretation**	19416X	CD23, IHC with Interpretation	19153X
BOB1, IHC without Interpretation**	19417X	CD23, IHC without Interpretation	19443X
Bombesin, IHC with Interpretation	19135X	CD25, IHC with Interpretation*	37074X
Bombesin, IHC without Interpretation	19291X	CD25, IHC without Interpretation*	19305X
Breast Cancer Antigen 225 (BCA225), IHC with Interpretation	19129X	CD3, IHC with Interpretation*	10024X
Breast Cancer Antigen 225 (BCA225), IHC without Interpretation	19288X	CD3, IHC without Interpretation*	19145X
CA 125, IHC with Interpretation	19137X	CD30, IHC with Interpretation*	39614X
CA 125, IHC without Interpretation	19292X	CD30, IHC without Interpretation*	19155X
CA 19-9, IHC with Interpretation	19138X	CD31, IHC with Interpretation	19154X
CA 19-9, IHC without Interpretation	19293X	CD31, IHC without Interpretation	19302X
		CD34, IHC with Interpretation	19156X
		CD34, IHC without Interpretation	19303X
		CD38, IHC with Interpretation	19157X
		CD38, IHC without Interpretation	19304X

*This test was developed and its performance characteristics determined by Quest Diagnostics Nichols Institute. It has not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary. Performance characteristics refer to the analytical performance of the test.

**This test was performed using a kit that has not been cleared or approved by the FDA. The analytical performance characteristics of this test have been determined by Quest Diagnostics Nichols Institute. This test should not be used for diagnosis without confirmation by other medically established means.

