Hereditary Breast and Ovarian Cancer Syndrome *(BRCA1/BRCA2)*

01 Your result

Lynn, you may have a higher than typical chance of developing breast cancer and several other cancers.

This is due to a difference in your DNA in your *BRCA1* gene that is linked to an inherited condition called hereditary breast and ovarian cancer (HBOC) syndrome.[1]

02 Key takeaways

- This does not mean you will get cancer — just that your chances of developing certain cancers are much higher than typical.[12]
- Follow-up testing and cancer *screenings* can improve your chances of catching cancer early, when it may be more treatable.[18]
- Your family members, such as your parents, siblings, and children, may also have this same DNA difference and a higher chance of developing cancer.[21]
- To support you, your purchase of AncestryHealth® includes access to special resources. You can set up a one-on-one phone call or video conference with a PWNHealth genetic counselor or submit a question for a reply via a secure platform.
- **If you only do one thing, do this:** Share your physician report with a healthcare provider as soon as possible. Only a healthcare provider can determine whether you have HBOC syndrome.

Download physician report

Genes tested

This test found a DNA difference in your *BRCA1* gene.

This test also looked for DNA differences in 15 other genes linked to a higher chance of developing certain types of cancer: *ATM, APC, BMPR1A, BRCA2, CHEK2, MLH1, MSH2, MSH6, MUTYH, PALB2, POLD1, POLE, PMS2, SMAD4,* and *STK11.*

These genes are associated primarily with breast cancer and colon cancer. Though it cannot rule them out, this test did not find any DNA differences linked to a higher chance of cancer in those genes.

This information is helpful for a healthcare provider to know and is included in the physician report you can download and bring to them.

03 What this means for you

You may have an increased chance of developing breast cancer and ovarian cancer.

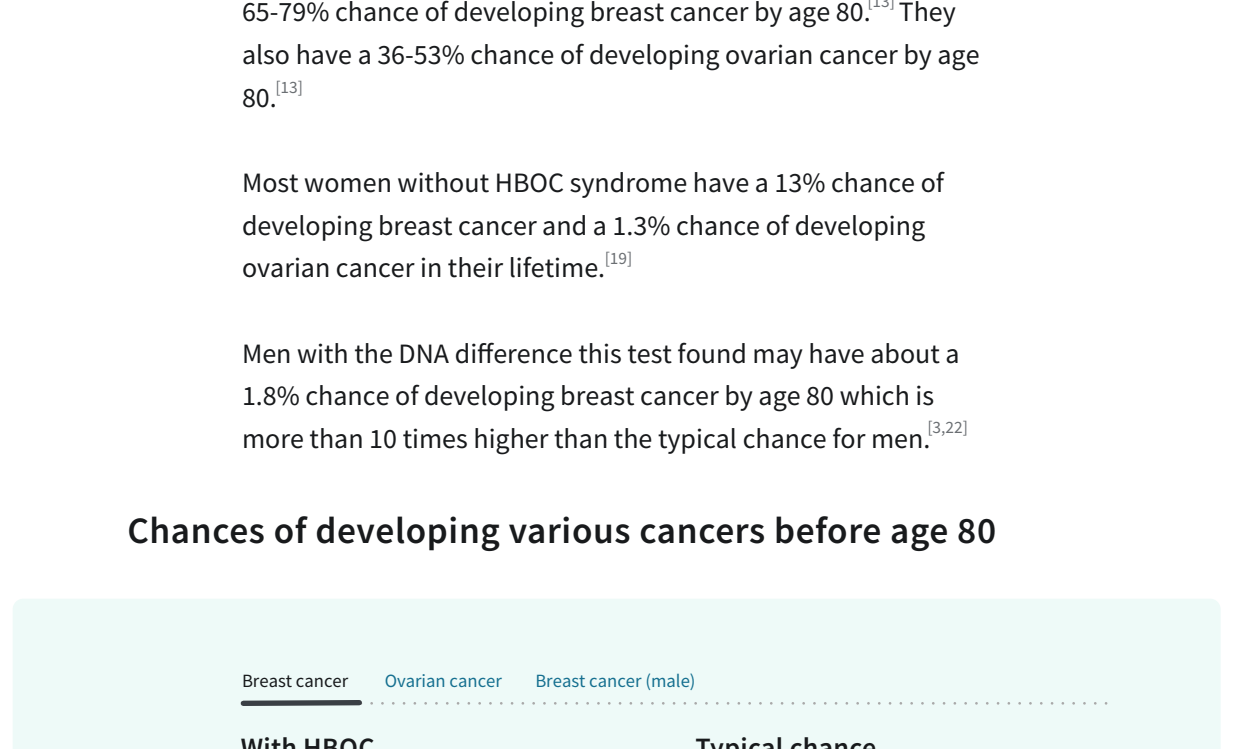
This is because of a DNA difference in your *BRCA1* gene that is linked to HBOC syndrome. People with HBOC syndrome have a higher chance of developing certain cancers. The two most common cancers that women with HBOC syndrome develop are breast cancer and ovarian cancer.[16,21]

