

# Specimen Collection & Handling Guide

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Select: Test Menu, Select: Specimen Collection & Handling Guide

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**24/7 Client Services hotline 801-507-2110 or 1-877-353-1106**

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## Mission Statement

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Intermountain Laboratory Services is committed to excellence in laboratory medicine by having a clear understanding of the needs of those we serve and by providing a process that consistently meets these expectations.

## Scope of Operation

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Intermountain Laboratory Services maintains adequate laboratory services in each facility to meet the needs of its patients. Emergency laboratory services are available 24 hours a day in the hospital facilities. Available tests and their frequency of testing are listed in the Laboratory Test Directory <https://www.testmenu.com/Intermountain> .

Additional information can be accessed through

<https://intermountainhealthcare.org/services/lab-services/>

## Client Services Contacts

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|                                |                              |
|--------------------------------|------------------------------|
| Central Region Hospitals:      | 801-507-2110 or 877-353-1106 |
| Logan Regional Hospital:       | 435-716-5401                 |
| Cedar City Hospital:           | 435-868-5081                 |
| Dixie Regional Medical Center: | 435-688-5022                 |
| Utah Valley Hospital:          | 801-357-7041                 |
| McKay-Dee Hospital:            | 801-387-7366                 |

## Introduction

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Intermountain Laboratory Services is committed to providing the highest quality patient care. All laboratory departments are staffed with highly qualified medical laboratory scientists and medical laboratory technicians. Board certified pathologists provide pathology services and laboratory consultations. Intermountain laboratories have pledged to operate in complete compliance with federal regulations for laboratories. This directory has been designed to give the proper information so that patient specimens can be tested promptly and accurate results reported in an efficient manner. This is not intended to be an all-inclusive laboratory reference guide. We hope this answers the most commonly asked questions, and provides phone numbers to people for other inquiries. We encourage you to call **801-507-2110** or **877-353-1106** with any and all questions.

The laboratories of Intermountain Laboratory Services:

- ◆ Hold CLIA licensure
- ◆ Hold all required state licenses
- ◆ Meet Medicare program requirements
- ◆ Are accredited by the College of American Pathologists (CAP), the Joint Commission on the Accreditation of Health Care Organizations (JC), or state laboratory inspection programs.

For licensure and accreditation information, please contact your providing laboratory.

Thank you for choosing Intermountain Laboratory Services!

# Medicare Limited Coverage Tests (ABN may be required-Part A & B)


A number of tests are designated as Medicare limited coverage tests. Medicare will only reimburse providers for these tests based on a limited list of diagnostic reasons and frequency limitations. The limited tests and the covered diagnoses are published by CMS and are called National Coverage Determinations (NCD). Our local Medicare contractor also has published additional Local Coverage Determinations (LCD). An ABN (Advance Beneficiary Notice of Non-coverage) should be collected for any patient with frequency limited testing or with a diagnosis that is not listed in the NCD/LCD policy. By signing an ABN, the patient indicates that he or she is responsible to pay for the tests if Medicare denies payment. Tests done for screening, investigative or research purposes will not be covered by Medicare. Medicare never covers the General Health Panel.

For a current copy of Intermountain Healthcare Laboratory Services ABN in English or Spanish contact Client Services at 1-877-353-1106. An example of an ABN form is below.

For more detailed information about LCDs and NCDs go to the following sites:

<https://www.cms.gov/medicare-coverage-database/indexes/ncd-alphabetical-index.aspx?bc=BAAAAAAAAAAAA>

[https://www.cms.gov/medicare-coverage-database/indexes/lcd-state-index.aspx?s=All&DocType=Active%7CFuture&Cntrctr=247&ContrVer=1&CntrctrSelected=247\\*1&name=Noridian+Administrative+Services%2C+LLC+\(02402%2C+MAC+-+Part+B\)&bc=AggAAAAAAAAAAAA%3D%3D&#ResultsAnchor](https://www.cms.gov/medicare-coverage-database/indexes/lcd-state-index.aspx?s=All&DocType=Active%7CFuture&Cntrctr=247&ContrVer=1&CntrctrSelected=247*1&name=Noridian+Administrative+Services%2C+LLC+(02402%2C+MAC+-+Part+B)&bc=AggAAAAAAAAAAAA%3D%3D&#ResultsAnchor)



Intermountain  
Laboratory Services

36 South State Street  
Salt Lake City, Utah 84111

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**Patient Name:** \_\_\_\_\_ **Identification Number:** \_\_\_\_\_

**ADVANCE BENEFICIARY NOTICE OF NONCOVERAGE (ABN)**

**NOTE:** If Medicare doesn't pay for items checked or listed in box below, you may have to pay. Medicare does not pay for everything, even some care that you or your health care provider have good reason to think you need. We expect Medicare may not pay for the items listed or checked in box below.

**Listed or Checked Items Only:**  
Medicare does not pay for these tests:  
\_c=condition (for your condition)    \_nc=never covered

|   | Estimated Cost: |   | Estimated Cost: |  | Estimated Cost: |
|---|-----------------|---|-----------------|--|-----------------|
| <input type="checkbox"/> Alpha fetoprotein                  | \$120           | <input type="checkbox"/> Genetic Testing      | Call            | <input type="checkbox"/> PSA   | \$85            |
| <input type="checkbox"/> BNP (B-type natriuretic peptide)   | \$120           | <input type="checkbox"/> (part B)             | Lab             | <input type="checkbox"/> PTT   | \$40            |
| <input type="checkbox"/> CA125                              | \$115           | <input type="checkbox"/> GAIT                 | \$45            | <input type="checkbox"/> T uptake  | \$20            |
| <input type="checkbox"/> CA 15-3 (27.29)                    | \$20            | <input type="checkbox"/> Glucose              | \$40            | <input type="checkbox"/> Thyroxine (T4)                                    | \$65            |
| <input type="checkbox"/> CA 19-9                            | \$20            | <input type="checkbox"/> hCG                  | \$75            | <input type="checkbox"/> Transferrin                                       | \$75            |
| <input type="checkbox"/> CBC (or any component)             | \$40            | <input type="checkbox"/> HDL cholesterol      | \$50            | <input type="checkbox"/> Triglycerides                                     | \$60            |
| <input type="checkbox"/> CEA                                | \$125           | <input type="checkbox"/> Hemoglobin A1C       | \$80            | <input type="checkbox"/> TSH   | \$90            |
| <input type="checkbox"/> Cholesterol                        | \$30            | <input type="checkbox"/> Hepatitis panel      | \$230           | <input type="checkbox"/> Urinalysis  | \$40            |
| <input type="checkbox"/> Collagen Crosslink                 | \$120           | <input type="checkbox"/> HIV (PCR diagnostic) | \$230           | <input type="checkbox"/> Urine culture                                     | \$65            |
| <input type="checkbox"/> Cytogenetic (part B)               | \$900           | <input type="checkbox"/> Iron                 | \$50            | & Sensitivities  | \$80            |
| <input type="checkbox"/> Digoxin                            | \$90            | <input type="checkbox"/> Iron Binding Cap.    | \$70            | Vitamin D  |                 |
| <input type="checkbox"/> Drug Screen & Confirmation Testing | Call            | <input type="checkbox"/> LDL cholesterol      | \$30            | <input type="checkbox"/> 25 Hydroxy  | \$100           |
| <input type="checkbox"/> Ferritin                           | \$70            | <input type="checkbox"/> Lipid panel          | \$75            | <input type="checkbox"/> DHydroxy 1,25                                     | \$70            |
| <input type="checkbox"/> Free Thyroxin (freeT4)             | \$65            | <input type="checkbox"/> Magnesium (part A)   | \$45            | <input type="checkbox"/> Experimental or research test (see back for list) |                 |
| <input type="checkbox"/> General Health panel               | \$215           | <input type="checkbox"/> Occult blood         | \$40            |  |                 |
|   |                 | <input type="checkbox"/> Protims (PT)         | \$30            |  |                 |

**WHAT YOU NEED TO DO NOW:**

- Read this notice, so you can make an informed decision about your care.
- Ask us any questions that you may have after you finish reading.
- Choose an option below about whether to receive the checked items in the table shown above.

**Note:** If you choose Option 1 or 2, we may help you to use any other insurance that you might have, but Medicare cannot require us to do this.

**Options: Check only one box. We cannot choose a box for you.**

**OPTION 1.** I want the lab test/s listed above. You may ask to be paid now, but I also want Medicare Billed for an official decision on payment, which is sent to me on a Medicare Summary Notice (MSN). I understand that if Medicare doesn't pay, I am responsible for payment, but I can appeal to Medicare by following the directions on the MSN. If Medicare does pay, you will refund any payments I made to you, less co-pays or deductibles.

**OPTION 2.** I want the lab test/s listed above, but do not bill Medicare. You may ask to be paid now as I am responsible for payment. I cannot appeal if Medicare is not billed.

**OPTION 3.** I don't want the lab test/s listed above. I understand with this choice I am not responsible for payment, and I cannot appeal to see if Medicare would pay.

**Additional Information:**

This notice gives our opinion, not an official Medicare decision. If you have other questions on this notice or Medicare billing, call 1-800-MEDICARE (1-800-633-4227/TTY: 1-877-486-2048).  
Signing below means that you have received and understand this notice. You also receive a copy.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

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Form CMS-R-131 (03/2011) Form Approved OMB No. 0938-0566

HCLAB251 H / 04-2014 3 PART FORM Revised for IHC Health Services, Inc. (2008) 50141

## Specimen Types

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### **Serum:**

The liquid portion of a clotted specimen is referred to as serum. The blood drawn into a tube without an anticoagulant additive will clot. After clotting is complete, these tubes are centrifuged to separate the serum from the cells. Complete clotting may take up to 20-30 minutes and even longer if the patient is on anti-coagulant medication (warfarin, heparin, etc.).

### **Plasma:**

The liquid portion of an unclotted specimen is referred to as plasma. Blood drawn into a tube with an anticoagulant additive will not clot if mixed properly. Proper mixing is gentle inversion several times (typically at least 8 times). These tubes are centrifuged to separate the plasma from the cells.

### **Whole Blood:**

Blood drawn into a tube with an anticoagulant additive will not clot if mixed properly. Proper mixing is gentle inversion several times (typically at least 8 times). Whole blood specimens are not centrifuged.

## Blood Collection Tubes

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**Lavender-Top Tube (EDTA anticoagulant):** Used for most hematological procedures that require whole blood or plasma, such as CBC.

NOTE: **A minimum of 1 mL blood in a 4.5 mL tube is required for a correct blood/anticoagulant ratio.** Immediately after the tube has been filled with blood, gently invert the tube at least 8 times to prevent clotting.

**Pink-Top Tube (EDTA anticoagulant):** Used for blood bank testing.

NOTE: Immediately after the tube has been filled with blood, gently invert the tube at least 8 times to prevent clotting.

**Clear-Top with Red Rim Tube (no additive):** Used for a waste tube, such as clearing the line of a butterfly winged collection set before drawing into a blue top tube, or as a waste tube for line draws.

**Light Blue -Top Tube (3.2% sodium citrate anticoagulant):** Used to collect whole blood or plasma for coagulation studies.

NOTE: The ratio of blood to anticoagulant is critical for valid coagulation studies. Fill the tube to the indicated fill line etched on the tube (approximately to the top of the manufacturer's label). If using a butterfly, be sure to clear air from the line with a waste tube before using the blue top tube. Immediately after the tube has been filled with blood, gently invert the tube at least 8 times to prevent clotting.

**Gold or Tiger-Top (Red/Gray) Tube (SST-Serum Separator Tube with clot activator and separator gel):** Used for most chemistry tests.

NOTE: Invert the tube at least 8 times to activate the clotting. Let tube stand for 30 minutes before centrifuging. If frozen serum is required, pour off serum into plastic vial and freeze. Do not freeze SST tubes.

**Light Green (Mint) Green Tiger Top Tube (PST- Plasma Separator Tube with lithium heparin anticoagulant and separator gel):** Used to collect heparinized plasma for selected chemistry tests, or whole blood for other testing.

NOTE: Invert the tube at least 8 times to prevent clotting. Centrifuge for 15 minutes or the number of minutes required based on your centrifuge settings. If frozen plasma is required, pour off plasma into plastic vial and freeze. Do not freeze PST tubes.

**Dark Green-Top Tube (sodium or lithium heparin anticoagulant):** Used to collect heparinized plasma or whole blood for special tests. Choose correct anticoagulant type to avoid interference by sodium or lithium heparin with their corresponding chemical tests.

NOTE: Immediately after the tube has been filled with blood, gently invert the tube at least 8 times to prevent clotting.

**Red-Top Tube (clot activator /no anticoagulant)**: Used for collection of serum for selected chemistry tests. Gentle inversion 5 times after filling the tube will facilitate clotting.

**Grey-Top Tube (Potassium oxalate/Sodium fluoride anticoagulant)**: Used to preserve glucose in whole blood, and for some special chemistry tests. Preferred tube for oral glucose tolerance testing.

NOTE: Immediately after the tube has been filled with blood, gently invert the tube at least 8 times to prevent clotting.

**Special Collection Tubes**: Some tests require specific tubes not listed here. Contact the laboratory prior to specimen collection to obtain the correct tube as identified in the individual test listings.

## Venipuncture

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### SUPPLIES NEEDED:

- ◆ Tourniquet
- ◆ Gauze
- ◆ Alcohol prep or other suitable cleansing solution
- ◆ Venipuncture safety needle
- ◆ Disposable plastic tube holder or barrel
- ◆ Vacutainer tubes
- ◆ Adhesive bandage or tape
- ◆ Marking pencil or pen
- ◆ Gloves
- ◆ Sharps disposal container

### TECHNIQUE:

1. Sanitize hands. Positively identify patient using two unique identifiers.
2. Prepare and assemble needed supplies. Make sure all supplies are easily accessible during procedure.
3. Position the patient. A reclining position is preferred. A sitting position in a sturdy, comfortable chair with an arm support is also acceptable. Make the patient as comfortable as possible.
4. Select venipuncture site. Inspect both arms for good veins. Place a tourniquet on the patient's arm. Having the patient make a loose fist (do not pump) may make the veins more prominent and easier to feel. Find the vein that feels the fullest. Palpate and trace the path of the vein. Release the tourniquet.

#### **CAUTION: Do not attempt venipuncture:**

- in an arm on the same side as a mastectomy,
  - above an IV site, with a PICC line (peripherally inserted central catheter), or
  - with a dialysis fistula.
5. Put gloves on.
  6. Apply tourniquet. Stretch both ends of the tourniquet around the arm so the tourniquet is tight but not painful. Tie the tourniquet with a partial loop to allow for easy removal during the venipuncture procedure.
  7. Cleanse venipuncture site. Using an alcohol prep or cotton ball saturated with alcohol or cleansing solution, cleanse the site by moving the pad in a circular motion from the center of the site outward. In order to allow the area to be properly disinfected, allow site to air dry

(do not wipe, fan or blow dry). Do not touch the cleansed site. Inspect needle and other equipment for defects.

8. Perform venipuncture. Grasp the patient's arm firmly, but gently. Use your thumb to draw the skin taut. Enter the vein with the bevel of the needle upward with angle of insertion 30° or less. Fill vacutainer tubes in appropriate order (see Order of Draw). While keeping the holder in place, depress an evacuated tube into the holder. Fill the tube until the vacuum is exhausted and the blood flow ceases, ensuring a proper fill volume and for tubes with anticoagulant a correct ratio of anticoagulant to blood. Remove the tube from the holder. Gently invert tubes (5-8 times) to assure adequate mixing of blood and anticoagulant (refer Mixing Tube Additives).
9. Release and remove tourniquet.
10. Remove the needle, activate the safety device and immediately place a folded gauze pad or cotton ball over the puncture site. Hold the gauze pad ball firmly over the venipuncture site until bleeding has stopped. If bleeding has not stopped after 5 minutes, contact the patient's nurse or clinician.
11. Dispose of needle/puncture unit in sharps container.
12. Apply appropriate bandage. Instruct the patient to leave the bandage on for at least 15 minutes. Give the patient instructions for after blood draw (Patient Instruction After Blood Collection).
13. **In the patient's presence, label specimens after verifying correct patient information** (Specimen Labeling Requirements).
14. Complete necessary paper work and computer entry, if applicable.
15. Place specimens in secondary container (e.g., bag, tray, etc.)
16. Remove gloves and wash/sanitize hands.

## Capillary Blood Collection

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### SUPPLIES NEEDED:

- ◆ 70% alcohol prep pad or other approved disinfectant
- ◆ Gauze (cotton balls may be substituted)
- ◆ Approved skin puncture device, appropriate for the site of puncture
- ◆ Plastic capillary tubes/microtainers, glass slides for blood smears, etc.
- ◆ Sharps disposal container
- ◆ Bandage
- ◆ Instant hot pack (Optional; use as needed.)

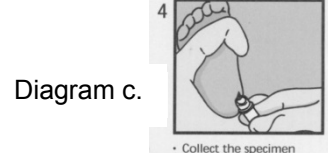
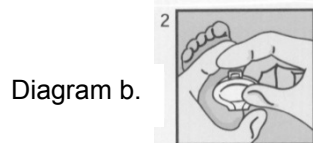
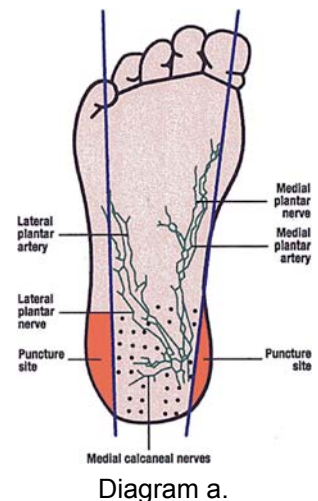
### PROCEDURE

- A. Review all tests ordered to determine the total volume of blood required for each collection and the correct microtainers to be used.
- B. Positively identify the patient, using two unique identifiers.
- C. Reassure the patient and/or parents.
- D. Sanitize hands and put on gloves.
- E. Properly position patient.
  1. For heel punctures, the baby should be in a supine position.
  2. An adult (e.g., mother, father, or other responsible adult) may hold the infant on their shoulder to comfort and console while the heel puncture is being performed. The adult should be sitting while holding infant for puncture.
  3. For a finger stick the patient may be in a supine or sitting position. Do not perform finger stick on infants under 1 year of age.
- F. Select capillary site.

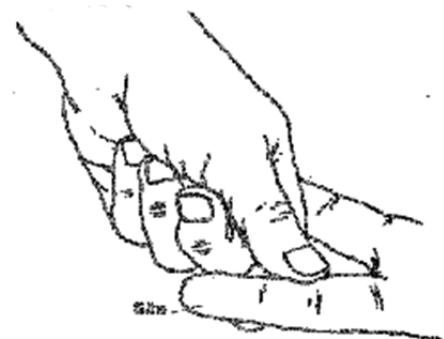


- G. Warm the site, if applicable. Use caution when using the instant hot packs. Follow these precautions:
1. Assess the patient's skin integrity prior to use. Don't apply a heel warmer to an infant whose skin integrity is compromised in any way. Exercise extra caution when using this device on a premature infant.
  2. Activate the heel warmer according to the device's labeling. Don't activate it near the infant or near anyone's eyes.
  3. Don't wrap the heel warmer with any additional heat source, such as a warm washcloth.
  4. Use the device for 3 to 5 minutes and monitor the application site continually, at least every 30 seconds, to avoid burns when using the warmer with premature infants. After removing the heel warmer, inspect the skin for any signs of altered skin integrity, such as blisters or erythema.
- H. Prepare the needed supplies. Select an appropriate puncture device for the site selected.
- I. Clean the puncture site with alcohol. Allow the site to air dry. Do not wipe away or fan the alcohol.
- J. Perform skin puncture.
1. Heel puncture:

- a. The recommended location for blood collection on a newborn baby or infant is the heel. The puncture should be made on the most medial or most lateral position of the plantar (flat) surface of the heel. (See dark shaded areas in Diagram a.)
- b. Do not use the central portion of the heel because you might injure the underlying bone, which is close to the skin surface. It is also possible to cause neurological or soft tissue damage if the central portion of the foot is used. (See Diagram a.)
- c. Do not use a previous puncture site. Make the cut across the heel-print lines (Diagram b.) so that a drop of blood can well up and not run down along the lines.



- d. Wipe away the first drop of blood with a piece of clean, dry cotton. Since newborns do not often bleed immediately, use gentle pressure (Diagram c.) to produce a rounded drop of blood. Do not use excessive pressure or heavy massaging because the blood may become diluted with tissue fluid.
2. Finger puncture:
    - a. Puncture on the side of the ball of the finger. Make the puncture across the fingerprint marks.
    - b. Wipe away the first drop of blood with a dry gauze pad to remove any possible tissue fluid contamination.
- K. Gently squeeze the puncture area and collect the required blood into the appropriate container(s).
- L. Fill tubes in the correct order.
1. Capillary blood gas (mix immediately). Heal must be pre-warmed.



2. Tests collected in EDTA microtainers (**mix intermittently during collection** and immediately after collection).
  3. Tests collected in heparin microtainers (**mix intermittently during collection** and immediately after collection).
  4. Tests collected for serum microtainers.
  5. Newborn screen testing.
- M. Check puncture site, apply pressure until blood flow ceases and bandage if appropriate.
- N. Label specimens immediately after collection, in the presence of the patient. All specimens must be labeled with two unique patient identifiers, the date and time of collection and the identity of the phlebotomist.
- O. Place the specimen(s) in a secondary container (e.g., Ziplock bag, tray, etc.).
- P. Remove gloves and wash/sanitize hands.
- Q. Send or carry the specimens to the laboratory for testing, accompanied with appropriate paper work/orders.

## Blood Culture Collection

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### REAGENTS/SUPPLIES/EQUIPMENT

- A. Blood culture vials. Store in a cool, dry place (2-25°C), out of direct sunlight.
  1. BD BACTEC Plus Aerobic/F Culture vials (plastic vial – silver on blue cap/silver label).
  2. BD BACTEC Lytic/10 Anaerobic/F culture vials (plastic vial – purple on red cap/purple label).
  3. BD BACTEC Myco/F Lytic – (Fungal) culture vials (glass vial – red cap/red label).
- B. Betadine or 2% tincture of iodine or Chloraprep
- C. Alcohol prep

### PROCEDURE

- A. Select site for venipuncture. Mark site with surgical marker if vein is difficult to locate.
- B. Thoroughly cleanse the skin with 70% alcohol.
- C. With a sterile applicator, apply 2% tincture of iodine or 10% povidone-iodine solution (Betadine) to the venipuncture site, starting at the center and moving outward in a circular motion. **Allow the site to completely air dry** before collecting blood.
 

**NOTE:** Do not remove iodine or Betadine from skin before collecting blood.
- D. For an alternate cleaning method Chloraprep may be used according to manufacturer's instructions.
 

**NOTE:** Although not recommended by the manufacturer for use in newborns, the cumulative experience at several highly regarded NICUs around the country is that chlorhexidine products are safer and more efficacious than iodophor-based products. Therefore the Intermountain Healthcare NICU Development Team has determined that chlorhexidine products may be used in Intermountain NICUs. There is still some concern about chlorhexidine use in babies of <26 weeks gestation who are <3 days of age. Please review with your facility neonatologists before use with these few tiny, immature newborns.
- E. Prepare blood culture vials.
  1. Examine each vial for evidence of contamination (leakage, cloudiness, bulging or depressed septum) and damage or deterioration (turbidity, contamination, discoloration or darkening). DO NOT USE a vial if any defect is detected.
  2. Mark the blood culture bottle with the correct volume needed. Refer to the following table(below) for optimum volumes.

3. After removing the cap, wipe the rubber septum with a sterile pad soaked in 70% alcohol. Allow the septum to air dry. DO NOT USE IODINE to wipe off the vial septum, as iodine will disintegrate the rubber.
- F. Apply a tourniquet and visually locate the vein to be punctured, but DO NOT TOUCH the cleansed site.
- G. **Blood culture bottles should never be inverted, attached directly to any line access device or attached to a straight needle on a vacutainer barrel for the collection process.** The following problems may arise.
  - The volume of blood cannot be measured.
  - There is enough vacuum in the bottles to draw much more than the maximum as listed on each bottle.
  - Once the vacuum is equalized, the blood culture medium will flow in the opposite direction (like hanging an IV).
- H. Collect the specimen using one of the following methods:
 

**NOTE:** Draw blood cultures separate from other tests. If it is necessary to draw them with other tests, inoculate the blood culture vials first to reduce likelihood of contamination.

  1. Syringe draw
    - Use the largest gauge needle that the patient's vein will allow.
    - Remove needle completely before touching the gauze to the puncture site. Transfer blood from the syringe into **upright** blood culture vials using a transfer device. Allow vacuum in vial to draw the blood in. When drawing with a butterfly/syringe combination, discard the butterfly after drawing specimen into the syringe, then attach a transfer device to the syringe to inoculate the vial(s).
  2. Butterfly needle
    - a. Attach butterfly to the barrel. Place the barrel over the end of **upright** blood culture vials. Bottles must remain in an upright position throughout the collection. Never invert the bottle while the bottle is filling and the needle is in the patient.
    - b. Carefully observe the direction of blood flow when starting specimen collection. The vacuum in the vial will usually exceed 10 mL, so the user should monitor the volume collected by means of the 5 mL graduated marks on the vial label. DO NOT OVERFILL.
      - a. When the desired volume has been drawn, remove the needle from the vial.
- I. Specimen volumes

**OPTIMAL VOLUMES FOR BLOOD CULTURE VIALS**

| Age                 | Plus Aerobic/F vial | Lytic/10 Anaerobic/F vial | Myco/F Lytic vial |
|---------------------|---------------------|---------------------------|-------------------|
| Neonate to 1 year   | 1 – 2 mL            | 1 – 2 mL                  | 1 – 2 mL          |
| 1 to 6 years        | 3 – 5 mL            | 3 – 5 mL                  | 3 – 5 mL          |
| Adolescent to Adult | 8 – 10 mL           | 8 - 10 mL                 | 3 – 5 mL          |

**NOTE:** For suboptimal specimen volumes, if <2 mL, place the entire specimen in the aerobic vial; if ≥2 mL, divide specimen equally between the aerobic and anaerobic vials. Use of lower volumes may adversely affect recovery and /or time to detection of organisms.

- J. Remove Betadine or iodine from the skin using alcohol.
- K. Properly label vials with collection date, time, identity of phlebotomist and site of collection (e.g., “left arm”, “right hand”, “subclavian line red port”, etc.). DO NOT COVER VIAL BARCODE LABEL.
- L. Transport the specimen promptly to the laboratory.

