

## Hereditary Prostate Cancer

Prostate cancer is the most common cancer in males. Most men develop prostate cancer by chance or as a result of risk factors that occur over the course of a lifetime. However, approximately 10 percent of men who are diagnosed with prostate cancer develop it due to a hereditary prostate cancer syndrome.

A hereditary prostate cancer syndrome is an inherited increased risk to develop prostate cancer and possibly other cancers. Inherited conditions are passed to an individual through their blood relatives. People who have a hereditary prostate cancer gene mutation have a higher than average risk of developing cancer.

### What Causes Hereditary Prostate Cancer?

Hereditary prostate cancer syndromes are caused by an inherited change, called a mutation, in a gene. Genes are the set of instructions that tell all of the cells in our bodies what to do. Genes determine physical characteristics, such as hair and eye color, the shape of the nose, and blood type. A mutation is a change in a gene that causes the gene to stop working. In the case of hereditary prostate cancer, a gene that normally helps to prevent cancer has stopped working. Therefore, certain types of cancer are more likely to develop and are more likely to occur at a younger age than usual.

Mutations in the Hereditary Breast and Ovarian Cancer (HBOC) syndrome genes (BRCA1 and BRCA2) account for the majority of hereditary prostate cancer. A person who has HBOC syndrome has increased lifetime risks for breast (female and male), ovarian, prostate, pancreatic, skin (melanoma) and other cancers. Mutations in the Lynch syndrome genes (MLH1, MSH2, MSH6, PMS2 and EPCAM) have also been found in a portion of individuals with prostate cancer. A person who has Lynch syndrome has increased lifetime risks for colon, uterine, ovarian, stomach and other cancers. Mutations in the HOXB13 gene have been found in a portion of individuals with early-onset prostate cancer and / or families with multiple cases of prostate cancer. There are also a number of other genes, including TP53, CHEK2, ATM, and others that increase lifetime prostate and other cancer risks.

Each person inherits two copies of most genes. We receive one copy from our mother and one from our father. Inheriting a mutation in just one copy of a hereditary prostate cancer syndrome gene is enough to increase the risk for cancer. There is a 50 percent chance that a person with a hereditary prostate cancer syndrome gene mutation will pass it to each of his or her children. However, if a person does not inherit the hereditary prostate cancer syndrome gene mutation present in his or her family member(s), that person usually has an average chance of developing cancer.

## **Why Is It Important to Diagnose Hereditary Prostate Cancer in a Family?**

People who have a hereditary prostate cancer syndrome have a greater than average chance to develop prostate or other cancer than the general population. For someone who already has been diagnosed with prostate cancer, the diagnosis of a hereditary prostate cancer syndrome may indicate a greater chance of developing another cancer.

Because a hereditary prostate cancer syndrome is inherited, the diagnosis also affects family members. If genetic testing identifies a mutation in a gene that causes a hereditary prostate cancer syndrome, family members can be tested for that same gene mutation.

It is very important for people with a hereditary prostate cancer syndrome to consider specialized cancer screening exams. Cancer screening exams are medical tests performed to help identify cancers at their earliest, most treatable stages. They may also consider medical options that can lower their risk of developing cancer. Usually a team of specialists will tailor a cancer screening and risk reduction plan to each patient and his or her family members.

## **How Is Hereditary Prostate Cancer Diagnosed?**

A genetics evaluation includes a review of a person's medical and family history. A multi-generation family tree, called a pedigree, is often drawn during the evaluation. This information is used to determine the likelihood that the person has a hereditary prostate cancer syndrome. A genetic counselor usually conducts this evaluation.

Some signs in a family history that suggest hereditary prostate cancer may include:

- Prostate cancer diagnosed at age 65 or younger.
- Metastatic prostate cancer.
- A Gleason score greater than seven coupled with a family history of cancer, including breast, ovary, pancreas, and prostate. The Gleason score is a numeric representation of how much the cells in the cancerous tissue look and behave like normal prostate tissue under the microscope.
- Family history of a cancer syndrome, including Hereditary Breast and Ovarian Cancer syndrome (HBOC), Hereditary Prostate Cancer (HPC), and Lynch syndrome.
- Several close blood relatives with breast (female and/or male), prostate, ovarian, colon, or other related cancers on the same side of the family.

If you or your family members have any of the above features, you may consider genetic counseling and testing. We encourage you to discuss this with your physicians.

## **Genetic Testing**

A person's blood or saliva sample can be tested to search for a genetic mutation that causes hereditary prostate cancer. This testing may be limited to the HBOC and/or Lynch syndrome genes or may also include other genes that cause hereditary prostate cancer. In general, there are three types of results:

- Positive for a mutation. If a mutation is found, then the diagnosis of a hereditary prostate cancer syndrome is confirmed. Next, other family members may have a genetic test to learn whether or not they carry the same mutation and have the same hereditary prostate cancer syndrome.

- Negative for a mutation. If no mutation is found the cancer in the family may not be hereditary. However, a negative genetic test result does not eliminate the possibility of a hereditary prostate cancer syndrome in the family. This is because current genetic testing technology is not able to identify all mutations that cause hereditary prostate cancer. It is also possible that the prostate cancer in the family is being caused by a gene that was not included in the test.
- Variant of unknown significance. A variant is a gene change that does not provide clear information regarding cancer risks. More research is needed to determine whether a genetic variant increases cancer risk. Thus, a variant result should not be used to make medical decisions.

If you are concerned about the possibility of a hereditary cancer syndrome in your family, you are encouraged to discuss your personal and/or family history with your healthcare provider. Your physician may refer you to the Cancer Genetics Program of the MD Anderson Cancer Center at Cooper for a genetic evaluation and discussion of testing options. If genetic testing is recommended and you choose to proceed, a blood or saliva sample will be taken during your visit. Please note that health insurance may cover most, if not all, of the cost of genetic testing on a case-by-case basis.

#### **Where Can I Find More Information?**

*Us TOO* serves as a resource of volunteers with peer-to-peer support and educational materials to help men and their families/caregivers make informed decisions about prostate cancer detected, treatment options, and related side effects. Visit [www.ustoo.org](http://www.ustoo.org).

Cancer Net offers oncologist-approved cancer information from the American Society of Clinical Oncology. Visit [www.cancer.net/cancer-types/prostate-cancer](http://www.cancer.net/cancer-types/prostate-cancer).

National Cancer Institute website has valuable cancer related health information on more than 200 cancer types, clinical trials, cancer statistics, prevention, screening, risk factors, genetics, and support resources. Information is available in Spanish. Visit [www.cancer.gov](http://www.cancer.gov).

American Cancer Society (ACS) is a voluntary national health organization that supports research, provides information about cancer, and offers many programs and services to patients and their families. Information is available in Spanish. Visit [www.cancer.org](http://www.cancer.org).

Genetic Alliance, Inc., supports individuals with genetic conditions and their families, educates the public, and advocates for consumer-informed public policies. This site provides information on genetic policy, research, and a helpline for people with genetic questions. Visit [www.geneticalliance.org](http://www.geneticalliance.org).