Heredity can increase a patient's risk of cancer

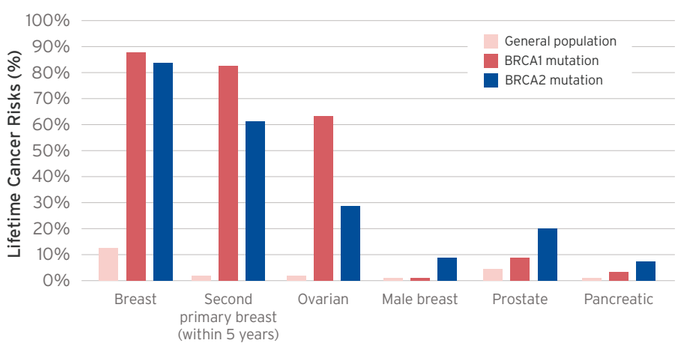
5–10% of breast cancer cases **&** **~15%** of ovarian cancer cases

are associated with a mutation in a cancer predisposition gene.[1,2]

In all ethnic populations, the most common forms of hereditary breast and ovarian cancer result from a mutation in the BRCA1 or BRCA2 gene.[3]

- The BRCA1 and BRCA2 mutations occur in both men and women, and are estimated to be carried in:
  - **1 in 300** to **1 in 500** individuals[2]
  - 1 in 40 individuals of **Ashkenazi Jewish ancestry**[3]

Cancer risks associated with BRCA1 and BRCA2 mutations*[4,5]



*There is an increased risk of other cancers, such as melanoma, to a lesser extent[4,5]

BRCA1 and BRCA2 mutations are inherited

- Children and siblings of individuals with a BRCA1 or BRCA2 mutation have a 50% chance of inheriting the mutation[5]
- Not all individuals with a cancer-predisposing mutation will develop cancer

How can my patients get tested for BRCA1 and BRCA2?

1. Request the test
- Physicians are required to sign a requisition for the test
- Patients must read the Patient Information Form and sign the consent on the requisition

2. Give a sample
- Blood or saliva samples can be collected at a LifeLabs® location or the patient's home

3. Talk to a genetic counsellor
- A 15 – 30 minute genetic counselling telephone session (via telephone or Skype™) will be scheduled once LifeLabs Genetics receives the sample
- Both patient and physician will receive a written summary of the session

4. BRCA1 and BRCA2 analysis
- Samples are analyzed by our German laboratory partner, Centogene

5. Receive the test results
- Within 4 – 6 weeks, the results and a letter of explanation will be sent to you

6. Have patients discuss their test results with a genetic counsellor
- A post-test genetic counselling appointment with Lifelabs Genetics is encouraged

The field of genetics is always evolving and so are we! Please visit our website for a list of current tests at **www.lifelabsgenetics.com**

Ask.Genetics@LifeLabs.com | www.lifelabsgenetics.com | 1-844-363-4357

References: 1. Claus EB, et al. The genetic attributable risk of breast and ovarian cancer. *Cancer*. 1996;77(11):2318-2324. **2.** Morgan R.J, Jr., et al. Ovarian Cancer, Version 1.2016, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw*. 2016;14(9):1134-1163. **3.** Hall M.J, et al. BRCA1 and BRCA2 mutations in women of different ethnicities undergoing testing for hereditary breast-ovarian cancer. *Cancer*. 2009;115(10):2222-2233. **4.** National Cancer Institute. BRCA1 and BRCA2: Cancer Risk and Genetic Testing, 2015. Available at: https://www.cancer.gov/about-cancer/causes-prevention/genetics/brca-fact-sheet. Retrieved February 22, 2017. **5.** Petrucelli N, et al. *BRCA1- and BRCA2-Associated Hereditary Breast and Ovarian Cancer*. In: Pagon RA, Adam MP, Ardinger HH, et al., eds. *GeneReviews®*. Seattle (WA); 1993. **6.** American College of Obstetricians and Gynecologists. *Hereditary Cancer Syndromes and Risk Assessment*. June, 2015. **7.** Whittemore AS, et al. Prevalence of BRCA1 mutation carriers among U.S. non-Hispanic Whites. *Cancer Epidemiol Biomarkers Prev*. 2004;13(12):2078-2083. **8.** Horsman D, et al. Clinical management recommendations for surveillance and risk-reduction strategies for hereditary breast and ovarian cancer among individuals carrying a deleterious BRCA1 or BRCA2 mutation. *J Obstet Gynaecol Can*. 2007;29(1):45-60. **9.** Daly MB, et al. NCCN Guidelines Insights: Genetic/Familial High-Risk Assessment: Breast and Ovarian, Version 2.2017. *J Natl Compr Canc Netw*. 2017;15(1):9-20.

