

## King Edward VII Memorial Hospital

## **DEPARTMENT OF PATHOLOGY**

### **Anatomic Pathology and Clinical Laboratory Services**

# LABORATORY CLIENT SERVICES MANUAL

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#### INTRODUCTION

#### Mission Statement

"Excellence is not just our goal, it's our standard!"

The Department of Pathology will maintain excellence in performance while continuously striving to improve the quality of patient care we provide. Our services will be delivered within a professional environment that is patient-focused, caring toward employees, team oriented, and upholds the values of the Bermuda Hospitals Board.

#### About Us

Our pathology staff includes physicians certified in anatomic and clinical pathology as well as the subspecialties of anatomic pathology, biochemistry, cytology, transfusion medicine, hematology and a consultant in microbiology.

The internal organization of the laboratory consists of the following laboratory sections:

- Accessioning and Specimen Handling
- Anatomic Pathology (Histopathology, Cytology and Mortuary Services
- Biochemistry (routine, including blood gases, immunoassay, infectious diseases and therapeutic drug monitoring.
- Blood Donor Center
- Blood Bank and Transfusion Services:
- Consultation Services (chemical pathology, hematology, transfusion and microbiology)
- Courier Service
- Hematology
- Microbiology
- Out Patient Phlebotomy
- Referred Testing (Reference Laboratory Services)

We are dedicated to providing accurate information in a timely manner to our physicians, private laboratories, caregivers and other customers.

Your regular and effective use of the information in this Laboratory Client Services Manual will contribute significantly to the quality and safety of patient care within Bermuda Hospitals Board healthcare system.

#### Accreditations and Affiliations

The Department of Pathology adheres to the Accreditation Canada Standards, Joint Commission International (JCI) Accreditation Standards for Clinical Laboratories and participates in the College of American Pathologists (CAP) Proficiency Testing Programs and United Kingdom National External Quality Assessment Service (UK NEQAS).

## **Laboratory Services Directory**

#### Dr. Eyitayo Fakunle

Acting Chief of Pathology KEMH - 1<sup>st</sup> Floor, Room 1097 441 239- 1418 **Kathy Stephens, BSci, MT (ASCP), MA** Pathology Manager KEMH – 1<sup>st</sup> Floor, Main Laboratory 441 239-1481

LABORATORY SECTION	EXTENSION	LOCATION at KEMH 1 <sup>st</sup> Floor Main Laboratory
Accessioning and Specimen Handling	1738/1198	Main Laboratory
Anatomic Pathology: Cytopathology	1751	Room 1080
Histopathology	1372	Room 1081
Pathology Secretaries	1877/1740	Room 1069
Biochemistry	1732/1485	Main Laboratory
Blood Donor Center (BDC)	1398/2219	1 <sup>st</sup> Floor, Room 1068
Blood Bank and Transfusion Services	1818/1419	Main Laboratory
Consultants:		
Dr. Eyitayo Fakunle BDC Medical Director, Hematology and Transfusion Services	1418 331-7370	Main Laboratory
Dr. Takawira Mubako Cytology and Anatomic Pathology	1677	Room 1096
	331-0024	
Courier Service	1738/1198	Main Laboratory
Hematology	1732/1485	Main Laboratory
Laboratory Information System (LIS)	1739/1004	Room 1098
Microbiology	1297/1643	Main Laboratory
Mortuary	1404/1587	Basement
Out Patient Phlebotomy	1298/1742	Main Laboratory
Pathology Quality Manager	1864	

## **Hours of Operation**

The laboratory provides service 24 hours/day, seven days a week. Hours for providing routine service and restricted service are as follows:

BIOCHEMISTRY / HEMATOLOGY / BLOOD TRANSFUSION / MICROBIOLOGY*
Monday to Friday (excluding Public Holidays) 8:00 a.m. – 12:00 midnight (routine service) Midnight – 8:00 a.m. *8:00 a.m 9:00 p.m.
Weekends 8:00 a.m. – 4:00 p.m. (restricted out-patient service-stats, inpatients) 4:01 p.m. – 7:59 a.m. (restricted out-patient service-stats, inpatients)
Public Holidays (restricted out-patient service – stats, inpatients)
HISTOLOGY/CYTOLOGY
Monday to Friday (excluding Public Holidays) 8:00 a.m. – 4:00 p.m. (routine service)
CLIENT SERVICES - SPECIMEN RECEPTION
Monday to Friday (excluding Public Holidays) 8:00 a.m 4:30 p.m. (routine service)
CLIENT SERVICES - PHLEBOTOMY OUTPATIENTS
Monday to Friday (excluding Public Holidays) 7:15 a.m 4:00 p.m. (routine service)
MORTUARY SERVICES
Monday to Friday (excluding Public Holidays) 8:00 a.m 4:30 p.m. (routine service)

#### **BLOOD DONOR CENTER**

Monday through Thursday (excluding Public Holidays) 8:30 a.m. – 2:30 p.m. Friday (excluding Public Holidays) 8:30 a.m. - 1:00 p.m. Therapeutic and Autologous Donations Monday through Thursday (excluding Public Holidays) 8:30 a.m. – 2:30 p.m. Friday (excluding Public Holidays) 8:30 a.m. - 1:00 p.m.

#### **Clinical Consultation**

Pathologist consultation is available to all clients, including assistance in interpreting laboratory test results or recommending appropriate laboratory testing. Request for pathologist consultation may be directed to the appropriate pathologist.

#### Referral Testing Policy

The Department of Pathology selects and uses qualified licensed reference laboratories to perform those tests not available at the King Edward VII Memorial Hospital. Reference laboratories are selected based on the quality of service provided.

#### **Clinical Laboratory Staffing Structure**

The Department of Pathology is fully staffed during the day and evening shifts. There is limited number of staff during the Public Statutory Holidays, weekends and midnight shift.

#### **Specimen Submission Requirements**

#### **Specimen Labeling Policy**

Label all specimens submitted for testing with:

- Patient's full legal name (no nicknames)
- Unique identifier (date of birth and medical record number), and
- Date and time the specimen was collected and initials of the individual who collected the specimen.

#### **Transfusion Services Specimens**

Specimens received with a Laboratory Services Request Form or external request form must be labeled with patient's full names, date of birth, phlebotomist's initials and date/time collected.

Specimens received for blood products, group and hold, RhoGAM evaluation and Kleihauer Betke must be accompanied by a Transfusion Service Product Request Form. The Transfusion Service Product Request Form must be labeled at the time of collection with the patient's full name, date of birth, medical record number, phlebotomist initials and date/time collected.

The Transfusion Service Product Request Form must have the following areas completed:

- Patient information, including at least three independent identifiers (patient name, medical record number and date of birth)
- Patient Identified by (employee name and employee number)
- Patient Identified and Sample Collected by (employee name and employee number)

The Transfusion Service Product Request Form should also include:

- Patient location (inpatient or outpatient)
- Diagnosis
- Clinical history
- Clinical indication
- Gender
- Product/test requested
- Procedure/surgery or transfusion date
- Products (type and quantity), if applicable
- Priority

This will ensure positive identification and optimum integrity of patient specimens from the time of collection until testing has been completed and results reported. Clients (refers to any person(s) that use our services) will be notified of inappropriately labeled specimens and the specimen will not be returned to the client. Tests will not be performed on unlabeled or incompletely labeled specimens.

#### **General Specimen Rejection Criteria**

Specimens will be rejected and the tests and charges canceled under the following conditions:

- Unlabeled
- Leaking specimen
- Broken container
- Incorrect specimen submitted for test requested (such as specimen with wrong anticoagulant)
- Insufficient volume (QNS)
- Improper specimen transport temperature
- Age of the specimen, depending on the analyte requested
- Hemolyzed blood specimen, depending on the analyte requested
- Specimens not transported in the proper holding container
- Blood bank specimens not collected according to SPECIMEN SUBMISSION REQUIREMENTS

#### **Specimen Handling and Transport**

Submission Requirements

- Complete a Test Request Form for each patient (appendix 14). Requisition is located on the BHB network, BHB connect >forms. Complete all required patient information.
  - Patient's legal name, birth date, gender and if available medical record number
  - Collection date and time, and collector's initials
  - Ordering physician name and signature. If there is a Locum in the office, please put the name of the Locum and the physician for whom he/she is standing in.
  - If the report is to be sent to someone other than requesting physician, list facility, for example, the name of a nursing home.
  - Call back/fax information if applicable.
  - Complete insurance information. This is particularly important if sample is being drawn in outside location and being sent to the laboratory. Name should appear as it does on the insurance card. This is especially important if the patient will not be available for Department of Pathology staff or admitting staff to verify information. This should include the Insurance Company, Group Number, and Policy Number.
  - Laboratory test(s) ordered, with ICD-10 codes or the relevant clinical diagnosis appropriate for each test. If test does not appear on requisition, legibly write in the name of the test.
  - If you have any questions, please call the laboratory.
- Write patient name legibly on specimen containers. Be sure that the name and other identifiers written on the specimen completely match the name and identifiers on test request form.
- Unlabeled specimens will be rejected.
- Incomplete test request forms will be rejected and sent back to the doctor's office.
- Place labeled specimen(s) in the sealed portion of specimen bag. Place the folded test request form into the outer portion of specimen bag. Do not place specimen and requisition in same portion of the bag. Samples that leak in transit will not be tested.

## <u>Note</u>: All specimens from a single requisition are to be placed in the same plastic transport bag. There should be only one set of patient samples placed in each bag.

• **STAT Test Requests**: Most chemistry and hematology tests are available on a STAT or emergency basis (meaning results will be available in the computer within one hour of receiving the specimen in the laboratory).

If the sample is in the laboratory and you wish to change the order to STAT, contact the relevant laboratory department.

#### TRANSFUSION

Cross match- Can take approximately 60 minutes if no atypical antibodies are found.

- Add-On Test Requests: All requests for additional testing to be added to a specimen already in the laboratory should be directed to the relevant laboratory department. The request will be processed providing there is a sufficient amount of the correct sample type and within the stability time requirement for the requested test. Patient reports will be generated under the original order, with a comment and the additional tests requested.
- **Test Requests**: Abbreviations must be avoided at ALL times. Write the full test name clearly.

*Specimen Storage:* In most cases, specimens are transported to the laboratory for processing and storing. However, in those circumstances where a specimen cannot be transported to the laboratory within the required time for the test, please follow specimen processing, storage and transport requirements. Call the laboratory if there are questions about processing and storage instructions.

- **Storage:** Client specimens should be stored in one of the following three thermal environments depending on the client, specimen, and test requirements:
  - Ambient or room temperature
  - Refrigerated
  - Frozen

The viability of each specimen depends upon how well the thermal environment is maintained throughout the specimen transport process. All specimens must be maintained at the proper temperature to prevent the need to recollect due to thermal damage or deterioration. The temperature of each specimen should be clearly defined by the client and the location, as well as how the specimen was stored at the drawing location; if not clearly indicated, room temperature stability criteria will be applied.

Laboratory specimens are to be packed in primary, secondary, and tertiary containers for transportation.

- Primary = tube, cup, slide, or swab
- Secondary = biohazard bag
- Tertiary = courier bag

*Frozen Specimens:* Serum or plasma specimens need to be frozen only if specifically stated in the specimen requirement. In these cases, it is essential to freeze the specimen as soon as it is separated from the cells. Always freeze specimens in plastic tubes unless specifically instructed otherwise. Glass tubes are not acceptable. Lay the tube in the freezer at a 45° angle to avoid tube breakage caused by expansion during freezing. Apply labels to the tube with ends overlapping to prevent detachment of label from tube during freezing. Submit a separate specimen for each test that must be frozen. Thawed samples are not acceptable for analysis. Indicate if the specimen is plasma or serum on both the specimen and the test request form.

*Courier Service:* The laboratory has a courier service that picks up specimens at physicians' offices in the area. This occurs Monday to Friday except holidays. Couriers are also equipped

with the necessary materials to ensure proper transport of specimens in compliance with standard guidelines.

Health and Safety Precautions

- Handle all specimens as if they are infectious. The greatest dangers to health care workers exposed to blood and body fluids are the Hepatitis B, Hepatitis C and HIV viruses.
- All specimens should be properly sealed prior to being transported. Leaking containers pose a health hazard. The courier will not accept any samples if the specimen container is contaminated or leaking.
- Do not submit needles attached to syringes. Specimens with needles attached will not be transported.

#### Errors in Orders and Misidentified Specimens

*Errors in Orders:* When an ordering error is discovered, call the laboratory immediately to avoid the expense of unnecessary testing and ensure the patient is credited. The following information is required:-

- Patient name, location, DOB and medical record number
- Date / Time of specimen collection.
- Test(s) and reason for cancellation.
- Name / title of person authorizing the cancellation.
- Name / title of person requesting cancellation (if different from above).

