

UNDERSTANDING YOUR PATHOLOGY RESULTS

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About this booklet

Your pathology results give details about your breast cancer that can help your treatment team decide the treatment you're offered.

It's normal to have questions about your pathology results. This booklet explains different types of pathology results and may help you think about questions to ask your treatment team.

Your pathology results may include medical terms you're not familiar with. You can ask your treatment team to explain anything that you do not understand.

What are pathology results?

Pathology is the study of disease.

If you've had a biopsy to diagnose breast cancer, or you have had breast cancer surgery, a doctor called a pathologist will look at the tissue under a microscope. They'll confirm the diagnosis and look at the features of the cancer cells. The pathologist may also do tests on the tissue to get more information.

This information is called the pathology results. The pathology results help your treatment team decide the treatment you'll be offered.

Waiting for your results

It's understandable to feel anxious waiting for your pathology results. How long you wait depends on the type of biopsy or surgery you had.

Results usually take between 1 and 2 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 or may need to do extra tests, which can take longer. Your specialist or breast care nurse should be able to tell you when your results will be ready.

Getting your results

When you first get your results, you may find it difficult to take everything in.

You might want to bring a pen and paper to your appointment so you can make notes. Or you could record the appointment on your phone so you can listen back to it later. Just ask permission first.

It might also be helpful to bring a relative or friend with you to the appointment, to help you remember what was said.

If you're told anything you do not understand, ask your treatment team to explain.

You can also call our helpline on **0808 800 6000** to help you understand your results.

Pathology reports

Each time you have tissue removed, it's looked at under a microscope and a report is written by a pathologist.

A report will be written if you have:

- **A biopsy** – removal of a sample of tissue
- **Breast-conserving surgery** – removal of the cancer with a margin (border) of normal breast tissue around it. It's also known as wide local excision or lumpectomy
- **A mastectomy** – removal of all the breast tissue, usually including the nipple area
- Surgery to the lymph nodes under the arm

You can ask for a copy of your pathology report to read through with a member of your treatment team or later in your own time.

The amount of detail in each report will depend on what tissue was removed and how much. For example, a report after surgery might contain more information than a biopsy report.

Your treatment team may need to wait for all your reports to come back before they can discuss a full treatment plan with you.

Your treatment team will use all the information from your pathology results, alongside other factors such as your medical history, to decide which treatments to offer you and how they might benefit you.

What's in a pathology report?

Not all pathology reports look the same. The layout and words used might be different between hospitals. However, most follow this structure.

General information

This will include your:

- Name
- Date of birth
- Hospital number

It will also include 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 removed, such as which breast it came from and where it was in the breast.

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

This section may include information about:

- The overall size, weight and appearance of the tissue
- How it was prepared to be looked at under the microscope

Features of the cancer seen under a microscope

This section of the report describes various features, which are explained in more detail later in this booklet.

Summary of the main points

This will often be a list at the beginning or end of the report.

Information about your breast cancer

The table on these pages is a simple summary of information commonly found in pathology results.

You'll find more detailed information on the following pages.

Information	What it means
Type of breast cancer	<p>There are different types of breast cancer.</p> <p>The type you have depends on what the cancer looks like under a microscope.</p>
How big the cancer is	The size of the cancer is usually given in millimetres (mm). There may be more than one area of cancer.
How fast the cancer is growing (grade)	Breast cancers can grow at different speeds.
If all the cancer has been removed	<p>During surgery, the cancer is removed along with a margin (border) of normal breast tissue around it.</p> <p>This is to try to make sure no cancer is left behind.</p>
If the cancer has spread under the arm	Breast cancer can spread to the lymph nodes under the arm.
What's helping the cancer grow	Hormones and proteins found naturally in your body can sometimes help your cancer grow. Tests will be done to find out what might be helping your breast cancer grow.
Other information about your breast cancer	Your treatment team may do other tests on the cancer. They will explain what the tests are and why they would like you to have them.

