the language of medicine in english
English for Careers

The Language of Medicine in English

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FOREWORD

This book is one of a series called *English for Careers*, intended to introduce students of English to the language of a number of different professional and vocational fields. The career areas covered are those in which English is widely used throughout the world, such as air travel, hospital services, computer programming, and, in this book, medicine.

Each book in the series serves a dual purpose: to give the English student an English introduction to the terminology of a specific career and to improve his or her overall use of the language.

*The Language of Medicine* deals with such topics as human anatomy, surgery, health care systems, and common diseases, making it a broad survey of the opportunities and problems inherent in the world of medicine.

From the vantage point of learning English, *English for Careers* books are intended for a student at the high intermediate or advanced level who is acquainted with most of the structural patterns of the language. The principal goals of the learner should be mastering specific vocabulary, using normal patterns, and improving his or her ability to communicate naturally in English, especially with reference to a particular area of work.

This book is helpful with these needs. Each lesson begins with a glossary of special terms in which specific vocational words and expressions are defined. There follows a vocabulary practice section in which questions and answers guide the reader to proper use of these terms. Then the terms are used again within a contextual frame of reference. Each section is followed by topics for discussion which give the student an opportunity to use special terms, structural patterns,
and general vocabulary. The lesson ends with comprehensive vocabulary review and conversational practice.

Much successful language learning comes from interest and experience which is not fully conscious. In presenting this book it is hoped that the English student's identity with medicine will enhance his or her ability to communicate effectively in English.

GRETCHEN BLOOM
Washington, D.C.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORWARD</td>
<td></td>
<td>v</td>
</tr>
<tr>
<td>UNIT ONE</td>
<td>Medicine: Its History and Folklore</td>
<td>1</td>
</tr>
<tr>
<td>UNIT TWO</td>
<td>Human Anatomy</td>
<td>13</td>
</tr>
<tr>
<td>UNIT THREE</td>
<td>Disease: Its Symptoms and Cures</td>
<td>25</td>
</tr>
<tr>
<td>UNIT FOUR</td>
<td>Common Diseases and Ailments</td>
<td>35</td>
</tr>
<tr>
<td>UNIT FIVE</td>
<td>Doctors</td>
<td>49</td>
</tr>
<tr>
<td>UNIT SIX</td>
<td>Surgery</td>
<td>61</td>
</tr>
<tr>
<td>UNIT SEVEN</td>
<td>Careers in Medicine</td>
<td>73</td>
</tr>
<tr>
<td>UNIT EIGHT</td>
<td>Health Care Systems</td>
<td>83</td>
</tr>
<tr>
<td>UNIT NINE</td>
<td>Medical Emergencies</td>
<td>93</td>
</tr>
<tr>
<td>UNIT TEN</td>
<td>Prevention and High Technology Health Care</td>
<td>103</td>
</tr>
</tbody>
</table>

INDEX OF SPECIAL TERMS  115
UNIT ONE
MEDICINE: ITS HISTORY AND FOLKLORE

Special Terms

**Medicine:** Science of diagnosing, treating, and preventing disease. The word also refers to any drug used to treat an illness or injury.

**Physician or Doctor:** Person trained and licensed to practice medicine; one who treats the entire body is a *general practitioner* (G.P.).

**Surgery:** Medical specialty of cutting into, or performing operative procedures on, the patient. A doctor who does this is a *surgeon*.

**Acupuncture:** Method of curing illness or relieving pain by inserting needles into the body at certain points; originally developed by the Chinese.

**Epidemic:** Contagious disease which spreads rapidly throughout large portions of the population. The bubonic plague is a famous example of an epidemic which ravaged Europe in the Middle Ages. Modern medical science has found means of preventing most epidemics.

**Skeleton:** Bony framework of the body, including the spinal column, the rib cage, the skull, and the bones of the arms and legs.

**Anatomy:** Science of the structure of organisms, including the human body; can be studied by *dissecting*, or cutting into, organisms.

**Pharmacy:** Store where medicines are sold, especially by prescription; also known as a *drugstore* or an *apothecary*. Licensed *pharmacists* prepare medications, selling certain drugs only when they are prescribed by a physician.
Disease: Pathological condition which causes abnormal body functions and presents certain symptoms or signs; can be caused by a germ, such as a bacterium or a virus.

Drug: Substance used to treat illness. Antibiotics, such as penicillin and tetracycline, are familiar examples.

Microscope: Instrument which uses a series of lenses to produce magnified images of objects too small to be seen well by the eye alone. Laboratory technicians use microscopes to analyze specimens of blood, urine, and tissue.

Diagnosis: Identification of a disease or ailment after careful examination and analysis. A doctor always diagnoses the patient's ailment before treatment.

Communicable disease: Disease in which the causative organism factor can be transmitted from one person to another; the common cold is the most familiar example.

Family Practice: A certified primary care specialty emphasizing general medical care for the entire family.

Biopsy: Portion of tissue removed from the living body by an operation and examined to aid in diagnosing a disease.

X-ray: Form of radiation used to create photographic images of bones and internal organs and, in some cases, to treat them when they are diseased; overexposure can be dangerous.

Nurse: Person trained to care for the sick, infirm, or injured, often under the direction of a doctor.

Patient: Person who is undergoing medical treatment for sickness or injury.

Health insurance: Form of protection against the high costs of health care. Payment of a premium guarantees medical coverage to the insured person.

Hospital: Place where medical and surgical care is provided for sick and injured persons.

First aid: Emergency medical treatment given when professional medical advice is not available.

Vocabulary Practice

1. Explain the term medicine.

2. Name the medical specialty that involves operations.
3. What is another name for a doctor? What is the term for a sick or injured person under medical care?

4. What is the method of curing disease that was developed in China?

5. What term describes a disease that spreads widely and rapidly?

6. Define a skeleton.

7. What is the study of the structure of organisms called?

8. Give three names for a place to buy prescription drugs.

9. What is a disease?

10. What is an antibiotic? Name some.

11. Who uses a microscope? What can it do?

12. A doctor cannot cure an illness unless he has made a diagnosis. What is it?

13. Name one familiar communicable disease. Do you know others?

14. How can x-rays help doctors make more accurate diagnoses?

15. What does a nurse do?

16. What is a patient?

17. What is the purpose of health insurance?

18. What is a hospital used for?

19. When is first aid given?
Medicine: Its History and Folklore

People have always been concerned with their health. Everyone, at some time, knows the frustration, inconvenience, fear, and pain that comes with illness. Many years ago, injury and disease were attributed to possession by an evil spirit, a disturbance in the natural balance of physical and chemical forces, or the anger of the gods. Throughout history, there have been countless techniques to prevent and cure illness and preserve health. Magic and prayer, heating and cooling, cutting and burning, potions and foods have all been used. All of these, as well as modern science, comprise the field of medicine.

The legendary father of medicine, a man named Hippocrates, was born in Greece in 460 B.C. His medical observations became well-known in the Western world and physicians are still required to take the Hippocratic Oath and practice their profession according to its principles.

Hippocrates was not the first to make medical discoveries worth noting and remembering, however. The tombs of the Egyptians contain drawings of surgical operations performed in Egypt as early as 3000 B.C. The Babylonian Code of Hammurabi, dated 2040 B.C., contain statements on doctor-patient relationships and medical ethics. Early medical documents and prescription lists have been discovered. In China, acupuncture was developed centuries ago to treat a wide variety of ailments.

Despite these early discoveries, society relied on folk beliefs to provide a rationale for medical treatment. For instance, people believed that wearing a dirty sock around the neck offered protection against the common cold or that putting one’s shoes upside down under the bed helped prevent cramps in the legs. Tobacco juice in the ear was reputed to help an earache, while black pepper and lard were supposed to cure asthma. Pregnant women were not supposed to hang clothes on a clothesline for fear they might produce knots in the umbilical cord. Amulets and incantations were trusted medical devices.
This 1805 Japanese woodcut by Kuwatsu shows common acupuncture points and meridians illustrated with Japanese characters.

In the Middle Ages, an *epidemic* of bubonic plague, often called the "Black Death," ravaged Europe. Similar experiences provided the impetus for scientists to work more determinedly on solutions for medical problems. This marked the beginning of the scientific approach to medicine.

In 1515 the first public dissection of a human cadaver, or dead body, was performed. Dissection enabled physicians to identify and study the human body's *skeleton*, the heart and its circulatory system, the major nerves, the stomach and other digestive organs, and so on. Without a thorough knowledge of *anatomy*, little medical progress could have been made.
In 1545, the first pharmacy was opened in London. Prescription medicines had been administered prior to this time, but establishment of this shop indicated that medication was becoming an accepted means of treating disease. Today many thousands of drugs are used to treat illness; those that are potentially dangerous or addictive must be prescribed by a physician. Among these are the antibiotics and the narcotic drugs such as morphine. Drugs not considered harmful, like aspirin and vitamins, are sold without a prescription.

The microscope was invented in 1590. This tool has since become indispensable in the diagnosis of disease. Laboratory technicians use it regularly to analyze specimens of blood, urine, and tissue; their reports provide physicians with valuable information which could not otherwise be known.
The history of medicine is full of major turning points. The first blood transfusion was performed in 1667. In 1699 a law to control communicable diseases was enacted in the American colony of Massachusetts. In 1769 New York City made the first attempt to regulate the practice of medicine. In 1895 Roentgen discovered the X-ray to detect abnormalities inside the body where the eye cannot see.

In the twentieth century major advances have been made in nearly every area of medicine. Open-heart surgery has been developed. Organ transplants are sometimes successful. The Salk and Sabin vaccines have virtually eliminated the threat of poliomyelitis. The electrocardiogram and electroencephalogram help physicians detect heart and brain malfunctions, respectively. There have been advances in the diagnosis and treatment of cancer. Health care for old people has gained respect.

These developments have increased the need for trained personnel in health-related careers. The general practitioner (G.P.) is no longer the only qualified individual in the medical field. There remain the ancient divisions of surgery, internal medicine, pediatrics, and obstetrics and gynecology. But within each are specialists, who have taken residency training and fellowship training as part of the house staff of teaching hospitals affiliated with medical schools. For example, within internal medicine is cardiology (heart), pulmonary medicine (lungs), rheumatology (diseases of bone and joints), dermatology (skin), and many others. Surgeons may specialize in cardio-thoracic (heart and lungs), vascular (blood vessels) or plastic (precise remodeling of superficial or surface anatomy) surgery. Newer specialities reflect new technologies (nuclear medicine). There is even a specialty of general practice—now called family practice.

Scientific developments are of no benefit if they are not shared. The cost of medical training, machinery, institutions, and treatment is so high that only the rich can pay for it. But increasing numbers of people have access to adequate health care through public health
programs, *health insurance*, socialized medicine, and various kinds of *hospitals*. The United Nations has improved health facilities through its subsidiaries, the World Health Organization (WHO) and the United Nations International Children's Educational Foundation (UNICEF). In the United States, medical societies and legislation set and maintain standards and disseminate information.

Medicine is a highly technical and complex science. But the basic principles of medical care and good health should not be the prerogative of medical professionals alone. Each individual should assume the primary responsibility for his or her own health and should be familiar with the first aid procedures necessary in an emergency situation when medical assistance is not available. Everyone should *known* the basic principles of medical science.

**Discussion**

1. What are some of the methods used in the past to prevent illness and restore health?

2. Who is called the "Father of Medicine?" Discuss the oath that is named after him.

3. What is acupuncture? Who developed it?

4. Give an example of a folk belief related to health.
5. What was the "Black Death?"

6. When did medical science begin to make real progress in Europe?

7. Why is the study of human anatomy important for work in a medical career?

8. What was significant about the establishment of the first pharmacy in London in 1545?

9. Certain drugs are available by prescription only. Why? Name some of them.

10. How do laboratory technicians use the microscope? What other tools help doctors diagnose disease?

11. Name some of the major medical advances made in this century.

12. Recent medical developments have increased the need for health personnel. Name some of these new positions.

13. What does a dermatologist do? A pediatrician?

14. What is WHO? What does it do?

15. Why is it important to be familiar with first aid?
Review

A. Complete the following sentences with the appropriate words.

1. Physician is another name for ________________.

2. Someone who is under a doctor’s care is called a ____________________.

3. A prescription drug can be purchased only in a ____________________.

4. A disease which spreads from one person to another is a ____________________.

5. Laboratory technicians use a ________________ to examine blood specimens.

6. The Salk and Sabin ________________ have greatly reduced the threat of polio.

7. In 1895 Roentgen discovered the ________________ which makes it possible to diagnose problems in the skeleton and internal organs.

8. A doctor who specializes in heart problems is a ____________________.

9. The cost of health care is so high that ________________ is necessary for most people.

10. The study of the human body, called ____________________, was greatly advanced when dissection was first used in 1515.
B. What are some common medical folk beliefs in your community or society?

C. Find out all you can about the health care facilities in your community. Do you feel they are adequate? Why or why not?

D. What medical career have you chosen? Why?
UNIT TWO
HUMAN ANATOMY

Special Terms

Epidermis: Tough outer layer of skin that protects the inner skin or dermis.

Glands: Organs in the body which produce secretions. There are apocrine glands (such as the salivary and sweat glands) and endocrine glands (such as thyroid or adrenal).

Tissue: Group of cells organized in a particular fashion with a similar function.

Muscle: Tissue composed of fibers which shorten by contraction to produce movement. Muscles are joined to bones by tendons.

Artery: Large blood vessel which carries blood away from the heart. Smaller vessels with the same function in the circulatory system are arterioles. Veins and venules return blood to the heart. The two systems are united by tiny capillaries.

Hemoglobin: Red colored protein in red blood cells that contains iron. Hemoglobin carries oxygen from the heart to the body cells and carbon dioxide back to the lungs.

Clot: Thick coagulated mass of blood. A clot can be dangerous if it blocks the circulation but it is necessary to stop the bleeding from a wound. Clotting is caused by platelets and numerous special proteins found in the blood.

Transfusion: Injection of blood or plasma into the body. A transfusion is given when a person has lost a lot of blood. Blood for transfusions is donated and stored in a “blood bank” until needed. It must be of the same blood type as the recipient’s.
Respiration: Process of breathing oxygen into the lungs and expelling carbon dioxide. It occurs in two phases, inspiration and expiration, at the rate of about 14–18 breaths per minute.

Enzyme: Protein which serves as a catalyst in bodily chemical reactions. For example, saliva, secreted in the mouth, contains several different enzymes which break down carbohydrates to begin the digestive process.

Neuron: Nerve cell. Fibers bringing impulses into the neuron are dendrites and fibers taking impulses away from the neuron are axons.

Autonomic nervous system: Nerves that control the involuntary muscles, glands and organs. The other nervous system, called the central nervous system, sends messages from the brain to the voluntary muscles.

**Vocabulary Practice**

1. What is the name for the tough outer layer of skin?

2. What are the tissues which permit the body to move?

3. A large blood vessel which carries blood away from the heart is an artery. What is a large vessel which returns blood to the heart?

4. Hemoglobin is the iron protein in the blood which gives blood its red color. What is its function?

5. When is clotting important?

6. When might a transfusion be necessary?

7. What is the average rate of respiration?

8. Where are the first enzymes that help the digestive process secreted?
9. What is another name for a nerve cell? What are axons and dendrites?

10. Does the autonomic nervous system control voluntary or involuntary muscles?

**Human Anatomy**

The human body is a remarkable machine, complex and enduring, although not immortal. It is able to absorb the oxygen necessary for life through respiration and to circulate it through the blood to the tissues. Food is digested, providing energy. It is given form by a skeletal system. It is protected against injury and disease by a layer of tissue called skin. The science of the structure of these major bodily systems is anatomy. Anyone working in a medical career must have a thorough knowledge of human anatomy.

The first major system is the skeleton. The body is supported and given shape by this bony structure, consisting of more than two hundred bones. It is strong, but can bend at its many joints. The heart, brain, and other vital organs are protected from harm by the major bones of the skeleton, including the rib cage, the skull, the spinal column, and the pelvis. The arms and legs are given form and strength by their major bones.
Bone is as strong as iron but much lighter and more flexible. It is composed of mineral and organic matter and water, held together by a cement-like substance called collagen.

