riscover®
HEREDITARY CANCER

Result Navigator

Positive Test Result: *NF1*

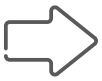
Positive test results identify a change, or "misspelling," of DNA that is known or predicted to cause an increased risk for cancer. DNA is the blueprint of life—it carries all of the genetic information needed for our bodies to function. A section of DNA with a specific job is called a gene. A pathogenic variant is a change in a gene that is known to cause increased risk for cancer. A likely pathogenic variant is a change in a gene that is very likely to cause increased risk for cancer.

After a positive test result, there can be many questions about what to do next.

This guide is a supplement to Riscover® Hereditary Cancer test results, helping patients and healthcare providers understand the results and together determine the best path forward.

Navigate Your Results

Learn | *page 2*
Review the test results along with this guide, and discuss the meaning of these results with your healthcare provider.



Plan | *page 3*
Develop a healthcare plan for early detection and prevention of specific cancers.

Share | *page 4*
Understand the risks for other family members, and consider how to inform relatives of their risks.

Connect | *page 5*
Reach out to medical experts and find local and national groups that can provide more information and support.

Glossary of Terms

Breast tomosynthesis: Advanced three-dimensional (3-D) breast imaging.

Gene: A section of DNA with a specific job.

MRI: An abbreviation for magnetic resonance imaging, a test that provides detailed pictures of a specific part of the body.

Neurofibroma: A small, benign (noncancerous) growth on or under the skin.

Ophthalmologist: A medical doctor who specializes in the eye.

Pathogenic: Causing or capable of causing disease.

Risk: The chance, or possibility, of developing a disease.

Variant: A change, or "misspelling," in the DNA sequence. Variants can be benign (not associated with disease), pathogenic (associated with disease), or of uncertain significance.

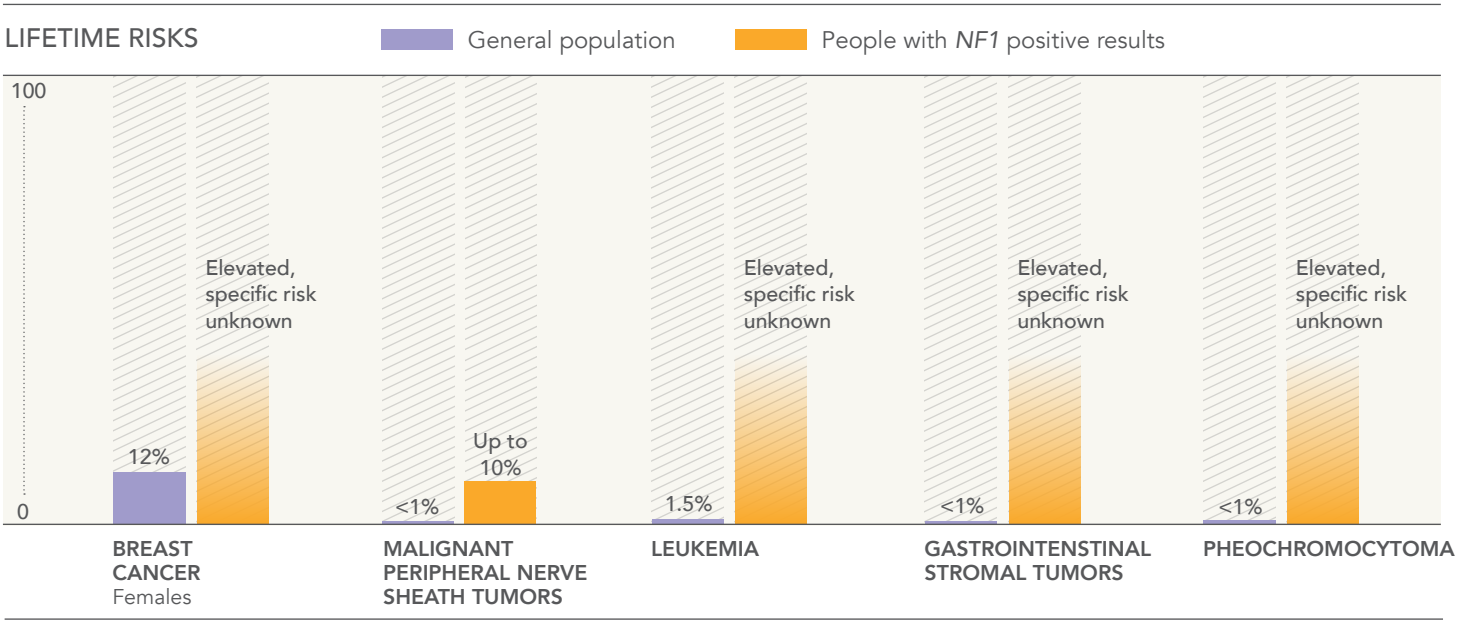
Your Diagnosis: Neurofibromatosis Type 1

