Answering Your Questions on Prostate Cancer

Canadian Cancer Society

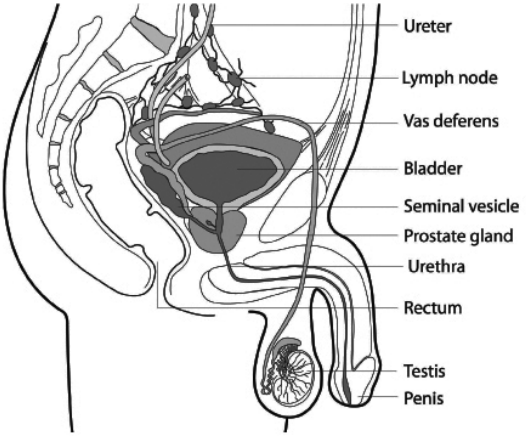
Section 1: The Basics

Understanding prostate cancer may seem overwhelming at first. Let's begin with the basics.

> What is the prostate?

The prostate is part of the male reproductive system. It adds nutrients and fluid to sperm. Normally the size of a walnut, the prostate can be divided into right and left "lobes." It is located in front of the rectum, just below the bladder. It surrounds the urethra, the tube that carries urine and semen through the penis.

The growth of cells in the prostate, both healthy and cancerous, is stimulated by testosterone. Male hormones, including testosterone, are produced almost entirely by the testicles, with only a small percentage produced by the adrenal glands (small glands found just above the kidneys).



> What is prostate cancer?

Prostate cancer is the most common cancer to affect Canadian men. One in nine men will be diagnosed with the disease in their lifetime[i].

Prostate cancer is a disease where some prostate cells have lost normal control of growth and division. They no longer function as healthy cells.

A cancerous prostate cell has the following features:

- Uncontrolled growth
- Abnormal structure
- The ability to move to other parts of the body (invasiveness).

It is important to note that not all clusters of cells growing in a mass are cancerous, and that a prostate with an irregular shape is not necessarily cancerous. See section 'Non-cancerous and precancerous prostate conditions'. It is advisable to talk with your doctor.

Prostate cancer can be slow-growing and some men who develop prostate cancer may live many years without ever having the cancer detected. It's important to talk to your doctor about screening so that if you do develop prostate cancer, the appropriate action can be taken. A significant proportion of prostate cancers, if untreated, may have serious consequences.

There is no single cause of prostate cancer. However, there are some risk factors...

> Who gets prostate cancer?

There is no single cause of prostate cancer. However, there are some factors that make developing prostate cancer more likely.

Age: the chance of getting prostate cancer rises quickly after a man reaches age 50, and almost two out of three prostate cancers are found in men over 65[ii]. Age is the most important factor for prostate cancer.

Race: we don't know why, but black men are more likely to develop prostate cancer.

Family history: your risk of prostate cancer is increased if close family members have had the disease.

Weight: men who are overweight or obese have a higher risk of developing advanced prostate cancer.

It's still possible to develop prostate cancer even when none of these risk factors are present.

> How can I tell if I have prostate cancer?

Typically, the first symptoms of prostate cancer are difficulty urinating, frequent urination, and blood in the urine. However, symptoms are not always present especially in the early stages of prostate cancer. If detected and treated in its earliest stages (when the cancer cells are only in the prostate), your chances of survival are greatly increased. Early detection is key.

There are two main tests that are used to determine whether it is likely you have prostate cancer, even if there are no obvious symptoms. These are the prostate-specific antigen (PSA) test and the digital rectal exam (DRE). Please see section 2: Testing & Diagnosis for more information.

Section 2: Testing & Diagnosis

This section provides information about tests that are used for early detection and diagnosis. It also covers tests that are used to find out what type of prostate cancer is present and how far the cancer has spread.

Why is testing important?

Regular testing increases the likelihood of cancer being detected at an early stage when there are more treatment options and the chance of cure is highest.

> The PSA test

This is a simple blood test that your doctor can order. It measures the amount of prostate-specific antigen (PSA) in your blood. PSA is a protein made by prostate cells. It's mostly found in semen, which is also made in the prostate, but it's normal to find small amounts of PSA in the blood. Higher levels in the blood can be caused by prostate cancer, among other things.