The laboratory does not delete tests from the computer; unwanted tests are answered with an appropriate comment to provide a permanent record on the patient's medical record.

In the case where the specimen and the requisition cannot be "unequivocally associated" the laboratory, in the interest of patient safety and for reasons of legal liability, shall reject the specimen.

#### Mismatched Specimens

These are defined as specimens, which are submitted with a requisition on which the identifying information does not exactly match that which appears on the specimen.

There may be a mismatch of either the first name or surname.

- For instance, the requisition may bear the patient's nickname while the specimen label, bears the patient's full name. (As an example, "Margaret" may be known as "Peggy" to her physician) –the requisition bear the patient's name in his native language while the specimen has the patient name using the English name. (As an example, "Mei Li" may also be known as "Melissa.) Or,

-The patient may be identified by a married name or hyphenated name on the requisition and by their maiden name on the specimen or vice versa.

In the instances noted above, the laboratory will contact the physician's office to verify that the requisition and specimen pertain to the same patient. The date, time and results of the conversation will be recorded and a note added to the requisition indicating that the change has been made, consistent with the physician's instructions. The laboratory should do the testing and attempt to contact the physician again before releasing the results.

#### **Unlabeled Specimens/No Requisition**

Unlabeled specimens submitted without an accompanying laboratory requisition <u>will be</u> <u>rejected.</u> The laboratory may, if the physician can be identified, telephone the physician to inform him or her that unlabelled specimens have been received, without an accompanying requisition. <u>No test will be done and no report generated.</u>

#### **Unlabeled Specimens/Requisition**

Unlabeled specimens received with a laboratory requisition <u>will be rejected</u>. The laboratory should contact the **physician** to inform him or her that unlabeled specimens have been received with a requisition. The laboratory will not seek confirmation that the specimens are associated with the requisition. The receipt of unlabeled specimens with a requisition will be documented and **the laboratory report will indicate that no testing was done for the specimens**.

#### Labeled Specimens/No Requisition

The laboratory will **contact the physician**, if the physician can be identified, to inform him or her that labeled specimens have been received but without an accompanying laboratory requisition. The laboratory may, in consultation with the physician, develop a requisition and proceed with testing. Reports will be issued and the laboratory will forward the requisition to the physician for signature.

#### **Difficult to Collect and Irretrievable Samples**

Procedures for difficult to collect or irretrievable samples are necessarily different from those for samples which may readily be recollected. The following listing is not exclusive but indicates those difficult to collect or irretrievable samples, to which special attention should be paid by both the physician and the laboratory:

- Histopathology / cytology specimens (other than PAP smears, urines and sputum)
- Synovial fluid
- Blood cultures in height of fever

- Biopsies
- Kidney Stones
- IUD's for culture
- CSF
- Samples from young children and special care baby units

For the above mentioned specimens submitted unlabeled, the laboratory may consider testing. The laboratory will **contact the physician's office or nursing unit**, if the identity of the physician can be determined, to advise that unlabeled specimens have been received. The laboratory should make no effort to verify the identity of the patient. An oral report of the results of testing of the unlabeled specimen will be provided but a note should be made on the written test report indicating that unlabeled specimens were received and test reports must be interpreted with caution. The written report may be released upon the request of the physician in consultation with the appropriate Consultant Pathologist.

#### **Specimen Collection and Preparation**

The quality of results from laboratory testing depends greatly on the proper collection and handling of the specimen submitted for analysis. Correct patient identifier, preparation, specimen collection, specimen packaging and transportation are essential factors; it is important that all specimens and requisitions be properly labeled with the name of the patient, date of birth, medical record number, collection date, time and the origin (source or body site) of the specimen, when applicable.

If there is any doubt or question regarding the type of specimen that should be collected, it is imperative that the Hospital Laboratory be called to clarify the order and specimen requirements.

Specific specimen requirements for each determination, including specimen volume are provided in the Alphabetical Test Listings section. To avoid additional delay and inconvenience, please make sure that you have submitted at least the quantity specified for the test requested.

**NOTE:** After the tube has been filled with blood, immediately invert the tube several times in order to prevent coagulation.

#### **Specimen Collection Tubes:**

Some tests require specific tubes for proper analysis. Please contact the hospital laboratory prior to patient draw to obtain the correct tubes as identified in the individual test listings.

*Specimen Requirements:* Specific specimen requirements for each test are provided in the test directory. Submit the quantity specified for each test requested. Tests will be canceled as "QNS"

(Quantity Not Sufficient) when the sample volume is inadequate and will be indicated as such on the report. As a general rule, the volume of blood drawn should equal 2-1/2 times the amount of serum plasma required. For example, to obtain 4mL serum or plasma, draw at least 10mL blood. When inappropriate or insufficient specimens are submitted, the laboratory will store them and contact the requesting facility to request that the specimen be recollected. Documentation of this action will appear on the report.

#### NOTE!! NOTE!! NOTE!! IMPORTANT!!

The 'Minimum Specimen' is not the quantity desired for routine work. The 'Minimum Specimen' is the smallest quantity from which results can usually be obtained.

#### THE "MINIMUM SPECIMEN IS FREQUENTLY NOT ENOUGH."

If the patient has an elevated hematocrit, or if a dilution and repeat determination is necessary because of an elevated value, the minimum specimen is frequently not enough.

For routine work, it is helpful to have 50% to 100% more than the stated minimums with the exception of blue top tubes.

The "Minimum Specimen" is the answer to the question: "What is the least specimen which is usually adequate for a valid result?"

If the "substance" listed for the test is blood or any blood component (plasma, serum, platelets, erythrocytes, leukocytes), the volume given in milliliters for "minimum specimen" is the volume of whole blood needed.

Micro-specimen requirements are listed where applicable as the number of polyethylene microcentrifuge tubes needed. These "micro tubes" have a capacity of 0.4 - 0.6 ml blood per tube.

*Serum Separator Tubes*: For most tests requiring serum, the laboratory recommends the use of serum separator collection tubes. However, refer to the individual test for specific requirements since certain tests preclude their use.

When using a serum separator tube, follow these instructions:

- 1. Perform venipuncture as with any other blood collection vehicle.
- 2. Invert the tube gently no more than five times (further inversion may cause alterations in sample integrity).
- 3. Do not remove the stopper at any time. If the blood cannot be transported to the laboratory expeditiously, allow the blood to clot for at least 15 minutes but not longer than 1 hour. Do not centrifuge immediately after drawing blood.
- 4. If you are processing the blood, centrifuge at 3000 rpm for at least 10 minutes.
- 5. Transfer the clear serum to a labeled plastic vial for transport to the laboratory.
- 6. Make sure the plastic vial is clearly labeled as being serum.

#### **Coagulation Testing Requirements**

*Coagulation Collection to Obtain Platelet-Poor Plasma*: For most coagulation tests and factor assays, use the following instructions. For individual requirements, refer to the specific tests. In order to produce valid results for coagulation tests and factor assays, specimen integrity is crucial and must be maintained. All specimens sent for testing must be collected in the following manner:

- 1. Obtain venous blood by drawing a clearing tube prior to obtaining the specimen. Draw the specimen in a light blue top sodium citrate tube. Avoid stasis and contamination of the specimen by tissue thromboplastin.
- 2. Mix blood with anticoagulant (3.2% or 3.8% buffered sodium citrate) by gentle inversion. Use 0.5mL sodium citrate for every 4.5mL blood. An exact ratio of 9 parts blood to 1 part coagulant should be maintained.
- 3. Blood should be transported to the laboratory as soon as possible.

*Criteria for Rejection of Citrated Samples*: Citrated samples will be rejected and the tests canceled under the following conditions:

- 1. The specimen is not labeled properly.
- 2. The sample is spilled or the tube is broken.
- 3. Abnormal results are found in a hemolyzed specimen.
- 4. A clot is found in the sample.
- 5. The tube is inadequately filled.
- 6. The hematocrit of the sample is 50% or greater. In this case, the sample must be redrawn, using an adjusted whole blood to sodium citrate ratio. In cases where the hematocrit is greater than 50%, contact the laboratory for instructions.

#### **Blood Collection from Infants**

#### **Successful Heel sticks**

<u>Prewarm the heel.</u> Everybody knows this but it's amazing how few actually use this technique on a regular basis. Exposure to a warm compress (no more than 42 degrees Celsius) for three to five minutes works miracles. Those who don't have time usually waste at least that much time milking the heel for a specimen that will probably be rejected anyway. Pre-warm the heel. It'll save you both some grief.

<u>Keep the heel down.</u> If someone is holding the infant, have them angle the baby partially upright so the feet are downward. When the feet are below the center plane of the body, gravity works to keep more blood in the capillary beds of the heel.

**<u>Point the puncture site downward.</u>** When you do a heel stick, do you end up with more blood on the heel than in the tube? If you point the puncture site downward to the floor you can collect every drop because the blood has nowhere to run but into the tube.

Work these techniques into your heel stick routine on a regular basis and the job of collecting neonate heel stick specimens will become much simpler. Your technique will yield a better specimen and be less traumatic for you and the infant.

#### Newborn Screening

#### **Instructions for Specimen Collection**

- To prevent specimen contamination, do not touch any of the filter paper circles before or after collection.
- Select puncture site and cleanse with 70% isopropanol.
- Use a sterile, disposable lancet with 2.0mm, or less, point to perform a swift, clean puncture.
- Keep the heel in a horizontal position (heel down) at or below heart level.
- Wipe away the first blood drop.
- Allow a second LARGE blood drop to form and apply to the surface of filter paper completely filling the circle. Do not apply more than one drop to the circle.
- Do not use blood collection devices that contain EDTA, citrate, oxalate or heparin.
- FILL all required circles. FILL from only one side of the filter paper. Circles must be completely filled when observed from both sides of the filter paper.
- Dry specimen at room temperature 3 4 hours in HORIZONTAL position away from heat and sunlight.
- Forward the specimen to the lab within 24 hours.
- IMPROPERLY COLLECTED SAMPLES WILL BE REJECTED.
- If problems occur during collection, repeat collection using another form. Original form can be returned for replacement.
- Do not use expired filter paper.

#### Tips for Newborn Screening Specimen Collection

- Complete each item on the newborn screening collection form.
- Closely follow the collection instructions on the back of the request form. (Reference: NCCLS Document LA4 A2)
- Warm heel with a warm towel and hold the heel at or below the heart.
- Sampling after a feeding promotes better blood flow.
- Fill one circle at a time.
- Capillaries tubes are not recommended. Do not use blood collection devices that contain EDTA, citrate, oxalate or heparin.
- Do not touch the blood collection area, as this may contaminate the results.

• Forms should be returned to the laboratory within 24hrs. **Do not stockpile completed** forms on the nursing unit.

#### **Urine Specimen Collection**

#### Random

The normal composition of urine varies considerably during a 24-hour period. Most reference values are based on analysis of the first urine voided in the morning. This specimen is preferred because it has a more uniform volume and concentration, and its lower pH helps preserve the formed elements. Submit a first morning specimen whenever possible. Urine for pregnancy testing should be a first morning voiding, or a random specimen with a specific gravity of at least 1.010. Note the time of collection of the specimen on the test request form and on the label of the container. Submit urine for pregnancy testing in a plastic vial with no preservative. Refer to the Test Directory for specific analyte requirements. To reduce contamination, the specimen submitted for urinalysis should be a clean catch "midstream sample."

#### **24-Hour Urine Collection**

Proper collection and preservation of 24-hour urine specimens is essential for accurate test results. Patients must be carefully instructed in the correct procedure. Refer to the Test Directory for specific analyte information.

Give a collection container and detailed instructions to the patient. If a urine preservative is required, it is important that the designated preservative be in the urine collection container at the start of the collection. Caution the patient that the preservative may be toxic and/or caustic and that it should not be spilled or discarded. Record any medication that the patient is receiving on the test request form. If the total 24 hour urine is not to be transported to the laboratory, mix the urine well, measure the volume of the 24-hour collection and record volume on both the test request form and the transport vial. Transfer a minimum of 50 mL of urine into a plain urine transport vial. Add any additional required preservative (if applicable) and mix well.

**Note:** For those analyses requiring the addition of 6N HCI or other preservatives, add the preservative at the start of collection. Have the patient collect each specimen in a smaller container and carefully pour the urine into the 24-hour container to avoid any possible acid burns to the patient. **Be sure to mix urine thoroughly before removing the aliquot.** 

The KEMH laboratory does carry a stock of 24 hour containers pre-filled with 6N HCL available for use.

#### **Instructions to the Patient for 24-Hour Urine Collection**

1. Do not discontinue medications unless instructed to do so by your physician. Inform the laboratory which medications you are taking.

