LEUKEMIA & LYMPHOMA SOCIETY OF CANADA®

Lab and imaging TESTS

WHAT YOU NEED TO KNOW

You or your loved one has been diagnosed with a type of blood cancer. Your doctor may ask you to have different kinds of lab and imaging tests. What are they and how do they work?

This fact sheet will help you:

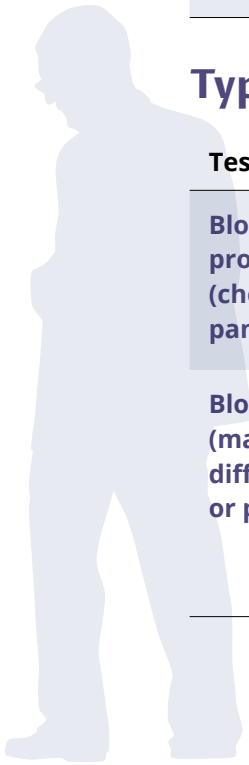
- Get an overview of tests for blood cancers
- Understand what different lab and imaging tests are used for
- Learn about the healthcare professionals who do these tests
- Find out how to prepare for tests

Testing for blood cancers

Lab and imaging tests are important tools that help doctors diagnose, treat, and manage blood cancers. They may be done in a doctor's office, in an outpatient clinic, at a lab, or in the hospital.

These tests help your doctor to:	• Confirm that you have a blood cancer • Guide decisions about your treatment by: - Confirming the subtype you have - Determining the stage or extent of the cancer - Identifying genetic or molecular markers - Determining your risk and expected outcomes (prognosis) • Monitor your condition • Measure how you respond during and after treatment
About lab tests	• Lab tests can be done on blood, urine, or tissue. - These tests look for signs of a blood cancer. • Bone marrow (where your blood is made) tests look at fluid and tissue. - These tests help to find out what type of blood cancer you have and what stage it is at.
About imaging tests	• Help doctors find signs of disease • Check to see if the cancer has spread • Create pictures of your chest, abdomen, head, neck, and other parts of your body • Pass different forms of energy through your body, such as sound waves and x-rays • Can be done "with contrast," where you are injected with an iodine dye to make certain organs and tissues easier to see

Lab tests and imaging tests help doctors diagnose, treat, and manage blood cancers.

