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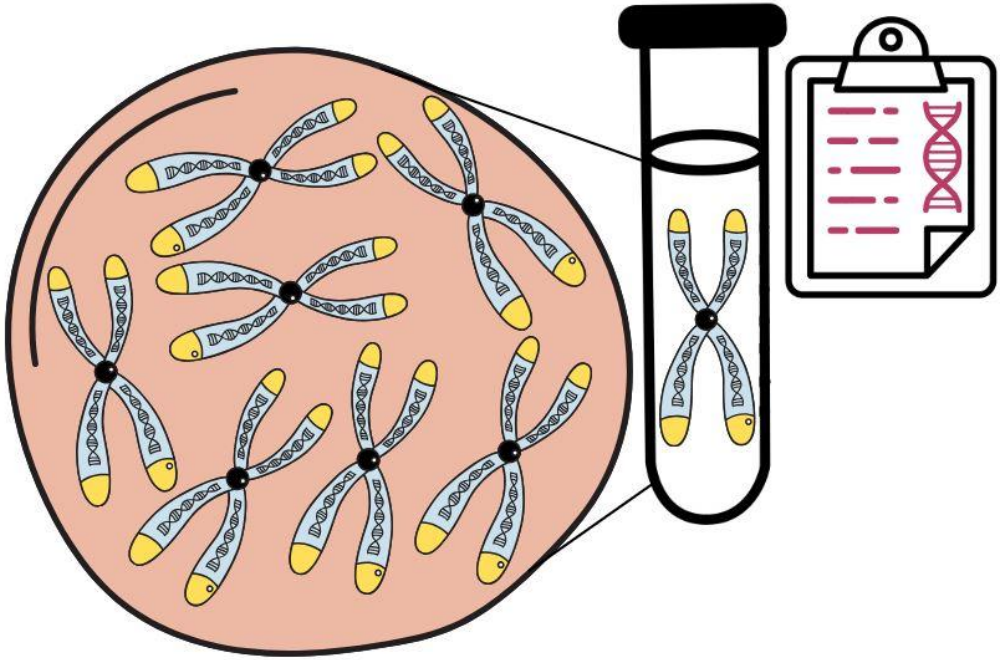
DIAGNOSTIC GENETIC TESTING FOR OVARIAN CANCER PATIENTS



NORTHERN IRELAND REGIONAL GENETICS SERVICE

Last updated January 2025

GENETIC TESTING FOR OVARIAN CANCER PATIENTS

This leaflet provides information for individuals who have been diagnosed with ovarian cancer, and have been offered genetic testing.

IS OVARIAN CANCER INHERITED?

Cancer is a common condition, affecting around 1 in 2 people during their lifetime, usually at an older age. It's not unusual to see multiple family members with cancer. In the UK, approximately 1 in 50 women will be diagnosed with ovarian cancer during their lifetime. Around 15-20% of these cases are linked to inherited genetic variants that can be passed through family. The other 80-85% are considered 'sporadic', and may be due to a combination of environmental and lifestyle factors, and are often just due to chance. The main risk factor is getting older. It is much more likely that a cancer diagnosis is sporadic and has occurred by chance than be due to inherited factors in a family.

WHAT ARE CANCER PREDISPOSITION GENES?

Our DNA contains thousands of genes, which are inherited instructions that guide how our bodies grow, develop, and function. Some of these genes help protect us from cancer, known as cancer predisposition genes. The most well-known are BRCA1 and BRCA2, but many others can also be tested. If someone inherits a faulty copy of a cancer predisposition gene, it may not work properly, increasing their risk of certain cancers. The level of risk depends on which gene is affected. Cancers caused by inherited gene variants often develop at a younger age than those in the general population.

WHAT DOES GENETIC TESTING INVOLVE?

As standard we now offer all patients testing using a **multigene panel** (analysing several genes in a single blood test). Collection of this blood sample will be arranged by your oncology clinician. Results take on average 3-4 months from the date that we receive your sample.

WHICH GENES WILL BE TESTED?

Your clinician may ask about your family history of cancer. If you have a family history of breast cancer, you may be offered testing for additional genes linked to breast cancer. The table below shows the standard genes tested (if there is no family history of breast cancer). Some of these genes might not be directly linked to your cancer type or family history.

GENE	CANCER TYPES MOST ASSOCIATED*
BRCA1	Breast and Ovarian
BRCA2	Breast, Ovarian and Prostate
BRIP1	Ovarian
EPCAM, MLH1, MSH2, MSH6, PMS2	Colorectal and Endometrial (womb) + smaller ovarian cancer risks
PALB2	Breast and Ovarian
RAD51C	Breast and Ovarian
RAD51D	Breast and Ovarian
Additional genes to be tested for those with a personal and/or family history of breast cancer:	
ATM	Breast
CHEK2	Breast
PTEN	Breast, Thyroid, Renal, Bowel, Endometrial
STK11	Breast, Bowel, Gastric, Pancreatic
TP53	Breast, Bone and Soft tissue, Central nervous system, Adrenocortical

