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Manuals

SEER Program

Self Instructional Manual for Cancer Registrars
Cancer Characteristics and Selection of Cases

Book Two

Third Edition

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

SEER Program

Self Instructional Manual for Cancer Registrars
Cancer Characteristics and Selection of Cases

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Third Edition

US DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
National Institutes of Health

SELF-INSTRUCTIONAL MANUAL FOR TUMOR REGISTRARS

Book 2 - Cancer Characteristics and Selection of Cases

Third Edition

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BOOK 2

CANCER CHARACTERISTICS AND SELECTION OF CASES

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BOOK 2: CANCER CHARACTERISTICS AND SELECTION OF CASES

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SECTION A

OBJECTIVES AND CONTENT OF BOOK 2

SECTION A

OBJECTIVES AND CONTENT OF BOOK 2

Sections B, C, and D of Book 2 are concerned primarily with cancer-related medical vocabulary. At the end of these blocks of instruction, you should be able to describe:

1. The essential differences between benign and maligant tumors.

2. Some of the general characteristics of cancer.

3. The main characteristics of the diagnosis of cancer: primary site, cell type, and stage of disease.

In Sections E and F of Book 2, you will learn how cells and tissues are derived from embryonic cell and tissue layers and how tissues are classified histologically. At the end of these two blocks of instruction, you should be able to answer some of the general questions about the tissue composition of sarcomas and carcinomas. Also, you should be able to look at some of the names for common types of cancer and list the type of cancerous tissue associated with each name.

In Section G you will learn the how to identify and code the diagnostic terms used to describe the morphology[1] and behavior of neoplasms. At the end of this segment of instruction, you should be able to use the *International Classification of Diseases for Oncology*, Second Edition *(ICD-O-2)*, published by the World Health Organization, Geneva, 1990. This edition goes into effect in most registries with 1992 and later diagnoses.

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[1]morphology--The description of the form and structure of tissues of the body.

SECTION B

BENIGN AND MALIGNANT TUMORS

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BENIGN AND MALIGNANT TUMORS

In this block of instruction you will learn to use some of the common words and phrases associated with tumor registry activity. Many of these words you have encountered already, and you may feel that you know the definitions for most of them. Even so, it would be a good idea for you to review this material, especially since it contains general information about cancer and tumor registries.

What is cancer? Cancer is the name commonly used for what your doctor would call a malignant[1] tumor. In everyday English, that means "harmful growth". A cancer is a harmful growth of tissue somewhere in the human body. If this harmful growth is allowed to keep growing, it will eventually interfere with the physiological functions of the body's vital organs causing death.

How does cancer start? If you were to look at sections of the body through a microscope, you would see that all of the sections are made up of tiny units called cells. Each organ, such as liver, heart, lungs, and stomach, is constructed of different types of these cells, arranged in different ways. Yet all of these cells have certain basic similarities. The most fundamental characteristic is the ability to reproduce themselves. This they do simply by dividing. One cell becomes two, the two become four, and so on.

As your body grows, ages, and is put to different uses, its parts change in size and shape. A muscle, used vigorously for some time, develops in size (hypertrophies). A muscle that is not used becomes smaller (atrophies); its cells do not divide as actively. In most parts of the body, the cells continually divide and form new ones, to supply the material for growth or to replace worn-out or injured cells. When you cut your finger, for instance, the cells divide rapidly until the tissue is healed and the skin is repaired; and then they go back to their normal rate of division.

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[1] malignant--Tending to become progressively worse and to result in death.

In some persons, however, this normal life process gets out of control. The mysterious mechanism that regulates the division of the cells breaks down. Wildly-growing cells are formed that do not build normal flesh or bone tissue. They serve no useful purpose in the body at all. They divide more rapidly than normal cells and in a haphazard way. They pile up into a nonstructured mass or tumor.

Sometimes these tumors remain in the part of the body in which they start, often growing quite large and pressing on neighboring structures but not spreading to other parts of the body. Frequently, they are completely enclosed in a protective sheath or envelope of tissue. These are known as benign[1] tumors. But sometimes tumors develop that do not stay harmlessly in one place. They destroy the part of the body in which they originate and they spread to other parts where they start new growth and cause new destruction. These are *malignant* tumors or cancers. It is this spread of cancer (metastasis) to vital organs that generally kills the patient. It is this characteristic which contrasts a malignant tumor and a benign tumor.

In the beginning, any tumor, benign or malignant, can usually be removed from the body by surgery or destroyed by x-ray or other radiation therapy (when amenable to such treatment). However, the untreated malignant tumor, even in a non-vital part of the body, eventually will kill the cancer patient because it will metastasize to other organs. The important thing to remember is that most malignant tumors begin in the same way as benign tumors--as a local growth. In this stage they can often be removed or destroyed. In short, if the cancer is detected in time it can usually be cured.

A tumor can be defined in terms of two basic characteristics:

1. It is a mass of nonstructured new cells.
2. It has no known purpose in the physiological function of the body.

Sometimes the term *neoplasm* is used as a synonym for *tumor*. The term *neoplasm* means "new growth" (neo = new; plasm = protoplasm, the essential material of plant and animal cells). The term *tumor* is a more general term which means swelling, including neoplasm. In practice, however, the terms *tumor* and *neoplasm* often are used interchangeably. When cancer is diagnosed, neoplasm is preceded by the word "malignant."

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[1]benign--Not malignant; not spreading; not recurrent; favorable for recovery.

Tumors arise because of the uncontrolled growth or multiplication of cells. There are two general types of tumors: benign (non-cancerous) tumors and malignant (cancerous) tumors. The essential difference between the two is:

1. A benign tumor is composed of cells that will not invade other unrelated tissues or organs of the body, although it may continue to grow in size.

2. A malignant tumor is composed of cells that will invade or spread to other parts of the body either by direct extension to neighboring organs and/or tissues or by metastasizing to distant sites by means of the blood stream (vascular system), the lymphatic system, or by seeding or implantation of cancer cells.

Cells that break away from the original or primary tumor may be carried by the lymph system or the blood stream to other areas of the body where they may settle and form "secondary" tumors. When this occurs, the tumor is said to have metastasized,[1] and the new growths are called metastases.[2] When a cancer has spread in this manner throughout the body, it is difficult to control.

---

[1]metastasize--To form new foci of disease in a distant part by *metastasis* (the spread of disease from one organ or part to another not directly connected with it).

[2]metastases--Plural of metastasis.

Q1

A recent lump under the skin of the thigh which was found to contain new cells or tissue would be called a tumor or neoplasm. Which of the statements below probably describes a neoplasm?

[ ] a. A swelling around the ankle that was found to contain "old blood".

[ ] b. A callus on the finger of a baseball player.

[ ] c. A recent swelling about a scratch.

[ ] d. A recent lump under the arm that feels as if it contains fleshy material.

Q2

A patient was found to have a tumor. It had been slowly enlarging for five years, but there apparently was no evidence of invasion or metastases. The tumor probably is:

[ ] a. Malignant.

[ ] b. Benign.

[ ] c. Can't say.

Q3

How would you classify a new growth that appears to be spreading and ulcerated[1]?

[ ] a. Probably a benign tumor or benign neoplasm.

[ ] b. Probably a malignant tumor or malignant neoplasm.

[ ] c. Can't say.

---

[1]ulcerated--Broken skin or mucous membrane characterized by loss of surface tissue on an inflammatory base.

Answer: Q1

d--A lump under the arm. It most nearly meets the definition of a tumor or neoplasm--namely, that it is a mass of new cells having no directed physiological function. a is a hematoma; b is a hardening of the skin due to friction or pressure; c is inflammation indicating infection; and d may be a malignant lymph node.

Answer: Q2

b--Benign. Benign tumors may grow in size. However, microscopic examination (a histopathologic diagnosis) is necessary to rule out malignancy.

Answer: Q3

b--Probably a malignant tumor. The description "spreading and ulcerated" sounds like a malignant condition. However, the malignancy of a tumor can only be determined by microscopic examination of the cells taken from the tumor. Ulceration, of course, may occur without an associated tumor.

Q4

Which of the following statements best describes the difference between a malignant tumor and a benign tumor?

[ ] a. Malignant tumors grow much larger than benign tumors.

[ ] b. Malignant tumors grow much faster than benign tumors.

[ ] c. Malignant tumors spread to other organs; benign tumors do not spread to other organs.

Q5

A patient was diagnosed as having a breast cancer and a lung cancer. The lung was called a metastatic site. Where in the body did the lung cancer begin--that is, where was its primary site?

_____

Q6

A new mass of tissue that has been growing in size for two months is probably:

[ ] a. A benign tumor.

[ ] b. A malignant tumor.

[ ] c. Either benign or malignant.

[ ] d. Neither benign nor malignant.

Q7

Which of the following statements best describes a cancerous condition?

[ ] a. The neoplasm appeared two months ago and has doubled in size since that time.

[ ] b. The neoplasm ceased to grow after a two-month period.

