

**Circle Of Life<sup>SM</sup>: Cancer Education and Wellness for American Indian and Alaska Native Communities**



**American Cancer Society Circle Of Life<sup>SM</sup>**  
*Cancer Education and Wellness for American Indian and Alaska Native Communities*

**Wellness Along the Cancer Journey:  
Healthy Habits and Cancer Screening**  
Revised October 2015  
**Chapter 6: Family History and Genetics**



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**Family History and Genetics**

Group Discussion		True	False	Not Sure
1.	Only about 5%-10% of cancers are linked to inherited factors.			
2.	If a close relative has had cancer, it is not really important to tell a health care provider.			

Cancer is such a common disease that many families have at least a few members who have had cancer. Sometimes, certain types of cancer seem to run in families. This can be caused by a number of factors. Often, family members have certain risk factors in common, such as smoking, which can cause many types of cancer. But in some cases the cancer is caused by an abnormal gene that is being passed along from generation to generation. Although this is often referred to as *inherited* cancer, the abnormal gene is inherited, not the cancer itself. Only about 5% to 10% of all cancers start with an inherited gene.

**Genes and Their Relation to Getting Cancer**

Cancer is a disease of abnormal gene function. Genes are pieces of DNA (deoxyribonucleic acid). They contain the instructions on how to make the proteins the body needs to function. They decide when to destroy damaged cells, and how to keep the cells in balance. Genes control things such as hair color, eye color, and height. They also can affect a person’s chance of getting certain diseases, such as cancer.

Gene mutations – when a gene’s function changes from normal to abnormal – can be caused by all sorts of things. It can be things we are exposed to, such as cigarette smoke, radiation, hormones, and diet. As we get older, more gene mutations build up, which leads to a higher risk of cancer.

Some gene mutations that are inherited from our parents makes it easier (and quicker) for enough mutations to build up for a cell to become cancer. That is why cancers based on inherited genes tend to show up earlier in life than cancers of the same type that are not related to inheritance.

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### **How Does a Person Find Out if Cancer Is Inherited?**

When many cases of cancer occur in a family, most of the time it's due to chance or because family members have been exposed to the same toxin, such as cigarette smoke. Less often, these cancers may be caused by inheriting an abnormal gene. Certain things make it more likely that such a gene is causing cancers in a family, such as:

- Many cases of a rare type of cancer (like kidney cancer).
- Cancers that are found at younger ages than usual (like colon cancer in a 20 year old).
- More than one type of cancer in a one person (like a woman with breast cancer and ovarian cancer).
- Cancers that start in both of a paired organ (both eyes, both kidneys, both breasts).
- More than one childhood cancer in a set of siblings (like sarcoma in a brother and his sister).

Cancer in a close relative, like a parent, brother, sister, or child, is more cause for concern than cancer in a more distant relative. Even if the cancer was from a gene mutation, the chance of someone inheriting the mutation is lower with more distant relatives. Before a person decides that cancer runs in their family, there are some questions to think over:

### ***How Am I Related to the Person with Cancer?***

It is important to look at each side of the family separately. A genetic link is more likely if a person with two relatives who have cancer are related to each other – meaning that they are both on the same side of the family. For example, if a person's mother has 2 brothers with cancer, it means more than if one was the father's brother and the other was the mother's brother.

### ***What Type of Cancer Is it?***

The type of cancer matters, too. More than one case of the same rare cancer is more of a concern than cases of a common cancer. And having the same type of cancer in many relatives is more likely to have a genetic link than if they have different kinds of cancer.

Still, in some family cancer syndromes, a few types of cancer seem to go together. For example, breast cancer and ovarian cancer run together in families with hereditary breast and ovarian cancer syndrome (HBOC). Colon and uterine

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cancers tend to go together in a syndrome called hereditary non-polyposis colorectal cancer (HNPCC).

