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Prostate Cancer

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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WHAT'S INSIDE

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**) and a **biopsy**.
- Further investigations can help to determine how advanced the cancer is. For example, scans called **magnetic resonance imaging** (**MRI**), **positron emission tomography** (**PET**) and **computed tomography** (**CT**) **scans** may be used to see how far the cancer has spread. **Lymph nodes** in the pelvis may also be removed and examined to check if they contain cancer cells.
- **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 in life expectancy.
- Treatment approaches for **prostate** cancer include **active surveillance** (in which the cancer is closely monitored and then treated as soon as it progresses), surgery, **radiotherapy**, **hormone therapy** (e.g. **androgen deprivation therapy**, **anti-androgens** or **testosterone** synthesis blocker) and **chemotherapy**.

Localised prostate cancer

- **Localised prostate** cancer is defined as low risk, intermediate risk or high risk.
- Patients with low-risk disease might receive **active surveillance**, **radical prostatectomy** (surgical removal of the **prostate gland**) or **radiotherapy**, which is given either as **external beam radiotherapy** or **brachytherapy**.
- 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 **radiotherapy** to the **prostate** and **lymph nodes** with **neoadjuvant** and **concurrent androgen deprivation therapy** and **adjuvant androgen deprivation therapy** too.

Locally advanced prostate cancer

- **Locally advanced** disease is usually treated with a **radical prostatectomy** plus **pelvic lymphadenectomy** or **radiotherapy** with **neoadjuvant androgen deprivation therapy** and possibly **adjuvant androgen deprivation therapy** too.

Metastatic prostate cancer

- **Metastatic** disease is typically treated with **androgen deprivation therapy**, either alone or in combination with the **testosterone** synthesis blocker **abiraterone** or **chemotherapy**.
- If the cancer continues to grow despite treatment with **androgen deprivation therapy** (also referred to as **castration-resistant prostate cancer** [**CRPC**] or **hormone-refractory prostate cancer** [**HRPC**]), then **chemotherapy**, the **anti-androgen** drug **enzalutamide** or **abiraterone** may be used.
- **Radium-223**, **denosumab**, **zoledronic acid** or **palliative radiotherapy** can be used to treat complications from bone **metastases**.

Recurrent prostate cancer

- **Radiotherapy**, **androgen deprivation therapy** or **radical prostatectomy** may be used to treat a **recurrence**.

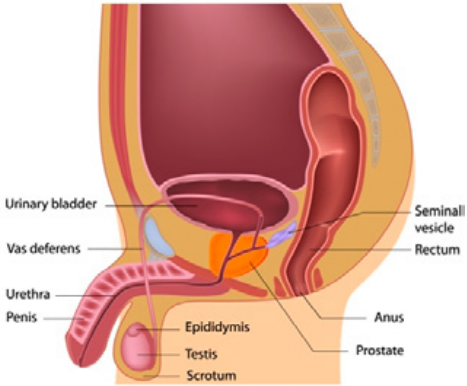
Follow-up during/after treatment

- The timings of follow-up appointments vary between regions and practices. Typical follow-up appointments include a blood test to monitor **PSA** levels, clinical examination and scans.
- Patients receiving long-term **hormone therapy** may have **MRI scans** to monitor the cancer and bone 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 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: This is the most common type of prostate cancer, accounting for around 90% of cases. Acinar adenocarcinoma develops in the outer gland cells of the prostate.
- Ductal adenocarcinoma: This type of prostate cancer develops in the cells that line the ducts (or tubes) of the prostate gland. Ductal adenocarcinoma tends to grow more quickly than acinar adenocarcinoma.
- Transitional cell (or urothelial) cancer: This cancer develops in the cells of the urethra. It typically begins in the bladder and spreads to the prostate, but rarely it can begin in the prostate and spread into the bladder and nearby tissues.
- Squamous cell cancer: This type of cancer develops from flat cells that cover the prostate, and tends to grow more quickly than adenocarcinomas.
- Small cell cancer: This is a type of neuroendocrine cancer made up of small round cells, which is also sometimes called oat cell cancer. Small cell prostate cancer is very rare, accounting for less than 2% of all cases of prostate cancer.

