



INTEGRATIVE ONCOLOGY  
Professional  
Training Program

CLINICIAN  
GUIDES

# Understanding Tumor Staging, Grading, & Pathology Reports

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CREATE AN ENVIRONMENT WHERE CANCER CANNOT THRIVE

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# Tumor Staging

There are many staging systems. Some cover many types of cancer. Others are specific.

**Most staging systems include information about:**

- **Where** the tumor is located in the body
- The **Cell Type** (such as, adenocarcinoma or squamous cell carcinoma)
- **Tumor size**
- **Whether the cancer has spread to nearby lymph nodes**
- **Whether the cancer has spread to a different part of the body**

**Tumor grade** refers to how abnormal the cancer cells look and how likely the tumor is to grow.

## THE TNM STAGING SYSTEM

The TNM system is the most widely used cancer staging system.

- **The T refers to the size and extent of the main tumor** (usually called the primary tumor).
- **The N refers to the amount of cancer that has spread to nearby lymph nodes.**
- **The M refers to whether the cancer has metastasized.** This means that the cancer has spread.

### THE BASIC TNM STAGING SYSTEM

**T: Primary tumor**

**TX:** Main tumor cannot be measured

**T0:** Main tumor cannot be found

**T1, T2, T3, T4:** Size and/or extent of the main tumor

The higher the number after the T, the larger the tumor or the more it has grown into nearby tissues.

**N: Regional lymph nodes**

**NX:** Cancer in nearby lymph nodes cannot be measured

**N0:** There is no cancer in nearby lymph nodes

**N1, N2, N3:** Number and location of lymph nodes that contain cancer

The higher the number after the N, the more lymph nodes that contain cancer.

**M: Distant metastasis**

**MX:** Metastasis cannot be measured

**M0:** Cancer has not spread to other parts of the body

**M1:** Cancer has spread to other parts of the body

**For many cancers, the TNM combinations correspond to one of five stages:**

**Stage 0**

Carcinoma in situ, also called CIS. Means that abnormal cells are present but have not spread to nearby tissue. CIS is not cancer, but it may become cancer.

**Stage I, Stage II, Stage III**

The higher the number, the larger the cancer tumor and the more it has spread into nearby tissues.

**Stage IV**

The cancer has spread to other parts of the body



## EXAMPLE: Breast Cancer Staging

### Stage I Breast Cancer

The tumor is up to 2 centimeters in diameter and has not spread beyond the breast.

### Stage IIA Breast Cancer

The tumor is up to 2 centimeters and has spread to the axillary lymph nodes under the arm, or the tumor is between 2 and 5 centimeters and has not spread to the lymph nodes.

### Stage IIB Breast Cancer

The tumor is between 2 and 5 centimeters and has spread to the lymph nodes under the arm, or the tumor is larger than 5 centimeters in diameter and has not spread to the lymph nodes.

### Stage IIIA Breast Cancer

The tumor is larger than 5 centimeters in diameter and has spread to the lymph nodes under the arm, or the tumor is any size and has spread more extensively in the lymph nodes.

### Stage IIIB Breast Cancer

The tumor is any size and has extended to other tissues near the breast; the tumor may or may not have spread to the lymph nodes.

### Stage IV Breast Cancer

Cancer that has spread (metastasized) to other locations in the body, such as the lungs, liver, bones or brain.

## Tumor Grading

Tumor grade is the description of a tumor based on how abnormal the tumor cells and the tumor tissue look under a microscope. **It is an indicator of how quickly a tumor is likely to grow and spread.**

If the cells of the tumor and the organization of the tumor's tissue are close to those of normal cells and tissue, the tumor is called "**well-differentiated.**"

These tumors tend to grow and spread at a slower rate than tumors that are "**undifferentiated**" or "**poorly differentiated,**" which have abnormal-looking cells and may lack normal tissue structures.

Based on these and other differences in microscopic appearance, **doctors assign a numerical "grade" to most cancers.** The factors used to determine tumor grade can vary between different types of cancer.

