



# Specimen Collection

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# Completing the Requisition

Correct, complete clinical, test and demographic information is required on all requisitions. The requisition must be legible and completed in indelible ink. Incomplete information results in delays, difficulty in reporting or possible rejection. If the test is not in the CLS Test Directory contact the lab for consultation. The following minimum demographic and test order information must be included on all requisitions. Additional information is required for some requisitions as indicated under Additional Information.

## Demographic and Test Order Information

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**Patient Name:** Print patient's legal name legibly, LAST name first followed by FIRST name and MIDDLE initial. Please use legal first name.

**Personal Health Number:** Provide patient's Personal Health Number or other billing information. For patients who wish to maintain billing confidentiality and prevent a laboratory encounter from appearing on their Alberta Health Care statement, indicate 'suppression of claim' here; DO NOT indicate patient's PHN.

**Confidential Patient Identification:** In special circumstances, to maintain a higher level of confidentiality, patient identity may be protected by using a code name/number instead of the patient's name. Assign a code name/number that is unique to the patient. You will need to maintain a record of assigned patient codes. The code you provide is the only identifying patient information that will appear on the laboratory report. DO NOT indicate the patient's PHN or other billing information.

**Patient Address and Phone Number:** Patient phone number is required on all requisitions. Patient address is not required for patients with a valid Alberta PHN. Addresses with postal code must be included for all out of province patients and in cases where patients are paying for their tests.

**Chart Number:** Enter the patient chart number, if applicable.

**Gender & Date of Birth:** many reference ranges are determined by patient gender and/or age.

**Tests Ordered:** One requisition may be used to order multiple tests. Certain divisions/tests require specific requisitions (see additional information below).

**Specimen Source and Patient History:** Indicate specific source and/or site plus patient history.

**Date and Time of Collection:** Date and time must be recorded as well as the name or initials of the collector.

**Specimen Priority:** Indicate specimen priority for each test.

**Referring (Ordering) Physician:** Indicate the name and location of the ordering physician. Community physicians are provided with a stamp. For further information on the importance of the stamp or how to request new or modified stamps, see the Information for Physician and Healthcare Professionals section. When a stamp is not available for use, please provide the physician's surname with first name and address for report delivery and physician's client (college) number.

**Copy To Physician:** When requesting additional report copies please provide the first and last name of the 'copy to' physician name or the name **and** fax number for the intended fax 'copy to' physician. If an office location is not provided for the 'copy to' physician, and he/she has multiple locations, the report will be directed to a default location for that physician.

## Additional Information

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### Microbiology Requisition (7827M)

Indicate relevant patient history, i.e. travel, suspected organisms/infection/diagnosis, if the patient is immunosuppressed or neutropenic, and list all antibiotics the patient is currently taking.

### Point of Care HIV Requisition

MUST be completed before rapid HIV testing can proceed and cannot be ordered on a hospital information system. Ordering physician name, signature, pager/phone number are required.

**Microbiology Infection Surveillance Requisition (7828M)**

For Sterility Testing and Infection Control requests from acute care sites, donor programs and registered clients, complete the CLS Microbiology Infection Surveillance requisition

**Cytopathology Requisition (#CY0001)**

A completed requisition form must accompany each specimen with clinical information.

Clinical Information must include:

- Cervico-vaginal (PAP) smears
  - Complete all boxes in the history area
  - Other history as required
  - Previous history when relevant
  - Source of specimen
- Type of specimen
- Other Cytopathology appropriate history
  - Previous history when relevant
  - Source of specimen(s)
  - Type of specimen(s)

**Flow Cytometry Requisition (#00414)**

Flow Cytometry requisitions should be used whenever possible to avoid delays in specimen transport. Include clinical diagnosis and any additional information (previous history when relevant) to assist the laboratory in proper sample processing and interpretation of results. **Check off the test requested** in the appropriate box(es). Requisitions may be obtained by ordering form #00414 using CRHA Crain-Drummond Stock Forms Supply Requisition (or call Flow Cytometry at 944-4765).

**Anatomic Pathology Requisition**

A completed requisition must accompany each specimen with clinical information.

Clinical information must include:

- Specimen type and origin
- Clinical history
- Admitting and/or preliminary diagnosis

**Tissue Typing Requisition**

Tissue Typing requisitions should be used to avoid delays in specimen transport. Include clinical diagnosis, type of patient (or relationship to patient), ethnic origin (maternal and paternal), and additional information (transfusion, pregnancies, transplants, and treatment history) to assist the laboratory in proper sample processing and interpretation of results. **Check off the test requested** in the appropriate box(es). Requisitions may be obtained from the Tissue Typing department by calling 770-3652.

**Transfusion Medicine Requisition**

For further information please see Transfusion Medicine - Specimen Collection.

**Molecular Hematology Requisition**

Molecular Hematology requisitions should be used to avoid delays in specimen transport. To assist the laboratory in proper sample processing and interpretation of results, include clinical diagnosis and transplant/treatment history for specimens requiring molecular analysis.

For hemostasis and thrombosis gene studies, include a clinical diagnosis and a personal and/or family history.

**Check off the test requested** in the appropriate box(es). Refer to requisition for ordering guidelines for molecular studies. **Requisitions may be obtained from Molecular Hematology by calling 770-3699.**

# Specimen Identification (Labelling)

**The laboratory reserves the right to refuse improperly labelled specimens.** Specimens collected for laboratory testing must be labelled with a permanently attached label in the form of a computer-generated label or written legibly in indelible ink. The label must include, at minimum, the **patient's legal name (last name, first name and middle initial), and a second identifier** that can be traced directly back to the patient, specifically their Personal Health Number (PHN) or Medical Record Number (MRN). The label should match the requisition accordingly.

## Anatomic Pathology Specimen Identification

All specimens for anatomic pathology must have the following information on the container label:

- Patient's first and last name
- One of the following identifiers:
  - Date of birth
  - Medical Record Number or Personal Health Number

Multiple specimens requiring individual diagnosis should be placed in separate containers. They should be labelled as above and differentiated with a body site, number or letter that coincides with the requisition. Specimens from patients with known or suspected infectious diseases should be marked infectious.