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.
- 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.

The Gleason score indicates how aggressive the prostate cancer is

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.
- Leaking urine.
- Blood in the urine or semen.
- Erection problems.

Prostate cancer often has no symptoms in its early stages

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.

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 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 falsely diagnosed and treated for prostate cancer. However, PSA testing may be useful in certain groups of people, for example men who have a family history of prostate cancer.

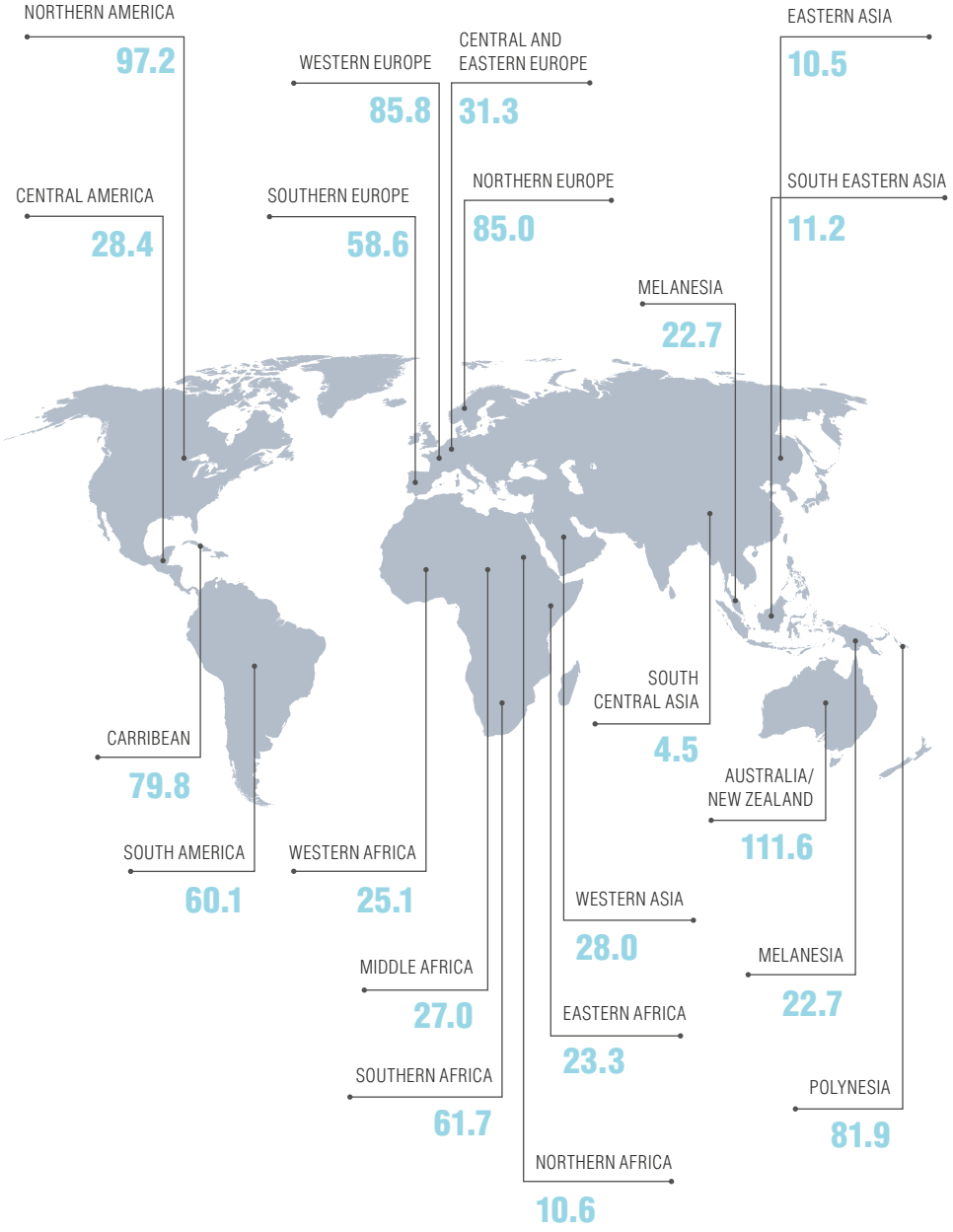
There is currently no routine screening programme for prostate cancer in the general population

