



# Prostate cancer



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This information was produced by the European Association of Urology (EAU).

This leaflet contains general information about prostate cancer. If you have any specific questions about your individual medical situation you should consult your doctor or other professional healthcare provider. No leaflet can replace a personal conversation with your doctor.

**For detailed information about prostate cancer, diagnosis and treatments please visit: [www.patients.uroweb.org](http://www.patients.uroweb.org)**

#### Contributors:

Dr. Roderick van den Bergh, Utrecht (NL)  
Prof. Dr. Zoran Culig, Innsbruck (AT)  
Prof. Dr. Louis Denis, Antwerp (BE)  
Prof. Bob Djavan, Vienna (AT)  
Mr. Enzo Federico, Trieste (IT)  
Mr. Günter Feick, Pohlheim (DE)  
Dr. Pirus Ghadjar, Berlin (DE)  
Dr. Alexander Kretschmer, Munich (DE)  
Prof. Dr. Feliksas Jankevičius, Vilnius (LTU)  
Prof. Dr. Nicolas Mottet, Saint-Étienne (FR)  
Dr. Bernardo Rocco, Milan (IT)  
Ms. Maria Russo, Orbassano (IT)

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# Prostate Cancer

## What is prostate cancer?

Prostate cancer is a malignant tumour in the prostate. There are several stages of prostate cancer. Your treatment and experience depend on the specific characteristics of the tumour and the expertise of your medical team.

The sections in this series provide general information about prostate cancer, diagnosis, and various treatment options. Discuss with your doctor what is best in your individual situation.

Most prostate cancers develop slowly and do not cause symptoms. Fast-growing prostate cancer is less common. The risk of getting prostate cancer increases with age. The average age for diagnosis of prostate cancer is 69.

Because of the development in diagnostic tools and longer life expectancy, more prostate cancers are now detected. Prostate cancer is the most common cancer in elderly men in Europe. The survival rate for prostate cancer in Europe is relatively high and is still going up.

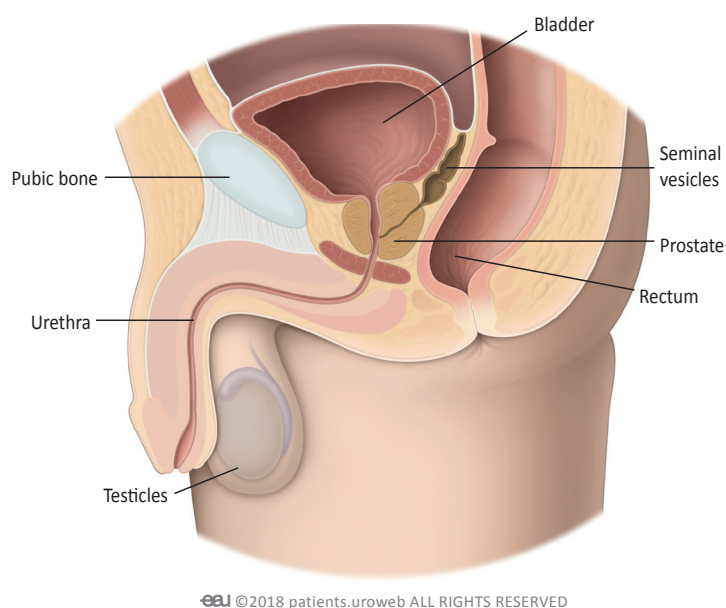


Fig. 1: A healthy prostate in the lower urinary tract.

## The role of hormones in prostate cancer cell growth

A tumour develops when cells begin to grow faster than normal. The growth of prostate cancer cells is related to male sex hormones called androgens. Testosterone is the most important androgen. Androgens are almost exclusively produced in the testicles.