Effect on treatment	Find out more
<p>There are lots of ways breast cancer can be treated. You'll be offered the best treatment for you based on your type of cancer.</p>	Page 8
<p>The size may affect the type of operation you have, and whether you need other treatments.</p>	Page 10
<p>If you have a faster-growing cancer, you're more likely to be offered chemotherapy.</p>	Page 13
<p>If it looks like not all the cancer was removed, you may need another operation to remove more breast tissue.</p>	Page 14
<p>If the cancer has spread to the lymph nodes under the arm, you may be offered more surgery or radiotherapy to this area. Some people will be offered chemotherapy.</p>	Page 17
<p>Depending on the test results, you may be offered hormone therapy or targeted therapy.</p>	Page 19
<p>The results of these tests will help your treatment team decide which treatments are best for you.</p>	Page 22

Types of breast cancer

There are many different types of breast cancer. The type you have depends on what the cancer cells look like under a microscope.

Breast cancer can be invasive or non-invasive (also called *in situ*).

Most breast cancers are invasive. This means they have the potential to spread to other areas of the body.

Non-invasive breast cancers are not yet able to spread, either within the breast or to another part of the body.

Sometimes there are areas of both invasive and non-invasive breast cancer at the same time. If this is the case, the report will include information about both.

How the type of cancer affects treatment options

The treatment your team recommends will depend on the type of breast cancer you have, along with other features of your cancer.

Our booklet **Treating primary breast cancer** has more information on this.

Invasive breast cancer (no special type)

Most invasive breast cancers are of no special type (NST).

They're called no special type (NST) because they have no features that class them as a special type of breast cancer when examined under a microscope. You may also hear it called invasive ductal breast cancer or invasive breast cancer not otherwise specified (NOS).

Our booklet **Invasive breast cancer (no special type)** has more information on this.

Other types of invasive breast cancer

Other breast cancers are known as “special” types. When these cancer cells are looked at under a microscope, some have certain features that identify them as a particular type.

These types of breast cancer include:

- Cribriform
- Inflammatory
- Invasive lobular
- Invasive micropapillary
- Malignant phyllodes
- Medullary
- Metaplastic
- Mucinous
- Paget’s disease of the breast
- Papillary
- Tubular

They are mostly treated in the same way as invasive breast cancer (NST). Sometimes there are areas of no special type and special type at the same time.

We have information about all the types of breast cancer listed above on our website **breastcancernow.org**

Ductal carcinoma in situ (DCIS)

Ductal carcinoma in situ (also called DCIS) is an early type of non-invasive breast cancer. It’s sometimes called pre-invasive or intraductal.

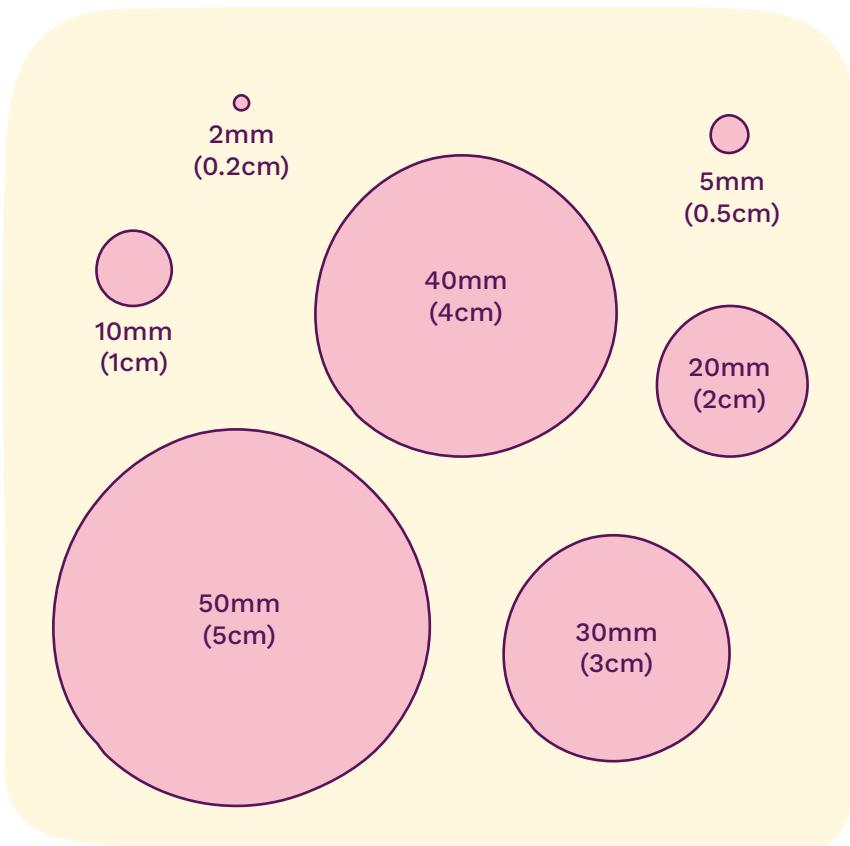
Our booklet **Ductal carcinoma in situ (DCIS)** has more information on this.

