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# Prostate Cancer

by Ron Pohar, BScPharm, Clinical Pharmacist

## Learning Objectives:

Upon successful completion of this lesson, the pharmacy technician should be able to:

1. Understand the epidemiology of prostate cancer in Canada
2. Describe the various stages of prostate cancer
3. Describe the signs, symptoms and risk factors for prostate cancer
4. Understand the role of the pharmacy technician in the care of patients with prostate cancer
5. Understand the various approaches to the management of prostate cancer and the main adverse effects of commonly used therapeutic agents

### Introduction

Prostate cancer accounts for 27% of new cancers in males each year. In 2010 there will have been an estimated 24,600 cases of prostate cancer in Canada and 4,300 deaths.<sup>1</sup> One in seven Canadian men will be diagnosed with prostate cancer in their lifetime.<sup>1</sup> The incidence rate of prostate cancer (which reflects the number of new cases in a year) is 123 per 100,000 population, making it the cancer of highest incidence amongst males.<sup>1</sup> Given these statistics, it is likely that pharmacy technicians (both in hospital and community practice) will encounter individuals with prostate cancer in their daily practice. A better understanding of the risks for prostate cancer, screening guidelines, and treatment of the disease will help pharmacy technicians to better provide care to patients with this condition.

### What is prostate cancer?

By definition, prostate cancer is a cancer that starts in the cells of the prostate gland.<sup>2,3</sup> The prostate gland is located near the rectum, below the bladder at the base of the penis.<sup>2,3</sup> It is a walnut-sized gland that surrounds the urethra (the tube that carries urine and semen through the penis).<sup>2,3</sup> The prostate gland is a component

of the male reproductive system and plays a key role in the production of seminal fluid, which, when combined with sperm, makes semen.<sup>2,3</sup>

### What causes prostate cancer?

The underlying pathophysiology of prostate cancer is not clear, but over the past 10 years increased research in this area has helped to gain a better understanding.<sup>3</sup> It has become increasingly apparent that a condition referred to as high-grade prostatic intraepithelial neoplasia (PIN) precedes the development of prostate cancer. In the condition referred to as PIN, there is an increase in the number of cells within the ducts and glands of the prostate due to cell growth and cell division. In addition, there are changes in the formation, structure and function of cells, similar to what would be observed in cancer cells. Over time, PIN may become more similar to cancer and may be a marker for the development of prostate cancer. As well, genetics are thought to play a role in the pathophysiology of prostate cancer.<sup>3</sup>

### What are the risk factors for prostate cancer?

The key risk factors for the development of prostate cancer are age, race and family history.

There is a clear association between the risk of developing prostate cancer and advanced age.<sup>4</sup> Only about 0.2% of cases of prostate cancer develop in Canadians under the age of 50, but this increases to about 2% in men between the ages of 50 to 59 and peaks at 11.6% in men that are over the age of 75. It is estimated that more than 80% of prostate cancer cases occur in men who are over 65. Further, about 90% of prostate cancer deaths occur in males over the age of 65.<sup>4</sup>

Ethnic origin is related to the risk of developing prostate cancer.<sup>3,4,5</sup> Males of African descent are at greater risk of prostate cancer than Caucasians, while males of Asian decent have a lower risk of prostate cancer than Caucasians.<sup>3,4,5</sup>

Genetic factors can predispose an individual to the development of prostate cancer.<sup>4,5</sup> For example, a man whose father or brother has been diagnosed with prostate cancer is twice as likely to develop prostate cancer himself compared to a man who has no relatives affected by the disease. This risk becomes five to 11 times higher in men who have two or more first-degree relatives who have been diagnosed with prostate cancer.<sup>3,4,5</sup>

Diet also is thought to play a role in the development of prostate cancer.<sup>4,5</sup> Diets that are high in saturated fats, red meat and dairy products are thought to increase the risk of developing prostate cancer. There is some evidence that the risk of prostate cancer can be reduced by nutrients such as lycopene, vitamin E, vitamin A, beta-carotene, soy products and selenium, but this evidence is currently preliminary, somewhat controversial and requires further confirmation.<sup>4,5</sup>