## Stages of the disease

There are different stages of prostate cancer. If the tumour is limited to the prostate and has not spread, this is called localised prostate cancer. In locally-advanced prostate cancer, the tumour has grown out of the prostate into surrounding tissue such as the seminal vesicles, the bladder neck, or lymph nodes around the prostate. Doctors speak of metastatic disease if the cancer has spread either to distant lymph nodes or other organs.

## Risk factors for prostate cancer

There are several known risk factors for prostate cancer, of which age is the most important one. Prostate cancer is rare in men younger than 40 and mostly develops in men over the age of 65. A family history of prostate cancer can increase the risk.

This type of cancer is most commonly diagnosed in men of African descent, and least in Asian men. It is still unknown what causes these differences. Eating more meat and dairy products could increase the risk of prostate cancer, but this is still being researched.

## Symptoms

Prostate cancer is generally asymptomatic, which means that there are no clear symptoms to indicate it. In most cases, symptoms are caused by benign prostatic enlargement (BPE), or an infection. If prostate cancer does cause symptoms it is usually a sign that the disease has advanced. Because of this it is important that you see a doctor to understand what causes the symptoms.

The symptoms may include:

- Urinary symptoms such as urinary frequency or a weak stream of urine
- Blood in the urine
- Erection problems
- Urinary incontinence
- Loss of bowel control
- Pain in the hips, back, chest, or legs
- Weak legs

Bone pain could be a sign that the cancer has spread through the body. This is known as metastatic disease.

## Diagnostics

### PSA Testing

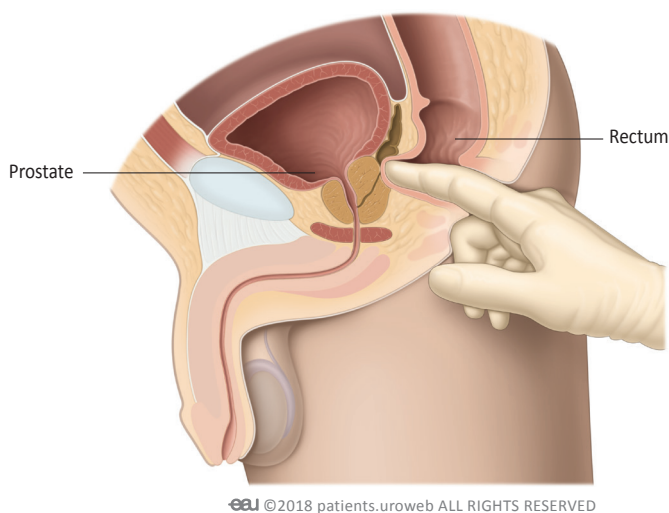
One of the most frequently used tools to diagnose prostate conditions is a blood test to check the level of prostate specific antigen (PSA). If the PSA level is too high, this suggests that the cells in the prostate are behaving unusually.

This could be because of a tumour in the prostate, but also because of an infection or a benign enlargement of the prostate.

### Digital rectal examination

Your doctor will do a rectal examination with a finger to feel the size, shape, and consistency of the prostate (**Fig. 2**).

This test is known as digital rectal examination (DRE).



*Fig. 2: Digital rectal examination to feel the size, shape, and consistency of the prostate.*

## Imaging

In some cases your doctor may recommend to make a scan of the lower urinary tract. Different types of scans are available, such as ultrasound, CT scan, MRI scan, and bone scan.

None of these tools will provide a definite answer on whether or not you have prostate cancer. Your doctor will use the test results, together with your age and your family history, to estimate the risk of you having prostate cancer.

If the risk is high, you may need a biopsy of prostate tissue. This test is done to confirm if you have a tumour or not.

## Classification

Prostate tumours are classified according to the tumour stage and the grade of aggressiveness of the tumour cells. These two elements are the basis for your possible treatment pathway.

The doctor does a series of tests to better understand your specific situation. Physical examination and imaging can be used to determine the stage of the disease. Prostate cancer is classified according to how advanced the tumour is, and whether or not the cancer has spread to the lymph nodes or other organs.

