What is Prostate Cancer?

Let us explain it to you.

ESMO Patient Guide Series
based on the ESMO Clinical Practice Guidelines
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Prostate cancer

An ESMO guide for patients

Patient information based on ESMO Clinical Practice Guidelines

This guide has been prepared to help you, as well as your friends, family and caregivers, better understand prostate cancer and its treatment. It contains information on the causes of the disease and how it is diagnosed, up-to-date guidance on the types of treatments that may be available and any possible side effects of treatment.

The medical information described in this document is based on the ESMO Clinical Practice Guideline for prostate cancer, which is designed to help clinicians with the diagnosis and management of prostate cancer. All ESMO Clinical Practice Guidelines are prepared and reviewed by leading experts using evidence gained from the latest clinical trials, research and expert opinion.

The information included in this guide is not intended as a replacement for your doctor’s advice. Your doctor knows your full medical history and will help guide you regarding the best treatment for you.

Words highlighted in colour are defined in the glossary at the end of the document.

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An ESMO guide for patients
Prostate cancer: A summary of key information
What is the prostate?
What is prostate cancer?
What are the symptoms of prostate cancer?
How common is prostate cancer?
What causes prostate cancer?
How is prostate cancer diagnosed?
How will my treatment be determined?
What are the treatment options for prostate cancer?
What are the treatment options for localised prostate cancer?
What are the treatment options for locally advanced prostate cancer?
What are the treatment options for prostate cancer that returns after treatment?
What are the treatment options for non-metastatic castration-resistant prostate cancer?
What are the treatment options for metastatic prostate cancer?
Prostate cancer in younger patients
Clinical trials
Supplementary interventions
How will prostate cancer affect my quality of life?
What are the possible side effects of treatment?
What happens next?
Support groups
References
Glossary
Prostate cancer: A summary of key information

Introduction to prostate cancer

- **Prostate** cancer forms in the cells of the **prostate gland**. Many **prostate** cancers grow slowly and are not likely to spread, but some can grow more quickly.
- The exact causes of **prostate** cancer are not known, and in its early stages, **prostate** cancer often has no symptoms.
- **Prostate** cancer is the second most common cancer in men worldwide and mostly affects older men – more than half of **prostate** cancers occur in men over the age of 70 years.

Diagnosis of prostate cancer

- Early **prostate** cancer typically has no symptoms. Symptoms that may appear as the cancer progresses are often caused by the cancer pressing on the **urethra**, such as increased frequency in passing urine, and difficulty or urgency in passing urine.
- A diagnosis of **prostate** cancer is usually based on the results of clinical examination of the **prostate**, a blood test to check levels of a protein called **prostate-specific antigen** (**PSA**), a **magnetic resonance imaging** (**MRI**) scan to decide whether a **biopsy** is needed.
- Further investigations can help to determine how advanced the cancer is. For example, **positron emission tomography** (**PET**) / **computed tomography** (**CT**) scans may be used to see how far the cancer has spread and a bone scan can help to detect bone **metastases**.
- **Prostate** cancer is ‘staged’ according to **tumour** size, whether it has spread to the **lymph nodes** and whether it has spread into the bones or to other parts of the body. This information is used to help decide the best treatment.

Treatment options for prostate cancer

- Treatment for **prostate** cancer depends on the size, location and stage of the **tumour**.
- Patients should be fully informed and involved in decisions about treatment options.
- For some patients, especially elderly men with slow-growing **prostate** cancer, treatment may not be appropriate or necessary – this is because they are more likely to die from old age or causes other than **prostate** cancer, and therefore the negative side effects from treating the cancer may outweigh any benefits.
- Treatment approaches for **prostate** cancer include **active surveillance** (in which the cancer is closely monitored and then treated if it progresses), surgery, **radiotherapy**, **hormone therapy** (e.g. **androgen deprivation therapy**, **anti-androgens** or **testosterone synthesis blocker**), **chemotherapy** and **targeted therapy**.
Localised prostate cancer

- **Localised prostate** cancer is defined as low risk, intermediate risk or high risk.
- Patients with low-risk disease are managed by active surveillance. Radical prostatectomy (surgical removal of the prostate gland) or radiotherapy, which is given either as external beam radiotherapy or brachytherapy are nowadays seldom used in this setting.
- Patients with intermediate-risk disease might receive active surveillance, radical prostatectomy or radiotherapy with or without neoadjuvant and concurrent androgen deprivation therapy.
- Patients with high-risk disease might be treated with radical prostatectomy with pelvic lymphadenectomy (removal of the pelvic lymph nodes) or external beam radiotherapy with neoadjuvant and concurrent androgen deprivation therapy. Adjuvant androgen deprivation therapy is recommended for 2 years after radiotherapy.

Locally advanced prostate cancer

- **Locally advanced** disease is usually treated with androgen deprivation therapy and radiotherapy. Adding abiraterone to androgen deprivation therapy and radiotherapy showed efficacy in this setting. It might be also treated with a radical prostatectomy plus pelvic lymphadenectomy.

Recurrent prostate cancer

- Radiotherapy, androgen deprivation therapy or local therapies such as radical prostatectomy, high-intensity focused ultrasound, cryoablation or brachytherapy may be used to treat a recurrence.

Non-metastatic castration-resistant prostate cancer

- Non-metastatic prostate cancer that continues to grow despite treatment with androgen deprivation therapy (non-metastatic castration-resistant prostate cancer [CRPC]) is usually treated with the anti-androgen drugs apalutamide, darolutamide or enzalutamide.

Metastatic prostate cancer

- **Metastatic** disease is typically treated with androgen deprivation therapy, usually in combination with the testosterone synthesis blocker abiraterone, or the anti-androgen drugs apalutamide or enzalutamide, or the chemotherapy drug docetaxel. Patients with low burden metastatic disease also receive prostate radiotherapy.
- If the cancer continues to grow despite treatment with androgen deprivation therapy (metastatic CRPC), then docetaxel, enzalutamide or abiraterone may be used. The targeted therapy olaparib is an option for patients with metastatic CRPC who have mutations in the BRCA1 or BRCA2 genes, and who have already received treatment with abiraterone or anti-androgens. Treatment with cabazitaxel is also an option in patients with metastatic CRPC who had been previously treated with docetaxel and abiraterone or enzalutamide.
- Radium-223 is a radioactive substance used for delivering bone-targeting radiotherapy. Prostate specific membrane antigen (PSMA) is highly expressed in metastatic CRPC. Lutetium-177 is another radioactive substance used in lutetium-177-PSMA, as radionuclide therapy to deliver radiation to PSMA-expressing cells.
- Denosumab and zoledronic acid are used to prevent fractures in case of bone metastases.
- Palliative radiotherapy is used for treatment of pain in case of bone metastases.
Follow-up during/after treatment

- The timings of follow-up appointments vary between regions and practices. Typical follow-up appointments include a blood test to monitor PSA levels.
- Patients receiving long-term hormone therapy, if not on a bisphosphonate may have bone density scans to check for osteoporosis.
- The treatments for prostate cancer can have long-term side effects that may impact the patient’s life for years after diagnosis.
- Support groups can help and educate patients and their families to better understand prostate cancer, and to learn how to cope with all aspects of the disease, from diagnosis to long-term physical and emotional effects.
**What is the prostate?**

The prostate is a small, walnut-sized gland that lies at the base of the bladder in men. It consists of two symmetrical lobes and surrounds the first part of the tube (the urethra) that carries urine from the bladder to the penis. The urethra also carries semen, which is the fluid containing sperm.

The prostate is coloured orange in the diagram.

*Anatomy of the male reproductive organs, showing the position of the prostate.*
What is prostate cancer?

Prostate cancer is a cancer that forms in the cells of the prostate gland. Most prostate cancers begin in the cells that line the prostate gland — these cancers are known as acinar adenocarcinomas. Many of these cancers grow extremely slowly and are not likely to spread, but some can grow more quickly.

Prostate cancer is often a slow-growing cancer with few symptoms

What are the different types of prostate cancer?

There are five main categories of prostate cancer. Acinar adenocarcinoma is the most common type of prostate cancer, accounting for around 90% of cases. Ductal adenocarcinoma tends to grow more quickly than acinar adenocarcinoma. Transitional cell (or urothelial) cancer typically begins in the bladder and spreads to the prostate. Squamous cell cancer tends to grow more quickly than adenocarcinomas. Small cell cancer is a type of neuroendocrine cancer and it is very rare.
Prostate cancer is classified by how advanced the disease is:

**Localised prostate cancer**

Localised prostate cancer means that the cancer is completely contained within the prostate gland and has not spread anywhere else in the body. Localised prostate cancer is further divided into three risk groups, depending on how likely it is that the cancer will grow and spread:

- **Low-risk prostate cancer**: Unlikely to grow or spread for many years if ever.
- **Intermediate-risk prostate cancer**: Unlikely to grow or spread for a few years.
- **High-risk prostate cancer**: Might grow or spread within a few years.

**Localised prostate cancer is categorised into low-, medium- and high-risk cancer**

**Locally advanced prostate cancer**

Prostate cancer is described as locally advanced if the cancer has spread beyond the prostate gland. For example, the cancer may have spread into the tissue around the prostate, the seminal vesicles, nearby organs such as the rectum, or nearby lymph nodes.

**Metastatic prostate cancer**

Metastatic prostate cancer means that a cancer that began in the prostate has spread to another part of the body. Tumours found in other parts of the body away from the prostate are called metastases. Prostate cancer most commonly spreads to lymph nodes in other parts of the body or to the bones, but can also spread to other organs.
Prostate cancer is also classified according to its grade. The grade of a cancer tells us how much the cancer cells look like normal cells, and can give the doctor an idea of how aggressive the cancer is and what treatment is needed.

