How common are BRCA1 and BRCA2 mutations?
- In the general population, between one in 300 and one in 800 individuals carry a BRCA1 or 2 or mutation.\textsuperscript{1,3}
- For individuals of Ashkenazi Jewish ancestry, one in 40 individuals carry a BRCA1 or 2 or mutation.

What percentage of breast and ovarian cancers are caused by BRCA1 or BRCA2 mutations?
- 5 percent-10 percent of all breast cancer.
- Up to 15 percent of ovarian cancers.\textsuperscript{1,4}

What are the lifetime cancer risks associated with BRCA1 and BRCA2 mutations?
- Breast cancer: 44 percent-87 percent
- Ovarian cancer: 20 percent-50 percent
- Male breast cancer and pancreatic cancer: \textsim 7 percent

Which patients should I refer to a genetic counselor for risk assessment and discussion of genetic testing for BRCA1 and BRCA2 mutations?

Patients who have a personal or family history (this includes maternal or paternal lineages) or those who have had: \textsuperscript{1,3,5}
- Breast cancer at a young age (younger than age 50)
- Ovarian cancer at any age
- Bilateral breast cancer or 2 or more primary tumors of the breast
- Breast and ovarian cancer
- Breast cancer and are male
- Two or more biological relatives* on the same side of the family with breast and/or ovarian cancer (*parent, child, siblings, grandparent, grandchild, aunt/uncle, niece/nephew, first cousin)
- Breast or ovarian cancer and are of Ashkenazi Jewish ancestry
- Confirmed BRCA1 or BRCA2 mutation in their family

Specific indications for genetic counseling and testing vary among professional organizations. The indications above are to be used as a guide and are not a substitute for clinical judgment. Not all clinical scenarios can be anticipated such as when there is a limited family structure or family medical history.

What are the benefits of genetic counseling when offering BRCA1 and BRCA2 testing?
- Patient education and informed consent are critical aspects of the genetic testing process and will help individuals decide if genetic testing is right for them.
- Pre-test counseling addresses the implications of potential test results, medical management options, psychosocial challenges, laws protecting against genetic discrimination, other options for testing and testing costs. Examples include:
  - The possibility of false negative results because genes other than BRCA1 and 2 may be responsible for cancers in the family
  - The possibility of test results with mutations noted to have “uncertain clinical significance”
  - The cost of BRCA gene testing differs depending on which level of testing is indicated ($440-$3,770)
  - The possibility of indirectly disclosing non-paternity, non-disclosed adoptions or use of egg or sperm donation
If help is needed, a genetics health care professional also can provide assistance with dissemination of relevant information to at-risk family members.

**Resources**

**Genetics health care professionals:**
- Illinois Department of Public Health ([http://www.idph.state.il.us/HealthWellness/genetics.htm](http://www.idph.state.il.us/HealthWellness/genetics.htm))
- National Society of Genetic Counselors ([www.nsgc.org](http://www.nsgc.org))

**BRCA1 and BRCA2 referral, testing and risk management guidelines:**
- American College of Obstetrics and Gynecology (ACOG)
- American Society of Clinical Oncology (ASCO)
- National Cancer Institute (NCI)
- National Comprehensive Cancer Network (NCCN)
  - [www.nccn.org/professionals/physician_gls/PDF/genetics_screening.pdf](http://www.nccn.org/professionals/physician_gls/PDF/genetics_screening.pdf)
- U.S. Preventative Services Task Force (USPSTF)
  - [www.ahrq.gov/clinic/uspsft/uspsbrgen.htm](http://www.ahrq.gov/clinic/uspsft/uspsbrgen.htm)

**Patient friendly facts about genetic testing for breast and ovarian cancer risk**
- U.S. Centers for Disease Control and Prevention
  - [www.cdc.gov/genomics/resources/diseases/breast_ovarian_cancer.htm](http://www.cdc.gov/genomics/resources/diseases/breast_ovarian_cancer.htm)
- Facing Our Risk of Cancer Empowered (FORCE)
  - [www.facingourrisk.org](http://www.facingourrisk.org)
- National Cancer Institute
- National Institute of Health – Genetics Through a Primary Care Lens: A Web-Based Resource for Faculty Development
  - [www.genetests.org](http://www.genetests.org)

**References**

5. Guidelines listed in Resources above.