The other element of classification is the Gleason score. The Gleason score is determined by the pathologist, based on the tissue taken during biopsy. It gives information about the aggressiveness of the tumour. Based on the pattern that the cancer cells show, the pathologist can see how fast the tumour grows.

## Treatment

This section describes the different treatment options which you should discuss with your doctor.

This is general information, which is not specified to your individual needs. Keep in mind that individual recommendations may depend on your country and health care system.

Each treatment has its own advantages and disadvantages. The choice depends on your individual situation.

Which treatment pathway is best for you depends on:

- The tumour characteristics
- Your medical history

- Your age
- The kind of treatment available at your hospital
- Your personal preferences and values
- The support network available to you

## Localised Prostate Cancer

If you are diagnosed with localised prostate cancer, your doctor can recommend treating the cancer with conservative management, radical prostatectomy, radiation therapy, or new experimental techniques: ablation therapy.

### Conservative management

Conservative management is a type of treatment where the progress of your disease is closely monitored. In prostate cancer, this can be done through active surveillance or watchful waiting.

### Radical prostatectomy

Radical prostatectomy is a surgical treatment option for localised prostate cancer. The aim is to remove the entire prostate and the seminal vesicles.

### Radiation therapy

Your doctor could also recommend radiation therapy. This therapy damages and kills cancer cells. You may be treated with external beam radiation therapy or brachytherapy.

Your doctor may suggest brachytherapy if you have a low Gleason score and no urinary symptoms.

New experimental techniques: Ablation therapy

Besides surgery, radiation, and conservative management there is also ablation therapy (also referred to as focal therapy) as treatment options for localised prostate cancer, such as:

- Cryosurgical ablation of the prostate (CSAP)
- High Intensity Focussed Ultrasound (HIFU)

Because the tumour cells are targeted directly, there is not much damage to other tissue in the prostate or the lower urinary tract.

## Locally-advanced Prostate Cancer

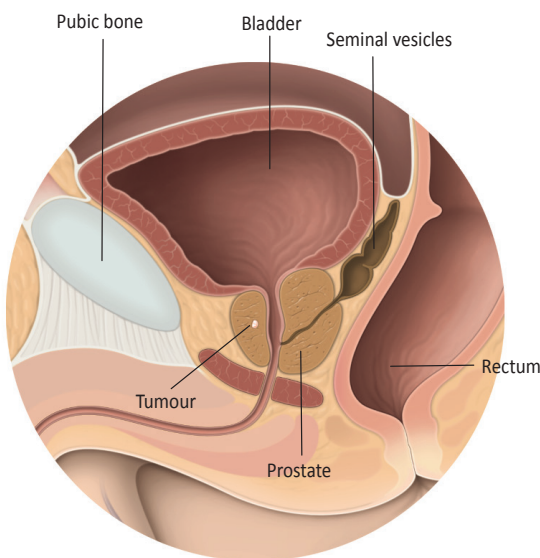
If you are diagnosed with locally-advanced prostate cancer, your doctor can recommend treating the cancer with watchful waiting, radical prostatectomy, or a combination of radiation therapy and hormonal therapy.

### Watchful Waiting

In watchful waiting the doctor schedules regular visits to monitor your health and recommends further treatment when symptoms appear. This treatment is generally indicated when you are unfit for radical prostatectomy, radiation therapy or hormonal therapy. This may be related to your age or any medical conditions which make those treatments dangerous for you.