The Gleason score system is used to grade prostate cancer. Several samples of cells (biopsies) from the prostate are examined and a pathologist grades each sample from 1 to 5. Grades 1 and 2 are normal prostate cells. Grades 3–5 are cancer cells, with grade 5 being the most abnormal. The pathologist works out an overall Gleason score by adding together the two most common Gleason grades in the samples. For example, if the most common grade is grade 3, and the second most common is grade 4, then the overall Gleason score is 7. Typical Gleason scores in prostate cancer range from 6 to 10. The higher the Gleason score, the more likely it is that the cancer will grow and spread quickly. In particular, tumours with a Gleason score $3 + 4 = 7$ still have a good prognosis, although not as a good as a Gleason score 6. Tumour with a Gleason score $4 + 3 = 7$ is more likely to grow and spread than tumour with a Gleason score $3 + 4 = 7$, yet not as likely as tumour with a Gleason score 8. Tumours with a Gleason score of 8 to 10 are likely to grow and spread more quickly, although one with a Gleason score of 9 to 10 is twice as likely to grow and spread as a tumour with a Gleason score 8.

The Gleason score indicates how aggressive the prostate cancer is

Gleason grade grouping system breaks prostate cancer into 5 grade groups with different prognosis. Grade group 1 is when a Gleason score is 6 or less; grade group 2 when a Gleason score is $3 + 4 = 7$; grade group 3 when a Gleason score is $4 + 3 = 7$; grade group 4 when a Gleason score is $4 + 4 = 8$; and grade group 5 when a Gleason score is 9 and 10.
What are the symptoms of prostate cancer?

In its early stages, prostate cancer often has no symptoms. As the cancer progresses and the prostate becomes enlarged, symptoms that may be experienced include:

- Passing urine more frequently during the day and/or night.
- Difficulty passing urine.
- Urgency to pass urine.
- Dripping or leaking urine.
- Blood in the urine or semen.
- Erection problems.

You should see your doctor if you experience any of these symptoms. However, it is important to remember that these symptoms are common in people who do not have prostate cancer; they may also be caused by other conditions. For example, benign prostatic hyperplasia is caused by enlargement of the prostate gland. Benign prostatic hyperplasia does not usually develop into cancer, but can have similar symptoms to prostate cancer as a result of the enlarged prostate gland pressing on the urethra.
Prostate cancer

Screening for prostate cancer

Prostate-specific antigen (PSA) is a protein that is produced by normal cells and by cancerous prostate cells. It is normal for all men to have some PSA in their blood, but a high level of PSA can be a sign of prostate cancer. Routine testing (or screening) of PSA levels in men who do not have any symptoms of prostate cancer is not usually recommended. This is because large studies have shown that although this type of screening can reduce the number of deaths from prostate cancer, it also leads to many men being diagnosed (overdiagnosis) and/or treated for a prostate cancer that is unlikely to cause any symptoms during the patient’s lifetime (overtreatment). However, PSA testing may be useful in certain groups of people, for example men who have a family history of prostate cancer, as the diagnosis of an aggressive prostate cancer at an early stage can be curable. Furthermore, the pros and cons of PSA testing have shifted in favour of PSA testing because of the introduction of MRI as a triage test in men with an elevated PSA to decide who does, or does not, need prostate biopsy. Previously, men with an elevated PSA level routinely underwent prostate biopsy. Now, men with an elevated PSA should have a prostate MRI scan to decide whether biopsy is indicated. With MRI as a triage test, around 25% of men with an elevated PSA can safely avoid biopsy.

Currently, early PSA testing followed by a risk-adapted follow-up can be offered to the following men following an informed discussion with their doctor of the potential risks and benefits:

- Men over 50 years
- Men over 45 years with a family history of prostate cancer or African American descent
- Men over 40 years with BRCA1/2 gene mutations.

Testing PSA levels in men with poor health and/or with a relatively short life expectancy (i.e. less than 10 years) is not recommended as these men are unlikely to derive benefit from prostate cancer treatment.

Population-based PSA screening of men for prostate cancer is not recommended
How common is prostate cancer?

Prostate cancer is most common in older men

Prostate cancer mostly affects older men – more than half of prostate cancers occur in men over the age of 70 years. Prostate cancer is the second most common cancer in men worldwide (Ferlay et al., 2020). The highest incidences of prostate cancer are reported in Northern and Western Europe. The lowest incidences are in South Eastern and South Central Asia. The large geographic variation in prostate cancer rates is probably due at least in part to differences in the availability of testing and diagnosis.
The map shows estimated numbers of new cases of prostate cancer diagnosed in 2020 per 100,000 people of each region’s population (Ferlay et al., 2020).
What causes prostate cancer?

The causes of prostate cancer are not known, but several risk factors for developing prostate cancer have been identified. It is important to remember that having a risk factor increases the risk of cancer developing but it does not mean that you will definitely get cancer. Likewise, not having a risk factor does not mean that you definitely won’t get cancer.

The precise causes of prostate cancer are not known

FACTORs THAT MAY INCREASE RISK

- Increasing age
- Ethnicity – prostate cancer is more common in Black-African men than in White men, and least common in Asian men
- Family history of prostate cancer
- Certain gene mutations
- Being overweight
- Being tall
- Hormone levels – a high level of a hormone called insulin-like growth factor 1 (IGF-1) is associated with an increased risk of prostate cancer

There are various risk factors associated with developing prostate cancer although each factor may not apply to every man who develops the disease.

Some gene mutations can increase the risk of developing prostate cancer; for example, a mutation in the BRCA2 gene can increase the risk by up to 5 times and mutations in BRCA1 are also associated with increased risk. Men who have changes in other genes that usually correct errors in DNA, such as MLH1 and MSH2, also have a higher chance of developing prostate cancer.
How is prostate cancer diagnosed?

A diagnosis of prostate cancer is based on the results of the following examinations and tests:

Clinical examination

If you have symptoms of prostate cancer, your doctor may carry out a clinical examination to feel your prostate gland. This examination is called a digital rectal examination. He/she will put a gloved finger into your rectum in order to feel the prostate gland and check for any abnormalities.

PSA blood test

Your doctor may recommend that you have a PSA test to check the levels of PSA in your blood; however, it is important to understand that high levels of PSA can also be caused by non-cancerous conditions, and a PSA test on its own cannot diagnose prostate cancer.

Clinical examination and a PSA test can indicate if prostate cancer might be present, but further tests are needed for a definite diagnosis

Imaging

Based on the results of the digital rectal examination and PSA tests, your doctor may recommend that you have a magnetic resonance imaging (MRI) scan (Parker et al., 2020), which uses magnetic fields and radio waves to produce detailed images of the inside of the body. The MRI scan can show up abnormalities in the prostate gland and can help your doctor to decide if you need a biopsy, and where exactly the biopsy should be taken from.
**Biopsy**

When the MRI scan shows signs of prostate cancer, you will need to have a biopsy. This involves taking samples of tissue from the prostate gland to look for cancer cells.

A procedure called transperineal biopsy is typically used to diagnose prostate cancer (Parker et al., 2020). The procedure may be done under general anaesthetic, or local anaesthetic can be injected into the perineum (the skin behind the testicles) to make the procedure as comfortable as possible. A small ultrasound scanner is inserted into the rectum and produces sound waves to create a clear picture of the prostate gland. A fine needle is then inserted into the prostate gland through the perineum and is used to take samples of tissue. Some patients may undergo a different type of biopsy called a transrectal ultrasound scan guided biopsy, in which the biopsy needle is inserted into the prostate via the rectum.

*A prostate biopsy is carried out to confirm the presence of prostate cancer*
How will my treatment be determined?

Your treatment will depend on the staging of your cancer, risk assessment, and your overall health.

Staging

Staging of the cancer is used to describe its size and position and whether it has spread from where it started. To gather this information, your doctor will use the findings from the imaging scans that you already had before biopsy or if not, then your doctor may carry out an MRI scan or a positron emission tomography (PET) / computed tomography (CT) scan (Parker et al., 2020). You may also undergo a bone scan to look for bone metastases; this involves a small amount of radioactive substance being injected into a vein to allow doctors to see abnormal areas of bone across your whole body, as abnormal bone absorbs more radioactivity than healthy bone.

Staging helps to determine the most appropriate treatment for prostate cancer

After diagnosis, imaging scans can show how far advanced the prostate cancer is

The stage grouping system for prostate cancer is described in the table below (Parker et al., 2020). This may seem complicated but your doctor will be able to explain which parts of this table correspond to your cancer.
Stage grouping system for prostate cancer.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>T Level</th>
<th>N Level</th>
<th>M Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I.</td>
<td>Cancer is confined to half of one side of the prostate or less (T1-N0-M0 or T2a-N0-M0)</td>
<td>T</td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>• Clinically inapparent tumour that is not palpable (T1)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Tumour involves one half of one lobe or less (T2a)</td>
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<tr>
<td></td>
<td>N • No regional lymph node metastasis (N0)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>M • No distant metastasis (M0)</td>
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<tr>
<td>Stage II.</td>
<td>Cancer is in more than half of one side of the prostate, but is still contained within the prostate gland (T2b-N0-M0 or T2c-N0-M0)</td>
<td>T</td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>• Tumour involves more than half of one lobe but not both lobes (T2b)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Tumour involves both lobes (T2c)</td>
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<tr>
<td></td>
<td>N • No regional lymph node metastasis (N0)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M • No distant metastasis (M0)</td>
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</tr>
<tr>
<td>Stage III.</td>
<td>Cancer has broken through the covering of the prostate gland and may have spread into the seminal vesicles (T3-N0-M0)</td>
<td>T</td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>• Tumour extends through the prostate capsule but is not fixed or does not invade adjacent structures (T3)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N • No regional lymph node metastasis (N0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M • No distant metastasis (M0)</td>
<td></td>
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<tr>
<td>Stage IV.</td>
<td>Cancer has spread into nearby body organs, such as the rectum or bladder (T4-N0-M0), to nearby lymph nodes (any T-N1-M0), or to other parts of the body outside the pelvis (any T-any N-M1)</td>
<td>T</td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>• Tumour is fixed or invades adjacent structures other than seminal vesicles, such as external sphincter, rectum, bladder, levator muscles, and/or pelvic wall (T4)</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>N • Metastasis in regional lymph node(s) (N1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M • Distant metastasis (M1)</td>
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</table>

Genetic testing

If you have a strong family history of prostate, breast, colon, ovarian or pancreatic cancer, or if you are diagnosed with metastatic prostate cancer, you may undergo tests to look for certain gene mutations. This is because the presence of some mutations (for example, mutations in genes called BRCA1 and BRCA2) can indicate how aggressive the cancer is and which treatment is most likely to work for you.
What are the treatment options for prostate cancer?