[ ] c. After the first occurrence of the neoplasm, a secondary site of neoplasm appeared.

[ ] d. The new growth appeared to have no planned physiological function.

Answer: Q4

c--Malignant tumors spread to adjacent organs and tissues or metastasize to distant sites. Benign tumors do not do this. That is the most important distinction between benign and malignant tumors.

Answer: Q5

The primary site for this cancer was the breast. The cancer began in the breast. Calling the lung a *metastatic site* is the same as saying that the lung tumor is a "secondary" tumor. It is composed of cells that came from some other place in the body--in this example, from the breast.

Answer: Q6

c--Either benign or malignant. Both benign and malignant tumors may grow. However, benign tumors may stop growing of their own accord. This is quite unlikely for a malignant neoplasm. A biopsy and microscopic examination must be made to determine specifically whether a tumor is malignant or benign.

Answer Q7

c--This best describes the condition of *spread* or *metastasis* which is the main distinction between benign and malignant neoplasms.

Q8

Match the terms and phrases on the left with the terms and phrases listed on the right. More than one "match" may be possible.

___1. A term meaning "new growth"	a. Noncancerous tumor
___2. A malignant tumor	b. Cancerous
___3. Benign neoplasm	c. Harmful tumor
	d. Neoplasm

Q9

By definition a tumor or neoplasm has two basic characteristics. Describe these characteristics in your own words.

a._____

b._____

Q10

Tumors are classified into two main types. What are these two types?

a._____

b._____

Q11

A tumor is defined in terms of two basic characteristics. A cancer or malignant tumor possesses these two characteristics plus a third one. Describe in your own words this third characteristic.

_____

Answer: Q8

1. d.

2. b and c--These are the best answers.

3. a--c is a possible answer because benign tumors can be harmful.

Answer: Q9

a--New growth of cells; a mass of tissue composed of new cells

b--No known useful physiological function

Answer: Q10

a--Benign tumor, sometimes called benign neoplasm

b--Malignant tumor, sometimes called malignant neoplasm

Answer: Q11

A cancer, or malignant neoplasm, is composed of cells that are growing at an uncontrolled rate and that tend to *spread* or metastasize to other areas of the body.

Q12

Using the information and definitions you have just studied, write a paragraph of two to four sentences using correctly the terms cancer, *benign tumor, malignant neoplasm,* and *metastasis.*

Answer: Q12

You could have said something like this: There are two general types of tumors, benign tumors and malignant tumors. Cancer is a type of malignant tumor or malignant neoplasm. The difference between benign tumors and malignant tumors is that malignant tumors metastasize or spread to other areas of the body and benign tumors do not. It is often the spread of the cancer to vital organs that kills the patient.

SECTION C

SOME CHARACTERISTICS OF CANCER

SECTION C

SOME CHARACTERISTICS OF CANCER

Cancer is a disease which may recur or persist throughout the lifetime of the cancer patient. Some cancer patients are never completely free of the disease. Other cancer patients may be free of the disease after treatment or may be in remission[1] and then the cancer may recur. When patients are in remission, they may have cancer cells in their bodies but the cells are in a state which does not interfere with the functions of the body. Still other patients may never have a recurrence. In any case, the patient should be followed throughout life. The disease of cancer has to be viewed as a biological continuum,[2] that is, an uninterrupted, ordered sequence of biological events.

During his or her lifetime a cancer patient may make many visits to the hospital and may receive various types of treatment. The term *cancer management* refers to all the diagnostic procedures that go into the discovery of the patient's cancer, the treatment received, and the continuing follow-up of the patient after release from the hospital.

Before cancer or any other disease can be properly treated, it must be diagnosed. Abnormal symptoms lead a person to seek medical attention. The physician's job is to identify or diagnose the disease process which is causing these symptoms. The term diagnosis[3] means identification of the nature of the disease and its manifestations. In making a diagnosis of cancer, the physician may employ a variety of diagnostic techniques.

At one time, medical practitioners believed that when a treated cancer had not reappeared within five years, it was an indication that the patient was cured. We now know that a malignancy can reappear 10, 15, or even 20 years after treatment.

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[1]remission--A diminution or abatement of the symptoms of a disease.

[2]continuum--An uninterrupted, ordered sequence of events continuing over a period of time.

[3]diagnosis--The determination of the nature of a disease.

Sometimes treatment for a malignant neoplasm will lead temporarily to a partial or even complete disappearance of all symptoms. When this occurs, the patient is said to be in a state of remission. *Remission* means to be temporarily without symptoms but not necessarily free of disease.

From diagnosis, through treatment, and until the death of the patient, the tumor registry collects updated information on its cancer patients. This information is used to prepare reports which are the *end results* or the outcome of the disease. The term "end results" refers to any type of information that describes *what happened* to cancer patients after diagnosis and treatment.

Q13

Because the disease of cancer is an ongoing process or an ordered sequence of biological events continuing throughout the lifetime of the patient, it must be viewed as a biological _____. (Fill In)

Q14

Periodic follow-up examination of the cancer patient is an essential component of his/her _____ _____. (Fill In)

Q15

Which of the activities described below might be involved in making a diagnosis?

[ ] a. Forecasting the probable outcome of the disease.

[ ] b. Providing special care to combat the disease.

[ ] c. Distinguishing one disease from another.

Q16

In this course you will spend considerable time learning how to abstract medical chart information concerned with the physician's identification of the patient's disease. This identification would be called the _____.

Answer: Q13

continuum.

Answer: Q14

cancer management. It is important to remember that management of a cancer patient does not end with treatment. At periodic intervals throughout the patient's life, the patient should be examined so that any recurrences of the original cancer or growth of new types of cancer (second primaries) may be discovered. The quality of survival (the capacity of assuming the activities of normal life) is of great importance in planning treatment. Physicians want not only to keep the patient alive but to allow for the most normal life after therapy.

Answer: Q15

c--Distinguishing one disease from another. This is but one aspect of the total process of diagnosis. Some diseases have similar symptoms, especially during early stages. Therefore, it is necessary to identify a patient's particular disease. This is often termed "differential diagnosis".

a is a description of the prognosis[1] and b is a statement of *treatment.*

Answer: Q16

diagnosis. The identification or the labeling of a diseased condition is part of the process of *diagnosis.*

---

[1]prognosis--A forecast as to the probable result of an attack of a disease; the prospect as to recovery from a disease as indicated by the nature and symptoms of the case.

Q17

After a patient's condition has been diagnosed, something needs to be done about it--that is, the patient needs to be treated. The term *treatment* is sometimes defined as the management and care of a patient for the purpose of controlling disease or its symptoms. The term *therapy* is often used as a synonym for the term treatment. (Check the appropriate answer to the following.)

a. After a series of tests was performed on a sample of tissue removed while the patient was under anesthesia, the patient was diagnosed as having cancer. Would you say this patient received treatment?

[ ] YES
[ ] NO
[ ] UNCERTAIN

b. The patient was admitted to the hospital complaining of weight loss, a persistent cough, and shortness of breath. He was diagnosed as having cancer of the lung and was referred to a radiologist for radiation therapy. Would you say this patient received treatment?

[ ] YES
[ ] NO
[ ] UNCERTAIN

c. The patient was admitted to the emergency room because of bleeding from a small ulcer of the skin of the face. The emergency room surgeon recommended total excision of the lesion to which the patient agreed. The resulting specimen was sent to pathology and diagnosed as a basal cell carcinoma. Did this patient receive treatment?

[ ] YES
[ ] NO
[ ] UNCERTAIN

Answer: Q17

a. No. A biopsy (removal of a sample of live tissue for microscopic examination) is a diagnostic technique--an aid in identifying the disease, not in treating it. Removal of a portion of a tumor for diagnosis is called an incisional biopsy.

b. Uncertain. A form of treatment was prescribed, but the statement contains no evidence that the treatment actually was administered. Presumably it was. However, when abstracting a medical chart, you must be careful to distinguish between a prescription and a statement of treatment. Don't assume that a person has been treated unless it says so on the medical chart.

c. Yes. Removal of an entire small tumor, for whatever purpose, is called an excisional biopsy. This biopsy, in contrast to the example in a above, is therapy because it is a total excision.

Q18

Surgery, radiation, chemotherapy[1], and immunotherapy[2] can be used together or separately to control, modify, or eliminate the growth of cancer. When used in this fashion, they are forms of treatment. Some surgical procedures, however, are diagnostic in that their purpose is to aid in the identification of the disease. Choose from the following the procedure that is a form of treatment:

[ ] a. A surgical incision[3] into the abdomen (laparotomy) to visually inspect a suspected malignancy.

[ ] b. The excision[4] of part of the lung plus chemotherapy to control the spread of lung cancer.

[ ] c. A surgical biopsy and/or x-ray to diagnose a bone tumor.

Q19

Which patient(s) in the list below will never have a recurrence of cancer?

a. A person who has just been treated for colon cancer.

b. A person who was treated for colon cancer three years ago.

c. A person who was treated for colon cancer seven years ago.

d. All of the above persons have the same probability of recurrence.

e. None of the above persons can be absolutely certain of never having a recurrence.