### What are the current screening recommendations for prostate cancer?

There is potential for prostate cancer to be detected with a digital rectal exam (DRE) prior to the development of disease symptoms.<sup>3,6</sup> A DRE is performed by a healthcare professional by inserting a finger into the rectum to feel one side of the prostate gland to identify any abnormalities. A DRE may miss some prostate cancers.<sup>3,6</sup>

Prostate cancer can also be detected using a blood test referred to as PSA (prostate-specific antigen).<sup>3,6</sup> PSA is a glycoprotein produced by cells in the prostate gland. In males with prostate

cancer, PSA may rise due to increased production of this protein and increased release of PSA into the serum of the blood. It should be noted, however, that evidence has shown that PSA levels can increase five to 10 years or more before an individual develops clinical disease. Further, elevated PSA is not necessarily diagnostic of prostate cancer since PSA levels also increase in other conditions such as benign prostatic hyperplasia (BPH) and prostatitis (infection of the prostate gland). In fact, two out of three men with elevated PSA will not have prostate cancer.<sup>3,6</sup>

Prostate cancer screening is a controversial topic since screening programs have not been shown to decrease mortality from the disease.<sup>3,6</sup> The combined use of PSA and DRE can increase the overall rate of prostate cancer detection; however, these screening tests have not been shown to improve outcomes, such as duration of survival in patients with prostate cancer. As such, the use of routine PSA and DRE for screening has been questioned.<sup>2,3,6</sup> Risks and benefits of testing should be weighed in making the decision to test or not. Guidelines and recommendations for prostate cancer screening differ across the country. The Canadian Cancer Society recommends that men talk to their doctors about their risk of developing prostate cancer and about the benefits (e.g. earlier detection and treatment) and harms of early detection screening (e.g. psychological distress associated with false positive results).<sup>2</sup> Specifically, it is recommended that men near the age of 50, over 50 and who have not yet discussed prostate cancer with their doctors, those at increased risk of prostate cancer (family history or African descent), or those who have symptoms of prostate cancer (reviewed in the section that follows) talk to their physician about screening.<sup>2</sup> The recommendations for prostate cancer screening in Ontario coincide with that of the Canadian Cancer Society.<sup>7</sup> The British Columbia Cancer Agency recommends that DRE be performed annually in healthy men aged 50–70 or if obstructive or other urinary tract symptoms are present in this age group.<sup>8</sup> They further recommend that PSA be used as a diagnostic adjunct in men with lower urinary tract symptoms or suspicious DRE findings and also state that healthy men aged 50–70 should be

TABLE 1 – Prostate Cancer Stages

Stage	Description
1	Cancer is found in the prostate only.
2	Cancer is larger than stage 1, but is still found only in the prostate.
3	Cancer has spread outside the prostate but not to nearby organs.
4	Cancer has spread to nearby organs, lymph nodes or distant parts of the body.

Source: [www.cancer.ca](http://www.cancer.ca)

educated about the availability of PSA as a detection test for prostate cancer.<sup>8</sup>

### What are the signs and symptoms of prostate cancer?

Most patients with early stage prostate cancer do not experience symptoms; however, in individuals with more advanced disease, symptoms may become apparent as the tumour grows, causing the prostate gland to enlarge.<sup>6</sup> When this happens, patients may develop difficulty or even inability to urinate and irritation (e.g. burning or pain) during urination. Other prostate cancer symptoms include needing to urinate often, especially at night, difficulty in starting or stopping the flow of urine, a sensation that the bladder can not fully empty, blood in the urine or semen, and pain upon ejaculation.<sup>6</sup> Some of these symptoms are similar to those of a urinary tract infection.

### How is prostate cancer diagnosed?

Often patients who could potentially have prostate cancer are identified through an abnormal DRE or because they report to their physician's office with urinary symptoms as previously described. Other symptoms such as a new onset of erectile dysfunction might be suggestive of prostate cancer.<sup>2,6</sup>

When prostate cancer is suspected, a serum PSA measurement is generally performed. Depending on this level and other considerations, a prostate biopsy is usually performed to definitively diagnose prostate cancer.<sup>2,6</sup>

### How is the severity of prostate cancer determined?

Disease grading and tumour staging are

**TABLE 2 – Prostate Cancer Grading**

Grade	Gleason score	Description
1	2-4	Low grade – slow growing, less likely to spread
2	5-7	Moderate grade – growing slightly faster than grade 1 and may spread
3	8-10	High grade – tend to grow quickly, more likely to spread