## NOTES:

- A. Contamination rates are higher with line draws than with venipunctures, so *blood cultures should not be collected through lines except to test for an infected line.*
- B. If a clinician orders blood cultures times a number (e.g., “blood cultures times 2”), but doesn’t specify different sites or time periods between specimens, the time interval is not important, but separate sites with separate preps are important when possible.
- C. If the venipuncture proves difficult, and the cleansed site must be touched to locate the vein, *the site must be completely re-cleansed again before venipuncture.*

## Order of Draw of Venipuncture Collection

When drawing several types of blood specimens during a single venipuncture, tubes should be drawn in the following order to avoid test result errors due to cross-contamination of tube additives. This applies to both evacuated tube systems and syringe specimens transferred to multiple tubes. This order of draw is based on the **CLSI GP41-A6** guideline. (PH0002-A1)

| Order of draw | HEMOGARD TOP   | CONVENTIONAL TOP               | ADDITIVE  | NUMBER OF GENTLE INVERSIONS AT BLOOD COLLECTION |
|---------------|--|--------------------------------|---|---|
| 1             | Blood culture Bottles  |                                | Culture medium  | 0   |
| 2             | Clear top with red stopper   | Red/Gray                       | none  | 0   |
| 3             | Light Blue   | Light Blue                     | Sodium citrate  | 8   |
| 4             | Red stopper, glass tube  | Red                            | none  | 0   |
| 5             | Red  | Red                            | Clot activator  | 5   |
| 6             | Gold-SST   | Red/Black SST (“Tiger Top”)    | Clot activator & gel for serum separation.                | 5   |
| 7             | Dark Green   | Green                          | Heparin (sodium or lithium)                               | 8   |
| 8             | Light Green PST  | Green/Gray (“Green Tiger”) PST | Lithium heparin and gel for plasma separation             | 8   |
| 9             | Lavender and Pink  | Lavender and Pink              | EDTA  | 8   |
| 10            | Gray   | Gray                           | Sodium fluoride/Potassium oxalate or Sodium fluoride only | 8   |
| 11            | All others as needed for specialty tests<br>Dark Blue no additive, Dark Blue EDTA, Yellow, Tan, etc. |                                |   | As instructed by test requirements              |

**NOTE:** When using a winged blood collection set and collecting a Light Blue top tube first, some blood must be collected into a waste tube to clear the line of air, or the volume will not be adequate in the Light Blue top tube. (REMEMBER, all Light Blue top tubes must be filled to the FILL LINE.)

## CAPILLARY ORDER OF DRAW

When collecting blood specimens during a single skin puncture, capillary tubes should be collected in the following order. The person collecting the specimens should work in a timely

and productive manner to avoid test result errors by hemolysis and clot formation. This applies to both heel and finger sticks. This order of draw is based on the **CLSI GP42-A6** guideline.

1. Capillary Blood Gas. (Mix immediately.) Heel must be pre-warmed.
2. Test collected in EDTA. (Mix intermittently during and immediately after collection.)
3. Test collected in heparin. (Mix intermittently during and immediately after collection.)
4. Test collected in serum microtainers.
5. Newborn screen testing.

## Draw Order for Blood Collection



To Prevent  
CROSS  
contamination of  
additives from  
tube to tube,  
order of draw  
must be  
followed.

### The order of blood collection

- 1- blood culture bottles
- 2- clear top with red stopper
- 3- light blue tube
- 4- red tube
- 5- gold tube
- 6- dark green tube
- 7- light green tube
- 8- pink or lavender tube
- 9- gray tube
- 10- all other tubes  
(including specialty kits)

Know your order of draw.  
Quality starts with you.

### QuantIFERON TB Gold Order of Draw (drawn after other labs)

1. Gray top Nil Control tube
  2. Red top TB Antigen tube
  3. Purple top Mitogen Control tube
- NOTE: It is crucial to shake tubes 10 times IMMEDIATELY after collection, just firmly enough to ensure that the entire surface of the tubes have been coated with blood, to solubilize antigens on tube walls.**

## Mixing Tube Additives

For proper performance of tube additives (anticoagulants, clot activators, and separation gels) tubes must be gently inverted several times immediately after collection (manufacturer recommends 8 inversions).

In tubes with anticoagulants, inadequate mixing may result in platelet clumping, clotting, and incorrect test results.

When mixing specimen tubes with additives, do not shake the tubes.

Vigorous mixing may cause foaming or hemolysis.

Insufficient mixing or delayed mixing in SST tubes may result in delayed clotting and incorrect test results

# Hemolysis

Hemolysis usually occurs at the time of the venipuncture but can only be detected after centrifugation, when the liquid portion of the blood has been separated from the cells. It occurs when the red blood cell wall is damaged and hemoglobin is released. The liquid portion of the blood will appear pink to red, reflecting the amount of released hemoglobin. Hemoglobin interferes with some laboratory tests. Some causes of and ways to prevent hemolysis are:

## ◆ Collection of Blood

1. Avoid prolonged application of the tourniquet (no more than two minutes).
2. Avoid a probing, traumatic venipuncture.
3. Avoid using a needle that is too small (less than 22 gauge). A 20-21 gauge needle is recommended.
4. Avoid drawing from a hematoma.
5. Make sure alcohol preparation of draw site is dry (residual alcohol may cause RBC lysis).
6. If the tube is filling very slowly, adjust the needle position to obtain a steady flow. Allow 1-2 mL of blood to flow into the tube, then discard that tube (as waste) and replace it with a fresh tube.
7. Avoid drawing the plunger back too forcefully if using a needle and syringe. Alternating gentle pressure with a short release will yield best results.
8. Immediately after the tube has been filled with blood, gently invert the tube several times. Do not shake or vigorously mix the tube.

## ◆ Transfer of Blood

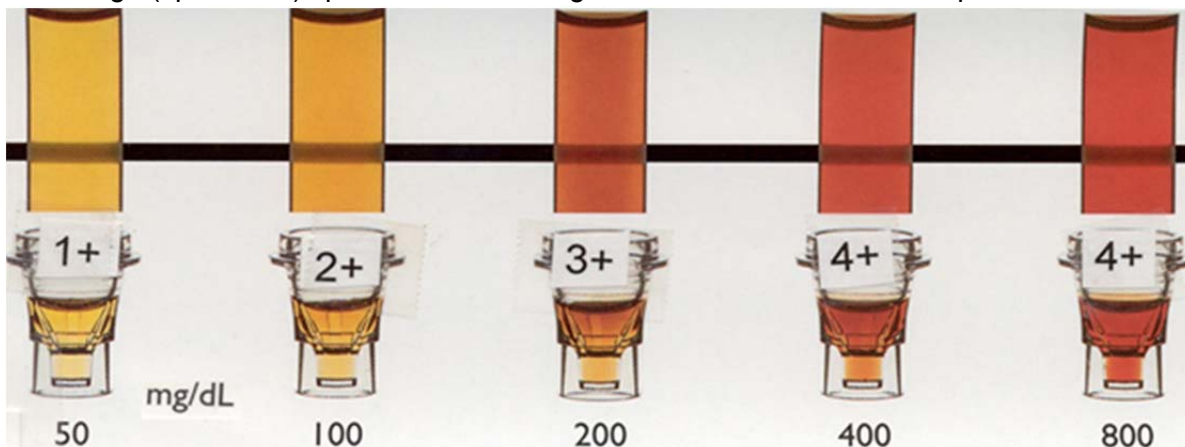
1. When transferring a specimen from a syringe through the transfer device, allow the tube to fill at its normal speed. Do not apply pressure to the plunger.
2. Position the transfer device so the blood flows down the side of the tube rather than splashing to the bottom.
3. Immediately after the tube has been filled with blood, gently invert the tube several times. Do not shake or vigorously mix the tube.

## ◆ Extreme temperatures

Do not expose the specimen to extreme temperatures (heating or freezing) or direct sunlight.

## ◆ Specimen Processing

Centrifuge (spin down) specimens according to the tube manufacturer's specifications.



# Nasopharyngeal Specimen Collection

---

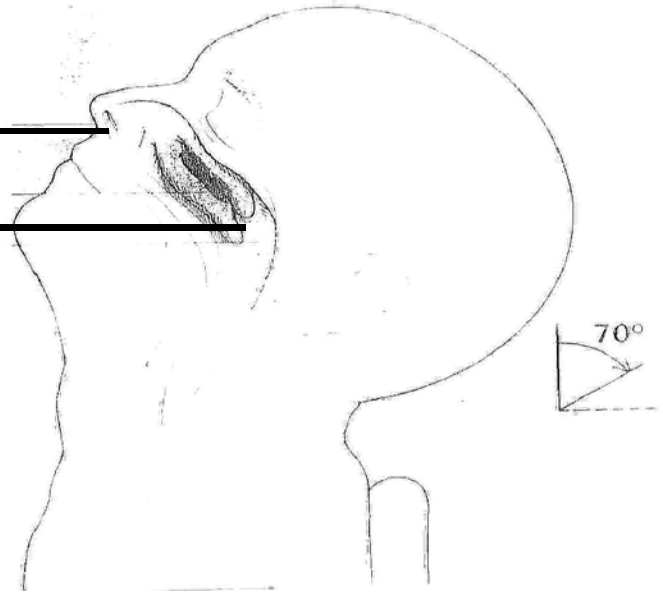
## Materials:

Flocked swab with Universal Transport Media

1. Gently insert a small flocked swab through the nares and into the posterior nasopharynx.
2. Rotate swab slowly for 3-5 seconds to absorb secretions.
3. Remove swab from nares.
4. Place the swab in the Universal Transport Media tube. Securely cap the tube. Vigorously swirl or agitate the swab in the liquid for 15 seconds.
5. Label the tube appropriately.
6. Send to lab.

**Anterior nares** \_\_\_\_\_

**Posterior pharynx** \_\_\_\_\_



Patient's head should be positioned from vertical as shown for proper specimen recovery.

## Vacuum-assisted: Nasal Aspirate Method

---

### Materials:

- Portable suction pump
- Sterile suction catheter
- Mucus trap (i.e., Luken's tube)
- Saline



1. Attach mucus trap to suction pump and catheter, leaving wrapper on suction catheter; turn on suction and adjust to suggested pressure.
2. Without applying suction, insert catheter into the nose, directed posteriorly and toward the opening of the external ear. NOTE: Depth of insertion necessary to reach posterior pharynx is equivalent to distance between anterior naris and external opening of the ear.
3. Apply suction. Using a rotation movement, slowly withdraw catheter. NOTE: Catheter should remain in nasopharynx no longer than 10 seconds.
4. Hold trap upright to prevent secretions from going into pump.
5. Rinse catheter (if necessary) with approximately 2.0 mL saline; disconnect suction; connect tubing to arm of mucus trap to seal.

| Patient Age         | *Catheter size (French) | Suction Pressure |
|---------------------|-------------------------|------------------|
| Premature infant    | 6                       | 80-100 mmHg      |
| Infant              | 8                       | 80-100 mmHg      |
| Toddler/Preschooler | 10                      | 100-120 mmHg     |
| School Age          | 12                      | 100-120 mmHg     |
| Adolescent/Adult    | 14                      | 100-150 mmHg     |

\*To determine length of catheter tubing, measure distance from tip of nose to external opening of ear.

Repeating procedure for the second nostril will deliver optimal combined specimen.

### Nasal Wash: Bulb Method

Materials:

- Saline
- 1-2 oz. tapered rubber bulb\*
- Specimen container (e.g., urine collection cup)

1. Suction 3-5 mL saline into a new sterile bulb.
2. Insert bulb into one nostril until nostril is occluded.
3. Instill saline into nostril with one squeeze of the bulb and immediately release bulb to collect recovered nasal specimen.
4. Empty bulb into suitable dry, sterile specimen container.



\*Length and diameter of syringe, tube or bulb as appropriate for infant, child, or adult. Repeating procedure for second nostril will deliver optimal combined specimen.

### Nasal Wash: Syringe Method

Materials:

- Saline
- 3-5 mL syringe\*
- 2" 18-20 gauge tubing\*
- Specimen container

1. Fill syringe with saline; attach tubing to the syringe tip.
2. Quickly instill saline into nostril.
3. Aspirate the recoverable nasal specimen.
4. Recovery must occur immediately, as the instilled fluid will rapidly drain.
5. (Alternate) In appropriate cases, patients may tilt head forward to allow specimen to drain into suitable sterile container.
6. Inject aspirated (if aspirated) specimen from syringe into suitable dry, sterile specimen container. Urine collection cup is acceptable.



\*Length and diameter of syringe, tube or bulb as appropriate for infant, child, or adult. Repeating procedure for second nostril will deliver optimal combined specimen.



## **Cervical, Endocervical, and Urethral Swab Specimen Collection**

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for PCR testing for

*Chlamydia trachomatis* (CLMPCR) and *Neisseria gonorrhoeae* (GCPCR) or both (GCLPCR)

### **REAGENTS/SUPPLIES/EQUIPMENT**

- Universal Transport Media (UTM),
- Transport Media (VTM)
- Thin Prep Preserv Cyt collection media
- M4 collection media or collection kit (contains swabs and media).

### **CERVICAL, ENDOCERVICAL SWAB SPECIMENS**

1. Prior to specimen collection it is important to clean exocervix with first swab. If using M4 collection kit, clean exocervix with larger swab. Remove mucus, contraceptive jellies/creams, and all other matter from the exocervix.

NOTE: If collecting a specimen for Pap testing as well, do not use a swab to collect specimen. Swabs may leave fibers behind that would obscure cells during microscopic examination. Specimen for combined Pap/HPV and Chlamydia/Gonorrhea testing may be collected in a liquid-based Pap vial using the appropriate collection device. See GYN Cytopathology Specimen Requirements, for more information.

2. Insert a second swab into the endocervical canal until the tip of swab is no longer visible. If using M4 collection kit, use smaller swab for endocervical canal.
3. Rotate 3-5 seconds and withdraw, avoiding contact with vaginal surfaces. Examine the swab for the presence of surgical lubricants, and if present, indicate this on the specimen label.
4. Place the swab in the Specimen Transport Media tube, vigorously swirl or agitate the swab in the liquid for 15 seconds.
5. Cap the tube and label it appropriately.
6. Specimens must be stored refrigerated at 2-8°C. Specimens may be stored for up to 7 days refrigerated or frozen for up to 3 months.
7. All specimens that require shipment must be shipped in compliance with all applicable local, state and country regulations for the transport of etiological agents.

### **URETHRAL SWAB SPECIMENS (MALE)**

- Patient should not have urinated for at least 2 hours prior to specimen collection.
- Insert the small swab provided with the kit 2-4 cm into urethra.
- Rotate 3-5 seconds and withdraw.
- Place the swab in the Specimen Transport Media tube, vigorously swirl or agitate the swab in the liquid for 15 seconds.
- Cap the tube and label it appropriately.
- Specimens must be stored refrigerated at 2-8°C. Specimens may be stored for up to 7 days refrigerated or frozen for up to 3 months.
- Upon receipt by the test center:

All specimens that require shipment must be shipped in compliance with all applicable local, state and country regulations for the transport of etiological agents.

## Other Specimen Types

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- ◆ Intermountain Laboratory Services accepts all types of body fluids and urine specimens for testing. If you need 24-hour urine containers, or other special containers, please call Client Services, refer to Client Services Contacts on page 4 for numbers.
- ◆ For more detailed information regarding specimen collection for microbiology, molecular pathology/serology and anatomic pathology, see the department specific sections in this manual (below).

## Rejection of Specimens

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### **The following represent some reasons for specimen rejection or test cancellation:**

- ◆ Improper/incomplete specimen labeling.
- ◆ Incomplete or incorrect laboratory requisition.
- ◆ Insufficient or incorrect specimen quantity (QNS – quantity not sufficient), e.g. specimen has leaked in transit.
- ◆ Incorrect specimen container or media.
- ◆ Specimen collected/transported in expired tube or media.
- ◆ Incorrect storage or transport conditions.
- ◆ Incorrect specimen type (e.g. serum vs. plasma).
- ◆ Specimen stability (time after collection during which the specimen can be accurately tested) has been exceeded for the analyte.
- ◆ Specimen not allowed to clot completely at room temperature prior to centrifuging.
- ◆ Failure to mix specimen thoroughly with anticoagulant additive immediately after collection (resulting in clot formation).
- ◆ Red cells damaged due to improper specimen handling (refer to hemolysis section).
- ◆ Patient preparation was incorrect or incomplete.
- ◆ Specimen collected at the incorrect time of day.
- ◆ Specimen taken from the wrong site, (e.g. a swab of the throat instead of the nasopharynx.)
- ◆ Specimen has been contaminated.
- ◆ Urine specimens:
  - Not refrigerated
  - Wrong container type (i.e., gray vacutainer tube for urinalysis testing is not acceptable)
  - Incomplete 24-hour collection (or other timed collection)
  - Non-sterile container (for culture)
  - Not a clean-catch, midstream specimen (for culture)
- ◆ Stool specimens:
  - Testing for *H. pylori* antigen cannot be performed on watery stools.
  - Formed (solid) stool specimens will be rejected for the following tests:
    1. Culture
    2. WBC's
    3. Electrolytes
    4. *Clostridium difficile* toxin by DNA
- ◆ Ova and Parasites: History of foreign travel (exact location) or risk because of immunocompromised status MUST be included with the order or on requisition. Indicate suspected parasites (especially Cryptosporidium, Cyclospora, and Isospora), immunity status, and available patient history (especially travel). Antibiotics may affect results. If the above information is not provided, Giardia antigen will be ordered.

## Specimen Labeling Requirements

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All specimens submitted to the laboratory must be individually labeled. Specimen labels may be ordered from us. Please call Client Services, refer to Client Services Contacts on page 4 for numbers.

Use indelible ink

- Print clearly
- Label containers, NOT caps or lids
- Container labeling **MUST** match information on requisition
- Label frosted end of slides with a #2 pencil
- Slides must be labeled with the patient's name and date of birth. If possible indicate if the slide is fixed or air-dried.

Each container **MUST** be labeled with the following information:

|   |
|---|
| <b>Name</b> <i>Doe, John Michael</i><br><b>Second identifier</b> <i>123456</i><br><b>Date</b> <i>09/04/01</i> <b>Time</b> <i>9:00 am</i> <b>Initials</b> <i>HR</i><br><b>Source/Site</b> <i>Right Upper Chest, (A or 1, B or 2)</i> |
|---|

- ◆ Patient's full legal name as it appears on the requisition - last, first and middle if available.
- ◆ **Second identifier such as date of birth or any unique identifier specific to the patient.**
- ◆ **Date and time of collection**
- ◆ **Initials, ID# or signature of person collecting the specimens**
- ◆ Collection source/site required for microbiology, molecular pathology, pathology, cytology and electron microscopy
- ◆ For pathology, multiple specimens submitted for one patient should be labeled with an alpha or numeric descriptor which corresponds to specimens listed on the requisition.

## Transporting Specimens

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**Basic methods for transporting specimens:**

- ◆ Transport specimens in labeled, appropriate containers, i.e., sterile, leak-proof, without needles, swabs in culettes, (strep screens acceptable in paper sleeves).
- ◆ Place the labeled specimen container in the sealable pouch of the biohazard transport bag. Seal the pouch securely.
- ◆ Place the completed requisition in the unsealed outer pouch of the biohazard transport bag containing the specimen.
- ◆ Place the sealed bag containing the specimen and the requisition inside a second bag. Seal it securely.
- ◆ Determine the correct temperature for transport as listed under test requirements. Mark the bag so.

Syringes with needles attached are dangerous to anyone handling them. **Specimens should not be shipped in syringes, except for some Microbiology specimens in capped syringes.** Transfer the contents of the syringe into an appropriate container. If a syringe is shipped with the needle attached, the ordering clinician or office will be contacted.

Specimens may be shipped in *capped* syringes *only* when it is specifically required by testing requirements, (e.g. anaerobic microbiology specimens). Before a syringe is shipped the needle must be removed and replaced by a securely attached cap.

Different tests have different temperature requirements during transportation and storage. Failure to provide the appropriate conditions can render a specimen unsuitable for testing. **If the specimen integrity will be compromised by the weather, either too hot or too cold, call a courier to transport the specimens immediately to the laboratory. For assistance, contact your providing laboratory refer to Client Services Contacts on page 4 for numbers** Here are general guidelines for “frozen”, “refrigerated” and “room temperature” (or “ambient”):

**Frozen: -10°C or colder (<14°F)**

When ordering multiple tests on a patient, prepare a separate aliquot for each test requiring a frozen specimen. Pour off serum or plasma into a properly labeled plastic tube before freezing. Do not freeze glass tubes. Do not freeze whole blood unless specifically indicated by the specimen requirements. Do not package frozen specimens with non-frozen specimens. Specimens must remain frozen during shipment.

**Refrigerated: 2-8°C (35.6-46.4°F)**

Specimens should be packaged in an appropriate shipping container with a frozen coolant pack. Insulate the specimen by placing a barrier (i.e., paper towels) to ensure that it does not come in direct contact with the coolant pack. One pack cools for 8-10 hours; 2 packs cool for 24 hours if the shipping container remains unopened.

**Room temperature (Ambient): 18-25°C (64.4-77°F)**

Room temperature specimens need not be packaged with coolants; however, extreme weather or other conditions such as exposure to sunlight could affect specimen quality. Take weather and other conditions into consideration when leaving specimens in locked boxes for couriers. **CLSI H21-A5 guideline.**

## Requisition Requirements

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Use of Intermountain Laboratory Services requisitions will help alleviate test order errors. Requisitions may be customized for each client. Contact your providing laboratory to obtain requisition forms. A licensed provider's signature with date and time (no stamped signatures) is requested when possible to authenticate the order for government payers. Orders may not be signed by nursing staff on behalf of the provider.

**Intermountain Laboratory Services requires the following legible information on every laboratory requisition:**

### **Patient Identification:**

- ◆ Full legal name, with patient's maiden name if married recently
- ◆ Date of birth
- ◆ Gender
- ◆ At least one of the following identifiers:
  1. EMPI #
  2. Other unique identifier

### **Insurance/Payor Information**

- ◆ Company name or payor name
- ◆ Company address or payor address
- ◆ Company telephone or payor telephone
- ◆ Patient's complete insurance information, including policy number and home and mailing address
- ◆ Guarantor name and address (patients who are minors cannot be their own guarantor)
- ◆ A copy of the insurance 'card' is helpful

### **Collection Information**

- ◆ Date and time of collection
- ◆ Initial, ID# or signature of person collecting the specimens
- ◆ Clinician name, address, phone number and fax number if available. (This information can be customized on the Intermountain Standard Requisition.)
- ◆ A pager number or telephone number to which results can be called must be included with Electron Microscopy orders.
- ◆ Include additional information that may be relevant and necessary to assure accurate and timely testing and reporting of results.
- ◆ Specimen type and source/site for Molecular, Microbiology, Pathology, Cytology and Electron Microscopy testing.

### **Testing Information**

- ◆ Test(s) to be performed
- ◆ Patient's diagnosis; use current ICD code (preferred) or signs and symptoms, i.e., mass of right breast
  - Testing for Medicare patients should meet the Medicare definitions for medical necessity. Screening requests on Medicare patients may require an Advance Beneficiary Notice (ABN). For example, a Lipid Screen may require a signed ABN. ABN forms can be obtained from the laboratory.

- ◆ Specimen type and source/site for Molecular, Microbiology, Pathology, Cytology and Electron Microscopy testing.

### **Specific Testing Information for GYN Cytopathology**

- ◆ Specimen source:
  - Cervical
  - Vaginal
- ◆ Information:
  - Date of last menstrual period (LMP)
  - DES Exposed
  - Pregnant
  - Nursing
  - Postpartum
  - IUD
  - Hormone therapy
  - Irregular Menses
  - Menopausal
  - Hysterectomy (full/partial)
  - Chemotherapy for \_\_\_\_\_
  - RadiationHormone therapy for \_\_\_\_\_
  - Current signs/symptom
  - Previous abnormal Paps, treatments & dates
  - Other Clinical Information

### **Specific Testing Information for Non-Gyn Cytopathology**

- ◆ Clinical information:
  - Recent related infections or illnesses
  - Signs or symptoms experienced
  - Applicable patient history, i.e. history of thyroid nodule, history of melanoma, history of bladder lesions, previous hysterectomy, etc.
  - Indicate if any special stains needed, i.e., silver stain, AFB stain, etc.
  - STAT orders-Circle or write out: STAT on the requisition and provide clinician's full name and contact information. Notify the pathologist on-call.

**EXAMPLE**

An Ordering Clinician **MUST** be clearly identified. First and last name required.

SHADED AREAS MUST BE COMPLETED

|                               |  |                      |               |   |  |
|-------------------------------|--|----------------------|---------------|---|--|
| Patient Legal Name: Last      |  | First                | MI            | Patient SSN: - - -  | Sex:   |
| Maiden or Other Name Used:    |  |                      | Patient DOB:  |   |  |
| Street:                       |  |                      |               | Is this patient in a Skilled Nursing Facility? <input type="checkbox"/> Yes <input type="checkbox"/> No |  |
| City, State:                  |  | ZIP:                 |               | Home #:( )  | <input type="checkbox"/> Bill physician or institution |
| Guarantor:                    |  | DOB:                 |               | SSN - - -   |  |
| Primary Insurance:            |  | Secondary Insurance: |               | Circle for <b>STAT</b>  |  |
| Subscriber Name:              |  | Subscriber Name:     |               | Call to:  |  |
| Subscriber SSN:               |  | Subscriber SSN:      |               | Page to:  |  |
| Policy Number:                |  | Policy Number:       |               | Fax to:   |  |
| Insur. Address:               |  | Insur. Address:      |               |   |  |
| Patient Relation:             |  |                      |               |   |  |
| DIAGNOSES OR SIGNS / SYMPTOMS |  |                      | Collected by: |   |  |
| A                             |  |                      | B             |   |  |
| C                             |  |                      | D             |   |  |

All shaded areas should be completed for proper billing.

MUST be filled in. USE current ICD codes or signs & symptoms. NOT suspicious vs. rule out, or possible.

TESTS PRINTED IN RED ARE MEDICARE LIMITED COVERAGE AND MAY REQUIRE AN ADVANCE BENEFICIARY NOTICE (ABN)

**MEDICARE NOTICE**  
Any testing for Medicare patients should meet the Medicare definitions for medical necessity. Medicare generally does not cover routine screening tests (Shown in red).