Specimen Collection

Test Name	Test Code	Test Name	Test Code
CD4, IHC with Interpretation	19146X	Cytokeratin 20, IHC without Interpretation	19326X
CD4, IHC without Interpretation	19298X	Cytokeratin 34BE12 (MA903), IHC with Interpretation	19235X
CD43, IHC with Interpretation*	10868X	Cytokeratin 34BE12 (MA903), IHC without Interpretation	19367X
CD43, IHC without Interpretation*	19159X	Cytokeratin 5/6, IHC with Interpretation**	19177X
CD45 (Leukocyte Common Antigen), IHC with Interpretation*	15798X	Cytokeratin 5/6, IHC without Interpretation**	19319X
CD45 (Leukocyte Common Antigen), IHC without Interpretation*	19160X	Cytokeratin 7, IHC with Interpretation*	19178X
CD45RO, IHC with Interpretation*	12112X	Cytokeratin 7, IHC without Interpretation*	19320X
CD45RO, IHC without Interpretation*	19161X	Cytokeratin 8 and 18 (CAM 5.2), IHC with Interpretation	19180X
CD5, IHC with Interpretation*	38995X	Cytokeratin 8 and 18 (CAM 5.2), IHC without Interpretation	19322X
CD5, IHC without Interpretation*	19147X	Cytokeratin 8, IHC with Interpretation*	19179X
CD52, IHC with Interpretation**	19418X	Cytokeratin 8, IHC without Interpretation*	19321X
CD52, IHC without Interpretation**	19419X	Cytokeratin AE1, IHC with Interpretation	19185X
CD56, IHC with Interpretation	19162X	Cytokeratin AE1, IHC without Interpretation	19327X
CD56, IHC without Interpretation	19306X	Cytokeratin AE1/AE3, IHC with Interpretation*	39502X
CD57, IHC with Interpretation	19420X	Cytokeratin AE1/AE3, IHC without Interpretation*	19186X
CD57, IHC without Interpretation	19421X	Cytokeratin AE3, IHC with Interpretation	19187X
CD61, IHC with Interpretation	19163X	Cytokeratin AE3, IHC without Interpretation	19328X
CD61, IHC without Interpretation	19308X	Cytokeratins LP34, 34betaE12, and 35betaH11, IHC w/o Interpretation, Skin	19329X
CD68, IHC with Interpretation	19164X	Cytokeratins LP34, 34betaE12, and 35betaH11, IHC with Interpretation, Skin	19188X
CD68, IHC without Interpretation	19309X	Cytomegalovirus, IHC with Interpretation	19189X
CD7, IHC with Interpretation	19148X	Cytomegalovirus, IHC without Interpretation	19330X
CD7, IHC without Interpretation	19335X	DBA.44, Hairy Cell Leukemia, IHC with Interpretation	19191X
CD74, IHC with Interpretation*	19165X	DBA.44, Hairy Cell Leukemia, IHC without Interpretation	19332X
CD74, IHC without Interpretation*	19310X	Desmin, IHC with Interpretation	19192X
CD79a, IHC with Interpretation	19167X	Desmin, IHC without Interpretation	19333X
CD79a, IHC without Interpretation	19311X	E-Cadherin, IHC with Interpretation*	37079X
CD8, IHC with Interpretation	19149X	E-Cadherin, IHC without Interpretation*	19194X
CD8, IHC without Interpretation	19300X	Epidermal Growth Factor Receptor (EGFR), IHC with Interpretation	10479X
CD99, IHC with Interpretation*	19168X	Epidermal Growth Factor Receptor (EGFR), IHC without Interpretation	19195X
CD99, IHC without Interpretation	19312X	Epithelial Membrane Antigen, IHC with Interpretation	19196X
CEA, Monoclonal, IHC with Interpretation	19171X	Epithelial Membrane Antigen, IHC without Interpretation	19336X
CEA, Monoclonal, IHC without Interpretation	19314X	Epstein-Barr Virus, IHC with Interpretation	19193X
CEA, Polyclonal, IHC with Interpretation	19172X	Epstein-Barr Virus, IHC without Interpretation	19334X
CEA, Polyclonal, IHC without Interpretation	19316X	Estrogen Receptor (ER), IHC with Interpretation*	36160X
Chromogranin, IHC with Interpretation	19173X	Estrogen Receptor (ER), IHC without Interpretation*	19197X
Chromogranin, IHC without Interpretation	19317X	Factor 13a, IHC with Interpretation	19199X
Collagen IV, IHC with Interpretation	19175X	Factor 13a, IHC without Interpretation	19338X
Collagen IV, IHC without Interpretation	19318X	FSH (Follicle Stimulating Hormone), IHC with Interpretation	19200X
Cyclin D1 (BCL-1), IHC with Interpretation*	15474X	FSH (Follicle Stimulating Hormone), IHC without Interpretation	19339X
Cyclin D1 (BCL-1), IHC without Interpretation*	19176X	Gastrin, IHC with Interpretation	19201X
Cytokeratin 18, IHC with Interpretation	19181X	Gastrin, IHC without Interpretation	19340X
Cytokeratin 18, IHC without Interpretation	19324X		
Cytokeratin 19, IHC with Interpretation**	19183X		
Cytokeratin 19, IHC without Interpretation**	19325X		
Cytokeratin 20, IHC with Interpretation	19184X		

*This test was developed and its performance characteristics determined by Quest Diagnostics Nichols Institute. It has not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary. Performance characteristics refer to the analytical performance of the test.

**This test was performed using a kit that has not been cleared or approved by the FDA. The analytical performance characteristics of this test have been determined by Quest Diagnostics Nichols Institute. This test should not be used for diagnosis without confirmation by other medically established means.