## Blood and Stool Specimens

All blood and stool specimens received in the laboratory must have a permanently attached label with, at a minimum, the following information either in the form of a computer generated label or written legibly in indelible ink:

- Patient's first name and last name
- Medical Record Number or Personal Health Number
- Date and time of collection

Some specimens require more information – see Alphabetical Test List and/or Transfusion Medicine section.

## Cytopathology

**Direct Smears:** All glass slides for cytological examination:

- Must be labelled in pencil with the patient's first and last name on the frosted end of the slide.
- Must be placed, when dry, into a plastic or cardboard container with the completed Cytopathology requisition wrapped around it.

**Specimens in Containers:** All non-gynecological specimens for cytological examination (e.g. washes, fluids, FNAs in Cytolyt):

- Must have the patient's first and last name in pen on the container label
- Must have the specimen type and source on the container
- Must have the ordering physician's first and last name.

## CSF and Body Fluid

Each tube submitted must be labelled with: patient's first and last name, Medical Record Number or Personal Health Number, date and time of collection, source of collection, tube identification number (1,2,3 etc. indicating order of collection). Cerebrospinal fluid (CSF) tests are usually considered to be stat procedures as the constituents are unstable. Because of this, all body fluids, especially CSF, must be taken to the laboratory **immediately** after collection and **handed directly** (not left on a counter) to laboratory personnel.

**Flow Cytometry**

Ensure the following information is fixed to each specimen container:

- Patient's first name and last name
- Medical Record Number or Personal Health Number
- Source and type of specimen
- Date of collection

Multiple specimens requiring individual diagnosis should be placed in separate containers to be accessioned separately. If specimens are not labelled, or are mislabelled, a repeat specimen may have to be collected resulting in a delay in processing. Exceptions will be made when invasive procedures are required for the specimen collection.

**Microbiology**

Ensure the following information is fixed to each specimen container:

- Patient's first and last name
- Medical Record Number or Personal Health number or date of birth
- Source and type of specimen
- Date and time of collection

Multiple specimens requiring individual diagnosis should be placed in separate containers to be accessioned separately. If specimens are not labelled, or are mislabelled, a repeat specimen may have to be collected resulting in a delay in processing. Exceptions will be made when invasive procedures are required for the specimen collection.

**Tissue Typing**

Ensure the following information is fixed to each specimen container:

- Patient's last name and given name
- Date of birth
- Medical Record Number or Personal Health Number
- Date of collection

If specimens are not labelled, or are mislabelled, a repeat specimen may have to be collected resulting in a delay in processing.

**Urine Specimens**

All urine specimens received in the laboratory must have, at a minimum, the following information fixed to the container (not lid): patient's first and last name, Medical Record Number or Personal Health Number, and date and time of collection. 24 h or other timed collection must have in addition to the above: start and stop dates and times of collection. Deliver urine specimens to the laboratory as soon as possible after collection to maintain cellular and chemical stability. Some specimens require special or immediate handling after collection. See the Alphabetical Test List for specific information.

# Specimen Rejection

The laboratory reserves the right to refuse improperly labelled specimens. Consistent practices for specimen rejection shall be employed across CLS. The laboratory shall take measures to maintain specimen integrity during the process of following up on the receipt of an improperly identified specimen. The laboratory recognizes that, in certain cases where the specimen is less common, involves an invasive procedure or could not otherwise be easily recollected, it may be acceptable to apply an exception to specimen rejection. Exceptions shall be applied using strict and explicit criteria in accordance with established procedures.

Generally, improperly identified specimens are not discarded until the collection site or the responsible nursing unit is notified. The high number of specimens received by the laboratory makes it impossible to positively identify specimens that are not clearly labelled in accordance with the specimen identification criteria.

## General Rejection Criteria

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### Unlabelled Specimens

- Generally, common specimen types (blood, urine, swabs, sputum, stool, etc.) which can be easily recollected and cannot, with certainty, be identified will require recollection.
- Specimens which are less common and more difficult to recollect (CSF, fluids, tissues, etc.) will require the person who collected them to come to the laboratory to identify the specimen and sign a waiver assuming responsibility for the identification of the specimen.
- If the person responsible for collecting the specimen is unable, with certainty, to identify the specimen, the appropriate Clinical Leader or designate and ordering physician will be notified.

### Incorrectly Labelled (Mislabelled) Specimens

- Specimens which are labelled with the wrong patient's name compared to that of the accompanying requisition or with a different patient's ID number, the same criteria as for Unlabelled Specimens apply.
- Specimens which have names misspelled, but the ID number is correct will have a notation accompany the patient report. Procedures ordered will be performed.
- The exception is requests for blood products for transfusion, which must be recollected.

### Incorrect Container or Preservative

- Specimens received in an incorrect container, or with/without appropriate preservative, which would invalidate the results, will require recollection. The collection site or nursing unit will be informed. In the case of a Patient Service Centre, the patient will be contacted to arrange for recollection of the specimen.

### Insufficient Specimen for Procedure(s)

- If insufficient specimen is received for all procedures requested and the specimen is easily recollected (urine, stool, sputum, blood, etc.), a repeat collection will be requested. Procedure(s) for which there is sufficient specimen will be performed.
- If the specimen is not easily recollected (CSF, fluids etc.), the ordering physician will be contacted to establish a priority order of tests to be performed.

### Unsuitable Specimen for Procedure(s)

- Specimens which are received and are unsuitable for the procedure requested (saliva for sputum tests, urine for blood tests) or if the specimen has been in transit too long for a valid result, the specimen will be rejected. The nursing unit or collection site will be informed so a proper specimen can be collected.

## Additional Rejection Criteria

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### Cytopathology

Slides/specimens not processed for screening include:

- Gynecological slides (pap smears) or non-gynecological direct smears that are not labelled with the patient's first and last name. **Note:** Both the first and last name are required. The actual slide must be labelled, not the slide holder/mailler. Pencil is recommended (ink washes off during the staining process.)
- Non-gynecological specimen containers that are not labelled with the patient's first and last name.
- The patient's first or last name on the slide/specimen container differs from the name on the requisition.
- The slide is broken beyond repair.
- The specimen container is broken, leaking or empty.
- Incomplete or incorrect patient or ordering physician information on the requisition.
- No slide or specimen accompanies the requisition form.
- No requisition form accompanies the slide or specimen.

