Breast Cancer’s Link to Ovarian Cancer: It’s in Your Genes
There are now more than 2.6 million women in America who have been diagnosed with breast cancer. A very small fraction of these women, about 5% to 10%, carry gene mutations that put them at high risk for developing a second breast cancer and ovarian cancer (including the fallopian tube (FT) and primary peritoneal (PP) ovarian cancer subtypes). Because there is no effective screening test for ovarian cancer, and early detection is challenging, women need to learn as much as possible about their personal risk for developing ovarian cancer.

**BRCA1 and BRCA2 Genes**

*BRCA1* and *BRCA2* are human genes that are involved with cell growth, cell division and DNA repair. Mutations (changes) in these genes can result in a failure to repair DNA that can, in turn, lead to the development of cancer, especially breast and ovarian cancer. The lifetime risk for developing ovarian cancer is up to 39–46% in *BRCA1* carriers and up to 10–27% in *BRCA2* carriers.

Both men and women can carry *BRCA1/2* mutations and have a 50 percent chance of passing the mutation on to each of their children. About 1 in 400 to 1 in 800 people in the general population have a mutation in one of these genes. While there may be other genes that predispose women to breast cancer and ovarian cancer, *BRCA1* and *BRCA2* are the most common and well-defined among them. Not all women who inherit an altered *BRCA1/2* gene will develop breast cancer and/or ovarian/PP/FT cancer.

Certain groups are more likely to carry an altered *BRCA1* or *BRCA2* gene. For example, about 1 in 40 Jewish women of Eastern European (Ashkenazi) descent have a *BRCA1/2* gene mutation.

**Women with Breast Cancer**

Women diagnosed with breast cancer should determine if they are at risk for ovarian cancer. While this is true for only a very small number of women with breast cancer, specific preventive steps are available. So it is important and worthwhile to determine if any of the risk factors apply to you and then take appropriate action.

**Do You Have Any of the Factors Below That Increase Your Chances of Developing Ovarian Cancer Following a Breast Cancer Diagnosis?**

- Personal diagnosis of breast cancer before age 45.
- A close blood relation on either your mother’s or father’s side of the family diagnosed with ovarian cancer at any age. A close blood relation includes mother, sister, daughter, grandmother, granddaughter, aunt or niece.
- Personal diagnosis of breast cancer before age 50 with at least one close relative who has had breast cancer before age 50 or ovarian cancer at any age.
If you suspect, or have been diagnosed with ovarian cancer or another gynecologic cancer (i.e. cervical, uterine, vaginal or vulvar cancer), you should seek care first from a gynecologic oncologist.

A gynecologic oncologist is a board-certified obstetrician/gynecologist who has an additional three to four years of specialized training in treating gynecologic cancers from an American Board of Obstetrics and Gynecology-approved fellowship program. This subspecialty program provides training in the biology and pathology of gynecologic cancers, as well as in all forms of treatment for these diseases, including surgery, radiation, chemotherapy and research trials.

Data continues to confirm that women who are treated first by a gynecologic oncologist for ovarian cancer experience better outcomes.

• Personal diagnosis of multiple primary cancers (i.e., bilateral breast cancer, or breast and ovarian cancer).
• Close relative with male breast cancer (for example a father, brother, uncle or grandfather).
• Two or more close relatives on the same side of the family (either your mother's or father's) who had breast cancer before age 50 or ovarian cancer at any age.
• Eastern European (Ashkenazi) Jewish ancestry, and you or a close relative on either side of your family has had breast cancer before age 50 or ovarian cancer at any age.

**Genetic Counseling and Testing**

Genetic counselors are certified healthcare professionals with specialized graduate training in the areas of medical genetics and counseling. They are somewhat like family tree medical detectives who can advise if you need to consider genetic testing depending upon what they learn from you and your family history.

Genetic testing is a blood test or saliva test. This test can determine if you test positive for a BRCA1 or BRCA2 gene mutation, and/or other known cancer gene mutations that increase your lifetime risk for cancer. Testing positive for one of these mutations cannot predict that you will develop cancer. They can only tell you that you are at a higher risk for developing a cancer like ovarian cancer.

**IF YOU ANSWERED YES TO ANY OF THESE, talk to your doctor about genetic counseling and the possibility of genetic testing to help determine the best screening and prevention strategies for you.**
Steps to Take If You Test Positive for Either the BRCA1 or BRCA2 Gene

• Have a gynecologic exam one to two times each year.
• Have both an annual mammogram and annual breast MRI beginning at age 25.
• Have both a transvaginal ultrasound and CA125 test two times per year starting at age 30–35 until the ovaries and fallopian tubes are removed preventively after childbearing.
• Talk to your doctor immediately if you experience any of the ovarian cancer symptoms described in this brochure on a daily basis for 2–3 weeks.

