Hereditary Hemochromatosis (HFE-Related)

Hereditary hemochromatosis is a genetic condition characterized by absorption of too much dietary iron. This may lead to iron overload, which can cause damage to the joints and certain organs, such as the liver, skin, heart, and pancreas. This test includes the two most common variants linked to this condition.

Overview Scientific Details Frequently Asked Questions

Jamie, you **do not have** the two genetic variants we tested.

Based on your genetic result, you are not likely at risk of developing iron overload related to hereditary hemochromatosis. However, you could still have a variant not covered by this test.

How To Use This Test

This test does not diagnose hereditary hemochromatosis or any other health conditions.

Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Review the Genetic Health Risk tutorial

See Scientific Details

See Frequently Asked Questions

Intended Uses

- Tests for the **C282Y** and the **H63D** variants in the HFE gene linked to hereditary hemochromatosis.

Limitations

- Does **not** test for all possible variants linked to HFE-related hereditary hemochromatosis.
- Does **not** test for variants in other genes linked to hereditary hemochromatosis.
- The interpretation of your genetic result depends on the sex you reported in your account settings.

Important Ethnicities

- The variants included in this test are best studied in people of **European** descent.

You **do not have** the two variants we tested linked to hereditary hemochromatosis.

Based on your genetic result, you are not likely at risk of developing iron overload related to hereditary hemochromatosis.

You do not have the two most common variants linked to hereditary hemochromatosis.

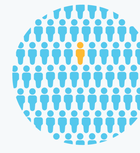
These variants are most commonly found in people of **Northern European** descent.

See Scientific Details

There is still a chance of having a variant linked to hereditary hemochromatosis.

A person typically must have certain combinations of variants to be at risk of developing iron overload related to hereditary hemochromatosis.

See Scientific Details



Hereditary hemochromatosis is caused by certain combinations of genetic variants, and only some combinations increase risk for iron overload.

People with your genetic result are not likely at risk for iron overload related to hereditary hemochromatosis, although it may be possible to develop iron overload for other reasons.

Age

Although developing symptoms of iron overload related to hereditary hemochromatosis is rare in younger people, the risk increases as a person ages. Symptoms of iron overload are most often diagnosed in men between the ages of 40 and 60, and in women after the age of 60.

See Scientific Details for more information

About Hereditary Hemochromatosis (HFE-Related)

Also known as: HFE-HH, primary hemochromatosis, hemochromatosis type I

When it develops

Because it is a genetic condition, hereditary hemochromatosis is present at birth. Many people with this condition never develop iron overload. Of those who do develop iron overload, only a small number develop symptoms. If men develop symptoms, they typically appear between 40 and 60 years of age. Women who develop symptoms tend to do so after menopause.

Typical signs and symptoms of iron overload

- Joint and abdominal pain
- Fatigue and weakness
- Darkening of the skin
- Liver disease
- Heart disease
- Diabetes

How common is the condition?

Hereditary hemochromatosis is most common in people of Northern European descent. Around 1 in 259 people of European descent has the genotype most commonly associated with hereditary hemochromatosis. However, only some of those people will go on to develop symptoms of iron overload related to hereditary hemochromatosis.

How it's treated

People with hereditary hemochromatosis are typically monitored for symptoms or complications. Iron overload related to hereditary hemochromatosis is a treatable condition. In some patients, having blood drawn on a regular basis can help lower iron levels. People with iron overload are encouraged to avoid drinking alcohol to minimize liver damage and to limit intake of iron-rich food.

Read more at: National Institute of Diabetes and Digestive and Kidney Diseases GeneReviews MedlinePlus

Learn more about hereditary hemochromatosis (HFE-related)

See our Frequently Asked Questions for more information.

FAQs

If you have a family history of this condition or think you have symptoms, consult with a healthcare professional.

Print report

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Overview | Scientific Details | Frequently Asked Questions

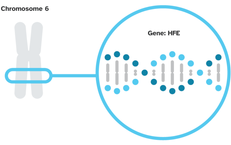
HFE-related hereditary hemochromatosis is linked to variants in the HFE gene.