All requests will be accessioned (assigned a laboratory number). All accessioned requests will generate a report. In the event a request is accessioned and the specimen is not processed, the requisition and slide/specimen will be returned to the ordering physician with a report detailing why processing did not occur.

### Microbiology

Rejection criteria are designed to prevent inaccurate data and to ensure the safety of laboratory personnel.

Microbiology specimens may be rejected for the following reasons:

- Improperly labelled specimen.
- Unlabelled specimen.
- Incomplete information on the requisition.
- Sub-optimal specimen i.e. leaking urine and/or stool containers, insufficient quantity.
- Duplicate microbiology specimens received on the same day, i.e. multiple stools, sputa specimens.
- Specimen delayed in transit.

### Transfusion Medicine

Any of the following will necessitate specimen recollection:

- Unlabelled specimens.
- Specimens collected without the use of a RTSIS form.
- Specimens collected without the RTSIS number being banded to the patient.
- Specimens collected without patient identification number.
- Specimens collected without patient name.
- Specimens with multiple minor errors in the name and/or identification number.
- Patient identification on requisition is completely different from the specimen.
- Unable to obtain missing documentation of collector/identifier.
- Multiple patient addressographs on the requisition or specimen.
- When directed by Transfusion Medicine staff to confirm patient identification (i.e. ABO and/or Rh of current specimen do not match historical records). In all cases where specimens have been rejected, the appropriate patient care unit will be notified of the rejection and a request for recollection will be made.

Corrections to labelling by the collector will be allowed in the following cases:

- Specimens with minor transcription errors in the name or number.
- First name omissions.
- Requisition/RTSIS form received without signature. Collector and/or identifier must sign before issue of blood product.
- Information is not legible by the Transfusion Medicine staff.

In all cases where changes are required, the person making the changes must sign a Transfusion Medicine Mislabeled Specimen Report form.

# Blood Collection Guidelines

The phlebotomist will collect blood samples ordered by the physician provided the sample can be collected in an evacuated tube, microtainer or syringe. The phlebotomists are limited to drawing from approved blood collection sites (see following section: Site Selection for Blood Collection). **Phlebotomists DO NOT collect arterial blood.**

## Blood Collection Tubes / Order of Draw

Vacuum tubes with color coded stoppers indicating the anticoagulant contained are used for blood sample collections. In the Alphabetical Test List, the color coding is indicated as well as the volume of blood sample required. When collecting blood samples it is important to allow the tube to fill completely and to follow the “order of draw” for tubes as indicated in the following chart:

Order Of Draw	Color Of Stopper	Comments
1	Blood Culture Bottle	When a culture is ordered along with any other blood work, the blood cultures <b>MUST</b> be drawn first.
2	Yellow	Contains sodium polyanethol sulfonate (SPS), and is used to collect whole blood samples for blood culture AFB specimens. When an AFB culture is ordered along with any other blood work, the blood culture <b>MUST</b> be drawn first. Invert gently 8 times immediately after collection to prevent clotting.
3	Royal Blue (Red band on label)	Glass tube containing no additive. This tube is used for collection of trace elements.
4	Red GLASS	Glass tube containing no additive. Used for serum tests, which <b>CANNOT</b> be collected in SST tubes.
5	Light Blue	Referred to as blue top tube. Contains sodium citrate anticoagulant. Invert gently 8 times immediately after collection to prevent clotting. The correct proportion of blood to anticoagulant is critical for accurate results. Complete filling of tube is necessary for accurate results. Used mainly for coagulation studies.
6	Gold	Usually referred to as “SST” (serum separator tube), contains a gel separator and clot activator and is the most commonly used tube where serum is required. Invert gently 5 times, allow to clot 30 minutes, and then centrifuge 10 minutes at 1100-1300 RCF. After centrifugation, the gel forms a barrier between the blood cells and the serum. Transport tube in upright position; no further preparation or handling is required.
7	Red PLASTIC	Plastic tube containing clot activator, and no anticoagulant. Used for serum tests, which <b>CANNOT</b> be collected in SST tubes.
8	Royal Blue (Green band on label)	Contains sodium heparin anticoagulant. Invert gently 8 times immediately after collection to prevent clotting. Complete filling of the tube is necessary for accurate results. This tube is used for collection of trace elements.
9	Dark Green	Contains sodium heparin anticoagulant. Invert gently 8 times immediately after collection to prevent clotting.
10	Light Green (mint)	Usually referred to as “PST” (plasma separator tube), contains lithium heparin anticoagulant as well as a gel separator. Invert gently 8 times immediately after collection to prevent clotting. Centrifuge 10 minutes at 1100-1300 RCF. After centrifugation, the gel forms a barrier between the blood cells and the plasma. Transport tube in upright position; no further preparation or handling is required.
11	Royal Blue	Contains EDTA anticoagulant. This tube is used for collection of trace

Order Of Draw	Color Of Stopper	Comments
	(Lavender band on label)	elements.
12	Lavender	Contains EDTA anticoagulant. Invert gently 8 times immediately after collection to prevent clotting. Complete filling of the tube is necessary for accurate results.
13	Pale Yellow	Contains acid citrate dextrose solution 'A' (ACDA) and is used primarily for Flow Cytometry testing. Invert gently 8 times immediately after collection to prevent clotting. Complete filling of the tube is necessary for accurate results.
14	Gray	Stocked in Acute Care locations only (not in CLS Patient Service Centres). Contains sodium fluoride and potassium oxalate anticoagulant. Invert gently 8 times immediately after collection to prevent clotting. Complete filling of the tube is necessary for accurate results. Used primarily for lactate testing.

## Phlebotomy Protocol

### Patient Identification

#### Inpatients

- The phlebotomist will identify an inpatient for blood collection by use of the hospital identification bracelet on his/her person.
- In situations where it is not feasible for a patient to have an identification bracelet on their person, i.e. burn patients, the phlebotomist will obtain the identification of the patient from the attending nurse or physician prior to blood collection. The identifying personnel will sign a form indicating that they identified the patient.

