

# Understanding your pathology results

breast  
cancer  
care

This booklet tells you about breast cancer pathology results, and may help you think about questions you want to ask your specialist team.



## **This information is by Breast Cancer Care.**

**We are the only specialist UK-wide charity that supports people affected by breast cancer. We've been supporting them, their family and friends and campaigning on their behalf since 1973.**

Today, we continue to offer reliable information and personal support, over the phone and online, from nurses and people who've been there. We also offer local support across the UK.

From the moment you notice something isn't right, through to treatment and beyond, we're here to help you feel more in control.

For breast cancer care, support and information, call us free on **0808 800 6000** or visit **[breastcancercare.org.uk](https://breastcancercare.org.uk)**



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## Introduction

The information given in pathology results comes from tests done on tissue removed from the body. Breast cancer pathology results are important in helping your specialist team decide which treatments might work best for you, and also help to estimate the chance of the breast cancer coming back (recurrence).

There may be some breast cancer pathology terms in your results that you don't understand. You can find a list of some of the common ones on page 7.

## What is pathology?

Pathology is the branch of medicine that looks at how disease affects the body's cells and tissues.

Tissue removed from the body (for example, during a biopsy or surgery) is looked at under a microscope, and may have tests performed on it. The results are given in a pathology report that explains the type of breast cancer and its features.

Pathology results can also come from tests called genomic assays but these are not suitable for everyone (see page 20).

## Waiting for your results

Most people feel anxious waiting for pathology results. How long you wait depends on the type of biopsy or surgery you've had and where you're treated. Results usually take between one and two weeks. Some tests take longer than others and may be done in a different hospital to the one where you're being treated. Occasionally pathologists get a second opinion about the results which can also delay them. Your specialist or breast care nurse should be able to tell you when your results will be ready.

When you're first given your results you may find it hard to take it all in. It can help to bring a relative or close friend with you to the appointment. If you're told anything you don't understand, ask your specialist or breast care nurse to explain. You can ask for a copy of your pathology report to read through with a member of your breast care

team or later in your own time. You can also call the Breast Cancer Care Helpline on **0808 800 6000** to help you understand the results.

## What is a pathology report?

Each time you have tissue removed, it's looked at under a microscope and a report is written by a pathologist (a doctor who examines cells and tissues).

For example, a report will be written if you have a biopsy (removal of tissue to be looked at under a microscope), breast-conserving surgery (removal of the cancer and a margin (border) of normal breast tissue around it) or a mastectomy (removal of all the breast tissue including the nipple area).

The amount of detail in each report will depend on what tissue you've had removed and how much. Not all reports include the same amount of information. For example, a pathology report after a biopsy won't contain all the information that's in a report following surgery. You may need to wait for all your pathology reports to come back before a full treatment plan can be decided.

For more information on different types of surgery see our **Treating primary breast cancer** booklet.

# What's in a pathology report?

Not all pathology reports look the same – the layout and terms used vary between hospitals. However, most follow this structure.

## General information

This may include your name, date of birth and hospital number, your specialist's name and the date of your surgery or biopsy.

## Clinical information

This is the information given to the pathologist about the tissue, such as where it was in the breast before it was removed.

## Features of the breast tissue before it's looked at under a microscope

This section of the report is called the macroscopic description, and may include information about:

- the size, weight and appearance of the tissue
- how it was prepared for examination under the microscope

## Features of the cancer seen under a microscope

This section of the report is called the microscopic description. These features are explained in 'Information found in breast cancer pathology results' on page 8.

## Summary of the main points

Sometimes this will be a list at the end of the report, under the heading 'Diagnosis'.

All the information in pathology results is considered together when deciding which treatments to offer you and their likely benefits. No one piece of information should be looked at on its own – it always needs to be related to all your other results.

## Common breast cancer pathology terms explained

**Grade** – the system used to classify cancer cells according to how different they are to normal breast cells and how quickly they are growing.