---

[1]chemotherapy--Treatment by chemicals (See Book 8).

[2]immunotherapy--Treatment by stimulating the body's own defense mechanism against disease or supplying antibodies and/or other missing molecules in a deficient immune system (See Book 8).

[3]incision--A cut; a wound produced by cutting.

[4]excision--An act of cutting away or taking out.

Answer: Q18

b. The use of surgery to remove the primary lesion (tumor) supplemented by chemotherapy to control possible metastasis. (The location and spread of the cancer are two factors the physician considers before determining the best method of treatment.)

Answer: Q19

e. None of these persons can be absolutely certain of never having a recurrence. However, the longer the patient has lived without a recurrence, the greater the probability that there will be no recurrence.

Q20

Choose the statement below that best describes the term *remission*:

[ ] a. The patient is asymptomatic[1] but continues on chemotherapy.

[ ] b. The malignant neoplasm was removed by surgery and the patient is receiving radiation therapy every week.

[ ] c. Surgery for stomach cancer revealed that the malignancy had spread to the liver. Therefore, chemotherapy was initiated following surgery.

Q21

After the patient is entered into the registry files, *follow-up* procedures* are initiated. You have already learned some of the reasons for patient follow-up. List at least two of them.

a._____

b._____

*See Book 1 for details on Follow-Up.

[1]asymptomatic--Showing or causing no symptoms.

Answer: Q20

a. Remission means free of symptoms but not necessarily free of disease. Because of the possibility of residual tumor, the patient continues to receive chemotherapy.

Answer: Q21

Some of the things you might have listed are:

1. To insure the early detection of any recurrence of the malignancy.

2. To insure the early detection of the occurrence of any type of malignancy (a second primary site).

3. To obtain information needed to assess the results of various types of treatment.

4. To obtain "end results" information, such as:

   a. How long the patient has lived.
   b. How well the patient has lived or "quality of survival".
   c. Whether the patient has expired and whether death was due to the cancer.

5. To maintain continuity of patient care (cancer management).

Q22

Which of the following types of information might be considered *end results information*?

[ ] a. The number of cancer cases diagnosed during the past year, arranged by anatomical site, by stage of disease, and by age of patient.

[ ] b. The cost and length of time required to diagnose various types of cancer.

[ ] c. The number of people surviving five years after treatment for various types of cancer.

[ ] d. The number of former cancer patients who have been followed during the past year who were free of disease.

Answer: Q22

c and d are forms of *end results information*.

a is a frequency distribution of cancer cases, and b is a cost analysis in terms of actual costs and time.

SECTION D

DIAGNOSTIC DESCRIPTIONS OF CANCER

SECTION D

DIAGNOSTIC DESCRIPTIONS OF CANCER

The diagnosis of cancer entails an attempt to identify accurately the anatomical site of origin of the malignancy and the type of cells involved. Cancer can arise in any organ or tissue in the body (such as lung, breast, cervix, colon, and rectum). The term *site* refers to the location of the cancer within the body. The term histology[1] refers to the type of cells involved.

Identifying the site is important because tumors in different organs or tissues of the body behave differently. Identifying cell types is important because various histological types have different growth rates and dissimilar prognoses. More than one histologic type of cell may be found in the same site. For example, a tumor whose primary site is skin can be a basal cell carcinoma, a squamous cell carcinoma, or a melanoma.

The histological type is determined by microscopic examination of suspected tissue which has been excised by biopsy or surgical resection. If the histological type is not that usually found in the tissue being examined, it means the cancer has spread to that area from the primary site by direct extension, by metastasis via the blood stream or the lymphatic system, or by seeding or implantation of cancer cells.

The public is now aware of the fact that cancer diagnosed at an early *stage of disease* has the best chance of successful treatment. More and more people are requesting frequent cancer-related check-ups from their physicians in the hope that if they are faced with the diagnosis of cancer, it will be detected before the disease has extended so far as to preclude recovery.

---

[1]histology--Science of tissues which deals with minute structures, composition, and function of the tissues.

Cancer is a group of cells that grow at an uncontrolled rate and have no directed physiological function. Non-contiguous spread from the primary site is known as a *metastasis*. Metastasis occurs when cells break away from the original location and are carried to secondary sites. They may be transported by the blood stream, the lymph system, or by fluids that bathe the cavities of the body, to distant areas where they form secondary growths (metastases), further attaching, involving, and destroying other organs or tissues. For example, a primary breast cancer may metastasize to the lungs forming a secondary growth in one of the lobes of the lung.

Q23

Choose the diagnostic statement below that does not contain anatomical site information.

[ ] a. Cancer of the cervix as determined by a Papanicolaou test.

[ ] b. Malignant tumor with possible metastatic characteristics.

[ ] c. Benign tumor of the stomach located during exploratory surgery.

Q24

In some cases the disease of cancer will start at one location or site in the body and spread or metastasize to other areas of the body.

The place where the cancer started is the first location and would be called the primary _____.

Q25

When metastasis occurs, we know that the cancer has spread from the _____ _____, and a secondary site is involved by cancer.

Q26

Cancer begins by involving only a small number of cells within the primary site. As these cells multiply (seemingly unrestricted), they involve a wider area within the organ or tissue of origin. The resultant mass or tumor compresses, invades, and destroys adjacent normal tissues.

(a) This is spread by direct extension to organs _____ to the primary site.

(b) Any contiguous[1] growth into neighboring tissues or organs is called involvement by _____ _____.

---

[1]contiguous--In contact, adjacent; for example, cancer of the stomach with uninterrupted spread to the esophagus. (Non-contiguous--not in contact or not adjacent; for example, breast cancer that has metastasized to the brain).

Answer: Q23

b--does not contain anatomical site information. The location of the cancer may be in any organ, bone, or tissue of the body.

Answer: Q24

site. It is very important to be as specific as possible when abstracting primary site information. The primary site of cancer is basic to the analysis of tumor registry data.

Answer: Q25

primary site. It is quite possible for cancer cells to metastasize to a number of secondary sites.

Answer: Q26

(a) adjacent.

(b) direct extension.

Q27

In the following examples, select the primary and secondary site(s) that would be recorded on the abstract form:

a. Patient has cancer of the prostate gland with regional lymph node involvement.

_____ _____
primary site secondary site(s)

b. Exploratory surgery was performed which showed cancer of the ovaries with metastases to liver and regional lymph nodes.

_____ _____
primary site secondary site(s)

c. Biopsy revealed malignant tumor in the breast, but examinations for metastases proved negative.

_____ _____
primary site secondary site(s)

Answer: Q27

a. primary: Prostate gland secondary: Regional nodes

b. primary: Ovaries secondary: Liver and regional lymph nodes

c. primary: Breast secondary: None

You will learn a technique to describe the extent of disease[1]. This process involves recording the extent to which the cancer has spread by direct extension or has metastasized to secondary sites.

Determining extent of disease means finding out in detail how far the cancer has extended beyond the origin (primary site), what other organs or parts of the body are involved, and whether or not cancer cells are contained within regional or distant lymph nodes.

From the described extent of disease, the stage of disease[2] can be determined. Stage of disease is a grouping of cases with similar prognoses. Terms frequently used to describe stage of disease are, for example, localized (if limited to the primary site), regional (if the disease has spread to adjacent organs or tissues and/or regional lymph nodes), and distant (if the cancer has spread to distant organs or nodes).

To help determine the extent to which the cancer has spread to neighboring or distant organs, lymph nodes, or tissues, the physician may submit a specimen of the suspected areas to the pathology department. Microscopic examination will be performed, which will identify the histological type of tissue involved and determine whether the cells are malignant. This subject will be covered in detail in a later Self-Instructional Manual.

---

[1]extent of disease--Detailed description of how far the disease has spread from the primary site.

[2]stage of disease--Grouping cases with similar prognoses into broad extent-of-disease categories, e.g., localized, regional, and distant spread.

Q28

Can you think of some of the information that you might look for in a medical chart in order to determine the extent of disease?

_____

_____

_____

Q29

The technique used by the tumor registry to record the degree to which cancer has spread from its primary site to other locations throughout the body is called determining the _____ _____ _____.

Q30

Sometimes the name given to a malignant tumor will also describe the type of cells involved. For example, a cancer that arises in glandular tissue might be called: (Use your dictionary if you need assistance.)

[ ] a. Myeloma

[ ] b. Adenocarcinoma

[ ] c. Epithelioma

Answer: Q28

You might have said:

1. Organs or tissues involved by direct extension
2. Distant site involvement via the blood stream or lymphatic system
3. Regional or distant lymph node involvement
4. Metastasis by seeding or implantation of cancer cells

The extent of disease will be discussed in detail in a later book.

Answer: Q29

extent of disease.

Answer: Q30

b. Adenocarcinoma. Cancers often are named for the type of cells involved. Later on you will learn more about the various types of body cells.