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. The highest incidences of prostate cancer are reported in Australia/New Zealand, North America, and Northern and Western Europe. The lowest incidences are in Eastern and South Central Asia and Northern Africa. The large geographic variation in prostate cancer rates is probably due to differences in the availability of testing and diagnosis *(Ferlay et al., 2013)*.

*The map shows estimated numbers of new cases of **prostate** cancer diagnosed in 2012 (the most recent statistics available) per 100,000 people of each region's population (Ferlay et al., 2013).*



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
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
Inflammation of the **prostate**
Exposure to cadmium

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

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

Biopsy

Based on the results of the digital rectal examination and PSA tests, your doctor may recommend that you have a biopsy. This involves taking samples of tissue from the prostate gland to look for cancer cells.

A procedure called transrectal ultrasound scan guided (TRUS) biopsy is typically used to diagnose prostate cancer. Local anaesthetic is injected into the rectum 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 used to take at least 10–12 samples of tissue from the prostate gland. If you undergo a TRUS biopsy, your doctor will give you antibiotics to prevent infection developing after the biopsy *(Parker et al., 2015)*.

If the TRUS biopsy shows no signs of cancer but your doctor still suspects that you may have cancer, he/she may recommend that you have a magnetic resonance imaging (MRI) scan, which uses magnetic fields and radio waves to produce detailed images of the inside of the body, or additional biopsies via the perineum (the skin behind the testicles).

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 and risk assessment.

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 may wish to carry out an **MRI scan**, a **positron emission tomography** (**PET**) **scan**, a **computed tomography** (**CT**) **scan**, **pelvic node dissection** and/or a bone scan *(Parker et al., 2015)*.

- **MRI scan**: **MRI** uses magnetic fields and radio waves to produce detailed images of the inside of your body.
- **PET scan**: **PET** uses a **radioactive** substance injected into a vein and can help find areas of cancer that an **MRI** or **CT scan** may miss. Most **PET** scans are now performed along with a **CT scan**.
- **CT scan**: This is a type of **x-ray** technique that lets doctors see your internal organs in cross-section.
- **Pelvic node dissection**: This is a procedure to remove pelvic **lymph nodes** to check if they contain cancerous cells.
- Bone scan: This is a scan to look for bone **metastases** and involves a small amount of **radioactive** substance 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.

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

Staging to determine the size and spread of the cancer is described using a sequence of letters and numbers. For **prostate** cancer, there are four stages designated with Roman numerals I to IV. Generally, the lower the stage, the better the outcome (or **prognosis**) for the patient. The TNM staging system considers:

- How big the cancer is, or **tumour** size (T).
- Whether the cancer has spread to **lymph nodes** (N).
- Whether it has spread to distant sites, or **metastases** (M).

Staging helps to determine the most appropriate treatment for prostate cancer

The stage grouping system for **prostate** cancer is described in the table below *(Parker et al., 2015)*. This may seem complicated but your doctor will be able to explain which parts of this table correspond to your cancer.