Neurofibromatosis type 1 (NF1) is an inherited disorder caused by a pathogenic/likely pathogenic variant in the NF1 gene. NF1 is associated with the development of benign tumors and possible development of cancer. People with NF1 may be at increased risk for malignant peripheral nerve sheath tumors, gastrointestinal stromal tumors (GIST), breast cancer (up to age 50), leukemia, pheochromocytoma and possibly other tumors. Most people with NF1 have other clinical signs and symptoms unrelated to cancer, including: multiple café-au-lait macules (light brown marks on the skin), neurofibromas, freckling in the armpits and groin, optic glioma, Lisch nodules, and osseous (bone) lesions.

About 1 in 3,000 – 4,000 people in the general population have NF1. About half of people with NF1 have a family history consistent with the disorder, while the other half are the first in their family to be affected.

Your Risk

Not all people with positive test results will develop cancer, but the chance for cancer is higher than the general population risk. The graphs below show how much the risk for cancer increases when a pathogenic variant is found. At this time, there are no data to suggest an increased breast cancer risk after age 50. The cancer risks are presented in ranges based on multiple studies of families who have a pathogenic variant. There is not enough evidence available to give a specific risk to a person or family.



Your Screening and Management Options

Listed below are the intervention options that are recommended by medical experts for individuals who carry this cancer gene variant. Your healthcare provider can explain these options in more detail, and together you can make a plan for cancer prevention and/or early detection.

SIGNS AND SYMPTOMS OF NF1

Physical exam	Annual physical exam, which should include checking for long bone bowing, limb asymmetry, and head circumference is recommended beginning in early childhood. Consider a referral to a neurofibromatosis specialist for evaluation and management.
Skin evaluation	Annual skin evaluation to check for neurofibromas, café-au-lait macules, and other skin findings is recommended beginning in early childhood.
Spine evaluation	Annual spinal evaluation to check for scoliosis and neurofibromas is recommended beginning in early childhood.
Eye exam by ophthalmologist	Annual eye exam by an ophthalmologist to check for optic glioma, glaucoma, and Lisch nodules is recommended beginning in early childhood.
Blood pressure check	Annual blood pressure check to check for renal artery stenosis is recommended beginning in early childhood.
Developmental assessment	Annual developmental assessment by your healthcare provider is recommended beginning in early childhood.
Cardiovascular exam	Cardiovascular exam to check for congenital heart disease and pulmonary stenosis is recommended on a routine basis as determined by your healthcare provider, beginning in childhood.
System specific exam/referral to specialist (if symptoms)	Unusual symptoms are to be reported to your healthcare provider as they occur.

BREAST CANCER (FEMALES)

Breast self-exams	Periodic, consistent breast self-exams at the end of your period may be considered.
Clinical breast exam	Regular clinical breast exams performed by your healthcare provider are recommended.
Breast MRI	Consider an annual breast MRI between ages 30 – 50, or earlier based on your family history of breast cancer or specific pathogenic/likely pathogenic variant.
Mammogram	Annual mammograms with consideration for breast tomosynthesis are recommended starting at age 30 or earlier based on your family history of breast cancer or specific pathogenic/likely pathogenic variant.
Risk-reducing mastectomy	There is not enough evidence for risk-reducing mastectomy to be routinely recommended. Manage based on family history.

LEUKEMIA

No specific guidelines	Your healthcare provider can recommend screening options based on your personal and family history

GASTOINTESTINAL STROMAL TUMORS

No specific guidelines	Your healthcare provider can recommend screening options based on your personal and family history.