Bones are filled with three types of living cells, each responsible for certain jobs in building and maintaining the bone. Bones are also filled with red and yellow bone marrow. The red marrow produces the red blood cells used throughout the body to transport oxygen while the yellow marrow consists predominantly of fat cells. A tough membrane, called the periosteum, covers most of the bone surface and allows the bone to be nourished by the blood.

The major bone structure in the body is the spinal column. It supports the head and trunk as it runs up and down the back and protects the spinal cord where many of the major nerves of the body are housed. It is composed of bony vertebrae which are held together by ligaments of connective tissue and separated from each other by the spinal discs—a special cartilage. At the top of the spinal column is the skull which protects the brain. Attached to the spinal column below the neck are the twelve pairs of ribs, comprising the rib cage. At the bottom of the spinal column is the sacrum, which forms the attachment to the pelvis. All bones are united by joints and held together by ligaments.

When a bone is broken, or fractured, a sticky substance is produced by the blood, forming a callus around the break. The bone heals gradually.

Another important system in the body is the outer covering called skin. It protects the body against injury, against bacteria, and against the loss of moisture. The skin also serves as an organ of perception for the nervous system, because of specialized receptor organs that respond to heat, touch or pain.

Three layers of tissue make up the skin, the epidermis, the dermis, and the innermost subcutaneous layer. The epidermis is in constant growth, with an outer layer of dead cells which are constantly being replaced as new cells are formed in lower layers. The middle layer or dermis is the location for two main types of glands, sweat glands and oil glands. The subcutaneous layer contains fat cells, blood vessels, nerves, and the coloring pigment called melanin. Hair, fingernails, and toenails are specialized forms of epidermis.
Muscles are special fibrous tissues found throughout the body. They are necessary for movement. Skeletal muscles are termed voluntary because they can be consciously controlled. Others, such as the stomach muscle, are involuntary. Muscles contract and shorten in response to nerve signals from the brain or the autonomic nervous system.

Muscles are attached to bones by tough fibrous tissues called tendons. Each muscle is surrounded by a protective sheath. The actual movement produced by contraction depends on the attachment of muscle, and by convention is usually referred to the joint which is moved (e.g., flexion or extension of the knee).

This schematic of the flow of blood through the heart reprinted with permission of the American Heart Association.
Healthy muscles are said to have good muscle tone. Not all muscles are healthy, however, for various ailments may affect muscles. An inflammation of tendon (tendonitis), protective sac at a joint (bursitis) or muscle itself (myositis) may occur. When a muscle contracts and becomes fatigued, a cramp occurs. Too much strenuous activity may produce a strain.

The most important muscle in the body is the heart. Without the heart and its circulatory system, human life would not be possible. The heart is about the size of two fists. It contracts at an average rate of 72 times per minute or nearly 40,000,000 times in a year.

The human heart consists of four chambers, two atria and two ventricles, each made of several layers of cardiac muscle arranged in circles and spirals. During the contraction phase, called the systole, blood is pumped out of the left ventricle into the aorta and then the arteries which carry blood to all parts of the body, and out of the right ventricle into the pulmonary artery and then the lungs. Used blood carrying carbon dioxide is returned to the right atrium through veins to the vena cava during the diastole or relaxation period and newly oxygenated blood returns from the lungs to the left atrium. Valves control the flow of blood from one part of the heart to another.

Arterioles are small arteries and venules are small veins. The two systems are joined by capillaries, the smallest blood vessels. In total there are 70,000 miles of blood vessels in the circulatory system.

The blood which runs through the circulatory system is made up of two parts, plasma and blood cells. The plasma, a clear, yellowish liquid, transports the 25,000,000,000,000 red blood cells, containing the protein hemoglobin, and the many fewer white cells, important for their role in fighting disease. The protein hemoglobin gives the red cells their color and carries oxygen to the body cells. Platelets in the blood permit clotting to take place at the site of a wound.

Each person has a particular blood type, depending on the detailed composition of the blood. There are four main types, labeled A, B, O or AM and more than 200 minor types known.

The oxygen transported by the blood is absolutely essential for life. Humans can live for weeks without food and for days without water but can exist for only a few minutes without air. Without oxygen the heart will not beat, the muscles will not contract, and the brain cells will die. Oxygen is breathed in through the nose, the first organ in the respiratory system, during inspiration. In the nose the air is filtered and its temperature is regulated. The air then passes
Many physicians have joined with the American Cancer Society and the U.S.
government to try to discourage cigarette smoking.

through the larynx, or voice box, and the trachea, or wind-pipe, into
the lungs. Once it reaches the lungs, it passes into branches called the
brancholes. These end in little air pockets called alveoli. Here the oxygen is passed into
the blood and carbon dioxide is returned for expiration into the
atmosphere. This entire process, called respiration, occurs at the rate
of about 14-18 breaths per minute.

Another major bodily system, the digestive system, allows food
to be consumed and utilized for energy and growth. The digestive
process begins in the mouth where food is chopped and crushed by
the teeth. The tongue helps in this process as well as being the
location of the taste buds. Saliva, excreted by the salivary glands in
the mouth, contains enzymes which help to break down the carbohydrates in food.

After food has been chewed, it is passed into the stomach by
swallowing. Peristaltic movements in the walls of the esophagus help
push the food along the alimentary canal. The muscular walls of the
stomach continue the mixing process while secreting hydrochloric
acid from the 35,000,000 glands in the stomach lining. After 30
minutes to 3 hours in the stomach this food, in a semi-liquid state, is
passed into the small intestine (duodenum-jejunum-ileum), a tube
about twenty feet long. Here enzymes in pancreatic fluid and bile
from the liver complete the digestive process. Nutrients are absorbed
into the blood through the villi which line the walls of the digestive
organs. These nutrients are either used in maintaining the body or
they are burned for energy. What cannot be absorbed is passed out
through the large intestine, or colon, and rectum as feces. (Liquid
wastes are also eliminated through the kidneys as urine.)

The last major bodily system important in the study of the
anatomy of the human organism is the nervous system. Nerves
respond to stimuli from the sense organs, including the eyes, ears,
nose, mouth, and skin. The nerves then send messages to the brain.
The brain interprets these messages and sends instructions for action
back through the nerves to the muscles.

Each nerve cell—and there are millions of them in the body—is
composed of a central soma, an axon, and dendrites. The axon is a
long, finger-like filament known as a process. It carries impulses away
from the soma while the smaller dendrites feed messages into the
soma.

The nervous system is specialized for rapid communication.
Electricity does not flow as it would in a wire: changes in axon
structure allow a wave of excitation to move along the axon. At the
gap between nerves, the synapse, the message is often carried by a
chemical secreted from one cell and stimulates the next. The central
nervous system is responsible for sending these impulses in cases where conscious control is possible such as skeletal muscle. The autonomic system regulates the involuntary muscles and organs, such as in the stomach. These organs are usually active to some degree at all times.

The brain is largely responsible for giving humans their unique qualities. It is composed of several parts, the pons, medulla, midbrain, cerebellum and cerebrum. But it is the cerebrum which allows humans to experience emotion and create the ideas which have made possible the development of civilization. It is this brain which makes human anatomy a subject quite different from the anatomy of other organisms.

Discussion

1. Why is a thorough knowledge of human anatomy essential for anyone working in a medical profession?

2. What functions does the skeleton perform?

3. How many bones are there in the skeleton?

4. Describe the composition of bone marrow. What important role does the red marrow play?

5. What is the tough membrane covering the bone called?

6. Name some major parts of the skeleton.

7. What do the vertebrae protect?

8. What bone surrounds the brain?

9. How does a bone heal when it is fractured?
10. The skin is a protective system. What does it protect the body against?

11. What else does the skin do?

12. How many layers does the skin have? Name them.

13. Two types of glands are located in the dermis. Which are they?

14. What tissues in the body allow movement?

15. What is the difference between a voluntary and an involuntary muscle? Give an example of each.

16. Ligaments attach bones to other bones. What attaches muscles to bones?

17. What are some of the ailments which affect muscles? Describe three of them.

18. What is the most important muscle in the body?

19. Explain how the heart works, mentioning atria and ventricles, the systole and diastole, and valves.

20. The circulatory system includes about 70,000 miles of blood vessels. Which of these vessels carry oxygen-bearing blood away from the heart? Which return the blood to the heart?

21. What two kinds of cells are found in the blood? What is the function of each?

22. What do platelets do?

23. How long can a person live without oxygen? Explain how it reaches the body’s cells.

24. What are the two phases of respiration? How many breaths are taken each minute?
25. What happens to air once it reaches the lungs?

26. Describe the digestive process, from the time food enters the mouth until it is absorbed into the blood or eliminated as waste matter.

27. Which organs handle liquid waste? What is this fluid called?

28. The nose is one sense organ. Name some others.

29. Explain how a nerve impulse is transmitted from the brain to a muscle or an organ.

30. Which of the body’s two nervous systems controls the internal organs, the autonomic or the central nervous system?

31. Why is the cerebrum so important?

**Review**

A. Identify each of the following terms by associating it with one of the major anatomical systems of the body: skeleton, circulatory system, skin, nervous system, digestive system, or muscles. A term may belong to more than one system.

- tendon
- trachea
- cerebrum
- salivary glands
- periosteum
- ligament
- plasma
- bursa
- bronchioles
- hemoglobin
- kidney
- eye

- synapse
- bile
- pancreas
- dentrite
- vertebra(e)
- taste buds
- ventricle
- nose
- teeth
- arteriole
- marrow
- skull

- pelvis
- flexor
- rib cage
- neuron
- liver
- peristalsis
- platelet
- capillary
- colon
- pulse
- rectum
- dermis
B. Which of the following statements are true and which are false? Explain your answers.

1. ____ Bronchi are part of the skeleton.

2. ____ The most important muscle in the body is the heart.

3. ____ Hemoglobin is a protein found in white blood cells.

4. ____ The top layer of skin is constantly dying and being replaced.

5. ____ Capillaries are secretions which help with the digestion of food.

6. ____ Oxygen is breathed into the body during inspiration and carbon dioxide is released during expiration.

7. ____ The pulse is a measure of the heart beat.

8. ____ The spinal column is composed of a number of flexible dendrites.

9. ____ Liquid wastes are passed out of the body through the rectum.

10. ____ The heart contracts at an average rate of 18 times per minute.

C. Choose one of the major systems of the body. Draw a simple diagram of it and explain how it functions to the rest of the class.
UNIT THREE
DISEASE: ITS SYMPTOMS AND CURES

Special Terms

**Symptom:** Patient complaint that may indicate something is wrong. Various symptoms, such as pain, coughing, or a fever, indicate a disease or other ailment.

**Fever:** Body temperature above 98.6° on the Fahrenheit scale or above 37° on the Centigrade or Celsius scale. Temperature is measured with a thermometer.

**Cough:** Air expelled from the lungs suddenly and noisily. A cough is usually associated with a cold or a lung disease, and may produce (bring up) mucous or pus.

**Hemorrhage:** Excessive bleeding, internally or externally.

Nausea: Feeling of the need to vomit or throw up the contents of the stomach. Nausea and vomiting are usually caused by stomach illnesses.

**Germ:** Disease-causing microorganism. Bacteria and viruses are two kinds of germs.

**Infection:** Invasion of the body by disease-producing microorganisms.

**Immunity:** Body's ability to resist infection. It may be either natural or acquired. Antibodies and white blood cells in the body are responsible for this immunity.

**Antibody:** Protective protein which is produced in response to foreign material, known as an antigen. Any foreign protein can be an antigen.
Vaccine: Preparation of living, weakened, or killed microorganisms used in preventing disease. Persons likely to be exposed to an infectious disease are vaccinated or immunized against it with vaccine.

Prescription: Written instruction by a physician to a pharmacist for the preparation and sale of medicine. Pharmacists are professionals trained in the preparation of drugs. Certain drugs are available only when prescribed.

Dose: Specified quantity of a medication taken at one time, usually repeated at regular intervals.

Addictive: Habit-forming. Certain narcotic drugs are addictive, creating in their users a compulsive urge for them.

Antibiotic: Drug which stops the growth of bacteria (but not viruses) and helps the body overcome infection. Penicillin is a familiar antibiotic.

Cure: Restore health through medical treatment.

Vocabulary Practice

1. Define symptom.

2. Fever, coughs, and sore throats are symptoms of disease. What is meant by fever?

3. Temperature is measured by a thermometer graded either in Fahrenheit or Centigrade degrees. What is normal body temperature on each scale?

4. What diseases is a cough usually associated with?

5. What may cause nausea?

6. How are colds spread?

7. What do germs do? Name two types of germs.

8. Immunity is the body's ability to resist infection. What produces this immunity?
9. What is a vaccine?

10. What is a drug?

11. What is the name for an instruction written by a physician for a medication?

12. Who can sell prescription drugs?

13. Why are narcotic drugs dangerous?

14. What drugs stop the growth of bacteria? Give an example.

Disease: Its Symptoms and Cures

Scientists have learned a great deal about the prevention and cure of ailments and have virtually eliminated certain diseases as major threats but there are still many ailments which afflict mankind. We no longer fear the bubonic plague, for example, and cholera and smallpox have largely been eradicated. But we still must contend with heart attacks, cancer, and other diseases of the modern era.
People notice changes in their bodies which they associate with illness. These are called symptoms. The most clearly recognizable symptom is pain. A pain in the stomach may indicate simple indigestion or a more serious ailment such as an ulcer or dysentery. A headache is associated with colds, the flu, and head injuries while a pain in the chest may be a warning of a heart attack or lung trouble.

Fever is another symptom of ill health. Normal body temperature is 98.6° when measured on the Fahrenheit scale or 37° Centigrade on the Celsius thermometer. A temperature higher than normal indicates that the body is fighting disease.

Other symptoms of disease include coughing and bleeding. A cough may be dry or it may produce a lot of phlegm or sputum. It is associated with ailments of the throat, chest, and lungs. Bleeding may be severe as in a hemorrhage or minimal as with a small abrasion or cut.

Fainting or dizziness are other symptoms that something is wrong. They may indicate a low red blood cell count, a condition known as anemia, or they may be a symptom of a concussion or other injury to the brain.

Nausea and vomiting are associated with stomach and intestinal disorders such as the flu, food poisoning, or dysentery. Chest pain or a congested feeling can be a symptom of heart trouble while sweating, itching, and rashes are skin manifestations of problems such as allergies, or even cancer.

Someone who experiences these symptoms should try to determine if they are characteristic of a serious ailment or a common one. If the ailment is not serious, it can be treated without medical advice. (Various ‘self-help’ medical encyclopedias may be helpful.) If serious, however, a doctor should be consulted.

The common cold is a good example of an ailment which does not require expert medical attention. Most colds are caused by viruses rather than by getting wet or standing in a draft, as is the common belief. It is true, though, that getting chilled can lower one’s resistance and make one more susceptible to attack by a virus. The symptoms of a cold may include a runny nose, a cough, a sore throat, a fever and various aches. None of the antibiotic drugs, such as penicillin, are effective in treating a cold. Drinking tea with honey and whiskey, a common home remedy, does not cure a cold nor does taking massive doses of Vitamin C. About all one can do is stay in bed and rest for the five to seven days duration of the illness. Happily, most virus infections in otherwise healthy people are self-limited.
On the left above is a photomicrograph of virus pneumonia (virus); on the right is Rocky Mountain spotted fever. Virus particles enter the body and cause infection.

While commonly available antibiotics do not help in the cure of a cold, other medications can relieve some of the accompanying aches. Aspirin, a common pain reliever, minimizes the headaches and other muscle aches. Gargling with salt water or sucking lozenges can soothe a sore throat. An antihistamine may decrease the stuffiness of the nose. And a prescription cough medicine with codeine or any other mild narcotic will suppress the urge to cough.

The cold and the flu are good examples of communicable diseases. They are caused by virus particles which are transmitted from person to person. These submicroscopic particles enter the body through the mouth or nose, through the skin, or through the intestines in food or water and cause infection. Depending on where the virus particles settle and multiply, different illnesses develop. A virus entering through the nose may cause a cold or a strep throat while one which is swallowed may result in the flu or a more serious ailment.