Specimen Collection

Test Name	Test Code	Test Name	Test Code
Glial Fibrillary Acidic Protein (GFAP), IHC with Interpretation	19203X	IGF-I Receptor (IGF-IR), IHC without Interpretation**	19431X
Glial Fibrillary Acidic Protein (GFAP), IHC without Interpretation	19342X	IGF-II, IHC with Interpretation**	19427X
Glucagon, IHC with Interpretation	19205X	IGF-II, IHC without Interpretation**	19428X
Glucagon, IHC without Interpretation	19344X	IgG, IHC with Interpretation	19225X
Glycophorin A, IHC with Interpretation	19206X	IgG, IHC without Interpretation	19360X
Glycophorin A, IHC without Interpretation	19345X	IgM, IHC with Interpretation*	10027X
Granzyme B, IHC with Interpretation	19207X	IgM, IHC without Interpretation*	19227X
Granzyme B, IHC without Interpretation	19346X	Inhibin (Alpha Subunit), IHC with Interpretation	19228X
Gross Cystic Disease Fluid Protein-15 (GCDFFP-15), IHC with Interpretation	19202X	Inhibin (Alpha Subunit), IHC without Interpretation	19361X
Gross Cystic Disease Fluid Protein-15 (GCDFFP-15), IHC without Interpretation	19341X	Insulin Receptor, IHC with Interpretation**	19432X
Growth Hormone (GH), IHC with Interpretation	19204X	Insulin Receptor, IHC without Interpretation**	19433X
Growth Hormone (GH), IHC without Interpretation	19343X	Insulin, IHC with Interpretation	19229X
hCG Beta Subunit, IHC with Interpretation	19134X	Insulin, IHC without Interpretation	19374X
hCG Beta Subunit, IHC without Interpretation	19290X	Kappa Light Chain, IHC with Interpretation*	39615X
Helicobacter pylori, IHC with Interpretation**	19210X	Kappa Light Chain, IHC without Interpretation*	19230X
Helicobacter pylori, IHC without Interpretation**	19348X	Lambda Light Chain, IHC with Interpretation*	38996X
Hemoglobin, IHC with Interpretation	19209X	Lambda Light Chain, IHC without Interpretation*	19231X
Hemoglobin, IHC without Interpretation	19347X	LH, IHC with Interpretation	19233X
Hepatitis B Core Antigen, IHC with Interpretation*	19211X	LH, IHC without Interpretation	19365X
Hepatitis B Core Antigen, IHC without Interpretation*	19350X	Lysozyme, IHC with Interpretation	19234X
Hepatitis B Surface Antigen, IHC with Interpretation*	19212X	Lysozyme, IHC without Interpretation	19366X
Hepatitis B Surface Antigen, IHC without Interpretation*	19351X	MART-1 (Melan-A), IHC with Interpretation	19238X
HepPar 1, IHC with Interpretation	19213X	MART-1 (Melan-A), IHC without Interpretation	19370X
HepPar 1, IHC without Interpretation	19352X	MIB-1 (Ki-67), IHC with Interpretation*	29914X
HER2 (HercepTest®), IHC, with Interpretation	30316X	MIB-1 (Ki67), IHC without Interpretation*	19100X
HER2 (HercepTest®), IHC, without Interpretation	19214X	MOC-31, IHC with Interpretation	19241X
Herpes Simplex Virus 1, IHC with Interpretation*	19221X	MOC-31, IHC without Interpretation	19373X
Herpes Simplex Virus 1, IHC without Interpretation*	19357X	Myeloperoxidase (MPO), IHC with Interpretation*	19470X
Herpes Simplex Virus 2, IHC with Interpretation**	19222X	Myeloperoxidase (MPO), IHC without Interpretation*	19242X
Herpes Simplex Virus 2, IHC without Interpretation**	19358X	MyoD1, IHC with Interpretation**	19243X
Herpesvirus 8 (HHV 8), IHC with Interpretation	19218X	MyoD1, IHC without Interpretation**	19375X
Herpesvirus 8 (HHV 8), IHC without Interpretation	19354X	Myogenin, IHC with Interpretation	19244X
HHF35 Muscle Actin, IHC with Interpretation**	19217X	Myogenin, IHC without Interpretation	19376X
HHF35 Muscle Actin, IHC without Interpretation**	19353X	Myoglobin, IHC with Interpretation*	19245X
Histone Deacetylase (HDAC), IHC with Interpretation**	19425X	Myoglobin, IHC without Interpretation*	19377X
Histone Deacetylase (HDAC), IHC without Interpretation**	19426X	Neuroblastoma (NB84), IHC with Interpretation**	19247X
HMB45, IHC with Interpretation**	19219X	Neuroblastoma (NB84), IHC without Interpretation**	19379X
HMB45, IHC without Interpretation**	19355X	Neurofilament Protein (NFP), IHC with Interpretation**	19248X
IgA, IHC with Interpretation	19223X	Neurofilament Protein (NFP), IHC without Interpretation**	19381X
IgA, IHC without Interpretation	19359X	Neuron-Specific Enolase (NSE), IHC with Interpretation	19250X
IgD, IHC with Interpretation*	10028X	Neuron-Specific Enolase (NSE), IHC without Interpretation	19383X
IgD, IHC without Interpretation*	19226X	Neutrophil Elastase, IHC with Interpretation	19249X
IGF-I Receptor (IGF-IR), IHC with Interpretation**	19429X	Neutrophil Elastase, IHC without Interpretation	19382X
		OCT2, IHC with Interpretation**	19435X
		OCT2, IHC without Interpretation**	19436X

