Important information about your data

Your genomic data and samples will be stored as part of your health record. DNA samples may be used anonymously for quality control. All data is kept securely and confidentially in line with UK law and NHS policy. More information can be found at www.england.nhs.uk/contact-us/privacy-notice

Information in this guide should be used to supplement professional advice specific to your circumstances. If you have any questions, it is important to ask your medical team or contact

Name

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Telephone Number/Email……
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Genomic testing in inherited Breast Cancer (Test Code R208)

Patient Information Leaflet

NHS
South West Genomic Laboratory Hub

Version V1.1 April 2023

Why have I been offered an inherited breast cancer genetic test (R208)?

You are being offered this test because of your breast cancer diagnosis and because you meet the current national criteria for genetic testing.

The test may give us information about why you developed breast cancer and about your risks of developing new cancers in the future. As this test looks for inherited (germline) variants, it may have implications for your future health and for your family. If we find that you have an increased risk of future cancers' we will discuss screening and risk reducing methods with you.

Please take time to ask all the questions that you need to. If you don't feel ready to have a test right now, your team can store a DNA sample and revisit this with you at a later date. If you decide not to have a genomic test you will still get the best possible health care, based on what we know about your cancer.

Is breast cancer inherited?

Most breast cancer is not inherited. Breast cancer is a common condition, it affects around one in seven women in the UK. Only a minority of breast, around 5-10%, are influenced by a genetic variant. Genes which influence breast cancer risk generally fall into one of two categories:

- High risk breast cancer genes. These genes can cause a high lifetime risk of breast cancer. High risk is defined as a lifetime breast cancer risk of 30-80%.

Testing for inherited variants (germline) testing

This test, called R208, is an inherited variant test. This test can pick up gene variants that are present in all of your cells and have been present since you were born. Your DNA is a combination of both of your parents, so this type of gene variant is usually inherited. Inherited (germline) variants may tell us why a cancer occurred. These variants may also predict the risk of future cancers, in you and your relatives.

Testing for cancer-specific (somatic) variants

This is separate to the R208 test but might be mentioned by your cancer treatment team. A somatic test looks at the DNA in your tumour, rather than the DNA in the rest of your body. These variants are not inherited and cannot be passed on. Somatic variants may give us information about your cancer type, or what treatment is most suitable for you.

Are other cancers associated with these genes?

The R208 genes primarily influence breast and ovarian cancer risk. Some R208 genes also influence the risk of other cancers, although this risk is smaller than the risk of breast cancer. Associated cancers can include; ovarian cancer for women. Pancreatic and skin cancer for men and women. As well as prostate and male breast cancer for men.

The R208 gene panel includes a number of genes and the laboratory will add to it as we learn more about cancer genetics. Only genes with a proven influence on breast cancer risk will be added. If you have specific questions about the genes currently included in the R208 test, please discuss these with your healthcare professional. If required, you have the option to speak to a genetic specialist before making your decision about testing. Everyone who tests positive, or has a significant family history, will be offered a referral to a genetic specialist.

Your Genomic Test results

Once your sample has been taken the results are returned to your healthcare professional who will share them with you. There are three outcomes to this genetic test:

Positive: A variant is found in a breast cancer gene.

Negative (normal): No variants were found in the genes tested.

Inconclusive: A gene variant was found but its significance is unclear.

1. What does it mean if a gene variant is found on my genetic test?

This is likely to explain why you developed breast cancer. Your breast cancer team will inform you of the result and consider this information when planning your treatment.

You will be referred to Clinical Genetics so that you can discuss your result in more detail. Clinical Genetics will explain what the test result means for your future risk of cancer, your options for cancer screening and measures to reduce these risks.

A test will be available for your relatives to assess their genetic cancer risk. Clinical Genetics will support you in sharing the information with family members, so that everyone gets the care they need.

2. What does it mean if no gene variants are found on my genetic test?

This is the most common result. This result means it is unlikely that your breast cancer was caused by an inherited gene variant. The risk of future cancers (in you or your relatives) is unlikely to be raised unless you have a significant family history of cancer.

If you have a significant family history of cancer you will be referred to Clinical Genetics for further discussion.

3. What does an inconclusive result mean?

People are diverse and there is a lot of variation within our genes. Some gene variants have no effect on how a gene functions. If a new or rare variant is picked up, it can hard to predict whether it affects cancer risk, or whether it is just harmless variation.

If the scientists cannot be sure of a variant's effect, they will report it as an uncertain finding. (In technical terms this is called a "variant of uncertain significance", or "VUS"). If an uncertain variant is found, you may be referred to Clinical Genetics so that they can assess this for you and your family.

Further information about Cancer Genomic Testing:

Cancer Genomics

Cancer occurs when damage inside of a cell results in that cell growing and dividing in an uncontrolled manner. Some cancers are triggered by specific environmental factors, such as smoking, UV light or radiation. Most cancers involve a number of different factors and are essentially a chance event, one that becomes more common as we age. In a small number of cases cancer can be caused by an inherited gene "variant", one that can be passed on between generations.

Genomic testing is increasingly being used in cancer treatment pathways. This kind of testing may help us to understand:

- Why you developed a cancer
- Which treatments may be most effective for your cancer
- If you are at risk of developing a further cancer in the future and potential screening and risk reducing options
- Whether your relatives are at increased risk of cancer

What is a Genomic test?

A gene is a specific sequence of DNA. Each gene performs a particular role in the body, some genes help to prevent cancer. A "variant" is a different code to the standard gene sequence. Changes to the gene sequence can affect how the gene functions. The exact effect depends on the gene involved.

There are different types of genetic tests: inherited (germline) and cancer-specific (somatic).

Examples of high risk genes include BRCA1, BRCA2 and PALB2. These genes also influence the risk of ovarian cancer. There may be some increased risk of other cancers, depending on family history.

- Moderate risk breast cancer genes. These genes increase breast cancer risk, but not as strongly as the high risk genes. Moderate risk genes typically cause a lifetime breast cancer risk of 20-30%, depending on family history. Examples of moderate risk genes include CHEK2 and RAD51C. Some of these genes also influence ovarian cancer risk. Moderate risk genes were discovered more recently, so we are still learning about their effect on cancer risk.

Inheritance: If a parent has a gene variant, there is a 50% chance of passing it on each time they have a child. This is not influenced by sex; we all have these genes and either parent can pass them on to any child.

What happens in a Genetic Test?

Genomic testing in inherited Breast Cancer (Test Code R208) is carried out on a blood sample.

If you decide to have the R208 genetic test, your healthcare professional will discuss this with you and there is a form to complete which records your choices. Your blood sample will be sent to our regional Genomics Laboratory Hub for testing. Testing usually takes between 2 to 3 months. This test is about your cancer and inherited breast cancer risk, it does not look for changes in DNA that may cause other health conditions.