Stage I. **Cancer is confined to half of one side of the prostate, or less (T1-N0-M0 or T2a-N0-M0)**	**T**	• Clinically inapparent **tumour** neither **palpable** nor visible by imaging (T1) • **Tumour** involves one half of one lobe or less (T2a)
	N	• No regional **lymph node metastasis** (N0)
	M	• No distant **metastasis** (M0)
Stage II. **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)**	**T**	• **Tumour** involves more than one half of one lobe but not both lobes (T2b) • **Tumour** involves both lobes (T2c)
	N	• No regional **lymph node metastasis** (N0)
	M	• No distant **metastasis** (M0)
Stage III. **Cancer has broken through the covering of the prostate gland and may have spread into the seminal vesicles (T3-N0-M0)**	**T**	• **Tumour** extends through the **prostate** capsule (T3)
	N	• No regional **lymph node metastasis** (N0)
	M	• No distant **metastasis** (M0)
Stage IV. **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)**	**T**	• **Tumour** is fixed or invades adjacent structures other than **seminal vesicles**, such as **external sphincter**, **rectum**, bladder, **levator muscles**, and/or pelvic wall (T4)
	N	• **Metastasis** in regional **lymph node(s)** (N1)
	M	• Distant **metastasis** (M1)

*Stage grouping system for **prostate** cancer.*

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'.

It is important that patients are fully involved in discussions and decisions about their treatment

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. Three simple questions that may be helpful when talking with your doctor or any healthcare professional involved in your care are:

- What treatment options do I have?
- hat are the possible advantages and disadvantages of these options?
- How likely am I to experience these advantages and disadvantages?

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, and is an option for men with low- or intermediate-risk **localised prostate** cancer *(Parker et al., 2015)*. During **active surveillance**, doctors may regularly check your blood **PSA** levels and carry out **prostate biopsies** or **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 low-risk **localised** disease and for men with **localised** or **locally advanced** disease who are not suitable for **curative** treatments *(Parker et al., 2015)*. 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 making a cut into your abdomen, but some patients may be offered **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., 2015)*. 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**.

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 inside the prostate gland.

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) are tablets that prevent testosterone from reaching the cancer cells.
- Abiraterone is a new 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 is not a curative treatment

Chemotherapy

Chemotherapy destroys cancer cells. **Chemotherapy** (e.g. **docetaxel**, **cabazitaxel**) may be used to treat some patients with **metastatic prostate** cancer *(Parker et al., 2015)*. A **steroid** is taken alongside **chemotherapy** to make it more effective and lower the risk of side effects.

Other therapies

Other treatments for **prostate** cancer include drugs to treat the effects of bone **metastases**, including **radium-223**, **denosumab** and **zoledronic acid** *(Parker et al., 2015)*.

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.

Low risk	T1–T2a and **Gleason score** ≤6 and **PSA** ≤10
Intermediate risk	T2b and/or **Gleason score** 7 and/or **PSA** 10–20
High risk	≥T2c or **Gleason score** 8–10 or **PSA** >20

*Risk groups for **localised prostate** cancer.*

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., 2015)*. The cancer is closely monitored and further treatment is considered if the cancer progresses.

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., 2015)*.

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., 2015)*.

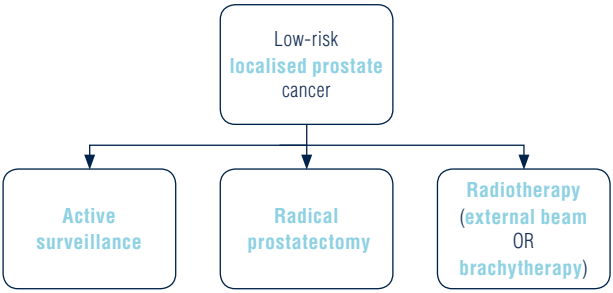
Hormone therapy

Hormone therapy alone is not recommended as the main treatment for **localised prostate** cancer, but it may be used in combination with **radiotherapy** 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.