A PSA test is often used together with a digital rectal exam (DRE) to increase the chance of finding prostate cancer early when it is easier to treat. Using these tests together is better than using either test alone.

Make an informed decision about whether the PSA test is right for you by talking with your doctor and considering your risk.

- If you have an average risk of developing prostate cancer, consider testing from age 50.
- If you have a high risk of developing prostate cancer, consider testing from age 45. Black men and those with a family history of prostate cancer have a high risk.

Your PSA levels will determine how often you get tested. The decision to stop testing is based on your PSA levels, age and general health.

Almost every test or procedure has benefits and limits. Testing for prostate cancer early – before you have any symptoms – is your choice. For more information on PSA testing and finding prostate cancer early visit cancer.ca/prostate.

What is a PSA number?

A PSA number shows the amount of prostate-specific antigen (in nanograms) per millilitre of blood. Research has shown that normal PSA numbers vary by age and race so it is important to take these factors into account when looking at your PSA number. For example, because PSA levels rise naturally with age, a normal PSA number at age 40 is different from a normal PSA number at age 70.

> The digital rectal exam

In a digital rectal exam (DRE), your doctor will feel the size and shape of the prostate by inserting a gloved and lubricated finger into the rectum. The area where most prostate cancers are found can be felt during this test. A healthy prostate feels soft, rubbery, smooth, symmetrical, regular and even. Any lumps, or hard, woody or irregular areas of the prostate may indicate the presence of cancer and will require further testing.

It is important to remember that no test is perfect. Combining the PSA blood test with a DRE provides your doctor with more information and helps to increase accuracy of these early detection methods.

> Further testing and diagnosis

The PSA test or DRE alone cannot diagnose prostate cancer. In order to determine whether or not you have prostate cancer, your doctor will perform one or more of the following exams and tests. If you do have prostate cancer, these tests can also help determine how advanced it may be. It's important to have this information to find the treatment best suited to you.

TRANSRECTAL ULTRASONAGRAPHY (TRUS)

This procedure allows a doctor to get a closer look at the prostate. An ultrasound is inserted into the rectum and positioned next to the prostate. This probe uses sound waves to create a picture of the prostate, allowing a doctor to assess its size.

TRUS is usually used as a guide to target the location(s) of the prostate the doctor intends to biopsy to confirm or rule out the presence of prostate cancer. TRUS also provides measurements of prostate size and, along with a PSA test, can determine PSA density. It cannot, on its own, indicate whether there is cancer or not.

Testing may result in early detection of the disease, at a stage when there are more treatment options and a better chance of survival.

COMPUTERIZED TOMOGRAPHY (CT) SCAN

The CT scan is another test that your doctor may recommend. It is often used to check whether enlarged lymph nodes are visible, which is important as prostate cancer can spread through the lymphatic system.

If you have a CT scan, you will be asked to lie flat on a table inside a doughnut-shaped machine that will take multiple images of different sections of your body. These images are then combined through a computer to produce two and three dimensional pictures from inside the body. The whole process usually takes about an hour.

BIOPSY

If your DRE and/or PSA level cause your doctor to suspect that you may have prostate cancer, the next step is usually a biopsy of the prostate. A biopsy removes a small amount of prostate tissue so that the cells can be tested.

Section 2: Testing & Diagnosis

A prostate biopsy is typically an outpatient procedure (does not require an overnight hospital stay). The doctor guides a hand-held device with a small needle through the wall of the rectum into the prostate gland. A small biopsy needle then removes a sample of prostate tissue (called a core). The doctor usually takes at least ten cores. Areas that appear abnormal or feel abnormal during a DRE are targeted and biopsied but additional cores in normal-looking areas of the prostate are also sampled.

A biopsy removes a small amount of prostate tissue so that the cells can be tested.

How a biopsy is performed?

Your doctor will ask you to stop taking any blood thinners (for example: Coumadin, Plavix, Aspirin) for about a week before the prostate biopsy. Be sure to indicate what vitamins or other supplements you might be taking, as these can also thin the blood. You should talk to your doctor before starting to take any blood-thinning medications again.