In addition to bacteria and viruses, fungi and parasites can cause infection. The severity of the infection depends on the body’s ability to resist infection. This ability is termed immunity and may be natural or acquired. Natural immunity is provided by such bodily defense mechanisms as the skin and mucous membranes, the harmless bacteria in the body which interfere with the growth of harmful
germs, and specialized white blood cells that live in the tissues, fluids and blood. Acquired immunity is developed by exposure to germs and their products and depends on specific antibodies produced by sensitized plasma cells. By introducing germs artificially in a controlled manner into the body, the body is stimulated to produce the antibodies which will prevent the growth of the same antigen in the future.

Vaccines are used to produce an acquired immunity. A person is vaccinated with a living but weakened germ, a killed germ, or a toxic poison from the germ. The body responds by developing an immunity to the germ. Because this acquired immunity often does not last a lifetime, it may be necessary to immunize people periodically with booster shots of the vaccine.
Despite vaccines and other precautions, however, people become ill. When this happens, drugs can be used to cure the illness. A drug is any substance which is used to treat illness. Many substances have been used historically for this purpose with varying success. Often there was no understanding of why the drug worked. It simply had been demonstrated effective through a process of trial and error. Today, as the result of sophisticated scientific experimentation, drugs have become more and more specific and effective. Nearly one thousand different drugs are currently available for the treatment of illness and new ones are continually being developed.

The most effective drugs are available by prescription only. These drugs are potent and may be dangerous if taken in an overdose. Some are addictive. Therefore their use must be strictly controlled. A patient can buy these medicines only if a doctor prescribes them and writes a prescription, or order, for a pharmacist to fill.

Some of the most dramatic prescription drugs are antibiotics. Penicillin, a well-known antibiotic, is generally effective against a variety of bacterial infections. Made from fungi, penicillin inhibits the growth of disease-producing microorganisms. The sulfa drugs, such as sulfanilamide, were among the earliest prescription drugs. The mycin drugs, like streptomycin, often work where penicillin fails or when a patient is allergic to penicillin.
Narcotic drugs such as codeine and morphine can also be obtained only with a prescription. They are addictive and thus can be used only in restricted dosages. Originally derived from opium and now mostly synthetic, they are excellent pain-killers.

Many other drugs which do not require a doctor’s prescription are available in pharmacies. One of the most well-known and widely-used is aspirin. It is usually taken to relieve pain, as in the case of a headache. Laxatives are another common medication. They are used to relieve constipation. Sedatives and other tranquilizers have increased in popularity recently as have “pep pills” and other stimulants. Many mild antiseptics and ointments are sold for the treatment of superficial wounds.

Other familiar drugs include digitalis which helps strengthen the failing heart, anticoagulants which prevent blood clots, and diuretics which help remove excess fluid from the body. Sleeping pills are used by many insomniacs to induce sleep. Injectable insulin is used in the treatment of diabetes. Oral contraceptives have become common for birth control.

Although it is never pleasant to be ill, it is comforting to know that scientists have discovered the causes of most illnesses and have developed drugs to cure them. It is now possible, at the first symptom of disease, to consult a physician regarding a prescribed medication or to use a mild remedy available in any pharmacy to relieve the unpleasantness of a less serious ailment. It is no longer necessary to suffer without the hope of any relief.

**Discussion**

1. Is the bubonic plague still a common disease?

2. Name several symptoms of ill health.

3. What problems can a stomach ache indicate?

4. What instrument is used to measure body temperature? Name the two temperature scales.

5. Is a small cut likely to produce a hemorrhage?
6. What are two symptoms of a brain concussion?

7. What is the cause of a common cold?

8. Can antibiotics help cure a cold?

9. What does aspirin do?

10. How can gargling help a sick person?

11. How are communicable diseases transmitted?

12. What is a germ? What does it do?

13. What is the difference between natural and acquired immunity?


15. How does a vaccination produce immunity? Why are booster shots given?

16. Why are some drugs available by prescription only?

17. Where is medicine sold?

18. Give an example of a well-known antibiotic.

19. What disease is treated with insulin?

Review

A. Use each of the following terms in a sentence of your own.

fever  infection  drug
immunity  overdose  addictive
hemorrhage  sedative  antihistamine
penicillin  headache  pharmacist
aspirin  nausea  ointment
flu  booster shot  
gargle  cure  
Fahrenheit  virus  
allergy  remedy  
cough

B. Describe the most recent disease you have had. What were the symptoms? What treatment did your doctor prescribe?

C. Have you ever been vaccinated? Against what disease or diseases?
UNIT FOUR
COMMON DISEASES AND AILMENTS

Special Terms

Fatal: Causing or resulting in death. Many diseases are fatal if they are not diagnosed and treated in time.

Arteriosclerosis: Hardening of the arteries caused by layers of fat which line the artery walls.

Coronary thrombosis: One form of heart attack in which a main artery becomes blocked by a blood clot.

Stroke: Ailment caused when the blood supply to the brain is stopped by a blood clot. Partial paralysis may result.

Cancer: A disease in which abnormal tissue grows and spreads as tumors throughout the body. Cancerous tumors are said to be malignant; harmless tumors are benign.

Sanatorium: Special health-care institution where victims of serious communicable diseases such as tuberculosis are isolated during treatment.

Paralysis: Inability to move. Paralysis is caused by diseases such as polio or by a stroke which affects the brain or the central nervous system, or by severe muscle disease.

Renal hemodialysis: Process in which the cleansing functions of the kidneys are performed by a machine. It is used by patients whose kidneys no longer function properly.

Hypodermic needle: Medical needle with a syringe used for injecting drugs into the body.
Incubation period: Time period during which bacteria or virus develop in the body. Diseases such as viral hepatitis do not affect the victim immediately after exposure to an infected person but only after an incubation period.

Allergic: Sensitive; reacting adversely to a substance. Someone who is allergic to chocolate, for example, may develop a rash after eating it.

Hiccups (hiccoughs): Series of spasms in the diaphragm causing one to take sudden gulps of air.

**Vocabulary Practice**

1. What happens to the victim of a fatal disease?

2. Two forms of heart disease are arteriosclerosis and coronary thrombosis. What is meant by each of these terms?

3. What is a stroke? What may be the result of a stroke?

4. What is the difference between a hemorrhage and a blood clot?

5. How does cancer affect a person?

6. Where might a tuberculosis victim be sent for treatment?

7. If someone is paralyzed in one arm, what is wrong with the arm?

8. What organs are replaced in function by renal hemodialysis?

9. What is the time period called during which hepatitis bacteria develop in a victim after exposure to an infected person?

10. Are you allergic to anything? If so, what?

11. Have you ever had the hiccups? How did you get rid of them?
Dr. Jonas Edward Salk (1914--), the microbiologist who introduced the first successful vaccine against poliomyelitis, inoculates a child.

**Common Diseases and Ailments**

Scientific discoveries have virtually eliminated certain diseases as threats and greatly diminished the severity of others. Smallpox, for example, has been eradicated in most parts of the world by vigorous immunization campaigns. The Salk and Sabin vaccines have reduced the threat of poliomyelitis. Drugs such as isoniazid (INH) are effective against tuberculosis. Nonetheless, diseases and other ailments continue to interfere with human productivity. In fact, some of the threats to health today, such as heart disease and cancer, are more prevalent than in the past.
One of the most common afflictions in modern society is heart disease. More than half of all deaths recorded in the United States each year are the result of heart disease. The heart is the strongest muscle in the body. For most people it functions healthily throughout their entire lives. Yet, like any piece of complicated machinery, it can wear out or break down.

Heart disease can appear in a variety of forms. Some can be treated successfully. Other heart ailments are fatal, either because they are diagnosed too late or because the damage caused is too extensive. Doctors can often predict heart problems by measuring the rate of the heartbeat, called the pulse, and from the blood pressure.

One condition which can be treated by changing the environment is arteriosclerosis or hardening of the arteries. With this disease, the inner walls of the arteries are gradually thickened by layers of fatty material, narrowing the channel for the passage of blood. Blood clots may form and block the circulation entirely. One way to decrease the likelihood of this condition is by reducing the cholesterol content of the diet, emphasizing vegetable oils, avoiding smoking and increasing exercise.

A patient who suffers a heart attack has what doctors call a coronary thrombosis leading to myocardial infarction or cardiac arrest. One or more of the arteries supplying the heart muscle with blood becomes narrowed by a blood clot. Symptoms include pain in the chest, shortness of breath, and nausea.

Angina pectoris refers to chest pains caused when the heart muscle does not get enough oxygen. An attack is usually caused by overexertion and can be relieved by rest and nitroglycerin tablets. A stroke occurs when the blood supply to the brain is reduced or completely cut off by a blood clot or a hemorrhage. Partial or complete paralysis may result.

Some patients with chronic heart conditions who do not respond to drugs can now be helped with open-heart surgery. Valves, arteries and other parts of the heart mechanism can be repaired or replaced. A pacemaker can be inserted to regulate the heart’s beat artificially. Heart transplants have also been tried experimentally, with some success.

While heart disease is still a threat, heart patients today can be grateful for the advances of modern science. Many victims who would not have survived their illnesses twenty years ago can be cured and enabled to go on living normal lives.
A technician charges a pacemaker which can then be inserted to regulate a patient's heartbeat artificially.

Another major killer in the twentieth century is cancer. Cancer is characterized by an unrestrained growth of abnormal cells. There are three main types of cancer. A carcinoma originates from the surface cells of the skin or the linings of the internal organs. A sarcoma attacks the muscles, bones, tendons, cartilage, fat, blood vessels, lymph system or connective tissue. Leukemias afflict the blood forming cells. Some cancers grow slowly; others spread rapidly, doubling in bulk in days. Cancer can appear anywhere in the body but some common sites are the lungs, the breasts, the uterine cervix, the skin, the colon, and the blood.

Cancer is fatal if it is untreated but it can often be cured in the early stages. As soon as a tumor is discovered, exploratory surgery is undertaken and a biopsy for examination of the tissue is performed. If the tumor is malignant, it may either be removed surgically or treated with radiation or chemotherapy.

The causes of cancer remain an enigma to scientists. Some of the accompanying conditions are known, however, including excessive cigarette smoking, overexposure to x-rays and sunlight, and contact with certain chemicals. A virus may be responsible; or a tendency to cancer may be inherited. Scientists are now conducting extensive research to learn more about the disease.
Communicable diseases differ from heart disease and cancer for they are passed from one person to another. One familiar communicable disease is tuberculosis. The tubercle bacillus microorganisms are carried through the air on droplets coughed up by victims from their lungs where the disease settles. Until recently there was no known cure and most people who contracted the disease died from it.

Today the tuberculin test is administered to detect sufferers of the disease at an early stage. An infected person will demonstrate an allergic reaction to this test. The chest x-ray is another means of diagnosing the disease.

Drugs such as isoniazid (INH) are effective in treating tuberculosis. Chronic sufferers were often isolated during treatment in special institutions called sanatoriums to prevent the spread of the disease. Recently, more effective medical treatment has replaced most of these institutions.
Prior to discovery of effective medical treatment, chronic tuberculosis sufferers were often isolated in special institutions called sanitoriums to prevent the spread of disease.

Another communicable disease is poliomyelitis, or polio for short. It is caused by a virus which enters the body through the mouth and multiplies in the intestinal tract, attacking the motor neurons of the spinal cord. It can cause paralysis of affected parts of the body in its most extreme state. Fortunately, polio is no longer the threat it once was due to the introduction of the Salk and Sabin polio vaccines in the 1950's.

The neuromuscular systems in the body can be affected by a number of diseases. These diseases all cause a loss of muscular control by disturbing the nerves which control the muscles. In muscular dystrophy, a chronic and inherited disease, the muscles gradually waste away. A patient with Parkinson's disease can be detected by his uncontrollable shaking caused by basal ganglion dysfunctions. Multiple sclerosis victims suffer from a loss of muscular coordination in various parts of their bodies because of damage to nerve fibers. Unfortunately, none of these diseases is curable at present. All that can be done for a victim is to lessen the undesirable symptoms.
A disease which attacks the kidneys is nephritis. The kidneys regulate the elimination of liquid wastes, called urine, from the body. A person can function with only one kidney but cannot survive if both kidneys are destroyed. A victim of infective nephritis suffers painful urination, backache and general weakness. If the disease becomes severe enough to destroy the kidneys, the victim can be saved through the transplantation of a donor's kidney or by regular use of a *renal hemodialysis* machine. This machine substitutes for the kidneys, cleansing the body of its wastes. Although effective, renal hemodialysis is nonetheless a painful and time-consuming ordeal, requiring the patient to spend about twenty hours weekly in bed attached to the machine.

![Image](https://example.com/image.jpg)

This young nephritis sufferer must have regular treatment on a renal hemodialysis machine.

Viral hepatitis (commonly called jaundice because of the yellowish tinge to the skin) is due to a viral infection in the liver. Hepatitis can be contracted from contaminated food, *hypodermic needle*, or blood transfusion. Symptoms of the disease do not usually appear until after an *incubation period* of several weeks. These symptoms include the loss of appetite, fatigue, fever, and nausea in addition to the yellowish color. Hepatitis can be treated with gamma globulin.
Diabetes is a disease in which the body no longer uses sugar properly. In a healthy body special cells in the pancreas secrete the hormones insulin and glucagon which help to store sugar. This no longer happens when one suffers from diabetes. A victim of diabetes thus must limit sugar and starch intake and possibly take daily injections of insulin.

Arthritis and rheumatism are ailments of the bones and joints. They are particularly common among the elderly. Symptoms include swelling, pain and stiffness. There are many different varieties of rheumatic diseases, including rheumatoid arthritis, osteoarthritis, and gout.

Diseases of the bones and joints are common among the elderly, but are not limited to adults.

Allergies are common, and may increase with environmental deterioration. Persons who cannot tolerate certain foreign substances may react with a rash or hives, with hay fever or asthma, or with eczema or other manifestations. The substance acts as an antigen which stimulates excessive antibody reaction. The reaction can usually be weakened by medication or by desensitization injections, but the only real cure is to avoid the allergen.
Diseases which are common in childhood include chickenpox, measles, mumps, diphtheria, tetanus, and whooping cough. In the United States children are routinely immunized against most of these. This is not true in all parts of the world, however, and many children suffer needlessly as a result. Fortunately, these diseases are not usually fatal.

Many other ailments of a less severe nature may afflict the human body. Diarrhea, or loose bowel movements, often results from contaminated water, fruits, or vegetables and is most often associated with foreign travel. It disappears as soon as the contaminant is eliminated from the body. The discomfort can be relieved by medications such as Lomotil, an antilaxative. Diarrhea can also be an indication of a more serious problem, such as dysentery, amebiasis, cholera or parasites. If it does not disappear quickly, a doctor should be consulted.

Hemorrhoids, or "piles," are irritating swellings due to enlarged veins near the anus, often associated with pregnancy. They can often be controlled by addition of bulk (such as wheat bran) to the diet and better hygiene (sitz baths). Gonorrhea and other venereal diseases result from sexual contact with infected persons. Toothaches are a sign of tooth decay; they should be treated by a dentist. Acne, in which pimples appear on the face, can be treated by cleansing and possibly by avoiding rich foods. Hiccups, usually an irritating embarrassment rather than a disease, are caused when the diaphragm begins to spasm. Holding one's breath, being startled, drinking water out of the wrong side of a glass, or eating a spoon of sugar are all reputed to be cures. Though they are really no more than folk beliefs, they often seem to work.

Whether one suffers from the hiccups or from a more serious ailment such as cancer or a neuromuscular disease, it is the goal of those working in the field of medicine to help. This goal is achieved to a much greater degree today than in the past due to the advances of medical science.
Immunization against infectious childhood diseases is a major element of child health care. Here a child is vaccinated in a UNICEF health center in India.

