Special Instructions for Collection of Specimens
by Nursing Personnel for Laboratory Testing

I. Principal

There are several laboratory tests or groups of tests from specific sources or for certain conditions that require extensive instructions on ordering, patient preparation, collection, handling or processing of samples. These instructions are too lengthy to put in the Boone Hospital Center Laboratory Catalog.

II. Supplies or Equipment

Each individual procedure will outline if any supplies or equipment is needed.

III. Procedure

Each procedure of special instructions is formatted in a style that is similar to Boone Hospital Center Nursing Standards. Each specific scenario/test type follows in alphabetical order.

Alcohol, Legal Blood

(Drawing Legal Alcohol Determination)

Note: This is the procedure followed by Laboratory Personnel when a legal alcohol is requested by law enforcement personnel

1. Take the laboratory Legal Blood Alcohol and Legal Drug Screen Record book with you when you are called to the emergency department or nursing floor.

2. Obtain positive identification of the patient, confirm that the patient knows what you are drawing.

3. Review the completed State Blood Alcohol form to assure the patient has no more than two chemical analysis performed.

4. Prepare the phlebotomy site using a non-alcoholic antiseptic.

5. Obtain the blood sample using a sterile needle and gray stoppered tube. You may use a tube kit supplied by the law enforcement officer.

6. Label the tube with the patient's name, the date/time of the draw and your initials.

7. Hand the tube to the law enforcement officer.

8. Complete the Laboratory Legal Blood Alcohol Phlebotomy Form in duplicate and give the officer a copy. Place the original in the back of the Laboratory Out-Patient Legal Blood Alcohol Record Book..

Ammonia

1. The blood must be drawn in EDTA. The tube must be at least 1/2 full. Place in a ziplock bag filled with ice and send immediately to the lab. The lab needs to process the sample within 15 minutes.

2. Keep tube stoppered, do not expose specimen to air.

Blood Gas

1. Blood Gases are done on arterial blood unless the physician requests venous gases.

2. Respiratory therapists and lab assistants are available on all shifts to draw the arterial samples. If difficulty is encountered, the physician may be asked to perform the arterial puncture.

3. Respiratory Therapy is responsible for collection of ABG's on the critical care units. Beep RT through the switchboard to alert them of the order.

4. Patients 2 years and younger will be drawn by the physician or by Intensive Care Nursery RN.

Blood Gas (cont)

5. A blood gas includes a pH, PCO2, PO2, measured oxygen saturation, bicarbonate, base excess.

6. When ordering ABG's include O_2 amount, device type, time on device, and temperature if ABG is to be corrected.

7. If results are needed at the bedside, order contact the laboratory or RT to perform the ABG by i-STAT.

Body Fluids

Malignant cells (Cytology)

1. When submitting body fluids for Cytology examination or PAP stain for malignant cells, the specimen must be sent immediately to the lab with an EPIC generated Cytology LAB8034 printed requisition.

2. Large volumes of specimen can be submitted in a vacuum bottle. Place 0.5 ml to 1.0 ml (10,000 U) Heparin in vacuum bottle before collection. Mix well during collection.

3. Specimens with a small volume (less than 15 ml), place 0.1 m (10,000 u) Heparin in tube before collection and mix immediately.

Cell Count and Differential; Crystals

1. Submit purple or green top tube for cell count only.

2. If crystals are requested on joint fluid submit a green top tube.

Chemistry (Protein, Glucose, LDH)

1. Chemistries can be submitted in green or red top tubes.

pH

1. Specimen should be collected in a blood gas syringe, labeled, placed on ice and sent to the laboratory ASAP.

Bone Marrow

1. Bone Marrow examinations are performed by a physician. Call the Hematology Department at ext 3466 to arrange a time for the exam. If the bone marrow is to be performed in the operating room or in Interventional Radiology , the ordering physician is responsible for ordering the procedure in EPIC. An order must be placed in EPIC for a Bone Marrow Biopsy Notification (LAB 6041) This alerts the laboratory to the special orders needed on the specimens.

2. The patient (or patient's guardian) must sign a Bone Marrow Permit before the procedure can be performed.

3. All bone marrows are accompanied by a CBC, diff, and retic count. Any orders regarding the bone marrow need to be conveyed to Hematology prior to the bone marrow, so they can bring all applicable specimen collection media.