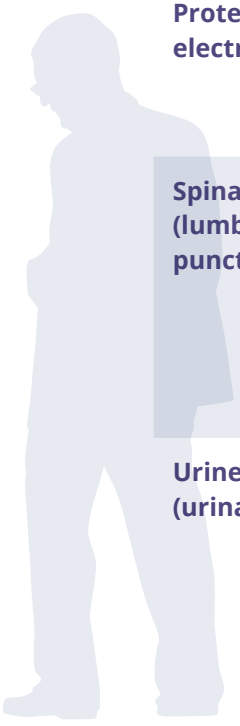


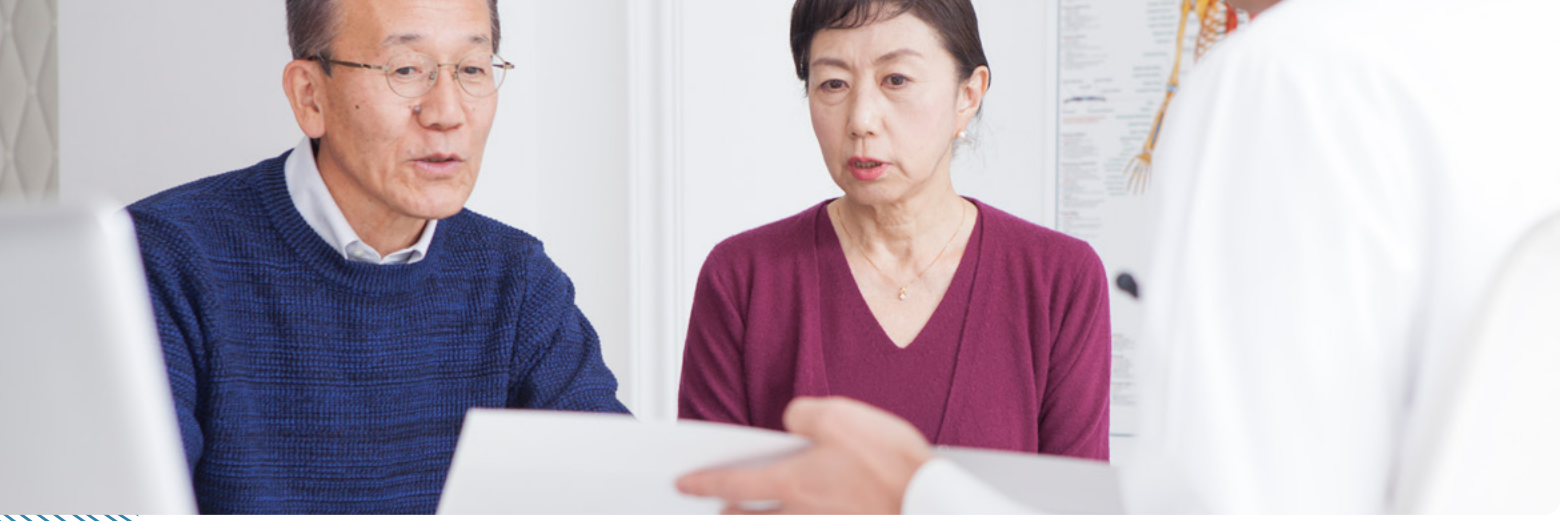
Types of lab tests

Test name	How the test is done	What the test looks for
Blood chemistry profile (chemistry panels)	• A needle is inserted into one of your veins and a sample of blood is taken	• Measures substances in the blood to see how well your kidneys, liver, and other organs are working • Finds out what stage your disease is at
Blood smear (manual differential or peripheral)	• A single drop of blood is spread on a glass slide, dried, and stained with dye • It is then examined under a microscope	• Finds out the number, size, shape, type, and pattern of blood cells • Looks for abnormal or immature cells: these may be signs of disease, can show how severe the disease is, and determine if you need further testing

Test name	How the test is done	What the test looks for
Bone marrow aspiration and biopsy	• A hollow needle is inserted through your hip bone into the marrow to remove a sample of cells (aspiration) or bone (biopsy) • The two tests are usually done at the same time	• Can confirm a blood cancer diagnosis • Provides information about your immune system • Sees how you are responding to treatment • Looks for anything abnormal in your genes that could help with diagnosis and treatment
Complete blood count (CBC)	• A needle is inserted into one of your veins and a sample of blood is taken	• Finds out the amounts of red blood cells, white blood cells, platelets, hemoglobin (a protein that carries oxygen), and hematocrit (proportion of red blood cells) in your blood • Gives information about your overall health and how you are responding to treatment
White blood cell differential (CBC plus differential)	• A needle is inserted into one of your veins and a sample of blood is taken • This test is part of the complete blood count (CBC)	• Measures the amount of each type of white blood cell (leukocyte) in your blood • Checks for abnormal patterns of white blood cells, which may be a sign of infection and leukemia
Fine needle aspiration	• A very thin needle is used to remove cells from a tumour	• Classifies the type of tissue in a new lump or tumour • Finds out if the tumour is cancerous or infected • Assesses how effective the treatment is
Flow cytometry	• Cells are taken from your blood or tissue biopsy and passed through a narrow channel • Light is used to count and profile the cells to see which proteins or markers (antigens) are in your blood	• Gives specific information about the type of cell that is present • Finds out how fast tumour cells are reproducing • Finds out if cells contain abnormal DNA
Fluorescence *in situ* hybridization (FISH)	• Samples are collected through blood or bone marrow tests	• Looks at changes in genes in your cells • Provides information about blood cancers that may have genetic abnormalities • Measures treatment • Monitors for residual (remaining) disease