- 2. Do not exceed your normal intake of liquids or change your dietary habits during the day before and the day of your collection unless your physician gives you specific instructions to do so.
- 3. Empty bladder (void) into the toilet on the morning of the collection day. Do not include the first urine specimen of the day. Note date and time on the container label.
- 4. Collect all subsequent urine voided for the next 24 hours and add to the container provided by the laboratory. The last sample collected should be the first specimen of the following morning at the same time as the previous morning's first voiding. Note date and time on the container label.
- 5. Keep the urine in a cool place. Refrigerate if possible.
- 6. Deliver to the BHB Laboratory promptly.
- 7. Preservative may have been added to this container. This may be caustic. Please be careful not to spill any of the preservative.

Test	Preservative	Special Instructions
Aldosterone	Acceptable: 24-hour urine	Refrigerate specimen during and
	collected in a container with or	after collection.
	without 10 g Boric acid.	
Arsenic	Collect urine in acid washed or	Avoid work site collection. Avoid
	metal free plastic container.	seafood consumption for 48 hours
	<b>Refrigerate</b> specimen during	prior to sample collection.
	collection.	
Calcium	Generally NO additive if	Will be acidified in Biochemistry
	ordered together with non-	Laboratory on completion of
	additive tests. Can use specimen	collection if collected without 6N
	acidified with 25 ml 6N HCL	HCL.
	Add 25 ml 6N HCL prior to	It is preferable for the patient to be off
Catecholamines	collection. Refrigerate	medications for three days prior to
(fractionated)	specimen during collection.	collection. However, common
		antihypertensives (diuretics, ACE
		inhibitors, calcium channel blockers,
		alpha and beta blockers) cause
		minimal or no interference. Avoid
		alcohol, tea, tobacco, and strenuous
		exercise prior to collection.
StoneRisk® Citrate	Requires special collection kit	See specific instructions included in
Test	available at KEMH Laboratory.	the kit.
Cortisol	Collect urine with 10 grams of	The pH will be adjusted by the
	boric acid or 25 mL 6N HCL or	Biochemistry Lab if no preservative
	keep urine refrigerated during	used.
	collection if preservative is not	
	used.	

### 24-HOUR URINE PRESERVATIVE LIST

	Add 25 and CN HOL main to	Define the different for a life in
<b>5-HIAA</b>	Add 25 million HCL prior to	Patient should avoid lood nigh in
(5 Hydroxy-	collection <b>Reingerate</b>	indole; avocado, banana, tomato,
Indoleacetic Acid)	specimen during collection.	plum, walnut, pineapple and eggplant.
Heavy Metals	Collect urine in acid washed or	Avoid work site collection. Avoid
(Arsenic, Lead, Zinc	metal free plastic container.	seafood consumption for 48 hours
and Mercury)	<b>Refrigerate</b> specimen during	prior to collection.
	collection.	
Homovanillic Acid,	Add 25 ml 6N HCL prior to	It is preferable for the patient to be off
24-Hour Urine	collection. Refrigerate	medications for three days prior to
	specimen during collection.	collection. However, common
		antihypertensives (diuretics, ACE
		inhibitors, calcium channel blockers,
		alpha and beta blockers) cause
		minimal or no interference. Patient
		should avoid alcohol coffee tea
		tobacco and strenuous exercise prior
		to collection
Lead	Collect urine in an acid washed	Avoid work site collection
Leau	or metal free plastic container	Avoid work site concention.
	<b>Befrigerate</b> specimen during	
	acleation	
Manau	Collect uring in an agid washed	Avoid work site collection Avoid
Mercury	container	Avoid work site collection. Avoid
	Container.	sealood consumption for 48 nr
	Reingerate specimen during	prior to sample collection.
	collection.	
Metanephrines,	Add 25 ml 6N HCL prior to	It is preferable for the patient to be off
fractionated	collection. <b>Refrigerate</b>	medications for three days prior to
	specimen during collection.	collection. Patient should avoid
		tobacco, tea, coffee, for three days
		prior to specimen collection.
		Common antihypertensives (diuretics,
		ACE inhibitors, calcium channel
		blockers, alpha and beta blockers)
		cause minimal or no interference.
		Medications which are alpha agonists
		(Aldomet), alpha blockers
		(Dibenzyline) should be avoided 18-
		24 hours prior to specimen collection.
Ovalia Acid	Collect urine with 25 mL 6N	Datient should refrain from taking
	HCl to maintain a pH balary 2	aversive amounts of Assorbia Asid
	Pafrigarata during and after	(Vitamin C) or Ovalata righ foods
	action	(vitalinin C) of Oxalate-ficit 10008
	conection.	(i.e., spinach, conee, tea, chocolate,
		and mudard) for at least 48 nours
		before the collection period.
Pornhyring	Random uring collected with 5	
1 orphymus	Kandom unite conected with 5	

	refrigerated and protected from light during collection is preferred. Collection with no preservative is acceptable, if property mfrigerated and	
	light protected.	
VMA (Vanillyl-	Add 25 ml 6N HCL prior to	It is preferable for the patient to be off
mandelic Acid)	collection. Refrigerate	medications for three days prior to
	specimen during collection.	collection. However, common
		antihypertensives (diuretics, ACE
		inhibitors, calcium channel blockers,
		alpha and beta blockers) cause
		minimal or no interference. Patient
		should avoid alcohol, coffee, tea,
		tobacco and strenuous exercise prior
		to collection.

### Laboratory Blood Sample Requirements

The quality and integrity of all samples collected for testing has a direct impact on the test results obtained. It is important that samples submitted for testing meet the specific predetermined requirements of tube type and sample volume.

#### NOTES

- Hematology and Transfusion DO NOT SHARE SAMPLES
- When ordering more than a CBC & ESR (3ml tube) take a second specimen.
- For a 'difficult' draw use a 2 ml tube. <u>Never draw coagulation studies from an IV line</u>
- Check IV Nurses for information on other clotting Disorder tests.
- It is essential that exact amount of blood is added to tube
- ALL DRUG LEVELS Note time drawn and time of last dose
- Digoxin to be drawn minimum of 6 hours after last dose
- Gentamicin and Vancomycin indicate Peak, trough or random

## **Blood Sample Requirements**



### **Specimen Collection Procedures for Microbiology**

#### General Information

Quality microbiology results depend on both the client and the laboratory. The successful isolation of potential pathogens is a factor of specimen selection, collection, proper transport and timely delivery as well as excellent microbiology practices within the testing laboratory. It is critical to refer to specimen submission requirements for specific cultures in the test directory to ensure that appropriate transport media is used.

**Test Request Form:** Submit a completed Test Request Form for each culture requested. Information regarding the patient, the specimen, collection time and date, clinical history, symptoms and diagnosis, antimicrobial therapy (or use of any other chemotherapeutic agents) and any suspected organism(s) is essential for the optimal and appropriate processing of the specimen. <u>Clearly indicate the source and type of culture requested.</u>

**Specimen Containers:** Shipping containers, sterile specimen containers, transport media and swabs are available through the laboratory. Specimens are acceptable for processing only when collected and submitted in the appropriate container. Specimen containers <u>must be tightened</u> <u>securely</u> to prevent any leakage.

Labeling: Clearly print the patient's complete name (as listed on the test request form) on the culturette or other specimen transport media. (Labeling of only the outside container is not acceptable).

**Transport:** Deliver specimens to the laboratory within 24 hours. Prompt processing minimizes loss in viability of potential pathogens and insures a more accurate appraisal of flora present.

**Results Reporting:** Preliminary and final results for Microbiology are included on the patient report. Preliminary results will be called to the client on any positive, significant culture (e.g., blood, CSF, sterile body fluid and Salmonella or Shigella isolates) or stain. Other results will be called to the client if the client writes "Call Results" on the test request form and indicates a phone number to which results should be called. Results or interpretations of results may be obtained by contacting the laboratory.

**Rejection Criteria:** Unacceptable specimens may result in test cancellation or delay. The Client Services staff will contact the doctor's office/client with such information and will also document the fact on the report. Listed below are general causes of such action.

- Incomplete patient information on the test request form
- Missing source
- Improper or missing labeling on specimen
- Conflicting labeling information between the specimen and the test request form
- Inappropriate specimen for culture requested
- Improper specimen container or transport media
- Leaking or spilled containers

#### • Specimen age

#### Antibiotic Susceptibility Testing

Antibiotic susceptibility testing will be performed using the automated Vitek Antimicrobial test system which is an automated test methodology based on the MIC technique

Antibiotic susceptibility testing will be also be performed using the disk diffusion test (disks impregnated with the specific concentration of the desired antibiotic are placed on the surface of an inoculated Mueller Hinton Agar plate). If the organism is susceptible, the microbial growth around the periphery of the disk is inhibited. If the organism is resistant, growth is not inhibited. The zones of inhibition are measured, correlated with minimum inhibitory concentration (MIC) values, and compared to CLSI interpretive criteria to determine the degree of susceptibility.

Occasionally, for very resistant organisms or for pathogens not defined by the CLSI guidelines, results will be reported using the ETEST method. The method employs a plastic strip which contains a predefined and continuous antibiotic concentration gradient.

The results for these three testing methods will be reported as sensitive(S) intermediate (I) or resistant(R)

The selection of antimicrobial agents for testing and reporting depends on the resistance patterns (antibiograms) of microorganisms, availability of different microbial agents in the drug formulary, clinical efficacy and indication of antimicrobial agents.

A complete list of antimicrobial agents currently tested can be obtained from the laboratory.

#### Investigation of Catheter Tips

Thoroughly disinfect the skin, remove the catheter and place in a sterile pot and transported to the laboratory as soon as possible.

#### Ear Swabs

Ear swabs are collected for the diagnosis of otitis externa and otitis media.

Specimens should be collected using a sterile swab before the administration of antibiotics and sent to the laboratory within two hours .If a there is a delay in transport the specimen should be refrigerated.

#### Eye Swabs

Eye, conjunctiva or eyelid swabs are collected for the diagnosis of conjunctivitis is and blepharitis. Specimens should be collected using a sterile swab and sent to the laboratory as soon as possible. If a there is a delay in transport the swabs should NOT be refrigerated but left at room temperature.

#### Tissues and Biopsies

Investigation of tissue and biopsy specimens is indicated for chronic or deep seated infections and burn specimens.

Using sterile equipment, collect the specimen according to the Wound Care Tissue Collection Protocol. Tissue biopsies must be sampled form the leading edge of the wound after debridement. Moisten with a small amount of sterile saline. DO NOT send on paper. Specimens should be sent to the laboratory as soon as possible.

#### <u>Urinalysis</u>

The laboratory provides a two step approach to urinalysis:

- 1. Macroscopic examination using reagent strips and the Clinitek Advantus urine chemistry analyzer, which is a semi automated instrument designed to read Bayer Reagent strips.
  - a. The tests analyzed are Glucose, Bilirubin, Ketone, Specific Gravity, Blood, PH, Protein, Urobilinogen, Nitrite, Leukocyte, Color and clarity.
- 2. Microscopic examination is performed using an inverted microscope and micro well trays.10fields are examined and an average or grading is reported.
  - a. Formed elements seen and reported in the urinary sediment are Epithelial Cells, Leucocytes, RBCs, Casts, Crystals, Spermatozoa, Yeast, and Parasites.

First morning or random collected urine- midstream is the specimen of choice. Specimens should be at room temperature no longer than two hours before testing. The urine should be collected in a sterile screw cap container. If a there is a delay in transport the specimen should be refrigerated.

#### Helicobacter Pylori

This is a rapid latex agglutination for the qualitative detection of Helicobacter pylori total antibodies. The test is reported as positive or negative.

A normal venous blood sample should be taken and the serum separated.-red top tube.

#### Syphilis Serology

Syphilis serology screening is performed using the TPPA test-a passive particle agglutination test for the detection of antibodies to Treponema pallidum and the RPR test which detects an antibody-like substance presence in the sera of syphilitic patients. A titer for this test is performed if the screen is reactive.

If either or both the screening tests are reactive then an FTA confirmatory test is performed which also tests for antibodies to Treponema pallidum by indirect immunoflourescence.

A normal venous blood sample should be taken and the serum separated-red top tube.

#### (FTA confirmatory test are sent away to Quest for confirmatory testing)

#### RPR Visa

RPR Test run for immigration requirements only. A normal venous specimen is required-red top tube.

#### Rotavirus Detection

This is a rapid latex agglutination for the detection of Rotavirus antigen in stool specimens. Stool specimens collected within the period of 3-5 days after the onset of symptoms are required in sterile screw top containers. Results are reported as reactive or non-reactive.

#### **CULTURE TYPES AND GUIDELINES**

Complete a Test Request Form, indicating the specific source of the specimen and diagnosis. Label the specimen appropriately. Record the date and time the specimen was collected.