HFE

The HFE gene contains instructions for making a protein that helps control the amount of iron absorbed by the body. Certain variants in this gene disrupt the ability of the HFE protein to regulate iron absorption, causing too much iron to be absorbed.

Read more at MedlinePlus

Chromosome 6



You do not have the two genetic variants we tested.

Variants Detected | View All Tested Markers

Marker Tested	Your Genotype*		Additional Information
C282Y **Gene:** HFE **Marker:** rs1800562	**G** Typical copy from one of your parents	**G** Typical copy from your other parent	Biological explanation Typical vs. variant DNA sequence(s) Percent of 23andMe customers with variant References [1, 2, 3, 6, 8, 10, 11, 13, 14, 15, 16, 19] | ClinVar*
H63D **Gene:** HFE **Marker:** rs1799945	**C** Typical copy from one of your parents	**C** Typical copy from your other parent	Biological explanation Typical vs. variant DNA sequence(s) Percent of 23andMe customers with variant References [1, 3, 6, 10, 11, 13, 14, 15, 16] | ClinVar*

*This test cannot distinguish which copy you received from which parent. This test also cannot determine whether multiple variants, if detected, were inherited from only one parent or from both parents. This may impact how these variants are passed down.

23andMe always reports genotypes based on the 'positive' strand of the human genome reference sequence (build 37). Other sources sometimes report genotypes using the opposite strand.

Test Interpretation

This report provides information about the risk of developing iron overload in people of Northern European descent who have the variants included in this test. Estimates for other ethnicities are not currently available.

Health Risk Estimates

Risk estimates are based on clinical studies that identify an association between a genotype and a health condition.

For certain genotypes, quantitative risk estimates may not be available.

Consider talking to a healthcare professional if you have any concerns about your results.

References [10, 12]

Risk estimates for developing signs or symptoms of hereditary hemochromatosis

The numbers in the table describe the percentage of people with the indicated genotype who are expected to be diagnosed with signs or symptoms of hereditary hemochromatosis, including iron overload.

Genotype	Men	Women
Two copies of C282Y variant	24%	14-18%
One C282Y variant and one H63D variant	3%	2%
Other genotypes	Not likely at risk	Not likely at risk

Other Factors

Hereditary hemochromatosis is a genetic condition. People with this condition have a higher risk of developing iron overload, which can lead to liver disease and other symptoms. In people with this condition, risk of developing iron overload can also be influenced by other factors.

This is not a complete list of other factors.

The factors described here include the most common and well-established risk factors associated with iron overload in people with hemochromatosis. Other factors not listed here may also influence risk for iron overload in people with the condition.

Typically, only people with certain combinations of variants in the HFE gene are at increased risk for iron overload. People with these genotypes in addition to other risk factors may have an even higher risk of developing iron overload.

Consult with a healthcare professional before making any major lifestyle changes.

Other Factors	References
Age In people with hemochromatosis, iron takes time to build up in the body. Thus, developing symptoms of iron overload related to hereditary hemochromatosis is rare in younger people. However, the risk increases as a person ages. Symptoms of iron overload are most often diagnosed in men between the ages of 48 and 69, and in women after the age of 68.	[4]
Sex Although most people with hereditary hemochromatosis do not develop noticeable symptoms, men with the condition are more likely than women to develop iron overload at a younger age, mostly because women lose iron through menstruation. Because iron takes many years to build up in the body, men usually don't experience symptoms of iron overload until their 40s or later. For women who do develop symptoms, they tend to develop them later than men, after menopause.	[2, 7]
Alcohol consumption In general, excessive alcohol consumption can lead to liver disease. In people with hemochromatosis, the liver is already at risk for damage from iron overload. For these individuals, the risk for liver damage is further increased with excess alcohol consumption. For example, studies have shown that people with two copies of the C282Y variant who have more than three to four drinks daily are significantly more likely to develop liver disease than those who drink less.	[7, 9, 18]
Diet Iron is an essential nutrient that the body needs to function properly. Consuming foods high in iron or taking certain supplements can increase the amount of iron stored in the body. For people with hemochromatosis, this may increase the chances of developing symptoms of iron overload. Consult with a healthcare professional before making any major dietary changes.	[7]

Test Details

Indications for Use

The 23andMe PGS Genetic Health Risk Report for Hereditary Hemochromatosis (HFE-Related) is indicated for reporting of the C282Y and H63D variants in the HFE gene. This report describes if a person has variants linked to hereditary hemochromatosis and a higher risk for iron overload, but it does not describe a person's overall risk of developing iron overload. This report is most relevant for people of Northern European descent.

