Increased Breast Cancer Risk in Women with NF1

In recent years, it has become clear that women with NF1 are at an increased risk for breast cancer, with the risk being two to three time higher in women with NF1 than in those in the general population. Also, these cancers occur at a younger age and tend to be more aggressive in women with NF1 than those that occur in women in the general population. The nature and composition of the cancers, however, are not different.

In many women who have been diagnosed with breast cancer, a genetic panel of tests is performed to detect mutations that might be associated with the cancer. The NF1 gene is now being tested as part of this panel, as well as other genes including BRCA1 and BRCA2. However, it's important to note that the increased risk of breast cancer in women with NF1 is not associated with mutations in the BRCA1 or BRCA2 genes.

The reason for the increased risk of breast cancer in women with NF1 is not completely understood. We know that cancer is the result of the accumulation of genetic alterations that cause cells to behave abnormally. The NF1 gene has been shown to have mutated in many common cancers, which might indicate that the NF1 mutation puts an individual one step closer to developing other cancers.

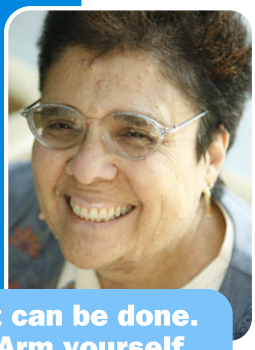
Breast Cancer Screening Recommendations

The increased risk of breast cancer in women with NF1 raises questions about screening recommendations. The National Comprehensive Cancer Network (NCCN), an organization that issues screening guidelines for various cancers, recommends that women with NF1 should be screened for breast cancer at an earlier age than the general population, beginning at age 30.

Meet Bev, a Breast Cancer Survivor with NF1

"I have found myself in the position to be able to talk to, either in person or via email to others, both with and without NF about fighting and beating breast cancer.

You and your doctors are a team – and you are an equal partner in your fight. Never be afraid to discuss all your options and remember more and more is being learned every day about the relationship between NF1 and breast cancer."



"It can be done. Arm yourself with facts, and don't be afraid to ask your doctor questions."

The above excerpts have been written by Bruce Korf, geneticist, neurologist & scientist, directs the UAB NF Program
Read his entire blog and more of Bev's story by scanning the QR code.

CANCER RISK MANAGEMENT BASED ON GENETIC TEST RESULTS[a,1,2]

The inclusion of a gene in this table below does not imply the endorsement either for or against multi-gene testing for moderate-penetrance genes.

Gene	Breast Cancer Risk and Management (First primary)	Epithelial Ovarian Cancer Risk and Management	Pancreatic Cancer Risk and Management[13-22] and Other Cancer Risks
NF1	• **Absolute risk:** 20%–40%[52,53] • **Management:**[b] ▸ Screening: Annual mammogram starting at age 30 y and consider breast MRI with contrast from ages 30–50 y[c,d] ▸ Risk reduction: Evidence insufficient for RRM, manage based on family history • **Strength of evidence of association with cancer:** Strong	**Evidence of increased risk:** No established association	**Malignant peripheral nerve sheath tumors, GIST, others** • Recommend referral to *NF1* specialist for evaluation and management
	Comments: At this time, there are no data to suggest an increased breast cancer risk after age 50 y. Consider possibility of false-positive MRI results due to presence of breast neurofibromas.		
PALB2	• **Absolute risk:** 41%–60%[5,8,22,54] • **Management:**[b] ▸ Screening: Annual mammogram and breast MRI with contrast at 30 y[c,d] ▸ Risk reduction: Discuss option of RRM • **Strength of evidence of association with cancer:** Strong **Male breast cancer** • **Absolute risk:** 0.9% by age 70 y[22] • **Strength of evidence of association with cancer:** Strong	• **Absolute risk:** 3%–5%[10-12,22,61,62] • **Management:**[f] ▸ Risk reduction: Consider RRSO at age >45 y[h] • **Strength of evidence of association with cancer:** Strong	**Pancreatic cancer** • **Absolute risk:** 5%–10% • **Management:** Screen P/LP variant carriers with a family history of pancreatic cancer, see PANC-A • **Strength of evidence of association with cancer:** Limited **Other cancers** • Unknown or insufficient evidence
	Comments: See GENE-B for reproductive implications/ recessive disease.		
PTEN	• **Absolute risk:** 40%–60% (historical cohort data), >60% (projected estimates)[55-58] • **Management:**[b] See Cowden Syndrome Management • **Strength of evidence of association with cancer:** Strong[59,60]	**Evidence of increased risk:** No established association	**Thyroid, colorectal, endometrial, renal cancers** • See Cowden Syndrome Management

Footnotes on GENE-A 8 of 10 **References on GENE-A 9 of 10 and GENE-A 10 of 10**