**MEDICARE SCREENING**  
 Glucose Screen (5) (Z13.1)  
 FIT Testing (FOBTI) (5)  
 Occult Blood Screen (5)  
 PSA Screen (5) (Z12.5)  
 LIPID Panel \_\_\_\_\_ hr fast (14) (recommend 12 hr fast) (Z13.6)  
 Chol  HDL  Trig  Panel  
 OGTT (Z13.1)  
 HIV screen (G0432) see back for definitions

**AMA Panels**  
Please refer to reverse side for description of panels.

Acute Hepatitis Panel  
 Basic Metabolic Panel  
 Comp Metabolic Panel  
 Electrolyte Panel  
 Hepatic Function Panel  
 LIPID Panel \_\_\_\_\_ hr fast (recommend 12 hr fast) (14)  
 Obstetric Panel+ HIV-1/2 Ab (2)  
 Without HIV-1/2 Ab  
 Renal Function Panel

Cardiovascular Risk Assessment (15). Risk is calculated from Lipid Panel and hsCRP

LIPID Panel \_\_\_\_\_ hr fast (recommend 9-12 hr fast) (14)  
 hsCRP (High Sensitivity CRP)  
 Homocysteine  
 Fasting Plasma Glucose  
 ALT (SGPT)  
 ANA  
 AST (SGOT)  
 ALK Phosphatase  
 Amylase  
 BUN  
 Bilirubin, conj & unconj  
 Bilirubin, total  
 Bilirubin, neonatal

BNP (BNPEP)  
 CA 125  
 Calcium, ionized  
 Calcium, total  
 Carbamazepine (Tegretol)  
 CK, total  
 CBC auto diff (3, 4)  
 CBC no diff (3)  
 CBC manual diff (3)  
 Cholesterol, total  
 Creatinine  
 CRP (Not for Cardiac Risk)  
 Estradiol  
 Factor II mutation  
 Factor FVL  
 FSH  
 Ferritin  
 FK506 (Tacrolimus)  
 Folate  
 Glucose (5)  
 GGT  
 HgbA1c (glycohemoglobin)  
 H. Pylori Ab, serum  
 hCG (Preg. Test, qual)  
 serum  urine  
 hCG Quantitative, serum  
 hCG Tumor marker  
 Hematocrit (HCTO)  
 Hemoglobin (HGBO)  
 Hepatitis, Chronic  
 Anti-HBc, total (HBCT)  
 Anti-HBs (HBSAB)  
 Anti-HCV (HCV) (18)  
 HBsAg(1)  
 HIV screening (Z11.59) if increased risk factors add Z72.89  
 At risk lifestyle  
 Immunofixation c̄ Interp (6)  
 serum  urine  
 Iron  
 Iron / TIBC  
 LDH  
 LH  
 Lipase  
 Lithium  
 Magnesium  
 MonoSpot (Heterophile)  
 PSA, diagnostic (17)  
 PSA, Free and total (5)  
 PSA (Screening) (5) (Z12.5)  
 PT / INR  
 PTT  
 Phenytoin (Dilantin)  
 Phosphorus  
 Potassium  
 Prolactin  
 Protein Electrophoresis c̄  
 Interp (6)  serum  urine  
 RPR  
 Rheumatoid factor  
 Rubella Ab, IgG  
 Rubeola Ab, IgG screen  
 Sed Rate (ESR)  
 Sodium  
 Thyroxine, Free (FT4)  
 T3, Free  
 TSH (only)  
 TSH c̄ Free T4 if abnormal (7)  
 Testosterone, total, only  
 Testosterone, total free, Bioavailable & SHBG  
 Triglycerides (12 hour fast)  
 Uric acid  
 Valproic acid (Depakote)  
 Vit B12  
 Vit D25OH  
 UA dipstick only  
 UA w/microscopic if indicated (8)  
 UA dipstick and microscopic  
 Urine Microalbumin (24 hr)  
 Urine Microalbumin (ALBEX) (overnight, timed)  
 Urine Microalb / Creat ratio (13)  
 Urine, 24 hr protein  
 Creatinine Clearance, 24 hr  
 HT: \_\_\_\_\_ WT: \_\_\_\_\_

**Microbiology (9) /PCR**  
Source is required.  
 FluA & FluB PCR  
 FilmArray PCR, full resp panel  
 Bordetella pertussis PCR  
 Chlamydia/Gonorrhea PCR  
 Chlamydia only  
 Gonorrhea only  
 Herpes Simplex PCR  
 Vaginosis Panel (Candida, Gardnerella, Trichomonas)  
 MRSA/S. aureus PCR  
 HCV Quantitation by PCR  
 HCV Quant w/ Genotype  
 HIV Quantitation by PCR  
 Varicella PCR  
 Culture, routine (Aerobic)(9)  
 Culture, Anaerobic & Aerobic (9)  
 Fungal Culture  
 Prenatal Strep Screen  
 Penicillin allergy  
 Rapid Strep (A) (14) (recommend 12 hr fast)  
 Rapid Strep (A) (14)  
 Strep (A) Culture, (14)  
 Urine Culture  
 Clean catch  
 C. diff Toxins, stool  
 Crypto Ag & Giardia Ag, stool  
 Crypto Ag, stool  
 Giardia Ag, stool  
 H. pylori Ag, stool  
 FIT Testing (FOBTI) (5)  
 Occult blood, diagnostic  
 Stool Culture plus EHECT  
 Stool Culture (10)  
 EHECT Testing  
 Ova & Parasite (16)  
 History of foreign travel or immunodeficiency

All Microbiology /Infectious disease requests MUST include a source and have specific testing indicated.

All testing printed in RED MUST be screened for Medicare's Medical Necessity. An Advanced Beneficiary Notice (ABN) may be required if applicable.

NOTES & REFLEX CRITERIA ON REVERSE SIDE

LAB COPY

Physician Signature: \_\_\_\_\_  
By submission of this requisition, the ordering physician certifies that the billing information provided is accurate and that Medicare has been determined to be the primary payor for these services, unless otherwise indicated.

**EXAMPLE**

An **Ordering Clinician** **MUST** be clearly identified. First and last name required.

**SHADED AREAS MUST BE COMPLETED**

All shaded areas should be completed for proper billing.

|                            |  |                      |                  |                              |      |
|----------------------------|--|----------------------|------------------|------------------------------|------|
| Patient Legal Name: Last   |  | First                |                  | Middle                       |      |
| Maiden or other name used: |  |                      | Patient SSN: - - |                              | Sex: |
| Street:                    |  |                      | Patient DOB:     |                              | MRN: |
| City, State:               |  | Zip Code:            |                  | Home/Work                    |      |
| Guarantor: DOB:            |  | SSN: - -             |                  | All physician or institution |      |
| Primary Insurance:         |  | Secondary Insurance: |                  | All patient insurance        |      |
| Subscriber name:           |  | Subscriber name:     |                  | Bill Medicare/Medicaid       |      |
| Subscriber SSN:            |  | Subscriber SSN:      |                  | Date Collected               |      |
| Policy Number:             |  | Policy Number:       |                  | / /                          |      |
| Insurance Address:         |  | Insurance Address:   |                  | / /                          |      |
| Patient Relation:          |  | Patient Relation:    |                  | / /                          |      |

A copy of the patient's insurance card (front and back) may be attached in lieu of completing the above insurance section.

**Cytology Pap Tests** **Sections 1, 2 and 3 must be completed. Medicare may require an ABN.**

**1. Pap Tests** Note: The Pap Test is a Screening Test with inherent false negatives.

Liquid-Based Pap Test with HR-HPV Reflexive Testing on result of ASC-US (Recommended for patients 21-29 years.)

Liquid-Based Pap Test with HR-HPV Testing regardless of Pap results (Non-Reflexive) (Recommended for patients 30-65 years.)

HPV 16/18 Genotyping (Performed reflexively only if ordered with Non-Reflexive HPV on patients 30 and over with a negative cervical Pap Test & positive HR-HPV test result.)

Liquid-Based Pap Test **Only**

**Ancillary Tests preformed from liquid-based Pap medium:**

HR-HPV Testing Only (Pap Test Not Performed)

Chlamydia Testing  Gonorrhea Testing (The CDC recommends Chlamydia testing for all sexually active women 25 years and younger or those at increased risk.)

**2. Clinical Information** Check all that apply: Where applicable

Cervical  Vaginal LMP: \_\_\_/\_\_\_/\_\_\_  DES Exposed  Other Clinical Information \_\_\_\_\_

Pregnant  Nursing  IUD  Menopausal  Radiation Therapy for \_\_\_\_\_

Postpartum  Irregular Menses  Hormone Therapy  Hysterectomy  Chemotherapy for \_\_\_\_\_

**3. Pap Test Risk Assessment Level**

We require a risk assessment level for accurate billing. Please select one of the following.

A  Low-risk for Cervical Cancer - Medicare coverage once / 24 months Dx:  Z12.4 (cervical)  Z12.72 (vaginal)

B  High-risk for Cervical Cancer - Medicare coverage once / 12 months Dx:  Z12.4 (cervical)Z77.9  Z12.72 (vaginal)Z77.9

See back for a list of possible high-risk factors

C  Diagnostic - Signs / symptoms present or history of disease (7 years)

**Clinical History, Signs and Symptoms** - Check all that apply (Mandatory for Diagnostic but optional for Low-Risk and High-Risk)

Previous positive HR-HPV test Date \_\_\_\_\_

Previous abnormal Pap; diagnosis \_\_\_\_\_ Date \_\_\_\_\_

Previous cancer of the uterus, cervix or vagina \_\_\_\_\_ Date \_\_\_\_\_

Significant complaint by the patient \_\_\_\_\_

Signs/Symptoms \_\_\_\_\_

Applicable ICD-10 code \_\_\_\_\_

For lab use only:

**MUST** be filled in. USE current ICD codes or signs & symptoms. NOT suspicious vs. rule out, or possible.

**Other Tests:** Clinical History / Pre-Op Dx \_\_\_\_\_

|  |  |   |
|--|--|---|
| <p><b>Tissue Pathology: Identify Specimen Source</b></p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p> <p>4. _____</p> <p>Time collected: _____ Time in formalin: _____ (Left / Right)</p> | <p><b>Non-Gyn Cytology:</b></p> <p><input type="checkbox"/> FNA <input type="checkbox"/> Thyroid (Cyst / Solid) <input type="checkbox"/> Breast</p> <p><input type="checkbox"/> Fluid <input type="checkbox"/> Urine (Void. / Cath.) <input type="checkbox"/> Washing <input type="checkbox"/> CSF</p> <p>Air-dry</p> <p>s): _____</p> <p>): _____</p> | <p><b>Flow Cytometry - 801-507-2276</b></p> <p>Source: _____</p> <p><input type="checkbox"/> Leuk/Lym Pheno (FLOWLL)</p> <p>*WBC &gt;5 for CSFs</p> <p><input type="checkbox"/> CD4/CD8 ratio (FLOWBL)</p> <p><input type="checkbox"/> Hold for flow cytometry at pathologist discretion (FLOWSP)</p> |
|--|--|---|

Fill in Source as much as possible

**Provider Signature:** \_\_\_\_\_ **Provider #:** \_\_\_\_\_



**EXAMPLE**

Name: \_\_\_\_\_  
 Gender: \_\_\_\_\_  
 DOB: \_\_\_\_\_

Date collected: \_\_\_/\_\_\_/\_\_\_

Check for  STAT

Call STAT results to: \_\_\_\_\_

Provider Name / Location \_\_\_\_\_

**Pre-op Diagnosis:**  
(Required for all testing)

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**Clinical History:**  
(Required for all testing)

Lab use only:

Date / Time received: \_\_\_\_\_

**Tissue Pathology - If sending bone marrow specimens, please fill out and submit Bone Marrow requisition instead.**

Specimen(s) Source/Site: For additional specimens, use additional forms.

- |          |          |
|----------|----------|
| A. _____ | F. _____ |
| B. _____ | G. _____ |
| C. _____ | H. _____ |
| D. _____ | I. _____ |
| E. _____ | J. _____ |

*Specimen time collected* \_\_\_\_\_ *Time placed in formalin* \_\_\_\_\_

**Cytology Non-Gyn Tests**

- |                               |                                       |                              |                                |
|-------------------------------|---------------------------------------|------------------------------|--------------------------------|
| <b>FNA</b>                    | <b>Respiratory</b>                    | <b>Other</b>                 |                                |
| ___ Breast (L/R)(solid/cyst)  | ___ Sputum*                           | ___ Bile Duct Brushing       | ___ Pleural Fluid (L/R)        |
| ___ Liver                     | ___ Bronchial Brush                   | ___ Bladder Wash             | ___ Peritoneal Wash            |
| ___ Lung                      | ___ Bronchial Wash*                   | ___ Breast Nipple Disc (L/R) | ___ Peritoneal Fluid (Ascites) |
| ___ Thyroid (L/R)(solid/cyst) | ___ BAL*                              | ___ CSF                      | ___ Urine (void/cath)          |
| ___ Other FNA                 | ___ *add special stains for infection | ___ Ovarian Cyst Fluid       | ___ Other _____                |

**FLOW CYTOMETRY** Please call 801-507-2276 to be connected with the Flow Cytometry department

Source \_\_\_\_\_

- \_\_\_ Leukemia/Lymphoma immunophenotyping (FLOWLL)  
 \_\_\_ CD4/CD8 Ratio (FLOWBL)  
 \_\_\_ Hold for Flow Cytometry at Pathologist discretion (FLOWSP)



SHADED AREAS MUST BE COMPLETED

Physician Signature \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

## Test Ordering Notes – CBC & UA

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### CBC Ordering Options

In order to reduce incorrect orders and confusion, Intermountain Laboratory Services has created standard definitions for a complete blood count and its variations. Hand written orders for CBC testing processed at Intermountain clinic and hospital laboratories will be interpreted using the following definitions:

1. **CBC** – hemogram without WBC differential
2. **CBC with diff** – hemogram with automated WBC differential
3. **CBC with manual diff** – hemogram with manual WBC differential
4. **Hemogram** – consists of RBC, WBC, platelets, Hgb, Hct, and RBC indices

### Manual WBC Differentials

100 cells are enumerated in the manual differential as compared to thousands of the cells in the automated differential. A manual differential is performed only if:

1. The clinician specifically orders a manual differential,
2. Flagged by instrument or otherwise indicated and the manual differential is determined to be more accurate.

### Urinalysis Ordering

Numerous studies have shown that when the urine is clear with a normal color and the four dipstick results listed below are all negative, the likelihood of a significant microscopic finding is very low. A microscopic analysis is more expensive than a urine dipstick only. If a urine culture is wanted, it must be specifically ordered. Hand written urinalysis orders will be interpreted as follows:

1. **UA** – Only urine dipstick performed.
2. **UA with microscopic** – Urine dipstick and microscopic analysis performed.
3. **UA with microscopic if indicated** – Urine dipstick is performed and the microscopic analysis is performed only if any of the following occur:
  - Abnormal appearance of urine specimen,
  - Positive leukocyte esterase, nitrite, protein or blood on urine dipstick.

### Add-On Tests

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The laboratory can arrange to do additional testing on previously collected specimens if sufficient specimen volume remains and the specimen meets time limit criteria for the requested testing. Accurate testing requires that some tests be completed within specified time limits after collection. Orders for add-on tests may be placed by phone; written confirmation will be required, usually by fax. Written requests for add-ons must clearly state that the requested test is an add-on to a previously collected specimen. The specimen collection date and time must be provided.

### Test Cancellations

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Once testing is initiated, requests for testing cancellation cannot be honored. Testing referred to a reference lab typically cannot be canceled. To cancel a test, contact the laboratory as soon as possible and if testing has not been initiated, the test order will be canceled.

## Phone Orders

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Intermountain Laboratory Services requires written confirmation of verbal orders. The clinician will be asked to sign an Outpatient Verbal Order Confirmation Form.

## Standing Orders

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**A written standing order must be specific to the patient and contain the following information:**

- ◆ Patient's full legal name
- ◆ Date of birth
- ◆ Clinician's full name and secondary identifier (i.e., address, phone number or clinician ID)
- ◆ Diagnosis (**standing orders without diagnoses cannot be used**)
- ◆ Test(s) ordered
- ◆ Test frequency (i.e., daily, weekly, and monthly). **“PRN” and “as needed” are not acceptable test frequencies.**
- ◆ Date of original order
- ◆ Order end date as applicable
- ◆ Signature of licensed provider with date and time (no stamped signatures). Orders may not be signed by nursing staff on behalf of the provider.

### **CHANGE OR RENEWAL OF STANDING ORDERS:**

- ◆ Standing orders for **non-Medicare and Medicare patients** will be valid for no longer than 1 year, after which they must be renewed or discontinued.  
A standing order renewal form or a new standing order must be completed by an individual authorized to order tests.

## Report Contents

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**Laboratory reports include the following information:**

- ◆ Patient's full legal name, age, sex and phone number
- ◆ Specimen collection date and time
- ◆ Test names
- ◆ Test results
- ◆ Units. For explanations of abbreviations refer to “Key to Units Reported”.
- ◆ Reference ranges. Reference ranges generally reflect the range of results expected in approximately 95% of the healthy population. As such, they often do not unequivocally differentiate normal from abnormal, but provide guidelines for the interpretation of results. Where applicable, reference ranges are age and sex specific.
- ◆ Flags. The letters “H” and “L” are used to flag numeric results above or below the limits of the reference range. Non-numeric results outside the reference range are flagged with the “\*” character. **Not all abnormal results will be flagged.** Every result should be evaluated based on the reference ranges given and the clinical condition of the patient.
- ◆ Comments: Comments are added by the technical staff, as appropriate, and are included in reports.
- ◆ Performing location

## Corrected Results

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When a test result is corrected, a new report is generated and the ordering clinician is notified of the corrected result. The report notes the new result, the original result and the time corrected.

## Key to Units Reported

The following table is a list of unit names and definitions used when reporting results.

| Units   | Interpretation                              | Units           | Interpretation                    |
|---------|---|-----------------|-----------------------------------|
| AU/mL   | arbitrary units per milliliter              | mg/L            | milligrams per liter              |
| CPU     | centipost unit                              | mL              | milliliter                        |
| d       | day   | mL/min          | milliliters per minute            |
| dL      | deciliter                                   | mm              | millimeter                        |
| EIA     | enzyme immunoassay unit                     | mm <sup>3</sup> | cubic millimeter                  |
| EU/d    | Ehrlich units per day (equivalent to mg/dL) | mmol            | millimole                         |
| EIU     | enzyme immunoassay unit                     | mmol/d          | millimoles per day                |
| g       | gram  | mmol/L          | millimoles per liter              |
| g/d     | grams per day                               | h               | hour                              |
| g/5 h   | grams per 5 hours                           | mOsm            | milliosmole                       |
| g/dL    | grams per deciliter                         | mOsm/kg         | milliosmoles per kilogram         |
| ISU     | immune status ratio                         | mU              | milliunit                         |
| IU      | international unit                          | mU/g            | milliunits per gram               |
| IU/g    | international units per gram                | mU/L            | milliunits per liter              |
| IU/mL   | international units per milliliter          | mU/mL           | milliunits per milliliter         |
| IU/L    | international units per liter               | min             | minute                            |
| Kg      | kilogram                                    | mol             | mole                              |
| L       | liter                                       | ng              | nanogram                          |
| LIV     | Lyme index value                            | ng/dL           | nanogram per deciliter            |
| µg      | microgram                                   | ng/L            | nanograms per liter               |
| µgE/mL  | microgram equivalents per milliliter        | ng/mL           | nanograms per milliliter          |
| µg/d    | micrograms per day                          | ng/mL/h         | nanograms per milliliter per hour |
| µg/dL   | micrograms per deciliter                    | nmol            | nanomole                          |
| µg/g    | micrograms per gram                         | nmol/d          | nanomoles per day                 |
| µg/L    | micrograms per liter                        | nmol/dL         | nanomoles per deciliter           |
| µg/mg   | micrograms per milligram                    | nmol/g          | nanomoles per gram                |
| µg/mL   | micrograms per milliliter                   | nmol/L          | nanomoles per liter               |
| µL      | microliter                                  | nmol/mL         | nanomoles per milliliter          |
| µmol    | micromole                                   | O.D.            | optical density                   |
| µmol/d  | micromoles per day                          | ppm             | parts per million                 |
| µmol/dL | micromoles per deciliter                    | %               | percent                           |
| µmol/g  | micromoles per gram                         | pg              | picogram                          |
| µmol/L  | micromoles per liter                        | pg/mL           | picograms per milliliter          |
| µmol/mL | micromoles per milliliter                   | pmol            | picomole                          |
| µU      | microunit                                   | pmol/g          | picomoles per gram                |
| µU/mL   | microunits per milliliter                   | S               | second                            |
| mIU     | milli international units                   | SD              | standard deviation                |
| mIU/hr  | milli international units per hour          | TV              | total volume                      |
| mPol    | milli polarization unit                     | U               | unit                              |
| mg      | milligram                                   | U/d             | units per day                     |
| mg/d    | milligrams per day                          | U/g             | units per gram                    |
| mg/dL   | milligrams per deciliter                    | U/h             | units per hour                    |
| mg/g    | milligrams per gram                         | U/L             | units per liter                   |
|         |   | U/mL            | units per milliliter              |

## Critical Values

The Intermountain Medical Leadership Council has endorsed a set of laboratory results that require immediate notification, referred to as critical values (CV). Critical values are called to the clinician responsible for the patient. Please refer to Intermountain Laboratory Services LabNet **CP0008-A1 (10/15)** or contact Client Services (**801-507-2110** or **877-353-1106**) for the most current critical values list.

\*Newborn defined as <30 days; \*\*Consecutive critical value exception applies;

\*\*\*Only applies when not reported in conjunction with a hematocrit





| BLOOD GASES (clinical lab CV's)   |   | MICROBIOLOGY  |                       |
|---|---|---|-----------------------|
| Carboxyhemoglobin   | ≥7%                                     | <b>Positive</b> cultures, smears, or molecular assays of normally sterile body fluids or sites. |                       |
| Bicarbonate (CO <sub>2</sub> )  | ≤10 or ≥40 mmol/L                       | NOTE: The only urine specimens considered critical will be from patients 90 days old or less.   |                       |
| Methemoglobin   | ≥5%                                     | CHEMISTRY   |                       |
| PCO <sub>2</sub> , newborns*  | <30 mm Hg                               | Acetaminophen   | ≥140 µg/mL            |
| PCO <sub>2</sub> , arterial or capillary  | ≥65 mm Hg                               | Alcohol/Ethanol   | ≥300 mg/dL            |
| PCO <sub>2</sub> , venous/mixed venous  | ≥71 mm Hg                               | Bicarbonate** (CO <sub>2</sub> )  | ≤10 or ≥40 mmol/L     |
| pH, arterial/capillary, newborns*   | <7.20 or >7.50                          | Bilirubin, total or indirect, newborns*   |                       |
| pH, arterial or capillary   | <7.20 or >7.60                          | 0 days old  | ≥10 mg/dL             |
| pH, venous/mixed venous   | <7.16 or >7.60                          | 1 day old   | ≥13.5 mg/dL           |
| PO <sub>2</sub> , arterial  | ≤45 mm Hg                               | 2 days old  | ≥16.0 mg/dL           |
| Oxygen sat, arterial  | ≤75%                                    | 3-4 days old  | ≥17.5 mg/dL           |
|   |   | 5 days to 1 month old   | ≥18 mg/dL             |
| HEMATOLOGY**  |   | Calcium, total  | ≤6 or ≥12 mg/dL       |
| Hematocrit  | ≤20 or ≥65%                             | Calcium, ionized  | ≤0.83 or ≥1.59 mmol/L |
| Hematocrit, ≤7 days old   | ≤35 or ≥65%                             | Carbamazepine   | ≥15 µg/mL             |
| Hemoglobin***   | ≤7.0 or ≥22.0 g/dL                      | Cyclosporine  | ≥700 ng/mL            |
| Platelets   | ≤20 or ≥1,000 x 10 <sup>3</sup> /µL     | Digoxin   | ≥2.5 ng/mL            |
| WBC   | ≤1.5 or ≥60.0 x 10 <sup>3</sup> /µL     | Gentamicin, trough  | ≥2.1 µg/mL            |
| Neutrophil Absolute Count, Newborns*  | ≤1.0 x 10 <sup>3</sup> /µL              | Glucose, newborns*  | <30 or ≥200 mg/dL     |
| Absolute Neutrophil, Count  | ≤0.5 x 10 <sup>3</sup> /µL              | Glucose   | ≤40 or ≥600 mg/dL     |
| <b>Peripheral Blood Smear:</b> blasts, sickle cells, bacteria or yeast, parasites, ≥2+ schistocytes |   | Lithium   | ≥1.5 mmol/L           |
| COAGULATION   |   | Magnesium   |                       |
| INR   | ≥5.0                                    | <18 yrs old   | ≤1.2 or ≥4.0 mg/dL    |
| PTT   | ≥130 sec                                | ≥18 yrs old   | ≤1.2 or ≥6.0 mg/dL    |
| Factor VIII   | ≤5%                                     | Phenobarbital   | ≥60 µg/mL             |
| Fibrinogen  | ≤100 mg/dL                              | Phenytoin   | ≥30 µg/mL             |
|   |   | Phenytoin, free   | ≥3.0 µg/mL            |
| URINALYSIS  |   | Phosphorus  | ≤1.0 mg/dL            |
| Glucose / Ketones , Urine - Both results concurrently:  | Glucose ≥500 mg/2+<br>Ketones ≥40 mg/2+ | Potassium, newborns*  | ≤2.9 or ≥6.5 mmol/L   |
| Sediment  | RBC or WBC casts                        | Potassium   | ≤2.9 or ≥6.0 mmol/L   |
| BODY FLUIDS   |   | Salicylate  | ≥40 mg/dL             |
| CSF WBC   | ≥10/µL                                  | Sodium  | ≤120 or ≥155 mmol/L   |
| <b>Smear:</b> blasts, malignant cells, bacteria or yeast, parasites                                 |   | Theophylline  | ≥20 µg/mL             |
| TRANSFUSION   |   | Valproic acid   | ≥150 µg/mL            |
| Hemolytic transfusion reaction  | Refer to TM0026 procedure H and I       | Vancomycin, peak  | ≥100 µg/mL            |
| For clinical notifications to pathologist/clinician refer to CP0011-A5                              |   | Vancomycin, trough or random  | ≥25.1 µg/mL           |






# Microbiology Specimens Collection

Microbiology specimens must be collected in the clinical setting (not in the laboratory). An improperly collected or transported specimen can result in inaccurate results, which could lead to improper treatment. Contact your providing laboratory with questions regarding specimen collection.

## Basic guidelines for Microbiology specimens:

- ◆ An aspirate is the specimen of choice for wounds. If aspiration is not possible, a swab should be used. Where appropriate, cleanse the area surrounding an infected site to avoid contaminating a specimen with normal flora.
- ◆ Recovery of pathogens is enhanced if specimens are collected before the administration of antibiotics, except when PCR or DNA based testing methods are used. If antibiotics are administered, please note type, name, and dose on the requisition.
- ◆ If submitting a swab specimen, Gram stains will only be performed when 2 swabs are submitted.

| Collection Device - Preferred*  | Test Name                         |
|---|-----------------------------------|
|  <p>RED CULTURE SWAB</p>   | Routine Aerobic Bacterial Culture |
|   | Fungal Culture                    |
|   | Rapid Strep Screen                |
|  <p>BLUE CULTURE SWAB</p>   | Routine Aerobic Bacterial Culture |
|   | Anaerobic Culture                 |
|   | Fungal Culture                    |
|  <p>GREEN CULTURE SWAB - mini-tip swab</p>   | Routine Aerobic Culture           |
|   | Fungal Culture                    |
|  <p>URINE CULTURE COLLECTION</p>   | Urine Culture                     |
|   | Chlamydia                         |
|   | Cytomegalovirus                   |
|   | Legionella urine antigen          |
|   | Strep pneumo urine antigen        |
| <p>*Please see Laboratory Test Directory for other test options and acceptable specimen types not listed here, or call Client Services, 801-507-2110 or toll free 877-353-1106.</p> |                                   |

| Collection Device - Preferred*   | Test Name  |
|--|--|
|  <p>STERILE CUP</p>                   | <p>Routine Aerobic Bacterial Culture</p> <p>Fungal Culture</p> <p>Acid-fast bacillus culture</p> |
|  <p>UNIVERSAL TRANSPORT MEDIA UTM</p> | <p>Viral Culture and PCR tests - see molecular test chart for more info</p>                      |
|  <p>ENTERIC TRANSPORT MEDIA</p>      | <p>Stool Culture</p> <p>Enterohemorrhagic E. coli</p>  |
|  <p>TOTAL-FIX</p>                   | <p>Giardia antigen</p> <p>Ova and Parasite</p> <p>Cryptosporidium</p>                            |
|  <p>CLEAN STOOL VIAL</p>            | <p>Clostridium difficile</p> <p>Fecal lactoferrin (WBCs)</p> <p>Occult Blood</p>                 |

\*Please see Laboratory Test Directory for other test options and acceptable specimen types not listed here, or call Client Services, 801-507-2110 or toll free 877-353-1106.