Women with the DNA difference this test found may have a 65-79% chance of developing breast cancer by age 80.[13] They also have a 36-53% chance of developing ovarian cancer by age 80.[13]

Most women without HBOC syndrome have a 13% chance of developing breast cancer and a 1.3% chance of developing ovarian cancer in their lifetime.[19]

Men with the DNA difference this test found may have about a 1.8% chance of developing breast cancer by age 80 which is more than 10 times higher than the typical chance for men.[5,22]

Chances of developing various cancers before age 80



Having HBOC syndrome doesn't mean you have cancer now or will develop it in the future. It just means that you have a much higher chance of developing certain types of cancer, often at a younger age.[10]

You can work with a healthcare provider to make a plan to try to catch cancer early, when it is more treatable.[6,7]

> You and your relatives have a much higher chance than typical of developing certain types of cancer, often at a younger age.

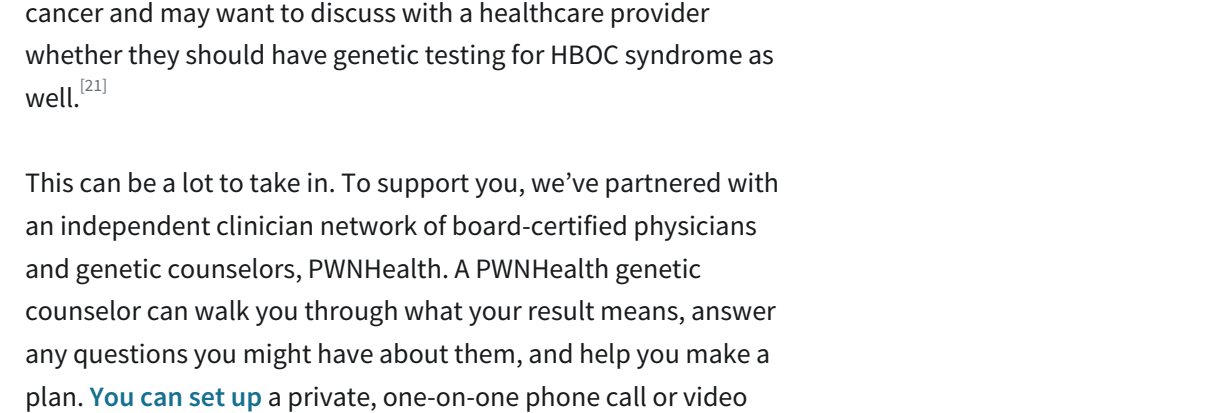
The best way to try to catch most cancers early is with cancer screenings like a mammogram or a breast MRI. But even if you're already getting screenings, discuss this important result and next steps with a healthcare provider.They may recommend additional options to try to prevent cancer, like surgery.