**Invasive breast cancer** – breast cancer that has the potential to spread to other areas of the body.

**Isolated tumour cell clusters (ITCs)** – when there is less than 0.2mm of breast cancer in the lymph nodes.

**Ki67** – a protein found in cells. The higher the levels, the faster the cells are dividing and growing.

**Lympho-vascular invasion** – when breast cancer cells spread into (invade) the lymph and blood vessels within the breast, and can be seen in these vessels under the microscope.

**Micrometastasis** – when there is between 0.2mm and 2mm of breast cancer in the lymph nodes.

**Multi-centric** – when there's more than one area of breast cancer in different quarters of the breast.

**Multi-focal** – when there's more than one area of breast cancer in one quarter of the breast.

**Non-invasive breast cancer** – breast cancer that has not yet developed the ability to spread either within the breast or to another part of the body.

**NST (no special type) or NOS (not otherwise specified)** – cancer cells that have no features that stand out as a particular type.

**Pathologist** – a doctor who examines cells and tissues under a microscope.

**Pathology** – the branch of medicine that looks at how disease affects the body's cells and tissues.

**Pathology report** – the report written by the pathologist after they examine your tissue.

**Primary breast cancer** – breast cancer that has not spread beyond the breast or the lymph nodes under the arm (axilla).

**Surgical margin** – how close the cancer cells are to the edges of the whole area of tissue removed during surgery.

# Information found in breast cancer pathology results

Your pathology report will include the following information about your breast cancer.

## What type of breast cancer is it?

There are several types of breast cancer, which are diagnosed depending on what the cancer cells look like under a microscope.

### Primary breast cancer

Primary breast cancer is breast cancer that has not spread beyond the breast or the lymph nodes (glands) under the arm (axilla). It can be invasive or non-invasive (also called 'in situ').

Most breast cancers are invasive, which means they have the potential to spread to other areas of the body. This doesn't mean the cancer has or will spread, just that it's a possibility.

Non-invasive breast cancers have not yet developed the ability to spread either within the breast or to another part of the body.

Often there are areas of both non-invasive and invasive breast cancer at the same time.

### Invasive ductal breast cancer of no special type

Most breast cancers are this type. The term no special type (NST) or not otherwise specified (NOS) is used because when the cancer cells are looked at under a microscope they have no features that stand out as a particular type. For more information see our booklet **Invasive ductal breast cancer**.

## Other types of invasive breast cancer

Other breast cancers are known as special type. When these cancer cells are looked at under a microscope, some have certain features that identify them as a particular type. Generally they are treated in the same way as invasive breast cancer of no special type. These include:

- invasive lobular
- inflammatory
- Paget's disease of the breast
- tubular
- cribriform
- mucinous (also known as colloid)
- medullary
- papillary
- micropapillary
- malignant phyllodes
- metaplastic

We have booklets and online information about all the types of breast cancer listed above on our website [breastcancercare.org.uk](http://breastcancercare.org.uk)

## Ductal carcinoma in situ (DCIS)

This is an early type of non-invasive breast cancer. It's sometimes called pre-invasive or intraductal. For more information see our booklet [Ductal carcinoma in situ \(DCIS\)](#).

## Treatment options

The treatment you are recommended will depend on the type of breast cancer you have. Our booklet [Treating primary breast cancer](#) has more information on this. You may also find our [Primary breast cancer resource pack](#) useful.

### You may want to ask:

What type of breast cancer do I have?

Is the breast cancer invasive or non-invasive?

Can I have a copy of the pathology report?