1. You will need to use a laxative or have an enema before the biopsy, which can be performed at the clinic, hospital, or at home.
2. Biopsies are generally performed under local anaesthetic. Under special circumstances, your doctor may recommend a general anaesthetic when a large number of cores will be taken or if the biopsy is expected to be complicated.
3. The biopsy itself takes about 20 to 30 minutes, but you may be asked to set aside a whole morning or afternoon so you can be monitored by healthcare professionals for any reactions.
4. Often, you need to take antibiotics before and after the biopsy because infection is a concern. You should follow directions carefully and finish the course of antibiotics prescribed.

Outside of vigorous exercise, most men can resume most of their normal activities on the same day as the procedure. If you experience soreness, you may be able to take medication for relief. Talk to your doctor for advice.

POSSIBLE SIDE-EFFECTS OF BIOPSY

It's normal to experience soreness in your rectum and penis after a prostate biopsy. This usually goes away after a few hours. Minor bleeding from the rectum is also common for a day or so. Following a bowel movement, you may notice some blood on the stool or on the tissue paper. About half of the men who undergo this procedure also have some blood in their urine. This is normal and will usually last about a week. You may also notice some blood in the semen. An abnormal colour in the semen may last up to several weeks or months and it may turn from red to a brownish or rusty colour. This is normal.

A prostate biopsy can cause an increase in PSA levels, this is normal. This does not mean you have cancer; it's a short-term reaction to the biopsy.

Uncommon and potentially dangerous side-effects include:

- *Extensive bleeding from the rectum* – very rarely, a biopsy needle nicks a small artery in the rectum, and bleeding will be more severe than normal. A large amount of blood may also be seen in the urine. Alert your doctor immediately if this occurs.
- *Infection* – infection is the main risk of a prostate biopsy. Antibiotics are usually given one or two days before the biopsy, the day of the biopsy and one to two days after to decrease the chance of infection. If you develop a fever shortly after a prostate biopsy, you should consult your doctor or go to your local emergency department.

BIOPSY RESULTS

A pathologist will examine the tissue samples to determine whether they are positive or negative for cancer. You might get a report that reads neither positive nor negative but "suspicious" or "atypical." This result means that the cells do not look cancerous, but neither do they look normal. Talk to your doctor about these results.

If cancer is present, biopsy results will also include a cancer analysis. The results will identify the type of cancer and indicate how abnormal the cancer cells are. A numerical grade is used to describe how abnormal the cells are. You may also be given some preliminary information about the stage of cancer.

Positive/negative: if the biopsy report is positive, it means the pathologist has found cancerous cells in the tissue samples. A negative report means no cancer was found in any of the samples. Note: It is possible for a biopsy to miss cancer. It's estimated that a biopsy may miss cancer in about 20 to 25 percent of cases[ii].

Type of cancer: The biopsy report should indicate the location where cancerous cells were found and what classification the cancer is. The biopsy should also provide information on how many cores contain cancer and how extensive the cancer is.

Most men can resume most of their normal activities on the same day as the procedure.

BONE SCAN

If you've been diagnosed with prostate cancer, and there is a high risk for metastases (cancer spreading from the prostate to other areas of the body), your doctor may recommend a bone scan. The cancer is likely to have spread to the bones if it's an aggressive cancer (see next section on "Grading"); if the PSA number is high (over 20); and the cancer has spread beyond the prostate (see next section on "Staging").

Prior to a bone scan, a radioactive material is injected into a vein in your arm, which takes about two to four hours to circulate and become absorbed by the bones. Sometimes, you are able to leave the hospital or medical centre for this period. During the scan, you usually lie still on a flat surface while a machine holding a gamma camera passes closely over your body. This records the pattern of radiation waves that your body emits. If prostate cancer has spread to the bones, it often shows up as a series of darker areas (called "hot spots") along the spine, long bones, skull or ribs.

It's important to note that various injuries or abnormalities in bone metabolism show up on a bone scan (e.g., old fractures, arthritis, or bone infections). Checking the results of the scan against your medical history will help determine whether the cancer has spread to the bones.

> Other tests being used

PCA3 TEST

This is a molecular test that looks for a prostate cancer-associated gene, which can often be detected in the urine immediately after a prostate examination. The test gives your doctor an idea of how likely you are to have prostate cancer and whether a biopsy should be done. PCA3 may be especially helpful in identifying patients who should have a repeat biopsy (e.g., those with a negative biopsy who continue to have high PSA levels). Clinical trials are currently being conducted in Canada and the United States to further evaluate the potential of the PCA3 test.

