## What Is Hereditary Breast And Ovarian Cancer (HBOC) Syndrome?

HBOC syndrome is an inherited genetic condition. This means that the cancer risk is passed from generation to generation in a family. If you have HBOC syndrome, you carry a gene mutation you inherited from your father or your mother, or sometimes from both parents, that significantly increases your risk for certain cancers. Hereditary Breast and Ovarian Cancer (HBOC) syndrome can be inherited from either the father's side or the mother's side of the family.

## What Causes HBOC?

BRCA1 and BRCA2 (BReast CAncer genes 1 and 2) are the most well-known genes linked to breast cancer risk and are associated with the majority of HBOC families.

BRCA1/2 mutations can be passed to you from either parent and can affect the risk of cancers in both women and men.

Inherited mutations of either the BRCA1 or the BRCA2 gene causes about 10% of breast and ovarian cancers.

A mutation or alteration in either BRCA1 or BRCA2 increases a woman's lifetime risk of developing breast and ovarian cancers. A person with BRCA1/2 mutations not only has a higher risk of developing these cancers, but also may pass that gene mutation on to his or her children. Men with these gene mutations also have an increased risk of breast cancer and prostate cancer.

Not all families with multiple cases of breast and ovarian cancer have mutations in BRCA1 or BRCA2.

## How Common Is Hereditary Breast And Ovarian Cancer?

Like other gene mutations, BRCA1/2 mutations are rare in the general population. Women in the general population have about an 8% chance of getting breast cancer by age 70 and about a 12% chance by age 85. Current estimates are less than 1% of the general population has a BRCA1/2 mutation.

## BRCA1 And BRCA2 Gene Mutations And Ethnicity

Among Ashkenazi Jewish men and women, about one in 40 have a BRCA1/2 mutation.

Approximately 1 in 10 women with breast cancer and 1 in 3 women with ovarian cancer in Ashkenazi families have BRCA1/2 mutations.

The table below shows how the prevalence of BRCA1/2 mutations varies among breast cancer survivors from different ethnic groups in alphabetical order.

| Ethnicity | BRCA1 | BRCA2 |
|---|---|---|
| African-American | 1% | 3% |
| Ashkenazi Jewish | 8-10% | 1% |
| Asian-American | Less than 1% | Data not available |
| Caucasian (non-Ashkenazi Jewish) | 2-3% | 2% |
| Hispanic | 4% | Data not available |

## Factors That Increase Inherited Risk For Cancer

Many people are unaware of their inherited risk, though they may be aware of a cancer history in their family. You should consider talking with a doctor about genetic testing for hereditary breast and ovarian cancer (HBOC) syndrome if at least one of the following applies to you or your family:

- Breast cancer before age 50
- One or more relatives diagnosed at age 45 or younger
- Two or more relatives who've had breast cancer
- A male relative who's had breast cancer
- Breast cancer in both breasts or twice in the same breast
- Being in a family Ashkenazi or Eastern European Jewish ancestry
- Ovarian cancer at any age
- A family member with a BRCA1/2 mutation or mutations in other related breast cancer risk genes
- A history of breast cancer, ovarian cancer, prostate and/or pancreatic cancer on the same side of the family

## Cancer Risks For Women With BRCA1/2 Mutation

Lifetime risk of breast cancer: 50% to 85%
Risk of breast cancer before age 50: 30% to 50%
Lifetime risk of ovarian cancer:

- BRCA1 gene mutation: 25% to 50%
- BRCA2 gene mutation: 15% to 30%

Developing a second breast cancer: 40% to 60%. The risk of breast cancer occurring in the other breast rises approximately 2% to 3% per year.

### BRCA1/2 Mutations And Cancer In Men

Men can also have BRCA1/2 mutations and may pass them on to their children.

- Lifetime risk of breast cancer

- BRCA1 gene mutation: 1% to 2%. This is a 10-fold increase over the general population.
- BRCA2 gene mutation: 6%

- Risk of prostate cancer
  - BRCA1 gene mutation: some increased risk.
  - BRCA2 gene mutation: 20%
- Men with a BRCA2 gene mutation have a significantly increased risk of developing more aggressive prostate cancer before age 65 and therefore screening should begin at age 40.

### Screening For BRCA1/2 Gene Mutations

The BRCA gene test is most often a saliva or blood test. Your test sample is collected in your doctor's office and sent to a laboratory for DNA analysis.

It takes 2-4 weeks before test results are available.

Your doctor or genetic counselor will contact you with your test results, discuss their implications and go over your options. Federal and state laws help ensure the privacy of your genetic information and protect against discrimination in health insurance and employment.

### What Do The Test Results Mean?

Testing does not tell you if you currently have cancer. Your test results tell you about your inherited ***risk*** of having breast and ovarian cancer.

A negative test result means that you do not have a BRCA1 or BRCA2 gene mutation.

Although the BRCA gene test can detect the majority of mutations in the BRCA1 and BRCA2 genes:

- You could have a gene mutation that the test wasn't able to detect.
- Or if your family carries a high-risk gene mutation that researchers haven't yet identified then the test would not be able to detect this gene mutation and you could be a carrier.

A negative test result does not eliminate the chance of developing a non-hereditary breast cancer. You still have the same cancer risk as that of the general population.

A positive test result means that you have a BRCA1 or BRCA2 gene mutation. A positive test result does not mean that you have cancer or that you will have cancer. Having the BRCA1/2 mutations does not mean that you will get breast cancer. Many women with a BRCA1/2 mutation will never have breast cancer.

A positive test result tells you that you have a much higher risk of developing breast cancer or ovarian cancer compared with someone who does not have the mutation. A positive test result helps you to better understand your personal risk of developing breast and ovarian cancers. You can then make choices on what to do to reduce your risk and about what follow up care is right for you.

### Should I Talk With My Relatives About My Result?

You are encouraged to share these results with your relatives. It is normal to feel some anxiety about this. But knowing this information may help your relatives understand their own future risk of developing cancer, which may help them prevent a cancer or detect it early.

### Follow-Up Care After A Positive Test Result

You might choose to take specific measures to reduce your cancer risk. What you choose to do depends on many factors, including your age, medical history, prior treatments, past surgeries and personal preferences. You and your healthcare provider will discuss your options for medical management.

For more information and patient advocacy groups, please visit our Patient Portal at

www.otogenetics/patientportal.com

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