Size of the breast cancer

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

If DCIS and invasive breast cancer are found together, the results will tell you their combined size, called “whole tumour size”. However, your treatment team will only use the details of the invasive breast cancer to look at treatment options and your prognosis (outlook).

The size of the cancer is just one part of the overall results.



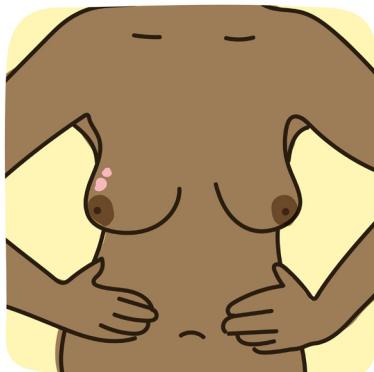
This illustration shows you what the size of the breast cancer might look like in millimetres and centimetres.

Is there more than 1 area of cancer?

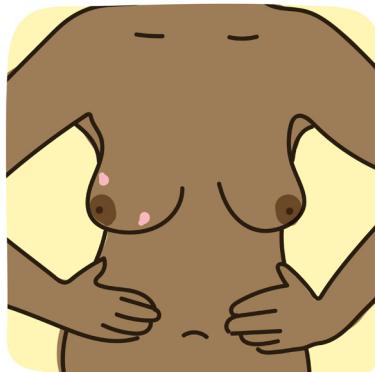
Your pathology results usually say whether there's only 1 area of cancer or more than 1 area.

If there's more than 1 area of breast cancer, each area is measured separately.

If there's more than 1 area of breast cancer in the same quarter of the breast, it may be called multi-focal. If there's more than 1 area of breast cancer in different quarters of the breast, it may be called multi-centric.



Multi-focal breast cancer



Multi-centric breast cancer

If you had chemotherapy or hormone therapy before surgery

Sometimes chemotherapy or hormone therapy is given before surgery, for example to shrink a larger cancer.

After surgery, the tissue removed is checked by the pathologist. Your pathology report will tell you the size of any cancer still present. On the report this is sometimes called the residual size of the cancer.

The size of the breast cancer that's left will help your treatment team see how well you responded to the treatment you had before surgery. This is called the pathological response. It can be described in 3 ways:

- Complete pathological response, meaning no remaining cancer
- Partial response, meaning only some remaining cancer
- No evidence of response, meaning the cancer is the same size or bigger than before the chemotherapy or hormone therapy

How size affects treatment options

The size of the cancer in relation to your breast size, as well as its position in the breast, may affect what treatment you're offered.

Your treatment team may recommend:

- A mastectomy to remove all the breast tissue
- Breast-conserving surgery (also called a wide local excision or lumpectomy)

Your treatment team will recommend chemotherapy depending on the size and other features of the breast cancer, and whether any cancer cells have spread to the lymph nodes under the arm (see page 17). You may have chemotherapy before surgery to shrink a larger breast cancer.

