Genetic Insights: quick reference guide for healthcare providers

This guide is intended to facilitate a discussion between a provider and their patient.

Genetic Insights test results: **Hereditary breast and ovarian cancer syndrome**

Key results

A pathogenic or likely pathogenic variant associated with hereditary breast and ovarian cancer (HBOC) syndrome was found in the *BRCA1* gene.

People with HBOC syndrome have a significantly increased risk of developing certain cancers, including breast cancer in males and females and ovarian cancer in females.

Next steps

Clinical recommendations	Resources
Genetic Insights is a screening test and not intended for diagnosis. A follow-up genetic test should be performed in a clinical setting before any other action is taken.	**Ready to order?** Check with your institution and/or patient's insurance about the preferred testing laboratory. Blueprint Genetics® offers hereditary cancer testing. To confirm this test result, **targeted variant testing** for the variant identified is available. You can order a confirmation test here: Blueprint Genetics/TVT **Have questions?** Call **1.866.GENE.INFO** (1.866.436.3463) to speak to a specialized Quest genetic counselor or geneticist available to healthcare providers to discuss test selection and results.
Refer your patient to a genetic counselor specializing in hereditary cancer. *Genetic counselors can provide counseling on the implications of this test result and next steps for your patient.*	Your patient can schedule a 1-on-1 remote genetic counseling session through their online Genetic Insights Cancer Risk Report at no additional cost. To find a genetic counselor with expertise in hereditary cancer practicing in your patient's area for an in-person session, please visit FindAGeneticCounselor.NSGC.org

Patient conversation starters:

Patient conversation starters summarize the preceding information in plain language to support meaningful conversations between you and your patient.

FindAGeneticCounselor.NSGC.org

Your Genetic Insights test is a screening test. The next step is to have your result confirmed with a second genetic test.

It's also important that you talk with a genetic counselor. Genetic counselors are experts in genetics and can help you understand this result and potential next steps.

You can access a genetic counselor through your online Genetic Insights dashboard at no additional cost to you, and we can discuss a referral to a local genetic counselor.

Visit QuestDiagnostics.com/Genetic-Health-Screening for more information about this test.

What is hereditary breast and ovarian cancer (HBOC) syndrome?

HBOC syndrome is a cancer predisposition syndrome characterized by a higher lifetime risk of certain cancers with an earlier age of onset than the general population.[1]

In females with HBOC syndrome, breast and ovarian cancer are most common. In males, risk for male breast cancer is increased. Risk for other cancer types including pancreatic and prostate may be increased. However, not everyone with HBOC syndrome will develop cancer.

HBOC syndrome is primarily caused by DNA variants in the *BRCA1* and *BRCA2* genes. Cancer risks vary depending on the specific DNA variant and gene involved.

People with HBOC syndrome are recommended to undergo more frequent cancer screening, typically starting at earlier ages than in the general population.[2]

See the Management options section for more detail.

Patient conversation starters:

Hereditary breast and ovarian cancer (HBOC) syndrome is caused by a DNA variant in certain genes.

People with HBOC syndrome have a higher than typical chance of developing certain cancers, such as breast cancer in both men and women. Not everyone with HBOC syndrome will develop cancer.

People with HBOC syndrome should have cancer screenings earlier in life and more often than typical. This increases the chance that if cancer develops, it's detected as early as possible when it's most treatable.

What this result means for family members

Family members may have the same DNA variant. The DNA variant was most likely inherited from a parent. Full siblings and children have a 50% chance of having this variant.[1]

Children of biological parents who both have a DNA variant in *BRCA1* are at risk for having a genetic condition called Fanconi anemia.[1]

In people with a confirmed DNA variant associated with HBOC syndrome, cascade genetic testing for other family members 18 years and older may help inform their risks and screening protocols.[1,2]

A genetic counselor can help determine the most appropriate testing options for family members. Therefore, it is strongly recommended that individuals share these results with their biological relatives and reproductive partners.

Patient conversation starters:

HBOC syndrome runs in families.

That means the DNA variants that cause HBOC syndrome can be inherited or passed down from parents to their children.

Your close relatives, like your parents, full siblings, and children have a 50% (or 1 in 2) chance of having the same DNA variant.

Other relatives might also have the same DNA variant. Sharing these results with your family members and reproductive partners is important so they can decide if they want to have genetic testing.

Cancer risk

Select estimated cancer risks in people with a confirmed variant in the *BRCA1* gene compared to the general population are included below. Individual cancer risks may be higher or lower depending on the specific variant identified in addition to personal and family health history.