**Discussion**

1. Why are smallpox and poliomyelitis no longer serious threats to mankind?

2. What disease is the greatest killer in modern society? Is it always fatal?

3. Explain what happens to a patient suffering from arteriosclerosis. How can the risk of arteriosclerosis be reduced?
4. What is the medical name for a heart attack? What happens to the victim during such an attack?

5. What may be the result of a stroke?

6. What modern medical advances can help the heart victim?

7. Name two types of cancer. Where does each originate?

8. Explain what happens to a victim of cancer. Why is cancer so feared?

9. How can a malignant tumor be detected?

10. What techniques have been developed for treating cancer?

11. What part of the body is affected by tuberculosis? Name two methods of detecting sufferers of T.B.

12. The polio virus attacks the central nervous system. What happens to the affected parts of the body?

13. Name three neuromuscular diseases. What are their symptoms? Are there any real cures?

14. Painful urination is a symptom of a disease affecting one particular organ. Which one?

15. What disease, indicated by a yellow coloring to the skin, can be caused by an infected hypodermic needle?

16. What disease requires daily injections of insulin?

17. What parts of the body are affected by arthritis and rheumatism?

18. How can diarrhea, dysentery, amebiasis, and parasites be avoided?

19. How do people get rid of the hiccups in your country?
Review

A. In each of the following, choose the answer which is most correct to answer the question or complete the statement.

1. More than half of all deaths recorded in the United States are caused by ____________.
   automobile accidents  cancer
   poliomyelitis       heart disease

2. A disease which is nearly always fatal if not detected early is _________________. It can often be treated by radiation or surgery.
   arthritis           cancer
   tuberculosis       jaundice

3. A variety of diseases can attack the neuromuscular system. One of them is _________________.
   Parkinson’s disease leukemia
   diabetes            nephritis

4. The Salk and Sabin vaccines provide immunity against ________________.
   tuberculosis       cancer
   hepatitis           poliomyelitis

5. One ailment which attacks the intestinal tract is _________________.
   dysentery           chickenpox
   muscular dystrophy mumps

6. Venereal diseases, such as _________________, are usually transmitted through sexual contact.
   diarrhea           gonorrhea
   acne                rubeola
7. An individual who cannot tolerate a certain substance is said to be allergic. Which of the following is not usually a common sign of an allergy?

- hay fever
- eczema
- asthma
- hiccups

8. Many varieties of ______________ cause pain, swelling and stiffness in the joints, particularly among the elderly.

- diabetes
- dysentery
- hepatitis
- rheumatism

9. ______________ does not usually appear in a victim until after an incubation period of several weeks following exposure to the disease.

- gastroenteritis
- hepatitis
- multiple sclerosis
- arthritis

10. All but one of the following is a common childhood disease. Which one is not?

- chickenpox
- whooping cough
- mumps
- hemorrhoids

B. Imagine that you are a physician. A patient enters your office complaining of severe stomach cramps, a headache and nausea. What might be wrong?

C. Describe the most serious illness you have had. What was it called? What were its symptoms? How was it treated?

D. Which immunizations are commonly given in your community? What shots have you had?
UNIFIVE
DOCTORS

Special Terms

License: Official permission to practice medicine. In the United States, doctors must be licensed by the state in which they wish to practice, after completing the necessary studies.

Internship: Period of time spent by a graduated M.D. in a hospital before being licensed to practice. The M.D. is known as an intern during this period. He or she spends one or two years rotating through the various divisions of the hospital to become familiar with all branches of medicine.

General practitioner: Physician who treats all medical problems rather than specializing. Often certified as a specialist in Family Practice.

Quack: One who pretends to have medical training but does not; a phony doctor.

Residency: Period following internship during which a prospective physician specializes in one area of medicine.

Fee: Payment made to a doctor for his or her services. Most doctors are paid on a fee basis rather than receiving a salary.

Medical history: Record of a patient’s past and current illnesses and treatments. (Also includes family history, social history, and a review of body systems.)

Rounds: Visits to patients by doctors in a hospital.

Lethargic: State in which the patient has reduced movement and attention; mentally and physically unresponsive.
On duty: At work. Doctors usually work in shifts, especially in hospitals. They are responsible for their patients, or on duty, only certain periods of the day. The opposite is off duty. A doctor who is not at the hospital but who is available if needed is on call.

Vocabulary Practice

1. What does it mean for a doctor to be licensed? Can a doctor establish a practice without a license?

2. What is meant by internship?

3. What is the name given to a doctor who handles all medical problems rather than specializing?

4. Would you go to a quack doctor? Why or why not?

5. How does a resident differ from an intern?

6. How many areas may a resident specialize in?

7. How are most doctors paid for their services?

8. When a new patient comes to a doctor’s office, the doctor must get information from him or her about past illnesses. What is this information called?

9. What does it mean to “make rounds”?

10. If a doctor is on call, is he necessarily at the hospital? How is it different to be on duty?
Doctors

The doctor of medicine, or physician, is the most familiar professional working in the health field. Most people turn to a doctor for advice when they are sick or injured. It is the doctor's responsibility to diagnose the patient's illness or other ailment and propose a treatment.

A doctor's profession provides many rewards but the physician must be willing to accept the responsibility of making life-and-death decisions. Doctors are also very busy. They sacrifice much of their privacy in order to be on call. Illness does not wait until office hours to strike.

In the United States, to become a licensed physician it is necessary to complete at least four years of undergraduate studies and four years of training in a medical school, including the study of such subjects as anatomy, biochemistry, pathology and histology. Following this training, the M.D. degree is awarded. The physician then becomes an intern in an accredited hospital for one year. The intern rotates throughout the various medical departments in the hospital to become familiar with all aspects of the medical profession.
A doctor who chooses to become a general practitioner may seek to become licensed to practice at the end of this period of internship. In the United States each state sets certain standards which a doctor must meet before being allowed to treat patients in that state. This is done in order to discourage persons, known as quacks, who pretend to be professionally qualified without actually having the proper training and knowledge.

A doctor who opens a general practice treats patients with a variety of medical problems. One day he or she may deliver a baby and the next morning set a broken leg. He or she may have one patient with heart disease and another who suffers from diabetes. General practitioners often work in small towns where they provide all the medical services, even making house calls to see sick patients. They may also work on the staff of a hospital in the department of general medicine.

Today more and more doctors are choosing to become specialists. A doctor with a specialty in cardiology, for example, treats only patients with heart disease, while a surgeon handles cases requiring operations. Before becoming licensed as a specialist, a doctor must complete an additional period of training in a hospital as a resident physician. During this residency, usually lasting three or four years, a doctor works only in the chosen specialty.

One of the best-known medical specialties is surgery. A surgeon performs operations on patients who cannot be cured by medication alone. Surgery may involve opening the heart to repair a damaged valve or cutting into the intestinal area to remove a cancerous tumor in the colon. Many operations are performed by specialists within the field of surgery. For example, broken bones are often fixed by orthopedic surgeons; nervous disorders are treated by neurosurgeons; and injured or malformed tissues or organs are repaired by plastic surgeons.

Another common area of specialization is obstetrics and gynecology. Obstetricians deliver babies while gynecologists treat problems related to the female reproductive system. Obstetricians and gynecologists are usually competent in both areas and are thus referred to as ob/gyn specialists. Once a child is born, it becomes the medical responsibility of a doctor trained in the treatment of children, called a pediatrician. One of the more recent specialties is family practice. Residency training in this area concentrates on the increasingly
complex problems of treating general medical problems of all ages in the context of today's society.

In addition to these familiar specialties, a doctor may choose to specialize in any number of other approved fields. The department of general medicine in a hospital may include, for example, an internist who treats general internal disorders, a dermatologist who is particularly knowledgeable about skin problems, and an ophthalmologist who handles patients with complaints about their eyes. There may also be an endocrinologist for glandular disorders and an otolaryngologist for ear, nose, and throat problems. A cardiologist is an expert in heart disease; a psychiatrist treats mental disorders; and a dentist fills cavities in the teeth. A doctor may also choose to become an anesthesiologist, a pathologist, an allergist, a radiologist, a urologist, a specialist in rehabilitation through physical medicine, and so on, all requiring full medical training. These areas of specialization have proliferated in recent years with the advance of medical technology. The future promises to create even more specialties.
The skills of doctors are needed in a variety of areas and doctors can thus choose the kind of life which they wish. They may decide to set up a private practice or join with other doctors in a group practice. They may work in a hospital curing sick patients or focus on the prevention of illness as part of a public health team. A doctor who works alone has a great deal of independence but is reliant on fees from patients. If employed by a health care institution, on the other hand, the doctor has the security of receiving a regular salary as well as having more regular hours.

Dr. Alex Brown is a doctor who is typical of many others. A look at a routine day in his life will serve to illustrate the problems and challenges confronting most physicians.

Dr. Brown has a practice in Chicago which he shares with two other general practitioners.

Dr. Brown’s day begins at 7:00 A.M. when he leaves his home. He reaches the office by 7:30 in time to review yesterday’s cases before his first patient arrives at 8:00.
John Smith, a man of about 50, is Dr. Brown's first patient this day. He is a nervous man with a demanding job. Consequently he suffers from chronic ulcers. Despite Dr. Brown's repeated advice that he should cut out some of his activities and stop smoking, Mr. Smith continues in his ways. As a result, he visits Dr. Brown frequently. Dr. Brown listens to Mr. Smith's new complaints patiently, hearing the same familiar symptoms repeated. Mr. Smith is often nauseous and he has constant indigestion. Alcohol irritates his stomach. But he has no fever so he is apparently no worse than usual. Dr. Brown encourages Mr. Smith once again to stop smoking and prescribes some antacids. He also proposes a simple diet with no alcohol.

Dr. Brown completes his first consultation at 8:45, making him only fifteen minutes late for his second patient. Jane Anderson is a new patient. She thinks she is pregnant and wants to confirm her suspicions. Dr. Brown's nurse assistant has recorded Ms. Anderson's medical history in preparation for the examination. After reviewing the history and briefly discussing the important points with Ms.
Anderson, Dr. Brown is ready to examine her. The nurse shows Ms. Anderson into the examination room, and asks her to get undressed and put on a white gown. When she is ready, Dr. Brown comes in. He takes her blood pressure, checks basic anatomy and performs a pelvic examination. He asks her to leave a urine specimen before she goes, and instructs his nurse to obtain a blood sample.

By 10:00 Dr. Brown is ready to leave for the general hospital nearby to visit the patients he and his colleagues have in the hospital. One of the three makes rounds daily to check on their patients. Today he sees Johnny Lee, a twelve-year-old boy who broke his arm falling out of a tree. Johnny is in the pediatrics ward with other children his own age. He seems to be recovering well. The break required reduction before casting, and Johnny was a little lethargic, so he was kept in the hospital for an extra day in order to assure that the cast would not cause him difficulty.

While he is in the hospital, Dr. Brown hears his name called over the loudspeaker. He is being paged to come to the emergency room. Edna Johnson, one of his elderly patients, has just been brought to the hospital in an ambulance after suffering a stroke. One side of her body is paralyzed due to a blood clot which has stopped the flow of blood to her brain.

Dr. Brown’s day continues without a break until he finally manages to get away about 7:00 in the evening and return home for supper with his family. He has two young sons and enjoys spending time with them. In fact, the one regret he has about his choice of medicine as a profession is that it keeps him away from his wife and sons so much. And, surely enough, shortly after supper, he receives an urgent call from a head nurse at the hospital saying that Edna Johnson’s vital signs are weakening and urging him to come immediately. As he is on call that evening, Dr. Brown has no choice but to go—it is his responsibility.

The life of a doctor is a challenging one with many rewards, but it is not an easy one. It demands a great deal of patience and dedication to the ideals of good health. Anyone who decides to become a doctor should be aware of these drawbacks as well as the rewards.
Discussion

1. Whom do most people turn to for advice when they are sick?

2. Why is so much dedication demanded from a doctor?

3. Describe the training needed to become a doctor. What are some of the subjects studied? What is meant by internship? Residency?

4. What is the difference between a licensed doctor and a quack doctor?

5. If you were a general practitioner, what kinds of patients would you see?

6. Why have medical specialties been increasing in recent years?

7. If you were a pregnant woman, which specialist would you see?

8. Who specializes in the treatment of children?

9. Name some of the medical specialists you might find in the department of general medicine in a hospital.

10. Do all doctors work in hospitals? Describe some alternative work arrangements for doctors.

11. What are the benefits of having a private practice? The drawbacks?

12. Prior to treating a patient, a doctor should know the patient's medical history. What might be contained in this history?
13. What was wrong with Dr. Brown’s first patient, Mr. Smith?

14. Why did Jane Anderson come to see Dr. Brown?

15. While Dr. Brown was visiting Johnny Lee in the hospital, he was paged. What does that mean?

16. Why was Dr. Brown paged? What was wrong with Edna Johnson?

17. Dr. Brown’s one regret about being a doctor was that he was so often called away from his family. What happened to interrupt his evening on the night of the story? Why couldn’t somebody else handle the problem?

**Review**

A. Match each of the medical specialties in the left column with the part of the body or the problem treated in the right column.

1. _____ ophthalmology a. skin
2. _____ dermatology b. children
3. _____ orthopedic surgery c. glands
4. _____ cardiology d. bones
5. _____ gynecology e. eyes
6. _____ pediatrics f. heart
7. _____ dentistry g. mind
8. _____ psychiatry h. teeth
9. _____ endocrinology i. disease
10. _____ pathology j. female genitalia
B. Complete the following sentences by filling the blanks with the appropriate words or phrases.

1. A doctor practicing in a small town is probably a _____________________.

2. It is the doctor's responsibility to ____________________ a patient's illness and propose a _____________________.

3. Following training in medical school, a medical student becomes an ____________________ in an accredited hospital.

4. A doctor who wishes to specialize in one area of medicine must complete a period of specialized training as a ____________________ physician in a hospital.

5. One of the best-known medical specialities is ____________________, in which patients are treated through operations.

6. A doctor working in a hospital makes ____________________ daily to visit his patients.

7. A person may suffer partial paralysis from a ____________________ in which the brain is denied oxygen by a blood clot.

8. A doctor who works as part of a ____________________ team focuses on the prevention of illness.
9. One should be aware of ________________ who pretend to be qualified physicians but really are not.

10. In order to set up a practice in the United States a physician must be ________________ by the state.

C. Imagine that you are a general practitioner. What kind of work would occupy most of your time?
UNIT SIX
SURGERY

Special Terms

Operation: Surgical treatment involving cutting into the body.
Scalpel: Knife used in surgery.
Forceps: Tong-like instrument used in surgery for gripping tissue.
Amputate: Cut off part of the body, such as a leg.
Anesthesia: Insensibility to pain, induced by inhalation or injection of an anesthetic drug. These drugs are usually administered by a trained anesthetist or anesthesiologist. They produce either general or local anesthesia.
Sterile: Perfectly clean; germ-free. All instruments used in an operation must be sterilized to avoid infection.
Exploratory Surgery: Surgery in which the aim is to discover the extent of a problem.
Corrective Surgery: Surgery in which the aim is to treat the problem.
Vital signs: Indications of functions essential to life. The blood pressure, the pulse and the rate of respiration, and the temperature are the major vital signs.
Intravenous: Within a vein. Fluids and drugs are often given intravenously through a catheter.
Sutures: Another name for the stitches used in sewing up the opening after an operation.
Ambulation: Walking about; moving of one's own volition. Early ambulation is encouraged after surgery to avoid complications.
Appendectomy: Operation in which the appendix is removed. An appendectomy is usually performed on an emergency basis following an acute appendicitis attack.
Malpractice: Improper or negligent medical treatment. A doctor guilty of malpractice is often sued for a large sum of money. Most doctors protect themselves against such a suit with malpractice insurance.

Vocabulary Practice

1. Name two tools used in surgery. Describe each of them.

2. Define amputate.

3. What does the word anesthesia mean?

4. How is anesthesia produced?

5. Who administers anesthetic drugs?

6. Why must all surgical instruments be sterilized?

7. What are the vital signs?

8. Through what tube are fluids given intravenously?

9. What is another name for the stitches used after an operation?

10. What is an appendectomy?

11. A surgeon who is negligent and leaves a surgical sponge in the patient after an operation can be sued. What would he or she be accused of?
William T.G. Morton, an American dentist, was the first to use ether as an anesthetic (1846).