Malignant tumors are divided into two main classes: *carcinomas* and *sarcomas*. A *carcinoma* is composed of a type of cell--epithelial cell--that makes up the skin and lines the walls of hollow organs and their derivatives. The *sarcoma* class of tumors includes all other malignancies.

The best way to distinguish between carcinomas and sarcomas is to remember that if epithelial cells are not the site of origin, the tumor is almost certain to be a sarcoma. Epithelial cells are limited to the covering of internal and external surfaces of the body. Remember that:

1. *SARCO* means flesh.

2. Flesh is composed of *muscle* and fatty tissue which, with their contained blood vessels, nerves, and tendons, *connect* the organs of the body.

3. The *bones* of the body constitute the skeletal system and, with their blood and nerve supply, also *connect* the various portions of the body.

4. In a sense, all of the *blood* and *lymph systems connect* various portions of the body. Sarcomas may originate in the organs and tissues involved in the production of *blood* and lymph[1]. These organs and tissues include the bone marrow, spleen, tonsils, lymph nodes, and thymus gland. Sarcomas may also have their origin in vascular tissue (blood or lymph vessels) or in nerve tissue found throughout the body.

5. Perhaps that is why the term sarcoma is defined as a malignant *connective tissue tumor* since it encompasses all of the above named tissues.

---

[1]lymph--The fluid found in lymphatic vessels and derived from tissue (interstitial) fluids.

Q31

Which of the following malignancies would most likely be classified as sarcomas?

[ ] a. Cancer of the colon.

[ ] b. Malignancy arising in muscle.

[ ] c. Cancer of the skin of the lip.

[ ] d. Gallbladder malignancy.

[ ] e. Malignant bone tumor.

Q32

Which of the following types of malignant neoplasms would be example(s) of sarcoma?

[ ] a. A malignant tumor arising in fibrous tissue.

[ ] b. A malignant tumor arising in cartilage.

[ ] c. A malignant tumor composed of fatty tissue.

[ ] d. A malignant tumor arising in lymph nodes.

Q33

a. Cancers arising from epithelial cells are classified as _____.

b. Cancers arising from connective tissue are classified as _____.

Answer: Q31

b. muscle and
e. bone

Answer: Q32

All are examples of sarcomas.

a. Fibrosarcomas (tumors arising in the fibrous connective tissue, such as, tendons, ligaments, and fibrous membranes)

b. Chondrosarcomas (tumors of the cartilage)

c. Liposarcomas (tumors of fatty tissue)

d. Lymphosarcomas (tumors of lymph nodes and lymphoid tissue)

Answer: Q33

a. carcinomas

b. sarcomas

SECTION E

DERIVATION OF CELLS AND TISSUES

SECTION E

DERIVATION OF CELLS AND TISSUES

Embryology is a comprehensive study of the origin and development of the individual organisms. This section provides a survey of the derivation of cells and tissues. You should find this information valuable as background material to enable you to better understand the instructional material which will be covered later.

Derivation of Cells

Shortly after the ovum or egg is fertilized, it divides to form two cells. These two cells then divide to form a total of four, these again divide to form eight, and so on. This group of cells continues dividing; after nine days' time it attaches to the wall of the uterus and becomes the embryo.

About two weeks after conception, as the cells of the embryo continue to divide, they begin to change their shape and structure. This process is known as *differentiation*. The cells become arranged into distinct layers called *germ layers*: an outer ectoderm[1] and an inner endoderm[2] (entoderm). Then a third embryonic layer, the mesoderm,[3] develops between the ectoderm and the endoderm[4]. All the organs of the body develop or differentiate in an orderly fashion from these three primary germ layers. From the ectoderm will come nerve cells and cells forming the outer layers of the skin (epidermis); from the endoderm (entoderm) will come cells that will form the lining of the digestive tract and its derivatives; and from the mesoderm will come all the others (bone, bone marrow, muscle, lymphatics, cartilage, blood).

Derivation of tissue

Cells that are similar in structure tend to group themselves together and form tissues. A *tissue*, then, is composed of a group of cells that are similar in structure and perform one or more functions in common. Some tissues contain intercellular material which is developed from the cells and which is very important in the performance of a particular function belonging to that tissue.

---

[1]ecto--(Greek *ektos*, outside). A prefix denoting situated on, without, or on the outside.

[2]endo--(Greek *endon*, within). A prefix denoting an inward situation, within (called also ento meaning within or inner).

[3]meso--(Greek *mesos*, middle). A prefix signifying middle, either situated in the middle or intermediate.

[4]derm--(Greek *derma*). The skin; especially the corium, or true skin.

The body tissues and organs develop from the three primary germ layers which form during the growth process of the human embryo. The names for these three layers are, respectively, ectoderm, mesoderm, and endoderm (entoderm).

The tissues derived from the ectoderm are as follows:

1. Some epithelial tissue:

   (a) The epithelial covering of the body, called the eidermis or outer layer of the skin. It extends inward a short distance at the external openings of the digestive tract. Here it forms the mucous membranes of the mouth and anus.

   (b) The epithelial cells forming the lining for all hollow organs which have cavities open to a surface covered by epidermis. Examples include the external ear, spaces under eyelids, and nasal cavity.

2. All nerve tissue

3. Modified epidermal tissue:

   (a) Fingernails and toenails
   (b) Hair
   (c) Glands of the skin

4. Salivary glands

5. Mucous glands of the nose and mouth.

Epithelial tissue can be derived from either the ectoderm or the endoderm. The epithelial tissue derived from the endoderm includes:

1. The epithelial lining of the digestive tract, except at the open ends.

2. The epithelial lining of all hollow structures formed as outpockets in the digestive tract, including:

   (a) The substance of the liver including communicating or connecting ducts.

   (b) The lining of the pharynx and respiratory tract (except the nose). This includes the lungs and the passageways leading from the pharynx to the lungs.

   (c) The epithelium of the bladder and urethra.

   (d) Glands that form secretions in the digestive tract.

Epithelial tissue derived from ectoderm is generally squamous epithelium; epithelial tissue derived from endoderm is essentially glandular epithelium.

Q34

For the present, we will distinguish between two general types of tissue: (1) epithelial and (2) nonepithelial. In a previous block of instruction, you learned about two general types of malignancies: carcinomas and sarcomas. Which one of these is associated with malignancies arising in epithelial cells?

_____

Q35

In the space provided below, write in the names of the three germ layers corresponding to their relative position to one another in the embryo.

a. Inner layer_____

b. Middle layer_____

c. Outer layer_____

Q36

(a) All malignant neoplasms arising from the lining of such organs as the external ear and nasal cavity would be called *sarcomas/carcinomas*. (Circle one.)

(b) These malignancies would all arise in *epithelial/nonepithelial* tissue. (Circle one.)

Q37

Structures and organs of the body derived from the endoderm and the ectoderm have certain features in common but dissimilarities as well.

a. Can carcinomas arise in an organ derived from the endoderm and an organ derived from the ectoderm? _____

b. What type of tissue is derived from the ectoderm and the endoderm?

_____

_____

c. As far as you know, are tissues from the endoderm exclusively epithelial?_____

Answer: Q34

Carcinomas. These are the most common of all malignant neoplasms. On the other hand, the general term *sarcoma* is used to describe malignancies that arise in connective tissue. Connective tissue is used here in the very general and broad sense to include all nonepithelial tissues--bone, muscle, blood, and cartilage, for example.

Answer: Q35

a. Inner layer - endoderm
b. Middle layer - mesoderm
c. Outer layer - ectoderm

Answer: Q36

a. Carcinomas
b. Epithelial

Answer: Q37

a. Yes.
b. Epithelial tissue is derived from both the endoderm and the ectoderm.
c. Yes.

There are a variety of body tissues derived from the third or middle primary germ layer known as the mesoderm. These body tissues include:

1. Muscles
2. Fibrous tissue
3. Bone and cartilage
4. Fat or adipose tissue
5. Blood and lymph vessels
6. Blood cells

In the early embryo the first cavity which develops is the coelomic cavity; this is derived from mesoderm. Parts of the urinary and genital systems are derived as outpouchings of the coelomic cavity. Later this coelomic cavity divides into the pleural cavity, the pericardial cavity, and the peritoneal cavity. The linings of these cavities are composed of a single layer of cells called mesothelium. A few epithelial cells are of mesodermal origin, e.g., endometrium of the uterus, vaginal epithelium, and mucosa of the bladder.

Endothelium derived from mesoderm lines the blood and lymphatic vessels and the walls of the heart. In the capillaries where the endothelium is covered only by a basement membrane, diffusion takes place. Elsewhere it is surrounded by supportive layers of connective tissue and smooth muscle. This is necessary because the endothelium is so thin that diffusion would occur otherwise. Many authorities classify this endothelium as connective tissue. No carcinomas arise in this enothelial tissue; the malignancies are classified as sarcomas.

Q38

When comparing the similarities and differences between the three germ layers, it can be said that: (Circle T for True, F for False.)