#### **Blood Cultures**

The detection of microorganisms in blood has great diagnostic and prognostic importance. A completed test request form (particularly time of collection, diagnosis, and antimicrobial therapy) is essential for timely and appropriate laboratory processing of the specimen. Both the request form and the specimen must have the collection site noted. It has been recommended that two sets be taken for diagnosis of infection, each set from a different site

*Routine adult blood culture collection* consists of two sets of blood cultures. The first set consists of two BactAlert bottles (one for aerobic and the other for anaerobic cultures), taken from a single venipuncture site. The second set consists of an aerobic bottle and anaerobic bottle. Also taken from a separate site

*For infants*, two sets of blood cultures are drawn. Each set consists of a single aerobic BactAlert pediatric bottle.

All organisms isolated from blood cultures will be identified, and susceptibility tests are performed, if appropriate, and stock cultures are made, with the exception of an isolate considered to be a skin contaminant. Stock cultures will be held for one year.

Unless otherwise indicated (not isolated from other sites), single cultures/sets of the following organisms should be considered contaminants:

- Bacillus species
- Corynebacterium species
- Micrococcus species
- Proprionibacterium species
- Coagulase-negative staphylococci

Minimal identification is required to <u>rule out non-pathogenic species</u>. Susceptibility results are not required.

#### **Collection Requirements for Blood Cultures**

- 1. Each set of blood cultures should be drawn from a separate venipuncture site or at different times.
- 2. Disinfect IV site with 2% w/v Chlorhexidine Gluconate and 70% v/v Isopropyl Alcohol Swab (apply in a circular motion from procedure site outward), and allow area to dry.

- 3. Remove protective plastic cap form each BactAlert bottle and disinfect the rubber septum with 70% alcohol only. Allow to dry.
- 4. Use the butterfly blood culture system to collect blood directly into bottles. This system can then be used to draw other blood vials (e.g., CBC).
- 5. To identify collection sets, label bottles with
  - Patient's legal first and last name
  - Chart number
  - Date, Time, and Collection Site

#### **Blood Volume Requirements**

- 1. There are five types of BACTEC media bottles: Aerobic, Anaerobic, Aerobic plus and Anaerobic plus (for patients on antibiotics) and Pediatric.
- 2. The Pediatric optimal draw is 1 3 mL per bottle, with 0.5 5 mL per bottle being the outer limits.
- 3. Adult optimal draws are 8 10 mL per bottle. If you are unable to draw 16 20 mL total, distribute blood as follows:

TOTAL BLOOD VOLUME	<b>VOLUME FOR AEROBIC</b>	VOLUME FOR
	BOTTLE	ANAEROBIC BOTTLE
16 - 20  mL	Split equally	Split equally
13 – 16 mL	8 mL	5-8  mL
10 - 12  mL	5 – 7 mL	5 mL
5-9  mL	Entire amount of blood	NONE

• **DO NOT** put amounts in excess of 10 mL into a bottle as false positive readings may occur.

#### **Timing of Blood Collection (Blood Cultures)**

- 1. Adults Routine Collection both sets can be taken at the same time from different sites before therapy is initiated.
  - Both sets consist of aerobic and anaerobic bottles
- 2. Adults Query Subacute Bacterial Endocarditis (SBE) or Brucella spp. The three sets need to be taken within 24 hours at the start of a fever, from different IV sites, before therapy begins.

- The first set consists of aerobic and anaerobic bottle.
- Second and third set consist of aerobic and anaerobic bottle- also, usually 30 minutes apart ideally from at least two different sites
- 3. Paediatric Routine Collection Two single paediatric bottles collected from two different sites before therapy begins.

#### **Transport of Blood Cultures**

Specimens should be transported to the laboratory as soon as possible and loaded into the BACTEC 9240 instrument. **NOTE: If a delay in transport or processing is anticipated, DO NOT refrigerate the bottles – leave them at room temperature.** 

#### **Special Requests for Blood Cultures**

1. When other special infectious pathogens in blood are suspected, such as Bartonella, Brucella, and Cytomegalovirus (CMV), please contact the laboratory for special collection procedures.

#### 2. Line Sepsis Investigation

Investigation of Central Venous Catheters (CVC) for sepsis is based on differential positivity times, a method described by Blot, et. al. This compares cultures drawn from the CVC with cultures drawn from a peripheral vein. The earlier the CVC culture becomes positive compared with the peripheral culture, the higher the probability that catheter-related sepsis exists. One set from the line in question and one set peripherally.

#### 3. Subacute Bacterial Endocarditits (SBE)

• When SBE is suspected, the BactAlert culture incubation period is extended from 5 days to 14 days.

#### 4. Sterile Fluids

- Sterile fluids should be collected and transported to the laboratory in clean, sterile containers. Occasionally, sterile fluid may be received in BactAlert bottles. These specimens are processed in the same manner as a blood culture.
- 5. Peritoneal Dialysis Fluid
- From patients with suspected peritonitis. Call microbiology to inform them of the specimen being sent.
- Send 30-50 mls of fluid in a sterile container (2 if required). The container must be labeled completely and correctly to avoid delay or rejection.

#### **Urine Culture and Specimen Collection**

Submit specimens in a sterile urine container and indicate the specimen type.

Patient Collection	Guidelines:	<b>Clean Catch</b>	
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	Prepare a sterile gauze pad for washing by wetting it and placing a small amount of
	soap on the surface. Prepare two more sterile gauze pads for rinsing by moistening.
	Finally, open a fourth gauze pad, but do not moisten. Wash the vaginal area from the
	front to the back, using the soapy gauze pad. Discard the gauze in the wastebasket.
Famala	Rinse the area from front to the back, using the first moistened pad and then the
remaie	second. Dry the area from the front to the back with the dry gauze pad. Lean slightly
	forward so that the urine flows directly down the toilet without running along the skin.
	After voiding the first portion of the urine, place the clean container under the stream
	of urine and collect the rest of the urine into the container. Transfer immediately into
	the urine culture transport tube.
	Prepare a sterile gauze pad for washing by wetting it and placing a small amount of
	soap on the surface. Prepare two more sterile gauze pads for rinsing by moistening.
	Finally, open a fourth gauze pad, but do not moisten. Use the soapy gauze pad to wash
Mala	the end of the penis. Rinse, using first one moistened gauze pad and then the other,
IVIAE	discarding them in the wastebasket. Use the fourth gauze pad to dry. Begin to urinate
	into the toilet. After voiding the first part, place the clean container under the stream of
	urine and collect the rest of the urine into the container. Transfer immediately into the

#### Patient Collection Guideline: Indwelling Catheter

Obtain the specimen with a needle and syringe. Select the puncture site 1-2 inches away from the catheter tube entry point. Cleanse the area to be punctured with 70% alcohol. Aspirate exactly 5mL of urine with a sterile needle and syringe. Disinfect the rubber stopper and aseptically transfer the specimen to the urine transport tube provided. Specimens obtained from the collection bag are not suitable for analysis. Foley tips will **not** be accepted.

#### Specimen Labeling:

- Label the specimen with patient information patient first and last names, date of birth and MRN, date and time of collection.
- Indicate on the request form whether the patient is symptomatic and/or taking antibiotics. This information is critical to quantitative culture interpretation, especially urine specimens with low colony counts.

#### **Urine Culture Transport**

- Refrigerate the urine if it cannot be delivered to the laboratory within 30 minutes of collection.
- Place the specimen in the laboratory refrigerator if no one is in the laboratory to receive the specimen.

#### Comments:

- Do not disconnect the catheter from the catheter bag to collect the specimen, and never submit the bag contents for culture.
- Urine from pediatric bags must be cultured immediately to minimize interference from contaminants.
- Patients with indwelling catheters will probably be colonized after 48 to 72 hours, often with multiple isolates.
- The laboratory must know whether the urine is collected by any method that might introduce contamination: for example, collection at home in an unconventional container, unknown collection method (e.g., from nursing homes, etc).
- A pooled, 24 hour collection of urine is unacceptable for culture, as is more than one specimen per 24 hours.
- Routine urine samples are unacceptable for anaerobic cultures.

#### **Respiratory Cultures**

The following sites are considered respiratory specimens: nasopharyngeal swabs, sputum, bronchial and tracheal aspirations, bronchoalveolar lavage (BAL).

#### **Upper Respiratory Tract Infections**

#### **Throat** – (pharyngeal specimens)

These specimens are submitted primarily for the detection of group A Streptococci.

N. gonorrhoeae – Culture for this organism is not included in routine testing. Indicate this special request on the requisition and send to the lab as soon as possible. This organism will die at refrigerator temperature.

For suspected pathogens other than Streptococci. – Indicate the suspected pathogen on the request form. For example, Haemophilus spp, which may be reported in pediatric patients when requested, although they are part of the normal flora in children and adults.

Do not obtain throat samples if epiglottis is inflamed, as sampling may cause serious respiratory obstruction. The specimen of choice is blood for culture.

Depress tongue gently with tongue depressor.

Extend sterile swab between the tonsillar pillars and behind the uvula. (avoid touching the cheeks, tongue, uvula, or lips.)

Sweep the swab back and forth across the posterior pharynx, tonsillar areas, and any inflamed or ulcerated areas to obtain sample.

If transport is to be delayed beyond 1 hour, refrigerate the swab.

#### Nasal Cultures

Nasal swabs are submitted for the detection of staphylococcal carriers (MRSA).

Nasal cultures do not predict the etiologic agent of sinus, middle ear, or lower respiratory tract infections and should not be submitted in lieu of specimens from these sites.

Anaerobic cultures are not done on nasal specimens.

Insert a sterile swab into the nose until resistance is met at the level of the turbinates (approximately 1 in into the nose).

Rotate the swab against the nasal mucosa.

Repeat the process on the other side using same swab.

Transport to the labeled specimen to the laboratory as soon as possible.

#### Nasopharyngeal Specimens

Submitted primarily for the detection of carriers of *N.meningitides* and to diagnose *Bordetella pertussis*.

A special transport medium is necessary if whooping cough is suspected. Contact the laboratory for a *Bordetella pertussis/parapertussis* evaluation kit. DO NOT REFRIGERATE AFTER INOCULATION. Specimen must arrive no later than 2pm. to ensure prompt transportation to the reference laboratory.

Specimens must be taken in a way that avoids contamination with the nasal or oral flora.

Carefully insert a flexible-wire calcium alginate-tipped swab through the nose into the posterior nasopharynx, and rotate the swab. (Keep the swab near the septum and floor of the nose.) Transport the specimen to the laboratory quickly.

#### **Oral Cultures**

Used to culture for yeast and to prepare smears for the detection of fusospirochetal disease.

Rinse mouth with sterile saline. Wipe the lesion with dry sterile gauze. Swab or scrape areas of exudation or ulceration.

#### **Lower Respiratory Tract Infections**

#### **Expectorated Sputum**

Specimen quality is judged microscopically:

Lower respiratory tract secretions from infected patients are confirmed by noting the presence of large numbers of leukocytes in the absence of epithelial cells. Since epithelial cells in the specimen signals gross contamination with the oropharyngeal flora, only specimens which represent infection will be cultured.

The first, early-morning specimen is preferred. Pooled specimens are not recommended for culture.

Anaerobic studies of sputum are not done.

For the diagnosis of **fungal** or **mycobacterial** disease, separately process three consecutive early-morning specimens.

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

#### Induced Sputum

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

Using an ultrasonic nebulizer, have the patient inhale approximately 20 to 30 ml of 3 to 10% 0.85% NaCl.

Collect the inducted sputum in a sterile screw-cap cup or other suitable sterile collection assembly.

Tracheostomy and endotracheal aspirations

Tracheostomy is followed by colonization with 24 h of insertion of the tube. Results must be correlated with clinical findings such as fever or infiltrate on chest X-ray.

Aspirate the specimen into a sterile sputum trap. Transport the labeled specimen to the laboratory quickly.

#### Bronchoscopy –Bronchial Washing

Bronchial wash and bronchoalveolar lavage specimens are generally obtained before brushing or biopsy specimens to avoid excess blood in the recovered fluid.

Bronchial brushings are preferable to washings because the washings are more dilute.

Most bronchoscopy specimens are *not* cultured for anaerobes. Consult the laboratory is testing is required.

Collect the specimen via bronchoscope. Specify the culture to be done: routine, acid-fast bacillus, or fungal. Transport the labeled specimen to the laboratory quickly.

#### Wound Cultures

The name of a specific anatomic site is required. General terms like "wound", "eye", and "ear" are inappropriate for describing a specimen source.

The quality of a wound culture can be assessed by Gram stain. The presence of epithelial cells indicates contamination with skin flora and may invalidate the significance of culture results.

Skin decontamination is critical to proper culture interpretation.