Your treatment will depend upon the size, location and stage of the tumour, as well as your general health and level of fitness. The choice of treatments will be discussed with you and your preferences will be taken into account. Your treatment will be discussed by a multidisciplinary team, which means that experts in different areas of cancer treatment (e.g. surgeons, urologists, oncologists, radiotherapists and nurses) come together to share their expertise in order to provide the best patient care.

It is important that patients are fully involved in the treatment decision-making – when there are several treatments available, doctors should involve patients in making decisions about their care so that the patients can choose the care that meets their needs and reflects what is important to them. This is called ‘shared decision making’.

When discussing treatment options for your prostate cancer, your doctor will want to weigh up the benefits to your health and life expectancy against the side effects of treatment. This is very important in prostate cancer, as many patients can live a normal life with a slow-growing prostate cancer for a number of years. For these patients, the side effects from treating the cancer may outweigh any benefits in terms of prolonging life – they are much more likely to die from old age or causes other than prostate cancer.

Your doctor will be happy to answer any questions you have about your treatment. Four simple questions that may be helpful when talking with your doctor or any healthcare professional involved in your care are shown below:

- “What treatment options do I have?”
- “What are the possible advantages and disadvantages of these treatment options?”
- “How likely am I to experience benefits or side effects?”
- “Are there any clinical trial options?”
Your doctor may recommend one or more of the following approaches for managing prostate cancer.

**Active surveillance**

Active surveillance involves close monitoring of the cancer, with no immediate treatment. Active surveillance aims to avoid unnecessary treatment, which may cause unpleasant side effects, thereby preserving quality of life. Active surveillance is an option for men with low- or intermediate-risk localised prostate cancer (Parker et al., 2020). During active surveillance, doctors may regularly check your blood PSA levels and carry out MRI scans. If the cancer starts to grow, your doctor will recommend a suitable curative treatment.

**Watchful waiting**

In watchful waiting, your doctor will monitor your cancer with no immediate treatment, but this involves fewer tests than with active surveillance. Typically, treatment will start if you develop symptoms that need to be controlled. Watchful waiting is an option for men with localised or locally advanced disease who are not suitable for curative treatments (Parker et al., 2020). The aim of watchful waiting is to manage, rather than cure, the cancer.

There is often no immediate treatment for prostate cancer, especially if the cancer is slow-growing.

**Surgery**

Some men with prostate cancer will have an operation to remove the prostate gland – this operation is called a radical prostatectomy. The aim of a radical prostatectomy is to cure the cancer by completely removing the tumour. The surgeon removes the prostate gland as well as the surrounding tissues, lymph nodes and seminal vesicles. This is usually done by keyhole surgery.

Nerve-sparing prostatectomy is a type of surgery that involves the removal of the prostate tissue without removing the nerves that control erections. This type of surgery can reduce the risk of erection problems after surgery, but is only possible when the cancer is not growing close to the nerves.

Radical prostatectomy is a curative treatment option for patients with localised or locally advanced prostate cancer (Parker et al., 2020). It is important to understand that radical prostatectomy is major surgery with many possible side effects. This type of surgery may not be suitable for men with slowly growing prostate cancer as they may be more likely to die of old age or causes other than prostate cancer.

Other types of surgery may also be used in the treatment of prostate cancer. For example, removal of the inner part of the prostate (also called transurethral resection of the prostate) or removal of the testicles can relieve symptoms or help control the spread of the cancer. However, these types of surgery are not curative.
Prostate cancer

Radiotherapy

Radiotherapy uses ionising radiation to damage the DNA of cancerous cells, causing them to die. Two types of curative radiotherapy may be used to treat prostate cancer:

- **External beam radiotherapy** directs radiotherapy to the cancer from a machine outside the body.
- **Brachytherapy** directs radiotherapy to the cancer from a radioactive source placed either permanently or inserted temporary through catheters inside the prostate gland, thus limiting the dose to the surrounding organs.

Radiotherapy is a recommended treatment option for men with localised or locally advanced prostate cancer.

Surgery to remove the prostate gland or radiotherapy can cure prostate cancer

Hormone therapy

Testosterone is a hormone made mainly by the testicles. Prostate cancer needs testosterone to grow, so hormone therapies that block the actions of testosterone are used to reduce the risk of prostate cancer coming back after treatment with surgery or radiotherapy, and to slow the growth of advanced prostate cancer. On its own, hormone therapy is not a curative treatment.

There are three main types of hormone therapy used in the treatment of prostate cancer:

- **Androgen deprivation therapy** works by stopping the testicles from producing testosterone. These drugs are given by injection or implant. There are two types of androgen deprivation therapy: luteinising hormone-releasing hormone agonists (e.g. leuprorelin, goserelin, buserelin, triptorelin) and gonadotrophin-releasing hormone antagonists (e.g. degarelix).
- **Anti-androgens** (e.g. bicalutamide, flutamide, enzalutamide, apalutamide, darolutamide) are tablets that prevent testosterone from reaching the cancer cells.
- **Abiraterone** is a type of hormone therapy tablet that blocks testosterone synthesis. A steroid is taken alongside abiraterone to lower the risk of side effects.

Hormone therapy can effectively manage prostate cancer but, on its own, is not a curative treatment
Chemotherapy

Chemotherapy destroys cancer cells. Chemotherapy (e.g. docetaxel, cabazitaxel) may be used to treat some patients with prostate cancer (Parker et al., 2020). A steroid is taken alongside chemotherapy to make it more effective and lower the risk of side effects.

Targeted therapy

Targeted therapies are drugs that block specific biological processes in cancer cells that encourage them to grow. Olaparib is a targeted therapy that blocks the actions of an enzyme involved in DNA repair and is used for the treatment of some men with metastatic prostate cancer who are not responding to hormone therapy and have mutations in the BRCA1 or BRCA2 genes.

Radionuclide therapy

Radionuclide therapy combines targeted agent that binds on markers expressed on tumour cells and a radioactive substance. Such approach enables targeted delivery of radiation to the tumour, while limiting side effects to surrounding normal tissues.

Radionuclide therapy includes radium-223, a radioactive substance used for delivering bone-targeting radiotherapy.

Prostate-specific membrane antigen (PSMA) is highly expressed in metastatic CRPC. Lutetium-177 is a radioactive substance used in lutetium-177-PSMA to deliver radiation to PSMA-expressing prostate cancer cells.

Bone health in prostate cancer

Denosumab and zoledronic acid are used to prevent fractures in case of bone metastases.

Palliative radiotherapy is used for treatment of pain in case of bone metastases (Parker et al., 2020).
What are the treatment options for localised prostate cancer?

Localised prostate cancer is categorised into three risk groups, which are defined by the size of the tumour (T), the grade of the cancer (Gleason score) and PSA levels. Your doctor will be able to tell you which risk group applies to you. This is important because the treatment for localised prostate cancer varies according to the risk group.

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>T1–T2a and Gleason score 6 and PSA 10</td>
</tr>
<tr>
<td>Intermediate risk</td>
<td>T2b and/or Gleason score 7 and/or PSA 10–20</td>
</tr>
<tr>
<td>High risk</td>
<td>T3a or Gleason score 8–10 or PSA &gt;20</td>
</tr>
</tbody>
</table>

It is important to understand that there is no single standard treatment for localised prostate cancer. A number of treatment options are available for each risk group, and your doctor will fully discuss these with you.

Treatment for localised prostate cancer depends on the risk group of the cancer

Active surveillance

Active surveillance is an option for men with low- or intermediate-risk localised disease (Parker et al., 2020). The cancer is closely monitored and further treatment is considered if the cancer progresses.

Watchful waiting

Watchful waiting with hormone therapy delayed until symptoms arise is an option for men with localised or locally advanced disease who are not suitable for, or who are unwilling to have, curative treatments (Parker et al., 2020).
**Surgery**

The aim of surgery is to remove the cancer as well as a healthy margin of tissue around it. After the operation, the removed tissue is examined under a microscope to check that all of the cancer was removed. Radical prostatectomy may be used to treat low- or intermediate-risk localised disease. If there is evidence that the cancer may have spread to the lymph nodes, then pelvic node dissection might also be carried out. High-risk localised disease may be treated with radical prostatectomy plus pelvic lymphadenectomy, in which the lymph nodes are removed from the pelvis (Parker et al., 2020).

**Radiotherapy**

Men with low- or intermediate-risk localised disease may receive external beam radiotherapy or brachytherapy. High-risk localised disease may be treated with external beam radiotherapy in combination with hormone therapy (Parker et al., 2020).

**Hormone therapy**

Hormone therapy alone is not recommended as the main treatment for localised prostate cancer, but it may be used as part of a watchful waiting strategy for men unable or unwilling to receive curative treatment, in combination with radiotherapy and as neoadjuvant and/or adjuvant therapy for intermediate- or high-risk disease. Neoadjuvant therapy is a treatment that is given before the main treatment, and adjuvant therapy is a treatment given after the main treatment.

In patients with intermediate-risk localised prostate cancer, neoadjuvant and concurrent androgen deprivation therapy for 4–6 months may be used in combination with radiotherapy.

In men with high-risk localised disease, neoadjuvant and concurrent androgen deprivation therapy is recommended for 4–6 months in combination with external beam radiotherapy. Adjuvant androgen deprivation therapy is recommended for 2 years after the radiotherapy treatment (Parker et al., 2020). Adding abiraterone is now an option.
Prostate cancer

Flowchart showing treatment approaches for low-risk localised prostate cancer.