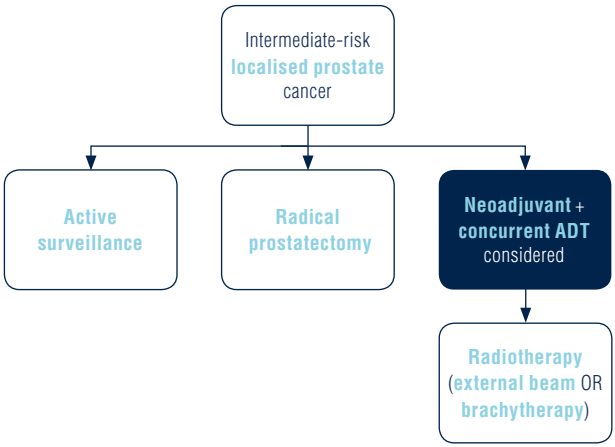
Hormone therapy may be used in addition to radiotherapy for some patients with localised disease

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

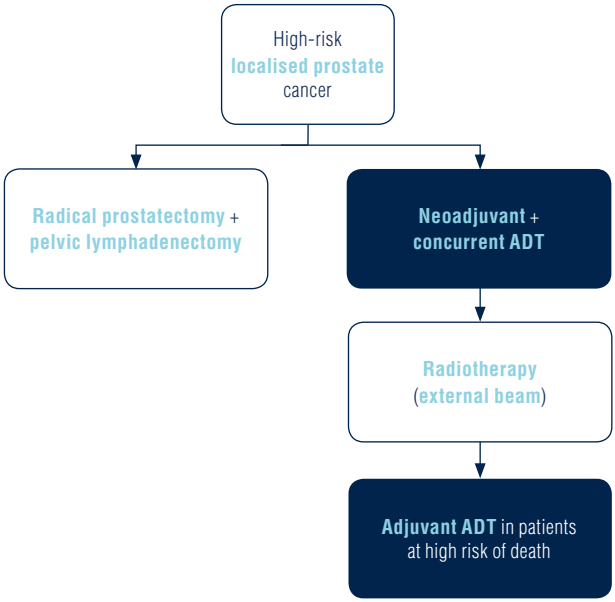
In men with high-risk **localised** disease, **neoadjuvant** and **concurrent androgen deprivation therapy** is recommended for 4–6 months in combination with **external beam radiotherapy**, and **adjuvant androgen deprivation therapy** may also be administered for 2–3 years after the **radiotherapy** treatment if the doctor thinks there is a high risk of death from the cancer *(Parker et al., 2015)*.



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



*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**.*

Watchful waiting

Some men with **localised** 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 locally advanced prostate cancer?

Surgery

Radical prostatectomy plus **pelvic lymphadenectomy** to remove **lymph nodes** from the pelvis is a treatment option for men with **locally advanced prostate** cancer *(Parker et al., 2015)*.

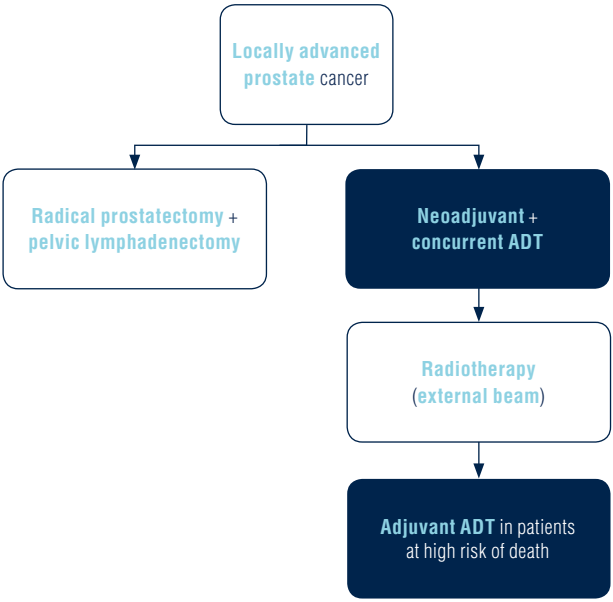
Radiotherapy

As an alternative to surgery, **locally advanced** disease can be treated with **external beam radiotherapy** in combination with **hormone therapy** *(Parker et al., 2015)*.

