Understanding Family Cancer Syndromes

When a gene change that greatly increases cancer risk runs in a family, it is often referred to as a **family cancer syndrome**. Other terms that you might hear include **inherited cancer syndrome** or **genetic cancer syndrome**.

Is cancer inherited?

It's important to understand that not every cancer that seems to run in a family is caused by a family cancer syndrome. About 1 in 3 people in the United States will develop cancer during their lifetime, so it’s not uncommon to have many cancers in a family. Sometimes, cancer might be more common in certain families because family members share certain behaviors or exposures that increase cancer risk, such as smoking, or because of other factors that can run in some families, like obesity.

But cancer can sometimes be caused by an abnormal gene that is passed from generation to generation. Although these cancers are often referred to as **inherited**cancers, what is actually inherited is the abnormal gene that can lead to cancer, not the cancer itself. Only about 5% to 10% of all cancers are known to be strongly linked to gene defects (called **mutations**) inherited from a parent.

To learn about the role of genes and how mutations can lead to cancer, see Genes and Cancer[1].

How do you recognize an inherited or family cancer syndrome?

Certain things make it more likely that cancers in a family are caused by a family cancer syndrome, such as:

- Many cases of the same type of cancer (especially if it is an uncommon or rare type of cancer)
- Cancers occurring at younger ages than usual (like colon cancer in a 20-year-old)
- More than one type of cancer in a single person (like a woman with both breast and ovarian cancer)
- Cancers occurring in both of a pair of organs (like both eyes, both kidneys, or both breasts)
- More than one childhood cancer[2] in siblings (like sarcoma in both a brother and a sister)
- Cancer occurring in the sex not usually affected (like breast cancer in a man)
- Cancer occurring in many generations (like in a grandfather, father, and son)

When trying to determine if cancer might run in your family, first collect some information. For each case of cancer, look at:

- Who has the cancer? How are you related? Which side of the family are they on (mother's or father's)?
- What type of cancer is it? Is it rare?
- How old was this relative when they were diagnosed?
- Did this person get more than one type of cancer?
- Did they have any known risk factors for their type of cancer (such as smoking for lung cancer)?
- Has anyone in the family with or without cancer had genetic testing, and did that testing show any abnormal genes?

Cancer in a close relative, like a parent or sibling (brother or sister), is more likely to be a cause for concern for you than cancer in a more distant relative. Even if the cancer in a distant relative was from a gene mutation, the chance of the abnormal gene being passed on to you is less likely than with a closer relative.

It's also important to look at each side of the family separately. **Having 2 relatives with cancer is more concerning if they are on the same side of the family.** For example, it's more concerning if both relatives are your mother's brothers (because they share some of the same genes) than if one was your father's brother and the other was your

mother's brother.

The type of cancer matters, too. **It is more concerning if many relatives have the same type of cancer than if they have several different kinds of cancer.** Still, in some family cancer syndromes, there's an increased risk of different types of cancer. For example, the risk of breast cancer and ovarian cancer is increased (as well as some other cancers) in families with inherited breast and ovarian cancer syndrome. Colon and endometrial cancer risk are increased in Lynch syndrome (also known as hereditary non-polyposis colorectal cancer, or HNPCC).

Likewise, **more than one case of the same rare cancer is more worrisome than cases of a more common cancer.** For some rare cancers, the risk of a family cancer syndrome is relatively high with even one case.

The age of the person when the cancer was diagnosed is also important. For example, colon cancer is rare in people younger than 30. Having close relatives under 30 with colon cancer could be a sign of a family cancer syndrome. On the other hand, prostate cancer is very common in elderly men, so if both your father and his brother were found to have prostate cancer when they were in their 80s, it is less likely to be due to an inherited cancer syndrome.

Certain kinds of benign (not cancer) tumors and medical conditions are sometimes also part of a family cancer syndrome. For example, people with the multiple endocrine neoplasia, type II syndrome (MEN II) have a high risk of a certain type of thyroid cancer. They also may develop benign tumors of the parathyroid glands and can also get tumors in the adrenal glands called pheochromocytomas, which are usually benign.

When many relatives have the same type of cancer, it's important to note if the cancer could be related to a risk factor like smoking. For example, lung cancer is commonly caused by smoking, so having several cases of lung cancer in a family of people who all smoke is more likely to be due to smoking than to an inherited or family cancer syndrome.

Genetic counseling and testing

People with a strong family history of cancer may want to learn more about their genes. This may help the person or other family members plan their health care for the future. Since inherited mutations affect all cells of a person's body, they can often be found by genetic testing done on blood or saliva (spit) samples. Still, genetic testing is not helpful for everyone, so it's important to speak with a genetic counselor first to find out if testing

might be right for you. For more information, see Understanding Genetic Testing for Cancer[3].

Hyperlinks

1. www.cancer.org/cancer/understanding-cancer/genes-and-cancer.html
2. www.cancer.org/cancer/types/cancer-in-children.html
3. www.cancer.org/cancer/risk-prevention/genetics/genetic-testing-for-cancer-risk/understanding-genetic-testing-for-cancer.html
4. www.nsgc.org

Additional resources

Along with the American Cancer Society, other sources of information and support include:

Hall MJ and Neumann CC. Lynch syndrome (hereditary nonpolyposis colorectal cancer): Clinical manifestations and diagnosis. In Grover S, ed. UpToDate. Waltham, Mass.: UpToDate, 2022. https://www.uptodate.com. Last updated November 20, 2020. Accessed January 27, 2022.

Hisada M, Garber JE, Fung CY, Fraumeni JF Jr, Li FP. Multiple primary cancers in families with Li-Fraumeni syndrome. J Natl Cancer Inst. 1998;90:606-611.

McGee RB, Nichols KE. Introduction to cancer genetic susceptibility syndromes. Hematology Am Soc Hematol Educ Program. 2016;2016(1):293-301. doi:10.1182/asheducation-2016.1.293.

MedlinePlus. National Library of Medicine (US). Multiple endocrine neoplasia (MEN) II. 2014. Accessed at www.nlm.nih.gov/medlineplus/ency/article/000399.htm on January 26, 2022.

National Cancer Institute. Genetic Testing for Inherited Cancer Susceptibility Syndromes. 2019. Accessed at www.cancer.gov/about-cancer/causes-prevention/genetics/genetic-testing-fact-sheet on January 26, 2022.

National Cancer Institute. Physician Data Query (PDQ). Cancer Genetics Overview – Health Professional Version. 2021. Accessed at www.cancer.gov/about-cancer/causes-prevention/genetics/overview-pdq on January 26, 2022.

National Cancer Institute. Physician Data Query (PDQ). Genetics of Breast and Gynecologic Cancers – Health Professional Version. 2021. Accessed at www.cancer.gov/types/breast/hp/breast-ovarian-genetics-pdq on January 26, 2022.

National Cancer Institute. Physician Data Query (PDQ). Genetics of Colorectal Cancer – Health Professional Version. 2021. Accessed at www.cancer.gov/types/colorectal/hp/colorectal-genetics-pdq#_72 on January 26, 2022.

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