Source: www.cancer.ca

used to determine the severity of disease, but are also important because they help guide treatment and also determine prognosis to some extent.<sup>2</sup> There are a number of different cancer staging, tumour staging and grading systems in use. The cancer stage describes the tumour size and gives an indication of the extent to which the cancer has spread beyond the initial tumour site. There are four different stages of prostate cancer, as defined in Table 1.<sup>2</sup> A number of medical tests are used to determine the stage of prostate cancer and may include imaging techniques such as CT scanning, bone scanning or MRI, lymph node biopsy, needle aspiration of the tumour, or surgical biopsy. DRE and PSA levels also help to determine the stage of prostate cancer.<sup>2</sup>

Disease grading is performed by a pathologist, who uses a microscope to examine a biopsy sample from the prostate tumour.<sup>2</sup> The pathologist assesses how the cancer cells appear and function in comparison to noncancerous cells. The tumour grade gives an indication of how rapidly the tumour is growing and the probability of it spreading to another site in the body. A common method of grading tumours is by using a scoring system referred to as the Gleason score. Gleason scores range from 2–10, with lower scores indicating similarity between the cells of the tumour and normal prostate cells. The higher the Gleason score, the more that the cancer cells differ from normal cells, and the poorer the prognosis. Table 2 provides a description of Gleason scores. In Canada, the majority of prostate cancers are identified when they are of moderate grade.<sup>2</sup>

### How is prostate cancer treated?

Information from the staging and grading, when combined with other diagnostic tests like PSA, is used to help develop a treatment plan. This information can also

help to predict the expected treatment response, since more advanced cancers are less likely to have a favourable treatment outcome. Other factors that help to determine the treatment approach are patient age, overall health status and personal preference for treatment.<sup>2</sup>

The general goals of cancer treatments are to prevent the growth and spread of cancer cells; remove or destroy cells that have the potential to develop into cancer; cure the cancer; control tumour growth; prevent further spread; and reduce the risk of the cancer recurrence. When these goals cannot be achieved, palliative treatment becomes the primary focus, with the objectives of temporarily shrinking tumours, reducing symptoms of cancer (e.g. bleeding, pain) and improving the patient's level of comfort and quality of life. In prostate cancer treatment, the main treatment approaches include hormonal therapy, surgery, radiation therapy and chemotherapy. These approaches are often used in combination to fit the individual's treatment needs. Combination of treatments can be used at the same time and in sequence.<sup>2</sup>

### What is the role of active surveillance in the treatment of prostate cancer?

In some instances when early prostate cancer is initially detected only through an elevated PSA level (i.e. there was no detectable tumour on DRE or symptoms of the disease), the decision may be made to delay treatment when the disease is unlikely to progress.<sup>9</sup> The purpose of active surveillance by a physician is to avoid the potential adverse effects and complications associated with treatment, while maintaining the opportunity for a curative treatment should the cancer begin to progress. A similar approach is termed “watchful waiting;” however, watchful waiting differs in that it is intended for men who would

not benefit from treatment due to factors such as advanced age or additional medical conditions with poor prognosis.<sup>9</sup>

### What is the role of surgery in the treatment of prostate cancer?

Radical prostatectomy (surgical removal of all or part of the prostate gland) is a well established first-line treatment for prostate cancer that has not yet spread beyond the prostate gland.<sup>9</sup> Radical prostatectomy may also be an alternative in patients with more advanced disease and is sometimes used in men who experience a recurrence of disease following initial treatment with radiation therapy. For patients whose disease is not strictly confined to the prostate, radical prostatectomy may be combined with other therapies, such as radiation therapy or systemic hormonal therapy. The success of radical prostatectomy can be determined through monitoring the PSA level, which should be undetectable following treatment. Approximately 80–90% of patients with localized prostate cancer who undergo radical prostatectomy will have long-term survival (i.e., a regular life-span) free from a subsequent rise in PSA level. Potential complications of radical prostatectomy include urinary incontinence and impotence.<sup>9</sup>