4. While nursing personnel does not need to assist with the collection of the bone marrow, it is very helpful if they remain with the patient during the procedure.

5. Nursing personnel are responsible for safe disposal of the bone marrow tray and sharps.

Catecholamines Fractionated
Plasma, Free

1. Discontinue any epinephrine, norepinephrine, or dopamine injections/infusions at least 12 hours before specimen collection, unless drug monitoring is the goal.

2. Discontinue drugs that release or hinder metabolism of epinephrine, norepinephrine, or dopamine for at least 1 week before obtaining the specimen. If this is not possible for medical reasons, contact the pathologist to discuss whether a shorter drug-withdrawal period may be acceptable.

3. Do not perform the test on patients withdrawing from legal or illegal drugs known to cause rebound plasma catecholamine release during withdrawal.
4. Patient must not use tobacco, drink coffee or tea, or eat anything for four hours prior to the specimen being drawn.

5. Calm the patient by giving complete instructions and reassurance regarding the procedure.

6. Preparation should also include the placement of an indwelling, intravenous catheter. Flush with 3.0 ml NaCl using positive pressure.

7. Patient should rest 30 minutes in supine position in quiet room before specimen is obtained

8. At the end of 30 minutes, withdraw and discard a minimum of 3.0 ml blood to flush out saline before obtaining specimen.

9. Specimen is drawn into two, chilled 10 ml EDTA meta-bisulfate tubes available from the lab.

10. Label specimens per laboratory protocol and send on ice immediately to the laboratory

Catecholamines, Fractionated, Free
24 hour Urine

PATIENT PREPARATION:

1. Assay is of most value when collected during hypertensive episode.

2. Discontinue any epinephrine, norepinephrine, or dopamine injections/infusions at least 12 hours before specimen collection, unless drug monitoring is the goal.

3 Discontinue drugs that release or hinder metabolism of epinephrine, norepinephrine, or dopamine for at least 1 week before obtaining the specimen. If this is not possible for medical reasons, contact the pathologist to discuss whether a shorter drug-withdrawal period may be acceptable.

4. Do not perform the test on patients withdrawing from legal or illegal drugs known to cause rebound plasma catecholamine release during withdrawal.

5. Obtain 24 hour urine collection jug with 25 ml 50% acetic acid from laboratory.

Cervical/Vaginal Collection for Cytologic Examination

1. Assemble needed Equipment—Surepath vials, PathGroup requisition and brush from Histology laboratory.

2. Collection of specimen--The cervical/vaginal specimen is collected by the attending physician. The procedure is the same as genital culture in the Microbiology section of manual.

3. Label container, complete requisition with requisite information and hand carry to the laboratory.

Tzank Smear

Skin (Viral) Lesion

1. Specimen is a scraping (cells) of vaginal endocervical lesions. It is collected as follows:

    a. Obtain slides and slide holder from Laboratory
    b. Clean surface of open lesion with saline and gently blot dry.
        i. Closed lesion must first be incised around edge with scalpel and crust/dome removed.

    c. Allow transudate to accumulate.
    d. Rub the base of the lesion with the blunt end of a cotton applicator stick, spatula or curette.
    e. Roll the sample thinly over an area of slide and air dry.
    f. Place slides in holder. Label according to Laboratory policy. Order Cytology LAB8034, print requisition and hand carry to the laboratory.

2. General Information:
    a. No fixative on slide is preferred. But fixed slides will be accepted.
    b. Slides will be examined by pathologist.

CSF (Cerebral Spinal Fluid) Examination:

1. Specimen is collected by physician and labeled according to general laboratory procedure and **hand** delivered ASAP to the laboratory.

2. Specimen is typically submitted in calibrated screw-top tubes that are included in lumbar puncture kits.

3. If a limited amount of specimen is obtained, please list the tests in order of priority in the order comments.

4. All CSF specimens should be sent to the laboratory and are required to have at least a SAVECSF test ordered on it. Anytime a CSF arrives in the lab without orders, they will request this order if the physician has not made orders.

Common CSF Orders:

1. Cell Count - 0.5 to 1.0 ml

2. Chemistry
   a. CSF Protein and Glucose - 0.5 ml to 1 ml.
   b. Electrophoresis 2.5 ml
   c. Oligoclonal Bands-0.5 ml
   d. MS Profile (IGGINDEX + OLIG Bands)1.5ml. Additionally one blood SST tube needed.

