

The Hereditary Cancer Program at Michigan State University is dedicated to providing genetic counseling and education to individuals with a significant family history of cancer. Our clinic is staffed by a medical geneticist and genetic counselors, who have specialized training in cancer genetics.

The initial genetic counseling session includes:

- Extensive review of the family history
- Personalized risk assessment
- Education about genetics and hereditary cancer syndromes
- Discussion of available screening and management options
- Explanation of genetic testing
- Creation of an appropriate testing strategy and/or management plan



It is recommended that everyone considering cancer genetic testing undergo genetic counseling prior to testing. The decision to undergo genetic testing for cancer predisposition is an important one, with results affecting both patients and their families. We assist individuals in their decision making process by reviewing the pros and cons of testing in detail.

Genetic testing can be coordinated for those who are interested in pursuing this option, with a follow-up results session to discuss results and their implications.

What is hereditary cancer?

While most cancer is considered sporadic, a small percentage of cancer is hereditary. With hereditary cancers, a gene is passed through the family that increases the risk of developing certain

types of cancer. Not everyone who has one of these genes will develop cancer. However, they may still pass on this gene to their children. Therefore, cancer can appear to skip generations in a family.

How do I know if the cancer in a family is hereditary?

The MSU genetics team reviews each family history to determine the likelihood that a family has a hereditary cancer syndrome.

Some clues that a cancer is hereditary include:

- Multiple relatives with the same type of cancer or related cancers
- Cancer diagnosed at an earlier than normal age
- An individual with two primary cancers or bilateral cancer
- Rare/unusual cancers

In most cases, genetic testing is the only way to say with certainty that a family has a hereditary cancer syndrome.

What cancers are hereditary?

Any type of cancer can be hereditary. The most commonly recognized hereditary cancer syndromes involve breast, ovarian, and colon cancer. Other rare cancer syndromes can also involve these common cancers. Therefore, it is important for the genetics team to review each family history to determine the most appropriate testing. If you are concerned about a family history, please contact us for more information.

Many hereditary cancer syndromes greatly increase the chance of developing cancer. Some hereditary cancer syndromes involve an increased risk for several different cancers, while others only increase the risk for one specific cancer. If a person is found to have a hereditary cancer syndrome, they should be have increased cancer screening, and may wish to take steps to further reduce their cancer risk.

Breast and Ovarian Cancer

Approximately 1 in 8 or 12% of women will be diagnosed with breast cancer in their lifetime. Ovarian cancer is less common, affecting 1 in 40 or 1.5% of women. Most breast and ovarian cancer is sporadic. However, 7% of breast cancer and 10% of ovarian cancer is hereditary.

Two genes, called *BRCA1* and *BRCA2*, account for 85% of hereditary breast and ovarian cancer. These genes cause an increased risk of developing breast, ovarian and other cancers in both men and women.

Genetic testing is available to determine if individuals from high-risk families have one of these altered genes. People who test positive should have increased screening for cancer. Women who test positive can also consider options that can reduce their risk of ever getting cancer, including medications or surgery.



Mary's grandmother was diagnosed with breast cancer when she was 42. Her aunt died of ovarian cancer in her 50's. When Mary was recently diagnosed with breast cancer, she wondered if there could be a genetic cause for the cancer in her family.

Her doctor referred her for genetic counseling. After discussing her options, Mary decided to pursue genetic testing. A genetic mutation was discovered that increases Mary's risk to develop cancer. Since discovering the mutation, Mary has chosen to have her ovaries removed to reduce the chance of developing cancer.

Mary's daughter, who is 24 years old and at 50% risk of having inherited the genetic mutation from her mother is now considering genetic testing to see if she also has this mutation.

Colon cancer

Approximately 5% of colon cancer is thought to be hereditary. There are common two types of hereditary colon cancer:

- **FAP** (Familial Adenomatous Polyposis)- characterized by 100s to 1000s of polyps (growths) in the colon and rectum. Without treatment, the polyps usually develop into cancer at a young age (usually by age 50). Individuals with FAP may also have desmoids and upper GI tract polyps, which have the potential to become malignant. Genetic testing and colon screening is recommended for children at 50% risk of FAP, beginning at age 10 to 12.
- **HNPCC** (Hereditary Non-Polyposis Colorectal Cancer)- characterized by early-onset colon cancer, as well as an increased risk for other cancers, including endometrial (uterine), stomach and skin cancer. Although termed 'Non-Polyposis', individuals with HNPCC may also have a small number of colon polyps.

Genetic testing can detect the majority of individuals with hereditary colon cancer. Test results may be used to determine appropriate screening and surgical options.

Andrew had always been worried about colon cancer, even at the age of 32, because his father had died of colon cancer at a young age, and he knew that his grandmother and aunt had also had colon cancer. Recently, Andrew's aunt told him that she had undergone genetic testing for hereditary colon cancer and was found to have a mutation.



Andrew came to the Hereditary Cancer Clinic, and decided that he wanted to know if he had this mutation and was at increased risk of colon cancer. Andrew had genetic testing, with negative results. Andrew was very relieved, as his risk of developing colon cancer is no longer considered to be higher than the general population. He was also happy knowing that he could not have passed this cancer risk onto his children.

Who can have genetic testing?

Genetic testing is only offered to individuals who are determined to have a high-risk personal or family cancer history. This testing is not available to the general population. The Hereditary Cancer Clinic will review each patient's history to determine if testing is appropriate. This testing is typically only offered to individuals over the age of 18 (with the exception of FAP and rare cancer syndromes that may testing).

What are the pros and cons of genetic testing?

Genetic testing may provide more accurate information about an individual's risk of cancer. Genetic testing can raise or lower a person's cancer risk. This information may be beneficial for planning medical management and cancer screening, making life planning decisions, and relieving uncertainty.

Genetic testing will not find a mutation in all families that are thought to have a hereditary cancer syndrome. Therefore, genetic testing is not useful for everyone. Sometimes, these families will participate in research studies

Some people have concerns about the effect of genetic testing on their insurance. At this time, there are both federal and state laws that protect people from health insurance discrimination. Others are concerned about how this will make themselves and their family members feel. These issues can be discussed in detail during the genetic counseling session.

If you would like more information regarding the MSU Hereditary Cancer Program, please call us at (517) 355-1297.

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HEREDITARY CANCER PROGRAM

*A Guide for
Patients &
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