Locally advanced prostate cancer is typically treated with surgery or radiotherapy

Hormone therapy

Neoadjuvant and **concurrent androgen deprivation therapy** is typically administered for 4–6 months in combination with **external beam radiotherapy** in the treatment of **locally advanced prostate** cancer, and **adjuvant androgen deprivation therapy** may be given for 2–3 years in patients who are thought to be at high risk of dying from their cancer *(Parker et al., 2015)*.



*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 metastatic prostate cancer?

The main aims of treatment for **metastatic prostate** cancer are to relieve symptoms and improve 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, in combination with the **testosterone** synthesis blocker **abiraterone** or in combination with **chemotherapy** *(Parker et al., 2015; ESMO Guidelines Committee, 2018)*.

If the cancer continues to grow despite treatment with **androgen deprivation therapy** (also referred to as **castration-resistant prostate cancer** [**CRPC**] or **hormone-refractory prostate cancer** [**HRPC**]), then the **anti-androgen** drug **enzalutamide** or **abiraterone** may be used in men with no or few symptoms *(Parker et al., 2015)*.

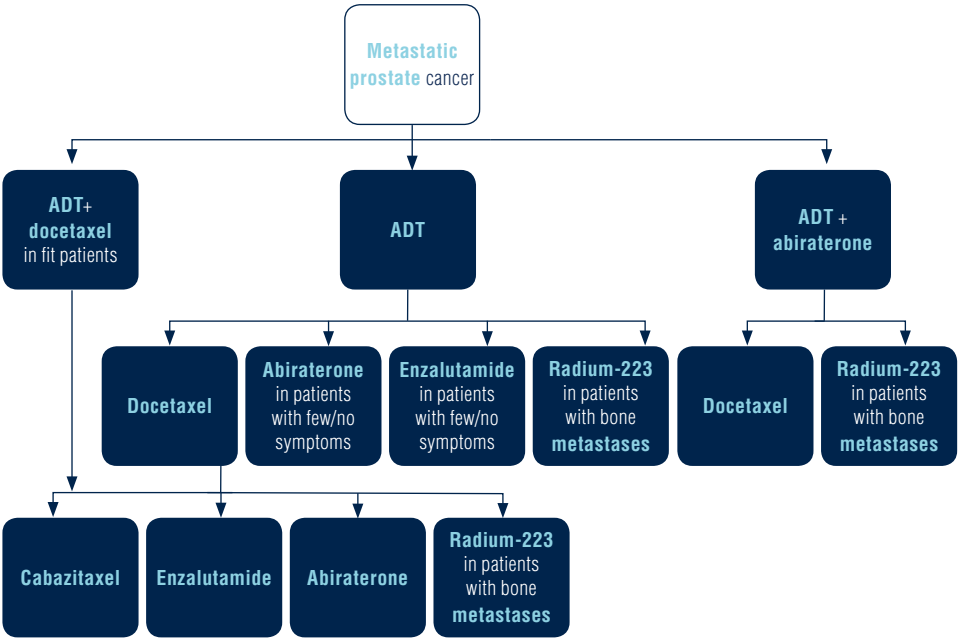
Hormone therapy is the main initial treatment option for metastatic prostate cancer

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** disease that has continued to grow despite treatment with **androgen deprivation therapy**. 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., 2015)*.

Other therapies

Radium-223 is a **radioactive** liquid that is sometimes used to treat patients with bone **metastases**. **Denosumab** and **zoledronic acid** are drugs that can reduce the bone-related complications of **metastatic** disease (e.g. bone pain, bone fracture), and may be recommended for some patients with bone **metastases**. **External beam radiotherapy** can also be used to treat pain from bone **metastases** (Parker et al., 2015).



*Flowchart showing treatment approaches for **metastatic prostate** cancer.*
*ADT, **androgen deprivation therapy**.*

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**.

Radiotherapy

Following **radical prostatectomy**, **PSA** levels are monitored closely. If the **PSA** levels rise, then **radiotherapy** may be given in the **prostate** area *(Parker et al., 2015)*.