**Surgery**

The most familiar and dramatic medical specialty is surgery. Nearly everyone has seen pictures of an operating room or has known someone who has had an operation. The words scalpel and forceps are familiar to most people.

People have tried to cure medical problems by cutting into the body ever since ancient times. Surgical operations are depicted on the tombs of the Egyptian pharaohs, dating from 3000 B.C. These early operations were painful and hazardous. A patient whose leg needed to be amputated did not have the benefit of an anesthetic drug to ease the pain. Alcohol was often used to dull the pain somewhat. And once the leg had been removed, the patient risked infection because the use of antiseptics was unknown.

Today this has all changed. Operations are now performed under sterile conditions. A variety of anesthetic drugs are available to reduce the pain. Great care is taken after each operation to avoid infection. In addition, the hospital stay has been reduced to a week or less for most operations.
During this century in particular, major advances have been made. Operations are now performed that had not even been imagined fifty years ago. The heart can be opened and repaired in open heart surgery. Clogged blood vessels can be cleaned out or replaced. Kidneys can be transplanted from one person to another. A lung or part of the stomach can be removed without impairing the patient’s ability to lead a normal life.

Most operations are performed by surgeons who specialize in one area of surgery. An orthopedic surgeon, for example, repairs broken bones while a neurosurgeon handles cases involving malfunctioning nerves. A plastic surgeon repairs and replaces limbs, features, and organs while a thoracic surgeon operates on patients with chest and respiratory ailments. There are also heart surgeons and brain surgeons, among others.

Most patients who receive surgical treatment have been referred to the surgeon by their own physician. He has diagnosed a problem which he feels can best be corrected by an operation and suggests that the patient seek the advice of a surgeon. The surgeon may not agree with the physician, however. Surgeons themselves often disagree about the practicality of performing an operation. Some advise surgery at the first sign of a problem while others wait until a patient manifests severe discomfort. Frequently a surgeon will perform exploratory surgery to learn more about the patient’s problem before undertaking actual corrective surgery.

Once the decision has been made to perform an operation, a trained anesthetist is called in. Anesthesia, a state of insensibility, is produced by an anesthetic drug. The drug is administered either locally to reduce feeling in the area of the operation or generally to put the patient to sleep. These drugs cause the muscles to relax, making it easier for the surgeon to operate, as well as rendering the patient insensitive to pain.

Before the advent of modern anesthetic methods, attempts were made to relieve pain by giving substances such as henbane, poppy, mandragora and hemp. Hypnotism was also used. Then in 1842, ether was used for the first time. Nitrous oxide, the so-called “laughing gas,” was discovered in 1844, chloroform in 1847, and ethyl chloride in 1894. Since that time, many new drugs have been discovered which are safer and more pleasant.
Although it is not usually difficult to produce anesthesia in patients, the skills of a carefully trained anesthetist are necessary, for anesthetic drugs can be dangerous. The anesthetist must prepare the patient with a series of preparatory drugs. He or she must also keep careful watch of the patient's vital signs throughout the operation to assure that they remain as close to normal as possible.

A patient about to undergo surgery is counseled not to eat or drink anything for twelve hours prior to the operation, to make it easier for the surgeon to operate but particularly to avoid complications with the anesthesia. A patient is often given an enema just before the operation to empty the colon of waste material. Usually a urinary catheter is used as well to void the bladder. The area to be operated on is routinely shaved.

The readied patient is then wheeled into the operating room and placed on the operating table. A blood pressure cuff is attached to one arm just above the elbow to measure the blood pressure at regular intervals and an intravenous (iv) line attached to a catheter is inserted into the other arm. Intravenous solution given in this fashion helps
maintain the body fluids and also provides a way to administer essential drugs during the operation. A mask is often placed over the patient’s mouth and nose, or a tube may be placed in the wind pipe (trachea) through which a general anesthetic and oxygen can be given. Anesthetic drugs can also be administered directly with a hypodermic needle. Donated blood of the same blood type is usually on hand from the “blood bank” in case a transfusion becomes necessary.

The surgeon on duty is assisted by a large staff. There is usually an assistant surgeon or two who are often interns or residents. The patient’s physician may also be present. The chief operating room nurse supervises the operating room nursing staff. These include a nurse in charge of surgical supply; a scrub or suture nurse who assists with the equipment; a circulating or chase nurse who is not dressed in a sterile gown and can be called upon for a variety of errands; and an orderly to help move the patient. The anesthetist is also in the room.

The drama of any operation, whether a simple appendectomy or elaborate brain surgery, is heightened by the array of specialized equipment used. In addition to the special operating table, there are high intensity lights and the anesthesia machine. A main instrument table is laden with a large collection of scalpels, forceps, suture needles and other sterilized instruments. There are suction machines to suck out excess blood and other fluids from the operating area. Bottles of blood and dextrose are on hand. There are wash basins and refuse bins. A special sponge stand holds the used sponges; these cotton pads used for mopping blood are always counted before the patient is sewn up to assure that none have been left inside. The instruments are also counted. Finally, there is a clock.

An operation may be completed in less than an hour or it may last for several hours. Once it is completed and the patient has been returned to the ward, careful post-operative care is begun. The wound is carefully bandaged and the dressings are changed frequently. The entire room is kept as sterile as possible through the use of antiseptics. As a result of these measures, the complications often associated with surgery in the past have largely been eliminated. Pneumonia is halted by antibiotics and respiratory physical therapy. Embolism, in which a blood clot forms in the patient’s limb and breaks off to travel to the lungs, has been reduced by early post-operative ambulation. And shock, which used to be the greatest cause of death, is held to a minimum by the use of blood transfusions and plasma iv’s.
Despite these improvements, surgery is not undertaken lightly. There are still dangers and the costs are high. The surgeon's fee must be paid. The hospital charges for room and board, drugs, nursing care, and blood transfusions. Laboratory work and x-rays cost extra and there is a separate, high fee for the use of the operating room. Fortunately, many patients have health insurance to cover these costs. Without this insurance, a major operation, easily costing several thousand dollars, might ruin a family financially.

Another risk associated with surgery is malpractice. A patient trusts his surgeon to be competent and conscientious. He presumes he will do everything possible to make the operation a success. If a surgeon is responsible for avoidable mistakes, he can be sued for malpractice. The damages awarded in these suits are usually very high, enough to ruin a surgeon. For this reason, surgeons protect themselves with malpractice insurance.

Other measures are taken as well to assure high standards of surgery. In the United States, the American College of Surgeons reviews candidates for membership through its local boards and chapters. Only surgeons with impeccable records, within the bounds
of human fallibility, are admitted. This group works in conjunction with the American Commission for the Accreditation of Hospitals to ensure safety and high standards. All of these efforts have changed the operating room from the crude and frightening setting of earlier days to a setting in which the miracles of modern science can be performed with a high record of success.

**Discussion**

1. Why were early operations so unpleasant and so dangerous?

2. What scientific discoveries revolutionized the field of surgery?

3. What are some operations which have been perfected in recent years?

4. What is meant by a kidney transplant?

5. Name some of the subspecialties in surgery.

6. What is the difference between exploratory and corrective surgery?

7. What is meant by anesthesia?
8. How does a local anesthetic differ from a general anesthetic?

9. Who usually administers the anesthetic?

10. Name some familiar anesthetic drugs. When were they first used? What was used before they were discovered?

11. What are some of the dangers associated with anesthesia? How are these avoided?

12. What measures must be taken prior to surgery to prepare a patient? Is a patient encouraged to eat a hearty meal before an operation?

13. Why is a blood pressure cuff attached to a patient's arm during surgery?

14. Why might an iv of dextrose be administered during an operation?

15. Describe three ways in which an anesthetic drug can be given.

16. An operation requires a variety of equipment. Which staff member is responsible for this equipment during the operation?

17. What does an orderly do?

18. Why are the sponges and instruments always counted before a patient is sewn up?
19. What measures are taken after an operation to ensure that no complications arise?

20. What is used to prevent pneumonia as a complication of surgery?

21. How is shock reduced?

22. What accounts for the high costs of surgery?

23. How do most patients pay for surgery?

**Review**

A. Complete the following sentences by filling in the blank spaces with the appropriate word or words.

1. A _____________ is a doctor who performs operations.

2. To avoid infection, operations are performed in very clean or _____________ surroundings.

3. _____________ surgery is sometimes undertaken before corrective surgery.

4. An anesthetic drug which dulls the senses in one area of the body only is a _____________ anesthetic.

5. When a blood transfusion is given, the _____________ of the two bloods must match.

6. Prior to an operation, a patient is usually given an _____________ to empty the colon of waste.
7. The anesthetist must keep careful watch of the patient’s _____________ throughout the operation.

8. The surgical ________________ covering a wound are changed frequently after an operation.

9. A patient on the operating table usually has a ________________ on one arm and a ___________ on the other dripping in a intravenous solution.

10. An ________________ surgeon repairs bone injuries.

B. Describe in writing an appendectomy. Concentrate on the setting, the characters and the dialogue rather than the operation itself. Use your imagination. When you have written it, designate members of your class to help you act out your drama.

C. Would you like to be a surgeon? Why or why not?

D. Describe a malpractice situation. Explain what brought about the malpractice charge and follow the case to its conclusion, including a depiction of the courtroom scene. What does the jury decide? How would you have voted if you have been on the jury?
UNIT SEVEN
CAREERS IN MEDICINE

Special Terms

Paramedical: Related but subsidiary to medicine. Not all health careers require professional medical training equivalent in duration to that demanded of doctors. Careers which permit personnel to assist physicians are paramedical careers.

Medic: Informal term used to refer to anyone practicing medicine; most often used for paramedical aides in the armed services.

Pathology: Study of the effects of disease on the body's structure and function. Medical pathologists are doctors with a specialty in pathology. They often supervise laboratories as well as performing gross and microscopic examination of tissues.

Electrocardiograph: Electronic instrument for recording heart action. It produces a tracing called an electrocardiogram (E.K.G.).

Electroencephalograph: Electronic instrument for recording brain waves. It is operated by an electroencephalograph (E.E.G.) technician.

Radiology: Science of the use of x-rays for diagnostic and therapeutic purposes.

Radioactive isotopes: Common chemicals tagged with a radioactive charge. The new field of nuclear medicine uses these isotopes in the diagnosis of disease.

Therapist: Person trained to rehabilitate patients through medical, physical, or occupational means.
Medical social worker: Person who assists patients with their readjustment to their own communities after a hospital stay.

Dietition: Person trained in the principles of nutrition. Most dietitians work in institutions such as hospitals, nursing homes, or schools planning meals.

**Vocabulary Practice**

1. Give an example of a paramedical career.

2. How does a nurse differ from a doctor?

3. Who usually runs a hospital laboratory?

4. What instrument can help a cardiologist with his diagnosis of heart disease?

5. Who operates an electroencephalograph?

6. If you are trained in radiology, what do you do?

7. What new branch of medicine uses radioactive isotopes?

8. How does a medical social worker help patients?

9. Who plans the meals in a hospital?
Careers in Medicine

Years ago a person who was interested in a medical career became a doctor, a nurse, or a dentist. The range of careers was limited. This is no longer the case. Technological advances have greatly increased the need for persons trained in a wide variety of health-related occupations. Now there are hundreds of jobs and professions in the health field. One can work in a hospital, caring for the sick and injured; or one can become a public health worker, trying to prevent illness through education campaigns. There are jobs for those who like people and jobs for those who prefer the solitude of scientific experimentation. The opportunities are so vast that anyone interested in pursuing a medical career can find something appealing and suitable.

The training required for the various occupations differs. It is not always necessary to spend as much time preparing for a medical career as a doctor must. For some careers, no training is needed beyond secondary school. The necessary skills can be learned on the job. For others, a year or two of specialized education are required.
Many of these related careers are called *paramedical*, indicating that persons working in these positions do not have the same role or medical background as a doctor.

One familiar medical career is *nursing*. Nurses work in hospitals and in doctors’ offices. They join public health teams and care for bedridden patients in their homes.

Becoming a nurse does not require as many years of study as becoming a doctor, but one must be equally dedicated. Caring for sick people demands great patience and a lot of work. Nurses work long days, often on irregular shifts or during the night.

Depending on the training, a nurse may be a professional nurse, also known as a registered nurse (R.N.), or a licensed practical or vocational nurse (L.P.N. or L.V.N.). Registered nurses may have completed a full college course (degree) or a two-year course (diploma). Vocational or practical nurses complete a specialized training course, usually one year long. A professional nurse has the major responsibility for a patient’s care, following the physician’s instructions. She is assisted in her duties by nurses with less training, who comprise the nursing team. Together they perform such tasks as administering medicine, assisting with blood transfusions, preparing patients for surgery, changing patients’ surgical dressings, and making routine checks of patients’ vital signs.
Orderlies and nurse's aides are often the unsung heroes of hospital care. They may be students working while they pursue further training, or professionals at their trade. They move patients, assist at procedures, and generally help with patient care and comfort, often doing unpleasant and demanding tasks.

A number of newer professionals have merged to join the health care team. Nurse practitioners (N.P.'s) are nurses who have taken a year (or more) of advanced training to enable them to work more directly in primary care areas such as gynecology, allergy and family practice. They work in close collaboration with physicians but are independently licensed under state nurse practice laws.

Certified Nurse Midwives (C.N.M.'s) have taken special training to care for normal pregnancy and routine delivery. They work in collaboration with obstetricians.

Physician Assistants (P.A.'s) are not nurses at all. Many were medics in the armed services. They are awarded a certificate to practice under the direction of an M.D., and perform many functions, including surgical assistance and providing primary care in clinics.
The jobs of the doctor and nurse are also made much easier by the work performed by laboratory technicians. These specialists have training in medical technology. They analyze blood, urine, and tissue specimens from patients, providing valuable information to doctors to help with their diagnoses. Lab technicians use many of the tools of modern medical science, particularly the microscope. Laboratories are usually run by pathologists with specialized training in the science of disease.

Advanced study in physics, chemistry, biology, pathology, parasitology, and other essential sciences is required of laboratory technicians. Others who study these same subjects become scientists engaging in medical research. There are hematologists who study blood and virologists who study viruses. Endocrinologists explore glandular malfunctions while geneticists do research on genetic reproduction. A relatively new science is biomedical engineering which makes use of computers. All these scientists are engaged in improving the medical techniques available to mankind.

Other technicians who help make medicine a more sophisticated science today are electrocardiograph and electroencephalograph technicians. The electrocardiograph machine, also known as the ECG or EKG machine, records the movements of the heart. It is used to diagnose heart disease. The electroencephalograph machine or EEG measures brain waves and helps brain specialists detect such problems as epilepsy and stroke. Both machines are complicated pieces of equipment requiring the skills of technicians with special training.

X-ray technicians, trained in radiology, operate X-ray machines to take pictures of the bones and inner organs of the body. They also administer any high energy radiation treatment prescribed by a radiologist.

A new and related field is nuclear medicine, which uses radioactive isotopes to locate problems. Nuclear medicine technologists inject an isotope into the blood stream, tissue, or organ and image its pattern of distribution with a scanner. A Nuclear Medicine Specialist (M.D.) then interprets the patterns.

Many of these people work primarily in hospitals. Hospitals are very complex institutions requiring the skills of countless workers, trained in a variety of occupations. In addition to the doctors, nurses, and various technicians, there are trained therapists who rehabilitate patients after an illness. Physical therapists use massage, heat, and exercise to help patients regain the use of their limbs. Occupational
therapists use various crafts with patients who must remain hospitalized for a long time. There are medical librarians, records technicians and medical social workers who provide assistance to patients and their families during their readjustment period following an illness. Dietitians and nutritionists play important roles in hospitals and other institutions, assuring that nutritious food is served to patients and staff and sharing the principles of good nutrition with the community. These are only a few of the employees who must be coordinated by the hospital administrator in order for a complex modern hospital to function smoothly.