## Microbiology Collection Media and Specimen Transport (MI1100-A1)

| Specimen Type<br>(source or test)                               | Preferred Collection Media<br>& Storage   | Storage<br>after Collection  | Comments   |
|---|---|--|--|
| <b>ANAEROBIC, AEROBIC &amp; ROUTINE CULTURES</b>                | <b>Blue Top</b><br>(BBL Culture Swab)<br>Gel Transport Swab<br><br>Room temperature               | <i>Room temperature</i>  | Maintains organism for 24-48 hrs.<br>Good for most bacteria.<br>Anaerobic cultures must also have an aerobic culture ordered<br><b>** Not for rapid antigen screens such as Rapid Strep</b>  |
| <b>BODY FLUIDS, WOUND ASPIRATES</b>                             | Syringe specimen<br><br>Sterile Container without preservative                                    | <i>Room temperature</i>  | Transport to lab ASAP<br>Transport only after the <u>needle has been removed</u> .<br>Transport with original cap (contact laboratory to order extra caps)   |
| <b>NASOPHARYNGEAL CULTURES</b>                                  | <b>Green Top</b><br>(BBL Culture Swab)<br>Room temperature  | <i>Room temperature</i>  | For <i>Bordetella pertussis</i> , preferred method is PCR  |
| <b>RAPID VIRAL ANTIGENS - RSV (Respiratory Syncytial Virus)</b> | Nasal washing<br><br>UTM flocked nasopharyngeal swab kit (UTM:Universal Transport Media)          | <i>Refrigerate</i>   |  |
| <b>THROAT SWABS - RAPID STREP GROUP A</b>                       | <b>Red Top</b><br>(BBL Culture Swab)<br>Room temperature  | <i>Room temperature</i>  |  |
| <b>PCR – N. gonorrhea, chlamydia, herpes, or other viruses</b>  | <b>M4 or UTM</b> Viral Transport (Red lid with pink fluid)<br><br>Room temperature or refrigerate | <i>Room temperature</i>  | DO NOT use for Mycoplasma / Ureaplasma cultures.   |
| <b>VIRAL CULTURES</b>   | <b>M4 or UTM</b> Viral Transport<br><br>Refrigerate.  | <i>Refrigerate</i>   | Do not place CSF, body fluids or urine in <b>M4/UTM</b> . Use sterile container.   |
| <b>MYCOPLASMA/ UREAPLASMA CULTURES</b>                          | <b>M4</b> Viral Transport (Blue lid with pink fluid)<br><br>Refrigerate.                          | <i>Refrigeration is optional for PCR specimens.</i>  |  |
| <b>STERILE SPECIMEN Sputum &amp; Tissue</b>                     | Sterile containers<br><br>Anaerobic transport media<br><br>Room temperature                       | <i>At lab with in 4 hrs if possible- Room temperature If received within 4 hrs. Refrigerate if over 4 hours.</i> | Sputum and tissue specimens must be delivered to lab ASAP.   |
| <b>PRENATAL STREP SCREEN</b>                                    | Culture swab <b>in transport media</b><br><br>Room temperature                                    | <i>Room Temperature</i>  | NOTE if patient has penicillin allergy   |
| <b>STOOL CULTURES</b><br>Not performed on formed stool.         | <b>ETM</b> (transport media)<br><br>Clean screw-capped container for unpreserved specimens        | <i>Transport media, room temperature</i><br><br><i>Unpreserved over 2 hours, place in transport media</i>        | Good for 24 – 48 hrs.<br>Specimen must not be contaminated with urine or toilet water or be from a diaper.<br>Submit fresh (unpreserved) specimens to lab preferably within 2 hours of collection.<br><b>Stool culture</b> for enteric pathogens includes campylobacter, shigella, and salmonella testing unless otherwise indicated. <b>Enterohemorrhagic E. coli (EHEC)</b> testing should be performed on bloody stools and must be ordered by clinician. |
| <b>OVA &amp; PARASITE GIARDIA ANTIGEN TESTING</b>               | Protifix-CLR<br><br>Clean container   | <i>Room temperature</i><br><br><i>Refrigerate</i>  | If no history of travel, immune status or risk factors indicated, Giardia Antigen will be performed.   |





| <b>Specimen Type<br/>(source or test)</b>   | <b>Preferred Collection Media<br/>&amp; Storage</b>  | <b>Storage<br/>after Collection</b>   | <b>Comments</b>  |
|---|--|---|--|
| <b>FECAL WBC, C DIFFICILE or<br/>ROTAVIRUS</b><br><br><b>Not performed on formed<br/>stool.</b> | Clean screw-capped container   | <i>Refrigerate up to 72<br/>hrs</i>   | Submit fresh (unpreserved, room<br>temperature) specimens to lab<br>preferably within 2 hours of collection.   |
| <b>URINE CULTURE</b>  | <b>Gray Top</b><br>(BD Urine Vacutainer/ Urine<br>Preservative Formula)<br><br>Sterile screw -capped container | <i>Room temperature, 2<br/>days</i><br><br><i>Refrigerate up to 72<br/>hrs.</i> | <u>Gray Top - NOT suitable for urinalysis.</u><br><br>Must be filled to the fill line.<br><br>Sterile screw -capped container may be<br>used for routine urinalysis. |
| <b>GENITAL WET PREPS</b>  | Minimal sterile saline   | <i>Room temperature<br/>&lt;4 hrs</i>   | For trichomonas or yeast, transport to<br>lab ASAP.  |
| <b>FUNGAL CULTURES</b>  | Sterile container (fluid or tissue<br>preferred over swab)<br>Swab   | <i>Refrigerate</i><br><br><i>Room temperature</i>                               | Blood and CSF specimens have special<br>requirements, call laboratory for<br>information.  |
| <b>ACID FAST BACILLUS (AFB)<br/>CULTURES</b>  | Sterile container (fluid or tissue<br>preferred specimen)<br><br>Culture swab in transport media               | <i>Refrigerate</i><br><br><i>Room temperature</i>                               | Blood and CSF specimens have special<br>requirements, call laboratory for<br>information.  |

**If you have any questions about specimen collection, storage requirements or  
transport, please call providing laboratory.**

## Molecular Test Specimen Collection

| Source - Preferred*     | Test Name                                  | Order Code | Performing Laboratory |
|-------------------------|--|------------|-----------------------|
| Upper Respiratory Tract | <i>Bordetella pertussis</i>                | BOPPCR     | Central               |
| Nasopharyngeal Swab     | Respiratory FilmArray Panel                | RFAPCR     | Central, Dixie, PCMC  |
|                         | FLU A&B                                    | FLUPCR     | Central               |
| Genital Swab            | Chlamydia & Gonorrhea                      | GCLPCR     | Central               |
|                         | Chlamydia only                             | CLMPCR     | Central               |
|                         | Gonorrhea only                             | GCPCR      | Central               |
| Lesion                  | Herpes Simplex I & II                      | HSVPCR     | Central               |
|                         | Varicella                                  | VARPCR     | Central               |
| Nasal Swab              | <i>Staphylococcus aureus</i> (MRSA) screen | MRSPCR     | Central               |

\*Please see LabNet Test Directory for other test options and acceptable specimen types and sources not listed here, or call (801) 507-2110 or toll free (877) 353-1106.

| Collection Device - Preferred*   |   |
|--|---|
| UNIVERSAL TRANSPORT MEDIA (UTM)  | <p><b>Test name</b></p> <p><i>Bordetella pertussis</i></p> <p>Respiratory FilmArray Panel</p> <p>FLU A&amp;B</p> <p>Chlamydia &amp; Gonorrhea</p> <p>Chlamydia only</p> <p>Gonorrhea only</p> <p>Herpes Simplex I &amp; II</p> <p>Varicella</p> |
| NASAL SWAB                      | <p><i>Staphylococcus aureus</i> (MRSA) screen</p>   |

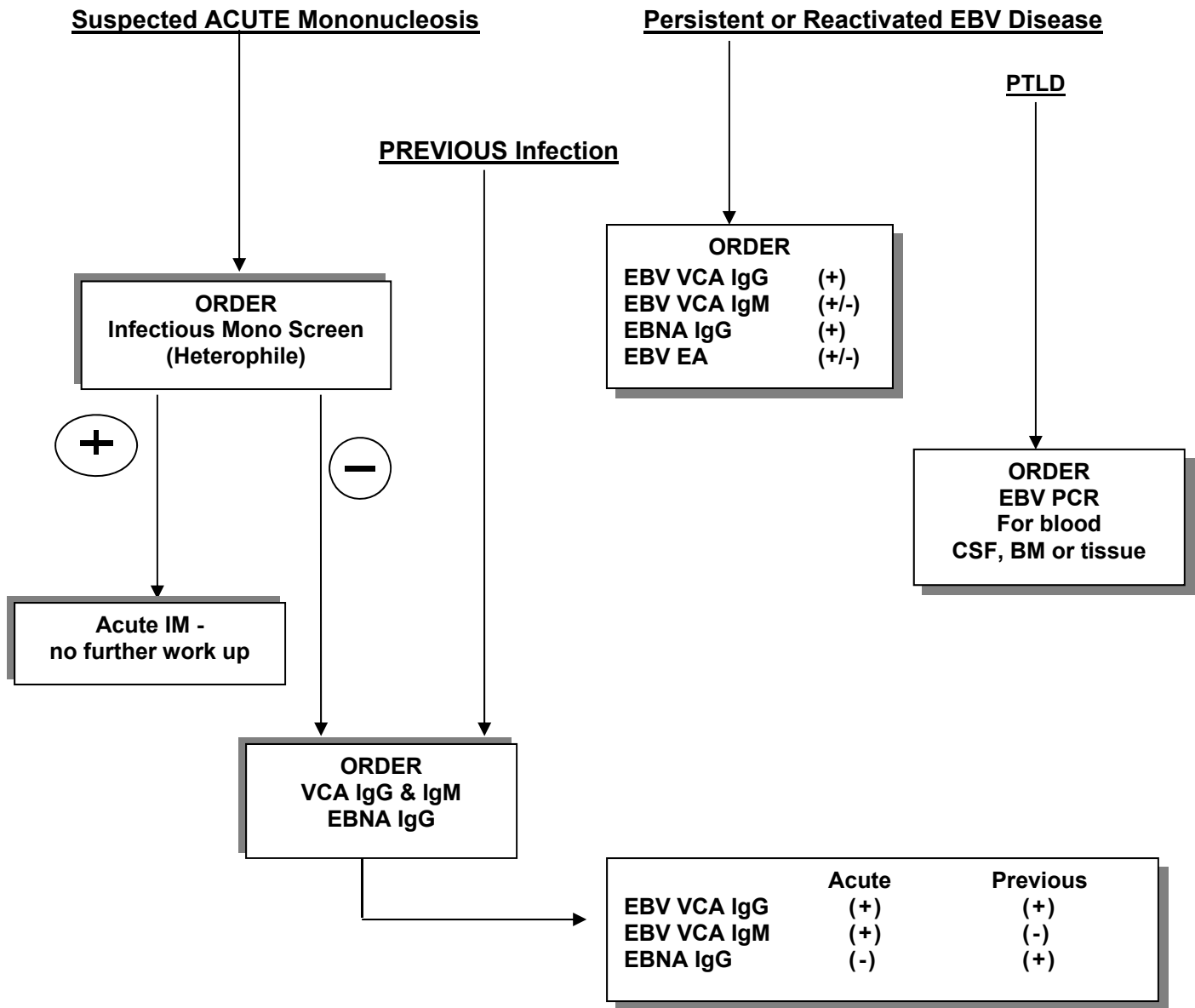
## Molecular Diagnostics Testing

For many infectious diseases, molecular diagnostic testing provides faster turnaround and improved sensitivity compared to conventional test methods such as culture.

We currently offer rapid testing for respiratory infectious diseases, screening for antibiotic resistant bacteria, therapeutic viral load monitoring, and screening for common genetic mutations.

Please contact performing laboratory molecular department for assistance finding the right test, (Laboratory Client Services, **801-507-2110** or **877-353-1106**, can help facilitate this) or refer to the online laboratory test directory for a complete listing of available tests and specimen requirements.

# Suggested Ordering Guidelines for Epstein-Barr Virus (EBV) and EBV-Related Conditions



For more DETAILS see Mononucleosis/EBV Assay Chart

## LEGEND

Acute = ≤ 4 wks since infection

EA = Early Antigen

VCA = Viral Capsid Antigen

PTLD = Post Transplant Lymphoproliferative Disease

+/- = Means Pos or Neg – Not “Weak”

EBV = Epstein-Barr virus

NA = Nuclear Antigen

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## Mononucleosis/ EBV Assays

Intermountain Laboratory Service does not offer an EBV panel. Select individual assays from the list below: Tests must be requested specifically. If not specified EBVCAG and EBVCAM will be ordered:

| Test/Codes                           | Order Codes   | Usefulness   |
|--------------------------------------|---|--|
| Infectious Mono Screen (Heterophile) | <b>EBVHM</b> (Central Lab)<br><b>MONRAP</b> (Hospital labs)   | Rapid test for acute mononucleosis (heterophile-antibody). Positive in 85% of adults with acute IM symptoms. Much less sensitive in children $\leq 4$ yrs  |
| EBV VCA IgG                          | <b>EBVCAG</b>   | Conventional serology to detect IgG antibody to Capsid antigen. Rises rapidly at times of acute symptoms and typically remains for life.   |
| EBV VCA IgM                          | <b>EBVCAM</b>   | Conventional serology to detect recent EBV infection. Appears only during acute infection and fades rapidly over about 4 weeks.  |
| IgG antibody to EBV Nuclear Antigen  | <b>EBVNAG</b>   | Negative in acute phase of IM. Usually appears 3 months after initial infection and typically remains for life.<br>May be useful in pediatric patients where VCA antibodies may remain negative.   |
| IgG antibody to EBV Early Antigen    | <b>EBVEAG</b>   | Antibody develops in approximately 80% of individuals with EBV infection and last for about 6 months. Has not been found to be helpful in the diagnosis of acute EBV infection but may be helpful in the evaluation of EBV-related conditions. |
| EBV PCR                              | <b>EBVPCR</b> (CSF, BM, Tissue)<br><b>EBVPCB</b> (Blood only) | EBV DNA in serum has been reported to be indicative of EBV associated disease. The presence of EBV DNA recovered from whole blood may be due to latently infected lymphocytes, from past infections.   |
| EBV Viral Load                       | <b>EBVPQN</b>   | EBV DNA levels are used for diagnosing and monitoring lymphoproliferative diseases in immunocompromised patients (i.e., PTLD).   |

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## Anatomic Pathology Locations

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The following information for Pathology tissue specimens does not apply to pediatric specimens. Please call the Primary Children's Pathology Office for proper handling and submission of pediatric specimens, M-F, 8am-5pm, 801-662-2150.

### CONTACT INFORMATION

|                               |  |
|-------------------------------|--|
| Central Region Pathology      | 801-507-7970                           |
| Logan Regional Hospital       | 435-716-5203                           |
| Cedar City Hospital           | 435-868-5090                           |
| Dixie Regional Medical Center | 435-251-2208                           |
| Utah Valley Hospital          | 801-357-2364                           |
| McKay-Dee Hospital            | 801-387-7338, after hours 801-387-7366 |

## Pathology Specimen Collection

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### ROUTINE

Tissue specimens for pathology are generally submitted in 10% neutral buffered formalin. Never allow the specimen to air dry; place in fixative as soon as possible. Certain studies such as cultures, flow cytometry, cytogenetics, etc., may require fresh tissue. If there is any doubt about how the specimen should be handled, DO NOT place the specimen in fixative (see #2 below).

- A. Remember to properly label the container, not the lid. Ensure the container lid is affixed properly and tightened. Seal the specimen container inside a specimen bag. Place the paperwork in the outside pocket. Submit only one patient's specimen(s) and requisition per bag.
- B. If there is any doubt about how the specimen should be handled, DO NOT place the specimen in any fixative. Wrap the specimen in a saline moistened gauze pad. Store it in an airtight container in the refrigerator. Contact Pathology for handling instructions.

### FROZEN SECTIONS

- A. Notify the Pathology Office or page the pathologist on service.
- B. Submit specimens, fresh, in a labeled container. Do not place specimens in fixative.
- C. Deliver specimens and completed requisition directly to lab personnel. Never leave a specimen for frozen section diagnosis on the counter unattended.

### STAT/RUSH SPECIMENS

- ◆ Notify the pathologist on the surgical service. After hours, contact the anatomic pathologist on-call.
- ◆ On the requisition indicate "STAT" or "Rush" and include a beeper number or telephone number to which results can be called.

### SPECIAL SPECIMEN HANDLING PROCEDURES

LABORATORY/PATHOLOGY SHOULD BE CONTACTED WHEN SPECIMENS REQUIRE SPECIAL HANDLING. SPECIMENS THAT MAY REQUIRE SPECIAL PROCESSING INCLUDE:

- Bone marrow biopsies
- Breast biopsies

- Specimens needing cytogenetic testing
- Heart biopsies
- Kidney biopsies
- Nerve/muscle biopsies
- Testicular <sup>biopsy</sup> for assessment of spermatogenesis
- Tissue for electron microscopy (EM)
- Flow cytometry specimens
- Lymph node or other tissue biopsies for evaluation for lymphoma
- Tissues for culture
- Tissues for gout
- Tissues for copper or iron analysis

## Electron Microscopy, Immunofluorescence, Immunoperoxidase, FISH or ISH

SPECIMENS TO BE TESTED BY **ELECTRON MICROSCOPY, IMMUNOFLUORESCENCE, IMMUNOPEROXIDASE AND ISH** REQUIRE SPECIAL HANDLING. PLEASE CONTACT YOUR PROVIDING LABORATORY.

- ◆ See specimen labeling, requisition requirements and **STAT/RUSH** sections above.
- ◆ For questions call Central Laboratory EM, M-F, 8am-4pm, 801-507-2171
- ◆ Weekends and after hours call the on-call anatomic pathologist or the Central Laboratory EM Technician on-call pager, 801-249-4230
- ◆ Utah Valley, M-F, 8am-4pm, 801-357-2364

## Flow Cytometry Testing

### Leukemia/Lymphoma/Phenotyping

**Test Code: FLOWLL** - This test is for immunophenotypic evaluation of suspected leukemias and lymphomas including CLL. This test is for new diagnoses and for follow up evaluations for minimal residual disease. The panel markers evaluated will be determined by reported clinical indication and at pathologist discretion.

| Specimen Type                                    | Acceptable Specimen                                    | Transport Temperature   | Paper Work (required)   |
|--|--|---|---|
| Bone Marrow Bx<br>Peripheral Blood<br>Body Fluid | Sodium Heparin (48 hrs) *<br>or EDTA (24 hrs)          | Ambient   | PB & BM Bx Requisition<br>***   |
| Lymph Node<br>Other Hematopoietic Tissue         | RPMI *<br>Saline                                       | Ambient<br>**   | Histology Requisition<br>***  |
| <b>NOTE:</b>                                     | * Preferred: Anticoagulant or<br>tissue culture medium | ** Frozen or fixed tissues<br>(e.g. formalin) are not<br>acceptable | *** Clinical History, Differential<br>Diagnosis, Account Number<br>are required |

### Other Flow Cytometry Testing

**Test code: CD3CD4** - CD3 with CD4 testing is to evaluate HIV infected individuals, to monitor immune system function, for initiating prophylaxis for opportunistic infections, and to monitor PML in MS patients (T cells).

| Specimen Type                   | Acceptable Specimen                        | Transport Temperature | Paper Work (required)                |
|---------------------------------|--|-----------------------|--------------------------------------|
| Peripheral Blood<br>Body Fluids | Sodium Heparin (48 hrs) *<br>EDTA (24 hrs) | Ambient               | Concurrent WBC % Lymph %<br>required |

**Test code: CD4CD8** - CD4 with CD8 testing is similar to CD3/CD4 testing but also includes a CD4:CD8 ratio (T cells).

| Specimen Type                   | Acceptable Specimen                        | Transport Temperature | Paper Work (required)                |
|---------------------------------|--|-----------------------|--------------------------------------|
| Peripheral Blood<br>Body Fluids | Sodium Heparin (48 hrs) *<br>EDTA (24 hrs) | Ambient               | Concurrent WBC % Lymph %<br>required |

**Test code: FLOWBL** - CD4 with CD8 testing is similar to CD3 /CD4 testing but also includes a CD4:CD8 ratio (T cells) on BAL fluid to help characterize sarcoidosis.

| Specimen Type | Acceptable Specimen | Transport Temperature | Paper Work (required) |
|---------------|---------------------|-----------------------|-----------------------|
| BAL           | BAL fluid           | Refrigerated          | None required         |

**Test code: IMMDEF** - Immunodeficiency testing is recommended for evaluating immunodeficiency in adults. It characterizes the different subsets of lymphocytes (T cells, B cells, and NK cells).

| Specimen Type                   | Acceptable Specimen                        | Transport Temperature | Paper Work (required)                |
|---------------------------------|--|-----------------------|--------------------------------------|
| Peripheral Blood<br>Body Fluids | Sodium Heparin (48 hrs) *<br>EDTA (24 hrs) | Ambient               | Concurrent WBC % Lymph %<br>required |

**Test code: TLYM** - T cell lymphocyte testing is ordered for acute organ rejection episodes for patients being treated with OKT3 or ATGAM.

| Specimen Type                   | Acceptable Specimen                        | Transport Temperature | Paper Work (required)                |
|---------------------------------|--|-----------------------|--------------------------------------|
| Peripheral Blood<br>Body Fluids | Sodium Heparin (48 hrs) *<br>EDTA (24 hrs) | Ambient               | Concurrent WBC % Lymph %<br>required |

**Test code: STEM** - Stem cell testing monitors CD34 positive stem cells from peripheral blood for stem cell transplants.

| Specimen Type     | Acceptable Specimen | Transport Temperature | Paper Work (required)                |
|-------------------|---------------------|-----------------------|--------------------------------------|
| Peripheral Blood  | EDTA (within 4 hrs) | Ambient               | Concurrent WBC % Lymph %<br>required |
| Apheresis Product |                     | Ambient               | Concurrent WBC % Lymph %<br>required |

**Test code: BCELLP** - B cell panel is for monitoring patients on Rituximab (anti-CD20) therapy.

| Specimen Type                   | Acceptable Specimen                        | Transport Temperature | Paper Work (required)                |
|---------------------------------|--|-----------------------|--------------------------------------|
| Peripheral Blood<br>Body Fluids | Sodium Heparin (48 hrs) *<br>EDTA (24 hrs) | Ambient               | Concurrent WBC % Lymph %<br>required |

\*Preferred: Anticoagulant or tissue culture medium

**Test code: B24HLA:** The presence of the HLA-B27 antigen is strongly associated with ankylosing spondylitis and related disorders.

| Specimen Type    | Acceptable Specimen                        | Transport Temperature | Paper Work (required) |
|------------------|--|-----------------------|-----------------------|
| Peripheral Blood | Sodium Heparin (48 hrs) *<br>EDTA (24 hrs) | Ambient               | None Required         |

Please call Flow Cytometry with any questions, **801-507-2276** or **801-507-2217**.

## GYN Cytopathology Specimen Requirements

### PURPOSE:

To ensure proper specimen identification and accurate results when sending **GYN** (cervical/vaginal) specimens to the Intermountain Cytopathology Laboratory, please refer to the list below and supply all required information. This information must be provided before the specimen can be processed. The initial receipt of this information will eliminate time-consuming phone calls or specimen returns, and allow us to provide you and your patients prompt quality service.

**Questions?** Call your providing laboratory refer to Client Services Contacts on page 4 for numbers.

## SPECIMEN REQUIREMENTS:

- Label the specimen as described in the General Section of this manual.
- Note: Do not collect a Pap in an expired vial as testing cannot be performed once a specimen exceeds the expiration date printed on the vial.

## REQUISITION REQUIREMENTS:

- ◆ Pap test order information
  - Select the appropriate risk assessment level for the patient: low-risk, high-risk or diagnostic. If diagnostic please indicate patient's signs, symptoms or history, or provide a current ICD code.
  - NOTE: Both the low-risk and high-risk levels are defined by Medicare to be screening tests. For Medicare patients receiving these screening tests, a signed ABN should be submitted with the requisition.
- ◆ Clinical information
  - Indicate the specimen source: cervical, vaginal or both.
  - Please provide any applicable clinical information including date of last menstrual period (LMP), as well as such information such as: pregnant, postpartum, nursing, menopausal, hysterectomy, hormone therapy, signs and symptoms experienced, etc., as appropriate.
  - Indicate any past abnormal results and treatments, including dates.
  - Ancillary testing: Select needed ancillary tests (listed below).

## ANCILLARY TEST INFO:

- ◆ **High-Risk HPV (HR-HPV)** testing can be ordered on Pap (cervical/vaginal) specimens collected in either ThinPrep® PreservCyt® Solution or BD SurePath® Preservative Fluid. HR-HPV testing ordered in conjunction with the Pap test will be result on the Pap report..
  - Reflexive HR-HPV testing is performed only when the result of the Pap test is ASC-US. Other procedures and testing are clinically indicated if the result of the Pap test is LSIL or higher.
  - Non-reflexive HR-HPV testing is performed regardless of Pap test results. To order, check the box on the requisition if available or write in "HR-HPV Non-Reflexive testing".
  - **NOTE:** HR-HPV testing on cervical/vaginal specimens collected in SurePath Preservative fluid must be performed within 7 days of the collection date. ThinPrep PreservCyt solution can be performed up to 28 days after the date of collection.. Please check with Cytopathology before ordering an add-on HR-HPV to determine if this testing can be performed.
  - **HPV 16 18/45 Genotyping** - This test, if ordered, can only be performed following a positive HR-HPV test. It is designed to detect the 16 and 18/45 HPV strains. This information can be used by the provider to determine appropriate follow-up care for the patient.
  - **HPV 16 18/45 Genotyping** is recommended as a reflexive test for patients who meet the following criteria:
    - a. 30 years old and above,
    - b. must have a current negative Pap test and positive (detected) HR-HPV test,
    - c. testing cannot be performed on a vaginal-only specimen. There must be a cervical component.
  - Reflexive 16 18/45 Genotyping must be ordered *with* a Pap test *and* Non-Reflexive HR-HPV, and can only be performed if the case meets the above three criteria.
  - **HPV 16 18/45 Genotyping** may be added-on to the current case as long as the HR-HPV result was positive (detected) and the specimen is still within the testing window given above. HPV 16 18/45 add-on Genotyping can only be performed on the specimen that tested positive (detected) for HR-HPV.



