

briefsheets: Prostate cancer

Prostate cancer is the most common cancer in men in the UK*. Around 27,200 new cases of prostate cancer were diagnosed in 2000, and the disease claimed nearly 10,000 lives in 2002**.

About prostate cancer

- Prostate cancer is the second most common cause of cancer death in UK men.
- It is mainly a cancer of older men. Only 1 in 20 cases occur in men under 60.
- The number of new cases increased rapidly in the 1990s. This was largely because greater use of the 'PSA test' (see box) led to more cases of prostate cancer being detected.
- A small number of men have a much higher than average risk of prostate cancer because they inherited a faulty gene from a parent.
- By the age of 80, more than half of all men have cancerous changes in their prostate. However, the disease often grows very slowly without causing problems. Many men never know they have it and will die of unrelated causes.
- The highest rate of prostate cancer in the world is in men of African descent. The lowest rates are in Far Eastern and Asian men.

What is prostate cancer?

The prostate is a small gland, about the size of a walnut, found only in men. It lies

Risk factors

Age

Prostate cancer is rare in men under 50.

Family history

A man's risk is higher if a first-degree relative (father or brother) has been diagnosed with the disease at a young age. Having an elderly relative with prostate cancer is not uncommon and does not increase a man's risk. In a small number of cases, prostate cancer runs in families because of a faulty gene, such as the BRCA2 gene.

Race

Prostate cancer is more common in men of African descent.

Diet

Some evidence suggests that diet may influence a person's prostate cancer risk. For example, it is thought that a diet high in animal fats may slightly increase the risk of developing the disease.

at the base of the bladder and surrounds the urethra, the tube that carries urine out of the body. It produces a fluid that protects the urethra and mixes with sperm during ejaculation. Prostate cancer occurs when a cell in the prostate starts dividing out of control because its DNA (the genetic material in all cells) has become damaged. The causes of prostate cancer are unknown.

How is prostate cancer treated?

Some prostate cancers grow slowly and may neither cause problems nor require treatment. For faster growing cancers, there are a number of treatment options. If the cancer has not spread, doctors may

recommend surgery to remove the prostate, or radiotherapy. If the cancer has spread, doctors may use hormone therapy, which switches off the supply of male hormones that encourage prostate cancer cells to grow.

What is Cancer Research UK doing about prostate cancer?

Cancer Research UK is a major supporter of prostate cancer research in the UK. We fund research at all levels, from uncovering the disease's causes to developing new treatments. We have a section dealing extensively with prostate cancer on our CancerHelp UK website aimed at patients and carers (<http://www.cancerhelp.org.uk>).

The PSA test

Prostate-specific antigen, or PSA, is produced by the prostate and can be measured in the blood. PSA levels are usually raised when a man has prostate cancer. However, some men with high PSA levels do not have prostate cancer and some men with prostate cancer do not have high PSA levels. The higher the PSA level, the more likely it is to be caused by prostate cancer.

Unfortunately, the PSA test cannot tell the difference between prostate cancers that grow quickly and are life-threatening, and those that grow slowly and do not require treatment. This can lead to men receiving unnecessary treatment for a prostate cancer that may not cause clinical problems. Treatment is not without risk, and can occasionally lead to complications.

The possible introduction of a screening programme for prostate cancer based on the PSA test remains

controversial. Many experts do not think that it would be helpful. Cancer Research UK is helping to find out whether a national screening test based on PSA would save lives.

In 2001 the government introduced the Prostate Cancer Risk Management Programme, a key component of which entitles men over 50 to a PSA test if they want one, provided that they have received full information on its risks and benefits.

*Excluding non-melanoma skin cancer.

**Latest available figures.

Prostate cancer – our research

Understanding the causes of prostate cancer

Genes are the building plans for the molecules that form our cells and control their behaviour. But genes can be damaged and this can lead to cancer. Cancer Research UK scientists are finding the gene damage that causes prostate cancer. For example, our scientists at Cambridge University are studying how a faulty BRCA2 gene increases the risk of prostate cancer and how widespread this faulty gene is in the population. Inherited damage to BRCA2 (which can also cause breast and ovarian cancer) can give men a five times higher risk of prostate cancer.