**Unruptured abscess** - Do *not* swab. Decontaminate the skin overlying the abscess, and aspirate abscess contents with a syringe. After excision and drainage, submit a portion of the abscess wall for culture.

**Open lesions and abscesses** – The <u>specimen of choice is taken from the advancing margin of the lesion</u>. Remove as much of the superficial flora as possible by decontaminating the skin. Remove exudate, and firmly sample the margin of the lesion with a swab.

**Burn wounds** – Debride the area, and disinfect the wound. As exudate appears, sample it firmly with a swab. Submit for aerobic culture only. Submit biopsy tissue as the specimen of choice. Surface specimens usually represent only colonization.

1. Transport the specimen to the laboratory quickly.

2. Refrigerate the specimen if it is not cultured within 1 hour.

#### **MRSA Swabs**

- 1. See Infection Control Procedures for guidelines on screening patients and frequency of testing.
- 2. Appropriate swabs include nasal swabs and swabs from open wounds. Indicate wound source.

#### **VRE Swabs**

- 1. See Infection Control Procedures for guidelines on screening patients and frequency of testing.
- 2. Rectal / perineal swabs, stool specimens are collected to screen for VRE.

#### **Genital Cultures and Specimens**

It is recommended that *Chlamydia* tests be ordered with each *N.gonorrhoeae* request, since the two infections often occur together.

Anaerobic studies are limited to certain specimens: Placenta from cesarean section, Uterus (endometrium), Culdocentesis, Fallopian tube, Cervical aspirate, Ovary, and Bartholin's gland.

#### Vaginal Cultures

For the detection of yeast, vaginitis, vaginosis, and *Trichomonas*. Specimens are also useful in the detection of group A streptococci in children Collect secretions from the mucosa high in the vaginal canal with sterile pipette or swab.

#### **Cervical / Endocervical Cultures**

#### For the recovery of *N.gonorrhoeae*.

Contamination of cervical or endocervical specimens with vaginal secretions will interfere with the recovery of *N.gonorrhoeae*.

- 1. Specimens to be cultured for GC must be cultured immediately. Transport to laboratory as soon as possible.
- 2. Do not refrigerate the specimen
- 3. Gram stain cannot be used effectively in women to detect *N.gonorrho*eae in cervical specimens. Other organisms that morphologically mimic this agent are present.

#### **Urethral Swab**

Cultured for GC only Do not refrigerate the specimen. Transport to the labeled specimen to the laboratory immediately. Diagnosis of GC in males can often be confirmed by Gram stain of urethral exudates.

#### Pelvic Inflammatory Disease (PID)

Specimens are all collected by invasive techniques. Peritoneal fluid may be collected from the cul-de-sac by aspiration through the posterior vaginal vault (culdocentesis). Material taken directly from the fallopian tubes or ovaries is collected surgically.

#### **Intrauterine Devices (IUD)**

These devices are removed surgically to prevent cervical or vaginal contamination. Place the entire device, including any exudates, into a sterile container for transport to the laboratory. Device will be Gram stained for the presence of *Actinomyces species* only

#### **Group B Streptococci Screening**

- 1. One swab from vaginal introitus and anorectum.
- 2. Cervical cultures are not acceptable and a speculum should not be used.
- 3. Indicate on requisition: Screening for Group B requested.

## GEN-PROBE® APTIMA®Molecular Assays for Chlamydia trachomatis and/or Neisseria gonorrhoeae

The Gen-Probe assay is run daily and resulted as positive, equivocal or negative for each organism

#### **Collection Kit for Endocervical and Male Urethral Swab Specimens**

See directions on swab packaging.

- 1. After collection, transport and store the swab in the swab specimen transport tube at  $2^{\circ}$  to  $30^{\circ}$ C until tested.
- 2. Specimens must be assayed within 60 days of collection. If longer storage is needed, store at  $-20^{\circ}$  to  $-70^{\circ}$ C for up to 90 days of after collection.

#### **Collection Kit for Male and Female Urine Specimens**

See directions on swab packaging.

1. After collection, transport and store urine specimen transport tube at 2°C to 30°C until tested.

- 2. Processed urine specimens should be assayed within 30 days of collection. If longer storage is needed, store at  $-20^{\circ}$  to  $-70^{\circ}$ C for up to 90 days of after collection.
- 3. Urine samples that are still in the primary collection container must be transported to the lab at 2°C to 30°C. Transfer the urine sample into the APTIMA urine specimen transport tube within 24 hours of collection. Store at 2°C to 30°C and test within 30 days of collection.

#### Semen

- 1. Call Laboratory for an appointment to bring in specimens. Appointments are available Tuesday to Thursday between the hours of 9:30 and 12 noon.
- 2. Specimens must arrive within one hour of collection and must be handed directly to lab personnel.
- 3. All samples must be labeled with full legal name, date of birth, date, and time of collection.
- 4. \*\*Three days of sexual abstinence is required prior to obtaining specimen to ensure adequate sample\*\*

#### Sterile Body Fluids (excluding CSF, Urine, and Blood)

- 1. Collect the specimen using strict aseptic technique.
- 2. Do not send aspirates to the lab in a syringe.
- 3. Transport all fluids to the lab quickly.

#### CSF

- 1. Notify Microbiology/Biochemistry of pending procedure.
- 2. The specimen is collected by the physician. Suggested volumes are 1, 2, and 2ml for routine, fungal, and mycobacterial cultures, respectively.
- 3. The microbiology dept. gets it first and distributes to relevant departments.
- 4. Hand carry the specimen to the laboratory.
- 5. Do *not* refrigerate the specimen. If there is any delay in transport, maintain the specimen at room temperature.

#### **Fecal Specimens and Cultures**

#### **Stool Cultures**

Submitted primarily for the detection of Campylobacter, Shigella, and Salmonella species and when specially requested, to detect Yersinia, Vibrio, and enterotoxigenic Escherichia coli. The specimen of choice is a diarrheal stool. (acute stage of illness) (A rectal swab for bacterial culture must show feces). Generally, swabs are recommended only for infants.

For bacterial pathogens, collect and submit three specimens, one each day for three days. A single stool specimen may not exclude bacterial pathogens as a cause of diarrhea.

Keep stool specimens cool; do not incubate them.

Do not use toilet paper to collect stool. Toilet paper may be impregnated with barium salts, which are inhibitory for some fecal pathogens.

Have patient obtain stool specimen by one of the following methods

Pass stool directly into a sterile, wide-mouth, leak proof container with a tight-fitting lid.

Pass stool into a clean, dry bedpan, and transfer stool into a sterile leak proof container with a tight-fitting lid.

#### Parasitology

Screening for the detection of Entamoeba histolytica/dispar, Giardia lamblia and Cryptosporidium parvum

Only one fresh, un-fixed stool specimen needed for this EIA method. Stool specimens should be received in an airtight container and stored at  $2^{\circ}$  -  $8^{\circ}$ C until tested.

#### **Complete Parasitological Examination**

Complete examination of stool specimens will be done on patients with a history of foreign travel, patients with unresolved illness, eosinophilia, increased WBC's, or HIV. Contact the laboratory is further testing is required.

For complete examination, three specimens collected every other day or every third day should be adequate. A single stool specimen may not exclude parasitic pathogens as a cause of diarrhea. Specimens for parasitic examination collected too soon after administration of barium oil, magnesium, or crystalline compounds are unsatisfactory. Delay specimen collection a minimum

5 days after administration of these agents.

If transport to the laboratory is delayed, place stool specimen in preservative.

#### **Pin Worm Examination**

Using Cellophane tape, obtain a sample from the perianal area when the patient gets up in the morning before patient bathes or defecates.

Send to laboratory as soon as possible.

#### **Clostridium difficile (Antigen) and Toxin Evaluation**

- Only fresh or freshly frozen unfixed stool specimens may be evaluated using this kit.
- Testing for *C.difficile* should <u>not</u> be carried out on <u>formed stools</u>.
- Children <u>less than or equal to 2 year</u> of age should not be tested, as it can be normal flora in this age group.
- Stool specimens should be received in airtight containers and stored at 2°-8°C until tested.

- Undiluted specimens (no preservatives) should be tested as soon as possible. If testing cannot be accomplished within 72 hours after receipt, they may be stored frozen at -20°C until tested.
- Specimens submitted from patients within 7 days of negative test should not be tested. Specimens submitted within 4 weeks of a positive test will not be tested
- A minimum amount of 1 ml of stool is required for the procedure.

#### MRSA

Culture swabs with blue tops should be used for all wounds to check MRSA status after decolonisation and to monitor known MRSA positive patients.

Culture swabs from nasal and other sites for screening will be inoculated onto chromogenic agar and cultured.

#### Virology Specimens

Specimens should be collected with 4 days after onset of illness, as virus shedding decreases rapidly after that time.

- 1. M4 Transport Medium ( a liquid medium) is available in the Microbiology laboratory and can be used for either viral or *Chlamydia* isolation. After collection, immerse swab immediately into the M4 transport medium to stabilize the virus and inhibit undesirable fungal overgrowth.
- 2. After placing swab in transport tube, break off the top so the cap will fit tightly.
- 3. Fill out Microbiology requisition with specimen source and request specific viral pathogen.
- 4. Send to laboratory immediately.
- 5. Do not use calcium alginate swabs or swabs with wooden shafts.

#### **RVP- Respiratory Virus Panel**

- 1. Obtain RVP collection kit from the Microbiology lab.
- 2. Alert Microbiology staff that samples have been taken.

#### Mycology (Fungal Specimens)

- 1. Hair plucked hairs including the root are needed, not cut pieces. Submit to lab in a clean dry sterile container.
- 2. Skin scrapings from the active margin of the lesion or a general scrape of the scaly area, if there is no active edge.
- **3.** Nail nails should be cleansed with 70% alcohol and then scraped deeply enough to obtain recently invaded nail tissue. Collect debris from *under* the nail, and place debris in a clean dry sterile container.

- 4. Do not refrigerate the specimen. Submit at room temperature
- 5. For systemic infections, consider the need for acute and convalescent-phase sera.
- 6. Always sample the peripheries of skin lesions.
- 7. Biopsy material must be kept moist by being placed between pieces of sterile, moistened gauze.
- 8. Swabs are usually *not* recommended for collecting fungal specimens except when swabbing the vaginal for yeasts or swabbing sporotrichotic chancres.

#### COVID-19 (SARS-CoV2 Testing)

#### Principle

The Panther System is a nucleic acid amplification in vitro diagnostic test intended for the qualitative detection of RNA from SARS-CoV-2. The SARS-CoV-2 assay combines the technologies of Target Capture, Transcription Mediated Amplification, and Dual Kinetic Assay.

#### Specimen requirements

Specimens can be taken from the Nasopharyngeal (NP), nasal, and the oropharyngeal (OP) areas. When obtaining specimens from patients, they must be collected in the correct transport system. The viral transport medium to use is VTM/UTM, saline, Liquid Amies, or specimen transport medium (STM). Swabs to use for specimen collection for NP, nasal, and OP must meet a standard technique using a polyester, rayon, or nylon-tipped swab. The volume needed for the transport media is 3ml.

#### **Anatomic Pathology Department**

The Anatomic Pathology Department comprises of the histology and cytology laboratories and the mortuary suite, all of which are committed to providing a service of the highest quality and will be aware and take into consideration the needs and requirements of its users. In its pursuit of excellence and as part of its continuous quality improvement programme the department participates in all relevant internal and external quality assurance schemes.

Please be aware that all histology and cytology specimens are processed and reported at the AP laboratory at BHB but in the case of further special/ancillary studies specimens may be sent to relevant reference laboratories overseas.

#### **Histology Department**

The Histology Department analyzes tissue specimens through gross and microscopic examination. Following analysis, a report is produced by the pathologist which is then faxed to all clinicians listed on the Histology Request form.

#### **Requirements for Collection of Routine Histology Specimens**

Tissue samples for histological examination should be placed immediately into formalin fixative solution except for certain requests or special specimens listed below. For submission to the laboratory, it is important to select a specimen container of adequate size; tissue must never be crammed into a container and the volume of fixative should be preferably ten times that of the specimen.

Accurate labelling of specimens is imperative. Please ensure that containers are properly sealed to prevent leakage and that the request forms are not placed in same bag as the specimen.

If an urgent report is required on any specimen, please state on the requisition form.

**WHMIS information** – Formalin is a toxic chemical. It must be handled in accordance with all safety regulations. Please ensure that the formalin fixative solution is used only as directed. A safety data sheet may be obtained upon request by contacting the AP laboratory.

A histology request form must accompany the specimen container. All patient information MUST be completed in full and contain the following information. Incomplete forms will be returned to sender with the corresponding specimen to the submitting clinician.