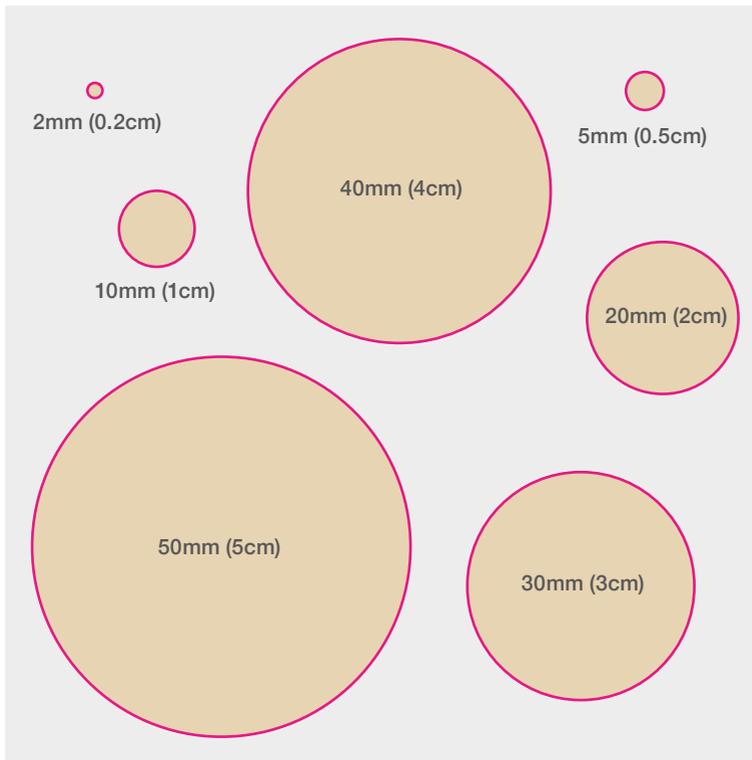
## What size is the breast cancer?

The size of the breast cancer is measured at its widest point, usually in millimetres (mm). One inch equals about 25mm.

If DCIS and invasive breast cancer are found together, the results will tell you their combined size (sometimes called 'whole tumour size') and how much there is of each. If both types are found together, only the details of the invasive breast cancer will be used by your specialist team to look at treatment and prognosis (outlook).

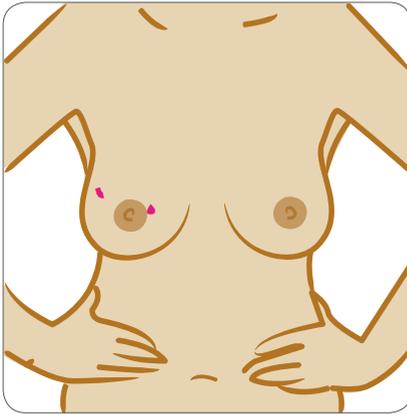
While in general smaller cancers may have a better outcome, size doesn't always give the whole picture and is just one part of the overall results. A small cancer can be fast growing while a larger cancer may be slow growing, or it could be the other way around.

### Size in millimetres and centimetres

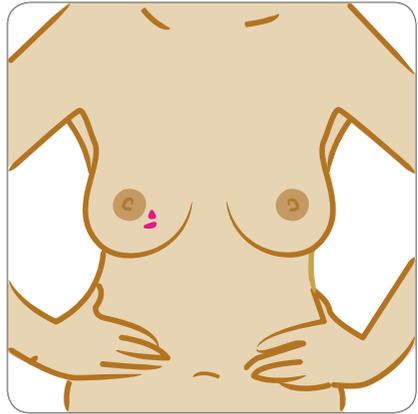


Sometimes there may be more than one area of breast cancer. In this case each area is measured. Multi-centric means there's more than one area of breast cancer in different quarters of the breast. Multi-focal means there's more than one area but only in one quarter of the breast. Your pathology results usually include information on whether the cancer is localised (which means there's only one area) or multiple foci (more than one area).

### Multi-centric breast cancer



### Multi-focal breast cancer



Some people have chemotherapy before surgery. This is called neo-adjuvant or primary chemotherapy. For these people, pathology results after their surgery will include a summary of how much cancer remained after the chemotherapy. This is called the pathological response:

- complete pathological response means no remaining cancer
- partial response means only some of the cancer remains
- no evidence of response means the cancer is the same or bigger than before the chemotherapy

## Treatment options

The size and position of the cancer in relation to your breast size may affect what operation you're offered. For example, with smaller cancers it's often possible to have breast-conserving surgery (also called wide local excision or lumpectomy). This is where only the cancer and a margin (border) of normal breast tissue surrounding it are removed.

If you have a larger cancer (in relation to your breast size), your specialist team may recommend a mastectomy, or chemotherapy before surgery (called neo-adjuvant or primary chemotherapy). This is sometimes given with the aim of shrinking the cancer before surgery.

