

## Cancer Staging

### Key Points

- Staging describes the extent or severity of a person's cancer. Knowing the stage of disease helps the doctor plan treatment and estimate the person's prognosis (see Question 1).
- Staging systems for cancer have evolved over time and continue to change as scientists learn more about cancer (see Question 2).
- The TNM staging system is based on the extent of the tumor (T), whether cancer cells have spread to nearby (regional) lymph nodes (N), and whether distant (to other parts of the body) metastasis (M) has occurred (see Question 3).
- Most tumors can be described as stage 0, stage I, stage II, stage III, or stage IV (see Question 3).
- Physical exams, imaging procedures, laboratory tests, pathology reports, and surgical reports provide information to determine the stage of the cancer (see Question 5).

### 1. What is staging?

Staging describes the severity of a person's cancer based on the extent of the original (primary) tumor and whether or not cancer has spread in the body. Staging is important for several reasons:

- Staging helps the doctor plan the appropriate treatment.
- The stage can be used to estimate the person's prognosis.
- Knowing the stage is important in identifying clinical trials that may be suitable for a particular patient.
- Staging helps health care providers and researchers exchange information about patients; it also gives them a common terminology for evaluating the results of clinical trials and comparing the results of different trials.

Staging is based on knowledge of the way cancer progresses. Cancer cells grow and divide without control or order, and they do not die when they should. As a result, they often form a mass of tissue called a tumor. As the tumor grows, it can invade nearby tissues and organs. Cancer cells can also break away from the tumor and enter the bloodstream or the lymphatic system. By moving through the bloodstream or lymphatic system, cancer cells can spread from the primary site to lymph nodes or to other organs, where they may form new tumors. The spread of cancer is called metastasis.

### 2. What are the common elements of staging systems?

Staging systems for cancer have evolved over time. They continue to change as scientists learn more about cancer. Some staging systems cover many types of cancer; others focus on a particular type. The common elements considered in most staging systems are as follows:

- Site of the primary tumor.
- Tumor size and number of tumors.
- Lymph node involvement (spread of cancer into lymph nodes).
- Cell type and tumor grade\* (how closely the cancer cells resemble normal tissue cells).
- The presence or absence of metastasis.



\*Information about tumor grade is available in the National Cancer Institute (NCI) fact sheet *Tumor Grade: Questions and Answers*, which can be found at <http://www.cancer.gov/cancertopics/factsheet/Detection/tumor-grade> on the Internet.

### 3. What is the TNM system?

The TNM system is one of the most widely used staging systems. This system has been accepted by the International Union Against Cancer (UICC) and the American Joint Committee on Cancer (AJCC). Most medical facilities use the TNM system as their main method for cancer reporting. PDQ®, NCI's comprehensive cancer information database, also uses the TNM system.

The TNM system is based on the extent of the tumor (**T**), the extent of spread to the lymph nodes (**N**), and the presence of distant metastasis (**M**). A number is added to each letter to indicate the size or extent of the primary tumor and the extent of cancer spread.

#### Primary Tumor (T)

TX	Primary tumor cannot be evaluated
T0	No evidence of primary tumor
Tis	Carcinoma in situ (CIS; abnormal cells are present but have not spread to neighboring tissue; although not cancer, CIS may become cancer and is sometimes called preinvasive cancer)
T1, T2, T3, T4	Size and/or extent of the primary tumor

#### Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be evaluated
N0	No regional lymph node involvement
N1, N2, N3	Involvement of regional lymph nodes (number of lymph nodes and/or extent of spread)

#### Distant Metastasis (M)

MX	Distant metastasis cannot be evaluated
M0	No distant metastasis
M1	Distant metastasis is present

For example, breast cancer classified as T3 N2 M0 refers to a large tumor that has spread outside the breast to nearby lymph nodes but not to other parts of the body. Prostate cancer T2 N0 M0 means that the tumor is located only in the prostate and has not spread to the lymph nodes or any other part of the body.

For many cancers, TNM combinations correspond to one of five stages. Criteria for stages differ for different types of cancer. For example, bladder cancer T3 N0 M0 is stage III, whereas colon cancer T3 N0 M0 is stage II.

Stage	Definition
Stage 0	Carcinoma in situ.
Stage I, Stage II, and Stage III	Higher numbers indicate more extensive disease: Larger tumor size and/or spread of the cancer beyond the organ in which it first developed to nearby lymph nodes and/or organs adjacent to the location of the primary tumor.
Stage IV	The cancer has spread to another organ(s).

Question 6 describes sources of additional information about staging for specific types of cancer.