Our **Chemotherapy for breast cancer** booklet has more information about this.

Grade of the breast cancer

Breast cancers are given a grade according to

- How different the cancer cells are to normal breast cells
- How quickly they are growing

This is different to the cancer stage, which is based on the size of the cancer and how far it has spread. You can read more about cancer stage on our website.

Invasive breast cancer grades

There are 3 grades of invasive breast cancer:

- Grade 1 – the cells look the most like normal breast cells and are slower growing
- Grade 2 – the cells look less like normal breast cells and are growing faster than grade 1
- Grade 3 – the cells look the least like normal breast cells and are growing quicker

Sometimes the grade given to a cancer after a biopsy can change after surgery. This is because there's more tissue for the pathologist to look at after surgery, which can give them more detailed information about the cancer.

How grade affects treatment options

Your treatment team will consider the grade of your cancer when deciding which treatment to offer you.

If you have grade 3 breast cancer, you're more likely to be offered chemotherapy. This is to help destroy any cancer cells that may have spread as a result of the cancer growing more quickly.

You're less likely to be offered chemotherapy for grade 1 and grade 2 cancers.

Our **Chemotherapy for breast cancer** booklet has more information about this.

Ductal carcinoma in situ (DCIS) grades

There are 3 grades of DCIS, usually called low, intermediate and high.

Our booklet **Ductal carcinoma in situ (DCIS)** has more information on this.

Ki67

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

Ki67 is not commonly included in pathology results. If it is, the report will say what percentage of the breast cancer cells test positive for Ki67. Usually:

- Less than 10% is considered low
- 10 to 20% is medium
- More than 20% is high

Has the breast cancer been completely removed?

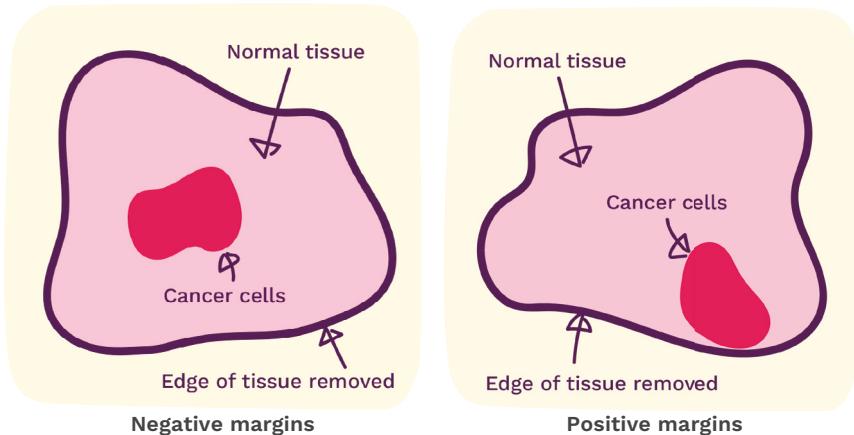
It's important the breast cancer is removed with a margin (border) of normal tissue around it. This is to try to make sure no cancer cells are left.

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 might be described as:

- Negative or clear margins, meaning no cancer cells were seen at the outer edge of the tissue removed
- Positive margins, meaning the cancer cells are very close to, or reach the edge of, the tissue

Surgical margins



Your pathology report will give the distance of the cancer from the margins around it.

You might see the words:

- Superior (top)
- Inferior (bottom)
- Medial (towards the middle)
- Lateral (towards the edge)
- Superficial/anterior (front)
- Posterior/deep (back)

The margin of normal tissue is usually a minimum of 1mm around an invasive cancer.

How margins affect treatment options

If you have negative or clear margins, you are unlikely to need more surgery. If you have positive or close margins, you may need to have another operation to remove more tissue. This may involve more breast-conserving surgery, but sometimes it means having a mastectomy to make sure all the cancer has been removed.