MAGNETIC RESONANCE IMAGING (MRI) SCANS

Medical researchers have started to look at how MRI scanning can be safely used to reduce the number of invasive biopsies that men may have to go through. MRI scans show the whole prostate and the surrounding tissue, so tumours of all sizes and locations can be seen. Doctors can often tell from looking at a tumour how invasive the cancer is, which can help determine the best treatment option. Clinical trials on the use of MRI scans are ongoing.

> Grading and staging of your prostate cancer

The grade and stage of your prostate cancer are important considerations when deciding on treatment options.

GRADE

A cancer's grade gives information about how fast the cancer is growing and how fast it's capable of spreading. It describes how closely its cells resemble normal cells of the area. There are two main methods of grading cancer: the general grading system and the Gleason grading system.

The grade and stage of your prostate cancer are important considerations when deciding on treatment options.

General grading system: this system classifies cancer cells as low, intermediate or high-grade.

Low-grade

These cancer cells look a bit like other prostate cells and retain many prostate cell qualities. The cells are arranged in patterns or glands almost resembling the normal prostate. These cancers usually grow slowly and are not aggressive.

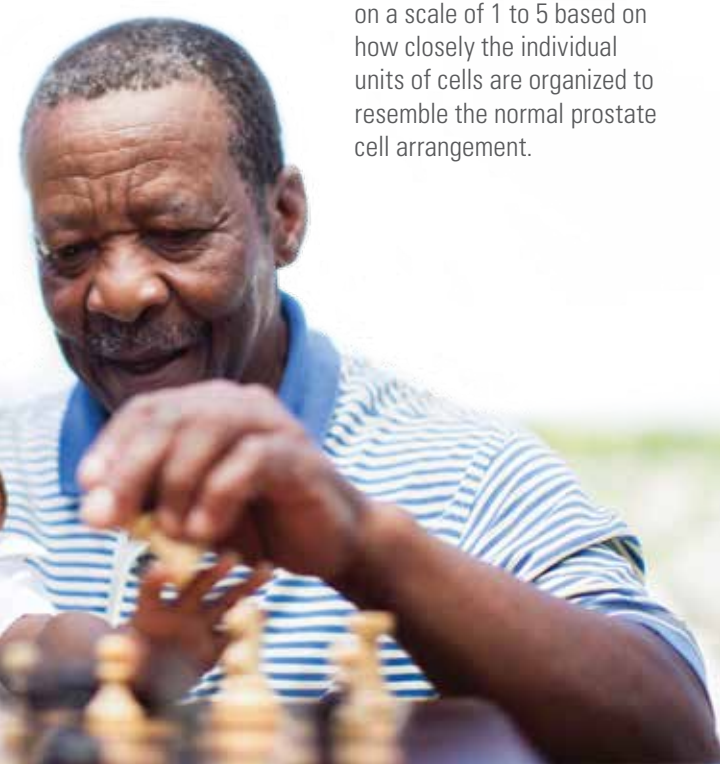
Intermediate-grade

These cancer cells are more abnormal looking than low-grade cancer cells. A pathologist can still recognize them as prostate cells, but they appear in a disorganized pattern. These cancers are intermediate in terms of aggressiveness.

High-grade

These cancer cells are "wild looking" and do not resemble normal prostate cells at all. They are aggressive, and they grow and spread quickly.

Gleason grading system: this system grades prostate cancer on a scale of 1 to 5 based on how closely the individual units of cells are organized to resemble the normal prostate cell arrangement.



GLEASON SCORE

Because there are often a number of different grades of cancer present within biopsy samples, a scoring system was developed. To determine a Gleason score, a pathologist first decides which two grades of cancer are most common in the patient's biopsied tissue. These grades are added together to reach a number between 2 and 10. For example, if cells that follow the Grade 3 pattern are most common, but some cells follow the Grade 4 pattern, the prostate cancer would have a Gleason score of 7 (dominant pattern 3 + secondary pattern 4 = 7).

Gleason score	Interpretation
6 or less	Considered low, meaning the cancer has a tendency to grow slowly.
7	Considered intermediate, meaning the cancer has a moderate speed of growth.
8 to 10	Considered high. The cells usually grow quickly and the cancer can spread fast.

