BREASTCANCER • ORG

Understanding Your *Pathology Report*

A pathology report includes information about the breast cancer that helps you and your doctor make decisions about treatment.

Your pathology report

Your pathology report explains the breast cancer's characteristics. This information helps you and your doctors decide which treatments are best for you and your unique situation.

The term pathology report makes it sound like it's just one report with all the information about the breast cancer in it. But that's not what a pathology report is.

You receive a report with results each time you have a test. Because no one lab does all the tests you may need, you are likely to receive several different reports. Some results take longer than others, but you can expect most results one to two weeks after surgery or a blood test.

Together, all these individual reports make up your pathology report. It's a good idea to keep all the reports in one place so when you visit your doctor you can discuss any of the results.

Reading and making sense of all these reports can be scary and confusing. Different labs may use different words to talk about the same things. If there are words in any of the reports that you don't understand, don't be afraid to ask your doctor what they mean.

More information about your pathology report

This booklet summarizes some of the most common information in your pathology report. For more information, visit breastcancer.org/pathology-report.

The parts of a pathology report

Different doctors may use different words to describe the same findings. Different labs may organize pathology reports differently. But most pathology reports include these sections:

Personal information: Your name, birth date, and the date you had surgery or a blood test. There also may be a number assigned to you to help protect your identity.

Doctor and lab information: The pathologist's and clinician's contact information, as well as the name of the lab and its location.

Specimen information: Details about the tissue sample, which doctors call a specimen, including the date the doctor removed the specimen, the type of biopsy or surgery you had, and the type of tissue it is.

Clinical history: Information about how the cancer was found and, sometimes, other information about your medical history.

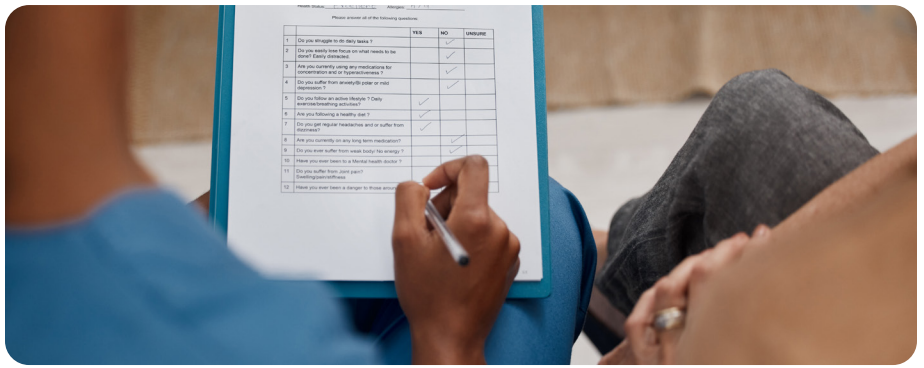
Gross description: What the doctor sees before looking at the tissue sample with a microscope. This usually includes the entire specimen's size and weight, as well as the presence or absence of any masses or lesions and their size, location, relationship to each other, color, and consistency.

Final diagnosis: Usually at the beginning of the pathology report and may be long or short, depending on the doctor's style. Includes summary of the breast cancer's most important characteristics if surgery or tests find cancer. The final diagnosis usually describes the type of breast cancer and is likely to include information about:

- cancer type and grade
- hormone receptor status
- HER2 status
- lymph node involvement
- anatomic location (where in the body the cancer is located)

Types of breast cancer you may see in your report include:

- Invasive ductal carcinoma (IDC): This is the most common type of breast cancer; about 80% of breast cancers are IDC.
- Invasive lobular carcinoma (ILC): Sometimes called infiltrating lobular carcinoma, this is the second most common type of breast cancer.
- DCIS (ductal carcinoma in situ): Non-invasive breast cancer that stays inside the milk ducts.
- Inflammatory breast cancer: This type of breast cancer is rare — only 1% to 5% of breast cancers are inflammatory. This is breast cancer that has symptoms such as swelling and reddening of the breast instead of a distinct lump.
- Paget's disease: Also called Paget's disease of the nipple, Paget's disease of the breast, and mammary Paget's disease, this is a rare type of cancer involving the skin of the nipple and the areola, the darker circle of skin around the nipple.
- Phyllodes tumors of the breast: These rare tumors start in the connective tissue, called the stroma, of the breast. About 75% of phyllodes tumors are benign, meaning they are not cancerous, and about 25% of phyllodes tumors are cancerous.
- LCIS (lobular carcinoma in situ): A collection of abnormal cells that stay inside milk glands or lobules. Even though its name includes the term "carcinoma," LCIS is considered to be a benign breast condition.