Your treatment team will discuss with you which treatments are most suitable for you.

Are there breast cancer cells in the lymph or blood vessels?

The breast contains blood vessels and other tiny tubes called lymph vessels.

If breast cancer cells spread into these vessels, it's called lymphovascular invasion. This increases the chances of the breast cancer spreading to somewhere else in the body.

The pathology results will say if there is any lymphovascular invasion in the tissue removed during surgery.

Having lymphovascular invasion is different from having breast cancer in the lymph nodes (see page 17).

How cancer in the lymph or blood vessels affects treatment options

If you have lymphovascular invasion, you may be offered treatments such as chemotherapy or radiotherapy.

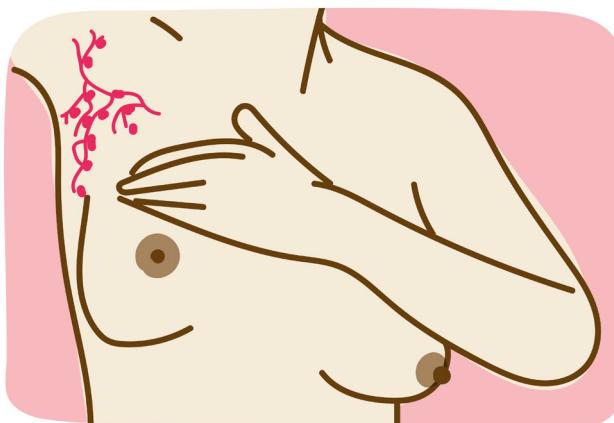
For more information about chemotherapy or radiotherapy, see our booklets **Chemotherapy for breast cancer** and **Radiotherapy for primary breast cancer**.

Are there breast cancer cells in the lymph nodes?

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

Surgery to the lymph nodes

Sentinel lymph node biopsy is often done if tests before your surgery show no evidence the lymph nodes contain cancer cells. The sentinel lymph node is the first lymph node or nodes cancer cells are likely to spread to.



Lymph nodes under the arm

If tests before your operation show your lymph nodes contain cancer cells, your surgeon is likely to recommend a lymph node clearance. This is when all the lymph nodes under the arm are removed.

Our **Treating primary breast cancer** booklet has more information about this.

Pathology results from lymph node surgery

The pathology results will say how many lymph nodes were removed during surgery and how many contained breast cancer cells. For example, 2/10 means 2 out of the 10 lymph nodes removed had cancer cells inside them.

There are a few ways the pathology report might describe what was found in your lymph nodes, including:

- Negative lymph nodes, meaning the nodes tested do not contain cancer cells
- Isolated tumour cells (ITCs), meaning the nodes contain very few cancer cells
- Positive lymph nodes, meaning there are cancer cells in the nodes. Generally, the more positive lymph nodes there are, the more likely the cancer may have or could spread somewhere else in the body
- Extracapsular or extranodal spread, meaning cancer cells were found in the tissue surrounding the lymph nodes
- Micrometastasis, meaning there was only a very tiny area of breast cancer (0.2mm to 2mm) in the lymph nodes

If you had chemotherapy or hormone therapy before surgery, the results will tell you if there's any evidence of cancer in the lymph nodes and, if so, if there are signs it has responded to the treatment.

How cancer cells in the lymph nodes affect treatment options

If there are cancer cells in the nodes removed during a sentinel lymph node biopsy, you may be offered more treatment to the armpit. This may involve surgery to remove more lymph nodes or radiotherapy to the armpit.

Our **Radiotherapy for primary breast cancer** booklet has more information on this.

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're having.

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.

Our **Chemotherapy for breast cancer** booklet has more information about this.

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

Are hormones helping the cancer to grow?

Some breast cancers use the hormones oestrogen or progesterone in the body to help them to grow. These are known as oestrogen receptor positive (ER-positive) and progesterone receptor positive (PR-positive) breast cancers.