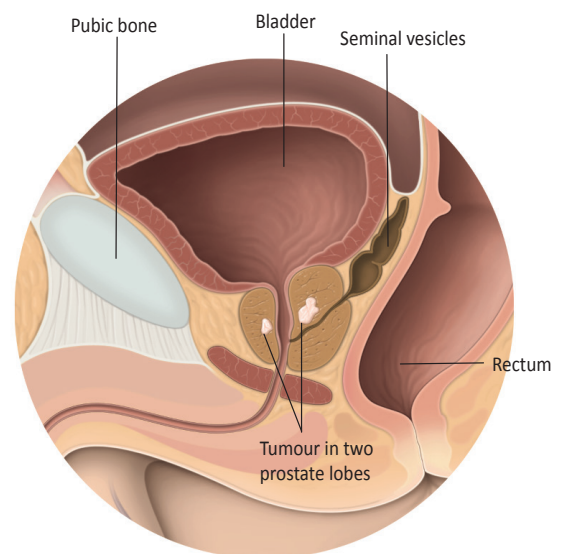
### Radical Prostatectomy

Radical prostatectomy is a surgical treatment option for locally-advanced prostate cancer. The aim is to remove as



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Fig. 3: A T1 prostate tumour is too small to be felt during a digital rectal examination or seen on a scan.



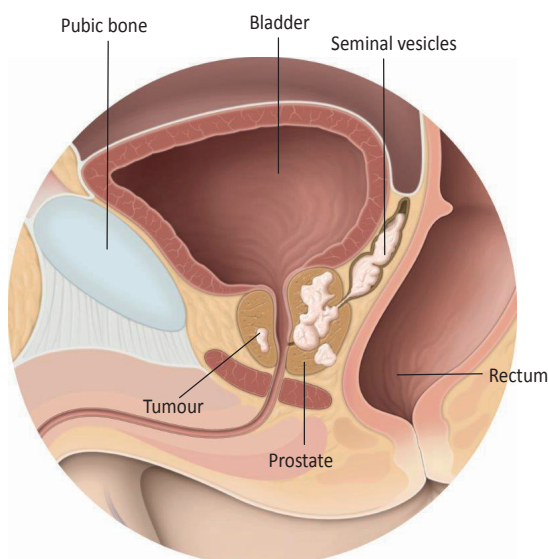
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Fig. 4: A T2 prostate tumour is limited to the prostate.

much of the tumour as possible. This is done by removing the entire prostate gland and both seminal vesicles, as well as surrounding tissue affected by the tumour. The procedure also includes the removal of lymph nodes in the pelvic area.

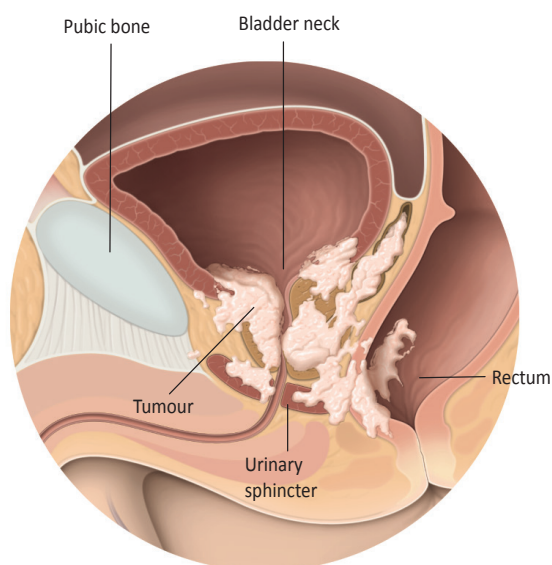
### Hormonal and radiation therapy

As an alternative to surgery, your doctor may recommend radiation therapy to cure your cancer. This therapy damages and kills cancer cells. It is a common treatment option for locally-advanced tumours. In locally-advanced prostate cancer, radiation therapy is always combined with hormonal therapy.



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Fig. 6: A T3 prostate tumour which has spread to the seminal vesicles.