Requirements for histology request form:

- Patient full name
- Patient date of birth
- Patient medical record number (MRN)
- Gender
- Site/Source of specimen

- Date and time specimen taken
- Submitting Physician
- Clinician responsible for patient
- Clinician's signature
- Specimen details
- ICD Code
- For specimens in which formalin fixation is critical e.g. breast and lung biopsies please state the time specimen is placed in formalin filled container.

The specimen container must also be clearly labelled. Please place the label on the side of the container and not on the lid. The minimum amount of information required on the specimen container is:

- Patient full Name
- D.O.B
- MRN number
- Date of collection
- Specimen Source

#### PLEASE NOTE THAT THE MRN NUMBER IS THE UNIQUE IDENTIFIER OF A PATIENT AND SHOULD BE DOCUMENTED ON BOTH THE REQUEST FORM AND SPECIMEN CONTAINER / SLIDES. This can be found on every patient report.

Without the above listed information the case may not be processed and may either be returned to the sender or the requesting clinician will be required to attend the laboratory in order to provide the required information. This will result in a delay in the turnaround time of the specimen.

Formalin solution can be provided by the histology department, however, the histology laboratory is only able to provide 80ml specimen containers. Please contact the Histology Laboratory at ext 1372 for information on obtaining specimens containers and formalin.

#### **Specimen Transport & Receipt**

All specimens taken at clinics / wards at BHB are subsequently delivered to the laboratory by relevant departmental personnel and will require histology personnel receipt signatures.

Specimens taken by the OR department are delivered to the laboratory twice daily by OR departmental staff and will require histology personnel receipt signatures.

Specimens taken by doctors' offices located in the laboratory courier catchment area may be collected by the courier and delivered to the AP department.

Specimens may also be delivered to the Histology Laboratory between the hours of 8am and 4pm and the main laboratory on the first floor if outside of these hours.

Specimens must be transported in a suitable sealed secondary container or carrier.

#### **Requirements for Special Specimens**

#### **Breast Specimens**

Breast specimens must be immediately placed in formalin and fixed for 6-72 hours prior to processing, as in the event of a malignant diagnosis further hormone receptor and HER2 studies will be required. For specimens in which formalin fixation is critical please state the time specimen is placed in the formalin- filled container on the container and request form.

Breast biopsies performed before noon will be processed overnight on the same day and breast biopsies received in the afternoon will be processed the next day. Lumpectomy and mastectomy specimens will required longer fixation; at least overnight or otherwise at the discretion of the Pathologist.

#### Tissue for the evaluation of Lymphoma

Tissue specimens taken for the evaluation of lymphoma in which flow cytometry studies are required MUST be sent to the histology laboratory as soon as possible after collection, FRESH (not in formalin) before 2pm on a weekday for send out and optimal processing. Smear and touch preparations will be performed and the tissue that is not sent for flow cytometry studies will be processed as usual. The turnaround time for flow cytometry studies is 5-10 days. Please call the lab at ext 1372 if you are planning to collect tissue for flow cytometry studies for the evaluation of lymphoma.

#### **Skin Specimens for the Evaluation of Bulbous Lesions**

In skin specimens for evaluation of bullous lesions for which immunofluorescence is required, **perilesional** tissue should be obtained with one biopsy placed in formalin for H&E light microscopic evaluation and one biopsy placed in Michel's media for immunofluorescence studies. Requested immunofluorescence studies will be sent to a reference laboratory for evaluation and the results may take up to 2 weeks. Please call the lab at ext 1372 if you are planning a skin biopsy for immunofluorescence.

#### **Kidney Biopsies**

Kidney biopsies will be sent overseas to an outsides institution for evaluation. One or more biopsies should be placed in formalin, one or more in glutaraldehyde and one or more biopsies in Michel's solution. The requestor must also complete dedicated request forms for submission to the outside institution. Both special media solutions and dedicated request forms are available in the Histology laboratory. Please call the lab at ext 1372 if you are planning a kidney biopsy.

#### **Frozen Section / Intraoperative Consultation Service**

This service is non-routine and is only available by booking and discussion with a secretary and a pathologist. Tissue for examination by frozen section must not be put in fixative, but should be placed in a fully labelled sterile universal container. A histopathology request form must be fully completed as outlined above but should also include a frozen section service request and also include a telephone number to contact when the report is ready. Frozen sections will not be performed on specimens that carry a risk of infection. Full contact details for the submitting physician must be provided to ensure efficient reporting arrangements.

In the case of an unplanned frozen section please contact the laboratory to advise of the request prior to dispatch of the specimen to the laboratory. The tissue sample must be taken directly to the histopathology laboratory and handed directly to a member of staff.

The histopathology office or laboratory must be notified of a postponement or cancellation of a frozen section request. (ext 1372/1740/1877).

For other intraoperative consultation, discussion and arrangements must be made with the duty pathologist.

#### **Turnaround Times**

Departmental turnaround times are calculated from the time of receipt of the specimen and do not include weekends or public holidays.

- Cases marked as **"STAT":** 24 hours
- New cancer diagnoses: 24 hours results will be faxed or phoned to the submitting clinician and also any other clinicians listed on the Histology Request form. Please note that these cases require ancillary studies in most cases, which may take up to 14 days.
- Routine, small specimens: 5 days
- Large resection specimens: 10 days
- Cases requiring ancillary studies: 14 days

#### **Reflexed Ancillary Studies**

Cases with specific diagnoses will be reflexed for ancillary studies as stated in the table below. These studies are performed at a Reference Laboratory and the results will typically take up to 14 days. If additional studies are needed please call the Histology Laboratory at ext 1372.

Carcinoma Type	<u>Test</u>
Breast	
Invasive carcinoma	ER, PR, HER2
In situ carcinoma	ER, PR
Metastatic	PDL1
Gastrointestional	
Colonrectal	MMR, KRAS, NRAS (if KRAS negative)

Gastric adenocarcinoma	HER2
Metastatic	BRAF
Lung	
NSCLC, adenocarcinoma	EGFR, ALK, ROS1/REA, PDL1
NSCLC, squamous	PDL1
ALL	Next Generation Sequencing
Melanoma	BRAF mutation analysis
Endometrium	MMR

*Cyt*ology Specimen Collection Procedures

The Cytopathology Department processes and analyzes gynecologic and non-gynecologic specimens using microscopic review of cellular elements. The microscopic examination includes review for

- Malignant cells
- Precursors of carcinoma (dysplasia, hyperplasia)
- Benign atypia due to inflammation, drug reactions, radiation reactions, etc.
- Microbiologic elements (parasites, fungi, viral changes, bacteria)
- Other incidental findings (e.g., asbestos bodies, crystals, psammoma bodies, casts, etc)
- Maturation index, when indicated

#### **Requesting and Sending Cytology Specimens to the Laboratory**

#### **Completing Cytopathology Test Requisition Forms**

All specimens must be submitted for testing with a completed requisition form. Please provide any pertinent information legibly. The following information must be included on the request form:

- Patient's full legal name
- Medical Record Number
- Date of birth
- Gender
- Date and time of specimen collection
- Relevant clinical history and ICD code
- Source of specimen (e.g. cervix, endocervix, neck)
- LMP for gynecologic specimens
- Collection Method (e.g., voided urine, fine needle aspiration)
- Number of specimens submitted
- Ancillary test request (e.g., HPV, Chlamydia, Gonorrhea, special stains for microorganisms)

• Signature of ordering physician

#### **Specimen Labeling Requirement**

#### **Labeling of Slides**

- 1) Slides should be clearly labeled to ensure correct identification **before** the sample is applied.
- Labeling must be done with a lead pencil on the frosted end of the slide. DO NOT USE BALL POINT PEN, PERMANENT MARKER, OR WAX PENCILS, AS IT WILL WASH OFF DURING PROCESSING.

Label the slide with the **patient's last name**, first initial, and source of specimen. Also, indicate a spray fixed slide with a 'WF' on the bottom right corner, denoting a wet fixed preparation. Air dried slides must be labeled with 'AD'



#### **Labeling of Specimens**

- 1. All specimens are to be clearly labeled to ensure correct and complete identification. All specimens should be labeled with
  - Patient's full legal name
  - Date of birth
  - Medical Record Number (MRN)
  - Date and time of collection
  - Source of specimen
  - Clinician's initials
- 2. Specimen containers must be fluid proof and puncture resistant.
- 3. Material collected from different sites must be submitted in different specimen pots, specifying the sites. (e.g., Right Breast FNA at 12:00 [pot #1], and Rt Breast FNA at 3:00 [pot #2])
- 4. Place the specimen in a biohazard specimen bag, sealing the zip lock securely for transport.

#### **Rejection of Specimens**

Specimen rejection criteria for cytologic specimens include:

- 1. No patient identification on slide or specimen pot/vial
- 2. Specimen pot/vial has illegible patient name
- 3. No specimen received with the requisition form
- 4. Slide broken beyond repair
- 5. Name on specimen pot/vial and requisition form do not match
- 6. Specimen pot/vial labeled with last name only
- 7. Insufficient patient/clinical information
- 8. Gynecologic specimens collected in less than 12 weeks after a prior pap test
- 9. Improper preservation/fixation of specimen

#### **Specimen Collection for Gynecologic Specimens**

Proper sample collection is the first step in ensuring the best result possible. The preferred method of collection for gynecologic specimens is the ThinPrep Pap Test. The range of clinical benefits of this method include increased disease detection, improved specimen adequacy, reduction of equivocal diagnoses, and the ability to perform additional tests out of the same vial, such as HPV and Chlamydia/Gonorrhea.

#### Equipment/Materials

ThinPrep® Pap Test Collection Vials (Contains PreservCyt® Solution) ThinPrep® Pap Test Collection Devices (Plastic Spatula and Endocervical Brush) Biohazard Specimen Bags Cytopathology Requisition Forms\*

\*These can be ordered from materials management 239-2429

#### Procedure

1) Obtain an adequate sampling from the ectocervix using a plastic spatula.

2) Immediately rinse the spatula as quickly as possible into the ThinPrep® vial by swirling the spatula vigorously in the vial 10 times. Discard the spatula.

Obtain an adequate sampling from the endocervix using an endocervical brush. 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 NO OVER ROTATE.

Rinse the brush as quickly as possible in the ThinPrep® vial by rotating the brush in the solution 10 times while pushing against the vial wall. Swirl the brush vigorously to further release the material. Discard the brush.

Tighten the cap so that the torque line on the cap passes the torque line on the vial.

Complete a K.E.M.H. Cytopathology Requisition form and submit the specimen to the K.E.M.H. Laboratory, 1<sup>st</sup> Floor.

#### **Specimen Collection for Non-Gynecological Specimens**

#### Purpose

To establish collection methods for maximum cell preservation and recovery for optimal cytologic evaluation. Also, to ensure the safety of health care personnel by requiring careful handling of specimens containing blood or body fluids. Transport of liter bags or bottles of body fluids presents a potential biohazard risk, and is therefore prohibited. All specimens must be submitted in fluid proof, puncture resistant containers with secure fitting lids to prevent leakage during transport.

#### A) Bronchial, Esophageal, Gastric, Colonic Brushes and Washings

#### Materials Needed

Specimen Container(s) of Cytolyt Solution Biohazard Specimen Bags (for small amounts, 90mls or less) Non-Gynecologic Requisition Forms\*

\*These materials can be obtained from the Cytopathology Department by calling 239-1382

#### Instructions

#### Washings

After obtaining the washings, place up to 30mls of washings in each Cytolyt container. DO NOT EXCEED 30mls of specimen per container. Multiple containers (maximum of 3) may be used.

#### Brushings

After obtaining the brushings, clip the stem of the sampling brush directly into the Cytolyt container.

- 1) Secure the lid tightly onto the specimen container(s) and label it with the patient's name, MRN and date of birth, source of the specimen, and other required information.
- 2) Complete a Cytopathology Non-Gynecologic Requisition Form.
- 3) Place the specimen in a biohazard bag, and close the zip-lock seal. Place the completed Non-Gynecologic Requisition Form in the outer pouch.

4) Deliver the specimen to the K.E.M.H. Laboratory on the 1<sup>st</sup> floor.

PLEASE NOTE: Specimens submitted fresh (without Cytolyt) must be submitted to the laboratory immediately. If submissions are made after hours, please ring the lab bell (located to the right of the main door) and give the specimen directly to a medical technologist only! Instruct them to refrigerate the specimen immediately.

#### B) Body Fluids

- Ascitic/Peritoneal
- Pleural
- Pericardial
- Synovial
- Vitreous
- Cyst (Except Breast)

#### Materials Needed

Specimen Container(s) of Cytolyt Solution Biohazard Specimen Bags (for small amounts 90mls or less) Non-Gynecologic Requisition Forms\*

\*These materials can be obtained materials management 239-2429

#### Instructions

After obtaining the specimen, place up to 30mls of specimen in each Cytolyt container. DO NOT EXCEED 30mls OF SPECIMEN PER CONTAINER. Multiple containers (maximum of 3) may be used.

