

October, 2015 • Members

Hereditary Breast and Ovarian Cancer

Cancer is caused by mutations (changes) in DNA. Some of these mutations are passed down in families. Cancer caused by a mutation that runs in families is called hereditary cancer. Hereditary cancer accounts for 5% to 10% of breast cancer in women.¹ It also accounts for 5% to 20% of breast cancer in men.¹

People who have a mutation that runs in their family don't always get cancer. But they are at greater risk of getting cancer. And they are more likely to have cancer at a younger age. They are also at a higher risk for having more than 1 cancer in their lifetime.

BRCA1 and BRCA2 Genes

Mutations in 2 genes cause the most cases of hereditary breast cancer. They also cause the most cases of ovarian cancer. These genes are called *BRCA1* and *BRCA2*. They normally help control cell growth. But when there is a mutation, cancer can develop. The table shows the risk of cancer linked to these genes.²⁻⁶

Cancer	Risk of Cancer, %		
	With <i>BRCA1</i> Mutation	With <i>BRCA2</i> Mutation	Without <i>BRCA</i> Mutation
Women			
Breast cancer by age 70	55-65	45-47	9
Ovarian cancer by age 70	39	11-17	1
2nd breast cancer in lifetime	83	62	15
Men			
Breast cancer by age 70	1	7	0.06

BRCA Mutations and Other Cancers

BRCA mutations increase the risk of breast and ovarian cancers. But they increase the risk of other cancers too. These include:

- Prostate
- Pancreas
- Melanoma



Other Breast Cancer Susceptibility Genes

Mutations in other genes are also linked with breast cancer. Mutations in these genes are rare. They are linked to other syndromes or conditions as well as to breast cancer. These genes include:

- *TP53*
- *PTEN*
- *CDH1*
- *STK11*
- *PALB2*

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It's a Family Affair

If a person has a mutation in one of these genes, some of his/her relatives might have it too.

Relative	Their Chance of Having the Same Mutation
Identical twin	100%
Fraternal twin	50%
Parent, sibling, child	50%
Grandparent, uncle, aunt, niece, nephew	25%
First cousin	12.5%

Testing for Mutations

Doctors use genetic tests to find out if a person has a mutation. But these tests are not for everyone. You might want to talk with your doctor about getting tested if you:

- Have had breast cancer before the age of 50
- Have had 2 separate (primary) breast cancers at any age
- Have had a triple negative (ER, PR, and HER2 negative) breast cancer
- Have had ovarian cancer at any age
- Are a man who has had breast cancer
- Have a male blood relative who has had breast cancer
- Have a strong family history of breast or ovarian cancer
- Have a blood relative with a *BRCA1* or *BRCA2* mutation
- Are of Ashkenazi Jewish ancestry

How the Laboratory Can Help

Quest Diagnostics can help people who want to have genetic testing by:

- Helping people find out if they might be at risk for these hereditary cancers and may meet the criteria for testing. They do this by providing an online quiz at BRCAVantage.com/take-the-quiz/.
- Providing a Patient Support Guide to help people learn more about the testing. It is available [here](#).
- Providing a free Concierge Service to:
 - Find out if a person's insurance plan covers the test
 - Find out how much the test will cost with or without insurance
 - Provide financial help for people who qualify

Insurance Coverage for Genetic Testing

Many insurance companies cover genetic testing. To find out if your insurance company covers it, you can:

- Call them
- Ask someone at your doctor's office to help you
- Work with a Quest Diagnostics Concierge Team member

If needed, your doctor can send your insurance company a letter to help support your claim. This letter is called a letter of medical necessity.

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You can learn more about the Concierge Service at BRCAVantage.com/provider-resources/reimbursement-support-financial-assistance/.

- Providing special reports that help people understand the test results and what they mean.

Steps You Can Take

People who have a mutation linked to breast or ovarian cancer are at higher risk. It's very important for them to learn about the things that can help lower it. These could include:

- Increased cancer screening
- Surgery
- Medicines

Their doctor or genetic counselor can help them find out what is best for them.

Whether you have a mutation or not, you can make lifestyle choices. These will help you keep your cancer risk as low as it can be:

- Maintain a healthy weight
- Exercise regularly
- Limit alcohol intake
- Eat a nutritious diet
- Never smoke, or quit smoking if you do smoke

References

1. American Cancer Society. Cancer facts & figures 2015. www.cancer.org/research/cancerfactsstatistics/cancerfactsfigures2015/index. Accessed September 8, 2015.
2. Cancer Query System: Probability of Developing or Dying of Cancer: surveillance.cancer.gov/devcan/canques.html; SEER 18 Registries Incidence and Mortality (2013 submission)
3. Antoniou A, Pharoah PDP, Narod S, et al. Average risks of breast and ovarian cancer associated with *BRCA1* or *BRCA2* mutations detected in case series unselected for family history: a combined analysis of 22 studies. *Am J Hum Genet.* 2003;72:1117-1130.
4. Chen S, Parmigiani G. Meta-analysis of *BRCA1* and *BRCA2* penetrance. *J Clin Oncol.* 2007;25:1329-1333.
5. Mavaddat N, Peock S, Frost D, et al. Cancer risks for *BRCA1* and *BRCA2* mutation carriers: results from prospective analysis of EMBRACE. *J Natl Cancer Inst.* 2013;105:812-822.
6. Tai YC, Domchek S, Parmigiani G, et al. Breast cancer risk among male *BRCA1* and *BRCA2* mutation carriers. *J Natl Cancer Inst.* 2007;99:1811-1814.