** based on currently known risk associations which are subject to change as new research findings emerge*

** there are smaller increased cancer risks associated with many of the genes listed*

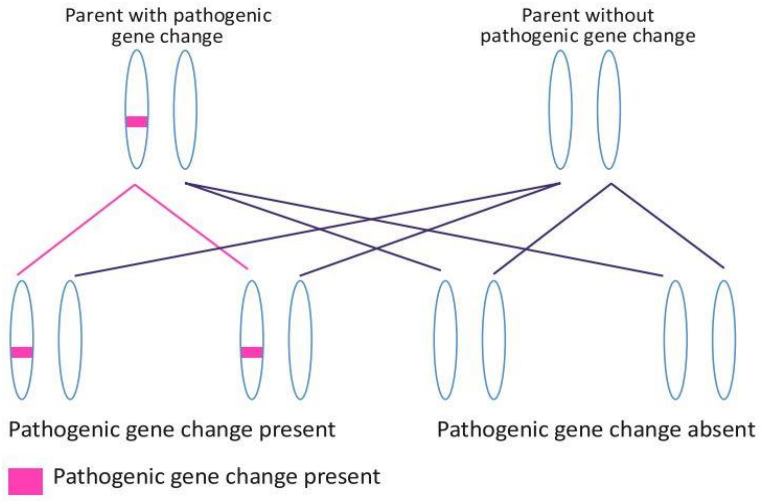
WHAT ARE THE POSSIBLE RESULTS OF THIS GENETIC TESTING AND WHO WILL INFORM ME OF MY RESULT?

There are three possible results of this type of testing, listed below in order of **most to least common**:

RESULT	RESULT MEANING AND IMPLICATIONS
No significant gene variant	This makes it much less likely that your cancer was caused by an inherited genetic risk factor, but it doesn't completely rule it out. There may be genes we don't yet know about or cannot test for. Research is ongoing to better understand the genetics of inherited cancers.
You will be informed of this by the **clinician who ordered your test**, along with a letter which further explains the meaning of this result for you and your family.	
Pathogenic gene variant	**A gene variant that is known to cause increased cancer risks** • May provide a likely explanation for your cancer diagnosis • Can be associated with increased risks of developing further cancers- in some cases, screening or risk-reducing measures could be available. • May be used by your oncologists when deciding the most appropriate treatment for you. • Certain relatives may be eligible for genetic testing to find out whether they have also inherited this.
You will be informed by your **clinician who ordered your test**, and will be offered an urgent appointment with the genetics service to discuss the meaning of this result, next steps, and the wider implications for you and your family.	
Variant of uncertain significance (VUS)	A variant was found in one of the tested genes, but it's unclear whether it causes cancer or is harmless. Since we don't know if it increases cancer risk, we typically wouldn't recommend testing relatives for it. However, in some cases, relatives with cancers linked to this gene might be eligible for testing.
You will be informed by your **clinician who ordered this test for you,** and will be offered an urgent appointment with the genetics service to discuss the meaning of this result.	

HOW ARE THESE GENES INHERITED?

We inherit our genes in pairs, one from each parent. When we have children, we randomly pass on one gene from each pair. If someone has a faulty copy of a cancer predisposition gene, each child has a 50% (1 in 2) chance of inheriting it. If they don't inherit the faulty copy, they can't pass it to their children. For most cancer predisposition genes, having one faulty copy increases cancer risk. This is called '**autosomal dominant inheritance**'. Genetic test results may be important for family members, as they could share the same inherited risk. Identifying a faulty gene in a relative with cancer is key to testing other family members.



WHAT IF THE RESULTS ARE NOT RELATED TO MY CURRENT CANCER?

Although rare due to the targeted genes in the test, genetic testing could find an inherited variant unrelated to your ovarian cancer. Even if it doesn't affect your treatment, it may impact your long-term health and have implications for your family. At your follow-up genetics appointment, we'll provide support and guidance to help you and your family understand these results.

WHAT ARE THE CANCER RISKS ASSOCIATED WITH PATHOGENIC VARIANTS IN CANCER PREDISPOSITION GENES?

The risks depend on which gene the pathogenic variant is in. For some breast and ovarian cancer genes, the risks can vary significantly based on family history. Your genetic health professional may provide a personalised risk estimate that considers your family history and individual situation.

WILL GENETIC TESTING IMPACT MY INSURANCE PROSPECTS?

Insurance companies may consider an individual's personal medical history, and their family history (including cancer) when setting up policies and calculating premiums. Medical history will need to be disclosed for some types of insurance. These commonly include life cover, critical illness insurance, and income protection insurance. There is however currently an agreement between the UK Government and The Association of British Insurers which prevents insurance companies who are signed up to the code from asking about genetic testing and/or using genetic testing information to calculate premiums. This code is reviewed every 3 years.
Detailed and up-to-date information about genetic testing and insurance can be found in the **'Code on Genetic Testing and Insurance'** at:
https://www.abi.org.uk/globalassets/files/publications/public/genetics/code-ongenetic-testing-and-insurance-final.pdf

ARE THERE ANY OTHER IMPLICATIONS OF GENETIC TESTING?

The results of genetic testing may provide information about your relatives' risk of developing cancer. If you are found to have a pathogenic gene variant, there is a chance that other people in the family have also inherited this. Some people experience a range of emotions when they are told they have a pathogenic variant in a cancer predisposition gene. They may feel angry, shocked, anxious, or guilty e.g. about possibly passing this to their children. Others feel relieved to have an explanation for their cancer, and are empowered to make medical and health decisions to lower their risks of developing another cancer in the future. If a pathogenic gene variant is found, you will have direct contact from a genetic counsellor who can help you to navigate the wider implications of testing, and provide support.

USEFUL LINKS

- https://belfasttrust.hscni.net/service/laboratory-services/clinical-genetics/patient-support/
- https://belfasttrust.hscni.net/service/laboratory-services/clinical-genetics/common-referrals-and-information-for-patients-professionals/