* An option for men with localised or locally advanced disease who are unable or unwilling to receive curative treatment.

Flowchart showing curative treatment approaches for intermediate-risk localised prostate cancer. ADT, androgen deprivation therapy.
Flowchart showing curative treatment approaches for high-risk localised prostate cancer. ADT, androgen deprivation therapy.
What are the treatment options for locally advanced prostate cancer?

**Hormone therapy**

In men with locally advanced prostate cancer, neoadjuvant androgen deprivation therapy is recommended for 4–6 months before external beam radiotherapy with concurrent androgen deprivation therapy. Adjuvant androgen deprivation therapy is recommended for 2 years after the radiotherapy treatment (Parker et al., 2020). Adding abiraterone is now an option.

**Locally advanced prostate cancer is typically treated with androgen deprivation therapy and radiotherapy**

**Radiotherapy**

Locally advanced disease can be treated with external beam radiotherapy in combination with hormone therapy (Parker et al., 2020).

**Surgery**

Some patients with locally advanced prostate cancer may undergone radical prostatectomy plus pelvic lymphadenectomy to remove lymph nodes from the pelvis (Parker et al., 2020).
Locally advanced prostate cancer

Neoadjuvant ADT

Radiotherapy (external beam) + ADT

Adjuvant ADT + abiraterone

Flowchart showing curative treatment approaches for locally advanced prostate cancer. ADT, androgen deprivation therapy.

Watchful waiting

Some men with locally advanced disease are not suitable for, or may choose not to undergo, the curative treatments described above. In these patients, watchful waiting may be an appropriate approach, followed by hormone therapy to treat symptoms if/when they arise.
What are the treatment options for prostate cancer that returns after treatment?

Despite the best possible treatment at diagnosis, there is still a possibility that your cancer may return. Cancer that comes back is called a recurrence. Following curative treatment, PSA levels are monitored closely. If PSA levels rise, then further treatment may be needed.

- **Recurrence** following radical prostatectomy may be treated with radiotherapy to the prostate area. Androgen deprivation therapy may also be given for 6–24 months.
- **Recurrence** following radiotherapy may be treated with local therapies such as radical prostatectomy, high-intensity focused ultrasound, cryoablation or brachytherapy. Androgen deprivation therapy is not routinely administered immediately; patients may be observed and androgen deprivation therapy started when symptoms or metastases appear, or if PSA levels are rising very quickly (Parker et al., 2020).

Recurrent prostate cancer can be treated with radiotherapy, surgery and/or hormone therapy.
What are the treatment options for non-metastatic castration-resistant prostate cancer?

Prostate cancer that continues to grow despite treatment with androgen deprivation therapy is known as castration-resistant prostate cancer (CRPC).

Non-metastatic CRPC is unusual because CRPC typically develops after the detection of metastases. The anti-androgens apalutamide, darolutamide and enzalutamide are all options for the treatment of non-metastatic CRPC (Parker et al., 2020).
What are the treatment options for metastatic prostate cancer?

The main aims of treatment for metastatic prostate cancer are to prolong life, to prevent or relieve symptoms and improve/maintain quality of life.

Metastatic prostate cancer is treatable

Hormone therapy

Androgen deprivation therapy is usually the initial treatment given to men with metastatic prostate cancer. This may be given alone, but is usually combined with abiraterone, apalutamide, enzalutamide or docetaxel. Men with low volume disease should also receive radiotherapy to the primary tumour (Parker et al., 2020).

If the cancer continues to grow despite treatment with androgen deprivation therapy (metastatic CRPC), then enzalutamide or abiraterone or docetaxel may be used, depending on which treatments have been used previously (Parker et al., 2020).

Hormone therapy is the main initial treatment option for metastatic prostate cancer

Chemotherapy

Docetaxel is a chemotherapy drug that may be given alongside androgen deprivation therapy in men with metastatic prostate cancer who are fit enough to tolerate chemotherapy. Docetaxel is also recommended for use in men with metastatic CRPC. If the cancer continues to progress after docetaxel treatment, then the chemotherapy drug cabazitaxel may be considered, as well as abiraterone, enzalutamide and Radium-223 (Parker et al., 2020).
**Targeted therapy**

Olaparib is a treatment option for patients with metastatic CRPC who have mutations in the BRCA1 or BRCA2 genes, and who have already received treatment with abiraterone or anti-androgens.

**Radionuclide therapy**

Radium-223 is a radionuclide therapy that is sometimes used to treat patients with bone metastases. Lutetium-177-PSMA is another radionuclide therapy to deliver radiation to PSMA-expressing prostate cancer cells.

**Bone health in prostate cancer**

Denosumab and zoledronic acid are drugs that are commonly used to maintain bone health and reduce the risk of fragility fractures. They may also be used to reduce the bone-related complications of metastatic disease.

External beam radiotherapy can also be used to treat pain from bone metastases (Parker et al., 2020).

For further information about bone health in case of prostate cancer and bone metastases, see ESMO’s patient guide on bone health in cancer (https://www.esmo.org/for-patients/patient-guides/bone-health-in-cancer).
Metastatic prostate cancer

Patients unsuitable for abiraterone, anti-androgens or chemotherapy

ADT in combination with:
- Abiraterone
- Apalutamide
- Enzalutamide
- Docetaxel
- (+ radiotherapy to prostate in low burden disease)

ADT

CRPC

Docetaxel

Abiraterone or enzalutamide in patients with few/no symptoms

Olaparib in patients with BRCA1/2 mutations

Cabazitaxel  Enzalutamide  Abiraterone  Radium-223

Flowchart showing treatment approaches for metastatic prostate cancer.
ADT, androgen deprivation therapy; CRPC, castration-resistant prostate cancer.
Prostate cancer in younger patients

Prostate cancer treatment can affect fertility – following a radical prostatectomy you will not be able to ejaculate semen, and radiotherapy and hormone therapy can reduce semen and sperm production. If you plan to have children in the future, your sperm can be collected and stored before your cancer treatment begins.
Clinical trials

Your doctor may ask you whether you would like to take part in a clinical trial. This is a research study conducted with patients in order to (ClinicalTrials.gov, 2019):

- Test new treatments.
- Look at new combinations of existing treatments or change the way they are given to make them more effective or reduce side effects.
- Compare the effectiveness of drugs used to control symptoms.
- Find out how cancer treatments work.

Clinical trials help to improve knowledge about cancer and develop new treatments, and there can be many benefits to taking part. You would be carefully monitored during and after the study and the new treatment may offer benefits over existing therapies. It’s important to bear in mind, however, that some new treatments are found not to be as good as existing treatments or to have side effects that outweigh the benefits (ClinicalTrials.gov, 2019).

Several new drugs for the treatment of prostate cancer are now entering clinical trials.

You have the right to accept or refuse participation in a clinical trial without any consequences for the quality of your treatment. If your doctor does not ask you about taking part in a clinical trial and you want to find out more about this option, you can ask your doctor if there is a trial for your type of cancer taking place nearby (ClinicalTrials.gov, 2019).
Supplementary interventions

Patients may find that supplementary care helps them to cope with their diagnosis, treatment and the long-term effects of prostate cancer.

Over the course of disease, anti-cancer treatments should be supplemented with interventions that aim to prevent the complications of disease and treatment, and to maximise your quality of life. These interventions may include supportive, palliative, survivorship and end-of-life care, which should all be coordinated by a multidisciplinary team (Jordan et al., 2018). Ask your doctor or nurse about which supplementary interventions are available; you and your family may receive support from several sources, such as a dietician, urinary incontinence nurse, lymphoedema nurse, social worker, priest or occupational therapist.

Supportive care

Supportive care involves the management of cancer symptoms and the side effects of therapy. This is particularly important for men with prostate cancer, as many will live with the disease for a long period of time. Supportive care can include dietary and exercise advice, as well as help with managing and coping with challenges such as incontinence, lymphoedema and changes in muscle mass.

Some men with prostate cancer take vitamins or other supplements to try to help manage their prostate cancer. While many of these supplements are harmless, they lack evidence of effectiveness, and some could be harmful to your health. Your doctor or nurse are best placed to provide medical advice tailored to you and you should discuss the use of any supplements with them.

Palliative care

Palliative care is a term used to describe care interventions in advanced disease, including the management of symptoms as well as support for coping with prognosis, making difficult decisions and preparation for end-of-life care. Palliative care in men with metastatic prostate cancer may include treatment for diarrhoea, urinary incontinence, nutritional problems, leg swelling, bedsores and pain. For further information and advice on coping with cancer pain, see ESMO’s patient guide on cancer pain (https://www.esmo.org/for-patients/patient-guides/cancer-pain-management).
Support for patients surviving cancer includes social support, education about the disease and rehabilitation. For example, psychological support can help you to cope with any worries or fears. Psychosocial problems impacting your quality of life may include concerns about sexual, urinary or bowel functioning. Patients often find that social support is essential for coping with the cancer diagnosis, treatment and the emotional consequences. A survivor care plan can help you to recover wellbeing in your personal, professional and social life. For further information and advice on survivorship, see ESMO’s patient guide on survivorship (http://www.esmo.org/Patients/Patient-Guides/Patient-Guide-on-Survivorship).

End-of-life care

End-of-life care for patients with incurable cancer primarily focusses on making the patient comfortable and providing adequate relief of physical and psychological symptoms, but can also address spiritual or social issues. Discussions about end-of-life care can be very distressing, but support should always be available to you and your family at this time.
How will prostate cancer affect my quality of life?

It is very important to understand that prostate cancer, and the treatments that you receive to treat it, can impact your quality of life. This section summarises some of the ways in which your quality of life may be affected, but each individual patient will have their own unique experience. You should talk to your doctor or nurse about any physical or psychological problems that you experience during or after treatment for prostate cancer.

Incontinence

More than half of men treated for prostate cancer experience some degree of urinary incontinence, with problems ranging from occasional dribbling to a complete lack of control. More than a third use one or more incontinence pads every day, compared with only a tenth of similarly aged men without prostate cancer (Europa Uomo, 2021).