**Tumor grade is not the same as the stage of a cancer.**

**Cancer stage refers to the size and/or extent (reach) of the original (primary) tumor and whether or not cancer cells have spread in the body.**

**Cancer stage** is based on factors such as **location of the primary tumor, tumor size, regional lymph node involvement** (spread of cancer to nearby lymph nodes), and the **number of tumors present.**



# Tissue Pathology Reports

The pathologist determines the tumor's grade and identifies other characteristics of the tumor. The pathologist's report is about the **visual and microscopic examination of tissue removed during a biopsy or other surgery.**

## How are tumor grades classified?

Grading systems differ depending on the type of cancer. **In general, tumors are graded as 1, 2, 3, or 4, depending on the amount of abnormality.**

In **Grade 1 tumors**, the tumor cells and the organization of the tumor tissue appear close to normal. These tumors tend to grow and spread slowly.

In contrast, the cells and tissue of **Grade 3 and Grade 4 tumors do not look like normal cells and tissue.** Grade 3 and Grade 4 tumors tend to grow rapidly and spread faster.

**If a grading system for a tumor type is not specified, the following system is generally used:**

**GX:** Grade cannot be assessed (undetermined grade)

**G1:** Well differentiated (low grade)

**G2:** Moderately differentiated (intermediate grade)

**G3:** Poorly differentiated (high grade)

**G4:** Undifferentiated (high grade)

Breast and prostate cancers are the most common types of cancer that have their own grading systems.

## How does tumor grade affect a patient's treatment options?

The tumor grade and other factors, such as cancer stage and a patient's age and general health, come together to inform a treatment plan and to determine a patient's prognosis.

**Generally, a lower grade indicates a better prognosis. A higher-grade cancer may grow and spread more quickly and may require immediate or more aggressive treatment.**

The importance of tumor grade in planning treatment and determining a patient's prognosis is greater for certain types of cancer, such as soft tissue sarcoma, primary brain tumors, and breast and prostate cancer.

Reference: American Joint Committee on Cancer, AJCC Cancer Staging Manual, 7<sup>th</sup> ed. New York, NY, Springer; 2010.

Source: National Cancer Institute, [www.cancer.gov](http://www.cancer.gov)



## EXAMPLE: Breast Cancer Grading – Nottingham Grading System

Also called: Elston-Ellis modification of the Scarff-Bloom-Richardson grading system for breast cancer

**This system grades breast tumors based on the following features:**

- **Tubule formation:** how much of the tumor tissue has normal breast (milk) duct structures
- **Nuclear grade:** an evaluation of the size and shape of the nucleus in the tumor cells
- **Mitotic rate:** how many dividing cells are present, which is a measure of how fast the tumor cells are growing and dividing

**Each of the categories gets a score between 1 and 3.**

A score of “1” means the cells and tumor tissue look the most like normal cells and tissue and a score of “3” means the cells and tissue look the most abnormal.

**The scores for the three categories are then added, yielding a total score of 3 to 9.**

**Three grades are possible:**

Total score = 3–5: **G1 (Low grade or well differentiated)**

Total score = 6–7: **G2 (Intermediate grade or moderately differentiated)**

Total score = 8–9: **G3 (High grade or poorly differentiated)**

## EXAMPLE: Prostate Cancer Grading – Gleason Scoring System

The Gleason score is based on biopsy samples taken from the prostate. The pathologist checks the samples to see how similar the tumor tissue looks to normal prostate tissue.

Both a primary and a secondary pattern of tissue organization are identified. The primary pattern represents the most common tissue pattern seen in the tumor, and the secondary pattern represents the next most common pattern.

**Each pattern is given a grade from 1 to 5, with 1 looking the most like normal prostate tissue and 5 looking the most abnormal. The two grades are then added to give a Gleason score.**

The American Joint Committee on Cancer recommends grouping Gleason scores into categories:

**Gleason X:** Gleason score cannot be determined

**Gleason 2–6:** The tumor tissue is well differentiated

**Gleason 7:** The tumor tissue is moderately differentiated

**Gleason 8–10:** The tumor tissue is poorly differentiated or undifferentiated

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