*This test was developed and its performance characteristics determined by Quest Diagnostics Nichols Institute. It has not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary. Performance characteristics refer to the analytical performance of the test.

**This test was performed using a kit that has not been cleared or approved by the FDA. The analytical performance characteristics of this test have been determined by Quest Diagnostics Nichols Institute. This test should not be used for diagnosis without confirmation by other medically established means.

Specimen Collection

Test Name	Test Code	Test Name	Test Code
p16 (INK4A) Oncoprotein, IHC with Interpretation	19251X	S-100, Polyclonal, IHC without Interpretation	19399X
p16 (INK4A) Oncoprotein, IHC without Interpretation	19384X	Sarcomeric Actin, IHC with Interpretation	19269X
P504S, IHC with Interpretation	19252X	Sarcomeric Actin, IHC without Interpretation	19401X
P504S, IHC without Interpretation	19385X	Serotonin, IHC with Interpretation**	19270X
p53 Oncoprotein, IHC with Interpretation*	36162X	Serotonin, IHC without Interpretation**	19402X
p53 Oncoprotein, IHC without Interpretation*	19253X	Smooth Muscle Actin, IHC with Interpretation*	19271X
p63 Oncoprotein, IHC with Interpretation	19254X	Smooth Muscle Actin, IHC without Interpretation*	19403X
p63 Oncoprotein, IHC without Interpretation	19387X	Smooth Muscle Myosin, IHC with Interpretation*	19246X
Pancreatic Polypeptide, IHC with Interpretation**	19255X	Smooth Muscle Myosin, IHC without Interpretation*	19378X
Pancreatic Polypeptide, IHC without Interpretation**	19388X	Somatostatin, IHC with Interpretation**	19272X
PCNA (Proliferating Cell Nuclear Antigen), IHC with Interpretation**	19256X	Somatostatin, IHC without Interpretation**	19404X
PCNA (Proliferating Cell Nuclear Antigen), IHC without Interpretation**	19389X	Synaptophysin, IHC with Interpretation	19274X
Placental Lactogen, IHC with Interpretation*	19259X	Synaptophysin, IHC without Interpretation	19405X
Placental Lactogen, IHC without Interpretation*	19391X	TdT (Terminal Deoxynucleotidyl Transferase), IHC with Interpretation	19275X
Progesterone Receptor (PR), IHC with Interpretation*	36159X	TdT (Terminal Deoxynucleotidyl Transferase), IHC without Interpretation	19407X
Progesterone Receptor (PR), IHC without Interpretation*	19261X	Thyroglobulin, IHC with Interpretation**	19439X
Prolactin, IHC with Interpretation	19262X	Thyroglobulin, IHC without Interpretation**	19440X
Prolactin, IHC without Interpretation	19393X	Thyroid Transcription Factor-1 (TTF-1), IHC with Interpretation	19278X
Prostatic Acid Phosphatase (PAP), IHC with Interpretation	19263X	Thyroid Transcription Factor-1 (TTF-1), IHC without Interpretation	19410X
Prostatic Acid Phosphatase (PAP), IHC without Interpretation	19394X	Toxoplasma gondii, IHC with Interpretation**	19276X
Protein Gene Product 9.5 (PGP9.5), IHC with Interpretation	19258X	Toxoplasma gondii, IHC without Interpretation**	19408X
Protein Gene Product 9.5 (PGP9.5), IHC without Interpretation	19390X	TSH, IHC with Interpretation**	19277X
PSA, IHC with Interpretation	19264X	TSH, IHC without Interpretation**	19409X
PSA, IHC without Interpretation	19395X	Vimentin, IHC with Interpretation	19279X
PTH, IHC with Interpretation**	19266X	Vimentin, IHC without Interpretation	19442X
PTH, IHC without Interpretation**	19396X	von Willebrand Factor Antigen, IHC with Interpretation*	17092X
Renal Cell Carcinoma, IHC with Interpretation	19267X	von Willebrand Factor Antigen, IHC without Interpretation*	19198X
Renal Cell Carcinoma, IHC without Interpretation	19397X	Wilms' Tumor 1 (WT1), IHC with Interpretation**	19280X
S-100, Monoclonal, IHC with Interpretation*	38197X	Wilms' Tumor 1 (WT1), IHC without Interpretation**	19411X
S-100, Monoclonal, IHC without Interpretation*	19400X		
S-100, Polyclonal, IHC with Interpretation	19438X		