Special Considerations

- Genetic testing for hereditary hemochromatosis is recommended under certain circumstances by several health professional organizations, including the American Association for the Study of Liver Diseases and the European Association for the Study of the Liver.

Test Performance Summary

Clinical Performance [13]

About 91% of all cases of HFE-related hereditary hemochromatosis are caused by the two variants included in this test.

Analytical Performance

Accuracy was determined by comparing results from this test with results from sequencing. Greater than 99% of test results were correct. While unlikely, this test may provide false positive or false negative results. For more details on the analytical performance of this test, refer to the package insert.

Warnings and Limitations

- This test does not cover all variants that could cause this condition.*
- This test does not diagnose any health conditions.
- Share results with your healthcare professional for any medical purposes.
- If you are concerned about your results, consult with a healthcare professional.

See the Package Insert for more details on use and performance of this test.

* Variants not included in this test may be very rare, may not be available on our genotyping platform, or may not pass our testing standards.

References

1. Adams PC et al. (2005). "Hemochromatosis and iron-overload screening in a racially diverse population." N Engl J Med. 352(17):1769-78.
2. Allen KJ et al. (2008). "Iron-overload-related disease in HFE hereditary hemochromatosis." N Engl J Med. 358(3):221-30.
3. Bacon BR et al. (2011). "Diagnosis and management of hemochromatosis: 2011 practice guideline by the American Association for the Study of Liver Diseases." Hepatology. 54(1):328-43.
4. Barton JC et al. (2009). "HFE-Associated Hereditary Hemochromatosis." [Accessed Oct 11, 2021].
5. Bradley LA et al. (1998). "Hereditary haemochromatosis mutation frequencies in the general population." J Med Screen. 5(1):34-6.
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7. European Association For The Study Of The Liver. (2010). "EASL clinical practice guidelines for HFE hemochromatosis." J Hepatol. 53(1):3-22.
8. Feeney GP et al. (2001). "The effects of wild-type and mutant HFE expression upon cellular iron uptake in transfected human embryonic kidney cells." Biochim Biophys Acta. 1538(2-3):242-51.
9. Fletcher LM et al. (2002). "Excess alcohol greatly increases the prevalence of cirrhosis in hereditary hemochromatosis." Gastroenterology. 122(2):281-9.
10. Gallego CJ et al. (2015). "Penetrance of Hemochromatosis in HFE Genotypes Resulting in p.Cys282Tyr and p.[Cys282Tyr];[His63Asp] in the eMERGE Network." Am J Hum Genet. 97(4):512-20.

See all references

Change Log

Your report may occasionally be updated based on new information. This Change Log describes updates and revisions to this report.

Date	Change
Dec. 7, 2022	For female customers with two copies of the C282Y variant, the interpretation of the genetic result was changed from "slightly increased risk" to "increased risk" based on new scientific research. Numerical information about the risk of developing signs or symptoms of hereditary hemochromatosis was updated for people with two copies of the C282Y variant.
Aug. 24, 2017	Hereditary Hemochromatosis (HFE-Related) report created.

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Hereditary Hemochromatosis (HFE-Related)

- What is hereditary hemochromatosis and how is it related to iron overload?
- What does this test do?
- What does this test **not** do?
- The report says the variants included in this test are best studied in people of **European** descent. What if I'm not of European descent?
- Where can I learn more about hereditary hemochromatosis, support groups, and other resources?
- My report says **zero variants** were detected. What does this mean?
- My report says **zero variants** were detected. What are some things I could do?
- What does **not likely at risk** of developing iron overload related to hereditary hemochromatosis mean?

Have more questions? **Check out our Customer Care Help Center.**