It is also important to share this result with your family. Some members of your family may have a higher chance of developing cancer and may want to discuss with a healthcare provider whether they should have genetic testing for HBOC syndrome as well.[21]

This can be a lot to take in. To support you, we've partnered with an independent clinician network of board-certified physicians and genetic counselors, PWNHealth. A PWNHealth genetic counselor can walk you through what your result means, answer any questions you might have about them, and help you make a plan. You can set up a private, one-on-one phone call or video conference with them or submit a question for a reply via a secure platform. This service is included as part of PWNHealth's clinical support of AncestryHealth®.

Introducing HBOC syndrome

Robin, a certified genetic counselor with the independent clinician network PWNHealth, talks about what this result means for you and your family, what to do next, and more details about HBOC syndrome.



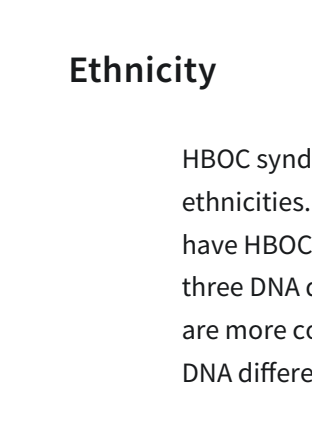
04 What is HBOC syndrome?

HBOC syndrome is the most common inherited cause of breast and ovarian cancer.

You're far from alone. Around 1 in 200 people in the U.S. have a DNA difference linked to HBOC syndrome.[15]

While breast and ovarian cancer are the most likely, other cancers are also linked to HBOC syndrome in both men and women.[16,21]

> HBOC syndrome is caused by DNA differences in one of two genes — *BRCA1* and *BRCA2* — that help control cell growth.



The chances of developing these cancers depend on a number of factors. For instance, a family history of breast cancer can make it more likely you would develop breast cancer.[4] The particular gene that has the DNA difference is another factor that affects the chances of developing different types of cancer.[13,21]

One reason cancers happen is because cells start growing out of control. HBOC syndrome is caused by DNA differences in one of two genes — *BRCA1* and *BRCA2* — that help control cell growth.[21] DNA differences can cause those genes to not work properly.

Ethnicity

HBOC syndrome is more common in people of certain ethnicities. About 1 in 40 people of Ashkenazi Jewish descent have HBOC syndrome, for example.[21] This is because there are three DNA differences that are linked to HBOC syndrome that are more common in people of Ashkenazi Jewish descent. These DNA differences are called "founder mutations."

05 How inheritance works

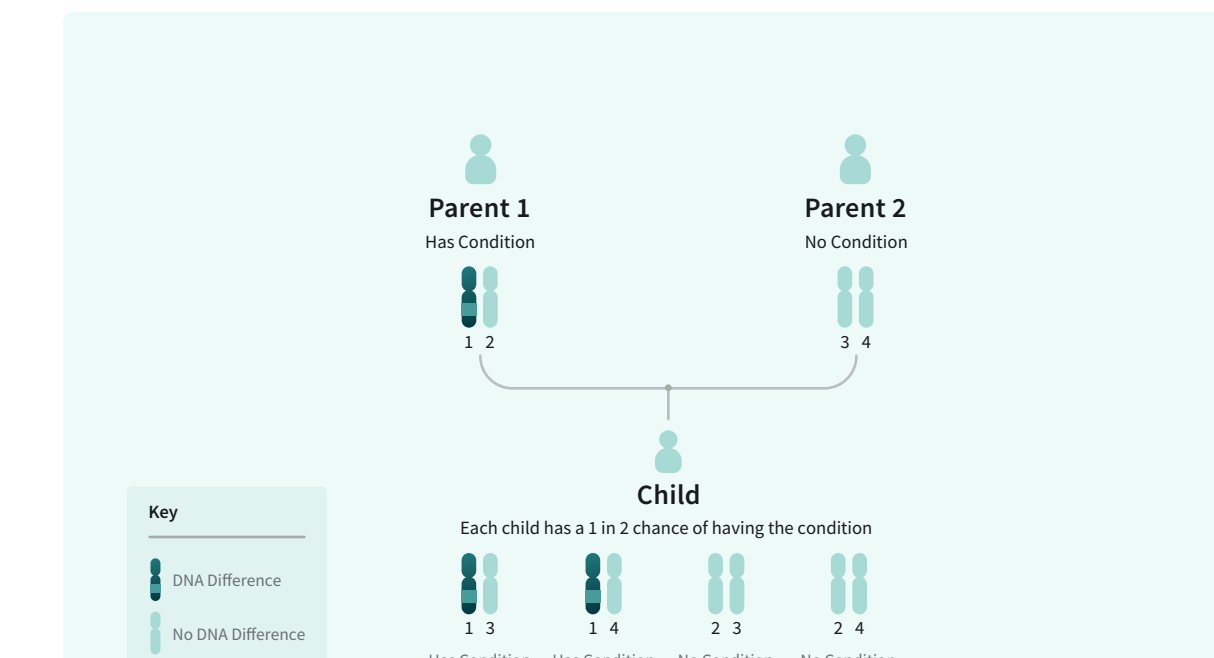
Each child of someone with HBOC syndrome has a 1 in 2 chance of having it as well.