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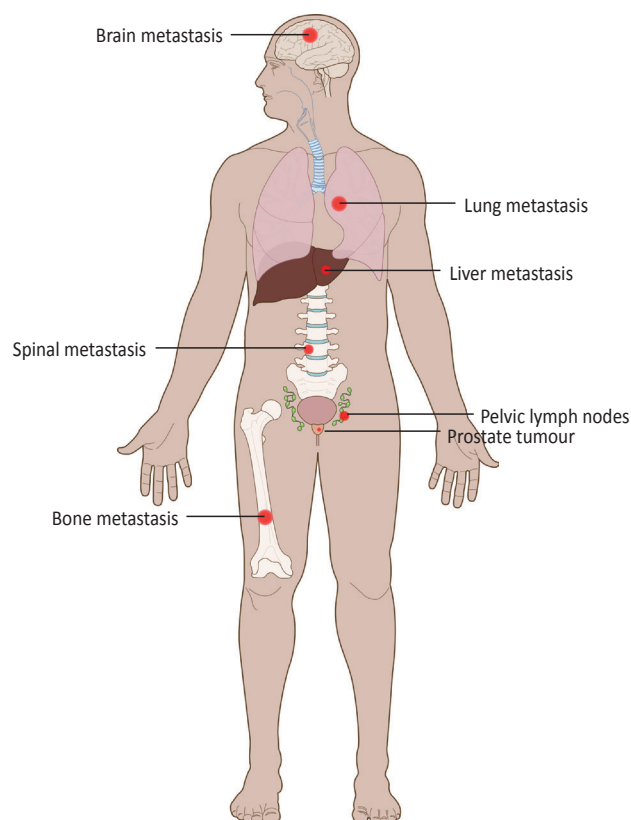
Fig. 7: A T4 prostate tumour which has spread to the bladder neck, urinary sphincter, and rectum.

Hormonal therapy affects the production of testosterone in the body. The aim is to stop the growth of the tumour. Another name for hormonal therapy is androgen deprivation therapy (ADT).

## Metastatic Prostate Cancer

Prostate cancer can spread to other organs or lymph nodes outside the pelvic area. This is called metastatic disease. The tumours in other organs or lymph nodes are called metastases. Your doctor may recommend treating metastatic disease with hormonal therapy.

It is important to realise that metastatic disease cannot be cured. Instead, your doctor will try to slow the growth of the tumour and the metastases. This will give you the chance to live longer and have fewer symptoms.



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Fig. 7: Metastatic prostate cancer can spread to the bones, spine, lungs, liver, or brain.

### Hormonal treatment

If you have metastatic prostate cancer, your doctor will recommend hormonal therapy. This is part of a palliative care approach. The treatment will slow the growth of the primary tumour and the metastases, and help to manage the symptoms



## Castration-resistant prostate cancer

If you have been diagnosed with castration-resistant prostate cancer, your doctor will recommend a care pathway to manage your symptoms and allow you to live longer. It is important to remember that castration-resistant prostate cancer cannot be cured.

Castration-resistant prostate cancer can be managed with:

### Additional treatment with anti-androgen therapy

When you have been treated with either surgical or chemical castration, your doctor may recommend additional treatment with anti-androgen therapy. The most common anti-androgen drug to manage castration-resistant prostate cancer is bicalutamide. Treatment with this drug aims to slow down the growth of the tumour. It will not relieve your symptoms. Side effects may include swelling of the breasts and liver problems.

### Stopping anti-androgen treatment

If you have been treated with LHRH agonists or antagonists in combination with anti-androgen therapy, your doctor may recommend to stop taking the anti-androgen drugs. This approach may lower the level of PSA in your blood for a few months. The effect will be seen 4-6 weeks after you stop taking the drugs.

### Adrenolytic agents

After castration, the adrenal glands continue to produce small amounts of androgens. Adrenolytic agents stop the adrenal gland from producing the hormones. Side effects of these drugs are diarrhoea, itching and skin rashes, fatigue, erectile dysfunction, and liver damage. These drugs are not commonly used.

### Oestrogen therapy

Drug therapy with the hormone oestrogen can slow down the growth of the tumour and lower the level of PSA in your blood, without affecting your bones. This treatment can cause cardiovascular disease, including blood clots and heart attacks. Because of these risks, oestrogen therapy is rarely recommended today.