#### Outpatients

- The phlebotomist will identify an outpatient by asking them to state and spell their full name and state their birth date (year, month and day), as well as by obtaining the patient's provincial health card or hospital card upon each visit.
- Pediatric patients may be identified by their parent/guardian.
- If a patient does not have a provincial health card or hospital card, the phlebotomist will obtain another form of I.D. such as a driver's license or credit card. The patient may be required to contact Data Maintenance at with their personal health number.

### Site Selection for Blood Collection

**Approved Sites** - Phlebotomists will collect blood using one of the following approved sites (listed in the order of preference):

- Antecubital area of the arm
- Back of hand or side of wrist
- Back of hand or side of wrist **below** a lock
- Antecubital area of arm **above** a lock
- Back of hand or side of wrist **below** an I.V. line. **I.V. must be turned off by physician/nurse for a minimum of three minutes prior to collection**
- Foot or ankle **only** with written permission of physician/nurse
- As a last resort, at the discretion of physician/nurse, a phlebotomist may collect from a site **above** an I.V. line. Physician/nurse must provide written permission for this procedure and **must turn off I.V. for a minimum of three minutes prior to collection.** A comment will be appended to the test results, indicating the possibility of dilutional/contamination effect.

**Alternate Sites (used only in exceptional and unusual circumstances)** - Phlebotomists **will not** collect from:

- The arm or hand from the side of a mastectomy unless all other sites have been ruled out, and only with written physician/nurse permission.
- Limbs with indwelling artificial access devices (other than I.V./lock) unless all other sites have been ruled out, and only with written permission of physician.

**Unacceptable Sites** - Phlebotomists **will not** collect from:

- Fistulas, shunts, arterial lines, or locks.
- Arteries, femoral vein, varicose veins, or the palmar region (inside) of wrist.

**Phlebotomy staff will not collect blood specimens from deceased patients, and will only collect from human patients.**

### **Specimens Drawn by Physician/Nursing Staff**

Phlebotomists will request a blood sample be drawn by the patient's physician/nurse if one of the following situations is encountered:

- Two phlebotomists are unable to obtain the required blood sample after a total of four collection attempts.
- The phlebotomist is unable to find a useable approved collection site.
- The patient refuses to have a phlebotomist collect the blood sample
- The patient has a shunt, port, Hickman, PICC line or arterial line (phlebotomist will check with nursing unit to see if blood can be drawn from line by nursing staff; if required, lab drawn blood may still be necessary).

### **Inpatient Absent for Scheduled Collection**

- The phlebotomists will make a reasonable effort to locate patients for collection.
- If a patient is not on or cannot be located on the identified unit, the phlebotomist will notify the nursing unit personnel.
- It is then the responsibility of the nursing personnel to contact the laboratory, on the return of the patient to the nursing unit, for blood collection.

### **Outpatient Services**

#### **Outpatients from Hospital Clinics**

- Patients from certain hospital clinics must be registered through an admission process and receive a facility medical record number prior to presenting for laboratory services.

#### **Non-Clinic Outpatients**

- Patients from community physicians' offices who present with a requisition for laboratory work as an outpatient at an acute care facility will be collected. However, as priority is given to hospital patients, they are encouraged to use one of the Patient Service Centres.
- Patient **MUST** have their Alberta personal health card or other province's health care card for processing.

### **Pretransfusion Testing**

#### **Identification of Patients**

Identification of the patient for pretransfusion testing is of critical importance. Positive identification of the patient implies that the patient's name and hospital number are known. In ER, the patient's name may be substituted by 'Trauma Patient' or 'Mr. X' as defined by ER procedures.

- Identification of the patient must be done by two people, one of which is the person drawing the sample. The other person may be the patient if they are at least 16 years old and competent to do so. Patients are considered competent to identify themselves if they are capable of responding to the question "what is your name?" and by spelling their first and last name.
- Alternately, the second person identifying the patient may be a member of the patient care unit staff, patient caregiver, physician, another CLS staff or a member of the patient's family.

The responsibility for ensuring that the sample is drawn from the correct patient and labelled correctly remains with the person performing the phlebotomy.

### Procedure for Patient Identification

To ensure the correct patient is drawn and that the blood sample is labelled correctly, the following steps **must** be followed:

#### In-patient identification:

- If the patient does not have a hospital ID band (bracelet) have the nursing staff place one on the patient.
- Ask the patient to spell his/her first and last name. If this is not possible due to the patient's age or condition, then another responsible adult such as relative, nursing unit staff or a physician may identify the patient. The person who identifies the patient must sign the phlebotomy permanent record in the appropriate place, indicating their title or relationship to the patient.
- Confirm the hospital ID number by comparing and checking the hospital band (bracelet) with the prepared Transfusion Identification Form and Transfusion Medicine requisition. Resolve any discrepancies before proceeding with specimen collection.

#### Outpatient identification:

- Ask the patient to spell his/her first and last name. If the patient is a child, a responsible adult such as nursing staff, parent, or a relative may identify the patient by spelling the first and last name.
- Confirm the hospital ID number or the Personal Health Number, patient name and date of birth by comparing the completed requisition to the available patient card. In the absence of these, other picture identification that includes the patient's name and date of birth are acceptable.