- **HPV 16 18/45** Genotyping alone cannot be performed on a recollected specimen as this may yield a false negative result, especially if it is collected less than three months after the Pap Test. A result on a recollected specimen may not correlate directly with the HR-HPV and Pap result, and would therefore be invalid.
- **HPV 16 18/45** Genotyping cannot be performed as a stand-alone test and cannot be performed non-reflexively regardless of the HR-HPV results.
- ◆ Chlamydia/Gonorrhea testing – Chlamydia/Gonorrhea (GCLPCR) testing can be ordered on Pap (cervical/vaginal) specimens collected in either ThinPrep® PreservCyt® solution or BD SurePath® Preservative Fluid. These tests can be ordered individually or together. To order, check the appropriate box(es) on the requisition, if available, or write in desired tests (“CTPCR” or “GCPCR”) under “Other Tests”.
  - **NOTE:** The specimen for Chlamydia/Gonorrhea testing is removed from the vial prior to processing the Pap test. This may have an effect on marginal Pap specimen collections.
  - **NOTE:** Because of the workflow process, Chlamydia/Gonorrhea test requests must be included on the cytopathology requisition at the time they are sent to the laboratory. Unfortunately, add-on orders for Chlamydia/Gonorrhea cannot be performed, as cross-contamination may occur during preparation of the Pap specimen. This could produce a false positive test result.
  - **NOTE:** CDC recommendations for Chlamydia testing are: (1) All pregnant women should be routinely tested for *Chlamydia trachomatis* at the first prenatal visit. Women aged <25 years and those at increased risk for chlamydia (i.e., women who have a new or more than one sex partner) also should be retested during the third trimester to prevent maternal postnatal complications and chlamydial infection in the infant. Screening during the first trimester might prevent the adverse effects of chlamydia during pregnancy, but supportive evidence for this is lacking. If screening is performed only during the first trimester, a longer period exists for acquiring infection before delivery. (2) Annual screening of all sexually active women aged ≤25 years is recommended, as is screening of older women with risk factors (e.g., those who have a new sex partner or multiple sex partners).

## **PAP TEST (Cervical/Vaginal Screening)**

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### **PURPOSE:**

The purpose of the Pap test is to detect malignant cells of cervical/vaginal cancers as well as cells which represent a precursor of malignancy (SIL) through microscopic evaluation of representative cells. Certain infectious and inflammatory conditions may also be detected in this process.

The liquid-based Pap test has become the industry standard for Pap test collection and processing. Two liquid-based Pap test methods, ThinPrep and SurePath, are available through Intermountain Laboratory Services. Both methods are FDA approved for Pap testing. Ancillary testing for HPV, Chlamydia and Gonorrhea is also available on these specimens.

### **SUPPLIES:**

Specimen collection supplies, including requisitions and specimen transport bags, can be ordered through providing laboratory refer to Client Services Contacts on page 4 for numbers. For ease of ordering, ThinPrep® Pap Test and BD SurePath™ Pap test supplies are pictured below, as well as a list of supplies needed for each of four collection techniques.



**ThinPrep® Pap Test PreservCyt® Solution vial with Broom-like collection device (25 each per package)**



**ThinPrep® Pap Test PreservCyt® Solution vial with Cytobrush and Spatula collection devices (25 each per package)**



**SurePath® Pap Test preservative fluid vial with Brush-like device (left) and brush and spatula (right) collection devices**

### **Technique 1, ThinPrep® Pap Test using broom-like device**

- One vial of PreservCyt®
- One Papette™ (a broom-like device)
- One cytopathology requisition
- One small specimen transport bag with outer document pocket

### **Technique 2, ThinPrep® Pap Test using spatula and endocervical brush**

- One vial of PreservCyt®
- One plastic spatula (do not use wooden spatula)
- One Cytobrush® (an endocervical brush)
- One cytopathology requisition
- One small specimen transport bag with outer document pocket

### **Technique 3, BD SurePath™ Pap Test using broom-like device**

- One vial of BD SurePath® Preservative Fluid
- One broom-like device (with detachable head)
- One cytopathology requisition
- One small specimen transport bag with outer document pocket

### **Technique 4, BD SurePath™ Pap Test using spatula and endocervical brush**

- One vial of BD SurePath® Preservative Fluid
- One plastic spatula (with detachable head, do not use wooden spatula)
- One endocervical brush (with detachable head)
- One cytopathology requisition
- One small specimen transport bag with outer document pocket

## **PATIENT PREPARATION:**

It is recommended that patients not use vaginal lubricants, vaginal medications, vaginal contraceptives, or douches within 48 hours before specimen collection. The patient should not engage in sexual activity within 24 hours before specimen collection. In menstruating women the optimal time for cell collection is at ovulation. Patients should not be scheduled during their menstrual cycle. Bleeding or a heavy exudate may make a specimen unsatisfactory for evaluation of epithelial cell abnormality.

## **COLLECTION PROCEDURE:**

### **Technique 1, ThinPrep® Pap Test using broom-like device**

1. Obtain specimen prior to bimanual examination using an un-lubricated speculum (saline or water may be used on the speculum).  
**NOTE:** Use of lubricant jellies can interfere with collection of a representative cervical specimen as well as processing and evaluating the specimen, and may lead to an unsatisfactory result. This is especially true of lubricants containing carbomers. If necessary a small amount of carbomer-free lubricant may be used on the speculum, but avoid getting lubricant on the tips of the speculum.
2. Gently remove excess mucus or other discharge from surface of cervix using a folded gauze pad held by ring forceps. Do not use a swab as fibers can obscure cells during microscopic examination.
3. Remove inflammatory exudate from the cervical canal before taking the specimen. Remove by placing a dry 2x2 inch piece of gauze over the cervix and peeling it away after it absorbs the exudates or by using a dry proctoswab or scopette.

**NOTE:** The excess cervical mucus and inflammatory exudate are essentially devoid of meaningful cellular material and when present in the specimen vial may yield a slide with little or no diagnostic material present.

4. The cervix should not be cleaned by washing with saline; doing this may result in a relatively acellular specimen.
5. The specimen should be obtained before the application of acetic acid.
6. Obtain an adequate sampling from the cervix using the broom-like device. Insert the central bristles of the broom into the endocervical canal deep enough to allow the shorter bristles to fully contact the ectocervix. Push gently and rotate the broom in a **clockwise** direction five times.

**NOTE:** The broom is designed to capture cells when rotated clockwise. Rotating the broom counter-clockwise will cause cells to slough off, but does not trap the cells in the broom.

7. Immediately rinse the broom in the PreservCyt® Solution vial by pushing the broom into the bottom of the vial 10 times, forcing the bristles apart. As a final step, swirl the broom vigorously to further release material. Tap the broom on the inside wall of the vial. Discard the broom. **Do not leave the broom head inside the vial.**
8. Tighten the cap so that the torque line on the cap passes the torque line on the vial.
9. Record the patient's name and date of birth or other unique identifier on the vial. (The date of birth is the preferred second identifier.)
10. Record the patient information and pertinent medical history on the cytopathology requisition.
11. Indicate the tests to be performed and the risk assessment level on the requisition.
12. Package the specimen and requisition for transport to the laboratory by placing the requisition in the document pocket on the outside of the specimen bag and the vial into the sealed pouch, making sure the seal is closed tightly.

### **Technique 2, ThinPrep® Pap Test using spatula and endocervical brush**

1. Obtain specimen prior to bimanual examination using an un-lubricated speculum (saline or water may be used on the speculum).

**NOTE:** Use of lubricant jellies can interfere with collection of a representative cervical specimen as well as processing and evaluating the specimen, and may lead to an unsatisfactory result. This is especially true of lubricants containing carbomers. If necessary a small amount of carbomer-free lubricant may be used on the speculum, but avoid getting lubricant on the tips of the speculum.

2. Gently remove excess mucus or other discharge from surface of cervix using a folded gauze pad held by ring forceps. Do not use a swab as fibers can obscure cells during microscopic examination.
3. Remove inflammatory exudate from the cervical canal before taking the specimen. Remove by placing a dry 2x2 inch piece of gauze over the cervix and peeling it away after it absorbs the exudates or by using a dry proctoswab or scopette.

**NOTE:** The excess cervical mucus and inflammatory exudate are essentially devoid of meaningful cellular material and when present in the specimen vial may yield a slide with little or no diagnostic material present.

4. The cervix should not be cleaned by washing with saline; doing this may result in a relatively acellular specimen.
5. The specimen should be obtained before the application of acetic acid.
6. Obtain an adequate sampling from the ectocervix using a plastic spatula by placing the rounded tip of the spatula into the cervix until the curved edge of the spatula rests against the ectocervix. Rotate the spatula 360 degrees.
7. Immediately rinse the spatula in the PreservCyt® Solution vial by swirling the spatula vigorously in the vial 10 times. Discard the spatula. **Do not leave the spatula in the vial.**

8. Obtain an adequate sampling from the endocervix using an endocervical brush device. Insert the brush into the cervix until only the bottom-most fibers are exposed. Slowly rotate  $\frac{1}{4}$  or  $\frac{1}{2}$  turn in one direction. DO NOT OVER-ROTATE.
9. Immediately rinse the brush in the PreservCyt® Solution vial by rotating the device in the solution 10 times while pushing against the PreservCyt® vial wall. Swirl the brush vigorously to further release material. Tap the brush on the inside wall of the vial. Discard the brush. **Do not leave the brush in the vial.**
10. Tighten the cap so that the torque line on the cap passes the torque line on the vial.
11. Record the patient's name and date of birth or other unique identifier on the vial. (The date of birth is the preferred second identifier.)
12. Record the patient information and pertinent medical history on the cytopathology requisition.
13. Indicate the test(s) to be performed and the risk assessment level on the requisition.
14. Package the specimen and requisition for transport to the laboratory by placing the requisition in the document pocket on the outside of the specimen bag and the vial into the sealed pouch, making sure the seal is closed tightly.

### **Technique 3, BD SurePath™ Pap Test specimen collection using broom-like device**

1. Obtain specimen prior to bimanual examination using an un-lubricated speculum (saline or water may be used on the speculum).
 

**NOTE:** Use of lubricant jellies can interfere with collection of a representative cervical specimen as well as processing and evaluating the specimen, and may lead to an unsatisfactory result. This is especially true of lubricants containing carbomers. If necessary a small amount of carbomer-free lubricant may be used on the speculum, but avoid getting lubricant on the tips of the speculum.
2. Gently remove excess mucus or other discharge from surface of cervix using a folded gauze pad held by ring forceps. Do not use a swab as fibers can obscure cells during microscopic examination.
3. Remove inflammatory exudate from the cervical canal before taking the specimen. Remove by placing a dry 2x2 inch piece of gauze over the cervix and peeling it away after it absorbs the exudates or by using a dry proctoswab or scopette.
 

**NOTE:** The excess cervical mucus and inflammatory exudate are essentially devoid of meaningful cellular material and when present in the specimen vial may yield a slide with little or no diagnostic material present.
4. The cervix should not be cleaned by washing with saline; doing this may result in a relatively acellular specimen.
5. The specimen should be obtained before the application of acetic acid.
6. Obtain an adequate sampling from the cervix using the broom-like device. Insert the central bristles of the broom into the endocervical canal deep enough to allow the shorter bristles to fully contact the ectocervix. Push gently and rotate the broom in a **clockwise** direction five times.
 

**NOTE:** The broom is designed to capture cells when rotated clockwise. Rotating the broom counter-clockwise will cause cells to slough off but does not trap the cells in the broom.
7. Immediately drop the detachable head of the device into the BD SurePath™ vial.
 

**NOTE:** Do not touch the head of the device while detaching it.
8. Place the cap on the vial and tighten it.
9. Record the patient's name and date of birth or other unique identifier on the vial. (The date of birth is the preferred second identifier.)
10. Record the patient information and pertinent medical history on the cytopathology requisition.
11. Indicate the tests to be performed and the risk assessment level on the requisition.

12. Package the specimen and requisition for transport to the laboratory by placing the requisition in the document pocket on the outside of the specimen bag and the vial into the sealed pouch, making sure the seal is closed tightly.

#### **Technique 4, BD SurePath™ Pap Test specimen collection using spatula and endocervical brush**

8. Obtain specimen prior to bimanual examination using an un-lubricated speculum (saline or water may be used on the speculum).  
**NOTE:** Use of lubricant jellies can interfere with collection of a representative cervical specimen as well as processing and evaluating the specimen and may lead to an unsatisfactory result. This is especially true of lubricants containing carbomers. If necessary a small amount of carbomer-free lubricant may be used on the speculum, but avoid getting lubricant on the tips of the speculum.
9. Gently remove excess mucus or other discharge from surface of cervix using a folded gauze pad held by ring forceps. Do not use a swab as fibers can obscure cells during microscopic examination.
10. Remove inflammatory exudate from the cervical canal before taking the specimen. Remove by placing a dry 2x2 inch piece of gauze over the cervix and peeling it away after it absorbs the exudates or by using a dry proctoswab or scopette.  
**NOTE:** The excess cervical mucus and inflammatory exudate are essentially devoid of meaningful cellular material and when present in the specimen vial may yield a slide with little or no diagnostic material present.
11. The cervix should not be cleaned by washing with saline; doing this may result in a relatively acellular specimen.
12. The specimen should be obtained before the application of acetic acid.
13. Obtain an adequate sampling from the ectocervix using a plastic spatula by placing the rounded tip of the spatula into the cervix until the curved edge of the spatula rests against the ectocervix. Rotate the spatula 360 degrees.
14. Immediately snap the device handle at the red scoring line and drop the device into the BD SurePath™ vial.  
**NOTE:** Do not touch the head of the device while detaching it.
15. Obtain an adequate sampling from the endocervix using an endocervical brush device. Insert the brush into the cervix until only the bottom-most fibers are exposed. Slowly rotate ¼ or ½ turn in one direction. DO NOT OVER-ROTATE.
16. Immediately snap the device handle at the red scoring line and drop the device into the BD SurePath™ vial.  
**NOTE:** Do not touch the head of the device while detaching it.
17. Place the cap on the vial and tighten it. **Submit the vial with collection device(s) to the lab.**
18. Record the patient's name and date of birth or other unique identifier on the vial. (The date of birth is the preferred second identifier.)
19. Record the patient information and pertinent medical history on the cytopathology requisition.
20. Indicate the test(s) to be performed and the risk assessment level on the requisition.
21. Package the specimen and requisition for transport to the laboratory by placing the requisition in the document pocket on the outside of the specimen bag and the vial into the sealed pouch, making sure the seal is closed tightly.

#### **SPECIMEN TRANSPORT:**

Specimens collected in ThinPrep® PreservCyt® Solution should be processed within four weeks of collection. Ancillary tests on specimens collected in SurePath Preservative Fluid must be performed within 14 days of collection. Specimens should be transported to the laboratory in a timely manner in order to meet these time limits. These specimens should be stored and transported at ambient temperatures. To find out if courier service is available in your area, contact your providing laboratory refer to Client Services Contacts on page 4 for numbers.

## **INTERPRETATION AND COMMENTS:**

The Pap test is a screening test for cervical cancer with inherent false negative results. The Pap test was designed to detect squamous neoplastic lesions of the cervix, and has less utility in detecting glandular lesions of the endocervical canal and endometrial cavity. In particular, the Pap test misses many lesions of the uterine endometrial lining (only about one-fourth to one-third of endometrial carcinomas are detected with a Pap test). Endometrial biopsy evaluation is recommended for patients with significant abnormal clinical bleeding or a suspected endometrial abnormality. Similarly, clinically abnormal or visible lesions of the cervix or vaginal mucosa should be biopsied. Reported false negative rates for Pap test vary considerably, and it should be stressed to the patient that regular Pap screening is important in detecting cervical disease at the earliest possible stages.

False negatives are due to both sampling error (clinician related) and failure to recognize or properly interpret cells (laboratory related). In a study from the Mayo Clinic, the overall false negative rate was 19 percent (12 percent sampling error and 7 percent laboratory error). False negative rates have been reported as high as 31 percent. False positives also occur. In one study from a well-known and well-run cytopathology department, thirteen percent of smears interpreted to be CIN or cancers showed no evidence of neoplasia in follow up biopsies. The method of cell collection and concern for details of collection is crucial. The liquid based Pap test has been shown to be more effective than the conventional glass smear.

Cellular effects of Herpes virus, candida (and related yeast), trichomonas, actinomyces, and bacterial infections may be detected with a liquid based Pap test.

Cases with malignant cells are classified as to cell type (squamous, endocervical adenocarcinoma, endometrial adenocarcinoma) as specifically as the individual specimen allows. Precursor lesions of carcinoma are reported as low or high-grade squamous intraepithelial lesion as defined in the Bethesda system. Smears that cover less than 10 percent of the slide or specimens in which more than 75 percent of the cells are obscured are considered "unsatisfactory". With liquid-based Pap there must be at least 40 percent coverage to be considered adequate.

Some Pap specimens (approximately 4 percent at Intermountain Healthcare) are considered "atypical" but not clearly neoplastic (not SIL or carcinoma). This is a very heterogeneous group of Pap specimens. Women in this category may have a high risk of having CIN. The ALTS study has shown HR-HPV testing to be of value in determining the risk factor.

In 2012, the American Society for Colposcopy and Cervical Pathology (ASCCP) updated the follow-up guidelines and algorithms for patients with abnormal cytopathology results. These algorithms provide a visual explanation of the 2006 Guidelines for the Management of Women with Abnormal Cervical Cancer Screening Tests and the Management of Women with Cervical Intraepithelial Neoplasia or Adenocarcinoma in situ, published in the October 2007 issue of the American Journal of Obstetrics and Gynecology. They also clarify when HR-HPV testing is valuable in treating the patient. The 2006 ASCCP algorithms can be viewed and printed from the following website: [www.asccp.org/pdfs/consensus/algorithms\\_cyto\\_07.pdf](http://www.asccp.org/pdfs/consensus/algorithms_cyto_07.pdf)

Postmenopausal smears are sometimes difficult to interpret. Repeat sampling after short-term estrogen therapy (0.625 mg oral conjugated estrogen for 5 days followed by specimen collection on day 7) can be helpful in resolving difficult cases.

- ◆ Guidelines for cancer screening of the female genital tract can be found through the American Cancer Society as well as the American College of Obstetricians and Gynecologists. When a repeat Pap test is indicated, recollection under 3 months is not recommended because of decreased sensitivity, even with colposcopy. Please repeat after a 3-6 month interval.

# Non-Gyn Cytopathology

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## PURPOSE:

To ensure proper specimen identification and accurate results when sending **Non-Gyn** specimens to your providing laboratory, please make sure that the slides and/or specimen container is labeled with the patient's name and second unique identifier such as date of birth. Specimen containers should also be labeled with the specimen type/site. A completed requisition must accompany all non-gyn specimens. The requisition must include the patient's name, date of birth and one other unique identifier, insurance information, the provider's name and location, the specimen type/source and pertinent clinical information. This information must be provided before the specimen can be processed. The initial receipt of this information will eliminate time consuming phone calls or specimen returns and allow us to provide you and your patients prompt quality service.

Note: If specimen requires Flow Cytometry testing as well, please refer to the Flow Cytometry section above for specimen requirements details.

**Questions?** Call your providing laboratory, M-F, 8am-5pm. Refer to Client Services Contacts on page 4 for numbers.

## SUPPLIES:

Specimen collection supplies, including non-gyn cytopathology preservative, requisitions and specimen transport bags, can be ordered through providing laboratory by calling Client Services. Refer to Client Services Contacts on page 4 for numbers. Non-gyn cytopathology preservatives may vary between laboratory sites. CytoLyt is the preferred cytopathology preservative at LDS Hospital, Alta View Hospital, Riverton Hospital, Park City Hospital, Intermountain Medical Center, McKay Dee Hospital, Utah Valley Hospital and Dixie Regional Medical Center. For ease of ordering, the most common non-gyn cytopathology preservative, CytoLyt, is pictured below.. For questions regarding CytoLyt or the preferred non-gyn cytopathology preservative for other facilities contact your providing laboratory.



**ThinPrep® CytoLyt® Solution Specimen Collection Cups**



# Body Cavity Fluids

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## **PURPOSE:**

Body cavity fluids are usually collected for the diagnosis of malignant neoplasms. Because of a high false negative rate, a negative cytopathology does not exclude the possibility of malignancy. High specificity, however, makes a positive diagnosis virtually definitive (see Interpretation and Comments). Washings are usually obtained at the time of surgery in order to stage women with gynecologic malignancies. Some infectious and inflammatory conditions also have characteristic cytologic findings (see Interpretation and Comments).

## **COLLECTION PROCEDURE:**

### Pleural Fluid, Peritoneal Fluid, Pericardial Fluid:

1. Collect specimen in a clean, properly labeled container.
2. Add five units of heparin for each mL of fluid. Gently agitate the specimen. Do not add preservative.
3. If at all possible, at least 50 mL of fluid should be collected for proper cytologic preparation.
4. Send immediately to Cytopathology Lab with a completed requisition.

### Peritoneal Washings, Gutter Washings, etc:

1. Using normal saline, the specimen is collected in a clean, properly labeled container. Due to the time required to transport specimens to the laboratory it is recommended that cytopathology preservative be added to the specimen in order to prevent degradation of specimen.
2. If cytopathology preservative is not available, add five units of heparin for each mL of fluid. Gently agitate the specimen. Specimen should be refrigerated in order to maintain cellular integrity.
3. If at all possible, at least 50 mL of fluid should be collected for proper cytologic preparation.
4. Send immediately to Cytopathology Lab with a completed requisition.

**NOTE:** We recommend providing separate specimens for microbiological and/or hematological studies.

## **SPECIMEN TRANSPORT:**

Fresh specimens (not in preservative) should be taken directly to the laboratory. If that is not possible refrigerate the specimen until transport, and request refrigeration during courier transport. Cells remain interpretable in body fluids for several days with refrigeration. Cells in washings are much more fragile. Specimens in preservative may be transported at room temperature.

## **INTERPRETATION AND COMMENTS:**

Body cavity fluids are usually collected for the diagnosis of malignant neoplasms. In a large study of 6,001 effusions, the overall sensitivity for finding malignant cells was 58 percent and the specificity 99 percent. The positive predictive value was 99 percent, and the negative predictive value was 80 percent.<sup>20</sup> Because of the high false negative rate, a negative cytopathology does not exclude the possibility of malignancy. High specificity, however, makes a positive diagnosis virtually definitive. Positive effusions are generally associated with disseminated disease and a poor prognosis.

The gross appearance of an effusion cannot be used to predict whether it will contain tumor cells. Almost half of malignant effusions are not bloody.<sup>21</sup>

Generally, classes of malignancy can be discriminated (adenocarcinoma, small cell carcinoma, squamous cell carcinoma, melanoma, lymphoma). The site of origin of an adenocarcinoma can

sometimes be suggested, especially when clinical information is incorporated into the interpretation. There are, however, no pathognomonic cellular findings that identify the site of origin of an adenocarcinoma.

Adenocarcinoma cells are by far the most commonly found tumor cells in malignant effusions, and most are from breast, lung, or ovary.<sup>22</sup> Squamous cell carcinoma cells are uncommon in effusions. Estrogen receptors can be found on tumor cells in effusions.

Lymphoma is not uncommon in effusions. High-grade lymphomas are more readily diagnosed than low-grade lymphomas. Flow cytometric studies may be useful in the diagnosis of lymphoma. Most benign effusions contain mostly T-cells. Monoclonal populations can be identified in malignant effusions.<sup>23</sup>

Mesothelioma is difficult to diagnose because of the similarity of the tumor cells to hyperplastic benign mesothelial cells.<sup>24</sup> Also, in some cases it may be difficult to distinguish a mesothelioma from adenocarcinoma. Immunocytochemistry<sup>25</sup> and electron microscopy<sup>26</sup> may be helpful in these cases.

Except for foul smelling fluids with many bacteria, almost all inflammatory effusions are nonspecific, the etiology not being apparent from the cytologic exam. Effusions associated with rheumatoid arthritis<sup>27</sup> and systemic lupus erythematosus<sup>28</sup> may show specific findings.

## **Bronchial Brushings and Washings**

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### **PURPOSE:**

To detect and classify neoplasms involving the bronchial tree.

### **COLLECTION PROCEDURE:**

#### Bronchial Washings:

1. Specimen is collected by clinician in a clean "specimen trap". Do not add preservative.
2. We recommend collecting separate sterile specimens (without preservative) for culture studies, molecular studies, and other studies, as appropriate.
3. Label container and send immediately to Cytopathology Lab with a completed requisition.

#### Bronchial Brushings:

The preferred collection method varies by hospital.

- Intermountain Medical Center, LDS Hospital, Alta View Hospital, Riverton Hospital and Park City Hospital:
  1. Rinse the brush in preservative solution by rotating the brush in the solution 10 times while pushing against the vial wall. Swirl the brush vigorously in solution to further release cells.
  2. Cut off the brush leaving approximately one and one-half inches of wire and drop into preservative container.
  3. Collect separate sterile specimens (without preservative) for culture studies, molecular studies, and other studies, as appropriate.
  4. Send immediately to Cytopathology Lab with completed requisition.
- Utah Valley Hospital and Dixie Regional Medical Center:
  1. Cut off brush leaving approximately one and one-half inches of wire and drop into a 15-20 mL tube of saline. If the specimen cannot be taken immediately to the laboratory, drop it into a 15-20 mL tube of cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.)
  2. Send immediately to Cytopathology Lab with completed requisition.
- McKay-Dee Hospital and Logan Regional Hospital:
  1. Cut off brush leaving approximately one and one-half inches of wire and drop brush into a 15-20 mL tube of cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.)
  2. Separate appropriate sterile specimens that need to be submitted for culture studies, molecular studies, and other special studies.

3. Send immediately to laboratory with completed requisition.

**SPECIMEN TRANSPORT:**

There is no time limit on transport of fixed slides or brushes placed in cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.) However, disposable brushes placed in saline should immediately be sent to the laboratory.

**INTERPRETATION AND COMMENTS:**

Cytologic diagnosis of bronchogenic carcinoma is best achieved when multiple specimen types (sputum, brushings, washings) are used. Brushings and washings do not necessarily replace sputum examination<sup>10</sup> and post bronchoscopy sputum often yields malignant cells.<sup>11</sup>

Sensitivity of bronchial washings for detecting malignant cells varies from 22 to 76 percent and for bronchial brushings varies from 67 to 77 percent.<sup>11</sup> Specificity is very good, in the area of 98 to 99 percent.

In general, cytologic classification of neoplasms agrees well with histologic classification but varies considerably with cell type. Of clinical importance is the fact that small cell carcinoma has a characteristic cytologic appearance and can be specifically diagnosed with cytologic specimens. Correlation between cytopathology and histology in two hospitals was as follows: Squamous Cell Carcinoma 92 percent, 75 percent; Adenocarcinoma 86 percent, 83 percent; Small Cell Undifferentiated Carcinoma 88 percent, 93 percent; Large Cell Undifferentiated Carcinoma 41 percent, 68 percent.<sup>10</sup>

Infectious diseases can be diagnosed with washings and brushings, but bronchoalveolar lavage is usually used in the workup of these diseases.

## **Bronchoalveolar Lavage (BAL)**

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**PURPOSE:**

To detect infectious agents causing pneumonia and malignancies. Certain other diseases can also be diagnosed.

**COLLECTION PROCEDURE:**

1. If testing for both microbiology and cytology are desired, the Microbiology Department and the Cytopathology Department should each receive a separate specimen.
2. For Microbiology, collect the specimen in a sterile, labeled container. Do not add preservative. Complete appropriate microbiology requisition.
3. For Cytology, the specimen may be collected in a sterile container with or without preservative. Formalin is never an appropriate cytopathology preservative. Complete a cytopathology requisition.
4. Send immediately to the laboratory.

**NOTE:** For specimens referred to Dixie Regional Medical Center and Utah Valley Hospital, it is preferred that cytopathology specimens be collected with preservative.