In almost all cases of HBOC syndrome, people inherit the condition from one of their biological parents. This means that if you have a DNA difference linked to HBOC syndrome, at least one of your parents probably has it too. It also means each of your biological brothers and sisters has a 1 in 2 chance of having it, as do each of your children.[21]

This is especially important information for close female relatives. That's because the DNA differences that can cause HBOC syndrome are a lot more likely to cause cancer in women than in men. It is important that you share your result with your family members so they can get tested for HBOC syndrome. The American Medical Association does not recommend genetic testing for people under age 18 unless it would affect their medical care during childhood.[8] A healthcare provider can answer any questions about whether and when family members should get tested.

Here is how the inheritance works: You have two copies of most of your genes, one from each of your parents. To have Lynch syndrome, you only need to inherit a DNA difference linked to Lynch syndrome from one of your parents.[21] This type of inheritance is called autosomal dominant inheritance.

How HBOC syndrome is inherited



It's also important to know that if two people with a DNA difference in their *BRCA2* gene have a child together, their child has a 1 in 4 chance of having a serious condition called Fanconi anemia.[17] Children with Fanconi anemia can have health issues such as birth defects and an increased chance of developing leukemia and certain other types of cancer at a young age.[17] If you already have children, you would likely already know whether or not they have Fanconi anemia.

06 What you can do

This information about your genes is only the beginning.

There are actions people with your result can take. The first thing to do is to share your physician report with a healthcare provider and discuss appropriate next steps.

The most important thing both men and women with HBOC syndrome can do after talking to a healthcare provider is get regular cancer screenings. Catching cancer early can significantly increase your chances of successfully treating it. [9]Current medical guidelines recommend women with a DNA difference in their BRCA1 or BRCA2 gene have a mammogram to screen for breast cancer every year starting at age 25 or possibly earlier if a close family member had breast cancer at a younger age.[20] A healthcare provider may also recommend additional screenings, such as a breast MRI. Screening for other cancers for both women and men may also be recommended.[20]

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Unfortunately, not all cancers linked to HBOC syndrome, such as ovarian cancer, can be found easily with current screening technology. Women may want to ask a healthcare provider about other options, including surgeries or medications, that can significantly reduce the chance of some cancers, such as breast or ovarian cancer.[11]

It's important to learn more about HBOC syndrome so that you can be proactive about your health. AncestryHealth® has partnered with PWNHealth, the independent clinician network that provided clinical oversight for your test, to support you and help you understand your result.

We encourage you to take advantage of educational videos created by PWNHealth. You can also set up a private, one-on-one phone call or video conference with a PWNHealth genetic counselor or submit a question for a reply via a secure platform.