### Transfusion Medicine Specimen Collection

The collection procedure is as follows:

1. Receive requisition/request for pretransfusion testing\* (Type and Screen or Crossmatch).
2. Assemble necessary phlebotomy supplies, including a yellow armband for the RTSIS ID band identification.
3. Using the CLS 0997 form (Regional Transfusion Service Identification System/ RTSIS) fill in the patient demographics on the 'Permanent Record' section of the form. The information may be hand-written, or addressographed. A label containing the patient name and number may also be used as long as it does not cover the RTSIS number.
4. Fill in the tube label(s) with the patient's name and ID number completely visible. Date and time should also be written on the tube label.
5. Write the date on the wristband insert portion.
6. If the patient is at the Pre-Operative Assessment Clinic, ask the Pre-operative Transfusion History questions. Record answers and sign/ date in box.
7. Perform proper identification procedure as defined under Identification of Patients.
8. Draw the correct volume in an EDTA tube as listed below.
9. Peel the tube label and place on the tube(s).
10. Detach the wristband label by tearing along the perforation. Push the wristband label into the RTSIS (yellow) band, RTSIS number end first.
11. Attach the RTSIS ID band securely to the patient. It may be placed on the wrist, arm, leg, ankle etc. If the band is too short, it can be made longer by clasping an additional band to the end.  
**For the system to be effective, it is critical that the band be placed on the patient at the time of collection.** Inform the patient that the RTSIS ID band must be worn until removed by hospital personnel, or after discharge. Removal of this armband will result in a new sample being drawn.
12. Sign and date the 'Permanent Record' to include who identified the patient and who drew the sample. This **MUST** be completed with two different signatures.
  - a) If patient identifies him or herself, checkmark the box provided or write 'SELF' in the 'Patient Identified by:' line.

- b) If a family member has identified the patient, the relationship to the patient must also be indicated on this line accompanying their signature (i.e. brother, mother, son etc.)
- 13. Deliver the specimen and requisition and/or RTSIS form to the appropriate accessioning area of the laboratory for direction to Transfusion Medicine.

**Pretransfusion\* Testing Specimen Requirements**

Patient	Specimen Volume
Adult – In-Patient	2 x 4 mL or 2 x 6 mL EDTA (lavender)
Adult – Out-Patient	2 x 6 mL EDTA
Neonate 0 to 4 months	1 mL EDTA (2 x 0.5 mL EDTA microtainers)
Child 4 months (or 7 kg) to 24 months	3 mL EDTA
Child 24 months to 18 years	4 mL EDTA
Child with known compatibility testing problems	8 mL EDTA (2 x 4 mL EDTA)

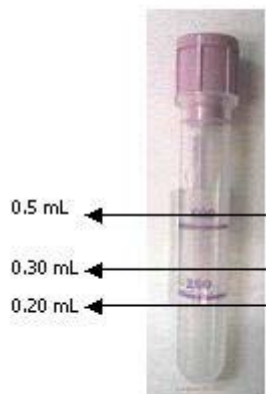
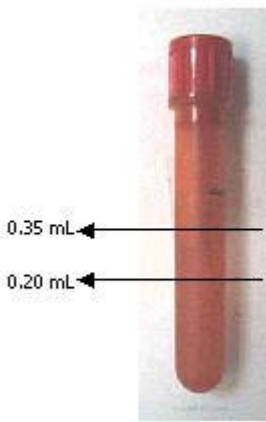
**\*NOTE: Pretransfusion testing is requested in the PathNet LIS as TS (Type & Screen). This is the same as a crossmatch.**

**Microtainer Tubes**

Tube sizes and volume markings are to scale.

Types Available:

Top Color	Anticoagulant
Red or Gold	None (amber tube and gel serum separator)
Lavender	EDTA
Light Green (mint)	Lithium Heparin (gel plasma separator)



## Minimum Blood Volumes for Patients Weighing Less Than 45 kg (100 lb)

The following table outlines the minimum volume of blood that can be drawn for an individual test on a patient weighing less than 45 kg (100 lb). The blood volumes are listed in mL of whole blood unless otherwise specified as serum or plasma.

Test	Volume	Test	Volume
A1AT & Phenotyping	0.5	Ceruloplasmin	0.3
ACE	1.5 serum	Chloride	0.3
Acetaminophen	0.3	Cholesterol	0.3
ACTH	0.5 plasma	CK	0.3
Alanine Aminotransferase	0.3	CKMB	0.4
Albumin	0.3	Clobazam	0.7 serum
Aldosterone	0.8 serum	Clomipramine	1.2 serum
Alkaline Phosphatase	0.3	Clozapine	1.0 serum
Alpha-1 Antitrypsin (AAT)	0.3	CO2	0.3
Alpha-1 Fetoprotein	0.75	Cortisol	0.5 serum
Amikacin	0.3	Creatinine	0.3
Amiodarone	1.0 serum	CRP/HSCRIP	0.3
Amitryptiline*	0.7 serum	Cyclosporin	0.5
Ammonia	0.3	DAT (Coombs)	0.3
Amylase	0.3	Desipramine*	0.7 serum
ANA	0.3	DHEAS	0.5
ANCA	1.5 serum	Diazepam	0.7 serum
Anti-DNA	0.6	Digoxin	0.3
Anti-GBM	1.0 serum	Disopyramide	2.0 serum
Anti-mitochondrial Antibody	0.5 serum	Doxepin	1.2 serum
Anti-parietal Cell Antibody	0.5 serum	Electrolytes	0.3
Anti-reticulatin Antibody	1.5 serum	Electrophoresis (SPE)	0.3
Anti-smooth Muscle Antibody	0.5 serum	EMA	0.3
ApoA/ApoB	0.5	ENA	5.0
ASOT	0.3	Estradiol	0.8
Aspartate Aminotransferase	0.3	Ethanol	0.9
B2 Glycoprotein	1.5 serum	Ethosuximide	0.3
B2 Microglobulin	0.6	Ethylene Glycol	0.3
BHCG	1.0	FDSB	5.0
Bilirubin, Direct	0.3	Ferritin	0.5
Bilirubin, Total	0.3	Fluoxetine	1.2 serum
C3/C4	0.3	Fructosamine	0.3
C-peptide	0.4	FSH	0.9
CA-125	0.6	Gastrin	1.2
CA-19-9	0.6	Gentamicin	0.3
Caffeine	0.3	GGT	0.3
Calcium	0.3	Glucose	0.3
Carbamazepine	0.3	Growth Hormone	1.2
Carbamazepine 10,11 Epoxide	0.7 serum	Haptoglobin	0.3
Cardiolipin Antibody	1.0 serum	HDL	0.3
Carotene	1.3	Hepatitis Screen	0.75
Catecholamines - Plasma	2.2 plasma	Hgb A1C	0.1 capillary special collection kit
CBC/Diff/Retic	0.3	HIV (Prov Lab)	1.5