Your specialist team will make a decision about whether to recommend chemotherapy depending on the size of the breast cancer and other features, such as whether or not the lymph nodes are affected (see page 15). Generally, people with larger breast cancers (greater than 2cm) are more likely to be offered chemotherapy. This is because larger cancers may have been there longer before being found and so may have had more chance to spread.

For more information read our **Chemotherapy for breast cancer** booklet.

### You may want to ask:

What size is the breast cancer?

Is there more than one area of breast cancer?

## What grade is the breast cancer?

Cancer cells are given a grade according to how different they are to normal breast cells and how quickly they are growing.

This is different to the cancer stage, which doesn't appear in a pathology report. You can read more about the stages of breast cancer on our website.

### Invasive breast cancer

There are three grades of invasive breast cancer:

- grade 1 – looks most like normal breast cells and is usually slow growing
- grade 2 – looks less like normal cells and is growing faster
- grade 3 – looks different to normal breast cells and is usually fast growing

## Treatment options

Generally, people with grade 3 invasive breast cancers are more likely to be offered chemotherapy, to help destroy any cancer cells that may have spread as a result of the cancer being faster growing.

For more information see our **Chemotherapy for breast cancer** booklet.

## Ductal carcinoma in situ (DCIS)

There are also three grades of DCIS, usually called low, intermediate and high.

### You may want to ask:

What grade is the breast cancer?

## What does Ki67 mean?

Ki67 is a protein found in cells. The higher the levels, the faster the cells are dividing and growing.

Ki67 is not usually included in pathology results. If it is, the report will say what percentage of the breast cancer cells test positive for Ki67. Less than 10% is considered low, 10–20% is medium and more than 20% is high. The higher the score, the faster the cells are dividing and growing.

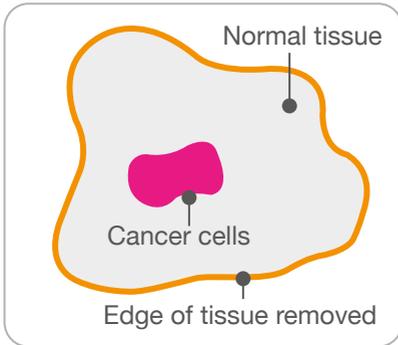
## Has the breast cancer been completely removed?

Your pathology results will say how close the cancer cells are to the edges of the area of tissue that was removed. This is called the surgical margin. It's important that the cancer is removed with an area of healthy tissue around it to try to ensure no cancer cells have been left behind:

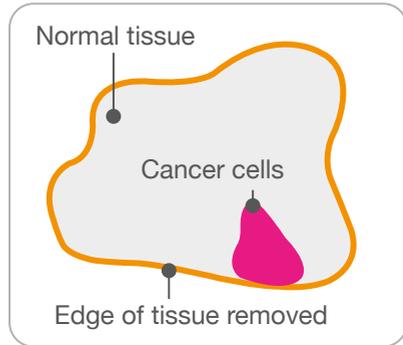
- negative (clear) margins mean no cancer cells were seen at the outer edge of the tissue removed
- positive margins mean the cancer cells are very close to, or reach, the edge of the tissue

Your pathology report is likely to give the distance of the cancer to all the margins around it. Words you may see in your report include superior (top), inferior (bottom), medial (towards the middle), lateral (towards the edge), superficial/anterior (front) and posterior/deep (back). Different hospitals will have their own guidelines as to how large the margin of clear, healthy tissue should be, but it's usually a minimum of 1mm around the cancer.

### Negative (clear) margins



### Positive margins



## Treatment options

If you have negative (clear) margins, it's unlikely you'll need more surgery to the breast. If you have positive or close margins, you may need to have another operation to take out more tissue depending on which, and how many, margins are involved. This sometimes means having a mastectomy to ensure all the cancer has been removed.

### You may want to ask:

Has all the breast cancer been removed, as far as you can tell?