**SPECIMEN TRANSPORT:**

Specimen should be transported immediately to the laboratory. The anatomic pathologist on call should be notified if a STAT result is required. Specimens should be submitted for both cytologic examination and culture.

## **INTERPRETATION AND COMMENTS:**

Bronchoalveolar lavage specimens are useful in the workup of immunocompromised patients with pulmonary infiltrates. The overall diagnostic yield for identifying an etiologic agent is 65 to 66 percent.<sup>16, 17</sup> BAL specimens have supplanted the need for bronchoscopic or open lung biopsy in many of these patients.<sup>18</sup> *Pneumocystis carinii*, viral, fungal, mycobacterial, and bacterial infections can be diagnosed.<sup>16, 17</sup> Specimens should be submitted for both cytologic examination and culture.

The yield for specific organisms varies with the clinical condition and organisms in question.<sup>17a</sup> The highest yield (95%) is with *Pneumocystis carinii* in AIDS patients with clinically significant pneumonia. Sensitivity for CMV is reported to be quite variable ranging from 25 to 60 percent. Yields for CMV are higher when assays for nucleic acids (PCR) or early antigen are used, but the cytologic detection of cellular inclusions probably best correlates with clinical condition. Yield for *Aspergillus* is only about 50 percent because of its frequent intravascular location. The significance of *Candida* is often problematic because of oral contamination.

Malignancies can also be diagnosed by this method,<sup>16, 18</sup> but bronchial specimens including biopsies and fine needle aspirates are usually used in the workup of malignancies.

Alveolar proteinosis has a characteristic cytologic appearance in lavage specimens, and the technique may also be helpful in the workup of interstitial pneumonia.<sup>19</sup>

## **Cerebrospinal Fluid (CSF)**

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### **PURPOSE:**

CSF is usually examined to detect malignant cells. If Creutzfeldt-Jakob disease is suspected please notify the anatomic pathologist on-call prior to submission, as the specimen may be excluded from testing.

### **COLLECTION PROCEDURE:**

1. Collect specimen in a clean, properly labeled container.
2. Fill out requisition indicating site of tap (lumbar, ventricle, Ommaya reservoir) and relevant clinical information.
3. Send specimen immediately to the laboratory.

### **SPECIMEN TRANSPORT:**

CSF specimens should be taken to the laboratory immediately since cells are often few in number and are not well preserved in this specimen.

## **INTERPRETATION AND COMMENTS:**

The chief role of cytopathology in the examination of CSF is the detection of malignant cells. Acute lymphocytic leukemia (ALL) frequently involves the meninges and is readily diagnosed in CSF. Acute myelocytic leukemias (AML) may also involve the subarachnoid space, especially acute myelomonocytic leukemia.<sup>29</sup> Chronic leukemias rarely involve the meninges. Lymphomas that involve the meninges are usually high grade. Peripheral blood contamination is sometimes present in the CSF specimens. It may be difficult or impossible to make a diagnosis of leukemia/lymphoma involvement of the CSF in patients that have peripheral blood contamination in a CSF specimen, and concurrently have leukemia/lymphoma circulating in the peripheral blood. A repeat CSF specimen lacking peripheral blood contamination may be necessary to evaluate for CSF involvement in these patients.

Most metastatic carcinomas to the central nervous system do not have access to the ventricles or subarachnoid space; therefore, tumor cells are not found in the CSF. About 5 percent of intracranial metastatic carcinomas, however, involve the meninges diffusely (meningeal carcinomatosis).<sup>31</sup> These tumors are usually adenocarcinomas of the lung, breast, or stomach<sup>32</sup> and are readily diagnosed by CSF cytopathology.

Primary CNS tumors may also shed cells into the CSF. Medulloblastoma, glioblastoma multiforme, germ cell tumors of the pineal, pinealomas, choroid plexus papillomas, and choroid plexus carcinomas are the most frequent.<sup>33</sup>

False negative rates for CSF cytopathology depend on the extent of meningeal involvement, varying from 66 percent for focal disease to 33 percent for diffuse disease. Multiple specimens are said to lower the false positive rate to 20 percent.<sup>34</sup> False positive rates are about 2 percent, but may be as high as 14 percent when only leukemia/lymphoma is examined.<sup>34</sup>

Cryptococcus may be identified in CSF cytopathology. Otherwise, infectious and inflammatory conditions do not produce diagnostic cellular changes. Viral inclusions are rarely identified.

## Fine Needle Aspirates (FNA)

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### **PURPOSE:**

Fine needle aspirates are usually obtained to make the diagnosis of a neoplasm or rule out neoplasia. Infectious and inflammatory conditions can also be diagnosed.

### **COLLECTION PROCEDURE:**

#### Aspirates of Superficial Sites:

1. Label two clean glass slides and/or label cytopathology collection bottle with the patient's legal name and another unique identifier such as patient's date of birth.
2. Wipe the skin over the lesion with an alcohol swab. Local anesthetic may be used, but is not usually needed.
3. Attach a 22 gauge (or 25 gauge in certain sites such as thyroid) needle to a 10-20 mL syringe.
4. Pass the needle through the skin and into the lesion.
5. After the needle is in the lesion, draw back the plunger of the syringe.
6. Move the needle back and forth several times in the lesion. A "jack hammer" motion is often effective.

**NOTE:** With solid lesions, material should be aspirated only into the needle and not into the syringe. Once material appears in the hub of the needle, aspiration should be discontinued. Blood is undesirable. In the case of cystic lesions, the syringe may be filled with fluid. This fluid may be submitted for cytologic examination.

7. Once aspiration is completed, release the plunger and allow it to fall back to a "neutral" position.
8. Remove the needle and syringe from the patient.

#### **If using glass slide method follow these steps:**

9. Remove the needle from the syringe.
10. Draw air into the syringe.
11. Replace the needle onto the syringe.
12. With the bevel pointed down, express the material in the needle onto the center of a slide using firm but not excessive pressure on the plunger.
13. Immediately place the second slide over the slide with the specimen.
14. Allow the specimen to spread between the two slides without any smearing motion (other smearing methods can be used but require experience).
15. Separate the slides by gently pulling them across each other and immediately fix one slide using a spray fixative or by placing the slide in 95% alcohol. Allow the other slide to air dry.
16. The procedure may be repeated several times.
17. Apply pressure to the aspirated site to minimize hematoma.

18. Place the slides in a carrier and send with a completed requisition (clinical information is required) to the laboratory.

**If using cytopathology preservative method follow these steps:**

19. Remove the needle from the syringe.

20. Draw air into the syringe.

21. Replace the needle onto the syringe.

22. Express the material in the needle into the cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.)

23. Thoroughly rinse the syringe by aspirating at least 2 mL of preservative and expressing it back into solution. Repeat as needed.

**Aspirates of Deep Sites:**

Deep sites are aspirated under radiologic guidance using a technique similar to that for superficial sites (see above).

If an adequacy check is requested express the first pass onto a sterile slide for rapid staining and adequacy evaluation by a cytotechnologist or pathologist. Additional passes may be collected for adequacy evaluation if needed to obtain an adequate sample. Once adequacy is determined additional specimen may be collected and either expressed into a cytopathology preservative container or onto a slide depending on laboratory preference.

If the lab prefers specimen in cytopathology preservative the specimen should be expressed into the container. Do not rinse the needle using the preservative as the needle cannot be used again on the patient if it has been rinsed with preservative. If needed the needle can be rinsed with sterile saline.

For labs that prefer specimen submitted on fixed/air dried slides, express the specimen onto a sterile slide and then spread the specimen between two slides by gently pulling them across each other. Then fix or air-dry as appropriate prior to submission to the laboratory. Make sure to indicate on the requisition whether the slides are fixed or air-dried.

If tissue cores are obtained they may be rolled across a glass slide to obtain a touch imprint. Cores of tissue can then be fixed for histologic sectioning. Immunohistochemistry (for estrogen receptor, prostate specific antigen, leukocyte common antigen, keratin, etc.) can be performed on cell block and cores of tissue. Particles can be saved for electron microscopy.

**SPECIMEN TRANSPORT:**

There is no time limit on receipt of fixed or air-dried slides. Do not submit aspirates to the laboratory in a syringe with a needle attached.

**INTERPRETATION AND COMMENTS:**

**General:**

Fine needle aspirates from a variety of sites have saved patients more invasive procedures. The proper interpretation of the specimen is heavily dependent on the adequacy and method of preparation of the specimen. Although a simple procedure, the quality of the specimen is often related to the experience of the clinician obtaining the specimen. Studies have shown that clinicians who frequently perform fine needle aspirates more often obtain diagnostic material than those who rarely perform the procedure.<sup>45</sup> Proper interpretation is also dependent on the experience of the pathologist. Please contact the anatomic pathologist for specific questions or advice.

**Breast:**

The following advantages of fine needle aspiration of the breast have been cited.<sup>46</sup>

1. Rapid, accurate diagnosis
2. Cost effective when used as triage
3. Differentiate cyst from solid lesion
4. Involvement of patient in decision making
5. Psychological help in relief of anxiety for patient with a benign lesion

6. Evaluation of chest wall recurrence
7. Ancillary studies such as estrogen receptor study

There has been a difference of opinion among many cytopathologists and clinicians about whether definitive therapy should be instituted on the basis of a FNA diagnosis alone.<sup>47</sup> Some clinically and cytologically obvious carcinomas can probably be definitively treated without frozen section confirmation. We, however, agree with Lannin<sup>48</sup> that in our clinical and litigious setting, the FNA is best used to triage patients. Patients with a lesion but negative FNA can be biopsied in the office. Patients with a positive FNA receive definitive therapy after frozen section confirmation of the lesion in the hospital. This approach has been shown to be cost effective.

The reported sensitivity of the procedure varies from 70 to 95 percent. The reported specificity varies from 83 to 100 percent.<sup>49</sup> The main "pitfalls" of breast fine needle aspiration lie in over interpretation of fibroadenoma (the most common cause of false positive), organizing hematoma, mastitis and abscess, and lactating adenoma.<sup>50</sup> A clinical history is invaluable in interpreting these specimens.

Unfortunately, there is a false negative rate in all series. Oertel<sup>51</sup> (8 percent in their series) cautions that over reliance on a negative result can delay appropriate therapy. Patients with mammographically or clinically malignant lesions should have these lesions excised regardless of FNA results.

As with FNAs in general, the quality of results is dependent on the experience of both the clinician obtaining the specimen and the cytopathologist interpreting it.<sup>45</sup>

#### Liver:

Fine needle aspiration plays a major role in the diagnosis of primary and metastatic tumors of the liver. Deep lesions and lesions of the left lobe which are not generally accessible to needle biopsy can be collected by CT-guided FNA. Diffuse non-neoplastic liver disease, however, does not lend itself to diagnosis by this method. Complications are rare.<sup>52</sup>

The sensitivity varies from 92 to 96 percent in recent literature, and with experience, there are very few false positive diagnoses.<sup>53</sup> Primary hepatocellular carcinoma can generally be separated from metastatic carcinoma. Very well differentiated hepatoma, however, can be confused with adenomas or reactive atypia of benign hepatocytes, and very poorly differentiated hepatomas can be difficult to separate from metastatic carcinomas.<sup>52</sup> Some primary cholangiocarcinomas are very difficult to aspirate because of marked desmoplasia. Abscesses are diagnosable. When combined with the radiologic and clinical setting, a presumptive diagnosis of liver cell adenoma and hemangioma is possible.<sup>54</sup>

#### Lung:

Fine needle aspiration of the lung has become a major tool in the diagnosis of pulmonary neoplasms. The major complication is pneumothorax, the incidence of which is dependent on the caliber of needle used (18 gauge--49 percent; 23 gauge--6 percent). Most are small and do not require a chest tube.<sup>55</sup>

In a study of 1,100 FNAs of the lung, a correct diagnosis was established in 89.9 percent of cases.<sup>56</sup> There were two false positive diagnoses from patients with chronic inflammatory diseases. Most of the false negative cases were seen when lesions were less than 2 cm. Well-differentiated squamous cell carcinoma, well-differentiated adenocarcinoma, and small cell poorly differentiated carcinoma can be specifically diagnosed. Large cell carcinomas that are poorly differentiated are readily diagnosed as carcinoma but a specific subtype is often difficult to diagnose.<sup>57</sup>

Benign lesions are more difficult to diagnose. Abscesses, mycoses, tuberculosis, and hamartomas can, however, be identified.<sup>58</sup> A negative diagnosis of a lung lesion does not rule out the possibility of malignancy.<sup>59</sup>

Transtracheal or transbronchial aspiration of tumors adjacent to a bronchus or the trachea as described by Wang can produce excellent results and this technique avoids pneumothorax.<sup>60</sup>

### Lymph Node:

Metastatic carcinoma, melanoma, lymphomas, granulomatous and suppurative inflammatory disease, and reactive hyperplasia can be diagnosed by FNA of lymph nodes.

Generally, metastatic carcinoma and melanoma are easily diagnosed and readily separated from lymphomas and reactive hyperplasia.

Non-Hodgkins lymphoma can also be diagnosed by FNA. Higher grade and large cell lymphomas are easier to diagnose than low-grade lymphomas. In some situations, low-grade lymphomas may be difficult to separate from reactive lymphoid hyperplasia. Follicular architecture is generally not recognizable in needle aspirates. When practical, a definitive primary diagnosis of lymphoma is made by histopathologic examination of a biopsy specimen. In a patient whose medical condition precludes surgery, FNA may be the only means of diagnosing intra-abdominal or intrathoracic malignancies.<sup>61</sup>

As with non-Hodgkins lymphoma, a primary diagnosis of Hodgkin's disease is generally made by histopathologic examination of biopsy specimens. FNA is generally reserved for documenting recurrences. There is uncertainty about the value of FNA in subtyping Hodgkins Disease.<sup>62</sup>

The reported diagnostic accuracy of FNA for lymphadenopathy of all types varies from 83 to 96 percent. The accuracy for lymphoma varies from 83 to 90 percent. The accuracy for metastatic carcinoma varies from 90 to 96 percent.<sup>63</sup>

### Pancreas:

Percutaneous CT-guided, endoscopic-ultrasound guided and intraoperative fine needle aspiration of the pancreas has become a reliable method of diagnosing adenocarcinoma of the pancreas. Few complications are reported.<sup>64</sup> Some consider intraoperative FNA superior to wedge or large bore needle biopsy.<sup>65</sup>

The reported sensitivity for diagnosing pancreatic carcinoma by percutaneous FNA varies from 61 to 91 percent. The sensitivity for intraoperative FNA varies from 72 to 96 percent. Few false positive diagnoses have been reported.<sup>66</sup> It may be difficult to separate well differentiated adenocarcinoma from atypia associated with pancreatitis<sup>67</sup> and carcinomas with significant desmoplasia may be difficult to aspirate.<sup>64</sup> Although there are criteria for separating islet cell tumors from well differentiated adenocarcinoma, the two can be confused.<sup>68</sup> Special techniques (argyrophil stain, immunoperoxidase, EM) may be helpful in this regard.

### Salivary Gland:

The major role of FNA of the salivary gland is to separate neoplasms from non-neoplastic conditions. Although classifying a neoplasm may be possible, often the definitive diagnosis is based on histopathologic examination of the resected specimen. Approximately one-third of patients can be spared surgery and surgical therapy can be individualized by use of FNA.<sup>69</sup>

Recent literature reports sensitivity for detecting a neoplasm to vary from 87 to 100 percent. Specificity varies from 96 to 99 percent.<sup>70</sup>

### Thyroid:

Fine needle aspiration of the thyroid is a first-line diagnostic procedure for the workup of thyroid nodules.<sup>71</sup> It has reduced the number of thyroidectomies for benign disease and as a result, reduced the cost of treatment of thyroid disease.<sup>71, 72</sup> In experienced hands, the technique is safe, and there is little or no morbidity.<sup>73</sup>

The cytologic findings of nodular goiter, Hashimoto's thyroiditis, papillary carcinoma, and anaplastic carcinoma are generally characteristic; and these diagnoses can be made with confidence in well-prepared specimens. Unfortunately, follicular adenoma cannot be reliably separated from follicular carcinoma by FNA. These tumors (including Hurthle cell neoplasms) are diagnosed as follicular neoplasms by FNA, and an excisional biopsy is recommended.

In the largest series of thyroid aspirates (1,536 cases) Stavric<sup>74</sup> found 4 false negative diagnoses in 43 malignant tumors and had 3 false positive diagnoses. Multiple other series show relatively few false positives and false negatives.<sup>75</sup>



Because of the highly vascular nature of the thyroid, suction on the syringe should be kept to a minimum. This serves to reduce dilution of the specimen with fresh blood.

Other:

The sites noted above are those most frequently aspirated and those with which we have the most experience.

Various other organs and anatomic sites have been the object of fine needle aspiration studies including mediastinum, kidney, adrenal gland, and various soft tissue sites.

## **Gastrointestinal Tract**

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### **PURPOSE:**

GI tract cytopathology has largely been replaced by histologic study of endoscopic biopsy specimens. Brushings may, however, compliment biopsy specimens in the detection of neoplasms and in some cases replace the biopsy.

### **COLLECTION PROCEDURE:**

The preferred collection method varies by hospital.

- McKay-Dee Hospital, Intermountain Medical Center, LDS Hospital, Alta View Hospital, Riverton Hospital and Park City Hospital:
  1. Rinse the brush in preservative solution by rotating the brush in the solution 10 times while pushing against the vial wall. Swirl the brush vigorously in solution to further release cells.
  2. Cut off the brush leaving approximately one and one-half inches of wire. Drop into preservative container.
  3. Replace cap tightly and label container.
  4. Send immediately to Cytopathology Lab with completed requisition.
- **NOTE:** At LDS Hospital, Alta View Hospital, Riverton Hospital, Park City Hospital and Intermountain Medical Center a brushing can be submitted on a slide using the steps immediately below. However, this is not the preferred method and should be submitted in addition to a specimen in preservative solution as described above.
  1. Roll the contents of the brush onto a clean, labeled glass slide and fix immediately with spray preservative (within one to two seconds).
  2. Send immediately to Cytopathology Lab with completed requisition.
- Utah Valley Hospital and Dixie Regional Medical Center:
  1. Cut off brush leaving approximately one and one-half inches of wire. Drop into a 15 mL tube of saline. If the specimen cannot be taken immediately to the laboratory, drop it into a 15 mL tube of cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.)
  2. Send immediately to Cytopathology Lab with completed requisition.

### **SPECIMEN TRANSPORT:**

Brushes in saline should be immediately delivered to the laboratory. There is no time limit on receipt of specimens in preservative.

### **INTERPRETATION AND COMMENT:**

Biopsy specimens have largely replaced cytologic techniques for the study of the GI tract. According to some authors, however, the procedures may be complimentary, accuracy being increased when both are used.<sup>41</sup> Strictures of the esophagus may be difficult to biopsy and

brushings may be useful in this setting. Sensitivity for this study varies from 70 to 90 percent and specificity 99 to 100 percent. False positive diagnoses secondary to inflammation, however, have been reported.<sup>42</sup> Candida esophagitis and herpes esophagitis can be diagnosed with brushings.

Brushings and bile collected at the time of ERCP or PTC may be useful in the diagnosis of carcinomas of the extrahepatic biliary tree. Sensitivity for these studies ranges from 47 to 73 percent. Occasional false positives have been reported. Because of the relatively high false negative rate, a negative result does not exclude carcinoma.<sup>43</sup>

## **Nipple Discharge**

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### **PURPOSE:**

To detect malignant cells in a patient with a nipple discharge.

### **COLLECTION PROCEDURE:**

1. Express secretion by gently compressing the full circumference of the areola between thumb and index finger. When a mass is palpable, the area between the mass and nipple may be compressed.
2. Smear secretion on a clean, labeled, glass slide. If secretion is scanty, the slide may be touched to the nipple. If secretion is thick, it may be smeared between two slides. Spray fix slides immediately (hold aerosol spray four to six inches from slide and apply for one to two seconds). (For Logan Regional Hospital place the slide immediately into a bath of 95% alcohol to fix cells.)
3. Place slides in carrier and send to Cytopathology Lab.

### **SPECIMEN TRANSPORT:**

There is no time limit for transport of fixed slides.

### **INTERPRETATION AND COMMENT:**

In our experience, most nipple discharges are associated with benign disease. The prevalence of cancer varies with the type of discharge: Bloody 3.96 percent; Purulent 0.83 percent; Serous 0.16 percent; milky 0.13 percent.<sup>44a</sup> Evaluation for carcinoma in nipple discharge is typically of low diagnostic yield, even for patients that have carcinoma involving the nipple (Paget's disease of the nipple) or carcinoma involving the major ducts of the nipple. The presence of ductal epithelium in a nipple discharge is considered atypical. Statistically, an intraductal papilloma is most likely to result in the presence of ductal epithelium within a nipple discharge specimen (particularly in a bloody nipple discharge). However, a low-grade intraductal papillary carcinoma can also present with cytologically bland ductal epithelium in a nipple discharge specimen, virtually indistinguishable from an intraductal papilloma on a cytologic basis alone. If there is an abnormal clinical and/or radiologic lesion of the nipple or ductal system of the breast, tissue biopsy may be necessary to define the abnormality and exclude malignant disease. It should be stressed that a negative nipple discharge result does not exclude carcinoma.

## **Skin (Tzanck Smear)**

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### **PURPOSE:**

To confirm the diagnosis of vesicular diseases secondary to herpes virus infections (Herpes Simplex virus and Varicella- Zoster virus).

### **COLLECTION PROCEDURE:**

1. Identify a fresh typical vesicle.
2. Unroof the vesicle.
3. Scrape the margin of the vesicle with a scalpel blade.

4. Spread the cells and debris adherent to the blade on a clean, labeled, glass slide.
5. Fix immediately with spray fixative. (Hold aerosol spray four to six inches from slide and apply for one to two seconds.)
6. Place slides in carrier, and send slides and requisition to the laboratory.

### **SPECIMEN TRANSPORT:**

Fixed slides should be placed in a carrier and sent with requisition to the laboratory. There is no time limit on transport of fixed slides.

### **INTERPRETATION AND COMMENT:**

Diseases of the skin are usually diagnosed by clinical examination or biopsy. Cytologic examination of cells from the base of a vesicle (Tzanck smear) is, however, a rapid, inexpensive technique to confirm a clinical suspicion of herpes virus infection. Tzanck smears were positive in 60 percent of Herpes Simplex virus infections and 75 percent of Varicella-Zoster virus infections in one report.<sup>44</sup> While a positive Tzanck prep may provide a rapid and inexpensive result, a negative Tzanck prep does not exclude herpes viral infection. Direct immunofluorescence testing, molecular testing, or culture for herpes viruses are more sensitive testing methods for confirming herpes viral infection.

## **Sputum Cytopathology**

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### **PURPOSE:**

Sputum specimens are useful for detecting malignant cells of the lower respiratory tract. Induced sputum may also be used to diagnose infectious conditions in immunocompromised patients, especially AIDS patients. It is important to include patient history for fresh samples, especially note a history or clinical suspicion of Tuberculosis or other communicable diseases.

### **COLLECTION PROCEDURE:**

#### Inpatient sputum:

1. Be sure that the specimen collected is an early morning, deep cough specimen (preferably before breakfast) and not saliva.
2. Have patient cough into a clean, labeled specimen container. Do not add preservative.
3. Send specimen with completed cytopathology requisition to the laboratory.

#### Outpatient sputum:

1. Specimen must be collected in labeled container with CytoLyt™ preservative. CytoLyt™ preservative is available from Laboratory Client Services, **801-507-2110** or **877-353-1106**.
2. Be sure that the specimen collected is an early morning, deep cough specimen (preferably before breakfast) and not saliva.
3. After patient expectorates into container, replace lid and shake container to distribute preservative.
4. Send specimen with completed cytopathology requisition to the laboratory.

#### Post-bronchoscopy sputum (24-hour post-bronchial sputum):

1. Collect ONE good, deep cough specimen at any time during the 24 hours following bronchoscopy. Pooled 24-hour continuously collected sputa are not suitable for cytopathology.
2. Send specimen with completed cytopathology requisition to the laboratory.

#### Induced Sputum:

1. A heated aerosolized solution of 15 percent NaCl and 20 percent Propylene Glycol is inhaled by the patient for 20 minutes.
2. Have patient cough into a clean, labeled specimen container. Do not add preservative.
3. Send specimen with completed requisition to the laboratory.

### **SPECIMEN TRANSPORT:**

Fresh sputum specimens should be sent immediately to the laboratory. There is no time limit on receipt of fixed outpatient sputum in preservative solution.

### **INTERPRETATION AND COMMENTS:**

Cytologic diagnosis of bronchogenic carcinoma is best achieved when multiple specimen types (sputum, brushings, washings) are used. Cytologic examination of early morning, deep cough sputum specimens remains a useful study and is not necessarily replaced by washings and brushings.<sup>10</sup> Post bronchoscopy sputum often yields malignant cells.<sup>11</sup>

Sensitivity for multiple sputum specimens varies from 57 percent<sup>12</sup> to 96 percent.<sup>13</sup> The sensitivity increases with the number of specimens examined. Three to five specimens are optimal.<sup>14</sup> Central lesions are more readily detected than peripheral lesions. Specificity is considered good at about 98 to 99 percent.

In general, cytologic classification of neoplasms agrees well with histologic classification, but varies considerably with cell type. Of clinical importance is the fact that small cell carcinoma has a characteristic cytologic appearance and can be specifically diagnosed with sputum examination. Correlation between cytopathology and histology in one large study was as follows: Squamous Cell Carcinoma 95 percent, Adenocarcinoma 88 percent, Bronchoalveolar Carcinoma 65 percent, Large Cell Carcinoma 81 percent, Small Cell Carcinoma 96 percent.<sup>10</sup>

*Pneumocystis carinii* is detected in 10 to 76 percent of induced sputum specimens from AIDS patients.<sup>14a</sup> Bronchoalveolar lavage (BAL) sampling is more sensitive and the preferred method for detecting *Pneumocystis carinii* infection. Direct immunofluorescent studies on BAL specimens can also increase sensitivity for *Pneumocystis carinii* detection. Viral inclusions are rarely identified in sputum specimens. The significance of yeast and bacteria is uncertain because of potential oral contamination.

## **Urine, Renal Pelvic Washings & Bladder Washings**

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### **PURPOSE:**

The major role of urinary tract cytopathology is the detection of neoplasms arising in the mucosa of the bladder, ureters, or renal pelvis. Changes associated with renal parenchymal disease are also found in cytologic specimens of urine and certain infectious conditions can be diagnosed.

### **PROCEDURE:**

#### Voided Urine:

1. Specimen is collected by patient. Be sure all specimens are collected "clean catch" and in properly labeled containers.
2. For optimal cytologic evaluation of urine, first-voided morning specimens should not be used.
3. Send immediately to the cytopathology laboratory with completed requisition. **Make sure to note that specimen is a voided urine.** If specimen cannot be sent immediately to the cytopathology laboratory, please refrigerate.
4. An alternative (especially if a delay in transport to the laboratory is anticipated) is to collect the specimen in a container of cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.) This is the preferred method at LDS Hospital, Alta View Hospital, Riverton Hospital, Park City Hospital, Intermountain Medical Center, Utah Valley Hospital and Dixie Regional Medical Center.