3. Serology
   a. VDRL - 0.5-1ml. Must send SST tube in addition to CSF.
   b. Cryptococcal Antigen 0.5-1.0 ml.

4. Cytology (Cytology Requisition) - 2 ml.

5. Culture with gram stain.

Chromosome (Karyotyping) Studies to Integrated Oncology

1. Chromosome studies may be performed on peripheral blood, bone marrow, fresh tissue or products of conception.
2. Call laboratory to obtain conical specimen tube for tissue containing RPMI media or sodium heparin vacutainer tube for blood. The laboratory will also send the appropriate Cytogenetics requisition. This needs to be fully filled out with diagnosis and patient and family history. For peripheral blood testing an EPIC order for either Peripheral Blood or Leukemia/Lymphoma should be made. For tissues or bone marrows the order can be included in the Bone Marrow Notification or the Surgical Pathology order.

3. For fetal demise, specimen required will be determined by the status of the infant and will be collected by the ordering physician. NOTE: If attending obstetrician or neonatologist cannot collect, beep the pathologist on call.

   a. Infant not macerated:
      (1) 1 cm section of skin from posterior body **and**
      (2) Entire spleen **or** 1 cm cube of liver
   b. Infant macerated:
      (1) 2 cm^2 by 2-5 mm section from the fetal surface of the placenta after it has been washed with normal saline. Specimens containing a portion of the maternal surface are considered contaminated and unusable.

Chromosome (Karyotyping) Studies to Integrated Oncology (cont)

4. Label specimen container with:
    a. Date
    b. Time
    c. Patient name and MRN (live birth) or Mother's name and MRN (stillbirth)
    d. Initials of collector
    e. Name of test "Cytogenetics or Microarray"

5. Complete Cytogenetics Test Form (obtained from laboratory)
    a. Patient name is the Mother's name on fetal demise, baby's name on live birth.
    b. Physician needs to fill out Indication/diagnosis and sign the order form
    c. Attach to specimen container and hand-deliver to the Histology Laboratory Monday-Friday 0500-1630 or to Hematology during evening and night shifts.
    d. Indicate the test needed Cytogenetics or Microarray.

6. Note that it is important to deliver the specimen immediately after collection to ensure appropriate refrigeration. **DO NOT** send the specimen through the pneumatic tube.

Employer Requested Urine Drug Screen and Breath Alcohol testing(Urine/BAT

The laboratory does not provide employee requested urine drug screens and/or breath alcohol testing. Patients presenting will be referred to Occupational Medicine of Missouri or Boone Convenience Care.

Fetal Lung Maturity Testing

Fetal Lung Maturity testing is not available in-house

1. Notify lab as early as possible before amniocentesis.

2. Lamellar Body Count testing is available from the Women's and Children's on a routine basis Monday-Friday. Specimen must be in laboratory by 10 am to assure same day results.

3. The laboratory needs a minimum of 5 ml, preferably 10 ml of amniotic fluid that does not contain blood.

4. Label according to general laboratory procedures. Order test as Miscellaneous Lab Test (LAB000.) Include gestational age in weeks.

5. Keep specimen iced, protected from light, and transport to lab immediately.

Fetal Fibronectin Specimen Collection

A. Patient Selection

1. Fetal Fibronectin tests are not intended for use in women with moderate or gross vaginal bleeding. The presence of blood may produce a false positive result.
2. Fetal Fibronectin is a test for accessing the risk for pre-term delivery. Fetal Fibronectin is elevated in the first 24 weeks of pregnancy but diminishes between 24 and 34 weeks. False positives will result if the patient is less than 24 weeks or greater than 34 weeks pregnant.
3. Specimens should not be tested if the patient has had sexual intercourse within 24 hours prior to the sampling time. The presence of sperm will cause a false positive.

B. Precautions

1. Care must be taken not to contaminate the swab or cervicovaginal secretions with lubricants, soaps, disinfectants or creams.
2. Specimens should be obtained prior to digital cervical examination or vaginal probe ultrasound examinations as manipulations of the cervix may cause the release of fetal fibronectin.