Other medical professionals and paraprofessionals help people maintain good health and recover from illness. Trained pharmacists prepare prescription drugs after they have been licensed. Dentists clean teeth and fill cavities with the assistance of dental hygienists. Technical writers and medical illustrators help prepare medical guidebooks and other printed materials. Health educators work through public health departments to educate communities regarding good health practices.
Dentists clean teeth and fill cavities with the assistance of dental hygienists.

These and other trained personnel help make the physicians' jobs easier and allow them to provide the most comprehensive medical care available to patients. The field of medicine today is as advanced as it is in large measure because of the support services provided by these individuals.

**Discussion**

1. Are there more or fewer health-related careers today than there used to be? Why?

2. Do all careers in the health field require as much training as that needed by doctors?

3. Where can one work as a nurse?
4. How does an L.P.N. or L.V.N. differ from an R.N.?

5. What are some duties of the nursing team?

6. How does the job of a Nurse Practitioner differ from that of a nurse?

7. What nursing degree is required to become a Physician's Assistant?

8. What do laboratory technicians do?

9. Who runs most laboratories?

10. Name some branches of science in which research is conducted.

11. How is an electrocardiograph machine used to help physicians with their diagnoses? An electroencephalograph machine?

12. What is the purpose of an x-ray?

13. Explain how a radioactive isotope is used to diagnose illness.

14. Who assists a patient who has just had a leg amputated to learn how to function without the leg?

15. What techniques does an occupational therapist use?

16. What employee assists a patient to readjust to his community after an illness?

17. What else may a dietitian do besides planning menus in a hospital?

18. Who is responsible for assuring that a hospital runs smoothly?

19. What person is trained to fill prescriptions?

20. What kind of assistance do dental hygienists provide?
Review

A. Match each of the careers in the left column with the appropriate description of the duties performed in the right column.

1. Registered nurse
2. Medical social worker
3. Dietitian
4. Lab technician
5. Nuclear medical technician
6. Health educator
7. Dental hygienist
8. Physical therapist
9. Health administrator
10. Hematologist

   ____a. Plans menus for hospital patients and staff
   ____b. Supervises patients' care
   ____c. Makes a health institution run smoothly
   ____d. Works through the public health department on disease prevention
   ____e. Helps patients readjust to normal life after a hospital stay
   ____f. Analyzes blood and urine specimens
   ____g. Specializes in study of blood
   ____h. Uses radioactive isotopes to detect problems
   ____i. Helps dentist with care of teeth
   ____j. Helps patients to regain use of limbs

B. Which medical career have you chosen? Why? What will your duties be?

C. Pretend that you are a hospital administrator with the task of staffing a new hospital. What medical personnel would you need, both professional and paraprofessional?
UNIT EIGHT
HEALTH CARE SYSTEMS

Special Terms

Chronic: Prolonged or re-occurring. Illnesses which last a long time, such as tuberculosis, are chronic. Ailments which can be cured in a relatively short time are acute.

Outpatient service: Facility in a hospital for treating patients who are ambulatory or able to walk about. Patients who require the full services of the hospital and who occupy a hospital bed are inpatients.

Nursing home: Health care institution for treating patients who are recovering from an illness, known as convalescing. Many elderly persons stay in nursing homes.

Public health department: Department of local government which emphasizes disease prevention through education and sanitation campaigns. Public health departments often run clinics to provide medical information and services to communities where the private health care facilities are inadequate.

Accredited: Certified according to certain standards. Health care institutions which meet certain standards of cleanliness and safety are accredited by an organization such as the American Commission for the Accreditation of Hospitals.

Socialized medicine: National health plan. System of medical care in which medical costs are paid with tax revenues. England provides free medical care through its system of nationalized health care.
Voluntary health agency: Organization created to raise the public consciousness about an illness and solicit contributions to fight it.

Health maintenance organization (HMO): Licensed plan in which a monthly payment entitles one to complete medical services, including routine visits, and preventive medicine as well as services normally covered by health insurance.

**Vocabulary Practice**

1. What patients are treated in a community hospital?

2. Is tuberculosis a chronic or an acute illness? What is the difference?

3. Would a woman expecting a baby be an inpatient or an outpatient at a hospital at the time of delivery?

4. What age are most of the patients in a nursing home?

5. What techniques do public health departments use to prevent disease?

6. Which health care institution has higher standards, one which is accredited or one which is not?

7. What are the differences between medical systems which are socialized and ones which depend on health insurance?

8. What are the goals of voluntary health agencies?
Health Care Systems

Health care is available for people throughout the world through a variety of institutions and systems. Some communities have better facilities than others, but most people in developed countries have access to some form of medical attention.

The most familiar health care institution is the hospital. Hospitals have provided care for the sick and injured for centuries, but modern hospitals bear little resemblance to earlier institutions of the same name. In ancient Greece and Rome, for example, temples were often used as hospitals. During the Middle Ages in Europe, hospitals were places of filth and death for the uncurables and outcasts of society. This began to change in the nineteenth century with advances in medical science. Today's hospitals are complex institutions providing sophisticated medical care.

There are many different kinds of hospitals. The most familiar is the general, or community, hospital, where patients of all ages with all kinds of illnesses and medical conditions are treated. Patients usually have acute problems and stay for only a short term, seven days on the average. Other hospitals provide more specialized care. Some treat patients with chronic illnesses, such as tuberculosis, requiring long-term care, or patients of one age group, like children.
Hospitals can also be categorized by their means of financial support. Most hospitals in the world are operated and financed by the government of their country. Other hospitals are private, non-profit institutions, known as voluntary hospitals. Proprietary hospitals are run to make a profit.

Despite their growth in numbers, hospitals cannot provide services for all medical needs or patients. As a result, many hospitals are developing outpatient facilities. A patient who remains in the hospital to receive constant medical attention is called an inpatient. An outpatient is ambulatory and visits the hospital only as the need arises. Some frequent users of outpatient services are persons who need follow-up treatment after a hospital stay, patients undergoing physical or occupational therapy, and psychiatric day-care patients.

The emergency units in hospitals are also becoming more important as all-purpose treatment centers. While these facilities have always been well used by the critically ill or injured, they are now also viewed as a convenient place to get treatment for conditions which are not critical. There are good reasons for this trend. Emergency rooms usually operate on a twenty-four-hour basis. Moreover, they are equipped with the most sophisticated facilities available today.

Other institutions provide health care in addition to hospitals. Nursing (or convalescent) homes offer live-in arrangements for the sick and for convalescing patients. They are becoming increasingly popular, particularly for the elderly. Public health departments run clinics to reach members of the community who have little or no access to other medical care. There are prenatal clinics for pregnant women, well-baby clinics for new mothers and their babies, and mental health clinics for those who need periodic psychiatric attention, among others. Public health departments also provide such community health services as water purification, sewage and garbage disposal, control of air pollution, and pest control.

Whatever health care institutions there are in a community, it is important that their standards of health care be regulated and maintained. Doctors and other medical professionals are required to be licensed before they can practice. Similarly, most health care institutions should be accredited, although they can operate without accreditation. In the United States, a number of organizations provide these controls. The American Hospital Association and the Commission for the Accreditation of Hospitals assure that high standards are
maintained in hospitals. The American College of Surgeons tests surgeons in a rigorous examination before admitting them as members. The federal government provides controls through such regulatory agencies as the Food and Drug Administration and the Narcotics Control Board.

One of the earliest groups to encourage high standards of medical performance was the American Medical Association (AMA), a private association founded in 1847. Today it has more than 200,000 members. Its goals are promoted through annual meetings, its library facilities, and a monthly journal called Today's Health.

The maintenance of high standards alone will not solve a community's medical care problems, however. If patients cannot afford to pay for this care, it is all but worthless. This is a profound problem today, brought about by increasing labor costs and the proliferation of sophisticated medical equipment.

One approach to the problem is socialized medicine (national health). With this system, health care is less individualized and doctors make less money but all members of the population have access to adequate medical care. The costs are borne out of taxes.
Where there is no such system, health insurance plans serve a similar purpose. To be insured, an individual pays a regular fee, called a premium, to the insurance company. With most insurance plans, the insured person pays for smaller expenses on a deductible basis and the insurance company bears the costs of major items. These plans protect individuals against unexpected illnesses which would cause severe economic hardship.

Many insurance companies offer medical coverage in the United States. Blue Cross and Blue Shield are two large, well-known private non-profit plans. Blue Shield insurance covers doctors’ fees while Blue Cross coverage pays hospital costs.

For persons with generally good health, a Health Maintenance Organization (HMO) has some advantages. Employers in the U.S. must offer and partially pay for one of several kinds of health benefits. Unlike insurance plans, all routine or preventive care and medications are provided at no extra charge after payment of a monthly fee, but care must be obtained at the plan’s own clinics. HMOs began with Kaiser Industries plan for its own employees.

For those who are unemployed or cannot afford to pay insurance premiums, the U.S. Government provides assistance through Medicare and Medicaid. Instituted in the 1960's, Medicare provides free medical care for the elderly while Medicaid helps the poor.

In the United States, there is still another type of group which concerns itself with health problems, called the voluntary health agency. A voluntary health agency is organized by persons who have an interest in one particular health problem. Members conduct health education campaigns and solicit money to finance further research into the causes and cures of the target disease.

The National Tuberculosis (TB) Association was the first voluntary health agency founded in the United States. In 1882, the tubercle bacillus was discovered to be the cause of tuberculosis. But little was
done with this knowledge. A sanatorium was established two years later to isolate the sick and in 1892 the Pennsylvania Society for the Prevention of Tuberculosis mounted a crusade against the disease. But it was not until 1907 when the National Tuberculosis Association was founded that this campaign really gained momentum.

The National Tuberculosis Association sells Christmas seals in December each year. This campaign, always endorsed by a celebrity chairperson, raises money and garners publicity.

Voluntary agencies raise money through a variety of methods. The TB Association pioneered the sale of stamps with their Christmas seals. An annual March of Dimes "drive" or money-raising campaign was conducted for many years to fight polio. In 1958, when polio was declared "cured," the agency turned its attention to birth defects. Most groups also receive grants from foundations and contributions from private individuals.

There are more than one hundred of these agencies in the United States, including the American Cancer Society, the National Kidney Foundation, and the American Digestive Disease Society. The U.S. is almost alone in having a highly developed system of voluntary health agencies.
Health care differs from community to community and among nations. No system is perfectly able to provide adequate care for all members of the community. Whatever arrangements are available, whether government-sponsored or private, whether free or covered by health insurance, health care is a complex business. In the United States alone there are nearly 7,000 hospitals, hundreds of other health care institutions, and numerous medical drug supply companies. There are 450,000 doctors, 90,000 of which were trained overseas. More than 1,000 insurance companies sell health insurance. The costs of health care are enormous and constantly increasing. In 1960, $26.9 billion was spent in the U.S. on health care. This had increased to $92.7 billion by 1972 and had reached $212 billion by 1979.

There is no easy solution to the dilemma of rising costs. As medicine becomes more sophisticated and the ability of physicians to cure an ever greater variety of ailments improves, the costs will inevitably be greater. The goal of health care institutions is to continue to provide adequate medical care to the greatest possible number of people.

**Discussion**

1. What is the most familiar health care institution?

2. How did early hospitals differ from today's hospitals?

3. What kinds of patients are treated in a community hospital?

4. Is a broken leg an acute or a chronic ailment?

5. What is the name given to a profit-making hospital?

6. What are some medical problems which can be treated through a hospital's outpatient facilities?

7. Is an outpatient usually ambulatory? What does this mean?

8. Why are hospital emergency units becoming more popular as all-purpose treatment centers?
9. Where do many elderly persons stay when they are ailing?

10. Disease prevention is the goal of a public health department. Explain how this is accomplished.

11. What organizations in the U.S. assure that standards are maintained in hospitals?

12. What are the goals of the American Medical Association?

13. In a country with socialized medicine, who pays the costs of health care?

14. Name the two best known private health insurance plans in the United States. How can one become insured?

15. What is Medicare? Who benefits from it?

16. Explain the purpose of a voluntary health agency. Give an example of one in the U.S.

**Review**

A. Which of the following statements are true and which are false? Explain your answers.

1. ____ An outpatient occupies a bed in a hospital.

2. ____ The Food and Drug Administration is a U.S. regulatory agency controlling the sale of food and drugs.

3. ____ Blue Cross and Blue Shield are voluntary health agencies.

4. ____ Most people in the United States pay their health costs with health insurance.
5. Public health departments often run clinics to inform communities about health matters.

6. Hospital emergency units treat emergency cases only.

7. Community hospitals usually treat patients with chronic illnesses.

8. The AMA is a program providing free medical care for the elderly.

9. A nursing home is a place where nurses live.

10. A health care institution which is accredited meets certain high standards of cleanliness and safety.

B. Find out all you can about the health care system in your community. How is it financed? Is it adequate? Design a system which you think would better meet the health needs of the community.

C. What arrangements do you have to pay for your own medical expenses?

D. Are there any voluntary health agencies in your country or community? What medical problems are they concerned with?
UNIT NINE
MEDICAL EMERGENCIES

Special Terms

Emergency: Situation requiring immediate action.
Ambulance: Vehicle used for carrying sick or injured people to a hospital rapidly.
Artificial respiration: Technique for reviving breathing by artificial means, usually by blowing directly into the victim's mouth.
External cardiac massage: Compressing the chest to maintain the blood flow.
Cardio-pulmonary resuscitation (CPR): Use of assessment, artificial respiration and external cardiac massage to maintain life processes until secondary care can be instituted.
Shock: Weakened state of the body with lessened activity of the heart, lungs, etc., usually following damage to the body.
Concussion: Injury to the brain, usually caused by a violent blow on the head.
Fracture: Break in a bone.
Bruise: Injury where bleeding under the unbroken skin produces a black-and-blue spot. A bruise is also called a contusion.
Wound: Injury in which the skin is torn, pierced, or cut. Abrasions, lacerations, and punctures are different kinds of wounds.
Pus: Thick yellowish-white liquid produced in an infected wound or poisoned part of the body.
Scar: Permanent mark left after a wound has healed.
Burn: Injury to the skin caused by heat, as from the sun or a fire. A burn may be first, second, or third degree depending on its severity.

Antidote: Something used to counteract a poison. A doctor or poison center should be consulted because the antidote for each poisonous substance is different.

Ace bandage: Brand name of a common elastic bandage used to support a leg or arm after a sprain.

Tracheotomy kit: Tools for performing a tracheostomy, that is, cutting into the windpipe, to allow breathing when the normal air passage is blocked.

Tongue depressor: Flat wooden stick used to hold the tongue down while examining the throat.

Red Cross: International organization devoted to the care of the sick and injured, especially in emergency situations.

**Vocabulary Practice**

1. What is an ambulance?

2. When is artificial respiration applied?

3. How is a victim whose heart has stopped beating resuscitated?

4. What is shock?

5. What is another name for a broken bone?

6. Is a contusion a wound like an abrasion? What is the difference?

7. What is the name given to a thick, yellowish-white liquid from a wound? Is it a healthy sign?

8. What are the different categories of burns?

9. When is an antidote used?

10. When is an Ace bandage applied?
Medical Emergencies

Medical problems do not always develop slowly. Sometimes there are emergency situations. An emergency can happen at any time. An emergency requires immediate care. However, it is not always possible to get professional medical help right away. Thus, it is important for everyone, not only the medically trained, to be familiar with the first aid procedures used in emergencies.

The primary objective of first aid is to save life. Fortunately most first aid procedures are not complicated. In all cases a doctor should be called and usually an ambulance. Whatever treatment is offered should be written down with the time administered for these facts will be important when medical help does arrive.

One of the most serious emergencies occurs when an individual has stopped breathing. This may be the result of asphyxiation, electrocution, drowning, a heart attack or another type of accident. A person cannot live long without oxygen. In fact, after only four minutes without it, an individual will almost certainly suffer brain damage even if he or she lives. Artificial respiration must be started immediately. If the heart has stopped beating as well, then cardiac massage will also be necessary.