## Are there any breast cancer cells in the lymph vessels or blood vessels (lympho-vascular invasion)?

The breast contains networks of lymph vessels and blood vessels that connect the breast to the rest of the body. If breast cancer cells invade (break through) the walls of these vessels, it's called lympho-vascular invasion. This increases the chances of the breast cancer spreading to somewhere else in the body. The pathology results will say if any lympho-vascular invasion has been seen in the tissue removed during surgery.

### Treatment options

People with lympho-vascular invasion are more likely to be offered chemotherapy to help destroy any cancer cells that may be in the lymphatic system or bloodstream.

For more information about chemotherapy see our [Chemotherapy for breast cancer](#) booklet.

#### You may want to ask:

Are there any signs of lympho-vascular invasion?

## Are there any breast cancer cells in the lymph nodes?

Breasts have a network of lymph vessels that drain into the lymph nodes (glands) under the arm (axilla). The number of nodes under the arm varies from person to person.

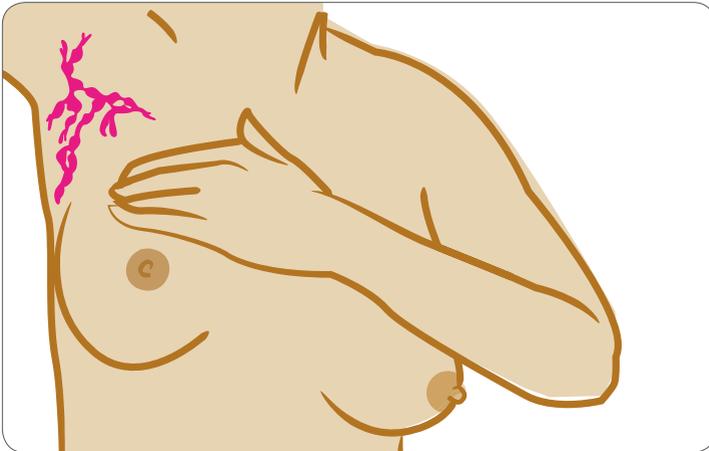
If you have invasive breast cancer, your specialist team will usually want to check if any of the lymph nodes under the arm contain cancer cells.

Sentinel lymph node biopsy is widely used for people with breast cancer whose tests before surgery show no evidence of the lymph nodes containing cancer cells. It identifies whether or not the first lymph node (or nodes) is clear of cancer cells:

- negative lymph nodes mean the nodes tested are free of cancer cells
- positive lymph nodes mean there are cancer cells in the nodes

Sentinel lymph node biopsy is usually carried out at the same time as your cancer surgery but may be done before your surgery.

### Lymph nodes under the arm



The pathology results will state how many lymph nodes were removed during surgery and how many contain breast cancer cells. This is often written as a number. For example, 2/10 means 10 lymph nodes were removed and 2 had cancer cells inside them. Generally, the more positive lymph nodes there are, the more likely the cancer has, or could, spread to somewhere else in the body. If cancer cells are found in the tissue surrounding the lymph nodes, it is called extra-capsular spread.

Sometimes there's only a very tiny area of breast cancer in the lymph nodes. Where the cancer in the lymph node is between 0.2mm and 2mm, this is called a micrometastasis. Where the area of cancer within the lymph node is less than 0.2mm, these are called isolated tumour cell clusters (ITCs).

## Treatment options

If you have micrometastases or isolated tumour cell clusters in your lymph nodes, you're unlikely to need any further treatment to the underarm.

People whose sentinel lymph nodes contain cancer cells may be offered further treatment to the underarm. This may involve surgery to remove more lymph nodes or radiotherapy to the underarm. Whether you are offered further treatment will depend on how many lymph nodes are affected, how much they are affected and what other treatment you are having.

For more information about radiotherapy see our [Radiotherapy for primary breast cancer](#) booklet.

Generally, people with lymph node positive breast cancer are more likely to be offered chemotherapy to help destroy any remaining cells, either in the nodes or elsewhere in the body.

For more information read our [Chemotherapy for breast cancer](#) booklet.

### You may want to ask:

Has the breast cancer spread to the lymph nodes under the arm?

If so, how many lymph nodes are affected?