C. Materials needed

1. Rapid FN Specimen Collection Kit from Adeza Biomedical
   a. Sterile polyester tipped swab
   b. Specimen transport tube containing 1 ml of extraction buffer.
2. Gloves

D. Collection of Specimen

1. Collect specimen prior to digital examination or manipulation of the cervix to avoid sample contamination.
2. Insert swab from the collection kit into the vagina and lightly rotate sterile swab across the posterior fornix of the vagina for approximately 10 seconds to absorb cervicovaginal secretions. Subsequent attempts to saturate the swab may invalidate the test.

5-HIAA (5-Hydroxyindoleacetic acid)

1. Patient Preparation—Patient should not eat avocados, bananas, eggplant, pineapples, plums, tomatoes, butternut squash, cantaloupe, dates, grapefruit, hickory nuts, honeydew, kiwi fruit, melons, nuts, pecans, plantains or walnuts for a 48 period prior to collection.

2. Obtain 24 hour urine container from the laboratory that contains 25 ml. 50% acetic acid.

3. Label according to General Laboratory policy.

Platelets-Special Concerns

The laboratory staff may contact the nursing personnel collecting blood from patients that have special handling and collection needs due to platelet conditions. Those are as follows:

1. **Platelets greater than 800 x 10^3** – green (lithium heparin) top tubes need to be collected on patients with high platelet counts to assure an accurate Potassium level. This would be on orders for (Potassium, Electrolytes, BMP, CMP, and RFP.)

2. **ETDA Clumping of Platelets** –there are patients that their platelets react adversely in vitro to EDTA which is the additive in lavender top tubes. On these patient the laboratory will request that you draw three tubes (lavender, green and blue), keep them warm and transport immediately to the laboratory. A heel warmer works adequately to warm the specimen. You may obtain one from the laboratory.

Primary Renin Activity

1. When screening for primary aldosteronism, no preparation is required. The plasma renin activity cannot be interpreted if the patient is being treated with spironolactone [Aldactone®]. Spironolactone should be discontinued for 4 to 6 weeks before testing.

2. When performing renal vein renins to investigate renovascular hypertension, the angiotensin converting enzyme (ACE) inhibition protocol may be used.

   It has been shown that acute administration of drugs which block the action of ACE will enhance renin lateralization. Surprisingly, the effect is not seen of three drugs are given chronically. An advantage of this protocol is that the inhibiting effects of other drugs can be eliminated and it is unnecessary to allow a washout period to pass. Captopril (Capoten®-Squibb) is available as a converting enzyme inhibitor. Reports of renal toxicity by a variety of mechanisms are known. It would appear, however, that a single dose for testing purposes is relatively innocuous.

3. Administer Captopril 25 mg by mouth 30 minutes prior to the procedure. Caution should be taken to guard against orthostatic hypotension.

4. Draw Renin level, while patient is upright into pre-chilled lavender top tube. Immediately after drawing place on ice.

5. Label according to general laboratory policy and send STAT to laboratory.

Primary Aldosteronism Study

Preparation of Patient and Specimens for Primary Aldosteronism Study:

1. Screening testing-the serum aldosterone to plasma renin activity (SA/PRA) ratio
   a. No salt depletion is necessary

   b. Collect a simultaneous blood specimen for plasma aldosterone and plasma renin activity before 10 a.m.

   No special instructions are needed. Blood should be drawn in the seated position. The SA/PRA ratio may be performed while the patient is on antihypertensive medications. Spironolactone is the only medication that will absolutely interfere with interpretation of the ratio. ACE inhibitors have the potential to falsely elevate PRA. Therefore, in a patient treated with an ACE- or a low SA/PRA ratio do not exclude the diagnosis of primary aldosteronism. In addition, a strong predictor for primary aldosteronism is a PRA level undetectably low in a patient taking an ACE-inhibitor. A high ratio of SA (in ng/dL) to PRA (in mg/mL hour) is a positive screening test result, a finding that warrants further testing. An SA/PRA ratio>20 and SA > 15 ng/dL indicates probable primary aldosteronism.

2. Confirmatory Testing - aldosterone suppression testing
   An elevated SA/PRA ratio is not diagnostic by itself, and primary aldosteronism must be confirmed by demonstrating inappropriate aldosterone secretion. The list of drugs and hormones capable of affecting the renin-angiotensin-aldosterone axis is extensive, inhibitor, the findings of a detectable PRA level and frequently in patients with severe hypertension, a "medication-contaminated" evaluation is unavoidable. Calcium channel blockers, a_1-adrenergic receptor blockers, and beta-adrenergic receptor blockers do not affect the diagnostic accuracy in most cases. It is impossible to interpret data obtained from patients receiving treatment with spironolactone. Therefore, spironolactone treatment should not be initiated until the evaluation is completed and the final decisions about treatment are made. If primary aldosteronism is suspected in a patient receiving treat treatment with spironolactone, the treatment should be discontinued for at least 6 weeks.