Test	Volume	Test	Volume
CEA	0.9	HIVR and HIVHVL	1.5
Homocysteine	0.4	Quinidine	1.2
IgE	0.4	Red Cell Folate	0.3
IgG, IgA, IgM	0.3	Renin	0.9
IgM only	0.3	Rheumatoid Factor	0.3
Imipramine*	0.7 serum	RPR	0.4 serum
Insulin	0.8	Rubella IgG/IgM	0.8
Iron/UIBC	0.3	Salicylate	0.3
Isopropanol	0.3	SHBG	0.3
Ketone	0.2	Sodium	0.3
Lactate	0.2 plasma	Sulfonylureas	1.2 serum
Lactose	0.2	T3, Free	0.3
Lpa	0.5	T3, Total	0.3
LD	0.3	T4, Free	0.3
LDL, Chol, HDL, Trig	0.3	Tacrolimus	0.5
LH	0.9	Testosterone	0.4
Lidocaine	0.3	Theophylline	0.3
Lipase	0.3	Thiocyanate	2.2 serum
Lithium	0.3	Thiopental	1.2 serum
Magnesium	0.3	Thyroglobulin	0.3
Methanol	0.3	Thyroid Antibodies see below	0.6
Methotrexate	0.5	-Anti Tg	0.3
NAPA/PROC	0.3	-Anti TPO	0.3
Nicotine	2.0 serum	Tobramycin	0.3
Nitrazepam	1.2 serum	Total Protein	0.3
Nortryptiline*	0.7 serum	Transferrin	0.3
17-OHP	1.0	Tricyclic screen	0.3
Osmolality	0.3	Triglyceride	0.3
Pentobarbital	1.2 serum	Trimipramine	1.2 serum
Phenobarbital	0.3	Troponin T	0.5 plasma
Phenytoin	0.3	TSH	0.5
Phosphate	0.3	Urea	0.3
Potassium	0.3	Uric Acid (Urate)	0.3
Prealbumin	0.3	Vancomycin	0.3
Primidone/Phenobarb	0.3	Valproate	0.3
Procainamide/NAPA	0.3	Viscosity	6.0 serum
Progesterone	0.4	Vitamin B1	0.5 serum
Prolactin	0.6	Vitamin B6	0.3
Propafenone	1.2 serum	Vitamin B12	0.75
Protein Total	0.3	Vitamin D, 25 Hydroxy	0.6
Pseudocholinesterase	2.0 serum	Vitamin D 1, 25 DiHydroxy	1.5 serum
PTH	0.3	Volatiles	0.5

\* If these tests are ordered together, only 0.7 mL required for any combination of tests.

### Common Pediatric Microtainer Collections

The following tests are commonly ordered on pediatric patients and collected in Microtainer tubes. Collect the indicated amount of blood for the required number of tests. Bilirubin, Total

- Bilirubin, Direct
- Glucose
- Neonatal Triglycerides
- Sodium (Na)
- Potassium (K)

# of Tests	RRL collect whole blood	PSC collect whole blood
1 test ordered	0.20 mL	0.30 mL
2-3 tests ordered	0.30 mL	0.40 mL
4-6 tests ordered	0.40 mL	0.50 mL

**Chemistry Automated Analyzers**

The following tests are performed on Hitachi Analyzers 912/917/Modular. Preferred collection is 1 x 5 mL (3.5 mL draw) gold top SST tube or 1 x 5 mL (3 mL draw) light green (mint) top PST tube for all tests. Minimum volume is 0.30 mL whole blood for 1-2 tests and 0.05 mL for each additional test.

Albumin	Cholesterol *	HDL*	Protein, Total
ALP	Chloride	Iron*	Sodium
ALT	CK	LD	Triglycerides *
AST **	CO2	LDL*	UIBC*
Amylase **	Creatinine	Lipase	Urea
Bilirubin, Direct	Electrolytes	Magnesium	Uric Acid
Bilirubin, Total	GGT	Phosphorus	
Calcium	Glucose	Potassium	

\* DSC only    \*\* DSC and ACH only

**Other Test Groups**

The following tests may be grouped together in collection tubes. Preferred collection is 1 x 5 mL (3.5 mL draw) gold top SST tube for all tests in a group. The minimum required volume is indicated for whole blood as well as the minimum amount of serum required.

Test	Whole blood collection	Serum collection
<b>Serum Protein Electrophoresis Group</b>		
SPE: includes SPE and TP	0.6 mL	0.2 mL
HSPE: includes SPE	0.3 mL	0.1 mL
Total TP/SPE/IgG/IgA/IgM	1.5 mL	0.5 mL

**Lipid Group**

LDL Calc, chol, trig, HDL,	0.3 mL	0.1 mL
Add ApoA/ApoB	0.9 mL	0.3 mL
Add Lpa (Lipoprotein little a)	<b>1.2 mL</b>	0.4 mL

**Hepatitis Group**

HAV-Total / HAVAB-M	0.75 mL	0.250 mL
HBsAg, core, Anti HBs	1.5 mL	0.500 mL
Anti HBs + HAVAB total	1.050 mL	0.350 mL
Hep Screen (HBsAg + AHAVM)	0.75 mL	0.250 mL
Positive HBsAg - confirmation	0.75 mL	0.250 mL