You should talk to your doctor or nurse if you experience troublesome incontinence. They may be able to refer you to a specialist incontinence clinic, which will provide advice on muscle exercises and bladder training. Surgery to fit an artificial urinary valve may be an option for patients who are suffering from severe incontinence.

For more information about the European study on quality of life in men with prostate cancer, see the study summary booklet from Europa Uomo (https://www.europa-uomo.org/wp-content/uploads/2021/07/EU_booklet_5July_web.pdf). For detailed information on the common side effects of specific prostate cancer treatments, see section ‘What are the possible side effects of treatment?’.

Bowel changes

The bowel changes in first weeks following surgery for prostate cancer occur because the body adjusts to the increased abdominal space due to prostate removal.

Radiotherapy for prostate cancer can cause inflammation of bowel lining resulting in diarrhoea.

Sexual function

Radical prostatectomy and radiotherapy are all associated with reduced sexual function in men with prostate cancer. Around three quarters of men with prostate cancer rate their ability to function sexually as poor or very poor, compared with half of men of a similar age without prostate cancer (Europa Uomo, 2021).

Help is available for men who wish to improve their sexual function. A penile rehabilitation programme can provide strategies to overcome sexual problems, including medications, devices (e.g. a vacuum pump) or injections to make sex possible. These programmes also provide counselling and advice on healthy living to promote improved sexual function.
Discomfort, fatigue and insomnia

Pain and discomfort are most commonly experienced by men who have received chemotherapy. In a European study of patients with prostate cancer, around a third of men who had been treated with chemotherapy reported moderate, severe or extreme pain at the time of the survey. Similarly, fatigue is most commonly experienced by men who have received chemotherapy. Insomnia is most frequently reported by men who have received radiotherapy in combination with androgen deprivation therapy, or chemotherapy (Europa Uomo, 2021).

It is important to tell your doctor if you are suffering from pain or insomnia as they can help you to cope with these effects on your quality of life. You should also take plenty of rest when you need it and try to make sure you are getting enough sleep, eating healthily and staying active. Complementary therapies, such as aromatherapy, may help you to relax and cope better with fatigue.

Mental health

More than a third of men who have been treated for prostate cancer experience depression or anxiety, with mental health problems increasing in advanced disease. Active surveillance is also associated with depression and anxiety, due to long-term worries related to regular testing and future treatment decisions (Europa Uomo, 2021).

It is common to be overwhelmed by your feelings when you have been diagnosed with cancer. If you feel anxious or depressed, talk to your doctor or nurse – they can refer you to a specialist counsellor or psychologist who has experience of dealing with the emotional problems of people coping with cancer. It may also help to join a support group so that you can talk to other people who understand what you are going through (see section ‘Support groups’ for more information). Each person’s experience is unique, but it can help to hear from others who know what it is like to have prostate cancer.
What are the possible side effects of treatment?

As with any medical treatment, you may experience side effects from your anti-cancer treatment. The most common side effects for each type of treatment are highlighted below, along with some information on how they can be managed. You may experience side effects other than those discussed here. It is important to talk to your doctor about any potential side effects that are worrying you.

Doctors classify side effects from any cancer therapy by assigning each event a ‘grade’, on a scale of 1–4, by increasing severity. In general, grade 1 side effects are considered to be mild, grade 2 moderate, grade 3 severe and grade 4 very severe. However, the precise criteria used to assign a grade to a specific side effect varies depending on which side effect is being considered. The aim is always to identify and address any side effect before it becomes severe, so you should always report any worrying symptoms to your doctor as soon as possible.

It is important to talk to your doctor about any treatment-related side effects that are worrying you.

Fatigue is very common in patients undergoing cancer treatment and can result from either the cancer itself or the treatments. Your doctor can provide you with strategies to limit the impact of fatigue, including getting enough sleep, eating healthily and staying active. Loss of appetite and weight loss can also arise due to the cancer itself or the treatments. Significant weight loss, involving loss of both fat and muscle tissue, can lead to weakness, reduced mobility and loss of independence, as well as anxiety and depression. Your doctor may refer you to a dietician, who can look at your nutritional needs and advise you on your diet and any supplements that you might need.

Surgery

Following surgery for prostate cancer, you may experience erection problems. This is likely if the surgeon had to remove nerves during the operation. Some men will be able to have an erection after undergoing surgery, but this will depend on whether or not the surgeon was able to avoid removing the nerves, whether or not you were able to have erections before the procedure, and your age. You may need to take a drug such as sildenafil to help you get an erection.

You may also have problems controlling the flow of urine (urinary incontinence) after your operation, resulting in leakage of urine. This can last up to a year after the operation, by which time most men have no problems or wear a small pad. Your doctor or nurse can refer you to a specialist urinary incontinence clinic if urine leakage continues to be a problem.
Prostate cancer

Lymphoedema can occur in the legs if lymph nodes have been removed. You can reduce your risk of lymphoedema in several ways:

- Maintain a healthy body weight to reduce the strain on your lymphatic system.
- Exercise regularly to encourage lymphatic drainage.
- Protect your skin to avoid infection.

If you notice any signs of swelling or infection, tell your doctor as soon as possible.

Radiotherapy

The immediate side effects of external beam radiotherapy are usually due to the effects of radiation on the organs surrounding the prostate gland. Common side effects of radiotherapy include urinary frequency, change of bowel habit and loss of pubic hair. The main side effects associated with brachytherapy include bladder irritation.

Hormone therapy

The common side effects in patients treated with hormone therapy often relate to the reduced action of testosterone (e.g. loss of sex drive, erection problems, hot flushes, decreased body hair and loss of muscle bulk). Many of the side effects from hormone therapy can be prevented or managed effectively. Always tell your doctor or nurse as soon as possible if you notice any side effects from taking hormone therapy. The table below lists the most common side effects of hormone therapy drugs that may be used in the treatment of prostate cancer.

<table>
<thead>
<tr>
<th>THERAPY</th>
<th>POSSIBLE SIDE EFFECT</th>
<th>HOW THE SIDE EFFECTS MAY BE MANAGED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiraterone (Zytiga SPC, 2020)</td>
<td>Diarrhoea, Hypertension, Hypokalaemia, Increased liver enzymes, Peripheral oedema, Urinary tract infection</td>
<td>Let your doctor know if you experience diarrhoea or fluid retention/swelling (oedema) – they will help you to manage these side effects. Your liver function, potassium levels and blood pressure will be monitored before, during and after treatment.</td>
</tr>
<tr>
<td>Apalutamide (Erleada SPC, 2021)</td>
<td>Anorexia, Arthralgia, Diarrhoea, Fall, Fatigue, Fracture, Hot flush, Hypertension, Rash, Weight decrease</td>
<td>Let your doctor know if you experience diarrhoea, fatigue, loss of appetite, rash or fracture – they will help you to manage these side effects. Your blood pressure will be monitored before, during and after treatment. You will be evaluated for fracture and fall risk before beginning treatment. Your doctor may be able to help you cope with hormonal effects such as hot flushes and decreased weight.</td>
</tr>
</tbody>
</table>

continued overleaf
<table>
<thead>
<tr>
<th>THERAPY</th>
<th>POSSIBLE SIDE EFFECT</th>
<th>HOW THE SIDE EFFECTS MAY BE MANAGED</th>
</tr>
</thead>
</table>
| **Bicalutamide**        |                      | • Abdominal pain  
• Anaemia  
• Asthenia  
• Breast tenderness  
• Constipation  
• Dizziness  
• Haematuria  
• Hot flushes  
• Nausea  
• Oedema  
| Let your doctor know if you experience dizziness, asthenia, or fluid retention/swelling (oedema) – they will help you to manage these side effects  
• Gastrointestinal effects such as constipation, nausea, and abdominal pain should be reported to your doctor  
• Your doctor may be able to help you cope with hormonal effects such as hot flushes and breast tenderness |
| **Buserelin**           | Abdominal pain  
• Arthralgia  
• Blood pressure changes  
• Bowel changes  
• Breast swelling  
• Fatigue  
• Heart palpitations  
• Hot flushes  
• Loss of sex drive  
• Myalgia  
• Nausea  
• Nose irritation  
• Oedema  
• Rash  
• Weight gain  
| Your cardiac function and blood pressure will be monitored before, during and after treatment  
• Let your doctor know if you experience arthralgia, myalgia, rash, or fluid retention/swelling (oedema) – they will help you to manage these side effects  
• Gastrointestinal effects such as constipation, nausea, and abdominal pain should be reported to your doctor  
• Your doctor may be able to help you cope with hormonal effects such as hot flushes, breast swelling, and loss of sex drive |
| **Darolutamide**        | Asthenia  
• Fatigue  
• Liver enzymes increased  
• Neutrophil count decreased  
| Let your doctor know if you experience fatigue or asthenia – they will help you to manage these side effects  
• Your liver function and white blood cell levels will be monitored before, during, and after treatment |
| **Degarelix**           | Hot flushes  
• Injection site reactions  
| Let your doctor know if you experience any burning or skin changes at the injection site, so that they can decide how to manage these  
• Your doctor may be able to help you cope with hormonal effects such as hot flushes |
| **Enzalutamide**        | Fall  
• Fatigue  
• Fracture  
• Headache  
• Hot flush  
• Hypertension  
| Your blood pressure will be monitored before, during, and after treatment  
• You will be evaluated for fracture and fall risk before beginning treatment  
• Let your doctor know if you experience fatigue or headaches – they will help you to manage these side effects  
• Your doctor may be able to help you cope with hormonal effects such as hot flushes and headaches |
### Prostate cancer