Synoptic summary

The synoptic summary tells you the characteristics of the tissue sample removed during breast cancer surgery. Pathology reports don't include a synoptic summary for people who had biopsies. This summary includes some of the same information from the final diagnosis and detailed information about the cancer's characteristics.

Non-invasive versus invasive: Non-invasive or in situ breast cancers stay in the place they start to grow. Breast cancer that has grown into tissue outside of the milk ducts or lobules where it began is called invasive or infiltrating. If the breast cancer cells have spread to parts of the body away from the breast, such as the bones or liver, it is called metastatic breast cancer.

In some cases, the removed tissue has both invasive and non-invasive breast cancer cells.

Nottingham grade of the cancer: The Nottingham histologic grade or histologic score is a grading system for tumors based on a cancer cell's size, shape, and growth rate. It's important to know that cancer grade is different from cancer stage.

Each characteristic gets a score between 1 (closest to normal) and 3 (most abnormal). To get the Nottingham score, you add these three scores together. There are three cancer grades based on the total score:

- Grade 1 (low grade or well-differentiated, score of 3 to 5): Grade 1 cancer cells look just a little bit different from normal cells.
- Grade 2 (moderate grade or moderately differentiated, score of 6 to 7): Grade 2 cancer cells look different from normal cells.
- Grade 3 (high grade or poorly differentiated, score of 8 to 9): Grade 3 cancer cells look very different from normal cells.

Size of the breast cancer: Doctors measure cancers in centimeters (cm) or millimeters (mm). The cancer's size is very important when determining the cancer's stage.

Tumor margins: When removing the cancer, the surgeon tries to take out all the cancer, plus a rim of healthy tissue around it, which is called the margin or margin of resection. The pathologist checks for cancer cells at or in the margin. Positive or involved margins mean there are cancer cells at the margin. Negative, clean, or clear margins mean there are no cancer cells at the margin. The pathologist also measures the distance between the cancer cells and the margin. Close margins mean there are cancer cells close to the edge of the healthy tissue.

Lymphovascular invasion: Lymph is a clear fluid that travels through the body's lymphatic system, helping to get rid of waste and other unwanted materials. Cancer cells can use the lymphatic system to spread into different areas of the body. Vascular invasion is when there are cancer cells in the blood vessels. Lymphatic invasion is when there are cancer cells in the lymph channels. Usually, lymphatic and vascular invasion are grouped together and called lymphovascular invasion in the pathology report. If there is lymphatic or vascular invasion, your pathology report says present. If there is no lymphatic or vascular invasion, your pathology report says absent.

Lymph node status: In most cases, your surgeon removes at least one or two lymph nodes during breast cancer surgery. Lymph nodes are the filters along the lymphatic system that trap bacteria, viruses, cancer cells, and other unwanted substances. When cancer cells are in the lymph nodes, there is a higher risk the cancer has spread to other places in the body. If there are cancer cells in the lymph nodes, the report says positive. If there are no cancer cells in the lymph nodes, the report says negative or benign. The report also says how many lymph nodes have cancer cells in them, as well as how many cancer cells are in each node.

In some cases, you may see the following words to describe how many cancer cells are in each lymph node and where they are in relation to the lymph node structure:

- Isolated tumor cells: Fewer than 200 cancer cells are in the lymph node, or the cancer in the lymph node is 0.2 mm or smaller.
- Micrometastasis: There are 200 cancer cells or more in the lymph node, or the cancer in the lymph node is between 0.2 mm and 2 mm.
- Macrometastasis: The cancer in the lymph node is larger than 2 mm.
- Extracapsular extension: The cancer has spread outside the wall of the lymph node.

Treatment effect: If you had treatment before surgery to remove the cancer, called neoadjuvant treatment by doctors, the report usually includes:

- Tumor bed size: The overall size of any remaining cancer found during surgery after neoadjuvant treatment.
- Tumor bed cellularity: The percentage of cancer cells found in the tumor bed.

If no cancer is found after neoadjuvant treatment, the report says no residual carcinoma.

Hormone receptor status: The breast cancer is tested to see if the cancer cells have receptors for the hormones estrogen and progesterone.

A cancer is called estrogen receptor-positive (ER-positive) if it has estrogen receptors. A cancer is called progesterone receptor-positive (PR-positive) if it has progesterone receptors. A breast cancer can be both ER-positive and PR-positive.

