

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 Cancer History:***
 - 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 of 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+ 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+ relatives with ovarian cancer
 - 3+ 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 (e.g., 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):
 - Early-onset cancers (typically < 50 years)
 - Multiple primary cancers in an individual
 - Multiple generations with cancer
 - Multiple individuals with the same type of cancer
 - Patterns of cancer together (such as colon and uterine or breast, uterine and thyroid, or lobular breast and gastric cancer) in families
 - Rare cancers

If you have questions about a patient and when to test/refer, please contact a Cancer Genetics Specialist in your area. Contact information for Indiana's genetics services providers is located on the Indiana State Department of Health's Genomics website at www.in.gov/isdh/20101.htm.

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 members can find a local genetics services provider by going to <http://www.nsgc.org/resourcelink.cfm> or www.in.gov/isdh/20101.htm.
- 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 \$3,120 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.