**Thyroid Marker Group**

Anti Tg	2.70 mL for all	0.9 mL for all
Anti TPO		
Thyroglobulin		
TSH		

# CSF and Body Fluid Collection Summary Guidelines

- All body fluids, especially cerebrospinal fluid (CSF), must be **taken to the laboratory immediately after collection** as cell lysis can begin within one hour of collection. **Hand directly** to the laboratory personnel (do not leave on counter). Lab personnel deliver **all** CSF specimens to Hematology.
- **Serous fluid (pleural, peritoneal, pericardial)** may contain debris from the collection of the specimen. It is essential to put Hematology samples into EDTA immediately. For Chemistry samples, please see specific requirements in the chart below.
- **Fluid for Crystals** must follow chart requirements as indicated below.
- **CSF collections** - use the standard pre-packaged sterile collection tubes numbered 1 to 4 for CSF collections (available through CHR). Collect the CSF from lumbar puncture into these tubes in sequence. For adults, typically 1.5-2 mL is collected into each tube. This will provide testing for routine chemistry, cell counts, culture and other investigations. Three tubes are sufficient for pediatric collections. Ensure each tube is labelled correctly with patient identification and order of collection (1, 2, 3, 4)
- If unable to collect optimum volume of fluid refer to the Alphabetical Test Listing for specific test volumes. Samples may be shared for certain tests; contact the laboratory for assistance.
- State source of fluid on requisition. If samples are collected from more than one site, each specimen and requisition must be labelled with source. See the Specimen Collection section for completing the requisition and specimen identification (labelling) requirements.
- Clotting of sample will occur when fibrinogen is introduced with a traumatic puncture.
- **DO NOT SEND FLUIDS IN SYRINGES (WITH OR WITHOUT NEEDLES ATTACHED).**
- **DO NOT SEND FLUIDS IN TRANSFUSION BAGS, OR I.V. BOTTLES FOR HEMATOLOGY OR CHEMISTRY ANALYSIS.**
- **DO NOT SEND LARGE VOLUMES OF FLUID. POUR INTO APPROPRIATE CONTAINERS OR CONTACT LABORATORY FOR DIRECTION.**
- Do not refrigerate fluids.

The chart below summarizes the most frequently ordered tests on the most common fluids. Refer to the Alphabetical Test Listing for additional tests and other fluids.

Fluid	Test	Requisition	Volume / Container	Notes	Handling Instruction/Department
CSF	Cell Count, Differential	CLS Acute Care	1 mL in pre-packaged sterile tube or 5 mL red top tube	Deliver to lab immediately. Hand directly to lab personnel.	See the Alphabetical Test Listing or contact lab (Hematology)
Dialysate fluid	Cell Count	CLS Acute Care	3-5 mL in lavender top EDTA tube	Do not send large volumes. Must not be clotted.	See the Alphabetical Test Listing or contact lab (Hematology)
Pleural Peritoneal Pericardial Synovial	Cell Count, Differential	CLS Acute Care	3-5 mL in lavender top EDTA tube or dark green top sodium heparin tube	Place immediately into tubes after collection; mix well.	See the Alphabetical Test Listing or contact lab (Hematology)
Peritoneal Pericardial	Hgb, HCT	CLS Acute Care	3-5 mL in lavender top EDTA tube		Contact lab (Hematology)

Fluid	Test	Requisition	Volume / Container	Notes	Handling Instruction/Department
Pleural Synovial	Crystals	CLS Acute Care	2.5 mL in dark green top sodium heparin tube	Place immediately into tubes after collection; mix well.	See the Alphabetical Test Listing or contact lab (Hematology-DSC or Chemistry-ACH, FMC, PLC, RGH)
CSF	Albumin, Glucose, Protein	CLS Acute Care	0.5-1.0 mL in pre-packaged sterile tube or 5 mL red top tube	0.2 mL for each test.	See the Alphabetical Test Listing or contact lab (albumin only: Chemistry-DSC protein & glucose: Chemistry-DSC, ACH, FMC, PLC, RGH)
Synovial	Glucose, Protein	CLS Acute Care	0.5 mL in gold top SST or light green (mint) top PST tube		See the Alphabetical Test Listing or contact lab (Chemistry-DSC only)
All	Culture (bacterial, Candida/ yeast, fungus, AFB)	CLS Microbiology	Volumes vary for each fluid type	Do not send swabs. Large volume fluids can be sent in sterile screw cap containers (up to 80 mL). Dialysate fluids can be collected using FAN bottles.	See the Alphabetical Test Listing or Microbiology Tests/Bacterial, Candida/Yeast, Fungal, or AFB Culture or Microbiology Helpdesk 770-3646
All	Anaerobic culture	CLS Microbiology	Anaerobic transport media (PRAS) or sterile container	Do not use swab. Inject fluid via rubber septum into anaerobic media.	See the Alphabetical Test Listing or Microbiology Test/Anaerobic Culture or Microbiology Helpdesk 770-3646
All, FNA		CLS Cytopathology	Cytolyte container	CSF: Minimum of 1.0 mL	Cytopathology or CLS Lab Information Centre
CSF, Body Fluids, FNA		CLS Flow Cytometry	2 mL CSF (10 mL preferred), 10-20 mL body fluid	<b>Do NOT put in cytology fixative.</b> FNA must be in RPMI/TTM solution.	Flow Cytometry 944-4765 or CLS Lab Information Centre
Amniotic Fluid		CLS Acute Care			See the Alphabetical Test Listing for collection guidelines
Pleural Peritoneal	pH	CLS Acute Care	0.5-1.0 mL in red top tube or dark green sodium heparin tube (lithium heparin syringe is acceptable if collected by nursing unit).		See the Alphabetical Test Listing or contact lab (pleural: Respiratory-ACH, FMC, PLC, RGH; peritoneal: Chemistry-ACH, FMC, PLC, RGH)
Pleural Peritoneal	Glucose LD Total Protein	CLS Acute Care	0.5-1.0 mL in gold top SST or light green (mint) top PST tube.		See the Alphabetical Test Listing or contact lab (Chemistry-DSC)

# Effects of Hemolysis on Clinical Specimens

Hemolysis due to the breakdown of red blood cells is important to the laboratory because it can have an effect on laboratory results. The effects can be the result of products liberated from the red cells themselves, or due to interferences with laboratory analyzers. This may vary from one test to another depending on the formulation of the reagent.

Hemolysis can occur *in vivo* (in the patient), due to a variety of medical conditions, including antigen-antibody reactions, hemolytic anemias, toxins and poisons, mechanical RBC rupture due to artificial heart valves, as well as treatments such as hemodialysis and the use of the heart-lung bypass machine. Hemolysis can occur during suboptimal blood collection, or *in vitro* (i.e. in the collection tube) due to improper storage.

Hemolysis is graded as slight, moderate or gross. Slight hemolysis has little effect on most test values. Gross hemolysis causes a slight dilutional effect on analytes present at a lower concentration in the red cells compared to plasma. However, a marked elevation may be observed for analytes present at a higher concentration in red cells than in plasma. Some tests are affected more than others. Notable examples of tests affected by hemolysis are found in the table below.