Cardio-pulmonary resuscitation (CPR) combines artificial respiration and external heart massage to save lives.
The cardio-pulmonary resuscitation of a victim in these instances involves two aspects. The first is getting oxygen into the blood by blowing air into the lungs. The second is the application of chest pressure to compress the heart and squeeze blood out of it into the circulatory system. Both can be done by one person but it is much easier and far more effective if performed by a team of two.

Before resuscitation is begun, the victim should be placed on his or her back on a hard, flat surface. Care should be taken to avoid rough handling in the case of fractures and other internal injuries; but these considerations are still of secondary importance if the victim is no longer getting oxygen. Clothing should be loosened and foreign matter or vomit cleared out of the mouth.

Mouth-to-mouth breathing is the most effective form of artificial respiration. In this method, the rescuer breathes into the victim’s mouth and nose in a regular rhythm, about twelve to fifteen times per minute for an adult and twenty times for a child. As the air enters the lungs, the chest will expand.

If the victim’s heart also has stopped beating, cardiac compression must be started simultaneously. If one is alone with a victim, breathing and massage must be alternated. In the massage, pressure is applied with the heels of the hands on the chest in a rocking motion, about sixty times a minute or once per second. This routine should not be stopped for longer than a beat or two. Even if one is fatigued, it is best to continue resuscitation efforts until help arrives. Although the chances of recovery diminish greatly as time passes, some victims have been known to recover after as long as two or three hours.

The second most critical emergency is severe bleeding, especially from a main artery. This bleeding can usually be stopped with direct pressure.

A condition which accompanies many medical emergencies is shock. In shock the victim’s bodily tissues are not receiving an adequate supply of oxygen-containing blood. To know when a victim is in a state of shock, touch the skin. It will be sweaty and pale and the victim may be unconscious. Test the pulse: someone in shock has a weak, rapid pulse and may also be nauseous or vomiting.

Shock is always serious and can be fatal. However, treatment is not always complex. The victim should be made to lie flat with feet raised. No food or drink should be given. Any bleeding should be controlled and the victim should be kept warm and comfortable until
help arrives. These measures will usually minimize the most severe effects of shock and keep the victim from dying.

Severe injuries to the head rank among the most serious injuries that can occur. If the skull is fractured or a victim suffers a concussion from a heavy blow, the brain can be irreparably damaged. Anyone with a suspected or known head injury should therefore be watched closely. Warning signs of damage include unconsciousness, excessive sleepiness, drowsiness, vomiting, severe headaches, paralysis, bleeding, and irregular breathing. No sedatives, alcohol, or pain medications should be given. Food and fluids should be kept at a minimum. A physician should be consulted in all cases, even if the victim has apparently recovered.

Neck and back injuries are equally serious. A broken back can result in paralysis if the spinal cord is damaged. A victim with such an injury should thus be moved as little as possible, although urgent life-saving aid to restore breathing or stop bleeding should nonetheless be undertaken.
A fairly common emergency, though not usually a serious one, is a broken bone. A bone may be broken, or fractured, in a variety of ways. In a simple, or closed, fracture, the bone fragments do not pierce the skin. If the bone ends come through the skin, the break is known as a compound, or open, fracture. A "greenstick fracture," common in children with soft bones, is a break where only the outer part of the bone splinters.

If a fracture is suspected, it is best not to have the victim test it by putting pressure on it—by walking, if it is the leg, for example—but to assume it is broken and put it in a temporary splint until medical attention is available. Anything which will keep the area stiff, such as ice cream sticks or rolled newspaper, can be used for a splint. A doctor will ultimately realign the bones and put the limb in a plaster cast until it heals, but a splint will protect it until then.

Fractures must be differentiated from sprains and strains. A sprain is an injury to the ligaments, tendons and soft tissues in the region of a joint. A strain is a muscle injury from overexertion or stretching. It is often necessary to X-ray the area to differentiate among a fracture, a sprain or a strain for the symptoms of swelling, pain, and tenderness are the same for all three ailments.

Cuts and bruises are not usually serious but they do demand care to avoid infection. There are various kinds of cuts and bruises. A contusion is a bruise to the tissue under the skin. An abrasion is a skin wound caused by rubbing or scraping while a laceration is the medical term for a cut. A puncture is a deep wound made by a piercing object. Whenever the skin is broken, the wound should be cleaned and disinfected with an antiseptic. If a cut is extensive, a doctor will sew it together with stitches, or sutures. Increasing pain, tenderness, swelling, pus, fever, or red streaks around a wound are all signs of infection. Even if a wound heals properly, it may still leave a scar.

Burns are other accidents which can be as trivial as a simple cut or can be cause for real concern. Burns are classified as first, second or third degree depending on their severity. A first-degree burn, such as a mild sunburn, involves just the outer surface of the skin; a more severe burn, indicated by swelling, blistering and a charred black color, involves the tissue below the skin and occasionally even underlying organs. A first-degree burn can be treated with a cooling lotion or cream but more serious burns require medical attention, even to the extent of hospitalization to avoid shock and dehydration.
Common household cleansers or sprays are dangerous to children when left where small hands can touch.

A final emergency situation occurs when a poisonous substance is swallowed. This usually happens in a household where a child swallows a household product such as ammonia, or even shampoo, or takes an overdose of medicine. The *antidote* for each substance is different; thus, instructions on the container should be followed closely. In some cases, the victim is to be forced to vomit; a medicine called ipecac may be kept in the home for this purpose. In other instances this is harmful. In all cases, a doctor should be contacted and the victim should usually be taken to the nearest hospital emergency room.
The first aid measures described here are quite elementary but nonetheless effective. Because speed is important in an emergency, it is critical to know how to act when the emergency arises. It is also helpful to have the necessary equipment and medications readily available in a first aid kit. Any first aid kit should contain a thermometer, sterile absorbant cotton for cleaning wounds and gauze pads with adhesive tape for bandaging them. An Ace bandage is useful for sprains, and equipment for making a splint is helpful in the case of a fracture. Various simple medications, such as aspirin, an antiseptic ointment, tranquilizers, and pain killers, can be useful. Tongue depressors can be used to help keep the mouth air passage open. A more elaborate kit might also contain a forceps, hypodermic needles and syringes, a stethoscope for measuring the heartbeat or listening to the lungs, a blood pressure cuff, tracheotomy and suture kits, and supplies of dextrose, plasma and saline solutions.

In any emergency situation, first aid is critical but it is only the first step. Expert advice should be summoned while these measures are being taken. The local rescue squad from the fire department, the hospital emergency staff, and the Red Cross are resources to call upon in time of need, as is a local physician.

**Discussion**

1. Why is it important to act quickly in an emergency?

2. What is the primary objective of first aid?
3. Who should be contacted in all medical emergencies?
4. What is one of the most serious medical emergencies?
5. What must be started immediately if a victim has stopped breathing? What if the heart has stopped beating?
6. What kind of artificial respiration is the most effective? Explain how it is done.
7. How can severe bleeding be stopped?
9. What can happen to the brain if the skull is fractured?
10. What are the warning signs of a brain concussion?
11. Why are spine injuries so serious?
12. What is the difference between a simple and a compound fracture?
13. How can one detect whether swelling and pain are the result of a fracture or sprain?
14. What is the first aid treatment for a fracture?
15. What measures should be taken to avoid infection in an abrasion?
16. When must sutures be used to repair a cut?
17. Which is the most severe, a first, second, or third degree burn? How can these three types be distinguished?
18. Is there a universal antidote for all poisons?
19. What is a first aid kit? Name some items found in one.
20. What organization provides emergency medical assistance?
Review

A. Are the following statements true or false? Explain your answers.

1. _____ If first aid measures have been taken in a medical emergency, it is no longer necessary to contact a doctor.

2. _____ The best way to test for a broken leg is to walk on it.

3. _____ A doctor should always be contacted in the case of a head injury, even if the victim seems to be well.

4. _____ A person will not suffer permanent damage without oxygen until ten minutes have passed.

5. _____ A victim suffering from shock should be given lots of liquids.

6. _____ A strain is an injury to a ligament or a tendon.

7. _____ A laceration is a bruise to the tissue under the skin.

8. _____ Cardiac massage is used when a victim’s heart has stopped beating.

9. _____ Blue Cross can be contacted for help in an emergency.

B. Explain how you would use each of the following items from a first aid kit.

<table>
<thead>
<tr>
<th>Ace bandage</th>
<th>plasma</th>
<th>thermometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>sterile cotton</td>
<td>splint</td>
<td>gauze pads</td>
</tr>
<tr>
<td>smelling salts</td>
<td>stethoscope</td>
<td>suture kit</td>
</tr>
</tbody>
</table>

C. What would you do if your child swallowed a bottle of cleaning fluid?
UNIT TEN
PREVENTION AND HIGH TECHNOLOGY HEALTH CARE

Special Terms

Resusci-Annie: Dummy or doll used for practice of cardiopulmonary resuscitation (CPR) which is required for recertification in emergency medical treatment.

Intubate: Act of placing a tube in a patient’s trachea (windpipe) to establish a secure method of providing artificial respiration. The tube is called an endotracheal tube.

Emergency medical technician (EMT): Certified classification of health professional primarily involved in acute emergency care and working in ambulance and emergency teams.

Physician assistant (PA): Health practitioner category certified to practice with a particular physician requiring several years’ training.

Nurse practitioner: Registered nurse who has received one or more years additional training and is licensed to provide primary health care services.

CT Scanner (Computerized tomography): X-ray photograph made by using a computer to assemble intensities of many small beams of radiation into a cross-sectional view of parts of the human body.

Ultrasonography: Use of very high frequency sound, directed precisely and controlled by computer programs, to assemble an image of the shape and movement of parts of the human body.
ICU (Intensive care unit): Special section of the hospital in which intensive nursing and high technology are used to support life in a critical situation.

CCU (Cardiac care unit): Special section of hospital with intensive nursing and high technology specifically for critical situations involving the heart.

Respirator: Machine which is used to provide artificial respiration for patients who cannot breathe.

Swan-Ganz catheter: Catheter, or hollow tube inserted into the patient's body, which allows measurement of pressure within the vascular system near or in the heart. Also called a PA line or Pulmonary Artery catheter.

Problem list: Method of identifying on-going health problems and compiling them in a way that predictable complications can be avoided through prevention.

SOAP: System devised by Dr. Lawrence Weed to make the writing of medical records more standardized. Stands for Subjective, Objective, Assessment, and Plan.

Vocabulary Practice

1. What is Resusci-Annie? What is it used for?

2. Why would a doctor intubate a patient?

3. What is the certified classification of health profession who is primarily involved in acute emergency care?

4. What is a Physician assistant?

5. What is a nurse who is licensed to practice primary health care called?

6. How does a CT scanner work?

7. How does ultrasonography work?

8. What is an ICU?

9. How does a CCU differ from an ICU?
10. Why would a doctor use a respirator on a patient?

11. What does a Swan-Ganz catheter measure?

12. What does SOAP stand for? Why is the procedure used?

**Prevention and High Technology Health Care**

Ms. Eva Martinez, PA, already knew the ABCs of CPR and was bored. The teacher had to follow a certain precise lesson plan because cardiopulmonary resuscitation, CPR, is a precise technique, not an art. **A** is for airway: be sure the victim's airway from mouth to lung is open. **B** is for breathing: look and listen for breathing. Call for help if there's no response. **C** is for circulation: check for a pulse. If the body's machinery fails, begin resuscitation.

Eva liked the practice: using Resusci-Annie, the practice dummy equipped with the special instruments to measure effectiveness of the practitioner's mouth-to-mouth breathing and the force and regularity of the stiff-armed compressions that pump blood through a failing
heart. But the instructor’s lecture—over and over, the same thing—was boring.

“But I must concentrate,” she reminded herself. “It doesn’t matter how smart I am or how much I love my patients. When the heart stops, this physician assistant had better know her ABCs.” She shook herself to stay alert and hoped the lunch break would come soon.

“And so,” the instructor said, as though she had heard Eva’s thoughts, “CPR is simple, so simple you may try to be creative or original. Don’t try! The American Heart Association has found that what matters is practice, not creativity. That’s why you are all here at this recertification session. Now let’s take a break for lunch. Be back here at 2:00 sharp. See you then!”

Eva stretched and bent down to pick up her purse stored under her chair. As she did so, her head bumped noisily against something. “Ouch,” she said looking up. It was her neighbor, rubbing his own head and looking foolish.

“Sorry,” he said, “Do you need resuscitation?”

“No,” Eva laughed, “but maybe I should intubate you just to be sure.”

“No, I think I’ll be all right. But perhaps you’d have lunch with me.” Her neighbor looked friendly, although his dark blue uniform with the EMT patch on the shoulder looked somewhat forbidding. She hesitated but thought she’d like to find out what an EMT does.

“O.K.,” she said, “I’m Eva Martinez and I am a PA, a physician assistant. I work at the Northgate Health Maintenance Organization Clinic, out on Highway 16. Who are you?”

“I’m Henry Wong,” said her new friend. “As you can see from the patch, I’m an EMT, one of those guys who rides in the ambulances. Doctors in training used to do that, but they’re better employed in other work now. I work right here at South General Hospital.”

“Tell me about this part of the hospital,” said Eva as they walked into a crowded hallway.

“This is the diagnostic services and education wing,” said Henry. “Lots of classrooms—for training programs and recertification like
Computerized tomography (CT scan) allows a radiologist to investigate internal growths in ways that were never possible with conventional x-ray equipment.

we’re doing—and committee meetings. And downstairs is diagnostic radiology, all sorts of x-ray equipment including the new CT scanner. CT means computerized tomography. I guess you know about that.”

“Yes,” said Eva, “the machine which makes an x-ray that looks like a slice through the body.”

“It’s fascinating,” said Henry, “you can see a blood clot on the brain or a tumor in the abdomen, all without any surgery and in ten minutes or so. And there is ultrasonography too,” he continued as they paused by the elevator. “You can examine an unborn fetus or look at the internal movements of a beating heart.

“So, are you a nurse, like a nurse practitioner?” asked Henry as they walked along another corridor toward the EMT office.

“No,” said Eva. “You don’t have to be a nurse to become a physician assistant. I have a state certificate, not a license, and I work directly with a Family Practice MD. But we work as a team. I can do direct patient care and even prescribe medicine.”
“Let’s stop here while I get my lunch,” Henry said as they entered a small room filled with equipment. In the center was a desk with three telephones and a computer terminal consisting of typewriter keyboard and a video display, like a television screen. Around the walls were several small cubicles with dictating equipment and lockers, shelves, and various racks holding what seemed to be very specialized equipment. “Maybe Gus can explain the operation of this room while I get my lunch.”

Eva moved to where she could watch Gus, the EMT technician, taking notes on the words and numbers flashing on the video display. “What’s going on right now?” she asked.

“Well,” said Gus gesturing at the screen, “this is a readout of what one of our ambulances is doing. Right now Unit 3-2—that’s the second ambulance based here at South General—is transporting with Code 3 (that’s emergency lights and sirens) a forty-year-old woman injured in a motor vehicle accident. It looks like she’s got low blood pressure and a high pulse—probably shock. She’s got a broken leg too.”

“Impressive,” said Eva. “Are most of your emergencies accidents?”

“Oh, sure,” said Gus. “With car accidents, heart attacks, and suicide attempts, you’ve got the most common emergencies. Of course, some people just call an ambulance when they feel bad. A lot of them don’t have a doctor to call.”

Henry returned and said, “Do you want to see the intensive care unit before we eat lunch? That’s where most emergency transports end up: the ICU.”

As a patient lay as though transfixed by an array of equipment, the intensive care nurse described the ICU to them as they stood in the doorway of a glass cubicle, one of a row of ten. “Basic vital functions are all automatic,” she pointed out, “the Swan-Ganz catheter measures the outflow of the heart, that screen shows pressures, and that’s the computer-calculated cardiac output. The blood pressure is measured from another catheter in an artery. Then the computer also has data on urine from a catheter in the bladder. The amount of fluid going into the patient’s veins from the iv bottles over there is controlled by the computer. Because the patient can’t breathe, there’s an endotracheal tube connected to the respirator by a plastic hose, and the computer programs the respirator breathing cycles. You can see, there isn’t much left to chance.”
As Eva watched, the student nurse who sat beside the patient reached out and gently wiped the sweat off his brow with a damp cloth. "I wonder which is more important, the computer or the nurse's hand," Eva murmured under her breath.