### New hormonal agents

Castration-resistant prostate cancer can be managed with two new hormonal agents: abiraterone acetate and enzalutamide.

They both work differently.

Abiraterone acetate stops the production of testosterone and enzalutamide blocks androgen receptors.

### Immunotherapy

Immunotherapy is a type of treatment that uses your own immune system to fight the tumour cells. In prostate cancer the drug Sipuleucel-T is used as immunotherapy. Because your own blood is used to prepare the drug, you need to get blood drawn before the procedure.

### Chemotherapy with docetaxel

Your doctor may recommend the chemotherapy docetaxel to manage castration-resistant prostate cancer. The drug relieves pain caused by the tumour or metastases. If effective, it allows you live longer and with fewer symptoms and side effects.

## Treatment after chemotherapy

After you have been treated with docetaxel, your doctor can recommend treatment with hormonal therapy or another chemotherapy drug. The main hormonal treatments are abiraterone acetate and enzalutamide. Cabazitaxel is the chemotherapy drug most commonly used in these cases. You could also receive a second course of docetaxel. Your doctor will discuss the different treatment options to find the best one for you.

## Treatment of bone metastases

Prostate cancer cells can spread to the bones, generally to the spine. The treatment of bone metastases can have severe side effects. Your doctor will help to prevent and treat possible complications and side effects. This may allow you to live longer and with fewer symptoms.

### Radiation therapy

Castration-resistant prostate cancer can be managed with radiation therapy. The radiation damages and kills cancer cells. The treatment will help to relieve pain and may allow you to live longer. Common side effects are a burning sensation when you urinate, urinary frequency, and anal irritation.

## Treatment of recurrence

In localised prostate cancer or locally-advanced prostate cancer, it is possible that prostate cancer comes back after you have been treated. This is known as recurrence. The cancer may come back in the prostate, in tissue around the prostate or pelvic lymph nodes, or in other parts of the body. The follow-up treatment pathway depends on where the cancer is. Your doctor will recommend imaging tests such as CT, MRI, PET scan or bone scans to locate the tumour, identify its characteristics, and determine treatment.

\* The underlined terms are listed in the glossary.

If you have been treated with radical prostatectomy and the PSA level in your blood rises, this could be a sign of recurrence. Your doctor may recommend salvage radiation therapy. In this procedure, the area where the prostate was located will be radiated to kill cancer cells. If your cancer was treated with radiation therapy, your doctor may recommend to treat recurrence with radical prostatectomy.

### **Localised prostate cancer**

If you have been treated with experimental techniques, discuss with your doctor which treatment option is best for you.

### **Locally-advanced prostate cancer**

If radiation therapy is not the best option for you, your doctor can recommend hormonal therapy.

If the PSA level rises quickly, or you have symptoms, hormonal therapy will be recommended. In some countries, brachytherapy is available to treat recurrence as an alternative to hormonal therapy.

## **Palliative care**

If your tumour has spread to other organs or tissues (metastases), surgery is not a treatment option. At this point, treatment should reduce symptoms and maintain your quality of life. This is the main focus of palliative care. During palliative care, you and your loved ones are supported by a multidisciplinary team. Together you address physical, psychological, social, and spiritual issues. Palliative care includes controlling your symptoms and medical treatment for pain management.

The palliative care team can provide care in the hospital or at your home. Another option is hospice care. A hospice is an institution that provides care during the final phase of your life.

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\* The underlined terms are listed in the glossary.



# Glossary of terms

## Active surveillance

A form of treatment in which the doctor actively monitors the tumour or tumours and their growth, based on a strict visiting schedule. For each visit, CT, ultrasound or x-rays are taken, and other appropriate exams may be performed.

## Adrenolytic agents

A group of drugs that reduces or stops the production of the hormone adrenaline.