Secure the lid(s) tightly onto the specimen container(s) and label it with the patient's name, medical record number and date of birth, source of the specimen, and other required information.

- 1) Complete a Cytopathology Non-Gynecologic Requisition Form.
- 2) Place the specimen in a biohazard bag, and close the zip-lock seal. Place the completed Non-Gynecologic Requisition Form in the outer pouch.
- 3) Deliver the specimen to the K.E.M.H. Laboratory 1<sup>st</sup> floor.

Please note: Specimens submitted fresh (without Cytolyt) must be submitted to the lab immediately. If submissions are made after hours, please ring the lab bell (located to the right of the main door) and give the specimen directly to a medical technologist only! Instruct them to refrigerate the specimen immediately.

#### C) <u>Fine Needle Aspirations (FNA)</u>

Whenever possible, the Cytopathology Department should be contacted for technical assistance in the FNA procedure, within the K.E.M.H. facility. The Cytotechnologist can confirm that the initial pass is sufficiently cellular to render a diagnosis.

The following procedure is to assist clinicians with the collection procedure in the absence of a Cytotechnologist.

#### Materials Needed

Leak/ Fluid proof specimen container of Cytolyt Solution Frosted edge glass slides (with chemical resistant marking surface for labeling.) A lead pencil Biohazard Specimen Bags Slide holders (cardboard or plastic) Cytopathology Non-Gynecologic Requisition Form\*

\*These materials can be obtained from materials management 239-2429

#### Instructions

1) Using a lead pencil, label 2 glass slides with the patient's last name, first initial, specimen site, and the letters 'AD' for air-dried.

2) After obtaining the aspirated material, carefully detach the needle from the syringe, and fill the syringe with air.

3) Re-attach the needle and place the needle in the center of one glass slide, with the bevel pointing downward.

4) Advance the plunger of the syringe to express a small drop of aspirate, 2-3mm in diameter onto the slide.

5) Invert the second labeled glass slide over the drop and as it spreads, gently pull the two slides apart horizontally. (Refer to diagram). DO NOT

Immerse the slides in alcohol or spray -fix the slides. AIR DRY ONLY.

6) Aspirate the remaining specimen into the Cytolyt container solution, thoroughly rinsing the needle in the Cytolyt.

7) Secure the lid tightly and label the specimen container with the patient's name, medical record number and date of birth, the source of specimen, and other required information.

8) Complete steps 2-6 for each additional pass.

9) Place the air-dried slides into the slides holder for transport.

10) Complete a Cytopathology Non-Gynecologic Requisition Form. Including the following:

- Patient's full legal name
- Medical Record Number (MRN)
- Date of Birth
- Source of Specimen
- Submitting Physician
- Relevant Clinical Details/History
- Physician's Signature
- Time of Specimen Collection
- ◆ ICD Code

11) Place the Cytolyt specimen container and the slide holder in a

biohazard bag, and close the ziplock seal. Place the completed requisition form in the outer pouch.

12) Deliver the specimen to the K.E.M.H. Laboratory 1<sup>st</sup> floor.

#### PLEASE NOTE:

Specimens submitted fresh (without Cytolyt) must be submitted to the lab immediately. If submissions are made after hours, please ring the Laboratory bell (located to the right of the main door) and give the specimen directly to a medical technologist. Instruct them to refrigerate the specimen immediately.

#### D) Urine Specimens

#### **VOIDED URINE**

This is a physician referral test. Patients are sent to the laboratory reception to collect specimen pots and receive instructions. Ensure that each patient has received 3 completed Non-Gynecologic Requisition Forms (one for each early morning urine specimen).

The following information must be submitted on the requisition form:

- Patient's full legal name
- Medical Record Number (MRN)
- Date of Birth
- Gender
- Source of Specimen
- Submitting Physician
- Relevant Clinical Details/History
- Physician's Signature
- Time of Specimen Collection

◆ ICD Code

The patient receives the Cytopathology Department instructions which appear on the following page.

#### Catheterized Urines

Catheterized urines received from wards must be sent immediately to the lab, in a fluid/leak proof container. If the specimen is collected after hours, deliver the specimen to the lab immediately. Ring the laboratory door bell located to the right of the door, and give the specimen to a medical technologist. Instruct them to refrigerate the specimen immediately.

A Non-Gynecologic Requisition Form must accompany the specimen, with the information noted in the section above, under 'Voided Urine'. Additionally, the date and time of specimen collection must be recorded on this form.

## PLEASE INDICATE THAT THE SPECIMEN IS A CATHETERIZED URINE ON THE REQUISITION FORM!

#### E) Sputum Specimens

#### Materials Needed

Leak/Fluid Proof containers of Cytolyt Solution Biohazard Specimen Bags Non-Gynecologic Requisition Forms\*

\*These materials can be obtained from the Cytopathology Department by calling 239-1382

#### Instructions

Three consecutive early morning deep cough sputums must be collected before the patient eats or drinks. Specimen collection must begin no later than Wednesday of each week.

- a. The patient should rinse the mouth with water before producing the sputum sample, and encouraged to produce a deep cough specimen.
- b. Collect the sputum sample directly into the Cytolyt Solution container. In cases where little or no sputum can be produced, induced sputum may be obtained.
- c. Secure the lid tightly on the container and label the container with the patient's name, MRN and date of birth and source of specimen, and other required information.
- d. Complete a Cytopathology Non-Gynecologic Requisition Form.

- e. Identify the specimen as collected as #1, #2, or #3 on the requisition form.
- f. Place the specimen in the biohazard bag, and close the ziplock seal. Place the completed Non-Gynecologic requisition form in the outer pouch.

**PLEASE NOTE:** Specimens submitted fresh (without Cytolyt) must be submitted to the lab immediately. If submissions are made after hours, please ring the laboratory bell (located to the right of the main door) and give the specimen directly to a medical technologist.

#### F) Ureter, Kidney, Bladder Washings

#### Materials Needed

- a. Specimen container(s) of Cytolyt Solution
- b. Non-Gynecologic Requisition Forms\*
- c. Biohazard specimen bags

\*These materials can be obtained from materials management 239-2429.

#### Instructions

- a. After obtaining the washings, place up to 30mls of washings in each Cytolyt containers. DO NOT EXCEED 30mls OF SPECIMEN PER CONTAINER.
- b. Secure the lid tightly onto the specimen container(s) and label it with the patient's name, K.E.M.H. chart number (or date of birth) and source of specimen.
- c. Complete a Cytopathology Non-Gynecologic Requisition Form.

Place the specimen in a biohazard bag and close the ziplock seal. Place the completed Non-Gynecologic Requisition Form in the outer pouch. Deliver the specimen to the K.E.M.H. laboratory 1<sup>st</sup> floor.

PLEASE NOTE: Specimens submitted fresh (without Cytolyt) must be submitted to the lab immediately. If submissions are made after hours, Please deliver to the main laboratory and ring the laboratory door bell (located to the right of the main door) and request immediate refrigeration for the specimen.

#### G) <u>Cerebral Spinal Fluids</u>

#### Materials Needed

- a. Sterile, leak/fluid proof container or collection tube
- b. Cytopathology Non-Gynecologic Requisition Form

After collecting the fresh specimen in the sterile collection tube or leak proof container the specimen must be transported directly to the Cytopathology Laboratory, and given to a Cytotechnologist or a Cytology Laboratory Assistant.

\*\* An absolutely fresh specimen is required and should be collected only when the laboratory can process it immediately. Delays can result in specimen deterioration.

The Cytopathology Non-Gynecologic Requisition Form must accompany the specimen.

If a CSF is taken after the departmental hours, please ring the laboratory doorbell (located to the right of the main door) and give the specimen directly to a medical technologist. Instruct them to refrigerate the specimen immediately.

#### H) Breast/Nipple Secretions

There are two (2) methods of collection:

- 1. Smear Preparations
- 2. Thin Prep Preparations

#### 1. Nipple Breast Secretion For Smear Preparations

#### Materials Needed

- a. Frosted End Glass Slides
- b. Cytology spray-fixative in a bottle (pump or aerosol)
- c. Cardboard or plastic slide holder
- d. Cytopathology Non-Gynecologic Requisition Form

These materials can be obtained from the Cytopathology Department by calling 239-1382

#### Instructions

- a. Label the frosted end of the glass slide using a lead pencil.
- b. (Patient's last name, first initial, source of specimen, and the letters 'WF' for the spray/wet fixed preparation.
- c. Refer to Section 3, 'Labeling Information')

NOTE: The number of smears will depend on the amount of secretion available for examination.

- d. Using the thumb and forefinger, gently express the nipple and subareolar area. Allow only a drop ('pea-size' or smaller) to collect on the nipple.
- e. Immobilize the breast and use the nipple to smear the material in a thin, even layer over the length of the glass slide.

- f. IMMEDIATELY SPRAY FIX THE SLIDE by applying Cytology spray-fixative evenly over the smear. Ensure that the spray bottle is held at least 12 inches away from the glass slide during the spraying action.
- g. Allow the fixed smear to dry completely before packing for transport.
- h. Place the dry, spray fixed smear(s) into a plastic/cardboard holder for transport. Secure the slide holder with scotch tape or rubber bands to prevent opening during transport.
- i. Complete a Cytopathology Non-Gynecologic Requisition Form.
- j. Place the specimen in a biohazard bag and close the ziplock seal. Place the requisition form in the outer pouch.
- k. Deliver the specimen to the KE.M.H. Laboratory 1st floor.

#### 2. Nipple Breast Secretions - Method for Thin Prep Preparations

#### Materials Needed

- a. PreservCyt® Vials
- b. Cytopathology Non-Gynecologic Requisition Forms
- c. Biohazard Specimen Bags

These materials can be obtained from the Cytopathology Department by calling 239-1382.

#### Instructions

- a. Collect the specimen directly into a PreservCyt® Solution Vial.
- b. Gently shake the PreservCyt Sample vial to mix the contents.
- c. Complete a Non-Gynecological Requisition Form.
- d. Place the specimen vial in the biohazard bag and close the ziplock seal. Place the requisition form in the outer pouch.

5) Submit the specimen to the K.E.M.H. Laboratory 1<sup>st</sup> floor.

#### I) Touch Preparations/Imprints

#### Materials Needed

2 Frosted End Glass Slides

Cytology Spray-fixative in a bottle (pump or aerosol) Cardboard/Plastic Slide Holder Cytopathology Non-Gynaecologic Request Form

\*These materials can be obtained From the Cytopathology Laboratory by calling 239-1382.

#### Instructions

- Label the frosted end of the glass slides using a lead pencil.
- Write the patient's last name, first initial, and source of specimen.

Complete a Cytopathology Non-Gynecologic Requisition Form. Include the following:

- Patient's full legal name
- Medical Record Number (MRN)
- Date of Birth
- Source of Specimen
- Submitting Physician
- Relevant Clinical Details/History
- Physician's Signature
- Time of Collection
- ICD Code

Obtain wet tissue sample for touch preparation/imprint.

Gently touch the wet tissue sample with the 1<sup>st</sup> labeled glass slide. Place the slide aside and allow to air dry.

Gently touch the wet tissue sample with the 2<sup>nd</sup> labeled glass slide. FIX IMMEDIATELY by applying spray-fixative evenly over the smear. Ensure that the spray bottle is held at least 12 inches away from the glass slide during the spraying action.

Label the air-dried slide with 'AD' on the frosted end. Label the 2<sup>nd</sup> fixed Slide with 'WF' on the frosted end.

Let smears dry completely before packing for transport.

Place dry smear(s) into a plastic/cardboard slide holder for transport. Secure the slide holder with scotch tape or rubber bands to prevent opening during transport.

Place the holders/container(s) into a biohazard specimen bag and close the zip lock seal. Place the requisition form in the outer pouch.

Deliver the specimen to the K.E.M.H. Laboratory.

#### J) Tzanck Cells

There are two (2) methods for collection:

- a. Smear Preparations
- b. Thin Prep Preparations

#### **<u>1. Smear Preparations</u>**

<u>Materials Needed</u> Cytopathology Non-Gynecologic Requisition Form Frosted End Glass Slides Cytology Spray Fixative in a bottle (pump or aerosol) Plastic/Cardboard Slide Holder

These materials can be obtained by calling the Cytopathology laboratory by calling 239-1382.

Instructions Complete a Cytopathology Non-Gynecologic Request Form.

Label the specimen container with the patient's name, MRN and date of birth and source of specimen.

Pre- moisten the suspected lesion with saline. If possible, select a fresh vesicle that has not ruptured and crusted.

Using a disposable needle carefully expose a fresh vesicle or crusted lesion.