### 4. Are all cancers staged with TNM classifications?

Most types of cancer have TNM designations, but some do not. For example, cancers of the brain and spinal cord are staged according to their cell type and grade. Different staging systems are also used for many

cancers of the blood or bone marrow, such as lymphomas. The *Ann Arbor* staging classification is commonly used to stage lymphomas and has been adopted by both the AJCC and the UICC. However, other cancers of the blood or bone marrow, including most types of leukemia, do not have a clear-cut staging system. Another staging system, developed by the *International Federation of Gynecology and Obstetrics*, is used to stage cancers of the cervix, uterus, ovary, vagina, and vulva. This system uses the TNM format. Additionally, childhood cancers are staged using either the TNM system or the staging criteria of the Children's Oncology Group, which conducts pediatric clinical trials.

Many cancer registries, such as NCI's Surveillance, Epidemiology, and End Results Program (SEER), use summary staging. This system is used for all types of cancer. It groups cancer cases into five main categories:

- **In situ:** Abnormal cells are present only in the layer of cells in which they developed.
- **Localized:** Cancer is limited to the organ in which it began, without evidence of spread.
- **Regional:** Cancer has spread beyond the primary site to nearby lymph nodes or organs and tissues.
- **Distant:** Cancer has spread from the primary site to distant organs or distant lymph nodes.
- **Unknown:** There is not enough information to determine the stage.

## 5. What types of tests are used to determine stage?

The types of tests used for staging depend on the type of cancer. Tests include the following:

- **Physical exams** are used to gather information about the cancer. The doctor examines the body by looking, feeling, and listening for anything unusual. The physical exam may show the location and size of the tumor(s) and the spread of the cancer to the lymph nodes and/or to other organs.
- **Imaging studies** produce pictures of areas inside the body. These studies are important tools in determining stage. Procedures such as x-rays, computed tomography (CT) scans, magnetic resonance imaging (MRI) scans, and positron emission tomography (PET) scans can show the location of the cancer, the size of the tumor, and whether the cancer has spread.
- **Laboratory tests** are studies of blood, urine, other fluids, and tissues taken from the body. For example, tests for liver function and tumor markers (substances sometimes found in increased amounts if cancer is present) can provide information about the cancer.
- **Pathology reports** may include information about the size of the tumor, the growth of the tumor into other tissues and organs, the type of cancer cells, and the grade of the tumor. A biopsy may be performed to provide information for the pathology report. Cytology reports also describe findings from the examination of cells in body fluids.
- **Surgical reports** tell what is found during surgery. These reports describe the size and appearance of the tumor and often include observations about lymph nodes and nearby organs.

## 6. How can a patient find more information about staging?

The doctor most familiar with a patient's situation is in the best position to provide staging information for that person. For background information, PDQ contains cancer treatment summaries that describe the staging of each type of cancer. PDQ treatment summaries are available at <http://www.cancer.gov/cancerinfo/pdq/> on NCI's Web site.

Information about cancer staging can also be obtained by calling NCI's Cancer Information Service (CIS) toll-free at 1-800-4-CANCER (1-800-422-6237). CIS information specialists also offer immediate online assistance through the LiveHelp link at <http://www.cancer.gov/> on the Internet.

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### Related NCI materials and Web pages:

- National Cancer Institute Fact Sheet 5.9, *Tumor Grade: Questions and Answers* (<http://www.cancer.gov/cancertopics/factsheet/detection/tumor-grade>)
- National Cancer Institute Fact Sheet 5.18, *Tumor Markers: Questions and Answers* (<http://www.cancer.gov/cancertopics/factsheet/detection/tumor-markers>)
- National Cancer Institute Fact Sheet 5.27, *Interpreting Laboratory Test Results* (<http://www.cancer.gov/cancertopics/factsheet/detection/laboratory-tests>)
- National Cancer Institute Fact Sheet 6.20, *Metastatic Cancer: Questions and Answers* (<http://www.cancer.gov/cancertopics/factsheet/sites-types/metastatic>)
- *What You Need To Know About™ Cancer* (<http://www.cancer.gov/cancertopics/wyntk/cancer>)

### How can we help?

We offer comprehensive research-based information for patients and their families, health professionals, cancer researchers, advocates, and the public.

- **Call** NCI's Cancer Information Service at 1-800-4-CANCER (1-800-422-6237)
- **Visit** us at <http://www.cancer.gov> or <http://www.cancer.gov/espanol>
- **Chat** using LiveHelp, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>
- **E-mail** us at [cancergovstaff@mail.nih.gov](mailto:cancergovstaff@mail.nih.gov)
- **Order** publications at <http://www.cancer.gov/publications> or by calling 1-800-4-CANCER
- **Get help** with quitting smoking at 1-877-44U-QUIT (1-877-448-7848)

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