



## Fact Sheet

# CHEK2 Mutations

Brought to you by the *National Society of Genetic Counselors, Cancer Special Interest Group*

## What you should know about *CHEK2* Mutations

Individuals with a *CHEK2* mutation are at an increased risk to develop breast cancer, colon cancer, prostate cancer and possibly thyroid and kidney cancer. Our knowledge of *CHEK2* and the related cancer risks primarily comes from data on one specific mutation seen predominantly in individuals with Northern European ancestry.

## Cancer Risks and Features Associated with *CHEK2* Mutations

Cancer risks associated with *CHEK2* mutations are largely based on family history. Cancer risks may be higher or lower based on family history and the specific *CHEK2* mutation.

Cancer Type	General Population Risk	<i>CHEK2</i> Mutation Risk
Female Breast Cancer	12.5%	28-37%
Male Breast Cancer	<1%	Increased
Colon Cancer	4-5%	Increased
Prostate Cancer	12%	Increased

Some studies have suggested an increased risk for other cancers such as thyroid cancer and kidney cancer. However, these risks are not clear, and more studies are needed to establish this association.

## Genetics and Inheritance of *CHEK2* Mutations

Genes are our body's instructions. They provide our body with information about how to grow and develop. When there is a mutation in a gene, it can cause the gene to no longer function correctly. Each person has two copies of every gene. One copy is inherited from their mother and the other copy is inherited from their father.

Cancer risks associated with *CHEK2* mutations are inherited in an autosomal dominant manner. This means that children, siblings, and parents of individuals with a *CHEK2* mutation have a 50% (1 in 2) chance of having the mutation as well. Both males and females can inherit a *CHEK2* mutation and can pass it on to their children.

Although many *CHEK2* mutations have been identified, estimated cancer risks are currently largely based on studies of a single mutation that is most common in individuals of European ancestry (c.1100del). Other variations of the *CHEK2* gene may be associated with lower cancer risks, also called low-penetrant variants (i.e. I157T). Additionally, other genes and non-genetic factors may interact with *CHEK2* mutations, so the *CHEK2* mutation may not be the only factor affecting cancer risks in the family. Given this, cancer risks and medical management recommendations are typically based off the family history.

## Managing Cancer Risks

The National Comprehensive Cancer Network (NCCN V1.2020) recommends the following surveillance.

- **Breast cancer:** For women, an annual mammogram beginning at age 40 (or earlier based on the family history) with consideration of annual breast MRI. There is insufficient evidence to support risk-reducing mastectomy based on having a *CHEK2* mutation alone. Management of breast cancer risk should be based on personal risk factors for cancer as well as family history of cancer.
- **Colon cancer:** Colonoscopy screening every 5 years beginning at age 40. If there is a family history of colon cancer, colonoscopies may begin 10 years before the age of onset in the affected family member.
- For other potential cancer risks, individuals are encouraged to speak with their physicians about recommended screening.

## Genetic Counseling

In many families, the cancer history may be due to a combination of genetic and environmental factors. In addition, other genetic conditions (i.e. other gene mutations) may appear to be clinically similar to *CHEK2* mutations. For this reason, a detailed review of the family history by a genetics professional is important before pursuing genetic testing. A genetic counselor can help determine which, if any, genetic tests may be helpful for a family and review the benefits, risks, and limitations of genetic testing. Genetic testing is usually performed through a blood or saliva sample.

Genetic test results can be complicated and are most useful when interpreted by a genetic professional in the context of an individual's complete personal and family history. To locate a genetic counselor near you, please visit [www.nsgc.org](http://www.nsgc.org) and click on the 'Find a Genetic Counselor' link.

## Genetic Discrimination

The Genetic Information Nondiscrimination Act (GINA) was signed into federal law in 2008. GINA prohibits health insurers and most employers from discriminating against individuals based on genetic information, including the results of genetic tests and family history information. According to GINA, health insurance companies cannot consider genetic information to be a preexisting condition, nor can they use it to make decisions regarding coverage or rates. GINA also makes it illegal for most employers to use genetic information in making decisions about hiring, firing, promotion, or terms of employment. It is important to note that GINA does not offer protections for life insurance, disability insurance, or long-term care insurance. More information about GINA can be found by contacting a local genetic counselor or by visiting [www.ginahelp.org](http://www.ginahelp.org).

## Resources

- Facing Our Risk Empowered (FORCE) – [www.facingourrisk.org](http://www.facingourrisk.org)
- Bright Pink – [www.brightpink.org](http://www.brightpink.org)

## References

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