In many cases, doctors use the term hormone receptor-positive (HR+) for cancers that are estrogen receptor-positive, progesterone receptor-positive, or both.

If the cancer has no estrogen or progesterone receptors, it's called hormone receptor-negative (HR-).

Most labs use a special staining process that makes hormone receptors show up in a sample of breast cancer tissue. Still, not all labs use the same method for analyzing the results of the test, and they don't report the results in exactly the same way. So you may see any of the following on your pathology report:

- A percentage that tells you how many cells out of 100 stain positive for hormone receptors. The percentage is between 0% (none have receptors) and 100% (all have receptors).
- An Allred score between 0 and 8. This scoring system is named for the doctor who developed it. The score combines the percentage of cells that test positive for hormone receptors and how well the receptors show up after staining (called intensity) for a possible score of 0 to 8. A high score means the test can easily see receptors in the sample and has found more of them.
- The word positive or negative.

HER2 status: The *HER2* gene makes HER2 proteins, which are sometimes called HER2/neu proteins. HER2 proteins are receptors on breast cells. Normally, HER2 receptors help control how a healthy breast cell grows, divides, and repairs itself. But in about 10% to 20% of breast cancers, the *HER2* gene doesn't work right and makes too many copies of itself, which doctors call *HER2* gene amplification. All these extra *HER2* genes tell breast cells to make too many HER2 proteins, which is called HER2 protein overexpression. This overexpression makes breast cells grow and divide in an uncontrolled way.

Breast cancers with too many *HER2* genes are called HER2-positive.

Doctors use different tests to find out if breast cancer is HER2-positive. The results may appear differently in the report depending on the test you have. Two of the most common tests are:

- IHC test (ImmunoHistoChemistry): The IHC test uses a chemical dye to stain HER2 proteins. The IHC measures the amount of HER2 proteins on the surface of cells in a breast cancer tissue sample and gives it a score of 0 to 3+. A score of 0 to 1+ is considered HER2-negative. A score of 2+ is considered borderline. A score of 3+ is considered HER2-positive.
- FISH test (Fluorescence In Situ Hybridization): The FISH test uses special chemically treated labels that can change color and glow in the dark when they attach to HER2 proteins. This test is more accurate but also more expensive than the other HER2 receptor tests, and it takes longer to return results. So doctors typically order an IHC test first. With the FISH test, you get a score of either positive or negative (some hospitals call a negative test result zero).

It's important to know which HER2 test you have had. Generally, only cancers that score IHC 3+ or FISH positive respond to the medicines that target HER2-positive breast cancers. An IHC 2+ test result is called borderline. If you have an IHC 2+ result, ask to have the tissue retested with the FISH test.

Breast cancer stage: Breast cancer staging can be pathologic or clinical.

The pathologic stage of a breast cancer is labeled with the prefix p. The pTNM stage is determined by the cancer's characteristics, particularly by how large it is and whether cancer cells are in the lymph nodes. The purpose of the staging system is to help guide treatment decisions and provide a common way to describe breast cancer so treatment results can be compared.

In the staging system, T, N, and M stand for:

- the size of the cancer tumor and whether it is invasive (T) or non-invasive (Tis)
- whether the cancer is in the lymph nodes (N)
- whether the cancer has spread to other parts of the body beyond the breast (metastasized) (M)

Numbers or letters after T, N, and M give more details about each characteristic. Higher numbers mean the cancer is more advanced.

When the stage is determined after neoadjuvant treatment — or treatment you have before surgery to remove the breast cancer — it is reported as ypTNM (y means after treatment).

Clinical staging is based on the results of any tests you have before surgery, such as an exam by your doctor or results from a mammogram or MRI. Clinical stage is determined by your oncologist and is labeled cTNM. Clinical staging information is not included in the pathology report.

Your doctor also may describe the stage of the cancer as stage 0, stage I, stage II, stage III, or stage IV. This type of staging also is not in the pathology report.

Other tests you may have

Doctors don't recommend the following tests for everyone who may be diagnosed with breast cancer, and their results are not part of the pathology report's synoptic summary. Still, the results of these tests can influence the treatments your doctor recommends, so we've included them here.

Learn more about additional tests

For more information about other types of tests that may help you and your doctor decide on a treatment plan that works for you, visit breastcancer.org/pathology-report#section-rate-of-cell-growth.

Rate of cell growth: Tests can show how quickly cancer cells are dividing, also called the mitotic rate. Low-grade cancers usually grow slowly, and high-grade cancers usually grow quickly.