*This test was developed and its performance characteristics determined by Quest Diagnostics Nichols Institute. It has not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary. Performance characteristics refer to the analytical performance of the test.

**This test was performed using a kit that has not been cleared or approved by the FDA. The analytical performance characteristics of this test have been determined by Quest Diagnostics Nichols Institute. This test should not be used for diagnosis without confirmation by other medically established means.

Specimen Collection

PEDIATRIC PROGRAM AND SPECIMEN COLLECTION

Quest Diagnostics is committed to solving the special laboratory testing needs of pediatricians and other providers who care for infants and children younger than 18 years of age. Our leaders at Quest Diagnostics Nichols Institute include clinically-trained, board-certified pediatric specialists who clearly recognize the need to manage small sample volumes and provide age-specific reference ranges. Using the expertise of our on-site Medical Directors, Scientific Directors, and University-based Academic Associates, we have developed (and continue to expand) a Pediatric Program designed to be flexible, creative, and diligent in all areas of pediatric test development and performance.

Reference Ranges

Our Clinical Correlations Department has established reference ranges based on chronological age, with additional ranges for most sex steroids based on Tanner stage of pubertal development. New tests are developed regularly at Quest Diagnostics Nichols Institute, and we invite interested clinicians to participate in Institutional Review Board-approved studies designed to establish valid pediatric reference ranges for these new assays.

Specimen Requirements

For each test, the specimen type, preferred and minimum specimen volume, preferred shipping/storage temperature, and any special handling notes are specified. The preferred volume is an amount sufficient to allow multiple runs of the assay either singly or in duplicate. The minimum volume allows one single analysis including instrument dead volume. In some situations, it may be possible to assay samples below the stated minimum volume (see below). Storage temperature is specified as room temperature (15-30° C), refrigerated (2-10° C) or frozen (-20° C or colder). When temperature is not indicated, the sample may be stored and shipped in the most convenient manner for the client.

Successfully Managing Minimum Volume Samples

A common problem in pediatric laboratory testing is the limited volume of available sample. Pediatric samples require different handling and individualized processing. To ensure that a pediatric sample receives special attention, please consider one or more of the following options:

1. **Flagging the tube and requisition:** Red labels with the word "Pediatric". Place a label on the tube as well as in a blank area of the Test Request Form (or on the link manifest).
2. **Using Pediatric Cards in Specimen Bags:** Pediatric cards may be placed in Nichols Institute plastic specimen bags to allow up-front identification and special handling of the pediatric specimens within. These cards are available through Nichols Institute.
3. **Up-front notification:** Notify Client Services if you have a sample that is close to or below the listed minimum volume. This will allow us to flag the sample in the system to receive special attention. If possible, please supply the name and contact information for the ordering physician/provider so that we may determine the priority of the various tests ordered. The ordering physician may also write down the priority of testing ahead of time on the Test Request Form.