## Androgens

Male sex hormones that control and provide male characteristics like facial hair and lower voice.

## Anti-androgen drug

Any drug that blocks the action of androgens.

## Asymptomatic

Any condition which does not cause symptoms and is discovered incidentally.

## Benign enlargement

Cell growth in the body which is not cancerous.

## Benign prostatic enlargement (BPE)

An enlargement of the prostate related to hormonal changes with age.

## Biopsy

A medical procedure in which a small piece of tissue is removed from the body to examine it. This is done to get information for diagnosing, monitoring, and treatment.

## Bladder

Organ that collects urine from the kidneys

## Bladder neck

The group of muscles that connect the bladder to the urethra. These muscles contract to keep the urine in the bladder, and relax to let the urine pass to the urethra.

## Bone scan

A scan of the entire body that can be used to find bone metastases.

## Brachytherapy

Sometimes called seed implantation. Radioactive “seeds”

are carefully placed inside of the cancerous tissue and positioned to attack the cancer most efficiently.

## Cardiovascular disease

A disease involving the heart and the blood vessels.

## Castration

A chemical or surgical treatment in which the production of androgens is stopped, or the effect of the hormones is blocked.

## Castration-resistant prostate cancer

A type of prostate cancer that needs lower levels of androgens to continue to grow.

## Chemical castration

A type of treatment in which drugs are used to stop the production of androgens, or block their effect.

## Chemotherapy

Is a treatment of cancer with drugs that are toxic to cells. Some are specifically toxic to cells that grow faster than normal, like cancer cells.

## Conservative management

A type of treatment in which the doctor monitors your health and can recommend treatment if necessary.

## CSAP

Cryosurgical ablation of the prostate. In this minimally-invasive technique, freezing temperatures are applied directly to the tumour cells to kill them.

## CT scan

Imaging technique that makes a series of x-ray images of the body.

## Digital rectal examination

A test in which the doctor uses a finger to feel the size, shape, and consistency of the prostate to diagnose conditions like an enlarged prostate or prostate cancer.

## Erectile dysfunction

The inability to get or keep an erection.

## External beam radiation therapy

A type of radiation therapy in which an external source of radiation is pointed at a part of the body

# Glossary of terms

## **Fatigue**

This means you feel more tired than usual, you are out of energy, and it doesn't get better after you sleep. You may also experience pain in your joints, muscles, and chest.

## **Focal therapy**

A general term for a variety of minimally-invasive techniques for destroying small tumours. The main purpose of focal therapy is to limit damage to surrounding tissue.

## **Gland**

A gland is an organ that synthesises hormones for release into the bloodstream or other parts of the body

## **Gleason score**

The Gleason score determines the aggressiveness of a tumour in the prostate. It is based on the pattern of the cancer cells. Each pattern gets a value between 1 and 5. The pathologist adds the scores of the two patterns that appear in most of the tissue samples after a biopsy. Tumours with a higher score are more aggressive and more difficult to cure.

## **HIFU**

High-Intensity Focussed Ultrasound. A minimally-invasive procedure that applies ultrasound energy to heat up and destroy cancer cells.

## **Hormones**

Molecules that are produced in glands and circulate in the blood system to reach their target organs. They affect body functions and behaviour.

## **Hormonal therapy**

Any treatment option in which hormones are used.

## **Imaging**

Taking images of the body with ultrasound, x-ray or other scanning techniques.

## **Immunotherapy**

A type of cancer treatment which boosts the immune system to fight tumour cells.

## **LHRH agonists**

Drugs used in prostate cancer treatment to stop the production of testosterone in the testicles.

## **Localised prostate cancer**

A prostate cancer where the tumour is limited to the prostate and has not spread.

## **Locally-advanced prostate cancer**

A prostate cancer where the tumour has spread outside of the prostate and into surrounding tissue.

