

# Hereditary Cancer Genetic Test Results

*This report is intended to facilitate a discussion between providers and their patients.*

## INFORMATION FOR INDIVIDUALS WITH A PATHOGENIC OR LIKELY PATHOGENIC VARIANT IN THE MAX GENE

### What this result means

Individuals who have a pathogenic or likely pathogenic variant (sometimes called a mutation) in the *MAX* gene have hereditary paraganglioma-pheochromocytoma (PGL-PCC) syndrome. Although many of these tumors are benign, they may cause serious health consequences. The chance of developing paragangliomas and pheochromocytomas is increased, but not everyone with a pathogenic or likely pathogenic variant will develop these tumors.\*

### Cancer risk

Information about cancer risks related to pathogenic variants in *MAX* is still emerging and is likely to change over time. Studies suggest the tumors associated with pathogenic variants in the *MAX* gene are seen primarily when the variant is inherited from an individual’s father. Patients should be encouraged to check in with their doctor or genetic counselor on a yearly basis so that any new information about this gene, such as associated risks and cancer screening recommendations, can be shared.

### Options for managing cancer risk

There are options for cancer prevention and early detection. The following are general guidelines for individuals who have a *MAX* pathogenic variant. These guidelines are evolving and are not specific to any one individual. Each individual’s gender, age, medical history, family history, quality of life goals, reproductive desires, general health status, and other medical information should be taken into account when developing a medical management plan.

	Considerations for cancer prevention/early detection	Age to begin	Frequency
<b>Paraganglioma/ Pheochromocytoma</b>	Check blood pressure	6-8 years	All visits
	Plasma free metanephrines or 24-hour urine for fractionated metanephrine	6-8 years	Annual and prior to any surgery
	Imaging with whole body MRI. Consider abdominal MRI, skull base and neck MRI, and chest CT if not available	6-8 years	Every 2 years
	Consider cortical-sparing adrenalectomy	—	—
<b>Other</b>	See Additional resources section below		

Source: National Comprehensive Cancer Network® Clinical Practice Guidelines in Oncology: Neuroendocrine and Adrenal Tumors. V4.2021. National Comprehensive Cancer Network Clinical Practice Guidelines in Oncology: Kidney Cancer. V4.2022. [www.NCCN.org](http://www.NCCN.org)

\*Data on file. Quest Diagnostics, 2022.

## What this result means for family members

Family members may have the same *MAX* variant that was identified in this individual. Parents, brothers, sisters, and children may each have a 50% chance of having the same variant. Other blood relatives also have an increased risk for the variant. It is important to share these test results with family members to allow each of them to decide if they want to be tested. Some family members may only need testing for this one *MAX* variant, while other relatives may need a more comprehensive test with multiple genes. A genetic counselor or other healthcare provider can help determine the most appropriate testing options.

## Reproductive information

Individuals interested in family planning should speak to their doctor and/or genetic counselor to discuss reproductive options. This may include discussion of prenatal diagnosis or pre-implantation genetic testing.

### Risk assessment and counseling: an important first step

A genetic counselor or other qualified healthcare professional can help explain test results and what they mean for a patient and family members. A team of specialized Quest genetic counselors or clinical geneticists are available to speak with healthcare providers about test results by calling 1.866.GENE.INFO (1.866.436.3463). Patients can access a directory of independent genetic counselors at [FindAGeneticCounselor.com](https://www.findageneticcounselor.com).





## Creating a plan: a checklist for patients

- Get a copy of your genetic test results.
- Talk with your healthcare provider about what this result means and the things you can do to manage your risk.
- Ask your healthcare provider if additional genetic testing may benefit you.
- Share your test results with your family members and give them a copy. Their healthcare provider will need this information in order to provide them with the most accurate risk assessment.
- Talk with your healthcare provider regularly so that you know about any important changes in genetic testing and cancer screening options. Be sure to let them know of any changes in your family history, including family members' genetic test results.
- Consider talking to a genetic counselor about your results.

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## Research opportunities

Prospective Registry of MultiPlex Testing (PROMPT) [PromptStudy.info](http://PromptStudy.info)

GenomeConnect: The ClinGen Patient Portal  
[GenomeConnect.org](http://GenomeConnect.org)

## Additional resources

National Comprehensive Cancer Network  
Clinical Practice Guidelines in Oncology  
(NCCN Guidelines®): Neuroendocrine  
and Adrenal Tumors [NCCN.org](http://NCCN.org)

Endocrine Society Clinical Practice Guidelines  
[endocrine.org/clinical-practice-guidelines](http://endocrine.org/clinical-practice-guidelines)

Pheo Para Alliance  
[pheopara.org](http://pheopara.org)

Quest Hereditary Cancer Testing Solutions  
[QuestHereditaryCancer.com](http://QuestHereditaryCancer.com)

Genetic Information Nondiscrimination Act  
(GINA) [GINAhelp.org](http://GINAhelp.org)

National Society of Genetic Counselors  
[FindAGeneticCounselor.com](http://FindAGeneticCounselor.com)

This information is not a substitute for medical advice, diagnosis, or treatment. The diagnosis or treatment of any disease or condition may be based on personal history, family history, symptoms, a physical examination, laboratory test results, and other information considered important by a healthcare provider. Always talk with a healthcare provider about the meaning of genetic test results and before stopping, starting, or changing any medication or treatment.

The classification and interpretation of the variant(s) identified reflect the current state of Quest's understanding at the time of this report. Variant classification and interpretation are subject to professional judgment, and may change for a variety of reasons including, but not limited to, updates in classification guidelines and availability of additional scientific and clinical information. This test result should be used in conjunction with the healthcare provider's clinical evaluation. Inquiry regarding potential changes to the classification of the variant is strongly recommended prior to making any clinical decision. For questions regarding variant classification updates, please call Quest Diagnostics at 866.GENE.INFO (436.3463) to speak to a genetic counselor or laboratory director, or visit [QuestDiagnostics.com/VariantIQ](http://QuestDiagnostics.com/VariantIQ).

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