"Henry," said Eva, as they ate in the cheerful but noisy cafeteria, "how much does all this cost?"

"You mean the equipment and all?" asked Henry, "It's really expensive! Transportation and emergency room costs can run up to $500 and a day in the ICU may cost more than $1,000. Equipment like the CT scanner costs more than $50,000. Each test has to be priced to cover that cost. So it's very expensive. But I guess you know that already."

"Yes, I know it," said Eva. "That's why I work in a Health Maintenance Organization. Employers with more than twenty five employees must offer an HMO as one of their health benefit options. It includes hospital insurance, but also covers visits to the doctor when you are not sick, unlike other health insurance. We try to prevent emergencies by doing health maintenance. It's sometimes hard to convince employers though, because they can't see where their money is going. Prevention isn't as flashy as ambulances and ICUs."
“What sort of thing can prevent a heart attack?” asked Henry.
“When it happens, it happens.”
“You can identify risk factors,” said Eva. “That’s why we use SOAP.”
“No,” said Eva, “you can use it to make a health maintenance book for each patient, a book of medical problems. The table of contents is the problem list; for example, hypertension, diabetes, depression, poor nutrition . . . whatever concerns the patient. Then each time the patient comes to the clinic, the practitioner who sees him or her knows what to check on. You can treat the hypertension, the nutritional problems, and maybe even the depression. Then perhaps the patient will never need an ambulance.”
“Sounds pretty dull to me,” Henry laughed. “I like ambulance work.”
“Oh, I’m glad you do,” said Eva. “Someone has to do it. But what gets me excited is the idea of people taking control of their own health care. I do a lot of patient teaching. I talk to them about medication and about the long-term effects of high blood pressure or diabetes. And, because I work with a Family Practice MD, we often have family conferences. The whole family, once they understand, can help Daddy deal with his low-salt diet. It can really make a difference.
“And it’s not all gloom and doom either. I help with prenatal care visits that are intended to identify risk factors such as poor nutrition or alcoholism. We offer classes and instructional groups as well—in areas such as smoking, arthritis, or stress reduction. I’ll bet you could use some stress reduction!”
“I sure could,” laughed Henry. “In fact I see your point now. Emergency work is exciting, but patients don’t need excitement.”
“That’s it exactly,” agreed Eva. “Health care should be pretty dull . . . because it should be preventive and not emergency oriented. It’s much less expensive in the long run. Of course, we’re all glad emergencies can be handled. But the real focus in medical care should be on prevention.”
Discussion

1. What did Eva feel was exciting about her work?
2. Give two examples of prenatal risk factors.
3. What does S.O.A.P. stand for?
4. What are the ABCs of CPR?
5. What kind of organization did Eva work for?
6. What does a CT scanner do?
7. What does ultrasonography do?
8. Give some examples of items on a medical problem list.
9. What types of medical problems create emergency health needs?
10. What does a high pulse and low blood pressure indicate?
11. What does an HMO provide that most insurance plans do not?

12. How much does a CT scanner cost?

13. What are computers used for in emergency health care?

14. Where do most emergency transports end up?

15. Why should health care be dull?

**Review**

A. Match the special term on the left with the definition on the right.

1. endotracheal  ____a. a method of imaging body organs tube
2. EMT  ____b. high priority emergency transport
3. CPR  ____c. health care facility
4. CT scan  ____d. machine to help patients breathe
5. prevention  ____e. hypertension, poor nutrition
6. respirator  ____f. a tube placed in the patients wind-pipe
7. HMO  ____g. helps monitor heart
8. Swan-Ganz catheter  ____h. emergency maintenance of vital organs
9. Code 3  ____i. an emergency health practitioner
10. risk factors  ____j. avoiding health risk

B. What do you think Eva was thinking about when she wondered whether the nurse’s hand or the computer was more important to patient care?
C. Describe the probable routine of a PA working in an HMO. Contrast this with an EMT working in an emergency room.

D. Choose a medical problem and write an imaginary S.O.A.P. note (a note in a patient history) such as you might to record a clinic visit.

E. Call a local hospital and ask about the cost of a CT scan. Do you think such expense is justified?
<table>
<thead>
<tr>
<th>Term</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABRASION</td>
<td>98</td>
</tr>
<tr>
<td>ACCREDITED</td>
<td>83</td>
</tr>
<tr>
<td>ACUPUNCTURE</td>
<td>1</td>
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<td>88</td>
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<td>26</td>
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<td>ALLERGIC</td>
<td>36</td>
</tr>
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<td>AMBULANCE</td>
<td>93</td>
</tr>
<tr>
<td>AMBULATION</td>
<td>61</td>
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<tr>
<td>AMPUTATE</td>
<td>61</td>
</tr>
<tr>
<td>ANATOMY</td>
<td>61</td>
</tr>
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<td>26</td>
</tr>
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<td>25</td>
</tr>
<tr>
<td>ANTIDOTE</td>
<td>94</td>
</tr>
<tr>
<td>APPENDECTOMY</td>
<td>62</td>
</tr>
<tr>
<td>ARTERIOSCLEROSIS</td>
<td>35</td>
</tr>
<tr>
<td>ARTERY</td>
<td>13</td>
</tr>
<tr>
<td>ARTIFICIAL RESPIRATION</td>
<td>93</td>
</tr>
<tr>
<td>AUTONOMIC NERVOUS SYSTEM</td>
<td>14</td>
</tr>
<tr>
<td>BIOPSY</td>
<td>2</td>
</tr>
<tr>
<td>BRUISE</td>
<td>93</td>
</tr>
<tr>
<td>BURN</td>
<td>94</td>
</tr>
<tr>
<td>CANCER</td>
<td>35</td>
</tr>
<tr>
<td>CAPILLARIES</td>
<td>13</td>
</tr>
<tr>
<td>CARDIO-PULMONARY RESUSCITATION</td>
<td>93</td>
</tr>
<tr>
<td>CATHETER</td>
<td>104</td>
</tr>
<tr>
<td>CHRONIC</td>
<td>83</td>
</tr>
<tr>
<td>CLOT</td>
<td>13</td>
</tr>
<tr>
<td>COMMUNICABLE DISEASE</td>
<td>2</td>
</tr>
<tr>
<td>CONCUSSION</td>
<td>93</td>
</tr>
<tr>
<td>CONTUSION</td>
<td>93</td>
</tr>
<tr>
<td>CONVALESCENCE</td>
<td>83</td>
</tr>
<tr>
<td>CARDIAC CARE UNIT</td>
<td>104</td>
</tr>
<tr>
<td>CORONARY THROMBOSIS</td>
<td>35</td>
</tr>
<tr>
<td>CORRECTIVE SURGERY</td>
<td>61</td>
</tr>
<tr>
<td>COUGH</td>
<td>25</td>
</tr>
<tr>
<td>CT SCANNER</td>
<td>108</td>
</tr>
<tr>
<td>CURE</td>
<td>26</td>
</tr>
<tr>
<td>DIAGNOSIS</td>
<td>2</td>
</tr>
<tr>
<td>DIETITION</td>
<td>74</td>
</tr>
<tr>
<td>DISEASE</td>
<td>2</td>
</tr>
<tr>
<td>DOCTOR</td>
<td>1</td>
</tr>
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<td>26</td>
</tr>
<tr>
<td>DRUG</td>
<td>2</td>
</tr>
<tr>
<td>ELECTROCARDIOGRAPH</td>
<td>73</td>
</tr>
<tr>
<td>ELECTROENCEPHALOGRAPH</td>
<td>73</td>
</tr>
<tr>
<td>EMERGENCY</td>
<td>93</td>
</tr>
<tr>
<td>EMERGENCY MEDICAL</td>
<td>108</td>
</tr>
<tr>
<td>TECHNICIAN</td>
<td>109</td>
</tr>
<tr>
<td>ENDOCRINE</td>
<td>13</td>
</tr>
<tr>
<td>ENDOTRACHEAL TUBE</td>
<td>108</td>
</tr>
<tr>
<td>ENZYME</td>
<td>14</td>
</tr>
<tr>
<td>EPIDEMIC</td>
<td>1</td>
</tr>
<tr>
<td>EPIDERMIS</td>
<td>13</td>
</tr>
<tr>
<td>EXPLORATORY SURGERY</td>
<td>61</td>
</tr>
<tr>
<td>FAMILY PRACTICE</td>
<td>2</td>
</tr>
<tr>
<td>FATAL</td>
<td>35</td>
</tr>
<tr>
<td>FEE</td>
<td>49</td>
</tr>
<tr>
<td>FEVER</td>
<td>25</td>
</tr>
<tr>
<td>FIRST AID</td>
<td>2</td>
</tr>
<tr>
<td>FORCEPS</td>
<td>61</td>
</tr>
<tr>
<td>FRACTURE</td>
<td>93</td>
</tr>
<tr>
<td>GENERAL PRACTITIONER</td>
<td>49</td>
</tr>
<tr>
<td>GERM</td>
<td>25</td>
</tr>
<tr>
<td>GLANDS</td>
<td>13</td>
</tr>
<tr>
<td>HEALTH INSURANCE</td>
<td>2</td>
</tr>
<tr>
<td>HEALTH MAINTENANCE</td>
<td>2</td>
</tr>
<tr>
<td>ORGANIZATION</td>
<td>84</td>
</tr>
<tr>
<td>HEMOGLOBIN</td>
<td>13</td>
</tr>
<tr>
<td>HEMORRHAGE</td>
<td>25</td>
</tr>
<tr>
<td>HICCUPS</td>
<td>36</td>
</tr>
<tr>
<td>HOSPITAL</td>
<td>2</td>
</tr>
<tr>
<td>HYPODERMIC NEEDLE</td>
<td>35</td>
</tr>
<tr>
<td>Term</td>
<td>Page</td>
</tr>
<tr>
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<tr>
<td>IMMUNITY</td>
<td>116</td>
</tr>
<tr>
<td>INCUBATION PERIOD</td>
<td>9</td>
</tr>
<tr>
<td>INFECTION</td>
<td>93</td>
</tr>
<tr>
<td>INPATIENT</td>
<td>49</td>
</tr>
<tr>
<td>INTENSIVE CARE UNIT</td>
<td>73</td>
</tr>
<tr>
<td>INTERNSHIP</td>
<td>73</td>
</tr>
<tr>
<td>INTRAVENOUS</td>
<td>35</td>
</tr>
<tr>
<td>INTUBATE</td>
<td>49</td>
</tr>
<tr>
<td>LACERATION</td>
<td>104</td>
</tr>
<tr>
<td>LETHARGIC</td>
<td>104</td>
</tr>
<tr>
<td>LICENSE</td>
<td>103</td>
</tr>
<tr>
<td>MALICANT</td>
<td>49</td>
</tr>
<tr>
<td>MALPRACTICE</td>
<td>35</td>
</tr>
<tr>
<td>MEDIC</td>
<td>61</td>
</tr>
<tr>
<td>MEDICAL HISTORY</td>
<td>93</td>
</tr>
<tr>
<td>MEDICAL SOCIAL Worker</td>
<td>1</td>
</tr>
<tr>
<td>MEDICINE</td>
<td>104</td>
</tr>
<tr>
<td>MICROSCOPE</td>
<td>83</td>
</tr>
<tr>
<td>MUSCLE</td>
<td>61</td>
</tr>
<tr>
<td>NAUSEA</td>
<td>35</td>
</tr>
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<td>1</td>
</tr>
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<td>1</td>
</tr>
<tr>
<td>NURSE PRACTITIONER</td>
<td>61</td>
</tr>
<tr>
<td>NURSING HOME</td>
<td>104</td>
</tr>
<tr>
<td>NUTRITION</td>
<td>25</td>
</tr>
<tr>
<td>ON CALL</td>
<td>73</td>
</tr>
<tr>
<td>ON DUTY</td>
<td>13</td>
</tr>
<tr>
<td>OPERATION</td>
<td>13</td>
</tr>
<tr>
<td>OUTPATIENT SERVICE</td>
<td>94</td>
</tr>
<tr>
<td>P A LINE</td>
<td>103</td>
</tr>
<tr>
<td>PARALYSIS</td>
<td>94</td>
</tr>
<tr>
<td>PARAMEDICAL</td>
<td>13</td>
</tr>
<tr>
<td>PATHOLOGY</td>
<td>103</td>
</tr>
<tr>
<td>PATIENT</td>
<td>26</td>
</tr>
<tr>
<td>PHARMACY</td>
<td>104</td>
</tr>
<tr>
<td>PHYSICIAN</td>
<td>13</td>
</tr>
<tr>
<td>PHYSICIAN ASSISTANT</td>
<td>61</td>
</tr>
<tr>
<td>PRESCRIPTION</td>
<td>84</td>
</tr>
<tr>
<td>PROBLEM LIST</td>
<td>93</td>
</tr>
<tr>
<td>PUBLIC HEALTH DEPARTMENT</td>
<td>2</td>
</tr>
<tr>
<td>PUNCTURE</td>
<td>9</td>
</tr>
<tr>
<td>PUS</td>
<td>93</td>
</tr>
<tr>
<td>QUACK</td>
<td>49</td>
</tr>
<tr>
<td>RADIOACTIVE ISOTOPES</td>
<td>73</td>
</tr>
<tr>
<td>RADIOL OGY</td>
<td>35</td>
</tr>
<tr>
<td>RED CROSS</td>
<td>94</td>
</tr>
<tr>
<td>RENAL HEMODIALYSIS</td>
<td>49</td>
</tr>
<tr>
<td>RESIDENCY</td>
<td>104</td>
</tr>
<tr>
<td>RESUSCI-ANNIE</td>
<td>93</td>
</tr>
<tr>
<td>ROUNDS</td>
<td>93</td>
</tr>
<tr>
<td>SANATORIUM</td>
<td>1</td>
</tr>
<tr>
<td>SCALPEL</td>
<td>61</td>
</tr>
<tr>
<td>SCAR</td>
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</tr>
<tr>
<td>SHOCK</td>
<td>1</td>
</tr>
<tr>
<td>SOCIALIZED MEDICINE</td>
<td>103</td>
</tr>
<tr>
<td>S.O.A.P.</td>
<td>83</td>
</tr>
<tr>
<td>SKELETON</td>
<td>61</td>
</tr>
<tr>
<td>STROKE</td>
<td>35</td>
</tr>
<tr>
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<td>1</td>
</tr>
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<td>1</td>
</tr>
<tr>
<td>SUTURES</td>
<td>61</td>
</tr>
<tr>
<td>SWAN-GANZ CATHETER</td>
<td>104</td>
</tr>
<tr>
<td>SYMPTOM</td>
<td>25</td>
</tr>
<tr>
<td>THERAPIST</td>
<td>73</td>
</tr>
<tr>
<td>TISSUE</td>
<td>1</td>
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<tr>
<td>TONGUE DEPRESSOR</td>
<td>94</td>
</tr>
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<td>103</td>
</tr>
<tr>
<td>TRACHEOSTOMY</td>
<td>94</td>
</tr>
<tr>
<td>TRACHEOTOMY KIT</td>
<td>94</td>
</tr>
<tr>
<td>TRANSFUSION</td>
<td>13</td>
</tr>
<tr>
<td>ULTRASONOGRAPHY</td>
<td>103</td>
</tr>
<tr>
<td>VACCINE</td>
<td>26</td>
</tr>
<tr>
<td>VASCULAR</td>
<td>104</td>
</tr>
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<td>VEIN</td>
<td>13</td>
</tr>
<tr>
<td>VITAL SIGNS</td>
<td>61</td>
</tr>
<tr>
<td>VOLUNTARY HEALTH AGENCY</td>
<td>84</td>
</tr>
<tr>
<td>WOUND</td>
<td>93</td>
</tr>
<tr>
<td>X-RAY</td>
<td>2</td>
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