Please note that, in some cases, we may be able to perform an assay on a sample whose volume is less than the stated minimum (typically by performing the test on a diluted sample, if the assay and the clinical situation permit). Please call Client Services to arrange for consultation.

Specimen Collection: Serum, Plasma, or Blood

Draw blood in the color-coded vacutainer tube indicated in the alphabetical test listing. For serum or plasma, draw approximately 2 1/2 times the requested volume. For serum, allow the blood to clot for at least ten minutes and separate by centrifugation. For plasma and whole blood, completely fill the vacutainer whenever possible to eliminate dilution from the anticoagulant or preservative and immediately mix the blood by gently and thoroughly inverting the tube five to ten times. Separate plasma by centrifugation. Transfer the serum, plasma or whole blood to a plastic transport tube (see Pediatric Specimen Tubes below).

Specimen Collection: Urine

Most urine chemistry tests require a 24-hour collection. Record on the test request form any medications that the patient is receiving. If a preservative is required, it is important that the designated preservative be in the urine collection container at the start of the collection. When the 24-hour urine output is less than 1 liter, 4 grams of boric acid can be used when boric acid is the specified preservative or 10 mL of 6N HCl can be used when HCl is specified. The patient (or responsible individual) should be cautioned that the preservative may be toxic and caustic, and not to spill or discard the preservative.

On the day of the collection, discard the first morning urine void, and begin the collection after this void. Collect all urine for the next 24 hours so that the morning urine void on the second day is the final collection. Measure the total 24-hour urine volume. Record this volume on the test request form and on the urine transport vial (see Pediatric Specimen Tubes below). Transfer the requested volume into the labeled urine transport vial. Do not send the entire urine collection.

Pediatric Specimen Tubes

Pediatric color-coded Vacutainer tubes are provided to facilitate special handling. Special small conical tubes with screw caps are provided to prevent evaporation of small volume samples. These tubes will hold up to 1.5 mL of specimen. Standard Quest Diagnostics specimen transfer tubes should be used for larger volume samples. For urine specimens, use Quest Diagnostics urine vials. For those tests requiring specimens be protected from light, amber vials for serum or urine may be obtained by calling client supplies.

We generally request 1 tube per test to avoid delays in processing and to expedite turnaround time. To minimize specimen volume requirements for

Specimen Collection

small children, however, only one tube is required even when multiple tests are ordered.

Tube Labels

Each tube or container should be labeled as follows:

- Patient Name
- Patient Date of Birth*
- Client Name
- Client/Patient #
- Date of Collection
- Time of Collection
- Test Codes Ordered

For pediatric specimen tubes, wrap the label around the tube just below the screw cap so the ends of the label adhere to each other and the information stipulated above can be read. When using the standard tubes, affix the label lengthwise down the tube. Special yellow tube labels for pediatric samples will further identify each specimen.

* It is important to indicate patient age so that appropriate reference ranges can be assigned for reporting purposes. The patient's age may also assist the technologist in choosing the appropriate initial sample dilution for the assay.

TOXICOLOGY TESTING

For Therapeutic Drug Monitoring

Serum: Collect blood in plain red-top evacuated tube. Do not use gel barrier tubes. Allow blood to clot at room temperature for 20-30 minutes. Separate serum from red cells by centrifugation at 800-1000 g for 10-15 minutes, at room temperature (approximately 15-25°C). Pour off serum in a polyethylene or polypropylene transport tube. Ship at the appropriate temperature (see individual test requirements).

Plasma: Collect blood in lavender-top evacuated tube (EDTA). Allow red cells to settle. Pipette plasma using glass, polypropylene or polyethylene pipettes into polypropylene or polyethylene transport tubes. Ship at the appropriate temperature (see individual test requirements).

For Determination of Trace Elements

Serum: Royal blue-top evacuated tubes certified free of the trace element in question are required for specimen collection. Please note that not all commercially available royal blue-top evacuated tubes are suitable for aluminum and selenium determination. A trace element serum collection package is provided containing acid-washed shipping containers (red label) and royal blue-top tubes (red label) suitable for aluminum, chromium, manganese, selenium, copper, and zinc in serum. Patients should refrain from taking vitamins, mineral supplements or antacids at least three days prior to specimen collection. (See individual test requirements.)