## **Lymph nodes**

Small oval-shaped organs that play a role in regulating how the immune system responds.

## **Malignant tumour**

A cancerous growth which either grows continuously or in spurts. Malignant tumours can metastasise, which means they spread throughout the body.

## **Medical history**

A brief summary of previous operations, previous and current diseases, known allergies, and drugs you currently take.

## **Metastatic disease**

When a tumour has spread to other organs or lymph nodes.

## **MRI scan**

Magnetic Resonance Imaging is a technique in which strong magnetic fields and radio waves are used to make images of the body.

## **Multidisciplinary**

A combination of different branches of expertise. In medicine, it means that for instance urologists, oncologists, psychologists or other medical specialists work together.

## **New hormonal agents**

A group of drugs for castration-resistant prostate cancer when standard hormonal treatment is no longer effective.

## **Oestrogen**

The main female sex hormones which control female characteristics of the body and are important to the reproductive and menstrual cycle.

## **Palliative care**

A concept of care with the goal to optimise your quality of life if you cannot recover from your illness. It involves physical, psychological, social, and spiritual issues.

# Glossary of terms

## Pathologist

A medical professional who studies tissue, blood, or urine to understand the specific characteristics of diseases. In cancer treatment, the pathologist helps with the diagnosis and classification of tumours.

## PET scan

A positron emission tomography (PET) scan is an imaging test that uses a radioactive substance called a tracer to look for disease in the body. A PET scan shows how organs and tissues are working.

## Physical

Having to do with or affecting the body

## Primary tumour

In metastatic cancer, the place in the body where the tumour first developed before it spread to other tissue or organs. The location of the primary tumour can influence treatment options.

## Prostate

The gland which produces the fluid which carries semen. It is located in the male lower urinary tract, under the bladder and around the urethra (see also Bladder, Lower urinary tract, Urethra).

## Prostatectomy

A surgical procedure in which part of or the entire prostate is removed.

## Psychological

Having to do with or affecting the mind.

## Radiation therapy

A type of cancer treatment that uses radiation to control or kill malignant cells.

## Rectum

The final section of the large intestine, ending at the anus.

## Recurrence

The return of cancer after treatment and after a period of time in which the cancer could not be detected. This can happen either in the place where the cancer first was detected, or somewhere else in the body. There is no standard period of time, but most doctors would consider it a recurrence if the cancer had not been detected again for at least one year.

## Salvage

A treatment for cancer given together with or after the main treatment. It can be a treatment to prevent recurrence or part of a palliative care approach.

## Seminal vesicles

A pair of glands located below the bladder. They produce semen.

## Testicles

The testicles are the male organs that produce sperm and the male hormone testosterone.

## Testosterone

A steroid androgen hormone that is produced mainly in the testicles and is responsible for the development of male sexual characteristics.

## Treatment pathway

One of the main management tools for doctors. The different tasks or interventions are defined, optimised and set in a specific order. With this the medical team can work on the health of a patient together.

## Tumour stage

This refers to how extended a cancer is in the body. It is usually based on the size of the tumour and whether the tumour has spread to the lymph nodes or other organs.

## Ultrasound

Imaging technique that uses high-frequency sounds to make an image of the inside of the body.

## Urinary incontinence

Involuntary loss of urine.

## Urinary sphincter

The muscles used to control the exit of urine in the bladder, through the urethra. When either one of the muscles contracts, the urethra is sealed shut.

## Urinary tract

The organ system that produces and transports urine through and out of the body. It includes two kidneys, two ureters, the bladder and the urethra. The urinary tract is similar in men and women, only men have a longer urethra.

## Urologist

A doctor specialised in health and diseases of the urinary tract and the genitals.



**European Association of Urology**

PO Box 30016

NL-6803 AA ARNHEM

The Netherlands

e-Mail: [info@uroweb.org](mailto:info@uroweb.org)

Website: [patients.uroweb.org](http://patients.uroweb.org)