riscover®
HEREDITARY CANCER

Result Navigator

Positive Test Result: *MUTYH*-Associated Polyposis

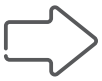
Positive test results identify a change, or "misspelling," of DNA that is known or predicted to cause an increased risk for cancer. DNA is the blueprint of life—it carries all of the genetic information needed for our bodies to function. A section of DNA with a specific job is called a gene. A pathogenic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

Colectomy: Surgery to remove the colon.

Colonoscopy: Visual exam of the inside of the colon with a flexible, lighted tube inserted through the rectum.

Endoscopy: Using an endoscope (a tube-shaped tool that includes a light, camera, and small tools to remove polyps or other tissues) to look in the body at the inside of organs such as the stomach or intestines.

Gene: A section of DNA with a specific job.

Pathogenic: Causing or capable of causing disease.

Polyp: An abnormal growth of cells that can become a cancer tumor.

Polyposis: The growth of a large number of polyps.

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: *MUTYH*-Associated Polyposis

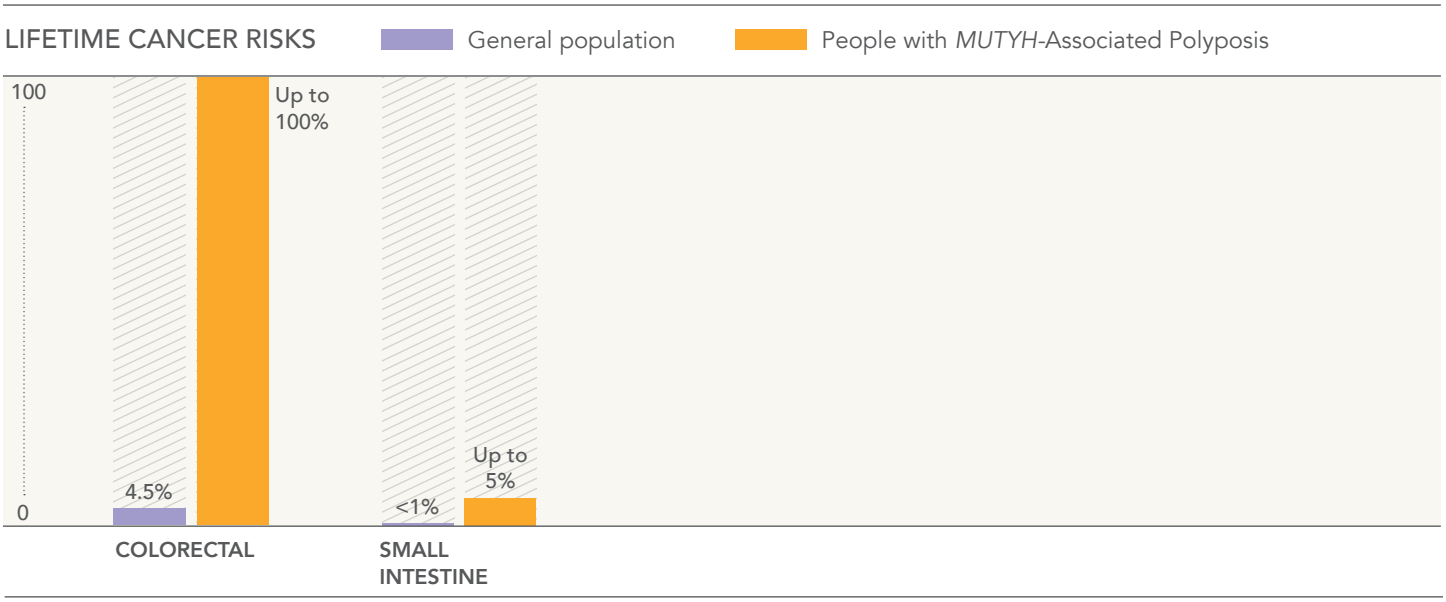
MUTYH-Associated Polyposis (MAP) is an inherited disorder caused by pathogenic/likely pathogenic variants in both copies of the *MUTYH* gene. MAP is associated with an increased lifetime risk of colorectal cancer, typically caused by multiple (10s – 100s) of colorectal polyps. People who have MAP are also at increased risk for small intestine cancer, stomach (gastric) cancer, and possibly other cancers (breast, ovarian, bladder, and endometrial), but further research is needed.

Some people with MAP have other clinical signs and symptoms. These include duodenal polyps, gastric fundic gland polyps, dental abnormalities (extra teeth, missing teeth or cysts), abnormalities on eye examination, thyroid disease, and other noncancerous growths, including skin cysts and fibromas.

About 1/40,000 – 1/200,000 people have MAP, and about 1 in 50 to 1 in 100 people are carriers.

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 pathogenic variants are found. The cancer risks are presented in ranges based on multiple studies of families who have pathogenic variants. 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 cancer gene variants. Your healthcare provider can explain these options in more detail, and together you can make a plan for cancer prevention and/or early detection.