### What is the role of radiation therapy in the treatment of prostate cancer?

Radiation therapy in the treatment of prostate cancer attempts to deliver radiation to the cancerous cells with minimal damage to surrounding tissues.<sup>9,10</sup> Radiation can be used in the treatment of localized prostate cancer, alone or following radical prostatectomy, for example, when the tumour margins are positive (meaning that there are cancerous cells detected around the edges of tissue where a tumour was removed). Radical prostatectomy is generally the first-line therapy for localized disease, however, the decision to use radiation therapy alone may be based upon patient preference or inability of the patient to undergo surgery. Radiation therapy can be used in combination with androgen deprivation therapy in patients with advanced disease.<sup>9,10</sup> Potential complications of radiation therapy include gastrointestinal (cramping and frequent defecation) and genitourinary (frequent

urination and urgency) adverse effects, since these systems are in close proximity to the prostate gland and therefore are exposed to radiation.

### What is the role of hormonal therapy in the treatment of prostate cancer?

Hormonal therapy is used in the management of advanced prostate cancer and is of questionable effectiveness in individuals with localized disease.<sup>9,10</sup> Hormonal therapy includes androgen deprivation therapy and antiandrogen agents. Androgen deprivation therapy includes drugs that are analogs of LHRH (luteinizing hormone-releasing hormone), a hormone that is naturally produced in the body and involved in the release of testosterone. Administering such agents reduces testosterone production. Examples of LHRH analogs include goserelin acetate, leuprolide acetate and buserelin acetate. Adverse effects of these treatments include loss of libido, impotence, hot flashes, bone loss, fatigue and mood changes. Antiandrogens block the effects of testosterone directly in prostate tissue. Examples of these drugs include flutamide, bicalutamide and nilutamide.

Adverse effects of antiandrogens include gynecomastia (enlargement of the breasts), gastrointestinal symptoms and problems with liver function. Antiandrogens can be used in combination with androgen deprivation therapy.<sup>9,10</sup>

### What is the role of chemotherapy in the management of prostate cancer?

Chemotherapy is generally reserved for patients with advanced prostate cancer or prostate cancer that does not respond to hormonal therapy. Chemotherapy agents that may be used include mitoxantrone and docetaxel.<sup>10</sup>

### What community support is available for patients with prostate cancer?

A diagnosis of prostate cancer can be extremely distressing to patients and their families. Awareness of local, provincial and national patient resources is important so that pharmacy staff can provide this information to patients and their families. Provincial arms of the Canadian Cancer Society ([www.cancer.ca](http://www.cancer.ca)) and Prostate Cancer Canada ([www.prostatecancer.ca](http://www.prostatecancer.ca)) are helpful resources. Local resources may include support groups and counselling services.

### What is the role of the pharmacy technician in helping patients with prostate cancer?

Pharmacy technicians can play an important role in the care of patients with prostate cancer. When dispensing hormonal therapies, pharmacy technicians can inquire about adverse events and refer the patient to the pharmacist to help develop strategies for medication management. Pharmacy technicians can also refer patients to pharmacists to assess over-the-counter (OTC) and prescription medications to determine if they could potentially aggravate the symptoms of prostate cancer or when patients present to the pharmacy seeking OTC medications to treat symptoms that could be suggestive of prostate cancer. Pharmacy technicians can also ensure that they are familiar with resources and community support for patients with prostate cancer and refer patients to these resources for support.

References are available at [www.CanadianHealthcareNetwork.ca](http://www.CanadianHealthcareNetwork.ca), CE section, Quick search CCCEP # 1065-2010-130-I-T

## QUESTIONS

Please select the best answer for each question or answer online at [www.CanadianHealthcareNetwork.ca](http://www.CanadianHealthcareNetwork.ca) for instant results.

1. Prostate cancer is the lowest incidence cancer amongst males in Canada.

- a) True                      b) False

2. Goals of prostate cancer treatment may include which of the following?

- a) Prevention of the growth and spread of cancer cells  
b) Destruction of cells that have the potential to develop into cancer  
c) Control tumour growth  
d) All of the above could be treatment goals.

3. Hormonal therapies are the treatment of choice for localized prostate cancer.

- a) True                      b) False

4. Which of the following is correct regarding serum PSA?

- a) An elevated PSA is diagnostic of prostate cancer.  
b) Prostate cancer is associated with low PSA levels.

c) PSA screening is recommended in all males aged 40 years and older.

d) PSA levels can be increased in males with prostatitis.