Test name	How the test is done	What the test looks for
Karyotype test	• Samples are collected through blood or bone marrow tests	• Provides a map of the 46 chromosomes of a cell • Identifies and evaluates any changes in cells • Identifies the number of chromosomes and changes in their size and shape to help develop a treatment plan that is tailored to you
Lymph node biopsy	• A surgeon makes a small incision in your skin to remove part or all of the enlarged lymph node to see if there are cancer cells there • The opening is then closed with stitches	• Examines the tissue to see if it is cancerous or infected
Polymerase chain reaction (PCR)	• Samples are collected through blood or bone marrow tests	• Measures any remaining blood cancer cells to see if treatment is working • When you are done treatment, this is a sensitive test to detect any return of blood cancer cells
Protein electrophoresis	• Samples are collected from your blood or urine	• Identifies abnormal proteins (or any missing normal proteins) in your blood • Diagnoses or monitors your disease to see if treatment is working
Spinal tap (lumbar puncture)	• A special needle is carefully inserted between two vertebrae in your lower back and then into the spinal canal • The test measures the pressure of spinal fluid and collects fluid	• Identifies blood cancer cells, bacteria, viruses, abnormal proteins, or glucose in your cerebrospinal fluid (the clear fluid in your brain and spinal cord) • May provide evidence of blood cancer cells or infection
Urine test (urinalysis)	• Your kidneys filter your blood and make urine: that means many things that show up in your blood can also be seen in your urine • You provide a sample by urinating into a sterile container • The urine is then analyzed in a lab	• Checks for abnormal levels of calcium or protein in your blood: these can cause a number of symptoms and be a sign of disease





Types of imaging tests

Test name	How the test is done	What the test looks for
Chest x-ray	• Two pictures are taken: one of your back and one of your side • These provide images of your chest, lungs, heart, large arteries, ribs, and diaphragm	• Checks for signs of disease, including infection, tumour, enlarged lymph nodes, and internal injuries
Computed tomography scan (CT scan)	• A computer linked to an x-ray machine makes a series of detailed pictures of areas inside your body • While you lie flat on your back, the machine rotates around you, taking images for 10 to 30 minutes	• Detects enlarged lymph nodes and signs of tumours • Finds out how a tumour is responding to therapy • Detects whether a tumour is growing back after treatment ends
FDG-positron emission tomography (FDG-PET) scan	• You are injected with FDG (something like glucose) that has a radioactive tracer • A PET scan is done to look for tumour cells that are consuming larger amounts of glucose than normal cells	• Detects cancer • Finds out how much your cancer has spread (if it has already been diagnosed) • Assesses your response to treatment
Magnetic resonance imaging (MRI) scan	• Magnetic fields and radio waves create images of the body's organs and tissues • You lie on a table that slides into the MRI machine • The machine takes many images	• Detects tumours, masses of cells, and bone changes
Ultrasound (sonography)	• Ultrasound uses high-frequency sound waves to create pictures of internal organs, tissue, and blood flow • The technician will rub lubricant jelly on the part of your body that is being scanned so the ultrasound wand can slide across your skin	• Detects signs of cysts, tumours, and lumps

Your healthcare team

A number of healthcare professionals are involved in ordering and interpreting your tests. They will explain the results to you.

Here are some health professionals who may be involved in your tests:

Health professional	Their qualifications	What they do
Family physician	Medical doctor	• Often the first contact when people develop signs or symptoms of blood cancers • Orders initial lab tests and imaging tests • Refers patients to specialist doctors for specific tests and treatment • Follows patients during and after treatment is completed
General surgeon	Medical doctor	• Performs surgery, lymph node biopsy, or other tissue biopsy to find out if you have cancer
Hematologist oncologist	Medical doctor	• Diagnoses and treats people with blood cancers
Hematopathologist	Medical doctor and pathologist (someone who examines cells and tissue)	• Reviews peripheral blood smears, bone marrow aspirate and biopsy samples, lymph node biopsy, and other tissue biopsy samples that help to diagnose blood cancer
Nurse practitioner	Registered nurse with special education and training	• Diagnoses and treats disease • Assesses patients • Prescribes care and medication • Promotes overall wellness and comfort
Oncology nurse	Registered nurse	• Cares for people who have cancer
Pathologist	Medical doctor	• Identifies disease by studying cells and tissues under a microscope
Radiologist	Medical doctor	• Reads imaging studies, such as CT scans and MRI scans, to help diagnose and treat cancer
Lab technician	Medical technician	• Withdraws blood from one of your veins for testing
Radiology technician	Medical technician	• Takes images of your body to help diagnose and treat cancer

Preparing for your test

Many people feel nervous about having medical tests. You may be anxious about:

- Having your blood taken
- Getting an injection (shot) or biopsy of the bone marrow or lymph node
- Being in an enclosed space (part of some imaging tests)
- Not eating or drinking before a test
- Stopping drugs or medications that could affect the test

Do not stop taking any medications without first talking to your healthcare provider. Discuss any concerns you have with your doctor. They can explain what to expect, which may reduce your fears. Always ask your doctor if there are instructions you should follow (such as fasting) before a test.

Questions to ask your healthcare team

Your healthcare team may include your doctor, nurse, and technicians. To make sure you receive the best care for you, be open and honest with the team. Ask questions so you understand why a test is being ordered and what you can expect when you go for the test.

Here are some questions you may want to ask:

- ☐ Are there any risks?
- ☐ Is it painful or uncomfortable?
- ☐ What do I need to do to prepare for it?
- ☐ Will I have pain or discomfort after the test?
- ☐ Do I need someone to pick me up after the test?
- ☐ When will I get the results?
- ☐ Will someone contact me with the results, or do I have to contact my doctor's office?
- ☐ When can I discuss the test results with my doctor?

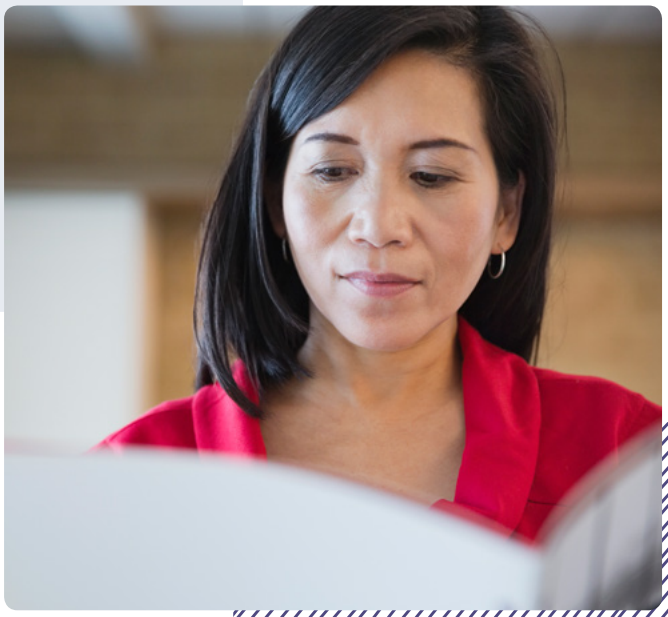
Your results

Many people find it difficult to have tests done and to wait for the results. But if you have a blood cancer, the lab and imaging tests are important tools that help your healthcare team diagnose your cancer, decide which treatment is right for you, and identify any problems early.

No single test result gives all the answers. You may need several tests to assess your overall health. The results also help you and your doctor make decisions about your treatment.

Here are some tips:

- Organize your health records: this will save you time and help you feel more knowledgeable about your health.
- Gather information or ask for clarification from your different doctors.
- Keep all your test results in one place.
- Stay informed and play an active role in your care.
- Refer to reports when you talk to members of your healthcare team.



This publication was made possible thanks to the support of:

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