At the Institute of Cancer Research (ICR) in Sutton, we fund work to find other genes that influence a man's risk. Scientists here are looking for rare gene faults that cause multiple cases of prostate cancer in a single family. Doctors from the UK and from an international consortium called ACTANE have located families for the study. The team is now using DNA from blood and tumour samples to track down the faulty genes. They are also looking for more common, 'low-risk' prostate cancer genes, which influence the effect of factors such as diet and bodyweight on prostate cancer risk. Finding these genes may lead to new ways to prevent the disease.

Another group at the ICR is taking a different approach to finding genes involved in prostate and other cancers. They have identified regions of DNA that are consistently altered in certain types of cancer and are now homing in on the specific gene faults involved using sophisticated 'DNA-chip' techniques.

In around a third of prostate cancer patients, the cancer spreads. Cancer Research UK scientists in London are working out how this occurs. They believe that two molecules, HGF and PAK4, which help to transmit signals inside cells, have particularly important roles in prostate cancer spread. To investigate this further, they are growing human prostate cancer cells in the laboratory and using high-tech imaging to study their movement.

Prevention and detection

Cancer Research UK is contributing to work looking at how diet influences cancer risk. The massive European Prospective Investigation into Cancer and Nutrition (EPIC) study is investigating the eating habits of more than 500,000 people across Europe. Cancer Research UK is funding the two UK arms of EPIC.

The charity supports research examining how the PSA test should best be used (see box), and how to deal with men whose PSA levels suggest that they might have prostate cancer.

Improving treatment

Cancer Research UK, together with the Medical Research Council and the Department of Health, is funding a large UK research collaborative called ProMPT (**P**rostate cancer: **M**echanisms of **P**rogression and **T**reatment). Co-ordinated from Cambridge and with centres in Bristol, Manchester, Newcastle, Sheffield and York, the collaborative brings together groups with diverse areas of expertise, so new laboratory discoveries can be quickly turned into new treatments.

Recently, Cancer Research UK-funded scientists at the ICR have discovered that a gene, E2F3, is overactive only in aggressive prostate cancers. This groundbreaking discovery should allow doctors to predict how aggressive a man's cancer will be, and offer them the most appropriate treatment.

Men with advanced prostate cancer are often treated with drugs to block the action of the male sex hormones that encourage the cancer to grow. This kind of treatment will usually work for a few years, after which many men relapse. A group in Birmingham is studying whether fewer men relapse if initially given a combination of hormone therapy and chemotherapy, rather than hormone therapy on its own.

A Newcastle-based Cancer Research UK group is studying a protein called NF- κ B. This protein helps prostate cancer cells become resistant to various types of therapy, and is activated by a protein called PARP-1. The team hopes that by designing drugs to block the activity of PARP-1 they may develop a new generation of treatments for the disease.

Psychological support

Cancer Research UK has pioneered research into how best to support cancer patients, their families and their carers. We've developed highly successful training courses to improve the communication and counselling skills of cancer doctors, now the basis for a government initiative.

We are funding research on how best to communicate the issues about the PSA test to men, and how to help them decide whether to take the test. We are also funding research to find out how to raise awareness of the disease and its symptoms.

The ProtecT study

The ProtecT study (**P**rostate **t**esting for **c**ancer **T**reatment), funded by the NHS Health Technology Assessment programme, will help discover the best treatment for men with early ('localised') prostate cancer. Men aged 50-69 from 400 general practices around the UK are being invited for a PSA test. Those with raised PSA levels and subsequently found to have prostate cancer are treated with active monitoring (so-called 'watch and wait'), or radiotherapy, or surgery to remove their prostate. The study's initial aim was to find out which of these three treatments options is best for men with early-stage prostate cancer detected by the PSA test.

Now Cancer Research UK is funding an extension to ProtecT that will enable the study to show if screening men for prostate cancer using the PSA test can help save lives, or whether it leads to more men being treated unnecessarily. The new arm of the trial will recruit another 400 general practices from across the UK. Trained researchers will collect data on all men aged 50-69 from these practices. They will record the number of these unscreened men who get prostate cancer, and their fates, and compare these data with those screened in the main ProtecT trial.