T F a. Carcinomas can arise in tissue that has been derived from any one of the three germ layers.

T F b. Sarcomas can arise in tissue that has been derived from either the ectoderm or the mesoderm.

T F c. Assuming that a structure of the body contains both an epithelial lining and supporting or connective tissue, either a sarcoma or carcinoma could arise in that structure.

Q39

Epithelial tissue, fibrous connective tissue, muscular tissue, nerve tissue, and vascular tissue are among the various tissues in the body. In the spaces provided, classify these tissues according to (1) the germ layers from which they are derived, and (2) type of tumor (carcinoma or sarcoma).

	1. Germ Layer	2. Tumor Type
a. Epithelial tissue	_____	_____
b. Fibrous connective tissue	_____	_____
c. Muscular tissue	_____	_____
d. Vascular tissue	_____	_____
e. Nerve tissue	_____	_____

Answer: Q38

a. False. Carcinomas begin in epithelial tissue which is derived from the ectoderm and endoderm.

b. False.

c. True. If both epithelial and connective tissues comprise a body structure, a carcinoma could begin in the epithelium and/or a sarcoma could start in the connective tissue.

Answer: Q39

	1. Germ Layer	2. Tumor Type
a. Epithelial tissue	ectoderm endoderm	carcinoma
b. Fibrous connective tissue	mesoderm	sarcoma
c. Muscular tissue	mesoderm	sarcoma
d. Vascular tissue	mesoderm	sarcoma
e. Nerve tissue	ectoderm	carcinoma*

*There are some exceptions in that "neurosarcoma" and "neuro- fibrosarcoma" are common diagnostic terms for tumors of nerve tissue, and some brain tumors have been termed "sarcomas". However, these apparent exceptions are in some cases due to continued use of traditional terms which preceded the definitions now used, and in some cases are due to continuing controversy about the exact germ layer origin of some cells. It is, therefore, not surprising to see diagnostic phrases ending in either "-carcinoma" or "-sarcoma" for certain nerve tumors. It is also true that there are elements of nerve tissue which are intimately intertwined with and considered part of the connective tissue, tumors of which are usually termed "sarcomas".

SECTION F

CLASSIFICATION OF TISSUES AND NEOPLASMS

SECTION F

CLASSIFICATION OF TISSUES AND NEOPLASMS

You have just learned about the way cells and tissues are derived. You learned that there are several kinds of body tissues. These are grouped into epithelial and connective tissue. Each of these tissue types can be composed of several varieties of cells. For example, *squamous epithelial cells* are flat and scale-like. They are found in the mouth, esophagus, and surface of the skin. *Columnar epithelial cells* line the stomach and intestines forming glandular epithelium. In the digestive tract is located a special variety of epithelial cells called *goblet cells*. These cells secrete mucus and therefore are a type of glandular cell.

Connective tissue is the most widespread and abundant tissue in the body. This tissue connects and supports all body structures. Some of the kinds of connective tissue are adipose, or fat, tissue; dense fibrous tissue (ligaments and tendons); bone and cartilage. Bone and cartilage as well as muscles and nerves will be discussed in a later instructional manual dealing with anatomy. In this section, you will learn about the various word roots used to classify the types of tissues, and the neoplasms associated with these tissues.

The *root word* is one of five elements used to form words. It is the basic core of any word. In the word "thermometer", for example, "therm" and "meter" are both root words with a combining vowel (o) for ease of pronunciation. We will take a closer look at all five elements in Book 3. However, at this time we merely want to introduce you to the subject of word roots in the tumor registry field. If you look up the root words in the dictionary, sometimes you will find both the root word and the combining form. For example, the root word "therm" will appear as "therm-, see thermo-." Thermo is the combining form denoting relationship to heat; "-meter" is the root word ending, designating relationship to measurement.

PRETEST

There are word roots that are used to describe the various body tissues. These roots are combined with other terms and word elements to provide the name of the *histologic* type for a neoplasm. Tumors containing more than one kind of tissue (mixed tumors) will be identified by a combination of these roots. You may already know the meaning of some of these roots. To find out, test yourself on the following word roots. If you look in the dictionary, some of these root words will appear only in the combining form, for example, myxo, osteo, fibro, lipo, leio, and meningo.

Answer	Word Root	Definition
_____	a. chondr-	1. gland
_____	b. myx-	2. sac, bladder, or cyst
_____	c. aden-	3. vessel
_____	d. oste-	4. cartilage
_____	e. cyst-	5. fat
_____	f. myel-	6. slime, mucus, glue-like
_____	g. fibr-	7. threadlike, fibers
_____	h. my-	8. membrane
_____	i. lip-	9. muscle
_____	j. lei-	10. bone
_____	k. mening-	11. marrow
_____	l. angi-	12. smooth

Answers:

Answer	Word Root	Correct Definition
4	a. chondr-	cartilage
6	b. myx-	slime, glue-like
1	c. aden-	gland
10	d. oste-	bone
2	e. cyst-	sac, bladder, or cyst
11	f. myel-	marrow
7	g. fibr-	threadlike, fibers
9	h. my-	muscle
5	i. lip-	fat
12	j. lei-	smooth
8	k. mening-	membrane
3	l. angi-	vessel

You have already learned that *sarcoma* is a frequently used term for a malignancy of connective tissue (originating from the mesoderm), and *carcinoma* is the general term for cancer of a tissue composed of epithelial cells (originating from ectoderm and/or endoderm). The terms *sarcoma* and *carcinoma*, therefore, are added to root words denoting a type of tissue. This results in a formation of a new term, a name indicating a malignant growth of that tissue type. The following are examples (note that a combining vowel (o) is inserted between the two root words for ease of pronunciation):

a. Chondrosarcoma is the name for a type of cancer of cartilage tissue (chondr = cartilage; sarcoma = connective tissue).

b. Fibrosarcoma is the name for a type of cancer composed of fibrous tissue (fibr = threadlike).

c. Myxosarcoma is a malignant neoplasm of connective tissue embedded in a myxomatous (slimy) stroma (myx = mucinous-like, resembling mucilage).

d. Adenocarcinoma is cancer of glandular epithelium (originating from the endoderm).

Most of the organs of the body are composed of more than one type of tissue and can give rise to mixed tumors. These tumors may be of connective and epithelial tissue origin.

Q40

Select the term that could be used as the name for a malignant neoplasm which consists of two types of cells--cells of cartilaginous connective tissue and cells of mucinous tissue.

[ ] a. Chondromyxofibroma

[ ] b. Chondromyxosarcoma

[ ] c. Myxochondroma

[ ] d. Myxochondrosarcoma

Q41

Indicate which of the following would be a cystic malignant growth of glandular epithelium. (Try this without referring to the Pretest answers.)

[ ] a. Adenocarcinoma

[ ] b. Cystadenoma

[ ] c. Cystadenocarcinoma

Answer: Q40

b and d--Chondromyxosarcoma and myxochondrosarcoma. This is a type of tumor known as a *mixed cell* tumor. Its name contains the word root for each of the two types of tissues involved - *chondr* = cartilage + *myx* = glue-like, slimy and viscid. The general root *sarcoma* has been added to indicate that it is a cancer of connective tissue. As you may have guessed, *chrondromyxoma* or *myxochondroma* is a benign form of this tumor. Generally speaking, the suffix *-oma* (tumor), excluding carcinoma and sarcoma, indicates that the tumor is benign. The term *chondromyxofibroma*, therefore, is a benign tumor of cartilaginous, myxomatous, and fibrous tissue.

Answer: Q41

c. Cystadenocarcinoma

Note: a. Adenocarcinoma is a malignant neoplasm of glandular epithelium, but not qualified by cystic (*cyst*); and b--cystadenoma is a cystic benign growth of glandular epithelium.

Q42

Match the neoplasm names listed on the left with the definitions listed on the right.

	Names	Definitions
____a.	Adenocystoma	1. A malignancy involving glandular cells and fat cells.
____b.	Fibromyosarcoma	2. A malignant tumor involving glandular cells and cells that compose the muscles.
____c.	Cystadenocarcinoma	3. A malignant tumor involving glandular epithelial cells in the form of a sac.
		4. A benign tumor involving glandular cells in the form of a cyst.
		5. A malignant tumor involving fibrous-like as well as muscle tissue.

Answer: Q42

a. 4 Adenocystoma-A benign tumor involving glandular cells in the form of a cyst.

b. 5 Fibromyosarcoma-A malignant tumor involving fibrous-like as well as muscle tissue.

c. 3 Cystadenocarcinoma-A malignant tumor involving glandular epithelial cells in the form of a sac (or cyst).

Note: 1. is a definition of an adenoliposarcoma and

2. is an adenomyosarcoma.

For the names of many benign neoplasms, the suffix *-oma* is added to the root name of the tissue. If the tumor is malignant, the term *carcinoma* or *sarcoma* is added to the root. This indicates that the tumor is cancerous or malignant.

