

New test set to transform breast cancer prevention

October 9 2017



Credit: University of Manchester

Women who have a family history of breast cancer are set to benefit from a new genetic test at Manchester University NHS Foundation Trust (MFT) that assesses breast cancer risk, with plans for it to enter clinical

practice within the next six months.

Developed by researchers at MFT and The University of Manchester, the test will accurately predict [breast cancer](#) risk in women who do not test positive for BRCA1/2 gene [mutations](#). In some instances, it may also help to refine [breast cancer risk](#) in those with the BRCA1/2 mutations, according to research published in the *Journal of Medical Genetics*, and funded by the NIHR and Prevent Breast Cancer.

Breast [cancer](#) is the most common cancer affecting women. Having a parent or sibling with breast cancer makes women twice as likely to get breast cancer themselves. Mutations in the BRCA1/2 genes have been identified as a cause of hereditary cancer, but only account for 15 to 20 per cent of the underlying inherited genetic trigger for the condition.

The new genetic test assesses breast cancer risk based on genetic variations (single nucleotide polymorphisms, SNPs) in an individual's DNA. The researchers found that mutations of 18 SNPs were indicative of breast cancer risk for women who did not carry BRCA1/2 mutations. These were found to have minimal effect in isolation, but when combined could increase or decrease breast cancer risk considerably.

The case-control study recruited 451 women (112 with BRCA1/2 mutations) with a family history of breast cancer who had developed breast cancer. The researchers compared the diagnosis of [invasive breast cancer](#) and genetic profile in the case group against that of a control group of 1,605 women (691 with BRCA1/2 mutations).

The analysis of DNA using participants' blood samples was used to determine their individual genetic makeup. To predict an overall risk estimate, the researchers used this information, alongside other risk factors including: age at first assessment; [family history](#) of first and second-degree relatives; age at first child, first period and menopause;

height and weight; and history of prior non-cancerous breast disease.

Many women who were originally high risk (lifetime risk of 30% or greater) were reclassified to a lower risk where risk reducing mastectomy is not recommended. The study suggested that the number of women with BRCA1/2 mutations who currently choose to have a mastectomy could reduce by a third – from 50 to about 36 per cent.

Prevent Breast Cancer's Predicting Risk of Cancer At Screening (PROCAS) SNP study of 10,000 women, 455 of which went on to develop breast cancer, has confirmed the accuracy of the predictions.

The study was led by Gareth Evans, Professor/Consultant in Medical Genetics and Cancer Epidemiology at The University of Manchester and Saint Mary's Hospital. He said: "This new test will help women at risk of familial breast cancer to make more informed decisions about their care.

"BRCA1 and BRCA2 are just part of what we should be looking for when assessing risk and in Manchester we plan to incorporate screening for these new genetic markers in clinical practice within the next six months.

"We are committed to improving cancer prevention through research and, with funding from the NIHR Manchester Biomedical Research Centre, we plan to develop new screening strategies and biomarkers for other common cancers, including womb, bowel, ovarian and prostate."

Becky Measures, BRCA1 carrier who had a mastectomy at Wythenshawe Hospital added: "When they find that they have the BRCA1/2 gene many women fear that they have to take action immediately. The new test will give [women](#) more options and help them to make a more informed decision."

Lester Barr, chairman of Prevent Breast Cancer, said: "With more accurate genetic testing, we can better predict a woman's risk of developing the disease and therefore offer the appropriate advice and support, rather than a 'one size fits all' approach. It's so exciting to see this additional test go into [clinical practice](#), as it's this more tailored method that will help us on our mission to protect future generations from [breast](#) cancer."

More information: Josie Innes et al. CNVs affecting cancer predisposing genes (CPGs) detected as incidental findings in routine germline diagnostic chromosomal microarray (CMA) testing, *Journal of Medical Genetics* (2017). [DOI: 10.1136/jmedgenet-2017-104892](https://doi.org/10.1136/jmedgenet-2017-104892)

Provided by University of Manchester

Citation: New test set to transform breast cancer prevention (2017, October 9) retrieved 4 July 2023 from https://medicalxpress.com/news/2017-10-breast-cancer_1.html

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