Invasive breast cancers are tested to see if they are ER-positive or PR-positive using tissue from a biopsy or after surgery.

If oestrogen is not helping your breast cancer grow, it's ER-negative. If progesterone is not helping the breast cancer grow, it's PR-negative.

Pathology results often give a score to show:

- The amount of hormone receptors on the cancer cells
- The proportion of cancer cells with receptors

You'll usually see 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-positive or PR-positive the breast cancer is.

The percentage of cells with hormone receptors is often given from 0% to 100%. A score of more than 1% is considered hormone receptor positive.

How hormone receptors affect treatment options

Hormone therapies block or stop the effect of oestrogen on breast cancer cells. Different hormone therapy drugs do this in different ways.

You will only be prescribed hormone therapy if your breast cancer is ER-positive.

The benefits of hormone therapy are less clear for people whose breast cancer is only progesterone receptor positive (PR-positive and ER-negative). 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.

See our individual hormone drug booklets for more information.

HER2 levels

Some breast cancer cells have a higher-than-normal level of a protein called HER2 on their surface, which makes them grow more quickly.

This is known as HER2-positive breast cancer.

All invasive breast cancers are tested for HER2 levels. This is done in a hospital laboratory on a sample of breast cancer tissue removed during a biopsy or surgery.

There are various tests to measure HER2 levels. The results are usually available between 1 and 3 weeks after your biopsy or surgery. A test called IHC is usually done first to measure HER2 levels. The results are reported as a score ranging from 0 to 3+:

- 0 or 1+ means HER2-negative
- 2+ is borderline
- 3+ means HER2-positive

Breast cancers with a borderline result (2+) are retested using a more specialised test. These include tests called FISH, CISH

or DDIH. These tests usually give a result of HER2-positive, HER2-low or HER2-negative.

How HER2 levels affect treatment options

If your breast cancer is HER2-positive you will usually be advised to have chemotherapy and a targeted therapy such as trastuzumab or Phesgo, which is a combination of trastuzumab and pertuzumab (another type of targeted therapy). Targeted therapies block the growth and spread of cancer.

There is also evidence that HER2-low breast cancer may benefit from HER2 targeted therapy. The drug trastuzumab deruxtecan (Enhertu) can be used to treat HER2-low breast cancers in some instances. However, this is not currently available throughout the UK.

Speak to your treatment team for more information.

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

Genomic assays are tests that look at groups of genes found in breast cancer cells.

They help identify who is most likely to benefit from chemotherapy as well as hormone therapy, and how likely the cancer is to return (recurrence).

Your team will use the tests, along with other information about the breast cancer, to help decide what treatment to recommend.

Usually, the tests are carried out on breast tissue removed during surgery, so you won't need more procedures to remove tissue.

If your specialist has recommended you have hormone therapy before surgery, the test must be done on cancer tissue removed during a biopsy before you start hormone therapy.

The tests are usually done in a laboratory away from your hospital and you'll get the results separately from your pathology report.

Genomic assays are not suitable for everyone. They're usually considered if the breast cancer is invasive, ER-positive (see page 19), HER2-negative (see page 20), and lymph node negative (see page 18) or if breast cancer has spread to up to 3 lymph nodes under the arm.

Your treatment team will discuss having genomic assays with you if they think they would help with making decisions about your treatment.

Examples of genomic assay tests include the following.

EndoPredict

This test predicts how likely the cancer is to spread somewhere else in the body. It's suitable for some people who will be taking hormone therapy for at least 5 years.

The test gives a score, known as an EPclin Risk Score, that's reported as low or high risk.

A low risk score means it's unlikely the breast cancer will spread to somewhere else in the body. Most people with a low risk score will not need chemotherapy.

A high risk score means it's more likely the breast cancer will spread to somewhere else in the body. Chemotherapy is recommended for most people with a high risk score.

Oncotype DX

This test predicts how likely the cancer is to spread to somewhere else in the body. It's suitable for some people who will be taking hormone therapy for at least 5 years.