Allow the specimen to clot at room temperature (15-30°C) for 30 minutes. Centrifuge the tube at 800-1000 g for 10-15 minutes, at room temperature. Pour the serum into a plastic trace element shipping container (red label). Use powderless gloves as part of standard precautions. Firmly replace the cap on the red labeled vial and ship the specimen refrigerated (2-10°C).

Plasma: Royal blue-top evacuated tubes (EDTA) certified free of the trace element in question are required for specimen acquisition and transport. Many commercially available royal blue-top tubes are suitable for zinc and copper determinations in plasma. Acid-washed shipping containers (lavender-labeled) are available for determinations of aluminum, chromium, manganese, selenium, copper, and zinc in plasma. Be sure to gently mix the specimen promptly after phlebotomy. Centrifuge the tube and pour the plasma into a plastic trace element shipping container. Use powderless gloves. Firmly replace the cap on the lavender-labeled vial and ship the specimen refrigerated. Avoid royal blue-top tubes containing heparin since the specimen frequently will gel or develop microclots over time. Be sure to confirm that the specific tubes used are free of the trace element in question. Patients should refrain from taking vitamins, mineral supplements or antacids at least three days prior to specimen collection. (See individual test requirements.)

Whole Blood: Specimens requiring whole blood are collected in EDTA containing royal blue-top evacuated tubes, free of the trace element in question. Analytes such as arsenic, cadmium, cobalt, lead, manganese, mercury, molybdenum, strontium, and thallium are sometimes analyzed in whole blood. Be sure to gently mix the specimen immediately after collection. Alternatively, whole blood may be poured into a plastic trace element shipping container (lavender label). Ship refrigerated. Use powderless gloves. Patients should refrain from eating seafood, antacids, or taking mineral or herbal supplements at least three days prior to specimen collection. (See individual test requirements.) For Lead and Zinc Protoporphyrin, Blood (test code 3699N), collect whole blood in EDTA containing royal blue-top evacuated tubes. Wrap tube in aluminum foil to protect from light. Ship refrigerated.

Urine:

Container

Collect urine in clean, trace element-free, or acid-washed plastic (polypropylene) containers without preservatives and glued inserts. The cap must be plastic. Do not expose container to direct sunlight or warm surface.

Collection Conditions

Inadvertent contamination of the specimen during collection is a problem. Frequent causes include introduction of dust from outer clothing and from hands contaminated by trace elements. This is a particular problem if the work environment contains large amounts of the element in question. Patients should be instructed to wash their hands each time before opening the container. Collect specimen in an area away from the work environment. Patients should refrain from eating seafood, antacids, mineral or herbal supplements at least three days prior to specimen collection. (See individual test

Specimen Collection

requirements.)

Specimen Transfer and Shipping

Acid-washed shipping containers are available. After collection, be sure the urine is mixed well before transferring to the shipping container. Carefully pour the designated amount of urine directly from the collection container into the acid washed shipping container (yellow label). For random urine, prepare two aliquots if practical. One aliquot is used for creatinine determination. Be careful not to expose the urine to contaminants, such as using a non-acid washed pipette for specimen transfer or measuring the total urine volume in a contaminated graduated cylinder. Do not add any hydrochloric acid or preservative to avoid contamination. Finally, be sure the cap is firmly closed on the shipping container. Ship refrigerated. For mercury determinations, ship and store frozen if the specimen is not sent within 24 hours of collection. Please note urine type on the test request form (random or 24-hr urine). Generally, the urine is suitable for trace element determination under the following conditions: room temperature – 2 days, refrigerated – 5 days, frozen – 2 weeks.

Immunology Testing (Sold Tumor Transplant Services)

Immune Cell Function Assay

This lymphocyte stimulation assay requires that testing be performed in less than 30 hours from the time of phlebotomy. Please contact Customer Service at (800) 553-5445 prior to specimen collection for optimal phlebotomy and logistics services in order to meet this critical time requirement.