### ***How Old Was my Family Member?***

The age of the person when the cancer was found is important. For example, colon cancer is rare in people under 30. Having two or more cases of cancer in close relatives under 30 could be a sign of a gene syndrome. On the other hand, prostate cancer is very common in elderly men. That means that if both a person's father and his brother were found to have prostate cancer when they were in their 80's, it is less likely to be a gene problem.

### ***Did my Family Member Use Tobacco?***

When many relatives have the same type of cancer it is important to notice if the cancer could be related to smoking outside of ceremonial uses. For instance, lung cancer is often caused by habitual smoking. Many cases of lung cancer in a family of heavy smokers is more likely to be due to smoking than to a gene problem.

### ***How Can I Find Out About Inherited Abnormal Gene?***

People with a lot of cancer in their families or a person with more than one type of cancer may want to find out about their genetic makeup. This knowledge may help the person or other family members in planning health care for the future. Since inherited gene changes affect all cells of a person's body, they can often be found by genetic testing that uses blood samples. Genetic counseling is the first step a health care provider may recommend for a person who wants to know more. It is important to be informed before choosing to get genetic testing.

### **Types of Cancer Linked to Cancer in the Family**

The following types of cancer may be linked to an abnormal gene:

***Breast Cancer:*** Many women are concerned that breast cancer seems to run in their family. A woman who has a mother, sister, or daughter with breast cancer is about twice as likely to develop breast cancer as a woman without this cancer in her family. Still, most cases of breast cancer, even those in close relatives, are not part of a family cancer syndrome caused by an inherited gene mutation.

Women with a strong family history of breast cancer may choose to get genetic counseling to estimate their risk for inherited breast cancer. They then can choose to be tested to find out if they have a breast cancer gene mutation. If a mutation is present, the woman has a high chance (or risk) of breast cancer. She

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may start getting mammograms at a younger age, and have extra breast cancer screening tests such as MRI. She may take other measures to find cancer earlier and reduce her chance or risk of getting breast cancer. And she may want to share her results with other family members. They may want to be tested too.

***Colon Cancer:*** An important cause of hereditary colon cancer among adults is a disease called familial adenomatous polyposis (FAP). People with this disease start getting colon polyps by their teens, and over time may have hundreds of polyps in their colon. If left alone, at least one of these polyps is very likely to become cancer. The gene for this syndrome is called APC, and a person can be tested for mutations in it. If FAP is found early in life, surgery to remove the colon can keep the colon cancers from developing.

Another major inherited syndrome that raises a person's risk for colon cancer is called hereditary non-polyposis colorectal cancer (HNPCC). People with this syndrome have a high risk of colon and rectal cancer. Most of these cancers are found before age 50. HNPCC can also cause uterine cancer (cancer in the lining of the uterus, called the endometrium) in women. A person with HNPCC needs to start screening for colon cancer in their 20's rather than waiting until age 50.

***Childhood Cancers:*** Like adult cancers, most childhood cancers are not inherited. They are caused by mutations that started during the child's life. Some of these gene changes may even have occurred before the child was born (while still in the womb). A few types of childhood cancer are known to occur more often in some families. Some of these are due to hereditary cancer syndromes.

***Retinoblastoma:*** This is a childhood cancer that starts in the eye. It can be caused by an inherited gene mutation. Even if the child inherited only one of the pair of chromosomes or genes for retinoblastoma, he or she is likely to have the disease.