COLORECTAL CANCER

Colonoscopy	A colonoscopy is recommended every 2 – 3 years, beginning between ages 25 – 30. Screening may start at younger ages based on your personal and family history. When polyps are present, screening frequency increases to every 1 – 2 years.
Colectomy	Your healthcare provider may recommend a colectomy if your polyp burden is too great.

SMALL INTESTINE AND STOMACH CANCERS/POLYPS

Upper endoscopy	Consider an upper endoscopy every 4 years beginning between the ages of 30 – 35 years. When polyps are present, screening frequency should increase depending on polyposis stage.

ALL CANCERS

Physical exam	An annual physical exam performed by your healthcare provider is recommended beginning at diagnosis.

Your Family Matters

MAP is inherited in an autosomal recessive manner, which means that both copies of the *MUTYH* gene have a pathogenic variant. This suggests that both of your parents are at least carriers, which means they have one normal gene and one gene with a *MUTYH* pathogenic variant. Carriers are not affected with MAP, but they can pass on the gene with the pathogenic variant to their children.

Typically, children of people with MAP are carriers of the condition. Carriers have a moderately increased risk for colorectal cancer (up to 12.5% lifetime risk) but do not have the other features of MAP.

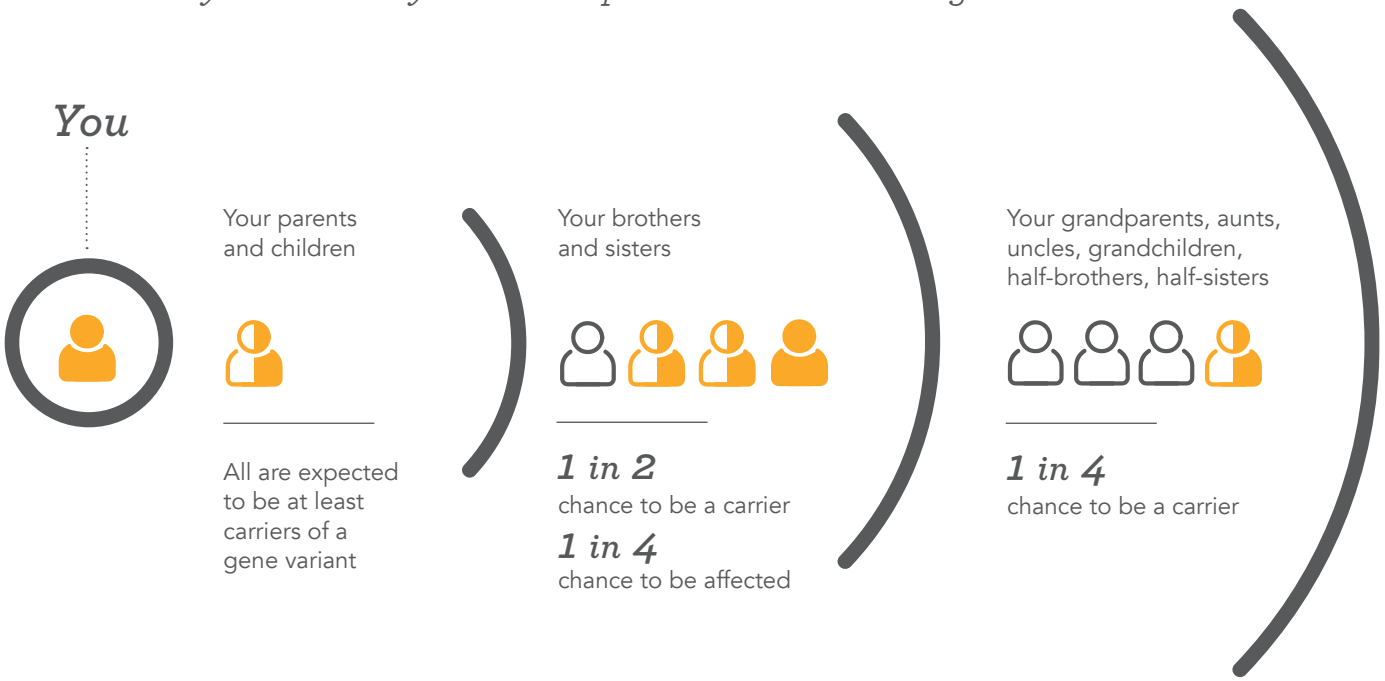
If your reproductive partner is a carrier of MAP, then there is a 1 in 2 (50%) chance for each child to have MAP, and a 1 in 2 (50%) chance for each child to be a carrier.

Some people who inherit variants will develop cancer, and some will not, but the risks are 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/NBK107219
A detailed clinical summary of MUTYH-Associated polyposis 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.

Hereditary Colon Cancer Takes Guts
hcctakesguts.org
A nonprofit organization serving the hereditary colorectal cancer community that includes resources for patients and healthcare providers.

REFERENCES

National Comprehensive Cancer Network. Genetic/Familial High-Risk Assessment: Colorectal (Version 1.2018). Available from: http://www.nccn.org/.

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