- Ki-67 testing: A special stain called Ki-67 measures how quickly cancer cells are growing.
- Ploidy: The ploidy of cancer cells refers to the amount of DNA they contain. If most of the cancer cells have a normal amount of DNA, they're called diploid. These cancers tend to grow and spread more slowly. If the amount of DNA is abnormal, the cells are called aneuploid. These cancers tend to grow and spread faster.

Genomic testing: Genomic tests, also called tumor genomic assays, analyze the cancer to see how active certain genes are. Different genomic tests analyze different sets of genes. The genes' activity level affects the cancer's behavior, including how likely it is to grow and come back after treatment. You and your doctor can use genomic tests to decide whether treatments after surgery would be beneficial.

Genetic testing: Changes in genes, called mutations, can tell a cell to make — or not make — certain proteins that affect how a cell grows and divides. Certain mutations can cause cells to grow out of control, which can lead to cancer.

Three of the most well-known genes that can mutate and raise the risk of breast and ovarian cancer are *BRCA1*, *BRCA2*, and *PALB2*. Women who inherit a mutation in any of these genes — from their mothers or fathers — have a much higher-than-average risk of developing breast and ovarian cancer. Men with these mutations have an increased risk of developing breast cancer, especially if the *BRCA2* gene is affected, and of possibly developing prostate cancer.

Genetic testing looks for mutations in a person's genes. Testing for genetic mutations linked to breast cancer is usually done on a blood or saliva sample taken in your doctor's office and sent to a commercial lab or research testing facility. Genetic tests can look at one gene for a mutation or at a set of genes to see if there are mutations. Genetic tests that look at multiple genes are called panel tests and can include from two to 30 or more genes.

Broad molecular profiling tests: These tests look at all the genes in a cancer tumor — called the genome — to see if there are mutations that have accumulated over time.

Other names for broad molecular profiling include next-generation sequencing, comprehensive genomic profiling, and molecular profiling.

Broad molecular profiling is different from genomic testing because it looks at the entire genome of the cancer. Genomic tests only look at a particular set of genes that affect how likely the cancer is to come back.

PD-L1 testing: PD-L1 testing can show whether an immunotherapy medicine such as Keytruda (chemical name: pembrolizumab) makes sense for certain types of hormone receptor-negative, HER2-negative breast cancer (called triple-negative) that is PD-L1 positive.

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My diagnosis worksheet

Filling in the information below helps you to keep all of the details about the breast cancer's characteristics in one place.

My pathology report says I have been diagnosed with:

☐ invasive ductal carcinoma (IDC)
☐ invasive lobular carcinoma (ILC)
☐ ductal carcinoma in situ (DCIS)
☐ inflammatory breast cancer
☐ Paget's disease
☐ phyllodes tumors of the breast
☐ lobular carcinoma in situ (LCIS)
☐ both invasive and non-invasive breast cancer; types:
_____

The Nottingham grade of the cancer is:

☐ grade 1 ☐ grade 2 ☐ grade 3

The size of the cancer is: _____

The tumor margins are:

☐ negative, clean, or clear ☐ positive or involved ☐ close

Lymphovascular invasion is:

☐ present ☐ absent

Lymph node status is:

☐ positive; number of positive nodes is: _____
and number of cancer cells in each lymph node is: _____
☐ negative or benign

Treatment effect (if you had treatment before breast cancer surgery)

☐ tumor bed size is: _____
☐ tumor bed cellularity is: _____

Hormone receptor status is:

☐ estrogen receptor-positive: the percentage of cells that have receptors is _____ or the Allred score is _____
☐ estrogen receptor-negative: the percentage of cells that have receptors is _____ or the Allred score is _____
☐ progesterone receptor-positive: the percentage of cells that have receptors is _____ or the Allred score is _____
☐ progesterone receptor-negative: the percentage of cells that have receptors is _____ or the Allred score is _____

HER2 status is:

☐ positive ☐ negative ☐ borderline

HER2 status test used:

☐ IHC ☐ FISH

The stage of the cancer is: _____

Other test results:

- Ki-67 test results: _____
- ploidy test results: _____
- genomic test done: _____
  results: _____
- genetic testing results: _____
- broad molecular profiling test done: _____
  results: _____
- PD-L1 test results:
  ☐ positive ☐ negative

Notes

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Our mission is to *help people make sense* of the complex medical and personal information about *breast health* and *breast cancer*, so they can make the best decisions for their lives.

Breastcancer.org is a registered 501(c)(3) nonprofit organization

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