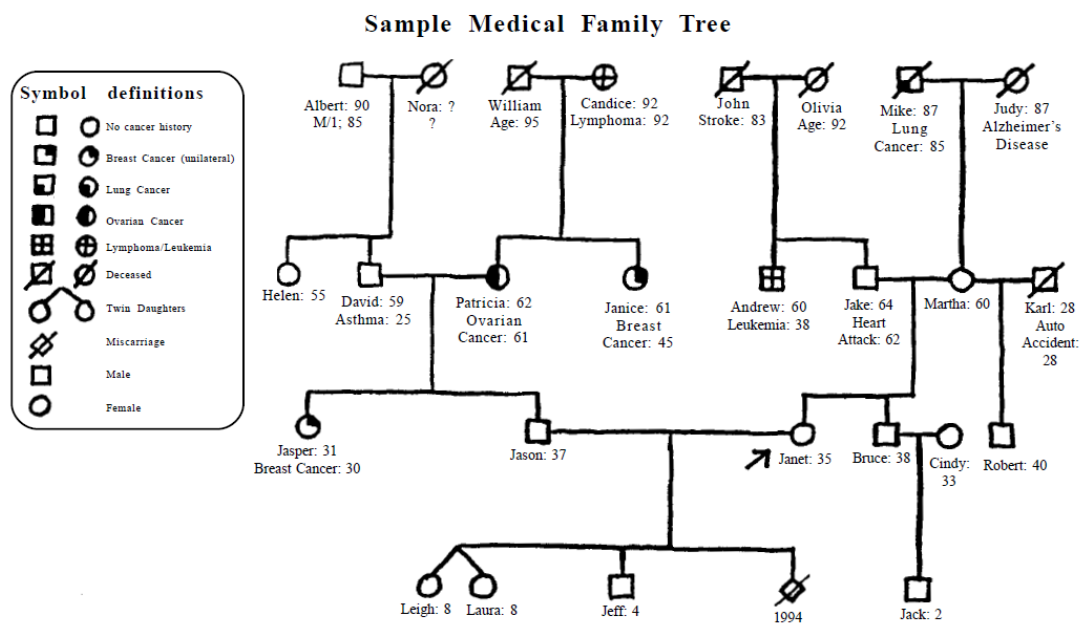
***Li-Fraumeni Syndrome:*** This syndrome occurs when a person inherits a mutation in the p53 gene. People with this abnormal gene have a higher risk of childhood sarcoma, leukemia, and brain (central nervous system) cancers. Li-Fraumeni syndrome can also cause cancers of the breast and adrenal glands.

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### **Activity**

Finding out about and writing up your cancer family tree can be one way to learn more about your chances of having inherited a higher risk for cancer.

### **Example**



(Dresbach, S.H., et al., (1997) Decisions for Health: Family History and Cancer. Columbus, OH: Ohio State University Extension.)

Follow these instructions to create your own family tree:

- Draw a square for each male and a circle for each female.
- If a couple is married, draw a horizontal line between them.
- If a couple has children, draw a vertical line. Add a horizontal line below, and enter the symbols for each child, listing the children in order of birth with the oldest to the left (see drawing above). Be sure to list all siblings, including those miscarried or stillborn.
- Continue by entering extended family members. Remember to keep all members of the same generation on the same row.
- To make a family's tree clearer, be sure to note things such as divorces, half- or step-siblings, or children who entered or left the family through adoption.

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- For reference, assign each person on the chart a number. This can be used to track everyone by name. It can also help keep up with any numbers on their health history form and medical chart (if one is available).

Next, add markings to highlight important health information:

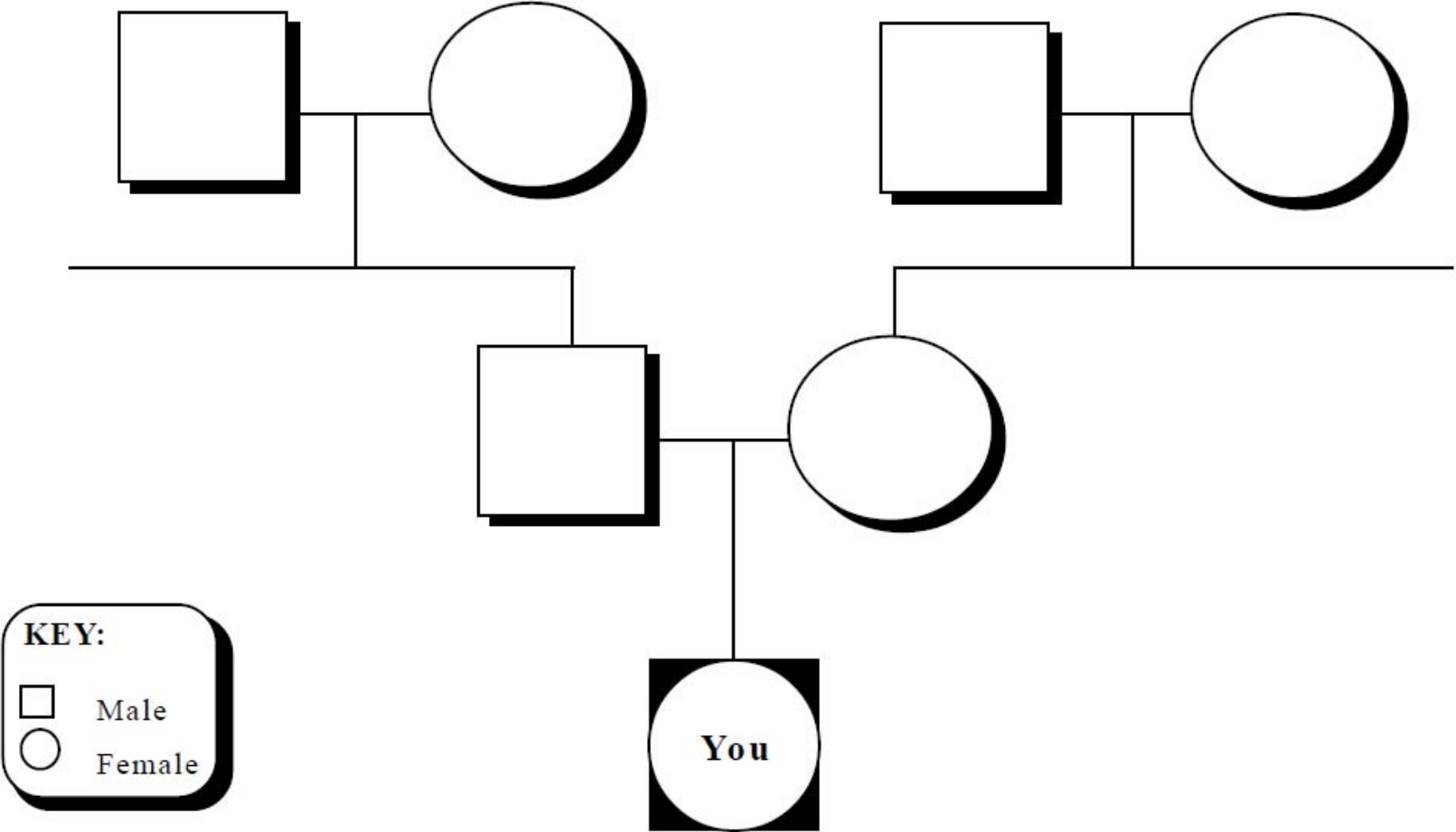
- For those still living, list the date of birth and make a note of any health conditions they know about.
- Put a slash through the square or circle to show that a person is deceased. Make a note listing the cause and age of death.

Finally, you can use a coding system to help track health concerns that show up a lot. Some suggest using color. For instance, use red to mark the symbol for all persons with heart conditions, and blue to mark all people diagnosed with cancer. (Be sure to include a “key” at the bottom of your chart to explain what each color means!)

**Activity**

Add any other known medical conditions to the chart below. Put in your brothers, sisters, and children, if you have any. You can go back later to add aunts and uncles if you can find out about them.

**Your Family Cancer History**





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**Key Messages**

- Only about 5 - 10% of cancers are linked to inherited genetics.
- It is important for people to know about cancer in their families. If a person has concerns about their cancer risk, they should talk with their health care provider.
- Women with a strong family history of breast cancer may ask about genetic counseling to learn more about their risk for inherited breast cancer.
- Make healthy lifestyle choices to limit the risk of cancer. Help family members to make healthy choices too.