<table>
<thead>
<tr>
<th>THERAPY</th>
<th>POSSIBLE SIDE EFFECT</th>
<th>HOW THE SIDE EFFECTS MAY BE MANAGED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flutamide</td>
<td>• Breast pain, tenderness and production of milk&lt;br&gt;• Diarrhoea&lt;br&gt;• Erection problems&lt;br&gt;• Hot flushes&lt;br&gt;• Loss of sex drive&lt;br&gt;• Nausea/vomiting</td>
<td>• <strong>Gastrointestinal</strong> effects such as constipation, nausea and vomiting should be reported to your doctor&lt;br&gt;• Your doctor may be able to help you cope with hormonal effects such as hot flushes, breast symptoms and sexual problems</td>
</tr>
<tr>
<td>Goserelin</td>
<td>• Acne&lt;br&gt;• Erection problems&lt;br&gt;• Hot flushes&lt;br&gt;• Increased sweating&lt;br&gt;• Injection site reactions&lt;br&gt;• Loss of sex drive</td>
<td>• Let your doctor know if you experience any burning or skin changes at the injection site, so that they can decide how to manage these&lt;br&gt;• Your doctor may be able to help you cope with hormonal effects such as hot flushes, sweating, acne and sexual problems</td>
</tr>
<tr>
<td>Leuprorelin</td>
<td>• Bone pain&lt;br&gt;• Erection problems&lt;br&gt;• <strong>Fatigue</strong>&lt;br&gt;• Hot flushes&lt;br&gt;• Increased sweating&lt;br&gt;• Injection site reactions&lt;br&gt;• Loss of sex drive&lt;br&gt;• <strong>Myalgia</strong>&lt;br&gt;• Testicular atrophy&lt;br&gt;• Weight changes</td>
<td>• Let your doctor know if you experience any burning or skin changes at the injection site, so that they can decide how to manage these&lt;br&gt;• Let your doctor know if you experience <strong>fatigue, myalgia</strong> or pain – they will help you to manage these side effects&lt;br&gt;• Your doctor may be able to help you cope with hormonal effects such as hot flushes, sweating, testicular atrophy and sexual problems</td>
</tr>
<tr>
<td>Triptorelin</td>
<td>• Loss of sex drive&lt;br&gt;• Lower limb <strong>paraesthesia</strong>&lt;br&gt;• Hot flushes&lt;br&gt;• Increased sweating&lt;br&gt;• Back pain&lt;br&gt;• Erection problems&lt;br&gt;• <strong>Asthenia</strong></td>
<td>• Let your doctor know if you experience <strong>asthenia, paraesthesia</strong> (a prickling sensation) or pain – they will help you to manage these side effects&lt;br&gt;• Your doctor may be able to help you cope with hormonal effects such as hot flushes, sweating and sexual problems</td>
</tr>
</tbody>
</table>

**Important side effects associated with individual hormone therapy drugs used in the treatment of prostate cancer.** The most recent Summary of Product Characteristics (SPC) for any individual drug can be located at: [http://www.ema.europa.eu/ema/](http://www.ema.europa.eu/ema/)
Chemotherapy

Side effects from chemotherapy vary depending upon the drugs and the doses used – you may get some of those listed below but you are very unlikely to get all of them. You may also experience some side effects that are not listed below. The main areas of the body affected by chemotherapy are those where new cells are being quickly made and replaced (bone marrow, hair follicles, the digestive system, the lining of your mouth). Some patients find that their sense of taste is affected – changes in enzymes in your mouth can lead to a metallic taste and blisters. Reductions in your levels of neutrophils (a type of white blood cell) can lead to neutropenia, which can make you more susceptible to infections. Most side effects of chemotherapy are temporary and can be controlled with drugs or lifestyle changes — your doctor will help you to manage them (Macmillan, 2018). The table below lists the most common side effects of chemotherapy drugs that may be used in the treatment of prostate cancer.
<table>
<thead>
<tr>
<th>CHEMOTHERAPY DRUG</th>
<th>POSSIBLE SIDE EFFECT</th>
<th>HOW THE SIDE EFFECTS MAY BE MANAGED</th>
</tr>
</thead>
</table>
| Docetaxel (Taxotere SPC, 2020) | • Alopecia  
• Anaemia  
• Anorexia  
• Asthenia  
• Diarrhoea  
• Extravasation-related tissue damage  
• Increased infections  
• Nail disorders  
• Nausea  
• Neutropenia  
• Oedema  
• Peripheral neuropathy  
• Skin reaction  
• Stomatitis  
• Thrombocytopenia  
• Vomiting | • Your blood cell counts will be monitored frequently throughout your treatment in order to detect any neutropenia, anaemia or thrombocytopenia — your doctor may adjust your treatment according to test results and will advise you on how to prevent infections  
• Report any signs of peripheral neuropathy to your doctor, who will help you to manage this side effect  
• Effects on the gastrointestinal system (nausea, vomiting, diarrhoea) and stomatitis may result in loss of appetite (anorexia) or feelings of weakness (asthenia). Your doctor will be able to help you to prevent or manage these side effects  
• Let your doctor know if you experience any nail changes, skin reactions or fluid retention/swelling (oedema) — they will help you to manage these side effects  
• Alopecia can be upsetting for many patients; your doctor will provide you with information on how to cope with this side effect. Some hospitals can provide cold caps to reduce hair loss  
• Let your doctor know if you experience any burning or skin changes at the injection site, so that they can decide how to manage these. Many extravasations cause very little damage, but you may need to be treated with an antidote and apply compresses to the area for a few days (Pérez Fidalgo et al., 2012) |
| Cabazitaxel (Jevtana SPC, 2021) | • Abdominal pain  
• Alopecia  
• Anaemia  
• Anorexia  
• Arthralgia  
• Asthenia  
• Back pain  
• Constipation  
• Cough  
• Diarrhoea  
• Dyspnoea  
• Fatigue  
• Fever  
• Haematuria  
• Leukopenia  
• Nausea/vomiting  
• Neutropenia  
• Taste changes (metallic, salty or bitter tastes)  
• Thrombocytopenia | • Your blood cell counts will be monitored frequently throughout your treatment in order to detect any neutropenia, anaemia, leukopenia or thrombocytopenia — your doctor may adjust your treatment according to test results and will advise you on how to prevent infections  
• Effects on the gastrointestinal system (constipation, nausea, vomiting, diarrhoea, taste changes) may result in loss of appetite (anorexia) or feelings of weakness (asthenia). Your doctor or nurse will be able to help you to prevent or manage these side effects  
• Let your doctor or nurse know if you experience a persistent cough. Troublesome dyspnoea can be treated with drugs called opioids or benzodiazepines, and in some cases, steroids are used (Kloke and Cherny, 2015)  
• Let your doctor or nurse know if you experience arthralgia or pain and they will help you to manage these side effects  
• Alopecia can be upsetting for many patients; your doctor will provide you with information on how to cope with this side effect. Some hospitals can provide cold caps to reduce hair loss |

**Important side effects associated with individual chemotherapy drugs used in the treatment of prostate cancer.** The most recent Summary of Product Characteristics (SPC) for any individual drug can be located at: http://www.ema.europa.eu/ema/
Targeted therapies

Common side effects in patients treated with targeted therapies include fatigue and effects on the gastrointestinal system (e.g. diarrhoea, vomiting). Many of the side effects from targeted therapies can be prevented or managed effectively. Always tell your doctor or nurse as soon as possible if you notice any side effects from taking a targeted therapy.

The table below lists the most important specific side effects of the targeted therapy drug olaparib, which is used in the treatment of prostate cancer.

<table>
<thead>
<tr>
<th>TARGETED THERAPY</th>
<th>POSSIBLE SIDE EFFECT</th>
<th>HOW THE SIDE EFFECTS MAY BE MANAGED</th>
</tr>
</thead>
</table>
| Olaparib (Lynparza SPC, 2021) | • Anaemia  
• Anorexia  
• Cough  
• Diarrhoea  
• Dizziness  
• Dysgeusia  
• Dyspepsia  
• Dyspnoea  
• Fatigue  
• Headache  
• Leukopenia  
• Nausea  
• Neutropenia  
• Thrombocytopenia  
• Vomiting | • Your blood cell counts will be monitored frequently throughout your treatment in order to detect any neutropenia, anaemia, thrombocytopenia or leukopenia – your doctor may adjust your treatment according to test results and will advise you on how to prevent infections  
• Effects on the gastrointestinal system (nausea, vomiting, diarrhoea, dyspepsia, dysgeusia) may result in loss of appetite (anorexia). Your doctor or nurse will be able to help you to prevent or manage these side effects  
• Let your doctor or nurse know if you experience a persistent cough. Troublesome dyspnoea can be treated with drugs called opioids or benzodiazepines, and in some cases, steroids are used (Kloke and Cherny, 2015)  
• Let your doctor or nurse know if you experience fatigue, dizziness or headaches – they will help you to manage these side effects |

Important side effects associated with olaparib. The most recent Summary of Product Characteristics (SPC) for any individual drug can be located at: http://www.ema.europa.eu/ema/.

Bone health agents

Supportive therapy with bisphosphonates such as zoledronic acid can result in side effects including flu-like symptoms, renal toxicity and low calcium levels. Bisphosphonates can also occasionally lead to osteonecrosis (death of bone tissues) in the jaw. Although this is very rare, it is important that you clean your teeth regularly and carefully and report any oral problems to your doctor and dentist. Denosumab therapy can also potentially lead to osteonecrosis of the jaw, as well as low calcium levels and skin infections. It is very important that you inform your doctor or nurse well in advance of any planned dental treatments, as bisphosphonates and denosumab therapy will have to be temporarily stopped.
Prostate cancer

What happens next?

Follow-up appointments

You will be able to discuss any concerns you have at your follow-up appointments.

Whether you have had curative treatment or are receiving long-term hormone therapy, your doctor will arrange follow-up appointments. During these appointments, you will typically have a blood test to monitor your PSA level. Depending on your PSA level, you might also have a digital rectal examination. Patients who are on long-term hormone therapy may have scans to check for osteoporosis — your doctor will discuss this with you.

Your doctor will let you know how often you need to return for further follow-up appointments, but a typical follow-up schedule after curative treatment would involve check-ups every 6 months in the first 2 years after treatment, then every 12 months after that.