Q43

Neoplasm	Classification	Tissue
a. Adenoma	_____	_____
b. Adenocarcinoma	_____	_____
c. Chondroma	_____	_____
d. Myoma	_____	_____
e. Myosarcoma	_____	_____
f. Lipoma	_____	_____
g. Liposarcoma	_____	_____

Answer: Q43

Neoplasm	Classification	Tissue
a. Adenoma	B	glandular
b. Adenocarcinoma	M	glandular
c. Chondroma	B	cartilage
d. Myoma	B	muscle
e. Myosarcoma	M	muscle
f. Lipoma	B	fat
g. Liposarcoma	M	fat

Just to remind you, muscle and fat tissues are composed of nonepithelial cells. Therefore, the term *sarcoma* may be added to *my-* and *lip-* to designate malignancies of muscle and fat tissue, respectively.

Most organs and structures of the body are composed of more than one type of tissue. Therefore, they can give rise to either sarcomas or carcinomas. If the tumor originates in epithelium it is a carcinoma; if it originates in connective tissue stroma it is a sarcoma.

Q44

Sometimes one or more qualifying terms are used in the diagnosis of neoplasms. This helps to specify the tumor type. For example, the prefix *lei-* means *smooth*.

From the list below, check (in the box) the neoplasms of smooth muscle; indicate if they are benign (B) or malignant (M).

[ ] a. Liposarcoma B M

[ ] b. Leiomyosarcoma B M

[ ] c. Myoma B M

[ ] d. Leiomyoma B M

Q45

The word root *angi-* means *vessel*. For each of the following indicate (1) the classification of the neoplasm (benign (B) or malignant (M)), and (2) whether the neoplasm involves a lymph vessel or a blood vessel.

	Classification	Vessel
a. Lymphangioma	_____	_____
b. Hemangioma	_____	_____
c. Hemangiosarcoma	_____	_____
d. Lymphangiosarcoma	_____	_____
e. Angiosarcoma	_____	_____

Answer: Q44

b. Leiomyosarcoma; malignant
d. Leiomyoma; benign

When combined, the word roots *lei-* and *my-* means *smooth muscle*. The suffix *sarcoma* is added to *leiomy-* to indicate a malignant tumor; the suffix *-oma* is added to *leiomy-* to name the benign form of the neoplasm.

Note: a. Liposarcoma is a malignancy involving fatty tissue.
c. Myoma is a benign tumor of the muscle.

Answer: Q45

	Classification	Vessel
a. Lymphangioma	benign	lymph
b. Hemangioma	benign	blood
c. Hemangiosarcoma	malignant	blood
d. Lymphangiosarcoma	malignant	lymph
e. Angiosarcoma	malignant	type of vessel not specified (could be blood or lymph)

Q46

Two or more word roots may be combined to indicate that two or more different types of cells are involved. Tumors of this type are called *mixed tumors*. Indicate which of the terms below refers to a tumor composed of cartilaginous, fibrous, and mucinous tissue.

[ ] a. Chondromyxosarcoma

[ ] b. Myxochondrofibrosarcoma

[ ] c. Myxofibrosarcoma

[ ] d. Fibrochondrosarcoma

Q47

Cerebral meningitis is an inflammation of the membranes or coverings of the brain; osteochondritis is an inflammation of both bone and cartilage (*-itis* means inflammation). From the list of neoplasms below, select (use numbers in answers):

_____a. The term designating a benign tumor of the brain covering.

_____b. The term designating a malignant neoplasm of bone.

(1) Cerebral meningiosarcoma

(2) Osteosarcoma

(3) Cerebral meningioma

(4) Chondrosarcoma

Answer: Q46

b. Myxochondrofibrosarcoma. This is the only term in the list that utilizes all the word roots for the tissues involved in this cancer:

myx- = glue-like, slime, mucus

chondr- = cartilage

fibr- = threadlike, fiberlike

Answer: Q47

a. (3)--Cerebral meningioma
b. (2)--Osteosarcoma

Mening- is the word root meaning membrane or covering; *oste-* is the word root meaning *bone*. (1)-cerebral meningiosarcoma is a malignant neoplasm of the brain covering since it contains the suffix *sarcoma*; (4)-chondrosarcoma is a malignant neoplasm involving cartilaginous tissue.

Q48

You have learned now how to combine terms which allow you to identify many highly specific and mixed neoplasms. Match the terms on the left with the definitions on the right.

____a.	Chondroliposarcoma	1. Tumor of fibrous and muscle tissue.
____b.	Fibromyxosarcoma	2. Tumor of glandular epithelium in the form of a sac.
____c.	Fibromyosarcoma	3. Tumor of fibrous and glue-like (mucinous) tissue.
____d.	Cystadenoma	4. Tumor of cartilage and fat tissue.

Q49

To complete this instructional section, assume that a student has just taken the test which appears at the beginning of this block of instruction. The student's answers appear below. Which are right and which are wrong?

(Place a check mark in the appropriate space.)

RIGHT	WRONG	ROOT	ANSWER
___	___	myel-	muscle
___	___	lip-	fat
___	___	lei-	smooth
___	___	myx-	marrow
___	___	chondr-	threadlike
___	___	cyst-	sac
___	___	mening-	membrane
___	___	angi-	vessel
___	___	aden-	gland
___	___	my-	glue-like; mucinous
___	___	oste-	bone
___	___	fibr-	cartilage

Answer: Q48

a. 4
b. 3
c. 1
d. 2

Answer: Q49

RIGHT	WRONG	ROOT	CORRECT ANSWER
___	x	myel-	marrow
x	___	lip-	fat
x	___	lei-	smooth
___	x	myx-	slime, glue-like
___	x	chondr-	cartilage
x	___	cyst-	sac
x	___	mening-	membrane
x	___	angi-	vessel
x	___	aden-	gland
___	x	my-	muscle
x	___	oste-	bone
___	x	fibr-	threadlike, fibers

SECTION G

SELECTION AND IDENTIFICATION OF CASES

SECTION G

SELECTION AND IDENTIFICATION OF CASES

In Book 1, we reviewed briefly the activities associated with the selection of cases for incorporation into a tumor registry. Generally speaking, identification of cases is made by the tumor registrar following the guidelines of the Cancer Committee.

Most registries abstract the medical records of patients *who have malignancies and in situ tumors,* although many do not collect all skin cancers. Sometimes even non-neoplastic lesions may be collected because of special interests of physicians associated with the registry, or of agencies supporting the registry.

Some registries, especially hospital registries, are part of a larger network such as a state registry. If so, they must collect the cases designated by this larger network. If these cases differ from what the registry collects for its own purposes, it must have the ability to identify the cases reportable to this central group.

The responsibility of the tumor registrar is to collect and identify all malignancies and in situ[1] tumors, as well as any additional cases designated by the supervisor or Cancer Committee or a central group to which data is reported.

A review of various classification schemes for neoplastic diseases seems appropriate here. At the present time in the United States there are several manuals used for coding medical information.

The International Classification of Diseases, 9th Revision (1975) (ICD-9), published by the World Health Organization (WHO), is used for coding mortality (deaths) by all member nations of the United Nations, including the United States. This manual is used in all state health departments and at the National Center for Health Statistics for coding death certificates. An adaptation of ICD-9, the *International Classification of Diseases, 9th Revision, Clinical Modification,* is used in the United States. This book has expansions at the fourth and sometimes fifth digits from the basic ICD-9 code, but is completely compatible. It is used in hospital record rooms and is required to code diagnoses sent to Medicare/Medicaid and other insurance carriers.

In 1976 the first edition of the *International Classification of Diseases for Oncology* (ICD-O) was published by WHO. ICD-O is used principally by tumor registries and pathologists dealing with cancer. This book provides more detail for coding tumors. ICD-O designated a four digit topographic category for coding the site of the tumor, based on the Malignant Neoplasm section of ICD-9 and a six-digit morphology code for the histologic type of tumors. In October of 1990 the Second Edition of the *International Classification of Diseases for Oncology* (ICD-O-2) was published. The topography[2] categories in this new book are based on the *International Classification of Diseases, 10th Revision*, published in 1991 for mortality coding in 1993.

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[1] in situ--Confined to place of origin, that is, has not penetrated the basement membrane of the epithelial tissue involved.

[2] topography--The description of anatomic regions or sites of the body.

For ICD-O-2, the morphology section of the First Edition was revised to include about one hundred new terms that had accumulated. In addition, a completely revised Non-Hodgkin's Lymphoma section, based on the Working Formulation,[1] was introduced. During the five years preceding the publication of ICD-O-2, several Field Trial editions (1986, 1987 and 1988) were in use. These books had no official sanction and were published purely to test the proposed revisions for ICD-O-2.

Another coding book that should be mentioned is the *Systematized Nomenclature of Medicine* (SNOMED) published by the College of American Pathologists, which covers coding of all pathologic entities, not just tumors. The neoplasm sections 8 and 9 are identical to the morphology of ICD-O. For non-neoplastic terms in ICD-O, SNOMED codes are given.