Actions that may make a difference

Lifestyle changes usually don't have a big effect on whether people with HBOC syndrome develop the cancers linked to HBOC syndrome.[10] That's why it's so important to get regular cancer screenings as recommended by the American Cancer Society and National Comprehensive Cancer Network.[2,20] There are, however, many reasons to continue to live a healthy lifestyle:

- **Ask about birth control options.** Women who use birth control may want to talk with a healthcare provider about which options might be right for them. Hormonal birth control options, such as pills, may raise the chance of breast cancer — though they may lower the chance of ovarian cancer.[3]
- **Don't smoke.** Smoking has been shown to increase the chances of breast cancer in people with HBOC syndrome.[12]
- **Maintain a healthy weight.** Having an unhealthy weight is linked to about 1 in 12 cancers in the U.S., including breast cancer.[5]

Remember to consult with a healthcare provider before making any health, treatment, lifestyle, or dietary changes.

07 Limitations

This test cannot tell you whether you will develop cancer, just whether you have a higher chance of developing it.

This test informs you about differences in your DNA in 16 genes linked to a higher chance of developing cancer: *APC, ATM, BMPR1A, BRCA1, BRCA2, CHEK2, MLH1, MSH2, MSH6, MUTYH, PALB2, PMS2, POLD1, POLE, SMAD4, and STK11.*

Read more about limitations

Incorrect results can happen, although they are rare. They might be due to a technical problem at the laboratory, you or a family member accidentally mixing up your samples, or other issues. It is very important to discuss this result with a healthcare provider. They will likely recommend that you get a second genetic test to confirm this result and can then talk about options to screen more closely for cancer.

This test cannot rule out having additional DNA differences linked to the conditions or genes included in this test.

There are other genes this test did not look at that may contain a DNA difference that is also linked to a higher chance of developing cancer.

Although your DNA doesn't change, your result may be updated as more is learned about which DNA differences and genes are linked to a higher chance of developing cancer.

This test was performed by our laboratory partner. For further technical details on the limitations of this test, download your physician report.

AncestryHealth® includes laboratory tests developed and performed by an independent CLIA-certified laboratory partner, and with oversight from PWNHealth, the independent clinician network of board-certified physicians and genetic counselors that provided clinical oversight for your test. The test results are not diagnostic and do not determine your overall chance of developing a disease or health condition. The tests are not cleared or approved by the U.S. Food and Drug Administration. Any healthcare recommendations in the report are made by PWNHealth. **You should consult a healthcare provider before taking any action, including before making any treatment, dietary, or lifestyle changes.**

07 If you only do one thing, do this:

Share your physician report with a healthcare provider as soon as possible.

Make an appointment as soon as possible and ask a healthcare provider about next steps. This is important because catching the cancers that HBOC syndrome can cause requires special screening. Download your physician report to take with you to your appointment. The physician report contains guidance for healthcare providers on what the next steps should be.

Download physician report

What else can you do?

Get support from a PWNHealth genetic counselor

We encourage you to set up a private, one-on-one phone call or video conference with a genetic counselor. You can also submit a question for a reply via a secure platform. Access to these resources is included with your AncestryHealth® purchase and provided by PWNHealth, the independent clinician network of board-certified physicians and genetic counselors.

Set up a one-on-one session

Ask a genetic counselor a question

provided by pwnhealth

Share your result with your family

Because HBOC syndrome runs in families, your family members have a much higher chance of having it too.[21] That is why it is important for you to share your result with them. That way they can work with a healthcare provider to decide whether they want to have genetic testing to learn more about their health.

Download your report

09 Resources

Learn more | FAQ | References | About test

Learn more about your result

- My result showed a difference in my DNA that is linked to HBOC syndrome. Does that mean I have cancer?
- If I have no family history of cancer, does this result still mean I have a higher than typical chance of developing cancer?
- Should I tell a healthcare provider about my result?
- Can I start taking actions to lower my risk right away?
- Should I tell my family about my result?
- How likely are my relatives to have HBOC syndrome?
- How accurate is this test?
- Should I get another test to confirm this result?
- Can my personal health history or that of my close relatives affect how likely I am to get cancer?
- Will the information I input into the AncestryHealth® family health history tool change the result in my health report?
- What should I do next?

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Check out the health support articles for more information.

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