### Catheterized Urine:

1. Specimen is collected by clinician or nursing staff in a clean, properly labeled container and sent immediately to the Cytopathology Laboratory with completed requisition. **Make sure to note that specimen is a catheterized urine.**
2. An alternative (especially if a delay in transport to the laboratory is anticipated) is to collect the specimen in a container of cytopathology preservative obtained from the lab. (Formalin is never an appropriate cytopathology preservative.) This is the preferred method at LDS Hospital, Alta View Hospital, Riverton Hospital, Park City Hospital, Intermountain Medical Center, Utah Valley Hospital and Dixie Regional Medical Center.

### Renal Pelvis and Bladder Washings:

1. Using normal saline, the washing specimen is collected by a clinician in a clean, labeled specimen container. Specifically designate right or left pelvis washing.
2. Send immediately to the laboratory with a completed requisition. Indicate that the specimen is a washing.
3. At Utah Valley Hospital, add an equal volume of cytopathology preservative (obtainable from the lab) to the specimen. (Formalin is never an appropriate cytopathology preservative.)

### **SPECIMEN TRANSPORT:**

Urine specimens without preservative should be sent directly to the laboratory or refrigerated if any delay is anticipated. Unpreserved refrigerated urine is suitable for cytologic examination for 24 hours. If specimens cannot be refrigerated or if a long delay in transport is anticipated, the specimen should be collected in an equal volume of cytopathology preservative obtained from the laboratory. (Formalin is never an appropriate cytopathology preservative.) This is the method preferred at Utah Valley Hospital. There is no time limit in transport of these preserved specimens. Washings should be sent directly to the laboratory.

### **INTERPRETATION AND COMMENT:**

Urine cytopathology is traditionally used to detect urothelial neoplasia in patients with hematuria, in patients with a history of bladder carcinoma, or in patients at high risk of developing bladder carcinoma (workers exposed to aromatic amines or cadmium).

The overall sensitivity of urinary tract cytopathology in one large study was 83 percent (reported sensitivity in the literature varies from 47 to 97 percent).<sup>35</sup> The sensitivity varies considerably with the grade of the neoplasm. Papillomas and grade I carcinomas cannot be reliably diagnosed. The sensitivity for grade II carcinomas (suspicious and positive) is 80 percent and grade III (suspicious and positive) 94 percent.<sup>35</sup>

Urinary tract cytopathology has a special role to play in carcinoma in situ (CIS). These tumors are often difficult to visualize at cystoscopy but readily shed cells. The sensitivity for CIS is 98 percent.<sup>35</sup>

Urine cytopathology is insensitive for the detection of renal cell carcinoma and carcinoma of the prostate.<sup>36, 37</sup>

Specificity of urinary tract cytopathology is reported to be good with a false positive rate of 3 percent.<sup>35</sup> In addition to examination of the sediment for malignant cells, the laboratory also searches for casts, renal tubular epithelial cells, dysmorphic red blood cells, and crystals which may be seen in renal parenchymal disease.<sup>40</sup>

The source of the specimen and the method of collection should always be indicated on the requisition. Instrumented specimens (catheterized specimens and washings) typically contain numerous cell groups, which are considered abnormal in voided urine. Also, chemotherapy should be indicated since systemic cyclophosphamide, and intravesical thio-TEPA and mitomycin C produce cellular changes, which may mimic carcinoma.<sup>38,39</sup>

## Non-Gyn Cytopathology References

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1. ACTA CYTOLOGICA 29:1043-1046, 1985.
2. Acta Cytologica 35:47-50, 1991.
3. Conference of Gyn & OB Pathology, Harvard Medical School, Boston, 1992.
4. Acta Cytologica 33:843-848, 1988.
- 4a. Acta Cytologica 12:157-158, 1968.
5. JAMA 262:931-934, 1989.
6. JAMA 267:1892, 1992.
7. Obstet Gynecol 78:410-414, 1991.
- 7a. Acta Cytologica, 37:115-124, 1993.
8. Am. J. Ob. Gyn. 157:544, 1987.
- 8a. "Compendium on Diagnostic Cytology" (7th ed.) The Tutorials of Cytology, 1992, p. 108.
9. "Compendium on Diagnostic Cytology" (6th ed.) The Tutorials of Cytology, 1988, p. 33-42.
10. Johnston, W. Respiratory Tract Cytology. In Comprehensive Cytopathology. Edited by M. Bibbo. Saunders. p 381, 1991.
11. Ibid, p. 379.
12. Acta Cytologica 20:446-453, 1976.
13. Acta Cytologica 8:104-113, 1964.
14. ACTA CYTOLOGICA 14:560-565, 1970.
- 14a. Chest 95:136-138, 1989.
15. Cancer 26:911-913, 1970.
16. Ann. Int. Med. 101:1-7, 1984.
17. Am. Rev. Resp. D. 130:659-662, 1984.
- 17a. Lindner, J. Bronchoalveolar Lavage. In Cytopathology Annual. Edited by W. Schmidt p. 55-63, 1992.
18. Acta Cytologica 31:235-242, 1987.
19. Johnston, W. Respiratory Tract Cytology. In Comprehensive Cytopathology. Edited by M. Bibbo. Saunders. p 322.
20. Naylor, B. Pleural, Peritoneal and Pericardial Fluids. In Comprehensive Cytopathology. Edited by M. Bibbo W. B. Saunders. p. 609, 1991.
21. Ibid, p. 542.
22. Ibid, p. 582-583.
23. Ibid, p. 600.
24. Ibid, p. 591.
25. Ibid, p. 594.
26. Coleman et al. The Ultrastructure of Malignant Pleural Mesothelioma. In Pathology Annual. Edited by P. P. Rosen, R. E. Fechner. Appleton & Lange, p. 303-353, 1989.
27. Acta Cytologica, 34:465-473, 1990.
28. Naylor, B. Pleural, Peritoneal and Pericardial Fluids. In Comprehensive Cytopathology. Edited by M. Bibbo. W. B. Saunders p. 570, 1991.
29. Bigner, S. Central Nervous System Cytology. In Comprehensive Cytopathology. Edited by M. Bibbo. Saunders, p. 474, 1991.
30. Ibid, p. 475.
31. Ibid, p. 476.
32. Cancer, 37:2906-2911, 1976.
33. Bigner, S. Central Nervous System Cytology. In Comprehensive Cytopathology. Edited by M. Bibbo. Saunders, p. 477, 1991.
34. Ibid, p. 478
35. Kern, H. Urinary Tract Cytology. In Comprehensive Cytopathology. Edited by M. Bibbo. Saunders, p. 466, 1991.
36. Ibid, p. 461.
37. Urology, 21:417-420, 1983.
38. J. Urology, 134:671-674, 1985.
39. Cancer, 57:2119-2122, 1986.
40. Laboratory Management, 1(a):45-48.
41. Husain, O. Alimentary Tract Cytology. In Comprehensive Cytopathology. Edited by M. Bibbo. Saunders, p. 428, 1991.
42. Schwartz, M. Gastrointestinal Tract. In Clinical Cytopathology and Aspiration Biopsy. Edited by I. Ramzy. Appleton & Lange. p.226, 1990.
43. Ibid, p. 235-236.
44. JAMA 268:2541-2544, 1992.
- 44a. Koss, L. Diagnostic Cytology and Ids. Histologic Basis, 4th Ed. Lippincott, p. 1224, 1992.
45. Cancer, 58:1493-1498, 1986.

46. Silverman, J., Breast Cytology, In Comprehensive Cytopathology, Edited by M. Bibbo, Saunders, p. 704, 1991.
47. Ibid, p. 703.
48. Ann. Surg. 203:474-450, 1986.
49. Silverman, J., Breast Cytology, In Comprehensive Cytopathology, Edited by M. Bibbo, Saunders, p. 762, 1991.
50. Oertel, Y., Fine Needle Aspiration of Breast, Butterworths, p. 167-179, 1987. 51. Ibid, p. 192.
52. Ramzy, I., Clinical Cytopathology and Aspiration Biopsy, Appleton & Lange, p. 246, 1990.
53. Ling-Che, T., Liver and Pancreas, In Comprehensive Cytopathology, M. Bibbo Editor, Saunders, p. 481, 1991.
54. Ibid, p. 832-833.
55. Koss, L., Woyke, S., Olszewski, W., Aspiration Biopsy, Cytologic Interpretation and Histologic Bases, Igaku-Shoin, p. 289, 1984.
56. Ibid, p. 328.
57. Ibid, p. 329.
58. Ibid, p. 290, 323.
59. Ibid, p. 331.
60. Chest, 80:48-50, 1981.
61. Das, D., Lymph Node Cytology, In Comprehensive Cytopathology, Saunders, p. 686, 1991.
62. Ibid, p. 689.
63. Ibid, p. 699.
64. Ramzy, I., Clinical Cytopathology and Aspiration Biopsy, Appleton & Lange, p. 241, 1990.
65. Ling-Che, T., Liver & Pancreas, In Comprehensive Cytopathology, edited by M. Bibbo, Saunders, p. 841, 1991.
66. Ibid, p. 856.
67. Ibid, p. 849.
68. Ibid, p. 854.
69. Acta Cytologica, 29:503-512, 1985.
70. Lowhagen, T., Salivary Gland and Rare Head & Neck Lesions, In Comprehensive Cytopathology, Saunders, p. 640, 1991.
71. Davidson, H., Campera, H., Thyroid Cytology, In Comprehensive Cytopathology, edited by M. Bibbo, Saunders, p. 649, 1991.
72. Am. J. Med., 73:381-384, 1982.
73. Miller, J., Techniques of Fine Needle Aspiration, In Guides to Clinical Aspiration Biopsy, Thyroid, Edited by Kini, S., Igaker-Shoin, p. 5-12, 1987.
74. Cancer, 45:340-344, 1980.
75. Ramzy, I., Clinical Cytopathology and Aspiration Biopsy, Appleton & Lange, p. 290, 1990.
76. DeMax MD, Richard M. The Art & Science of Cytopathology
77. Iqbal, S., Friedel, D., Gupta, M., Ogden, L. and Stavropoulos, S., Endoscopic-Ultrasound-Guided Fine-Needle Aspiration and the Role of the Cytopathologist in Solid Pancreatic Lesion Diagnosis, Pathology Research International, vol 2012, Article ID 31767.

## **Patient Instruction Sheet**

### **FASTING PRIOR TO BLOOD COLLECTION**

Your clinician has ordered a laboratory test that requires you to be fasting when the blood specimen is collected. If your clinician has requested a glucose (blood sugar) test, you must not eat for at least 8 hours. If your clinician has requested lipid (cholesterol) testing, you should fast for 12 hours.

Please note the following:

- It is best to have the specimen drawn in the morning.
- While fasting, you may drink water.
- If you are taking medications prescribed by your clinician, continue to take your medications on schedule during the fast, unless your clinician has told you not to. Use water if you need liquid to take medications.

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015

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## **Hoja de Instrucciones Para el Paciente**

### **AYUNO PREVIO A LA RECOLECCION DE MUESTRA DE SANGRE**

Su médico ha ordenado un examen de laboratorio que requiere que usted esté en ayunas cuando se tome la muestra de sangre. Si su médico ha solicitado una prueba de glucosa (azúcar de sangre), usted no debe de comer por lo menos 8 horas. Si su médico ha solicitado una prueba de lípido (colesterol), usted debe ayunarse por 12 horas.

Por favor, note lo siguiente:

- Es preferible tomar la muestra por la mañana.
- Mientras ayuna, puede tomar agua.
- Si está tomando medicamentos recetados por su médico, continúe tomándolos a sus horas mientras ayuna, a menos que su médico le indique lo contrario. Use agua si necesita tomar medicamentos.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

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## Patient Instruction Sheet

### PATIENT INSTRUCTIONS AFTER BLOOD COLLECTION

The most common reaction to a blood draw is slight bruising. Bruising is rarely serious, but can cause soreness, tenderness, and discoloration. Here are some steps to take to relieve symptoms of bruising.

- Apply a cold compress intermittently for 10-15 minute periods to the bruised area during the first 24 hours.
- Apply a warm compress intermittently for 10-15 minute periods to the bruised area after the first 24 hours.
- Analgesics such as acetaminophen or ibuprofen may be helpful.
- Do not use the bruised arm for heavy lifting or vigorous exercise for at least 2 days.
- Bruising may last up to 2 weeks.

Other rare complications may occur. These may include:

- Oozing pus from site of blood draw.
- Swelling of the arm.
- Discoloration of a large portion of the arm.
- Numbness or tingling of the arm or hand.

**IF ANY OF THESE RARE COMPLICATIONS OCCUR, SEEK EMERGENCY MEDICAL CARE IMMEDIATELY.**

Revised 4/2006



## Hoja de Instrucciones Para el Paciente

### INSTRUCCIONES PARA EL PACIENTE DESPUES DE RECOLECTAR UNA MUESTRA DE SANGRE

La reacción más común después de tomar una muestra de sangre es un pequeño moretón. Estos moretones son rara vez serios pero pueden causar dolor, sensibilidad y descoloramiento. A continuación le ofrecemos algunos pasos a seguir para aliviar los síntomas causados por los moretones.

- Aplique en el área amoratada una compresa fría por 10 – 15 minutos en forma intermitente durante las primeras 24 horas
- Aplique en el área amoratada una compresa tibia por 10 – 15 minutos en forma intermitente después de las primeras 24 horas
- El uso de analgésicos tales como acetaminofeno o ibuprofen pueden ser de ayuda.
- No utilice el brazo amoratado para levantar cosas pesadas o realizar ejercicios vigorosos por lo menos 2 días después de la colección de la muestra.
- El moretón podría durar hasta dos semanas.

Otras complicaciones poco comunes que pueden ocurrir incluyen :

- Supuración del lugar de donde se extrajo la muestra de sangre.
- Hinchazón del brazo.
- Descoloramiento de una amplia zona del brazo.
- Adormecimiento u hormigueo del brazo o la mano.

**SI SE PRESENTA CUALQUIERA DE ESTAS COMPLICACIONES POCO COMUNES, BUSCA INMEDIATAMENTE LOS SERVICIOS MEDICOS DE EMERGENCIA.**

Revisado 4/2006



## Patient Instruction Sheet

### GLUCOSE TOLERANCE TESTING BLOOD COLLECTION

#### **Before the test:**

Please note the following general considerations:

1. For three days prior to testing perform normal activity and eat as you normally do. You should feel well on day of testing.
2. This test requires you to fast before the test is performed. **Fasting** means that you must not eat for at least 8 hours.
3. It is best to start the test in the morning.
4. While fasting, you may drink water.
5. If you are taking medications prescribed by your clinician, continue to take your medications on schedule during the fast, unless your clinician has told you not to. Use water if you need liquid to take medications.

#### **Test Procedure:**

1. When you arrive at the laboratory, blood for a fasting glucose will be drawn. You will be required to wait while the laboratory performs this test before continuing. Testing will not be done if you cannot stay.
2. Once your fasting glucose results are known, you will be given a drink that contains a standard amount of sugar, or glucose. Drink all of the liquid you are given over about a 5-minute period. Do not drink it too fast. Let the technician know when you are finished.
3. Depending on the test ordered by your clinician, one or more blood specimens will be drawn at precisely timed intervals. The technician will explain the times you will need to have blood specimens drawn. Remain seated in the laboratory during the testing period. Do not eat or smoke. You may drink water only.
4. Plan on spending 1 to 3 hours in the lab depending on which test is ordered by your clinician.

**After the test, do not drive if you feel lightheaded, dizzy, or weak.** You may wish to have a snack before leaving the facility.

If you have any questions, please contact your clinician or providing laboratory



## Hoja de Instrucciones Para el Paciente

### RECOLECCION DE SANGRE PARA EVALUAR LA TOLERANCIA A LA GLUCOSA

#### **Antes del examen:**

Por favor tenga presente las siguientes consideraciones generales:

1. Por tres días antes del examen, realice sus actividades normales coma normalmente. Usted debe sentirse bien el día del examen.
2. Este examen requiere que usted ayune antes de la prueba. Ayuno significa que usted no debe comer por lo menos 8 horas antes de que se le tome la muestra.
3. Es mejor comenzar el examen por la mañana.
4. Mientras está ayunando, puede tomar agua.
5. Si está tomando medicamentos recetados por su médico, continúe tomándolos a sus horas mientras ayuna a menos que su médico le indique lo contrario. Use agua solamente si necesita tomar medicamentos.

#### **Procedimiento:**

1. Cuando llegue al laboratorio, se le tomará una muestra de sangre para medir su glucosa en ayunas. Antes de continuar, se le requiere que espere a que el laboratorio obtenga el resultado de esta muestra. El examen no se llevara acabo si usted no puede esperar.
2. Una vez que sepamos los resultados de su glucosa en ayunas, se le dará una bebida que contiene una cantidad específica de azúcar o glucosa. Tome todo el líquido que le darán en un periodo de 5 minutos. No lo tome muy rápido. Avísele al técnico cuando lo haya terminado.
3. Dependiendo del examen ordenado por su médico, le tomarán una o más muestras de sangre a intervalos de tiempo exactos. El técnico le explicará a qué hora se le tomarán las muestras de sangre. Manténgase sentado en el laboratorio mientras dure el examen. No coma o fume. Sólo puede beber agua.
4. Planee pasar de 1 a 3 horas en el laboratorio dependiendo cual examen sea ordenado por su doctor.

**Después del examen, no maneje si se siente mareado o débil.** Antes de irse a casa puede comer algo ligero si lo desea.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio



## Patient Instruction Sheet

### Tuberculin Skin Test

#### WHAT IS IT?

The Mantoux tuberculin skin test (TST) is the standard method of determining whether a person is infected with *Mycobacterium tuberculosis*.

#### HOW IS THE TST ADMINISTERED?

A small amount of tuberculin purified protein derivative (PPD) is injected intradermally (just under the skin), which will produce a pale elevation of the skin (a wheal) 6 to 10 mm in diameter.

#### WHO CAN RECEIVE A TST?

Most persons can receive a TST.

TST is contraindicated only for persons who have had a severe reaction (e.g., necrosis, blistering, anaphylactic shock, or ulcerations) to a previous TST. These reactions are rare.

TST is not contraindicated for any other persons, including infants, children, pregnant women, persons who are HIV-infected, or persons who have been vaccinated with BCG.

#### CARE OF THE TEST SITE:

Do not put a bandage or lotion on the test spot.

Do not scratch the spot.

If the area itches, put an ice cube or cold cloth on it.

It is okay to get the spot wet, but do not wipe or scrub the area.

#### CONTACT YOUR CLINICIAN IMMEDIATELY IF ANY OF THE FOLLOWING REACTIONS OCCUR:

The following reactions are extremely rare and usually present within a few minutes of having the injection. You are advised to stay at the facility for 15 minutes after receiving your test.

Difficulty breathing - Feeling of "lump" in the throat - Wheezing - Feeling of tightness in the chest

Shortness of breath - Hives - Pruritis - Nonpitting edema - Nausea - Vomiting

Cramping abdominal pain - Diarrhea

#### WHO CAN READ YOUR TB SKIN TEST?

Only a healthcare provider can read your TB skin test results the correct way.

#### HOW OFTEN CAN TST's BE REPEATED?

In general, there is no risk associated with repeated TB skin test placements. If a person does not return within 48-72 hours for a TB skin test reading, a second test can be placed as soon as possible.

#### WHEN DOES THE TEST NEED TO BE READ?

The TB skin test must be read between 48 and 72 hours after administration.

A patient who does not return within 72 hours will need to be rescheduled for another skin test.

Date test given: \_\_\_\_\_ Time: \_\_\_\_\_

You may return to have your test read on: \_\_\_\_\_, \_\_\_\_\_ after \_\_\_\_\_ (48 hours)  
DAY DATE TIME

You must return no later than: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ am / pm (72 hours)  
DAY DATE TIME



## Hoja de Instrucciones Para el Paciente

### Prueba Cutánea de Tuberculina

#### ¿QUÉ ES?

La prueba cutánea de tuberculina Mantoux ("TST" por sus siglas en Inglés) es el método estándar para determinar si una persona está infectada con *Mycobacterium tuberculosis*.

#### ¿CÓMO SE ADMINISTRA LA TST?

Una pequeña cantidad de derivado proteico purificado de la tuberculina (PPD por sus siglas en inglés) se inyecta por vía intradérmica (justo debajo de la piel), la que producirá una elevación pálida de la piel (roncha pálida) 6 a 10 mm de diámetro.

#### ¿QUIÉN PUEDE RECIBIR LA TST?

La mayoría de las personas puede recibirla.

La TST está contraindicada sólo para personas que han tenido una reacción severa (por ejemplo, necrosis, ampollas, choque anafiláctico o ulceraciones) a una TST anterior. Estas reacciones son poco frecuentes.

La TST no está contraindicada para cualquier otra persona, incluyendo bebés, niños, mujeres embarazadas, personas infectadas por el VIH, o personas que han recibido la vacuna del bacilo de Calmette-Guérin (BCG por sus siglas en inglés)

#### EL CUIDADO DEL ÁREA DE LA PRUEBA:

No coloque vendaje o loción en el área de la prueba.

No se rasque el área de la prueba.

Si el área le pica, póngase un cubito de hielo o un paño frío

Está bien mojar el área de la prueba, pero no la frote ni la sobe.

#### COMUNÍQUESE CON SU MÉDICO INMEDIATAMENTE SI TIENE ALGUNA DE LA SIGUIENTES REACCIONES:

Las siguientes reacciones son extremadamente raras y generalmente se presentan a los pocos minutos de recibir la inyección. Se le aconseja que permanezca en las instalaciones durante 15 minutos después de recibir su prueba.

Dificultad para respirar – Sensación de "bulto" en la garganta – Sibilancias – Sentir el pecho apretado- Falta de aire para respirar – Urticaria (ronchas) – Prurito (granitos)– Edema no depresible – Náuseas – Vómitos – Dolor abdominal con calambres – Diarrea.

#### ¿QUIÉN PUEDE LEER SU PRUEBA DE TUBERCULINA?

Sólo un proveedor de servicios de salud puede leer correctamente el resultado de la prueba cutánea de tuberculosis.

#### ¿CON QUÉ FRECUENCIA PUEDE REPETIRSE LA TST?

En general, no hay riesgos asociados con la colocación repetida de la prueba cutánea de tuberculosis. Si una persona no regresa en el plazo de 48-72 horas para la lectura de la prueba cutánea de la tuberculosis, una segunda prueba se puede administrar tan pronto como sea posible.

#### ¿CUÁNDO SE NECESITA LEER LA PRUEBA?

La prueba cutánea de la tuberculosis debe leerse entre 48 y 72 horas después de su administración. Un paciente que no regresa dentro de 72 horas tendrá que hacer una nueva cita para otra prueba de la piel.

Fecha de la prueba: \_\_\_\_\_ Hora: \_\_\_\_\_

Usted puede volver para la lectura de su prueba en: \_\_\_\_\_, \_\_\_\_\_ después de \_\_\_\_\_ (48 horas)  
DÍA FECHA HORA

Usted debe regresar a más tardar \_\_\_\_\_, \_\_\_\_\_ am / pm (72 horas)  
DÍA FECHA HORA

Revisado 4/2015



## Patient Instruction Sheet

### RANDOM URINE SPECIMEN COLLECTION

1. Randomly collected urine specimens should be early morning specimens.
2. Collect specimen in a clean, dry container. Containers may be obtained from the laboratory. Urine containers from home **must be leak-proof**.
3. Urine specimens for culture must be midstream, clean catch urine. See collection procedures for clean catch urines. Make sure only urine is in the container, i.e., no fecal contamination, etc.
4. Label the specimen container (not the lid!) with your name, birth date and the date and time the specimen was collected.
5. Place the specimen container in a sealed plastic bag and take it to the laboratory within 1 hour. If delivery within 1 hour is not possible, refrigerate the specimen. Deliver the refrigerated urine to the lab within 18 hours of collection.

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015

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## Hoja de Instrucciones Para el Paciente

### RECOLECCION DE MUESTRA DE ORINA AL AZAR

1. Las muestras de orina al azar deben recolectarse temprano en la mañana.
2. Recolecte la muestra en un envase limpio y seco. Se pueden obtener envases del laboratorio. Si usa envases caseros éstos deben ser a prueba de derrames.
3. Las muestras de orina para cultivos deben ser “muestras limpias de orina”. Vea los procedimientos de recolección para obtener muestras limpias de orina. Asegúrese de que el envase solo tenga orina, es decir, sin contaminación fecal, etc.
4. Coloque una etiqueta en el envase que contiene la muestra (no en la tapa) con su nombre, fecha de nacimiento, la fecha y hora en que se recolectó la muestra.
5. Coloque el envase con la muestra en una bolsa de plástico sellada y llévela al laboratorio dentro de la primera hora de recolectada la muestra. Si no es posible debe refrigerarla y llevarla al laboratorio dentro de las 18 horas de su recolección.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

Revisado 8/2015

## **Patient Instruction Sheet**

### **URINE SPECIMEN COLLECTION FOR ROUTINE CULTURE (CLEAN-CATCH MIDSTREAM)**

Urine for a culture must be collected in such a manner as to minimize contamination as much as possible. Therefore, the middle of the urine stream is collected into a *sterile* container. It is important to follow these instructions closely to maintain sterility of the specimen.

NOTE: Children may need assistance.

Obtain a sterile specimen container and towelettes from the laboratory or clinician's office.

1. Wash your hands with soap and water.
2. Cleanse genital area with towelettes.
  - a. Females  
Separate folds of urinary opening with thumb and forefinger and clean inside with towelettes, using downward strokes only; keep folds separated during urination.
  - b. Males  
Clean head of penis.
3. Open specimen container. DO NOT TOUCH INSIDE OF CONTAINER OR LID.
4. Begin urination into toilet. As urination continues, bring container into stream.  
FILL CONTAINER ONLY HALF WAY. Finish urinating into toilet.
5. Screw lid onto specimen container. DO NOT TOUCH INSIDE OF LID.
6. Label the container (not the lid!) with your name, birth date and the date and time the urine was collected.
7. Place the specimen container in a sealed plastic bag and take it to the laboratory within 1 hour. If delivery within 1 hour is not possible, refrigerate the specimen. Deliver the refrigerated urine to the lab within 18 hours of collection.

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015





## Hoja de Instrucciones Para el Paciente

### RECOLECCION DE MUESTRA DE ORINA PARA UN CULTIVO DE RUTINA

(MUESTRA LIMPIA TOMADA DEL FLUJO PRINCIPAL DE LA ORINA)

La orina para cultivo debe ser recolectada cuidadosamente para evitar la contaminación de la muestra lo más posible. Es por esta razón que se recolecta la orina en un envase estéril. Es importante seguir estas instrucciones para mantener la esterilidad de la muestra.

NOTA: Los niños pueden necesitar ayuda.