5. Which is correct regarding risk factors for prostate cancer?

- a) Males of Asian descent have a higher risk of prostate cancer than Caucasians.  
b) Males of African descent have a lower risk of prostate cancer than Caucasians.  
c) Genetic factors do not play a role in the development of prostate cancer.  
d) More than one-half of prostate cancer cases occur in men who are over age 65.

6. What is the function of the prostate gland in the body?

- a) The prostate gland has a key role in the production of testosterone.  
b) The prostate gland produces sperm.  
c) The prostate gland produces seminal fluid.

d) B and C are both correct.

7. Which is correct regarding prostate cancer staging or grading?

- a) Stage 4 prostate cancer has the best prognosis.  
b) Stage 1 prostate cancer has the worst prognosis.  
c) The stage of prostate cancer is unrelated to prognosis.  
d) Based upon the Gleason score, Grade 1 prostate cancer has a more favourable prognosis than Grade 3.

8. Which is correct regarding prostate cancer symptoms?

- a) Bone pain is the most common reason why males with localized prostate cancer seek treatment.  
b) Erectile dysfunction can be a symptom of prostate cancer.  
c) Some symptoms of prostate cancer are similar to those associated with a urinary tract infection.  
d) B and C are both correct.

## QUESTIONS (Continued)

### 9. Which is correct regarding prostate cancer treatment?

- Chemotherapy is the initial choice of treatment for males with localized prostate cancer.
- Radiation therapy can be used in combination with radical prostatectomy.
- Androgen deprivation therapy is the initial choice of treatment for males with localized prostate cancer.
- Watchful waiting is the most appropriate initial treatment for men with localized prostate cancer who are under the age of 40.

### 10. Patient preference should be one consideration when developing a treatment plan for individuals with prostate cancer.

- True
- False

### 11. Which of the following is correct regarding digital rectal examination?

- Digital rectal examination is recommended in all males aged 40 and over.
- If a digital rectal examination is suspicious of prostate cancer, there is no need to test serum PSA.
- Digital rectal examination can

Please select the best answer for each question or answer online at [www.CanadianHealthcareNetwork.ca](http://www.CanadianHealthcareNetwork.ca) for instant results.

potentially detect prostate cancer prior to disease symptoms, but can miss some tumours.

- Digital rectal examination is not recommended as it is inaccurate.

### 12. Which is correct regarding hormonal therapy for prostate cancer?

- Androgen deprivation therapy blocks the effects of testosterone directly in prostate tissue.
- Antiandrogens reduce testosterone production.
- Liver dysfunction is an adverse effect of antiandrogens.
- All patients with stage 5 disease will require hormonal therapy.

### 13. Which is correct regarding the diagnosis of prostate cancer?

- Serum PSA is frequently taken when prostate cancer is suspected.
- Prostate biopsy is usually performed to definitively diagnose prostate cancer.
- Staging and grading of prostate cancer is based upon examination of biopsy tissue and other imaging tests.
- All of the above are correct.

### 14. Which is correct regarding radical prostatectomy?

- Radical prostatectomy is generally reserved as a final resort in the management of localized prostate cancer.
- PSA level can be used to determine whether or not radical prostatectomy was successful.
- Radical prostatectomy achieves long-term survival free from a subsequent rise in PSA level in about one-half of patients with localized prostate cancer.
- Radical prostatectomy is seldom used as it is not successful in preventing spread of the cancer.

### 15. Which is correct regarding the use of radiation therapy in the management of prostate cancer?

- Radiation therapy is a treatment option for localized prostate cancer.
- Radiation therapy can be used in combination with other treatment options in the management of prostate cancer.
- Stage 1 disease is always treated with radiation therapy.
- A and B are both correct.

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### Prostate Cancer

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- Do you now feel more informed about prostate cancer?  Yes  No
- Was the information in this lesson relevant to you as a technician?  
 Yes  No
- Will you be able to incorporate the information from this lesson into your job as a technician?  Yes  No  N/A
- Was the information in this lesson...  Too basic  Appropriate  Too difficult
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