

Cancer Genetics

Cells are the basic units of life and are the building blocks for every part of our body. Genes are pieces of information within cells. Genes tell cells how to grow, divide and make more cells. The body makes new and healthy cells on a continuous cycle. New cells are made as old cells die.

Cancer is caused when genes change (mutate) and tell cells to grow in an abnormal way. Gene changes can happen for different reasons. Sometimes, cancer is caused by a gene change (mutation) that is passed down in families.

Cancers may be considered sporadic, familial, or hereditary (inherited)

- **Sporadic Cancer**

Most cancers are sporadic. In these cancers, the gene change that caused the cancer is not inherited and cannot be passed from a parent to their child. The risk for sporadic cancer increases with age. Environment, lifestyle, and medical factors influence the risk for sporadic cancer. Because cancer is common, it is possible for a family to have more than one family member develop cancer by chance.

- **Familial Cancer**

Cancers may occur in more than one member of the same family, but the gene change that causes the cancer is not due to an inherited change in one gene. These cancers are not hereditary. They are familial. They may be the result of multiple influences including combinations of genes, lifestyle, and environment. It is not possible to find the exact causes of familial cancers. We usually do not recommend genetic testing for patients with familial cancer.

- **Hereditary Cancer**

Hereditary cancers are rare. Only 5 to 10% of cancers are directly inherited. These cancers are caused by a gene change that is inherited (passed down in a family). Affected family members have the same gene change in their cells. The gene change is present in every cell of the body from birth. The change is usually passed from a parent to their child. Because of this, there is often a pattern of cancer on one side of the family.

Hereditary cancers are different from sporadic cancers. Sometimes there are patterns in families who have hereditary cancers. These patterns can include:

Mark applicable:

- Diagnosis at a younger age than sporadic cancers (often younger than age 50).
- Family members have the same or related types of cancer.
- Cancer that develops in more than one site on the body (i.e., prostate cancer that metastasizes, bilateral breast cancer, etc.)
- Rare cancers may occur (such as male breast cancer, pancreatic cancer, or ovarian cancer).

Genetic Testing for Hereditary Cancer

Genetic testing is a special blood test that can help determine if an inherited gene change is causing cancer in a family. Genetic testing is most often recommended for people who have already had cancer, but may also be recommended if an individual has not had cancer but has a strong family history of cancer.

If an Inherited Gene Change is Found

- It can predict if that person has a higher risk to develop a specific type of cancer.
- Often there are cancer screenings or surgeries that your doctor may recommend to help reduce cancer risk.
- Other family members could have the same gene change (including children and siblings)
 - Genetic testing on pregnancies for *most* inherited cancer predisposition mutations is heavily discouraged and would not be performed at Wilmington Maternal-Fetal Medicine. Speak with one of our prenatal genetic counselors at (910) 332-3660 for additional information on this topic.

Your health care team can talk with you about genetic testing, cancer screening and prevention services for families with a hereditary cancer.

What should I Consider Before Testing?

Legal protections are in place to prevent genetic discrimination, which would occur if health insurance companies or employers were to treat people differently because they have a gene mutation that increases their risk of a disease such as cancer or because they have a strong family history of a disease such as cancer.

In 2008, the Genetic Information Nondiscrimination Act (GINA) became federal law for all U.S. residents. GINA prohibits discrimination based on genetic information in determining health insurance eligibility or rates and suitability for employment. **However**, GINA does not cover members of the military, and it does not apply to life insurance, disability insurance, or long-term care insurance. Some states have additional genetic nondiscrimination legislation that addresses the possibility of discrimination in those contexts.

Additionally, for some individuals, knowing of a genetic predisposition to cancer formation may be alarming, stressful, and difficult to cope with. It is important for every person to consider what this information would mean for them and their families prior to making the decision to test.

Interested in Genetic Testing?

Genetic counselors can help you understand how your family history and DNA influence your health. Find a cancer genetic counselor near you by going to the National Society of Genetic Counselor's "Find a Genetic Counselor" tool at <https://findageneticcounselor.nsgc.org/>.