Most men have cancers with Gleason scores of 6 or 7, and less commonly 8, 9 or 10. Pathologists rarely, if ever, assign Gleason scores of 2, 3 or 4.

STAGE

A cancer's stage gives information on how far the cancer has spread. It's determined by considering three factors:

- Size of tumour, and whether the cancer has spread beyond the prostate capsule or covering.
- Whether the cancer has spread to the lymph nodes close to the prostate.
- Whether there are any distant metastases.

A cancer's stage gives information on how far the cancer has spread.

There are two main staging systems: TNM staging system and the lesser used Whitmore-Jewett staging system.

TNM staging system	The TNM staging system provides information about the cancer's size and how far it has spread. It is based on the extent of the tumour (T), whether cancer cells have spread to nearby (regional) lymph nodes (N), and whether distant metastasis (M) has occurred.
Whitmore-Jewett staging system	In this system, prostate cancer is classified by a letter between A and D. Stage A is the earliest stage and stage D is the most advanced stage of cancer.

> Non-cancerous and precancerous prostate conditions

PROSTATITIS

This is a non-cancerous infection or inflammation of the prostate. Prostatitis can develop rapidly (acute) or slowly (chronic) and is either bacterial or nonbacterial. Treatments can include antibiotics and anti-inflammatory drugs.

BENIGN PROSTATIC HYPERPLASIA (BPH)

BPH is an overgrowth of cells in the prostate, causing the prostate to become enlarged. It is common in men over 50 years of age.

Some men will not experience any symptoms with this condition. Other men may find that urine flow is reduced or stops altogether due to the enlarged prostate squeezing the urethra. Complications of untreated BPH include urinary stoppage, repeated bladder infections, bladder stones, and back-pressure on the kidneys leading to kidney failure. Depending on how bothersome the symptoms are and whether there are complications from the condition, BPH may be treated with changes to diet and lifestyle, medication, or surgery.

PROSTATIC INTRAEPITHELIAL NEOPLASIA (PIN)

In the case of PIN, there is abnormal and uncontrolled growth of cells that line the surface of the prostate.

High-grade PIN is sometimes considered a pre-cancerous condition. That does not necessarily mean that prostate cancer will develop. But it does mean that men with this condition need to be monitored more closely, sometimes with additional biopsies.

CANADIAN CANCER SOCIETY

We're here for you.

When you have questions about treatment, diagnosis, care or services, we will help you find answers.
Call us at 1-888-939-3333.

Ask a trained cancer information specialist your questions about cancer. Call us or email info@cis.cancer.ca.

Connect with people online to join discussions, get support and help others. Visit CancerConnection.ca.

Browse Canada's most trusted online source of information on all types of cancer. Visit cancer.ca.

Find your local community services in an easy-to-use, searchable database of cancer-related programs and services across Canada. Visit csl.cancer.ca.

Our services are free and confidential. Many are available in other languages through interpreters.

Please note: the information presented in this resource is not meant to replace any medical advice provided by your healthcare team. For medical advice please consult with your healthcare provider.

KEY REFERENCES:

[i] Canadian Cancer Society's Advisory Committee on Cancer Statistics. Canadian Cancer Statistics 2017. Toronto, ON: Canadian Cancer Society; 2017.

[ii] Lin, K et al. (2008). Benefits and Harms of Prostate-Specific Antigen Screening for Prostate Cancer: An Evidence Update for the U.S. Preventative Services Task Force. Annals of Internal Medicine. 149(3):192-1991.1.

Notes

ABOUT THE CANADIAN CANCER SOCIETY

The Canadian Cancer Society is the only national charity that supports Canadians with all cancers in communities across the country.

DOCUMENTS DE RÉFÉRENCE CLÉS

[i] Comité directeur des statistiques sur le cancer de la Société canadienne du cancer. Statistiques canadiennes sur le cancer 2017. Toronto (Ontario) : Société canadienne du cancer; 2017.

[ii] Lin, K et coll. (2008). Benefi ts and Harms of Prostate-Specifi c Antigen Screening for Prostate Cancer: An Evidence Update for the U.S. Preventative Services Task Force. Annals of Internal Medicine. 149(3) : 192–1991. 1.

For more information, contact the Canadian Cancer Society.

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