## Effect of Hemolysis on some Chemistry Test Results

Degree of change in analyte	Test result increased by hemolysis	Test result decreased by hemolysis
Slight change	Phosphate, Total Protein, Albumin, Magnesium, Calcium, Alkaline Phosphatase (ALP)	Haptoglobin, Bilirubin
Noticeable change	ALT, CK, Iron	Thyroxine (T4)
Significant change	Potassium (K+), Lactate Dehydrogenase (LD), AST	Troponin T

Note: If the specimen is grossly hemolyzed a recollected specimen will be requested. If the recollected specimen is also grossly hemolyzed, it will be processed and a comment added.

## Physicians Guideline / Patient Instructions

Guidelines for Physicians are subject to change. To ensure quality samples please use the most current forms which are available below.

<b>Form #</b>	<b>Name and Description of Form</b>
AP1017	Ophthalmic Pathology Consultation Requisition
CH3001	Patient Instruction Sheet – Preparation for a 2 Hour P.C. Glucose Test
CH3002	Patient Instruction Sheet – Preparation for a Glucose Tolerance Test
CH3003	Patient Instruction Sheet – 24 Hour Urine Collection
CH3004	Patient Instruction Sheet – Timed ___ Hour Urine Collection
CH3007	Patient Instruction Sheet – Stool for Occult Blood Test
CH3008	Patient Instruction Sheet – Urine 5 – HIAA (Serotonin)
CH3011	Maternal Serum Prenatal Screen
CH3012	Patient Instruction Sheet – Diet for 72 Hour Stool Collection for Fat
CH3013	CLS Prostate Specific Antigen (PSA) History Form
CH3022	Stool Collection for 72 H Fecal Fat Test
CH3025	Creatinine Clearance Blood and 24 Hour Urine
CH3034	Patient Instruction Sheet – Collections Procedure Saliva Cortisol
CH3041	Consent for Third Party HIV Testing
CY1101	Cytopathology Urine and Sputum Collection Techniques – Patient Instruction Sheet
MI6000	Patient Instruction Sheet – Stool Collection Procedure for OVA and Parasites
MI6001	Patient Instruction Sheet – Sputum Collection Procedure
MI6002	Patient Instruction Sheet – Malaria History Form
MI6003	Patient Instruction Sheet – Bordetella pertussis – Collection Guide for Physicians
MI6004	Patient Instruction Sheet – Instructions for the Collection of Superficial Mycology Specimens
MI6005	Patient Collection of Specimens for Anaerobes Guidelines for Physician Instruction Sheet
MI6006	Patient Instruction Sheet – Corneal Scrapings/Endophthalmitis Specimen Instruction Guidelines for Physicians
MI6007	Patient Instruction Sheet - Midstream Urine Collection (Non-Pediatric)
MI6008	Patient Instruction Sheet – Pinworm Specimen Collection Instructions
MI6010	Patient Instruction Sheet – Urine Collection for C & S (Infants)
MI6015	Patient Instruction Sheet – Herpes DFA Slide Specimen Collection – Guidelines for Physicians
OS7710	Patient Instruction Sheet – Post Vasectomy Collection Procedure
OS7711	Patient Instruction Sheet – Full Semen Analysis

# Specimen Packaging and Transport

The Transportation of Dangerous Goods Act requires three layers of packaging for transport of diagnostic specimens: a primary leak proof container, a secondary leak proof container, a rigid outer packaging to protect secondary container from damage in transit as well as enough absorbent material within the secondary liner to contain any leakage in the event of damage.

Calgary Laboratory Services provides Specimen Transport Boxes (STBs) for the purpose of transporting diagnostic specimens for testing. The outer packaging is a durable plastic toolbox. A large zip-lock plastic bag provides the secondary liner. This zip-lock bag contains absorbent material (Dri-Mop Absorber) to absorb the liquid volume carried in the STB. The blood collection tubes, urine containers or pour-off tubes with leak proof caps provide the primary container. To provide increased protection from specimen breakage a foam liner or bubble-wrap has been placed between the outer packaging and the secondary liner.

## Packaging Instructions

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- Place all specimens (tube racks, urines, swabs, tissue containers etc.) inside plastic bag and seal the top.
- ALL tubes, urine containers, etc. containing liquids MUST be placed in an upright position in the box. The STB must always be transported in an upright position.
- Plastic pouches are provided for requisitions. These should be inserted at the front of the STB between the secondary liner and the outer box.
- The couriers are provided with spare STBs, which they use for pick-up of specimens from physician offices or clinics. To provide safe handling these specimens should be placed inside a sealable plastic bag (preferably a two pocket zip-lock specimen bag) prior to pick-up by the courier.

Specimens being transported for testing MUST be packaged carefully to avoid chances of breakage or leakage. We supply a puncture proof container (Use Stat Transport Container – STC for STAT specimens), sealable plastic bag and absorbent material required for packaging. The specimen and the absorbent material are placed into the sealable side of the bag. The requisition, folded in half with patient information facing outward, is placed into the other side. Insert the bagged specimen and requisition into the STC.

## Frozen Specimens

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- **DO NOT** freeze specimens at the collection site on weekdays unless otherwise noted. Transport to the DSC as soon as possible; store specimen in refrigerator until courier pickup. Clearly mark “FREEZE” on the specimen container to ensure it is frozen upon receipt at DSC. For transport, secure specimen between two ice packs in order to maintain refrigerated conditions during transport.
- **DO NOT** transport to DSC on weekends or on statutory holidays; keep frozen at the collection site until first regular working day. Clearly mark “FREEZE” on the specimen container. For transport, pack in dry ice if possible or secure specimen between two ice packs in order to maintain frozen state during transport.
- Use plastic containers when sending frozen specimens. Never fill more than three-quarters full to avoid tube breaking or corks popping during freezing.

## Refrigerated Specimens

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Keep specimens refrigerated before forwarding unless otherwise indicated. When ready to forward, enclose ice pack to assist in maintaining temperature.