A complete historical review of coding books for neoplasms is given in the introduction of ICD-O-2.

[1]Working Formulation--A means of translation from the six classifications of non-Hodgkin's lymphoma to a summary and description for clinical usage, an NCI-sponsored study, published in Cancer 1982; 49:2112-2135.

Generally speaking, a tumor registry includes two categories of tumors:

1. Tumors which are specified to be malignant, that is either behavior code[1] /3 in ICD-O or specified by the pathologist as malignant.

2. Tumors which are stated to be in situ, that is either behavior code /2 in ICD-O or the pathologist has specified in situ.

1. Malignant Tumors

This category, as stated above, includes terms in ICD-O with a behavior code of /3 or tumors designated as malignant by the pathologist. In this latter case the behavior code would have to be changed to /3 as explained in the instructions of ICD-O-2.

Among the diagnoses accepted as malignant without the use of the word "malignant" are diagnoses containing terms such as "carcinoma"," sarcoma"," lymphoma", "leukemia", " cancer of..", or diagnoses containing adjectives such as "carcinomatous", "sarcomatous", "leukemic", or "cancerous".

2. In Situ Tumors

This category includes terms with a behavior code of /2 in ICD-O or tumors specified by the pathologist as in situ. Beginning with the second edition of ICD-O, intraepithelial neoplasia, grade III, of the cervix, vulva or vagina is considered carcinoma in situ. (See page xxix of ICD-O, Second Edition.)

[1]behavior code--A one-digit code which indicates whether a tumor is malignant, benign, in situ, or of uncertain behavior.

The *International Classification of Diseases for Oncology*, Second Edition, (ICD-O-2) is the basic coding manual used internationally for coding the topography and morphology of tumors and the behavior of tumors.

The ICD-O-2 book is comprised of five parts:

1. Introduction and Instructions for Use of ICD-O, Second Edition - Read this carefully as it describes the contents of the book and gives instructions for using ICD-O. Fourteen coding rules are summarized at the end of this section.

2. Topography - Numerical List

The Topography section is based on the Malignant Neoplasms section of Chapter II of ICD-10. These topography codes have four characters from C00.0 to C80.9. A decimal point (.) indicates subdivisions of the three-character categories.

3. Morphology - Numerical List

The morphology terms have code numbers which run from 8000/0 to 9989/1; the first four digits indicate the specific histologic terms and the fifth-digit, after the slash (/), is the behavior code. This behavior code indicates whether a tumor is malignant, benign, in situ, or of uncertain behavior. The numerical list displays the structure of the coded nomenclature and constitutes the primary point of reference for retrieval or decoding.

A separate one-digit code for histological grading or differentiation is appended to the first five digits for complete coding. For lymphoma or leukemia, this digit is also used for identifying T- and B-cell origin.

Therefore, 10 characters are necessary for the complete identification of topographic site (4 characters), morphologic type (4 digits), behavior (1 digit), and grade or differentiation of a neoplasm or its equivalent in leukemias and lymphomas (1 digit).

4. Alphabetic Index

This single index includes both the topographic and morphologic terms as well as a selected few terms that sound like tumors. It is arranged in alphabetic order with the code numbers preceding the term.

5. New Morphology Terms and Synonyms

A list of new terms added to the Second Edition, such as 8247/3, Merkel cell tumor, and 9762/3, Alpha heavy chain disease, is included at the end of the book. In addition,the last page shows four terms that have had the behavior code associated with them in the First Edition changed to malignant.

The tumor registrar must be thoroughly familiar with the use of ICD-O-2. Its use is carefully explained in detail in the Introduction and Instructions of ICD-O-2 and will not be repeated here. The following exercise requires the use of ICD-O-2. Do not attempt it without first thoroughly familiarizing yourself with ICD-O-2. Then check your answers. If you missed some, review the explanation to be sure you understand how the answers were derived.

Practice Session on Prefaces, Introduction and Instructions of ICD-O-2

Mark whether the statement is True (T) or False (F).

	Statement	T/F
1.	The revised ICD-O, Second Edition, topography section is based on the Ninth revision of the International Classification of Diseases (ICD-9).	_____
2.	An alphanumeric system of categories means a mixture of letters of the alphabet and numeric digits.	_____
3.	The principal change in the morphology section of ICD-O-2 is the Non-Hodgkin's Lymphoma section.	_____
4.	SNOMED's topography section is the same as ICD-O-2.	_____
5.	Chapter 3 of ICD-9 is for neoplasms.	_____
6.	The morphology section of ICD-O is based on the histologic terms in the International Classification of Tumors series.	_____
7.	The ICD-9-CM is used for coding death certificates in the United States.	_____
8.	ICD-O-2 does not use all the malignant rubrics of ICD-10.	_____
9.	SNOMED stands for Systematized Nomenclature of Medical Entities and Diseases.	_____
10.	The ICD-O-2 Manual has two main sections: Topography and Morphology.	_____
11.	NOS stands for Never Otherwise Stated.	_____

Practice Session on Prefaces,
Introduction and Instructions of ICD-O-2

	Statement and Explanation of Answer	T/F
1.	The revised ICD-O, Second Edition, topography section is based on the Ninth revision of the International Classification of Diseases (ICD-9). (It is based on ICD-10.)	F
2.	An alphanumeric system of categories means a mixture of letters of the alphabet and numeric digits.	T
3.	The principal change in the morphology section of ICD-O-2 is the Non-Hodgkin's Lymphoma section.	T
4.	SNOMED's topography section is the same as ICD-O-2. (It is completely different.)	F
5.	Chapter 3 of ICD-9 is for neoplasms. (It is always chapter 2.)	F
6.	The morphology section of ICD-O is based on the histologic terms in the International Classification of Tumors series.	T
7.	The ICD-9-CM is used for coding death certificates in the United States. (ICD-9 published by WHO must be used for coding death certificates.	F
8.	ICD-O-2 does not use all the malignant rubrics of ICD-10. (It only uses the rubrics from C00-C80 as the other categories are for histologic entities - lymphomas, leukemias, etc. that are coded in the morphology section of ICD-O-2.)	T
9.	SNOMED stands for Systematized Nomenclature of Medical Entities and Diseases. (It stands for Systematized Nomenclature of Medicine).	F
10.	ICD-O-2 has two main sections: Topography and Morphology. (There are five main sections besides the two mentioned, Introduction and Instructions, Alphabetic index and Differences in Morphology between first and second editions.)	F
11.	NOS stands for Never Otherwise Stated.	F

Case Finding (Reportablity)

If the registry only reports in situ and malignant tumors, except basal and squamous cell carcinomas (8000-8110) of skin, mark the Reportablity (Rep.) column (Y = yes and N = no) and code the Topography (4 characters) and Morphology (6 digits) by ICD-O-2. If listed with SNOMED code number, give SNOMED code under morphology.

	Diagnosis	Rep.	Topog.	Morph.
1.	Transitional carcinoma of dome of bladder	___	_ _ _._ _	_ _ _ _/_ _
2.	Squamous cell carcinoma of chin	___	_ _ _._ _	_ _ _ _/_ _
3.	Granuloma	___	_ _ _._ _	_ _ _ _/_ _
4.	Chronic lymphocytic leukemia	___	_ _ _._ _	_ _ _ _/_ _
5.	Subependymal glioma	___	_ _ _._ _	_ _ _ _/_ _
6.	Adenocarcinoma in situ in adenomatous polyp of rectosigmoid	___	_ _ _._ _	_ _ _ _/_ _
7.	Multicentric basal cell carcinoma of face	___	_ _ _._ _	_ _ _ _/_ _
8.	Blastoma	___	_ _ _._ _	_ _ _ _/_ _
9.	Carcinoid of appendix	___	_ _ _._ _	_ _ _ _/_ _
10.	Plasmacytoma of thyroid	___	_ _ _._ _	_ _ _ _/_ _
11.	Squamous cell carcinoma, gr. 2 of vulva	___	_ _ _._ _	_ _ _ _/_ _
12.	Cystadenoma, borderline malignancy of pancreas	___	_ _ _._ _	_ _ _ _/_ _
13.	Ameloblastoma of lower jawbone	___	_ _ _._ _	_ _ _ _/_ _
14.	Epidermoid carcinoma, keratinizing of nose	___	_ _ _._ _	_ _ _ _/_ _

Case Finding (Reportablity)

Answers

	Diagnosis and Explanation	Rep.	Topog.	Morph.
1.	Transitional carcinoma of dome of bladder	Y	C67.1	8120/39
2.	Squamous cell carcinoma of chin	N	C44.3	8070/39
	Not reportable as it is a skin cancer. You will note that carcinoma of the chin is assigned a skin topography code because the predominant tissue in the chin is skin.			
3.	Granuloma	N		44000
	Not reportable as no M code is listed and a SNOMED code is given in the index.			
4.	Chronic lymphocytic leukemia	Y	C42.1	9823/39
5.	Subependymal glioma	N	C71.9	9383/19
	Not reportable as this is a brain tumor, uncertain whether malignant or benign. Some registries do collect these but the instructions above did not include these.			
6.	Adenocarcinoma in situ in adenomatous polyp of rectosigmoid	Y	C19.9	8210/29
7.	Multicentric basal cell carcinoma of face	N	C44.3	8091/39
	Not reportable as it is a skin cancer.			
8.	Blastoma	Y	C80.9	8000/39
	This is reportable even though ending of "oma" usually means a benign tumor. The numeric index shows this as a synonym of "cancer".			