The Option of Preventive Surgery

For women determined to be at the highest risk for developing ovarian cancer, preventive surgery to remove the ovaries and the fallopian tubes is the most effective method for preventing ovarian cancer. This step can reduce the risk of ovarian cancer by 85–90% in some cases, and can reduce the risk of developing breast cancer.

Surgery however, is an important and personal choice. For pre-menopausal women, this will result in premature menopause. It can also have an impact on many aspects of your life, so it should be discussed with a gynecologic surgeon who specializes in ovarian/gynecologic cancer called a gynecologic oncologist, your family and others whose opinion you value.

Ovarian Cancer Symptoms

Symptoms associated with ovarian cancer are common and subtle, and are often experienced by women without ovarian cancer. This is one reason why detecting ovarian cancer is difficult.

Recent studies, however, have shown that the following symptoms are much more likely to occur in women with ovarian cancer than in the general population.

• Bloating
• Pelvic or abdominal pain
• Difficulty eating or feeling full quickly
• Urinary symptoms (urgency or frequency)

Women with ovarian cancer report that symptoms are persistent and represent a change from normal for their bodies. Listen to Your Body.

Occasionally experiencing any of these symptoms is, of course, normal for most women and does not mean you have ovarian cancer. But if you experience any of these symptoms that are not normal for you, almost daily for 2–3 weeks, talk to your doctor, preferably a gynecologist.

The frequency and/or number of such symptoms are key factors in the diagnosis of ovarian cancer. Several studies show that even early stage ovarian cancer can produce these symptoms.
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<tr>
<th>Resource</th>
<th>Contact Information</th>
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<tr>
<td>American Cancer Society</td>
<td>800.ACS.2345 cancer.org</td>
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<tr>
<td>American College of Obstetricians and Gyneceologists</td>
<td>202.863.2518 acog.org <a href="mailto:resources@acog.org">resources@acog.org</a></td>
</tr>
<tr>
<td>CancerCare</td>
<td>800.813.HOPE cancercare.org <a href="mailto:info@cancercare.org">info@cancercare.org</a></td>
</tr>
<tr>
<td>Cancer Support Community</td>
<td>917.305.1200 cancersupportcommunity.org</td>
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<tr>
<td>Centers for Disease Control and Prevention</td>
<td>800.CDC.INFO (800.232.4636) cdc.gov/cancer <a href="mailto:cancerinfo@cdc.gov">cancerinfo@cdc.gov</a></td>
</tr>
<tr>
<td>EyesOnThePrize.org Support for Gynecologic Cancer</td>
<td>eyesontheprize.org <a href="mailto:info@eyesontheprize.org">info@eyesontheprize.org</a></td>
</tr>
<tr>
<td>Force: Facing Our Risk of Cancer Empowered</td>
<td>866.288.RISK facingourrisk.org <a href="mailto:info@facingourrisk.org">info@facingourrisk.org</a></td>
</tr>
<tr>
<td>Foundation for Women's Cancer</td>
<td>312.578.1439 800.444.4441 (Information Hotline) foundationforwomenscancer.org <a href="mailto:info@foundationforwomenscancer.org">info@foundationforwomenscancer.org</a></td>
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<tr>
<td>Gilda Radner Familial Ovarian Cancer Registry</td>
<td>800.OVARIAN 716.845.4503 ovariancancer.com <a href="mailto:gradner@roswellpark.org">gradner@roswellpark.org</a></td>
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<tr>
<td>Gynecologic Oncology Group</td>
<td>800.225.3053 gog.org <a href="mailto:kness@gog.org">kness@gog.org</a></td>
</tr>
<tr>
<td>Lynne Cohen Foundation for Ovarian Cancer Research</td>
<td>877.OVARY.11 877.682.7911 lynnecohenfoundation.org <a href="mailto:info@lcfocr.org">info@lcfocr.org</a></td>
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<tr>
<td>National Society of Genetic Counselors</td>
<td>312.321.6834 nsgc.org <a href="mailto:nsgc@nsgc.org">nsgc@nsgc.org</a></td>
</tr>
<tr>
<td>National Cancer Institute Cancer Information Service</td>
<td>800.4.CANCER cancer.gov/cis <a href="mailto:cisinfo@cancer.gov">cisinfo@cancer.gov</a></td>
</tr>
<tr>
<td>National Coalition for Cancer Survivorship</td>
<td>301.650.9127 canceradvocacy.org <a href="mailto:info@canceradvocacy.org">info@canceradvocacy.org</a></td>
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<tr>
<td>National Ovarian Cancer Coalition</td>
<td>888.OVARIAN ovarian.org <a href="mailto:nocc@ovarian.org">nocc@ovarian.org</a></td>
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<tr>
<td>Sharsheret</td>
<td>866.474.2774 <a href="mailto:info@sharsheret.org">info@sharsheret.org</a></td>
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