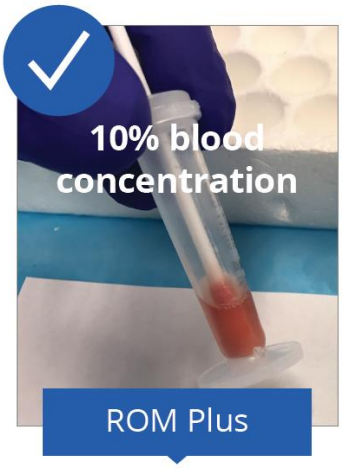
   Aldosterone suppression testing can be performed with orally administered sodium chloride and measurement of urinary aldosterone or with intravenous sodium chloride loading and measurement of SA. Our practice has been oral salt loading over 3 days. After hypertension and hypokalemia are controlled, patients should receive a high sodium diet (supplemented with sodium chloride tablets if needed) for 3 days. The risk of increasing dietary sodium in patients with severe hypertension must be assessed in each case. Because the high salt diet can increase kaliuresis and hypokalemia, vigorous replacement of potassium chloride should be prescribed. On the third day of the high sodium diet, a 24-hour urine specimen is collected for measurement of aldosterone, sodium, and potassium. The 24-hour urinary sodium excretion should exceed 200 mEq to document adequate sodium repletion. Urinary aldosterone excretion >12 mg/24 hours in this setting is consistent with hyperaldosteronism.

Rupture of Fetal Membranes (ROM)

The test detects AFP (alpha-fetoprotein) and IGFBP-1 (insulin-like growth factor-binding protein -1 or PP12 (placenta protein 12)) from amniotic fluid in vaginal secretions. It is collected by nursing staff and sent to the laboratory for testing.

1. ROM Plus test kits will function properly with trace amounts of blood in the sample.
   Significant amounts of bloody discharge may cause the test to malfunction and is not acceptable. An example of the maximum amount of contamination follows:

Rupture of Fetal Membranes (ROM) (cont.)



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2. **ROM Plus must be used within six (6) hours of collection** of the vaginal swab sample and placing it into the buffer vial.
3. Sample collection:
    a. The sample is collected by placing the swab in the vagina for 15 seconds, no speculum is needed.
    b. The swab is then mixed into a vial containing 400ul of buffer solution. The swab is broken off on a scored mark and the tip is left in the vial.
    c. The shipping cap is placed back on the vial at this point.
    d. The sample is appropriately labeled, testing ordered in EPIC and sent to the lab.

4. The properly labeled collection kit should arrive in the laboratory with a swab that has been broken off in the collection buffer vial with a shipping cap closing the container. If the container is leaking or the swab is not present, the specimen will be rejected according to laboratory protocol. A new collection kit should be used to recollect the sample.

Sputum for Cytology

1. Nursing personnel will instruct and/or assist the patient in proper collection technique.

2. Respiratory Therapy personnel will assist Nursing Staff when requested in the collection of specimens by induction methods.

3. Call the laboratory to obtain Saccomanno Fixative from the Histology Laboratory. If the orders x 3 ask the laboratory to prepare 3 containers. This fixative may not be sent via the pneumatic tube, so a representative will need to pick up the fixative.
4. Patient Preparation:

    a. Have patient brush teeth (or remove dentures), then gargle and rinse mouth with mouthwash. Do this preferably in the morning before breakfast.

    b. Have patient yield “deep cough” specimen (lower respiratory tract secretion only.)

    c. Collect 1-3 ml specimen directly into Saccomanno fixative container.

    d. Label according to general laboratory policy.

    e. EPIC order Cytology (LAB8034), hand carry printed requisition and specimen to the laboratory.

Therapeutic Drug levels

Each therapeutic drug has specific sampling strategies for trough and peak levels. The Dosing Times Chart follows this section with information regarding when to draw, desired ranges, critical values and lowest sensitivities.