Hormone therapy

Androgen deprivation therapy may be given to men who have signs of **recurrence** following **radical prostatectomy** or **external beam radiotherapy** *(Parker et al., 2015)*. In men who have previously been treated with **radiotherapy**, **radical prostatectomy** may be a treatment option.

Recurrent prostate cancer can be treated with radiotherapy, surgery and/or hormone therapy

Prostate cancer in younger patients

Prostate cancer diagnosed in men younger than 55 years often grows more rapidly than prostate cancer in patients diagnosed at an older age. The reasons for this difference are not clear, but we know that patients who are diagnosed at a younger age are less likely to survive the cancer. If you are a younger man diagnosed with prostate cancer, your doctor will guide you through all of your treatment options.

Prostate cancer in younger men can spread more quickly than in older 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, 2017)*:

- 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, 2017)*.

Clinical trials help to improve knowledge about diseases and develop new treatments – there can be many benefits to taking part

Several new drugs for the treatment of **prostate** cancer are now entering **clinical trials**, including **immunotherapy** agents, which stimulate the body's immune system to fight cancer cells.

Pembrolizumab, an **immunotherapy** drug which blocks a protein called **programmed cell death protein 1** (**PD-1**) on the surface of some immune cells, has shown encouraging results in some patients with **metastatic prostate** cancer *(Hansen et al., 2018; de Bono et al., 2018)*.

Olaparib is a drug that blocks the actions of an **enzyme** involved in **DNA** repair. **Olaparib** is already used to treat some types of cancer, especially those that have **mutations** in **genes** called **BRCA1** and **BRCA2**. **Olaparib** has shown encouraging results in patients with **metastatic prostate** cancer, both on its own and in combination with **abiraterone** *(Mateo et al., 2015; Clarke et al., 2018)*.

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, 2017)*.

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.

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 often includes treatment for pain, diarrhoea, urinary incontinence, nutritional problems, leg swelling and bedsores.

Survivorship care

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, for example **palliative** sedation to induce unconsciousness can relieve severe pain, **dyspnoea**, delirium or convulsions *(Cherny, 2014)*. Discussions about end-of-life care can be very distressing, but support should always be available to you and your family at this time.

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 *(Cancer.Net, 2017)*. 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 *(Escamilla and Jarrett, 2016)*. 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.

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 **fatigue**, skin irritation, bladder inflammation, diarrhoea and loss of pubic hair. The main side effects associated with **brachytherapy** include bladder irritation, blood in the urine and blood in the **semen**.

It is important to look after your skin during **radiotherapy** treatment to prevent infection and reduce pain. Let your doctor or nurse know of any symptoms as he/she may be able to help.

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.

THERAPY	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
Abiraterone (Zytiga SPC, 2017)	• Diarrhoea • **Hypertension** • **Hypokalaemia** • Increased liver **enzymes** • Peripheral **oedema** • **Urinary tract** infection	• 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
Bicalutamide (Bicalutamide SPC, 2017)	• 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

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THERAPY	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
Buserelin (Suprefact SPC, 2015)	• 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
Degarelix (Firmagon SPC, 2017)	• 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 (Xtandi SPC, 2018	• **Fatigue** • Headache • Hot flush • **Hypertension**	• Your blood pressure will be monitored before, during and after 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
Flutamide (Flutamide SPC, 2017)	• Breast pain, tenderness and production of milk • Diarrhoea • Erection problems • Hot flushes • Loss of sex drive • Nausea/vomiting	• **Gastrointestinal** effects such as constipation, nausea and vomiting should be reported to your doctor • Your doctor may be able to help you cope with hormonal effects such as hot flushes, breast symptoms and sexual problems
Goserelin (Zoladex SPC, 2017)	• Acne • Erection problems • Hot flushes • Increased sweating • Injection site reactions • Loss of sex drive	• 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, sweating, acne and sexual problems