Cancer type	Approximate risk by age 80 with this result	Approximate general population lifetime risk
Assigned female at birth:		
Breast	65%-79%[3]	13%[4]
Ovarian	36%- 53%[3]	1.3%[5]
Assigned male at birth:		
Breast	1.8%[6]	0.10%[7]

Patient conversation starters:

Not everyone with HBOC syndrome will develop cancer. But for people with HBOC syndrome, the chance of developing certain cancers is higher than typical.

This chart shows an estimate of the chance to develop certain cancers in people with HBOC syndrome compared to people without HBOC syndrome.

Associated cancers and risks may change over time as medical research advances.

Management options

There are options for cancer prevention and early detection for people with HBOC syndrome. Select clinical guidelines from the National Comprehensive Cancer Network® (NCCN®) for people with a *BRCA1* variant and no personal history of an associated cancer include[2]:

Cancer type	Guidelines for people with a *BRCA1* variant
Female breast cancer	Clinical breast exam, every 6-12 months, starting at age 25 Other breast screening: • Age 25-29, annual breast MRI screening with contrast. Note: timing of this screening may be individualized based on family history • Age 30-75, annual mammogram with consideration of tomosynthesis and breast MRI screening with contrast • After age 75, management should be considered on an individual basis Discuss options of risk-reducing mastectomy and medications
Male breast cancer	Breast self-exam training and education starting at age 35 Clinical breast exam, every 12 months, starting at age 35 Consider annual mammogram in men starting at age 50 or 10 years before the earliest known male breast cancer in the family (whichever comes first)
Ovarian cancer	Risk-reducing salpingo-oophorectomy (RRSO), typically between age 35 and 40 and upon completion of childbearing
Prostate cancer	Consider prostate cancer screening starting at age 40
Other	Other cancer screenings may be considered based on personal and family history

Patient conversation starters:

It's recommended that people with HBOC syndrome have cancer screenings earlier and more often than typical. This way, cancer is more likely to be caught in the early stages when it's most treatable.

If your HBOC syndrome result is confirmed, it's important to work with the right specialists, like a medical oncologist and a geneticist, to find cancer screening and risk-reducing options that are right for you.

See NCCN for complete recommendations. Guidelines and recommendations may change over time.
If the test result is confirmed, local centers for excellence in hereditary cancer should be consulted for further clinical management.

Additional resources

The following advocacy groups have additional information and resources about HBOC syndrome:

Facing Our Risk of Cancer Empowered (FORCE): FacingOurRisk.org
Foundation for Women's cancer: FoundationForWomensCancer.org
Susan B. Komen Foundation: Komen.org

References

1. Petrucelli N, Daly MB, Pal T. BRCA1- and BRCA2-Associated Hereditary Breast and Ovarian Cancer. September 4, 1998. Updated May 26, 2022. In: Adam MP, Ardinger HH, Pagon RA, et al, editors. GeneReviews®. University of Washington, Seattle; 1993-2023. https://www.ncbi.nlm.nih.gov/books/NBK1247/
2. National Comprehensive Cancer Network®. Genetic/Familial High-Risk Assessment: Breast, Ovarian and Pancreatic (version 3.2023). www.nccn.org
3. Kuchenbaecker KB, Hopper JL, Barnes DR, et al. Risks of breast, ovarian, and contralateral breast cancer for BRCA1 and BRCA2 mutation carriers. *JAMA*. 2017;317(23):2402-2416. doi:10.1001/jama.2017.7112
4. National Cancer Institute. Cancer Stat Facts: Female Breast Cancer. Accessed February 2023. https://seer.cancer.gov/statfacts/html/breast.html
5. National Cancer Institute. Cancer Stat Facts: Ovarian Cancer. Accessed February 2023. https://seer.cancer.gov/statfacts/html/ovary.html
6. Tai YC, Domchek S, Parmigiani G, Chen S. Breast cancer risk among male BRCA1 and BRCA2 mutation carriers. *J Natl Cancer Inst*. 2007;99(23):1811–1814. doi:10.1093/jnci/djm203
7. American Cancer Society. Key Statistics for Breast Cancer in Men. Accessed February 2023. https://www.cancer.org/cancer/breast-cancer-in-men/about/key-statistics.html

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.

Individuals should talk with a healthcare provider about the meaning of genetic test results and before stopping, starting, or changing any medication or treatment.

Genetic Insights is a test developed and performed by Quest Diagnostics. The test results are not diagnostic and do not determine overall chances of developing a disease or health condition. The tests are not cleared or approved by the US Food and Drug Administration.

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