Looking after your health

After you have had treatment for prostate cancer, you may feel very tired and emotional. Give your body time to recover and make sure you get enough rest, but there is no reason to limit activities if you are feeling well. It is important to take good care of yourself and get the support that you need.

- **Take plenty of rest when you need it:** Give your body time to recover. Complementary therapies, such as aromatherapy, may help you relax and cope better with side effects. Your hospital may offer complementary therapy; ask your doctor for details.

- **Eat well and keep active:** Eating a healthy diet and keeping active can help improve your fitness. It is important to start slowly, with gentle walking, and build up as you start to feel better. Vitamin D, which the body needs to absorb calcium, is very important for men having hormone therapy because of the risk of osteoporosis. We mainly get vitamin D from sunlight and some foods, but your doctor may also recommend that you take a daily supplement.
The following eight recommendations form a good foundation for a healthy lifestyle after cancer (Wolin et al., 2013):

- Don’t smoke.
- Avoid second-hand smoke.
- Exercise regularly.
- Avoid weight gain.
- Eat a healthy diet.
- Drink alcohol in moderation (if at all).
- Stay connected with friends, family and other cancer survivors.
- Attend regular check-ups and screening tests.

A healthy, active lifestyle will help you to recover physically and mentally

Regular exercise is an important part of a healthy lifestyle, helping you to keep physically fit and avoid weight gain. This is particularly important for men with prostate cancer, as studies have shown that an exercise training programme can reduce the side effects of long-term androgen deprivation therapy and improve quality of life (Bourke et al., 2018). It is very important that you listen carefully to the recommendations of your doctor or nurse, and talk to them about any difficulties you have with exercise.

Long-term effects

After completing treatment for prostate cancer, you may experience some long-term side effects, depending on the treatment you have received.

Long-term side effects of surgery for prostate cancer may follow on from the short-term effects, including permanent erection problems and urinary incontinence. The long-term effects of hormone therapy for prostate cancer can include weight gain, loss of stamina, mood swings, osteoporosis and heart problems.

Radiotherapy for prostate cancer may cause irritation of the rectum (proctitis) or the bladder (cystitis), leading to more frequent toilet visits and possibly bleeding (Deamaley et al., 2007). There may also be an increase in erection problems from 1–2 years after radiotherapy treatment. There is a theoretical possibility that radiotherapy could cause cancers in other organs around the treatment area, however this has not been proven in men treated for prostate cancer.
The long-term effects of prostate cancer treatment on your sex life can be difficult to come to terms with. Talking to your partner about your sexual difficulties can help, or it may help to talk to a close friend if you are not in a relationship. A penile rehabilitation programme can provide ways to adapt to the changes in your sexual function, and counsellors or therapists can help with anxiety about your sex life — talk to your doctor or nurse to find out what help is available in your area.

The long-term effects of prostate cancer and its treatment can be managed so it is important that you tell your doctor or nurse about any persistent or new symptoms. Your doctor or nurse will also work with you to develop a personalised survivorship care plan.

For further information and advice regarding how to regain your life as far as possible after treatment for cancer, see ESMO’s patient guide on survivorship (https://www.esmo.org/for-patients/patient-guides/survivorship).
Support groups

In Europe, there are patient advocacy groups, which help patients and their families to navigate the prostate cancer landscape. They can be local, national or international, and they work to ensure patients receive appropriate and timely care and education. These groups can provide you with the tools you may need to help you better understand your disease, and to learn how to cope with it, living the best quality of life that you can.

Europa Uomo is a European coalition of patient support groups for prostate cancer. It was established in 2004 and works to increase awareness of prostate cancer in Europe.

For further information about Europa Uomo visit: https://www.europa-uomo.org/
References


GLOSSARY

ABIRATERONE
A hormone therapy that inhibits testosterone synthesis by blocking an enzyme called cytochrome p17

ACTIVE SURVEILLANCE
A treatment plan that involves closely watching a patient’s condition but not giving any treatment unless there are changes in test results that show the condition is getting worse

ADENOCARCINOMA
Cancer that begins in glandular (secretory) cells

ADJUVANT (TREATMENT)
Additional treatment given after the primary treatment to reduce the chance of the cancer coming back

ALOPECIA
Hair loss

ANAEMIA
A condition in which there is a shortage of haemoglobin (a protein in red blood cells that carries oxygen throughout the body)

ANDROGEN DEPRIVATION THERAPY
Treatment to suppress or block the production or action of male hormones

ANOREXIA
A lack or loss of appetite

ANTI-ANDROGEN (THERAPY)
Treatment with drugs that block the action of male hormones in the body

APALUTAMIDE
An anti-androgen drug that prevents testosterone from reaching cancer cells

ARTHRALGIA
Joint pain

ASTHENIA
Abnormal feeling of weakness or lack of energy

BENIGN PROSTATIC HYPERPLASIA
A benign (not cancerous) condition in which an overgrowth of prostate tissue pushes against the urethra and the bladder, blocking the flow of urine

BICALUTAMIDE
An anti-androgen drug that prevents testosterone from reaching cancer cells

BIOLOGY
A medical procedure in which a small sample of cells or tissue is taken for examination under a microscope

BISPHOSPHONATES
Drugs that help prevent, or slow down, osteoporosis, and prevent broken bones and other bone problems caused by bone metastases; also used in adjuvant treatment

BONE MARROW
A spongy tissue found inside some bones (e.g. hip and thigh bones). It contains stem cells, which are cells that can develop into red blood cells, white blood cells or platelets

BRACHYTHERAPY
A type of internal radiotherapy in which the radioactive source is either placed permanently directly into the tumour (low dose rate brachytherapy) or inserted temporary through catheters, that are placed into or near the tumour and then removed again (high dose rate brachytherapy)

BRCA1
A gene that normally controls tumour growth but when mutated has the opposite effect

BRCA2
A gene that normally controls tumour growth but when mutated has the opposite effect

BUSERELIN
A luteinising hormone-releasing hormone agonist that blocks the production of testosterone in the testicles

CASTRATION-RESISTANT PROSTATE CANCER (CRPC)
Prostate cancer that is no longer responsive to castration treatments (i.e. reduction of androgen/testosterone by surgical or medical treatment)

CHEMOTHERAPY
A type of cancer treatment using medicine that kills the cancer cells by damaging them, so that they cannot reproduce and spread

CLINICAL TRIAL
A study that compares the effects of one treatment with another
**GLOSSARY**

**COLD CAP**
A cap that cools the scalp before, during and after treatment to reduce the effects of the treatment on hair follicles.

**COMPUTED TOMOGRAPHY (CT) SCAN**
A scan using X-rays and a computer to create detailed images of the inside of your body.

**CONCURRENT**
At the same time.

**CRYOABLATION**
A procedure in which an extremely cold liquid is used to freeze and destroy abnormal tissue.

**CURATIVE (TREATMENT)**
A treatment that is intended to cure the cancer.

**CYSTISIS**
Inflammation of the lining of the bladder.

**CYTOCHROME P17**
An enzyme that the testicles need to produce testosterone.

**DAROLUTAMIDE**
An anti-androgen drug that prevents testosterone from reaching cancer cells.

**DEGARELIX**
A gonadotrophin-releasing hormone antagonist that blocks the production of testosterone in the testicles.

**DENOSUMAB**
A drug used to treat osteoporosis and prevent broken bones and other bone problems caused by bone metastases.

**DIGITAL RECTAL EXAMINATION**
An examination in which a doctor or nurse inserts a lubricated, gloved finger into the rectum to feel for abnormalities.

**DNA**
Deoxyribose nucleic acid, the chemical that carries genetic information in the cells of your body.

**DOCETAXEL**
A type of chemotherapy that is administered through a drip into a vein in your arm or chest.

**DYSGEUSIA**
A change in the sense of taste.

**DYSPNŒA**
Shortness of breath.

**ENZALUTAMIDE**
An anti-androgen drug that prevents testosterone from reaching cancer cells.

**ENZYME**
A protein that speeds up chemical reactions in the body.

**EXTERNAL BEAM RADIOTHERAPY**
A type of radiotherapy that uses a machine to aim high-energy rays at the cancer from outside of the body.

**EXTERNAL SPHINCTER**
A muscle encircling the outside wall of the anal opening.

**EXTRAVASATION**
Leakage of fluid, such as an anti-cancer drug, from a blood vessel or tube into the tissue around it.

**FATIGUE**
Overwhelming tiredness.

**FLUTAMIDE**
An anti-androgen drug that prevents testosterone from reaching cancer cells.

**GASTROINTESTINAL (SYSTEM)**
The system of organs responsible for getting food into and out of the body and for making use of food to keep the body healthy – includes the oesophagus, stomach and intestines.

**GENERAL ANAESTHETIC**
A medication that causes a reversible loss of consciousness.

**GENES**
Pieces of DNA responsible for making substances that the body needs to function.

**GLAND**
An organ that makes one or more substances, such as hormones, digestive juices, sweat, tears, saliva or milk.

**GLEASON SCORE**
A system of grading prostate cancer tissue based on how it looks under a microscope. A low Gleason score means the cancer tissue is similar to normal prostate tissue and the tumour is less likely to spread; a high Gleason score means the cancer tissue is very different from normal and the tumour is more likely to spread.
GLOSSARY

GONADOTROPIN-RELEASING HORMONE ANTAGONIST
A drug that blocks the pituitary gland from making hormones called follicle-stimulating hormone and luteinising hormone. In men, this causes the testicles to stop making testosterone.

GOSERELIN
A luteinising hormone-releasing hormone agonist that blocks the production of testosterone in the testicles.

HAEMATURIA
Blood in the urine.

HAIR FOLLICLE
A small sac in the skin from which hair grows.

HIGH-INTENSITY FOCUSED ULTRASOUND
A procedure in which ultrasound is aimed directly at an area of abnormal cells or tissue in the body. The ultrasound creates heat, which kills the cells.