## Are the breast cancer cells oestrogen receptor positive (ER+)?

The hormone oestrogen can stimulate some breast cancers to grow. If your breast cancer has receptors within the cell that bind to the hormone oestrogen, it's known as oestrogen receptor positive or ER+ breast cancer. If oestrogen receptors are not found it's known as oestrogen receptor negative or ER-.

Invasive breast cancers are tested for oestrogen receptors using tissue from a biopsy or after surgery. Tests may also be done for progesterone (another hormone) receptors.

Pathology results often give a score to indicate the amount of hormone receptors per cancer cell and the proportion of cells with receptors. The most likely scores you'll see in the results are the Quick or Allred score (between 0 and 8) or the H score (between 0 and 300). For both of these, the higher the scores, the more ER+ the breast cancer is. The percentage of cells with hormone receptors is also usually given (from 0% to 100%). A score of more than 1% is ER+.

## Treatment options

There are a number of hormone therapies that work in different ways to block the effect of oestrogen on cancer cells. If your cancer is ER+, your specialist will discuss with you which hormone therapy they recommend. The benefits of hormone therapy are less clear for people whose breast cancer is only progesterone receptor positive (PR+ and ER-). Very few breast cancers fall into this category but if this is the case your specialist will discuss with you whether hormone therapy is appropriate.

For more information see our **Treating primary breast cancer** booklet and our booklets on individual hormone therapy drugs.

If your breast cancer is hormone receptor negative, hormone therapy will not be of any benefit to you.

### You may want to ask:

Is the breast cancer hormone receptor positive (ER+ and/or PR+)?

Will I benefit from hormone therapy?

If so, what type of drug would be best for me and are there any alternatives?

## Are the breast cancer cells HER2 positive?

Around 15–20% of breast cancers have a higher than normal level of a protein called HER2 on their surface, which stimulates them to grow. These cancers are called HER2 positive or HER2+. Generally they are more likely to grow and spread faster than most types of HER2 negative breast cancers.

All invasive breast cancers are tested for HER2 levels. The results can sometimes take longer than the rest of the pathology results but are usually available between one and three weeks after your biopsy or surgery.

There are various tests to measure HER2 levels. The four most commonly used tests are IHC (immunohistochemistry), FISH (fluorescent in situ hybridisation), CISH (chromogenic in situ hybridisation) and DDISH (dual-colour dual-hapten brightfield in situ hybridisation).

IHC is usually done first. It involves a special staining process performed on a sample of breast cancer tissue. It's reported as a score ranging from 0–3+. A score of 0 or 1+ means the breast cancer is HER2 negative. A score of 2+ is borderline and a score of 3+ means the breast cancer is HER2 positive.

Breast cancers with a borderline result (2+) should be retested with FISH, CISH or DDISH to find out if they are HER2 positive. These are more specialised tests and are usually reported in pathology results as positive or negative.

### Treatment options

If your breast cancer is HER2 positive you will usually be advised to have chemotherapy and a targeted (biological) therapy such as trastuzumab (Herceptin). Targeted therapies block the growth and spread of cancer.

If your cancer is HER2 negative, targeted therapies will not be of any benefit to you.

For more information see our [Trastuzumab \(Herceptin\)](#) booklet.

### You may want to ask:

Is the breast cancer HER2 positive (HER2+)?

Will I benefit from targeted therapy?

If so, what type of drug would be best for me and are there any alternatives?

## Genomic assays (also called gene expression profiling or gene assays)

These tests look at groups of genes found in the breast cancer. They help identify who is most likely to benefit from chemotherapy and how likely the cancer is to return (recurrence).

The tests are carried out on breast tissue removed during surgery, usually in a laboratory away from your hospital, and don't involve having any more tissue removed.

The results are provided separately from your pathology report and your specialist team will consider them alongside your other pathology results to help them decide what treatments to recommend.

Genomic assays are not suitable for everyone and will usually only be considered if your breast cancer is invasive, oestrogen receptor positive (ER+) (see page 17) and HER2 negative (see page 19) and with no more than three positive lymph nodes (see page 15).

If any of these tests could be of benefit to you and are available on the NHS, your specialist team should discuss this with you.

Examples of genomic assay tests include the following.