Using the edge of a spatula, scalpel blade, or glass slide, carefully scrape the lesion along its margin (the edges will yield the best morphologically recognizable inclusions)

DO NOT use a cotton swab or similar material to sample because diagnostic cells may become trapped in the fiber matrix.

Carefully, but quickly spread the material in a thin, even layer over the length of the slide.

FIX IMMEDIATELY by applying Cytology fixative over the length of the glass slide. Ensure the spray bottle is held at least 12 inches away from the glass slide during the spraying action.

Allow the spray fixed slide to dry completely before packing for transport. Secure the cardboard/plastic slide holder(s) with scotch tape or rubber bands to prevent opening during transport.

Place the specimen bag in the biohazard zip lock bag, and close the seal. Place the requisition form in the outer pouch of the bag.

10) Transport the specimen to the K.E.M.H. laboratory

#### 2. Thin Prep Preparations

Materials Needed

PreservCyt® Vials Cytopathology Non-Gynecological Requisition Forms Biohazard Bags

#### Instructions

- Collect the Specimen directly into the PreservCyt Vial.
- Gently shake the PreservCyt Vial to mix the contents.
- Complete a Cytopathology Non-Gynecological Requisition Form.

Place the specimen vial in a biohazard bag and close the ziplock seal. Place the requisition form in the outer pouch. Transport the specimen to the K.E.M.H. laboratory 1<sup>st</sup> floor.

#### <u>References</u>

Laboratory Accessioning, Anatomic Pathology, J.H.Publications Cytyc Corporation, Thin Prep® 2000 System Operators Manual The Manual of Cytotechnology, 7<sup>th</sup> Edition, pg 242 K.E.M.H. Anatomic Pathology Laboratory The Mayo Foundation for Medical Education and Research

#### Attachments/Related Documents

K.E.M.H Cytopathology Gynecologic Requisition Form K.E.M.H. Cytopathology Non-Gynecologic Requisition Form K.E.M.H. Cytopathology Department Urine Collection Instruction

## **Appendix 2 - Tests to Detect Iron Deficiency**

Serum Ferritin	< Normal range	Iron deficiency, high degree of confidence
	< 40 µg / L	Possible iron deficiency, lesser degree of confidence.
	< 70 µg / L	Iron deficiency in patients with inflammation, moderate degree of confidence.
Serum Iron TIBC	Decreased > Elevated	Iron deficiency, moderate degree of confidence.
TIBC	Normal	Results are inconclusive

## **Appendix 3 - Tests to Detect Iron Overload**

Serum Ferritin	Increased levels		Reflect increased body stores.
Serum Iron	Increased >	Γ	Increased stores but changes are not proportional to the degree of overload >60%
TIBC	Decreased or Normal		in males, >50% in females.
<u>% Saturation</u>	Increased		

#### **Appendix 4 - International Normalized Ratio (INR)**

The accuracy of the Prothrombin Time (PT) is known to be very system-dependent. The World Health Organisation has addressed the system variability problem by (1) the establishment of primary and secondary international reference preparations of thromboplastin and (2) the development of a statistical model for the calibration of thromboplastins to derive the International Sensitivity Index (ISI) and the INR.

The INR uses the ISI to equate all thromboplastins to the reference thromboplastin through the following equation:-

INR = (patient PT / mean normal PT) ISI

Thus, the INR can be calculated using the working prothrombin time ratio once the ISI of the thromboplastin is known.

Documented differences in PT results in several interlaboratory trials led the International Committee on Thrombosis and Hemostasis to make a joint recommendation in 1983 to express all PTs as INRs and that manufacturers indicate the ISI of their thromboplastin reagents.

Recommendations for extent of anticoagulation based on INR can be found in "The Sixth American College of Chest Physicians (ACCP) Consensus Conference on Antithrombotic Therapy" published in the January 2001 (supplement) issue of *Chest*. This contains recommendations of many specialists' conditions and other related topics. In brief, the recommendation of an INR of 2.0 to 3.0 is made for most indications. For further monitoring recommendations refer to the Consensus Conference Publication.

Patients are widely variable in response to oral anticoagulation. In addition, early efforts to use the INR among laboratories have had some problems. The guidelines can be helpful in monitoring patients but they should not replace sound clinical judgment.

Studies have shown that low ISI (high sensitivity) reagents are optimal. The laboratory will choose reagents with ISI <1.5. For further information about the current lot of reagents, please contact the Hematology Senior on extension 1732.

References Hirsh, J. et al, Oral Anticoagulants, *Chest* 2001; 119:85 – 215.

#### **Appendix 5- Hemolysis, a Pre-Analytical Quandary**

Hemolysis results from the destruction of RBC's and the liberation of hemoglobin in to the fluid portion of the specimen. When the red blood cell is ruptured and hemoglobin is released, it causes the pinkish to red coloration of serum or plasma.

Hemolysis can be caused by a variety of events. Some diseases will cause hemolysis but it is most likely hemolysis is caused by poor venipunctures or specimen handling during the preanalytical phase of testing.

Let's break down the causes of hemolysis during the pre-analytical phase into three parts; venipunctures, skin punctures and specimen handling.

#### Causes of hemolysis:

Venipunctures

- Drawing blood from a vein that has a hematoma.
- Pulling back the plunger on a syringe too quickly.
- Using a needle with too small of a bore for venipuncture.
- Using too large a tube when using a small-diameter butterfly needle.
- Frothing of the blood caused by improper fit of the needle on a syringe (bubbles in the tube).
- Forcing the blood from a syringe into an evacuated tube.
- Allowing alcohol into the sample from the site.
- Partially filled tubes.
- Excessive trauma to the vein (probing)
- An excessive amount of time withdrawing the blood (coming in too slow, or sitting in the syringe too long before being put into a tube).

#### Skin Punctures

- There is residual alcohol at the skin-puncture site.
- The collection device may have mechanically pressured the tissue adjacent to the puncture site to obtain greater volume of blood.
- Patients have increased red blood cell fragility and high packed cell volume.
- Excessive and aggressive milking of the site.
- Scooping the blood off the skin instead of allowing drops to flow freely into the microtube.
- Not wiping away the first drop of blood (may have residual alcohol).
- Puncturing over a hematoma.
- Puncturing through previously punctured sites (trauma)

#### Specimen Handling and processing

- Vigorous mixing of additive tubes.
- Extremes in temperature.
- Rough handling during transport.

- Improper centrifugation.
- Riming a specimen.

The way that hemolysis can affect lab results vary but is often significant to many analytes. NCCLS lists the following tests that are seriously affected (all increased) as follows: LD, AST, potassium, and plasma hemoglobin.

Tests noticeably affected include: Iron (increased), ALT (increased), and T4 (decreased).

Obviously red blood cell counts can be affected.

It is important to note that the increased use of whole blood samples for testing makes hemolysis a real challenge. It is recommended that if values are not consistent with the patient's usual values that the sample be checked for hemolysis. This can be done by aliquoting a small portion of the sample and spinning it down for visual inspection.

We can minimize the possibility of hemolysis by first being able to identify the causes. Avoiding many of the causes of hemolysis can primarily boil down to following the proper procedures and taking the time necessary to care for the patient and the sample.

#### References

NCCLS procedures for the Handling and Processing of Blood Specimens; Approved guideline – Second edition H18-A2 Vol. 19 No. 21

NCCLS Procedures and Devices for the Collection of Diagnostic Blood Specimens by Skin Puncture: Approved Standard – Fourth edition HA-A4 Vol 19. No. 16

Phlebotomy Essentials Second Edition McCall and Tankersley Published by Lippincott Williams & Wilkins 1998.

Phlebotomy for Nurses and Nursing Personnel by Dennis J Ernst and Catherine Ernst Published by Healthstar Press 2001.

The complete Textbook of Phlebotomy 2<sup>nd</sup> Edition by Lynn B. Hoeltke published by Delmar 2000.

Phlebotomy Handbook Blood Collection Essentials by D. Garza and K. Becan-McBride 6<sup>th</sup> edition published by Prentice Hall 2002.

Clinical Laboratory Science. The Basic and Routine Techniques by J.J. Linne and K.M. Ringsrud Fourth edition published by Mosby 1999.

### **Appendix 6 – Clinical Services Requisition Form**



## Bermuda Hospitals Board

Clinical Laboratory Services Appointments: (441) 239-2032 Fax: (441) 239-5922

SURNAME	MAIDEN NA	ME	
FIRST NAME.			
	c c	ld/mmm,	/ууу
ADDRESS	GENDER	ΠМ	DF
	DOCTOR		
CHART #	COPY TO		
INS./POLICY/CERT#			

RELEVANT CLINICAL DETAILS......

PROFILES		CHEMISTRY	ENDOCRINOLOGY	THERAP. DRUGS***		
ANTENATAL (c	BC,Syp,HepBAg,Rub,HIV,BGAS)	Carl Albumin	BHCG, quantitative	Carbamazepine (Teg)		
CHEM (EDPR,Liver,CPK,LDH,Uric,Trig,Chol,Phos,Ca Random D12hr fast		Alk. Phosphatase	Cortisol	Digoxin		
CORONARY RISK (Chol, Trig, HDL, LDL, Risk) 12hr fast only		ALT / SGPT	Estradiol	Lithium		
COAGULATION SCREEN	(APTT, INR)	Amylase	Free T3	Phenobarbital		
EDPR (Na,K,CI,Glu,BUN,Creat)	Random 12hr fast	AST /SGOT	Free T4	Phenytoin (Dilantin)		
HEPATITIS SCREEN (H	epBAg,HepBAb,HepBCAb,HCV)	Bilirubin, Total & Direct	G FSH	Theophylline		
IRON STUDIES	(Ferritin, Iron, TIBC, %Sat)	Blood Gas, venous	Intact PTH	Valproic Acid		
LIVER (AID, TP, GI	lob,A/G,Tbil,ALT,AST,ALKP,GGT)	Calcium	ОН	Vancomycin		
THYROID FUNCTION	(TSH,FT4,TT4,FT3)	Cholesterol	Progesterone	HEMATOLOGY		
GLUCOSE 75g (Non-Pregn	iant)	СРК	Prolactin	APTT APTT		
TOLERANCE 50g (Gestational	Only)	Creatinine	Testosterone, total	CBC CBC		
TESTS 100g (Confirmation	after previous elevated result)	Electrolytes (NA,K,CI)	Total T4	D-Dimer		
MICROBIOLOGY		GGT GGT	TSH	ESR ESR		
SPECIMEN	SITE or TYPE	Glucose Random 12hr fast	TUMOUR MARKERS	Fibrinogen		
Blood culture		Hemoglobin A1C	AFP	HGB Electrophoresis		
CSF CSF		Iron	CA 125	INR INR		
🗖 Ear		Lactate	CA 15-3	Malaria		
Eye		LDH	CA 19-9	Mono-Spot		
Fluid – cell count		Magnesium	CEA CEA	Reticulocyte Count		
Fluid – crystals		Phosphorus	PSA Total	TRANSFUSION**		
Fluid – culture		Potassium	SPECIAL CHEMISTRY	Antibody Titre		
Fungal		Total Protein	Complement 3	Blood Group & Screen		
Genital – culture		Triglycerides	Complement 4	Cold Agglutinin		
Genital – GC / CT		Troponin I	C-Reactive Protein Direct Coombs			
MRSA M		Urea Nitrogen	C-Reactive Protein (High Sens)	ADDITIONAL		
Nasopharyngeal - RSV		Uric Acid	G Ferritin	ANA Screen		
Semen Semen		Vitamin D	Folate	Free & Total PSA		
Sputum - AFB		URINE CHEMISTRY	Hepatitis B Antigen			
Sputum - Resp		Creatinine Random 24hr	Hepatitis B Surf. Antibody			
Stool - c.difficile		Creatinine Clearance*	Hepatitis B Core Antibody	y 🗖		
Stool - culture		Calcium Candom C24hr	Hepatitis C Antibody			
Stool - ova & parasite		Glucose				
Stool - rotavirus		Microalbumin/Creatinine Ratio	Homocysteine			
Throat		Potassium	🗖 IgA			
Tissue		Protein 🛛 Random 🗆 24 hr	Rheumatoid Factor			
Urine Urine		Sodium	RPRV (visa)			
U Wound		Total Protein/Creatinine Ratio	Rubella			
		Urea Nitrogen	Serum Protein Electrophoresis			
		Urine Protein Electrophoresis	Syphilis Syphilis			
Additional notes:						

\* CREATININE CLEARANCE test requires a Serum Creatinine analysis in addition to the 24hr Urine Creatinine sample.

\*\* A Transfusion Services Request Form is required for all other TRANSFUSION tests.

\*\*\* For THERAPEUTIC DRUGS blood should be drawn immediately before next dose is due.

June 2019

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LTR: LTR19982

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