Urinalysis - Specimen Collection

Random Specimen

1. Collect urine in a clean, dry container. Sterile screw lid containers are available through distribution and the laboratory. Optimal amount of urine is 12 ml.

2. Label according to general laboratory procedure.

3. Deliver specimen to lab via the pneumatic tube system within one hour of collection. If tube system is unavailable, hand deliver to lab within one hour of collection. Please double bag specimen.

Clean Void or Catheter Specimens

1. The physician should specify whether it is to be catheterized or clean voided specimen. Often female patients are catheterized.

2. A sterile urine container must be used for urine culture specimens. Keep container closed after collection. Send sample to the lab ASAP double bagged as for random specimen.

3. Label according to general laboratory procedure.

Urine Cytology

1. Urine cytology orders are typically made x 3. They are collected as the second morning urine on three consecutive days.

2. Call the laboratory to obtain Saccomanno Fixative from the Histology Laboratory. If the orders x 3 ask them to prepare 3 containers. This fixative may not be sent via the pneumatic tube, so a representative will need to pick up the fixative.

3. Patient Preparation:
   a. Have patient collect second morning urine in a clean dry container–does not need to be sterile. Instruct patient using the random specimen technique.

   b. Open the cap of the container with the Saccomanno fluid in it. Pour an equal amount of urine into the cup. If there is 40ml of fluid in the cup add 40 ml of urine–to the 80 ml line on the cup. If you have less urine than fluid, pour out some of the green fluid before you add the urine. This fixative can be disposed of in the toilet.

   c. Label according to general laboratory policy

   d. Order Cytology (LAB8034), print requisition and hand deliver to lab.

4. Outpatient Collections
   Obtain a kit for Urine Cytology X 3 from the Histology Laboratory. The kit includes three collection containers, three containers of Saccomanno fixative, three biohazard bags, three Cytology requisitions and the *Patient Instructions for Collection of Urine Samples for Cytology* Procedure. Patient Instructions for Collection of Urine Samples for Cytology

Urine Collection - 24 hr or timed specimen

Complete instructions are found in Nursing Standard–Urine Specimen-24 Hour Collections

1. General Considerations**:**

   a. Obtain a large urine collection jug from the laboratory by ordering **24 Hour Urine Jug Preparation** You will need to put the test(s) to be done on the urine in the comments. If there are multiple tests ordered the lab will need to know about all of the tests because the preservative for one test may not be compatible with another test. Two collections may be necessary. Copy a page of the orders and tube or fax to the laboratory if the physician has made a written order.

   b. The lab will determine if the urine needs a preservative, according to type of test requested. Containers with orange labels have a preservative added.

   c. Complete the label on the jug with the patient's name, medical record number, start and stop times, and dates. No unlabeled jugs will be accepted.

2. Patient Preparation:

   a. Instruct the patient to empty his bladder completely and discard the specimen. Note the time carefully.

   b. 24 Hour Urines - Have the patient save all urine for the next 24 hours. The last voiding should be exactly 24 hours after the time of the start.

   c. Timed Urines - Have the patient save all urine specimens for the specified time. The last voiding should be precisely at the end of the time period. The laboratory has 24, 12 and 10 hour collection times as appropriate for certain tests. Specific information is in the Alphabetical Test List.

3. Specimen Handling:
   a. Keep all collection jugs iced or refrigerated and protected from the light, unless instructed differently. (ie Uric Acid is collected at room temperature.)

   b. If any urine specimen is contaminated with stool or accidently discarded, the collection must be restarted with a new jug

4. Outpatient Collections
   a. The BHC Health Information flyer for OUTPATIENT PROCEDURE FOR 24 -HOUR URINE COLLECTION follows this section.

IV. References

A. Boone Hospital Center Laboratory Technical Procedure Manuals, revised 2019.
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Chemistry (ABG, ROCHE)
Histology Volume 1
Hematology Volume 1
Point of Care-Legal Blood Alcohol Procedures

B. Miller, J. Michael. A Guide to Specimen Management in Clinical Microbiology, 1999. American Society for Microbiology.

C. Mayo Access® Mayo Reference Services online copyright 1995-2020 www.mayocliniclabs.com

D. MU Health Care Laboratory Test Catalog https://muhealth.testcatalog.org

E. Integrated Genetics Laboratory Test Catalog https://www.integratedgenetics.com