HORMONE
A substance made by glands in the body. Hormones circulate in the bloodstream and control the actions of certain cells or organs.

HORMONE THERAPY
Treatments that block the actions of testosterone.

HYPERTENSION
Abnormally high blood pressure.

HYPOKALAEMIA
An abnormally low level of potassium in the blood.

IONISING RADIATION
Any type of particle or electromagnetic wave that carries enough energy to ionise or remove electrons from an atom (e.g. X-rays).

INSULIN-LIKE GROWTH FACTOR 1 (IGF-1)
A protein that stimulates the growth of many types of cells.

KEYHOLE SURGERY
Minimally invasive surgery carried out through a very small incision, with special instruments.

LEUKOPENIA
A decrease in the number of leukocytes (a type of white blood cell) in the blood, which places individuals at increased risk of infection.

LEUPRORELIN
A luteinising hormone-releasing hormone agonist that blocks the production of testosterone in the testicles.

LUTEINISING HORMONE-RELEASING HORMONE AGONIST
A drug that keeps the testicles from making testosterone by blocking other hormones that are needed to make it.

LEVATOR MUSCLES
Muscles on either side of the pelvis.

LOCAL ANAESTHETIC
A medication that causes reversible absence of pain sensation around the site of administration.

LOCALISED (PROSTATE CANCER)
Cancer that is completely contained within the prostate gland and has not spread anywhere else in the body.

LOCALLY ADVANCED (PROSTATE CANCER)
Cancer that has spread from where it started to nearby tissue or lymph nodes.

LUTETIUM-177
A radioisotope used as a part of lutetium-177-PSMA radionuclide therapy.

LUTETIUM-177-PSMA
A type of radionuclide therapy used to deliver radiation to PSMA-expressing prostate cancer cells.

LYMPHATIC SYSTEM
A network of tissues and organs that help rid the body of toxins, waste and other unwanted materials. The primary function of the lymphatic system is to transport lymph, a fluid containing infection-fighting white blood cells, throughout the body.

LYMPH NODES
Small structures throughout the lymphatic system that work as filters for harmful substances, such as cancer cells or bacteria.

LYMPHOEDEMA
Swelling caused by a build-up of lymph fluid in the tissues of the body. This may result from damage to the lymphatic system because of surgery or radiotherapy to the lymph nodes in the pelvis.
Glossary

**Margin**
The edge or border of the tissue removed in cancer surgery. The margin is described as negative or clean when no cancer cells are found at the edge of the tissue, suggesting that all of the cancer has been removed. The margin is described as positive or involved when cancer cells are found at the edge of the tissue, suggesting that all of the cancer has not been removed.

**Metastases**
Cancerous tumours that have originated from a primary tumour/growth in another part of the body.

**Metastatic (Prostate Cancer)**
A cancer that has spread from its (primary) site of origin to different parts of the body.

**Magnetic Resonance Imaging (MRI) Scan**
A type of scan that uses strong magnetic fields and radio waves to produce detailed images of the inside of the body.

**Multidisciplinary Team**
A group of healthcare workers who are members of different disciplines (e.g., oncologist, nurse specialist, physiotherapist, radiologist) and provide specific services to the patient. The activities of the team are brought together using a care plan.

**Mutation**
A permanent alteration in the DNA sequence that makes up a gene, such that the sequence differs from what is found in most people.

**Myalgia**
Muscular pain.

**Neoadjuvant (Treatment)**
Treatment given as a first step to shrink a tumour before the main treatment is given.

**Nerve-Sparing Prostatectomy**
Removal of prostate tissue without removing the nerves that control erections.

**Neuroendocrine Cancer**
Cancer that forms from cells that release hormones into the blood in response to a signal from the nervous system.

**Neutropenia**
An abnormally low level of neutrophils in the blood, which increases risk of infection.

**Neutrophils**
A type of white blood cell that play an important role in fighting off infection.

**Oedema**
A build-up of fluid in the body which causes the affected tissues to become swollen.

**Olaparib**
A drug used to treat some types of cancer caused by mutations in the BRCA1 and BRCA2 genes.

**Osteonecrosis**
Loss of blood flow to bone tissue, causing the bone to die.

**Osteoporosis**
A decrease in the amount and thickness of bone tissue, which causes the bones to become weak and break more easily.

**Palliative (Care)**
The care of patients with advanced, progressive illness. It focuses on providing relief from pain, symptoms and physical and emotional stress, without dealing with the cause of the condition.

**Palpable**
Can be felt by touch.

**Palpitations**
A rapid or irregular heartbeat.

**Paraesthesia**
An abnormal sensation, such as burning or prickling.

**Pelvic Lymphadenectomy**
Surgery to remove lymph nodes in the pelvis.

**Pelvic Node Dissection**
A procedure to remove pelvic lymph nodes to see if they contain cancerous cells.

**Penile Rehabilitation Programme**
A programme of treatment for sexual problems following prostate cancer treatment, including counselling and sex therapy, medication and lifestyle advice.

**Perineum**
The area of skin between the anus and scrotum in males.

**Peripheral Neuropathy**
Damage to the nerves in the extremities of the body. Symptoms may include pain, sensitivity, numbness or weakness in the hands, feet or lower legs.
### GLOSSARY

**POSITRON EMISSION TOMOGRAPHY (PET)**
An imaging test that uses a dye with radioactive tracers, which is injected into a vein in your arm.

**PROCTITIS**
Inflammation of the lining of the rectum.

**PROGNOSIS**
The likely outcome of a medical condition.

**PROSTATE**
A gland in the male reproductive system. The prostate surrounds the part of the urethra just below the bladder, and produces a fluid that forms part of the semen.

**PROSTATE-SPECIFIC ANTIGEN (PSA)**
A protein made by the prostate gland and found in the blood.

**PROSTATE-SPECIFIC MEMBRANE ANTIGEN (PSMA)**
A protein that is highly expressed in prostate cancer cells. PSMA positive cells are detected by PSMA PET scan.

**RADICAL PROSTATECTOMY**
Surgery to remove the entire prostate and some of the tissue around it.

**RADIOACTIVE/RADIOACTIVITY**
A material that is unstable and spontaneously emits energy (radiation).

**RADIOISOTOPE**
An unstable form of a chemical element that releases radiation as it breaks down and becomes more stable.

**RADIONUCLIDE THERAPY**
A treatment in which a small amount of a radioactive chemical (radionuclide) is injected into a vein and travels through the blood and accumulate in targeted organs in which radiation is then given off by the radionuclide.

**RADIOTHERAPY**
Treatment involving the use of high-energy radiation, which is commonly used to treat cancer.

**RADIUM-223**
A radioisotope liquid used to treat prostate cancer that has spread to the bone.

**RECURRENCE**
Return of a cancer.

**RECTUM**
Back passage.

**RENAL**
Relating to the kidneys.

**RISK FACTOR**
Something that increases the chance of developing a disease.

**SCROTUM**
The external sac that contains the testicles.

**SEMEN**
The fluid that is released through the penis during ejaculation. Semen is made up of sperm from the testicles and fluid from the prostate and other sex glands.

**SEMINAL VESICLES**
Glands that help produce semen.

**SILDENAFIL**
A drug used to treat erection problems.

**STEROID**
A type of drug used to relieve swelling and inflammation. Some steroid drugs also have anti-tumour effects.

**STOMATITIS**
Inflammation of the inside of the mouth.

**TARGETED THERAPY**
A type of cancer treatment that uses drugs or other substances to precisely identify and attack cancer cells, usually while doing little damage to normal cells.

**TESTICULAR ATROPHY**
A condition in which the testicles become smaller.

**TESTOSTERONE**
A hormone made mainly in the male reproductive system that is needed to develop and maintain male sex characteristics.

**THROMBOCYTOPENIA**
A decrease in platelets in the blood. This causes bleeding into the tissues, bruising, and slow blood clotting after injury.

**TRANSPERINEAL BIOPSY**
A procedure used to diagnose prostate cancer. A sample of tissue from the prostate gland is removed with a thin needle that is inserted through the skin between the scrotum and rectum and into the prostate.

**TRANSURETHRAL RESECTION OF THE PROSTATE**
Removal of the inner part of the prostate gland.
**Prostate cancer**

**GLOSSARY**

**TRIPTORELIN**
A luteinising hormone-releasing hormone agonist that blocks the production of testosterone in the testicles.

**TUMOUR**
A lump or growth of abnormal cells. Tumours may be benign (not cancerous) or malignant (cancerous). In this guide, the term ‘tumour’ refers to a cancerous growth, unless otherwise stated.

**ULTRASOUND**
A type of medical scan where sound waves are converted into images by a computer.

**URETHRA**
The tube through which urine leaves the body.

**URINARY INCONTINENCE**
Inability to control the flow of urine from the bladder.

**URINARY TRACT**
The organs of the body that produce and discharge urine, including the kidneys, ureters, bladder and urethra.

**WATCHFUL WAITING**
Closely watching a patient’s condition but not giving treatment unless symptoms appear or change.

**X-RAY**
An imaging test, using a type of radiation that can pass through the body, which allows your doctor to see images of inside your body.

**ZOLEDRONIC ACID**
A type of bisphosphonate used to treat cancers that have spread to the bone.
This guide has been prepared to help you, your friends and your family better understand the nature of prostate cancer and the treatments that are available. The medical information described in this document is based on the clinical practice guidelines of the European Society for Medical Oncology (ESMO) for the management of prostate cancer. We recommend that you ask your doctor about the tests and types of treatments available in your country for your type and stage of prostate cancer.

This guide has been written by Kstorfin Medical Communications Ltd on behalf of ESMO.

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We can help you understand prostate cancer and the available treatment options.

The ESMO Guides for Patients are designed to assist patients, their relatives and caregivers to understand the nature of different types of cancer and evaluate the best available treatment choices. The medical information described in the Guides for Patients is based on the ESMO Clinical Practice Guidelines, which are designed to guide medical oncologists in the diagnosis, follow-up and treatment in different cancer types.

For more information, please visit www.esmo.org