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THERAPY	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
Leuprorelin (Prostap SPC, 2018)	• Bone pain • Erection problems • Fatigue • Hot flushes • Increased sweating • Injection site reactions • Loss of sex drive • Myalgia • Testicular atrophy • Weight changes	• 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 • Let your doctor know if you experience fatigue, myalgia or pain – 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, sweating, testicular atrophy and sexual problems
Triptorelin (Decapeptyl SPC, 2016)	• Loss of sex drive • Lower limb paraesthesia • Hot flushes • Increased sweating • Back pain • Erection problems • Asthenia	• Let your doctor know if you experience asthenia, paraesthesia (a prickling sensation) or pain – 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, sweating and sexual problems

***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/.*

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, 2016)*. The table below lists the most common side effects of **chemotherapy** drugs that may be used in the treatment of **prostate** cancer.

CHEMOTHERAPY DRUG	POSSIBLE SIDE EFFECT	HOW THE SIDE EFFECTS MAY BE MANAGED
Docetaxel (Taxotere SPC, 2016)	• **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 effect • 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, 2017)	• 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/.*

Other treatments

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.

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.

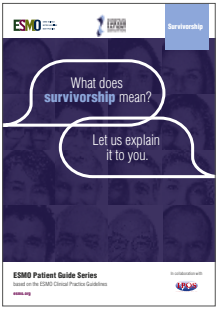
Long-term side effects of surgery for **prostate** cancer may follow on from the short-term effects, including permanent erection problems and **urinary incontinence**. The long-term effects of **hormone therapy** for **prostate** cancer can include weight gain, loss of stamina, mood swings, **osteoporosis** 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 *(Dearnaley 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 (http://www.esmo.org/Patients/Patient-Guides/Patient-Guide-on-Survivorship).



Emotional support

It is common to be overwhelmed by your feelings when you have been diagnosed with cancer and when you have been through treatment. 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 emotional problems of people dealing with cancer. It may also help to join a support group so that you can talk to other people who understand exactly what you are going through.

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/

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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 red blood cells or 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

ANTIBIOTIC
A type of drug used to treat and prevent bacterial infections

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

BIOPSY
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 **radiotherapy** in which the **radioactive** source is placed directly into or near a **tumour**

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**

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

CADMIUM
A metal that is a by-product of zinc refining and is used to make batteries, pigments and plastics. It is also found in tobacco and tobacco smoke

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

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

GLOSSARY

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

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

CYSTITIS
Inflammation of the lining of the bladder

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

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

DUCTS
Tubes or vessels in the body that fluids pass through

DYSPNOEA
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

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

GONADOTROPHIN-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

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

GLOSSARY

HORMONE-REFRACTORY PROSTATE CANCER (HRPC)
Prostate cancer that is no longer responsive to castration treatments (i.e. reduction of androgen/**testosterone** by surgical or medical treatment). This term has now been replaced by **castration-resistant prostate cancer** or **CRPC**

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**)

IMMUNOTHERAPY
A type of cancer treatment that stimulates the body's immune system to fight the cancer

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**

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

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

GLOSSARY

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

PEMBROLIZUMAB
A type of **immunotherapy** that blocks a protein called **PD-1** on the surface of certain immune cells called T-cells; this activates the T-cells to find and kill cancer cells. It is administered through a drip into a vein in your arm or chest

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

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

PROGRAMMED CELL DEATH PROTEIN 1 (PD-1)
A cellular protein thought to be involved in helping the **tumour** to evade detection by the body's immune system

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

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

GLOSSARY

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

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

RADIUM-223
A **radioactive** 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

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

TRANSRECTAL ULTRASOUND SCAN GUIDED (TRUS) BIOPSY
A procedure used to diagnose **prostate** cancer. An **ultrasound** scanner is inserted into the **rectum** to produce a clear picture of the **prostate gland** and a needle is used to take samples of tissue from the **prostate gland**

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

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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GOOD SCIENCE
BETTER MEDICINE
BEST PRACTICE

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**