Case Finding (Reportablity)

Answers

	Diagnosis and Explanation	Rep.	Topog.	Morph.
9.	Carcinoid of appendix The revised ICD-O-2 makes all carcinoids malignant and reportable except those of the appendix.	N	C18.1	8240/19
10.	Plasmacytoma of thyroid The ICD-O-2 considers this malignant now, a change from ICD-O-1.	Y	C73.9	9731/39
11.	Squamous cell carcinoma, grade 2 of vulva Cancers of the skin of genitals are always reportable as skin of these sites (vagina, vulva, penis, etc.) and are not assigned codes in the skin category (C44._).	Y	C51.9	8070/32
12.	Cystadenoma, borderline malignancy of pancreas Since the site is not ovary, borderline malignancy is /1 - uncertain whether malignant or benign, and the tumor is therefore not reportable.	N	C25.9	8440/19
13.	Ameloblastoma of lower jawbone Benign tumors are not reportable.	N	C41.1	9310/09
14.	Epidermoid carcinoma, keratinizing of nose Carcinoma of nose is not automatically assigned to skin, in contrast to chin in question 2. Nose, NOS, is assigned a code in the respiratory system, and therefore this tumor is reportable.	Y	C76.0	8071/39

Coding Exercise for ICD-O-2

Record the ICD-O-2 topography (T) (Site) and Morphology (M) codes on the right for the diagnoses on the left. For the purpose of this exercise, all malignant and in situ neoplasms are reportable. Put an X after each term that would NOT be reportable.

	Diagnosis	Topog.	Morph.
1.	Papillary carcinoma of the ovary	_____	_____
2.	Moderately differentiated medullary carcinoma of the central portion of the breast	_____	_____
3.	Epidermoid carcinoma of the buttock, grade 2	_____	_____
4.	Perigastric carcinoma	_____	_____
5.	Anaplastic mucin-producing adenocarcinoma of descending and sigmoid colon	_____	_____
6.	Adenocarcinoma of the intrahepatic and extrahepatic bile ducts	_____	_____
7.	Follicular carcinoma in situ	_____	_____
8.	Poorly differentiated gastric carcinoma, grade 2	_____	_____
9.	Histiocytic lymphoma, B-cell	_____	_____
10.	Bronchogenic cancer	_____	_____
11.	Hypernephroma	_____	_____
12.	Infiltrating duct carcinoma of the pancreas	_____	_____
13.	Melanoma of the back	_____	_____
14.	Bile duct carcinoma	_____	_____
15.	Minor salivary gland tumor of soft palate	_____	_____
16.	Myoleiosarcoma of the uterus	_____	_____
17.	Mixed basal-squamous carcinoma of the leg	_____	_____

Coding Exercise for ICD-O-2

	Diagnosis and Explanation	Topog.	Morph.
18.	Transitional squamous cell carcinoma of the bladder	_____	_____
19.	Follicular small cleaved cell lymphoma, B-cell	_____	_____
20.	Small cleaved cell lymphoma of stomach	_____	_____
21.	Acute granulocytic leukemia	_____	_____
22.	Waldenstrom's macroglobulinemia	_____	_____
23.	Cutaneous lymphoma of hand	_____	_____
24.	Adenocarcinoma of colon in multiple adenomatous polyps	_____	_____
25.	Anaplastic ependymoma of frontal lobe of brain	_____	_____

Coding Exercise for ICD-O-2

Record the ICD-O-2 topography (T) (Site) and Morphology (M) codes on the right for the diagnoses on the left. For the purpose of this exercise only malignant and in situ neoplasms are reportable. Put an X after each term that would NOT be reportable.

Diagnosis and Explanation	Topog.	Morph.
1. Papillary carcinoma of the ovary	C56.9	8050/39
Example of Rule 1 and NOS		
2. Moderately differentiated medullary carcinoma of the central portion of the breast	C50.1	8510/32
Example of Rules 1 and 6		
3. Epidermoid carcinoma of the buttock, grade 2	C44.5	8070/32
Example of Rule 2		
4. Perigastric carcinoma	C76.2	8010/39
Example of Rule 3 and gastric implies stomach which is located in the abdomen.		
5. Anaplastic mucin-producing adenocarcinoma of descending and sigmoid colon	C18.8	8481/34
Example of Rule 4		
6. Adenocarcinoma of the intrahepatic and extrahepatic bile ducts	C24.8	8140/39
Example of Rule 4 of an overlapping lesion crossing two three-character categories		
7. Follicular carcinoma in situ	C73.9	8330/29
Example of Rule 5		
8. Poorly differentiated gastric carcinoma, grade 2	C16.9	8010/33
Example of Rule 6		

Coding Exercise for ICD-O-2

	Diagnosis and Explanation	Topog.	Morph.
9.	Histiocytic lymphoma, B-cell	C77.9	9680/36
	Example of Rules 12 and 6		
10.	Bronchogenic cancer	C34.9	8000/39
	Example of Rule 7		
11.	Hypernephroma	C64.9	8312/39
	Example of Rule 8A		
12.	Infiltrating duct carcinoma of the pancreas	C25.9	8500/39
	Example of Rule 8B		
13.	Melanoma of the back	C44.5	8720/39
	Example of Rule 8C		
14.	Bile duct carcinoma	C22.1	8160/39
	Example of Rule 9		
15.	Minor salivary gland tumor of soft palate	C05.1	8000/19 X
	Example of Rule 9		
16.	Myoleiosarcoma of the uterus	C55.9	8890/39
	Example of Rule 10		
17.	Mixed basal-squamous carcinoma of the leg	C44.7	8094/39
	Example of Rule 10		
18.	Transitional squamous cell carcinoma of the bladder	C67.9	8120/39
	Example of Rule 11		
19.	Follicular small cleaved cell lymphoma, B-cell	C77.9	9695/36
	Example of Rule 12		

	Diagnosis and Explanation	Topog.	Morph.
20.	Small cleaved cell lymphoma of stomach	C16.9	9672/39
	Example of Rule 12		
21.	Acute granulocytic leukemia	C42.1	9861/39
	Example of Rule 13		
22.	Waldenstrom's macroglobulinemia	C42.0	9761/39
	New reportable term		
23.	Cutaneous lymphoma of hand	C44.6	9709/39
	New reportable item		
24.	Adenocarcinoma of colon in multiple adenomatous polyps	C18.9	8221/39
	New reportable item		
25.	Anaplastic ependymoma of frontal lobe of brain	C71.1	9392/34
	Anaplastic is coded in both the morphology and the grade.		

GLOSSARY OF TERMS

GLOSSARY OF TERMS

asymptomatic--Showing or causing no symptoms.

benign--Not malignant; not spreading; not recurrent; favorable for recovery.

contiguous--In contact, adjacent; for example, cancer of the stomach with uninterrupted spread to the esophagus.

continuum--An uninterrupted, ordered sequence of events continuing over a period of time.

derm--(Greek *derma*). The skin; especially the corium, or true skin.

diagnosis--The determination of the nature of a disease.

ecto--(Greek *ektos*, outside). A prefix denoting situated on, without, or on the outside.

endo--(Greek *endon*, within). A prefix denoting an inward situation, within (Called also ento meaning within or inner).

excision--An act of cutting away or taking out.

extent of disease--Detailed description of how far the disease has spread from the primary site.

histology--Science of tissues which deals with minute structures, composition, and function of the tissues.

incision--A cut, or wound produced by cutting.

lymph--The fluid found in lymphatic vessels and derived from tissue (interstitial) fluids.

malignant--Tending to become progressively worse and to result in death.

meso--(Greek *mesos*, middle). A prefix signifying middle, either situated in the middle or intermediate.

metastases--Plural of metastasis.

metastasis--The spread of disease from one organ or part to another not directly connected with it.

metastasize--To form new foci of disease in a distant part by metastasis.

morphology--The description of the form and structure of tissues of the body.

non-contiguous--Not in contact or not adjacent; for example, breast cancer that has metastasized to the brain.

prognosis--A forecast as to the probable result of an attack of a disease; the prospect as to recovery from a disease as indicated by the nature and symptoms of the case.

remission--A diminution or abatement of the symptoms of a disease.

stage of disease--Grouping cases with similar prognoses into broad extent-of-disease categories, e.g., localized, regional, and distant spread.

stroma--The supporting framework or connective tissue of an organ.

topography--The description of anatomic regions or sites of the body.

ulcerated--Broken skin or mucous membrane characterized by loss of surface tissue on an inflammatory base.

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