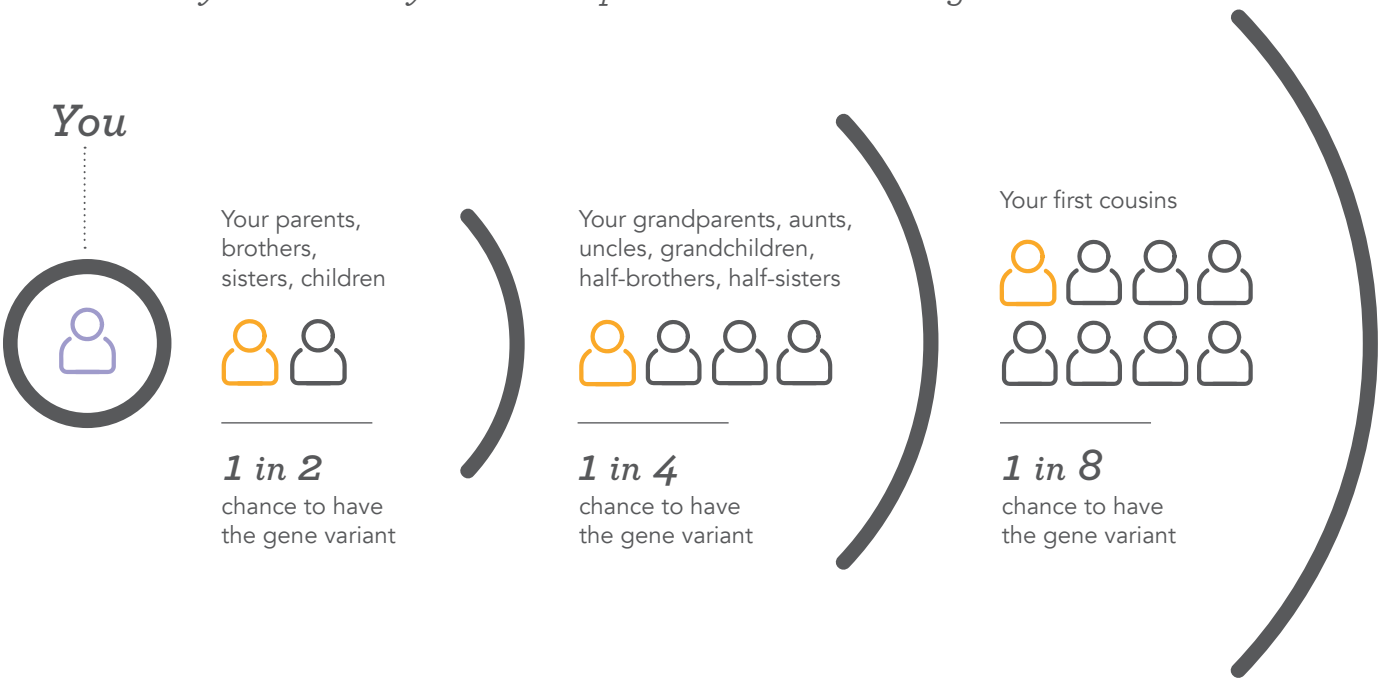
Your Family Matters

Cancer gene variants are inherited in an autosomal dominant manner. This means that when a parent tests positive, each child has a 1 in 2 chance to inherit the variant. Some people who inherit the variant will develop cancer, and some will not, but the risks are significantly increased compared to the average person. People in the same family may develop different types of cancers at varying ages, and the pattern of cancer and age of onset can differ from family to family.

Gene variants can be passed through families for many generations. When a gene variant is identified in one person in the family, relatives can be tested for just that variant. Sharing information about test results with family members is important, because it allows them to make informed choices about their healthcare and to decide whether they want genetic testing.

Some people who have pathogenic and likely pathogenic variants are interested in learning how to avoid passing these variants on to their children. If you are planning to have a child, you may wish to consult with a reproductive medicine specialist to discuss all of your reproductive options, including use of an egg or sperm donor, preimplantation genetic diagnosis, and prenatal genetic testing.

The likelihood for family members to carry the same gene variant depends on how closely related they are to the person with a known gene variant.



Your Expert Team

As you take your next steps, it can help to have a team of experts on your side. This team may include your primary care provider and a number of specialists who will help along the way.

If you haven't already done so, you may wish to speak with a genetic counselor. Genetic counselors are healthcare professionals with specialized training in medical genetics and counseling. They can help you understand your test results, discuss your healthcare plan, and connect to other resources in your area. Your healthcare provider may be able to provide a referral to a local genetic counselor. You can also find a genetic counselor through the National Society of Genetic Counselors at www.nsgc.org.

For questions about your test results, our genetic counseling team is available to help.
To reach a genetic counselor, call +1 855-293-2639 and select option 3.

Helpful Resources

GeneReviews
ncbi.nlm.nih.gov/books/NBK1109
A detailed clinical summary of NF1 written for healthcare providers.

National Comprehensive Cancer Network (NCCN)
nccn.org
Expert guidelines for cancer screening and treatment. Versions available for both providers and patients.

Facing Our Risk of Cancer Empowered (FORCE)
facingourrisk.org
A patient advocacy group whose mission is to improve the lives of individuals and families affected by hereditary breast, ovarian, and related cancers.

Children's Tumor Foundation
ctf.org
Organization dedicated to improving the health and well-being of individuals and families affected with NF.

REFERENCES

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