### Oncotype DX

This test predicts how likely the cancer is to return and the likely benefit of having chemotherapy. The result, called the recurrence score, is reported as a number between 0 and 100. The higher the score, the

greater the risk of recurrence of an invasive breast cancer, and the more likely it is chemotherapy will be recommended.

### EndoPredict

This test predicts how likely the cancer is to spread within ten years. The result, called the EPclin score, is reported as high risk or low risk.

### The Prosigna Breast Cancer Prognostic Gene Signature Assay

This test predicts how likely the cancer is to spread within ten years. The result is reported as low, intermediate or high risk.

#### You may want to ask:

Is a genomic assay test suitable for me? If so, what test could I have?

### Talk to your specialist team

You may find it helpful to discuss your results with your specialist team. If there's anything in your pathology report that you don't understand, ask them to explain it to you.

# Questions you may want to ask your specialist team

**What type of breast cancer do I have?**

**Is it invasive or non-invasive or both?**

**What size is the breast cancer?**

**Is there more than one area?**

**What grade is the breast cancer?**

**Was the breast cancer tested for Ki67? If so, what was the result?**

**Has all the breast cancer been removed, as far as you can tell?**

**Are there any signs of lympho-vascular invasion?**

**Has the cancer spread to the lymph nodes? If so, how many lymph nodes are affected?**

**Is the breast cancer hormone receptor positive (ER+ and/or PR+)?**

**Is the breast cancer HER2 positive (HER2+)?**

**Is a genomic assay test suitable for me? If so, what test will I have?**



## Four ways to get support

We hope this information was helpful, but if you have questions, want to talk to someone who knows what it's like or want to read more about breast cancer, here's how you can.



Speak to trained experts, nurses or someone who's had breast cancer and been in your shoes. Call free on **0808 800 6000** (Monday to Friday 9am–4pm, Wednesdays til 7pm and Saturday 9am–1pm).



Chat to other women who understand what you're going through in our friendly community, for support day and night. Look around, share, ask a question or support others at **[forum.breastcancercare.org.uk](https://forum.breastcancercare.org.uk)**



Find trusted information you might need to understand your situation and take control of your diagnosis or order information booklets at **[breastcancercare.org.uk](https://breastcancercare.org.uk)**



See what support we have in your local area. We'll give you the chance to find out more about treatments and side effects as well as meet other people like you. Visit **[breastcancercare.org.uk/in-your-area](https://breastcancercare.org.uk/in-your-area)**

# We're here for you: help us to be there for other people too

If you found this booklet helpful, please use this form to send us a donation. Our information resources and other services are only free because of support from people such as you.

We want to be there for every person facing the emotional and physical trauma of a breast cancer diagnosis. Donate today and together we can ensure that everyone affected by breast cancer has someone to turn to.

## Donate by post

Please accept my donation of **£10/£20/my own choice of £**

I enclose a cheque/PO/CAF voucher made payable to  
**Breast Cancer Care**

## Donate online

You can give using a debit or credit card at  
**[breastcancercare.org.uk/donate](https://breastcancercare.org.uk/donate)**

## My details

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ Postcode \_\_\_\_\_

Email address \_\_\_\_\_

We might occasionally want to send you more information about our services and activities

Please tick if you're happy to receive email from us

Please tick if you don't want to receive post from us

We won't pass on your details to any other organisation or third parties.

Please return this form to Breast Cancer Care, Freepost RRRKZ-ARZY-YCKG,  
Chester House, 1-3 Brixton Road, London SW9 6DE



# About this booklet

**Understanding your pathology results** was written by Breast Cancer Care's clinical specialists, and reviewed by healthcare professionals and people affected by breast cancer.



For a full list of the sources we used to research it:

Phone **0345 092 0808**

Email **[publications@breastcancercare.org.uk](mailto:publications@breastcancercare.org.uk)**



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When you have breast cancer, everything changes. At Breast Cancer Care, we understand the emotions, challenges and decisions you face every day, and we know that everyone's experience is different.

For breast cancer care, support and information, call us free on **0808 800 6000** or visit **[breastcancercare.org.uk](https://breastcancercare.org.uk)**

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