LifeLabs GENETICS™

BRCA1 and BRCA2 tests:
Help your patients make informed decisions about hereditary breast and ovarian cancer

Ask.Genetics@LifeLabs.com | www.lifelabsgenetics.com | 1-84-GENEHELP (1-844-363-4357)

LifeLabs GENETICS™

BRCA1 and BRCA2 testing

- Next generation sequencing (NGS): sensitivity >98.5%, specificity >98.2%, 100% coverage >20x
- Deletion/duplication via MLPA: sensitivity 99.9% and specificity 99.8%
- Sanger sequencing and familial mutation testing also available

LifeLabs Genetics also offers genetic testing for multi-gene panels and genes less frequently associated with breast and ovarian cancer.

Our genetic counsellors can help patients understand their test results

A **genetic consultation** is an important aspect of care for individuals with risk factors associated with a hereditary cancer syndrome.

Pre-test and post-test genetic counselling is available for all patients and includes:

- A hereditary cancer risk assessment based on personal and family medical history
- Review of the benefits, limitations, and risks of testing
- Medical and psychological implications of test results for the patient and family

Recommended screening questions for your patients

To determine whether your patient is at an increased risk for a BRCA1 or BRCA2 mutation, consider asking if your patient has a personal or family history of:[4-6]

☐ Breast cancer diagnosed at age 50 or younger	☐ Two or more relatives with breast cancer, one under age 50
☐ Multiple primary breast cancers	☐ Three or more relatives with breast, ovarian, pancreatic, and/or aggressive prostate cancer
☐ Triple-negative breast cancer (ER-, PR-, Her2/neu-)	☐ Ashkenazi Jewish ancestry with history of breast, ovarian, or pancreatic cancer
☐ Ovarian cancer, fallopian tube, or primary peritoneal cancer at any age	☐ Pancreatic cancer with breast or ovarian cancer in the same individual or on the same side of the family
☐ Both breast and ovarian cancer	☐ A previously identified BRCA1 or BRCA2 pathogenic mutation in the family
☐ Male breast cancer at any age	

Recent evidence indicates that **20 – 50%** of individuals with BRCA1 or BRCA2 mutations have **no reported family history** of breast and/or ovarian cancer.[7] Therefore, individuals who do not meet the criteria may still choose to pursue BRCA1 and BRCA2 genetic testing to find out more information about their risk of cancer, even though the chance of finding a BRCA1 or BRCA2 mutation might be low.

Publicly-funded genetic testing may be available for patients considered to be at high risk of carrying a BRCA1 or BRCA2 mutation. To obtain more information about publicly-funded options and/or to refer to a cancer genetics clinic, please visit: www.cagc-accg.ca.

Whenever possible, genetic testing should be performed on a family member diagnosed with either breast or ovarian cancer.

Recommendations for patients with a BRCA1 or BRCA2 mutation

There are a number of precautionary surveillance practices recommended for both men and women with BRCA1 or BRCA2 mutations.[8,9]

FOR WOMEN

Enhanced screening

- Breast awareness
- Clinical breast examination every 6 months
- Annual breast MRI and mammogram
- Consider transvaginal ultrasound and CA-125 levels
- Consider full body skin examination

Prophylactic surgery

- Bilateral mastectomy
- Bilateral salpingo-oophorectomy

Chemoprevention

- Tamoxifen, oral contraceptives

FOR MEN

Enhanced screening

- Breast awareness
- Regular clinical breast examination
- Consider mammogram
- Routine prostate cancer screening
- Consider full body skin examination

Cancer screening and prevention options should be based on personal and family medical histories for individuals when no mutation is identified.

Resources for healthcare providers and patients

- LifeLabs geneticists and genetic counsellors: **http://www.lifelabsgenetics.com**
- Find a genetics clinic: **http://www.cagc-accg.ca**
- Hereditary Breast and Ovarian Cancer Society: **http://hbocsociety.org**
- Ovarian Cancer Canada: **http://www.ovariancanada.org**
- Willow: Breast and Hereditary Cancer Support: **http://www.willow.org**
- HBOC on *GeneReviews®*: **http://www.ncbi.nlm.nih.gov/books/NBK1247**
- Canadian Cancer Society: **http://www.cancer.ca**
- Rethink Breast Cancer **https://rethinkbreastcancer.com/**