1. Obtenga del laboratorio o de la oficina del médico un envase estéril para muestras y toallitas húmedas (“towelettes” por su nombre en inglés).
2. Lávese las manos con agua y jabón.
3. Limpie la zona genital con las toallitas húmedas
  - a. Mujeres  
Separe los pliegues de la abertura urinaria con el pulgar y el dedo índice y limpie con las toallitas húmedas, haciéndolo solamente de adelante hacia atrás; mantenga los pliegues de la piel separados mientras orina.
  - b. Hombres  
Limpie la cabeza del pene.
4. Abra el envase para la muestra. **NO TOQUE EL INTERIOR DEL ENVASE O DE LA TAPA.**
5. Comience a orinar en el excusado. Mientras continúe orinando, acerque el envase al chorro de orina. **LLENE EL ENVASE HASTA LA MITAD.** Termine de orinar en el excusado.
6. Enrosque la tapa en el envase de la muestra. **NO TOQUE EL INTERIOR DE LA TAPA.**
7. Coloque una etiqueta en el envase que contiene la muestra (no en la tapa) con su nombre, fecha de nacimiento, fecha y hora en que la orina fue recolectada.
8. Coloque el envase con la muestra en una bolsa de plástico sellada y llévela al laboratorio dentro de la primera hora de recolectada la muestra. Si no es posible debe refrigerarla y llevarla dentro de las 18 horas de recolección.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

Revisado 8/2015

## **Patient Instruction Sheet**

### **URINE SPECIMEN COLLECTION FROM INFANTS**

You will need a urine bag and a specimen container to properly collect this specimen. Obtain these from the clinician's office or from the laboratory.

#### **Follow these steps for collection and delivery of specimen:**

1. Bathe the infant in warm, soapy water. Cleanse genital area well.
2. Dry infant well. DO NOT apply powders, oils or lotions to the skin.
3. Remove paper on the urine bag to expose the adhesive.
4. Attach the urine bag.

**For girls**, stretch the skin around the urinary opening to remove skin folds. Press the adhesive firmly to the skin all around the vagina.

**For boys**, fit the bag over the penis and scrotum and press the adhesive firmly to the skin.

5. As soon as the infant urinates, open the specimen container. DO NOT TOUCH THE INSIDE OF THE CONTAINER OR LID.
6. Remove the bag. Peel off the plastic tab at the bottom of the bag and drain the urine into the specimen container.
7. Screw the lid tightly onto the specimen container. DO NOT TOUCH THE INSIDE OF THE LID.
8. Label the specimen container (*not the lid!*) with the infant's name, date of birth and the date and time the urine was collected.
9. Place the specimen container in a sealed plastic bag and take it to the laboratory within 1 hour. If delivery within 1 hour is not possible, refrigerate the specimen. Deliver the refrigerated urine to the lab within 18 hours of collection.

If you have any questions, please contact your clinician or providing laboratory



## Hoja de Instrucciones Para el Paciente

### RECOLECCION DE MUESTRA DE ORINA DE INFANTES

Usted necesitará una bolsa para la orina y un envase para muestras para recolectar esta muestra apropiadamente. Puede obtener estos materiales de la oficina del médico o del laboratorio.

#### **Siga estos pasos para la recolección y entrega de la muestra:**

1. Bañe al niño en agua tibia y jabonosa. Lave bien el área genital.
2. Seque bien al niño. NO aplique talcos, aceites o lociones en su piel.
3. Remueva el papel de la bolsa para la orina de manera que el adhesivo quede expuesto.
4. Coloque la bolsa para la orina.

**Para las niñas:** Estire la piel alrededor de la abertura urinaria para remover los dobleces de la piel. Presione firmemente el adhesivo en la piel alrededor de la vagina.

**Para los niños:** Acomode la bolsa sobre el pene y el escroto (saco que contiene los testículos) y presione firmemente contra la piel.

5. Abra el envase para la muestra en cuanto el niño orine. NO TOQUE EL INTERIOR DEL ENVASE O DE LA TAPA.
6. Remueva la bolsa. Remueva la lengüeta de plástico en la base de la bolsa y vacíe la orina dentro del envase para muestras.
7. Enrosque firmemente la tapa en el envase de la muestra. NO TOQUE LA PARTE INTERIOR DE LA TAPA.
8. Coloque una etiqueta en el envase que contiene la muestra (no en la tapa) con el nombre del infante, la fecha de nacimiento y la fecha y hora en que la orina fue recolectada.
9. Coloque el envase con la muestra en una bolsa de plástico sellada y llévela al laboratorio dentro de la siguiente hora después de terminar la recolección. Si la muestra no puede ser llevada al laboratorio dentro de 1 hora, debe refrigerarla y mantenerla fría hasta que pueda llevarla. Lleve la muestra de orina refrigerada al laboratorio dentro de las 18 horas de su recolección.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

Revisado 8/2015

## Patient Instruction Sheet

### 24-HOUR URINE SPECIMEN COLLECTION

Please note the following general considerations during collection period:

1. It is recommended to start the collection in the morning.
2. Refrigerate the collected urine throughout the entire collection period.
3. Avoid alcoholic beverages for 24 hours prior to collection.
4. Do not change your eating habits unless instructed by your clinician.
5. Do not drink more or less liquid than usual unless instructed by clinician.
6. Medications can be administered unless instructed differently by the clinician.

### COLLECTING THE SPECIMEN

1. Obtain a specimen container from the laboratory or clinician.
2. Empty your bladder into the toilet and write down the date and time you did this on the urine specimen container as the starting time of the collection.
3. Collect ***all urine you pass for the next 24 hours*** into the specimen container obtained from the laboratory or your clinician. Make sure all urine is collected. Come to the lab if another container is needed.

Note: If unable to urinate directly into the specimen container, you may first urinate into another ***clean*** container and then transfer it to the specimen container.

4. Keep the urine specimen container refrigerated for the full 24 hours.
5. 24 hours after the starting time of the collection, empty your bladder **into the container**. This is the ending time of the collection. Make sure you consult initial starting time (from Step 2, above) to ensure a complete 24 hour collection. Do not collect urine for more than 24 hours.
6. Label the specimen container (not the lid!) with your name, birth date and the date and time you began the collection.
7. Deliver the 24 hour urine specimen to the laboratory as soon as possible. If transport time is more than 30 minutes, please place the specimen container on ice.

**Check with laboratory personnel to see if a blood specimen is required to be drawn before leaving the lab.**

If you have any questions, please contact your clinician or providing laboratory



## Hoja de Instrucciones Para el Paciente

### RECOLECCION DE MUESTRA DE ORINA DURANTE 24 HORAS

Por favor tome en cuenta las siguientes consideraciones generales durante el período de recolección:

1. Es recomendable comenzar la recolección por la mañana.
2. Mantenga la orina refrigerada durante todo el proceso de recolección.
3. Evite bebidas alcohólicas por 24 horas antes de la recolección.
4. No cambie sus hábitos alimenticios a menos que se lo indique su médico.
5. No beba más o menos líquido de lo usual a menos que se lo indique su médico.
6. Se le pueden administrar medicamentos a menos que su médico indique algo diferente.

### **PASOS PARA RECOLECTAR LA MUESTRA**

1. Obtenga un envase para muestras en el laboratorio o en la oficina del médico.
2. Vacíe su vejiga en la taza de baño y escriba la fecha y la hora en el envase proporcionado por el laboratorio u oficina del médico. Este es el tiempo de comienzo de su colección.
3. Recolecte **toda la orina que haga en las próximas 24 horas** en el envase para muestras que obtuvo del laboratorio o de la oficina del médico. Asegúrese de recolectar toda la orina. Venga al laboratorio si necesita otro envase.

Nota: Si no puede orinar directamente en el envase, primero debe orinar en otro envase **limpio** y luego pasar la orina al envase para muestras.

4. Mantenga el envase para muestras refrigerado las 24 horas.
5. Veinticuatro horas después del tiempo de comienzo, vacíe su vejiga en el envase. Este es el fin de su colección. Asegúrese de consultar su hora de inicio (ver paso número 2) para asegurar una recolección completa por 24 horas. No recolecte orina por más de 24 horas.
6. Coloque una etiqueta en el envase que contiene la muestra (no en la tapa) con su nombre, fecha de nacimiento, la fecha y hora en que comenzó a recolectar la orina.
7. Lleve la muestra de orina de 24 horas al laboratorio tan pronto como le sea posible. Si su tiempo de traslado es mayor a 30 minutos, coloque las muestras en hielo.

**Antes de irse, consulte con el personal del laboratorio para saber si necesitan sacar una muestra de sangre.**

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio  
Revisado 8/2015



## Patient Instruction Sheet

### 24-HOUR URINE SPECIMEN COLLECTION FOR CREATININE CLEARANCE

Please read and fill out this form and return it to the lab with your 24-hour urine specimen.

#### COLLECTING THE SPECIMEN

Refrigerate the collected urine throughout the entire collection period. The accuracy of the analysis to be performed on the 24-hour urine specimen depends on the accuracy with which the specimen is collected.

1. Obtain a specimen container from the laboratory or clinician.

**IMPORTANT: A blood specimen is also required for Creatinine Clearance. If you can return the urine specimen to the lab within 48 hours of when you pick up the container, the specimen can be drawn at this time. If not, the blood specimen must be drawn when the urine specimen is delivered to the lab.**

2. Empty your bladder into the toilet and write down the date and time you did this on the urine specimen container as the starting time of the collection.
3. Collect **all urine you pass for the next 24 hours** into the specimen container obtained from the laboratory or your clinician. Make sure all urine is collected. Come to the lab if another specimen container is needed.

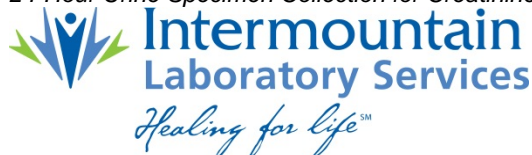
**Note:** If unable to urinate directly into the specimen container, you may first urinate into another **clean** container and then transfer it to the specimen container.

4. Keep the urine specimen container refrigerated for the full 24 hours
5. 24 hours after the start time of the collection, empty your bladder **into the container**. This is the ending time of the collection. Make sure you consult initial starting time (from Step 2, above) to ensure a complete 24 hour collection. Do not collect urine for more than 24 hours.
6. Label the specimen container (not the lid!) with your name, birth date and the date and time you began the collection.
7. Deliver the specimen to the laboratory as soon as possible. If transport time is more than 30 minutes, please place the specimen container on ice.
8. Have blood specimen drawn if not done at the time you picked up container.

|                                      |                         |
|--------------------------------------|-------------------------|
| PATIENT NAME:                        | DATE OF BIRTH:          |
| STARTING COLLECTION TIME:            | ENDING COLLECTION TIME: |
| HEIGHT:                      WEIGHT: | PHONE NUMBER            |
| FOR LAB ENTRY ONLY                   | TOTAL VOLUME:           |
|                                      | COLLECTION TIME:        |
|                                      | TECH INITIALS AND DATE: |

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015



## Hoja de Instrucciones Para el Paciente

### **RECOLECCION DE MUESTRA DE ORINA DURANTE 24 HORAS PARA LA DEPURACION DE CREATININA**

Por favor lea, complete y devuelva esta hoja al laboratorio junto con su muestra de orina de 24 horas.

#### **PASOS PARA RECOLECTAR LA MUESTRA**

Refrigere la orina durante todo el período de recolección. La exactitud del análisis que se hará en esta muestra de orina tomada durante 24 horas dependerá de la exactitud que se tenga para recolectar la muestra.

1. Obtenga un envase para muestras de la oficina del médico o del laboratorio.  
**IMPORTANTE:** También se requiere una muestra de sangre para Depuración de Creatinina. Si puede traer la muestra de orina al laboratorio en el período de 48 horas después de haber recogido el envase, se podría tomar la muestra de sangre al momento de recoger el envase para muestras. De no ser así, la muestra de sangre tiene que tomarse cuando la muestra de orina sea devuelta al laboratorio.
2. Vacíe su vejiga en la taza de baño y escriba la fecha y la hora. Este es el tiempo de comienzo de su colección.
3. Recolecte toda la orina que haga en las próximas 24 horas en el envase para muestras que obtuvo del laboratorio o de la oficina del médico. Asegúrese de recolectar toda la orina. Venga al laboratorio si necesita otro envase.  
**Nota:** Si no puede orinar directamente en el envase, primero debe orinar en otro envase limpio y luego pasar la orina al envase para muestras
4. Mantenga el envase para muestras refrigerado las 24 horas.
5. Veinticuatro horas después del tiempo de comienzo, vacíe su vejiga en el envase. Este es el fin de su colección. Asegúrese de consultar su hora de inicio (paso 2) para asegurar una recolección de 24 horas. No recolecte orina por más de 24 horas.
6. Coloque una etiqueta en el envase que contiene la muestra (no en la tapa) con su nombre, fecha de nacimiento, fecha y hora en que comenzó a recolectar la orina.
7. Lleve la muestra al laboratorio tan pronto como le sea posible. Si su tiempo de traslado es mayor a 30 minutos, coloque las muestras sobre hielo.
8. Pida que le tomen una muestra de sangre si es que no lo hizo en el momento de recoger el envase para muestras.

|  |                                   |
|--|-----------------------------------|
| Nombre del Paciente:                               | Fecha de Nacimiento:              |
| Hora de Inicio de la Recolección:                  | Hora de Término de la Recolección |
| Estatura:                      Peso:               | Número telefónico                 |
| Solo Para uso del Laboratorio (for Lab entry only) | Volúmen Total:                    |
|  | Hora de recolección:              |
|  | Iniciales del técnico y fecha:    |

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio  
Revisado 8/2015

## **Patient Instruction Sheet**

### **STOOL (FECAL) SPECIMEN COLLECTION**

Please note these general considerations when collecting a stool specimen:

1. The lab or clinician's office will provide you with containers and supplies for collecting a specimen.
2. Your clinician may order any combination of tests on stool, and may order them more than once. Please write your name, date of birth and the date and time of collection on each container.
3. Avoid laxatives and anti-diarrheal products (such as Kaopectate, etc.), mineral oil, and activated charcoal tablets for a period of 2-3 days before the test. Avoid the administration of a barium enema for 2-3 days prior to and during the collection of the test.
4. The stool specimen should be collected in a container with a tight-fitting lid with no added preservatives. The container should be refrigerated throughout the collection period and during transport to the laboratory.
5. Do not send any paper products, such as toilet paper, with the specimen.
6. **Do not overfill container. Make sure lids are secured tightly to prevent leaking!**
7. If you have questions about medication please contact your clinician.
8. Additional containers may be required. Contact your clinician's office for information about appropriate containers.

### **COLLECTION STEPS**

1. Collect specimens as directed.
2. Specimen containers (not lids!) should be labeled with patient name, date of birth, collection date and time.
3. Place specimen container in sealed plastic bag or sealed secondary container.
4. Return specimen to laboratory as soon as possible.

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015





## **Hoja de Instrucciones Para el Paciente**

### **RECOLECCION DE MUESTRA DE MATERIA FECAL (EXCREMENTO)**

Por favor tome en cuenta las siguientes consideraciones generales cuando recolecte una muestra de excremento:

1. El laboratorio o la oficina del médico le proporcionarán los envases o suministros para recolectar las muestras.
2. **Su médico puede ordenar varias combinaciones de exámenes en el excremento, u ordenar exámenes más de una vez. Escriba su nombre, la fecha de nacimiento y la fecha y hora de colección en el envase.**
3. Evite laxantes y productos contra la diarrea (tales como Kaopectate, etc.), aceite mineral y pastillas de carbón por un periodo de 2 a 3 días antes del examen. Evite la administración de enemas de bario por 2 a 3 días antes y durante la recolección del examen.
4. La muestra de excremento debe ser recolectada en un envase con tapa bien ajustada sin preservativos. El envase deberá ser refrigerado durante todo el periodo de recolección y durante su transporte al laboratorio.
5. No envíe ningún producto de papel junto con la muestra, como por ejemplo, papel higiénico.
6. **No llene los envases por encima de su capacidad. Asegúrese que las tapas están bien aseguradas para prevenir derrames.**
7. Si tiene preguntas respecto a medicamentos, por favor comuníquese con su médico.
8. Si requiere de envases adicionales contacte al consultorio de su médico para información sobre envases apropiados.

### **PASOS PARA LA RECOLECCION**

1. Recolecte las muestras como se lo indiquen.
2. Los envases con las muestras (no las tapas) deben tener el nombre del paciente, la fecha de nacimiento y la fecha y hora de la recolección.
3. Ponga el envase con la muestra adentro de una bolsa de plástico sellada o un envase secundario sellado.
4. Traiga la muestra al laboratorio lo antes posible.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

## Patient Instruction Sheet

### STOOL (FECAL) SPECIMEN COLLECTION FROM INFANTS

You will need a urine bag, clean container and clean diaper to properly collect this specimen. Obtain urine bag from the clinician's office or from the laboratory. The urine bag is used to prevent urine from contaminating the stool specimen.

1. Attach the urine bag.
  - A. **For girls**, stretch the skin around the urinary opening to remove skin folds. Press the adhesive firmly to the skin all around the vagina.
  - B. **For boys**, fit the bag over the penis and scrotum and press the adhesive firmly to the skin.
2. Begin with a clean diaper (either disposable or cloth).
3. Line the diaper with a clear plastic wrap (e.g., Saran Wrap) and place the diaper on the infant. If plastic is not used, the specimen may be absorbed into the diaper, especially if the infant has diarrhea. This may make the specimen unacceptable for culture.
4. Watch the infant closely until there is a bowel movement.
5. Immediately remove the soiled diaper and scrape a portion of the specimen into either a clean container with a screw-capped lid, or the vials provided with a stool collection kit from the clinician's office or laboratory.
6. Specimen containers (not lids!) should be labeled with the patient's name, date of birth, collection date, and time.
7. Place the specimen container inside a sealed plastic bag or sealed secondary container for transport to the laboratory.

**IMPORTANT: DO NOT SEND THE SOILED DIAPER!** The lab will not accept diapers. The stool specimen must be removed from the diaper as soon as possible.

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015



## Hoja de Instrucciones Para el Paciente

### RECOLECCION DE MUESTRA DE MATERIA FECAL (EXCREMENTO) EN INFANTES

Usted necesitará traer una bolsa para la orina, un envase limpio y un pañal limpio para recolectar la muestra apropiadamente. Puede obtener una bolsa para la orina en la oficina del médico o en el laboratorio. La bolsa para la orina se utiliza para prevenir que la orina contamine la muestra de excremento.

1. Cómo colocar la bolsa de orina.
  - a. Para las niñas:** Estire la piel alrededor de la abertura urinaria para remover los dobleces de la piel. Presione firmemente el adhesivo en la piel alrededor de la vagina.
  - b. Para los niños:** Acomode la bolsa sobre el pene y el escroto (saco que contiene los testículos) y presione firmemente contra la piel.
2. Comience con un pañal limpio (ya sea desechable o de tela)
3. Cubra el pañal con un plástico transparente para envolver (ej. Saran Wrap) y ponga al niño encima. Si no usa el plástico, el pañal podría absorber la muestra, especialmente si el infante tiene diarrea. Esto puede hacer que la muestra no sea aceptable para un cultivo.
4. Observar detenidamente al infante hasta que haga excremento.
5. Remueva inmediatamente el pañal sucio y recolecte una muestra de excremento y colóquela en un envase limpio con tapa de rosca, o en los frascos que le hayan dado en la oficina del médico o en el laboratorio junto con el equipo para recolectar la muestra.
6. Los envases con las muestras (no las tapas!) deben tener el nombre del paciente, la fecha de nacimiento y la fecha y hora de la recolección.
7. Ponga el envase con la muestra adentro de una bolsa de plástico sellada o un envase secundario sellada para transportar al laboratorio.

**IMPORTANTE: ¡NO ENVIE EL PAÑAL SUCIO!** El laboratorio no aceptará pañales. La muestra de excremento deberá ser removida del pañal lo más rápido posible.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

Revisado 8/2015

## **Patient Instruction Sheet**

### **FECAL OCCULT BLOOD COLLECTION**

1. The laboratory will provide you with a set of testing cards or a clean leak-proof container.
2. Follow the directions on the package.
3. When completed, return in the envelope provided or in a leak-proof container.

If you have any questions, please contact your clinician or providing laboratory

Revised 8/2015

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## **Hoja de Instrucciones Para el Paciente**

### **RECOLECCION DE MATERIA FECAL (EXCREMENTO) PARA DETECTAR SANGRE OCULTA.**

1. El laboratorio le proporcionará unas tarjetas para exámenes o un envase limpio a prueba de derrames.
2. Siga las instrucciones del paquete.
3. Una vez completada la muestra, devuélvala o envíela en el envase o en el sobre que se le proporcionó.

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio

Revisado 8/2015

## Patient Instruction Sheet

### Collecting Your Stool Specimen

**Please read these directions carefully before collecting your specimen.**

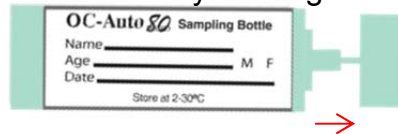
1. Fill in all required information on the specimen bottle.



2. Place supplied “hat” in the toilet (set it on the seat).
3. Have a bowel movement in the “hat”.

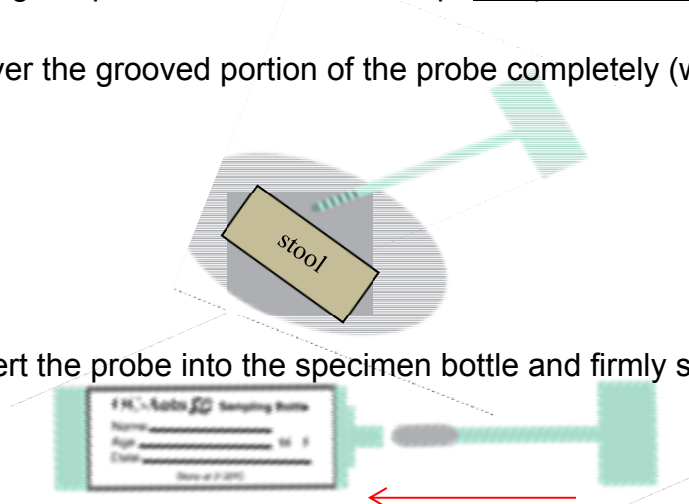


4. Open the specimen bottle by twisting and lifting the green cap.



5. Using the probe attached to the cap, scrape the surface of the feces (stool).

Cover the grooved portion of the probe completely (with stool).



6. Insert the probe into the specimen bottle and firmly snap the cap to close it.

7. Place the specimen bottle in the provided **specimen bag**.



8. Deliver the specimen and accompanying paperwork to the laboratory as soon as possible.

After being emptied into the toilet, the “hat” may be discarded with your regular trash.

If you have any questions, please contact Client Services, **801-507-2110** or **1-877-353-1106**.

Revised 9/2014

## Patient Instruction Sheet

### SEMEN ANALYSIS SPECIMEN COLLECTION

1. Avoid ejaculation for 2 to 7 days prior to specimen collection. Masturbation without lubricants is the only acceptable method of collection. **Specimens collected by any other method will be rejected.**
2. Collect single **entire** ejaculate into a clean, dry, plastic container. Do not use condoms, spermicides or lubricants.
3. Label specimen with your full name, birth date, and date and time of collection.
4. **Deliver specimen to laboratory within 30 minutes of collection.** Keep specimen as close to body temperature as possible. Do not let specimen get too hot or too cold. (For example, keep container in a pocket close to your body.)
5. **Due to testing personnel constraints, the laboratory can only accept specimens for analysis Monday through Friday, 8:00 AM until 3:00 PM (excluding holidays). If unable to deliver specimen during these hours, contact the laboratory to make special arrangements.**
6. Contact your clinician for results and interpretation. Please do not call the laboratory for results. Your clinician is the best person to explain and interpret the meaning of test results.

#### ***Patient Information***

***Important: Bring this form when delivering specimen to the laboratory.***

Please fill out the following:

Patient Last Name \_\_\_\_\_ First Name \_\_\_\_\_

Patient birth date \_\_\_\_/\_\_\_\_/\_\_\_\_

Clinician \_\_\_\_\_

Date of Collection \_\_\_\_\_ Time of Collection \_\_\_\_:\_\_\_\_ AM/PM

Reason for Analysis (check one):

|  |   |   |
|--|---|---|
| <input type="checkbox"/> Infertility<br>Name of associated female (for infertility only - optional)<br>_____<br>_____<br><input type="checkbox"/> Not applicable | <input type="checkbox"/> Post-Vasectomy | <input type="checkbox"/> Other (describe)<br>_____<br>_____ |
|--|---|---|

Was the specimen collected by masturbation without lubricants? Yes  No

Type of specimen container:

Sterile plastic cup (**recommended**)  other (describe) \_\_\_\_\_

Days of abstinence \_\_\_\_\_

Were there any collection or specimen transport problems? (For example, specimen not kept warm during transport, did not collect entire specimen, etc.):

No Problems

Problems (describe) \_\_\_\_\_

If you have any questions, please contact your clinician or the providing laboratory



## Hoja de Instrucciones Para el Paciente

### RECOLECCIÓN DE MUESTRA PARA ANÁLISIS DE SEMEN

1. Evite eyacular por 2-7 días antes de recolectar la muestra. La única forma de recolección aceptada es por masturbación sin el uso de lubricantes. Las muestras recolectadas por cualquier otro método serán rechazadas.
2. Recolecte una eyaculación completa en un envase plástico limpio y seco. No utilice condones, espermicidas o lubricantes.
3. Coloque una etiqueta en el envase de la muestra con su nombre completo, fecha de nacimiento y fecha y hora de recolección de la muestra.
4. **Lleve la muestra al laboratorio dentro de los primeros 30 minutos de recolección (máximo 60 minutos).** Mantenga la muestra a temperatura corporal tanto como le sea posible. No permita que la muestra se caliente mucho o se enfríe demasiado. (Por ejemplo, mantenga el envase en un bolsillo cerca de su cuerpo.)
5. Debido a que el personal que realiza este examen es limitado, el laboratorio sólo puede aceptar muestras para análisis de lunes a viernes, de 8:00 a.m. a 3:00 p.m., excluyendo días festivos. Si no le es posible llevar la muestra durante estas horas, comuníquese con el laboratorio para hacer arreglos especiales.
6. Comuníquese con su médico para obtener los resultados. Por favor, no llame al laboratorio para pedir resultados. Su médico es la persona adecuada para explicarle el significado de los resultados de su examen.

### Información del Paciente

Importante: Traiga esta hoja con la información requerida cuando entregue la muestra al laboratorio. Por favor complete la siguiente información:

Apellido del paciente \_\_\_\_\_ Nombre del paciente \_\_\_\_\_

Fecha de Nacimiento del Paciente \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Médico \_\_\_\_\_

Fecha y hora de la recolección \_\_\_\_\_

Razones para realizar este análisis (marque uno):

|  |   |   |
|--|---|---|
| <input type="checkbox"/> Infertilidad  | <input type="checkbox"/> Postvasec<br>tomía | <input type="checkbox"/> Otro<br>(describa) |
| Nombre de la mujer relacionada (por infertilidad, solo opcional)<br>Apellido del paciente _____<br>Nombre del paciente _____ |   |   |
| <input type="checkbox"/> No aplica   |   |   |

¿Se recolectó la muestra por masturbación sin el uso de lubricantes?? Si  No

Tipo de envase de recolección:  Envase estéril para muestras (recomendada)  Otro (describa) \_\_\_\_\_

Días de Abstinencia \_\_\_\_\_

¿Hubo algún inconveniente para tomar o transportar las muestras? (por ejemplo, la muestra no se mantuvo junto al cuerpo durante el traslado, no se recolectó la muestra completa, etc.)

No problemas

Problemas (describa) \_\_\_\_\_

Si tiene alguna pregunta, por favor comuníquese con su médico o con el laboratorio  
Revisado 7/2016