The test gives a score, called a Recurrence Score, from 0 to 100. The higher the score, the more likely breast cancer is to come back and the more likely you are to benefit from having chemotherapy as well as hormone therapy.

Chemotherapy is usually recommended if you have:

- A score of 26 or above and you are over the age of 50
- A score of 16 or above and you are aged 50 or under

Prosigna

Prosigna predicts how likely the cancer is to spread somewhere else in the body. It's suitable for some people who will be taking hormone therapy for at least 5 years.

The test gives a score, called a Recurrence Score, between 0 and 100. Based on this score and whether any lymph nodes under the arm are affected, the results are reported as low, intermediate or high risk.

A low risk score means it's unlikely the breast cancer will spread somewhere else in the body. Most people with a low risk score will not need chemotherapy.

An intermediate risk score means the decision to have chemotherapy is less clear. Your specialist will discuss with you what they recommend and why.

A high risk score means it's more likely the breast cancer will spread to somewhere else in the body. Chemotherapy is recommended for most people with a high risk score.

Questions you may want to ask your treatment team

You may find it helpful to discuss your results with your treatment team.

If there's anything in your pathology report that you do not understand, ask them to explain it to you.

Here are some ideas of questions you might want to ask. There's space to write down the answers on page 26.

- What type of breast cancer do I have?
- Is it invasive, non-invasive or both?
- What size is the cancer?
- Is there more than 1 area of cancer?
- What grade is the cancer?
- Has all the cancer been removed?
- Are there any signs of lymphovascular invasion?
- Has the cancer spread to the lymph nodes? If so, how many lymph nodes are affected?
- Is the cancer hormone receptor positive (ER-positive or PR-positive)?
- Is the cancer HER2-positive?
- Is a genomic assay test suitable for me? If so, what test will I have?

Further support

There can be a lot to take in when you get your pathology results back, and waiting for them can be a worrying time. But there's support available to help you.

Speak to your treatment team

It's important to get answers to any questions you have about the information in your pathology report. Speak to your treatment team if there's anything you don't understand or that you're worried about.

Helpline

You can call our helpline on **0808 800 6000**, 9am to 4pm Monday to Friday and 9am to 1pm on Saturdays, to speak to one of our specialist nurses if you've got any questions or worries about your pathology report.

Forum

Join our online forum to speak to others who are going through similar circumstances to you. Visit forum.breastcancernow.org to sign up.

Someone Like Me

If you've been diagnosed with primary breast cancer, our Someone Like Me service will match you with a trained volunteer who's had a similar experience to you. They'll be a phone call or email away to answer your questions, offer support or simply listen. Because there's nothing like finding someone who really understands.

Visit breastcancernow.org/support-for-you to find out more.

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We're Breast Cancer Now, the research and support charity. However you're experiencing breast cancer, we're here.

Life-changing support

Whoever you are, and whatever your experience of breast cancer, our free services are here. Whether you're worried about breast cancer, dealing with a diagnosis, working out life with or beyond treatment – or someone you love is.

World-class research

We support over 290 of the brightest minds in breast cancer research. They're discovering how to prevent breast cancer, live well with the disease, and save lives. Every day, they get closer to the next breakthrough.

Change-making campaigns

We fight for the best possible treatment, services and care for everyone affected by breast cancer, alongside thousands of dedicated campaigners.

Could you help?

We don't get any government or NHS funding for our support services or health information. So, we rely on donations and gifts in wills to make our vital work happen. If you'd like to support us, go to breastcancernow.org/give

ABOUT THIS BOOKLET

Understanding your pathology results was written by Breast Cancer Now'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:
Email health-info@breastcancernow.org



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We're here

Information you can trust, support you can count on

Whatever breast cancer brings, we're here for you.

Whether you're looking for information about breast cancer or want to speak to someone who understands, you can rely on us.

Call **0808 800 6000** to talk things through with our helpline nurses.

Visit **breastcancernow.org** for reliable breast cancer information.

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Patient Information Forum

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