



Cancer Genetics Risk Assessment Program

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Triaging patients for genetic testing: For offices planning to order BRCA1/2

Criteria for consideration of BRCA1/2 Genetic Testing:

Family History of known BRCA1/2 mutation

Personal History Cancer:

Breast cancer <50

Ovarian cancer at any age

Bilateral breast cancer when one of the following is true:

- First breast cancer diagnosed <50 OR
- Relative with breast or ovarian cancer at any age

Family History Cancer (On Same Side of the Family):

First degree relative with bilateral breast cancer, with first breast cancer diagnosed <50 (regardless of family history)

Relative with both breast and ovarian cancer (two primaries)

Relative with breast cancer <50 OR bilateral breast cancer at any age AND a relative with ovarian or pancreatic cancer, any age

2 or more relatives with breast cancer when one of the following is true:

- At least 1 individual is <50 OR
- One individual has bilateral breast cancer OR
- A relative with pancreatic cancer

2 or more relatives with ovarian cancer

3 or more relatives with breast cancer, diagnosed at any age

Male relative with breast cancer

Ashkenazi Jewish ethnicity and family history breast or ovarian cancer (regardless of age)

Individuals Who Would Benefit From a Formal Genetic Consultation:

- Early onset breast cancer (<50) and family history of other cancers (ie, uterine, colon, thyroid)
- Negative BRCA1/2 result in person with strong family history breast and/or ovarian cancer
- Positive BRCA1/2 result in person who desires more information
- Variant of uncertain significance result in BRCA1/2
- Families with the following features in relatives (outside of breast/ovarian cancer):
 - a. Early onset cancers (typically <50 years)
 - b. Multiple primary cancers in an individual
 - c. Multiple generations with cancer
 - d. Multiple individuals with the same type of cancer
 - e. Patterns of cancer together (such as colon and uterine or breast, uterine and thyroid, or lobular breast and gastric cancer) in families
 - f. Rare cancers

Tips on collecting family history:

- Sketch a quick pedigree including patient, siblings, children, parents and grandparents.
- *Ask about both sides of the family.* Mutations can be inherited from either side of the family.
 - For each side of the family, document the number of aunts/uncles and ask if they have had any cancer, and if any cousins have had cancer.
- Important questions to ask about relatives if they have had cancer:
 - *Type of cancer*
 - *Age of onset*
 - *Treatment* For example, a person reported to have ovarian cancer at age 25 who survived an additional 50 years or who was treated with surgery alone may have had something else.
- *Ask about age and cause of death for relatives.* If there are few women or all the relatives died young, this is relevant to risk assessment.
- *Ask about ethnicity.* Individuals of Ashkenazi Jewish descent have a 1/40 chance to carry one of 3 mutations in BRCA1/2 specific to this ethnic group.
- When possible, document family history with medical records and/or death certificates. Reported family history is not infrequently wrong.

On-line tool for family history collection:

<http://www.northshore.org/clinicalservices/medicalgenetics/mygenerations/default.aspx?id=4411>

On-line tool used to estimate the risk to carry a BRCA1/2 mutation (Takes about 2-3 minutes to enter data but tends to overestimate risk): <http://www.afcri.upenn.edu/itacc/penn2/>

Tips on testing

- Ideal to test youngest affected individual first, if at all possible, for the most informative test results.
 - Affected family member can find genetic service provider by going to <http://www.nsgc.org/resourcelink.cfm> (should you list GeneTests Clinic Directory as well – will NSGC list geneticists?)
- Ask if any family members have had genetic testing. If yes, get a copy of the report.
 - If family member tested positive, order single site testing only for known mutation.
 - If family member tested negative and was affected with cancer, consider genetic counseling referral for evaluation of other possible hereditary cancer conditions.
 - If family member tested negative and was not affected with cancer, genetic testing may still be appropriate.
- Full sequencing (BRCAanalysis) costs \$3120 and has a detection rate of 90%.
- Testing for a known mutation in the family is \$440 and is fully informative.
- Testing an Ashkenazi Jewish patient for the three common Jewish founder mutations costs \$535 and has a detection rate of 97%.
- Large gene rearrangement testing (BART) is performed automatically only when certain criteria are met. When criteria are not met and it is requested, it costs an additional \$650 for an additional 2-3% overall detection rate. The higher the level of suspicion for a BRCA mutation, the stronger you should consider BART testing.