MERIT BADGE SERIES

HEALTH CARE PROFESSIONS

STEM-Based

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HEALTH CARE PROFESSIONS

"Enhancing our youths' competitive edge through merit badges"

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Requirements

Always check www.scouting.org for the latest requirements.

1. Select three of the professions from Group 1 listed below which interest you, then complete the following:
   a. Briefly describe to your counselor the roles these professionals play in the delivery of health care.
   b. Describe to your counselor the educational and licensing requirements for the professionals you selected.

Group 1:

(1) Allopathic physician (MD) — all specialties
(2) Osteopathic physician (DO) — all specialties
(3) Podiatrist (DPM)
(4) Chiropractor (DC)
(5) Nurse Practitioner (NP)
(6) Psychologist (PhD or PsyD)
(7) Optometrist (OD)
(8) Audiologist (AudD)

35975
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2. Select three of the professions from Group 2 listed below which interest you, then complete the following:
   a. Briefly describe to your counselor the roles these professionals play in the delivery of health care.
   b. Describe to your counselor the educational and licensing requirements for the professionals you selected.

Group 2:

(1) Physician Assistant (PA)
(2) Registered Nurse (RN)
(3) Certified Nurse Midwife (CNM)
(4) Certified Nurse Assistant (CNA)
(5) Licensed Practical Nurse (LPN/LVN)
(6) Nurse Anesthetist (CRNA)
(7) Pharmacist (PharmD)
(8) Pharmacy Technician
(9) Emergency Medical Technician (EMT)/Paramedic

3. Select three of the professions from Group 3 listed below which interest you, then complete the following:
   a. Briefly describe to your counselor the roles these professionals play in the delivery of health care.
   b. Describe to your counselor the educational and licensing requirements for the professionals you selected.

Group 3:

(1) Physical Therapist (DPT)
(2) Occupational Therapist (OT)
(3) Orthotist/Prosthetist
(4) Medical Appliance Technician
(5) Respiratory Therapist (RT)
(6) Medical Assistant
(7) Dietitian (RD)
(8) Speech-Language Pathologist (Speech Therapist) (SLP)

4. Select three of the professions from Group 4 listed below which interest you, then complete the following:
   a. Briefly describe to your counselor the roles these professionals play in the delivery of health care.
   b. Describe to your counselor the educational and licensing requirements for the professionals you selected.

Group 4:

(1) Biomedical Engineer (BME)
(2) Medical Technologist
(3) Phlebotomist
(4) Radiology Technologist
(5) Sonographer
(6) Medical Records Specialist
(7) Cytopathologist
(8) Histotechnologist

5. Select one career from any of the lists in Requirements 1, 2, 3, or 4 and arrange to visit that professional at their workplace. Discuss with your counselor the following:

    a. Why did they choose their particular career?

    b. What do they most like about their job?

    c. What are their biggest challenges in doing their job?

    d. Identify the tools/instruments that may be used in their jobs.

    e. What has been the most surprising aspect of their career?

    f. What continuing education requirements are required to maintain certification?

6. Discuss with your counselor your understanding of the meaning of the Physician's Oath.

7. Describe the role of confidentiality between a patient and the health care provider. What is HIPAA?

8. Identify a medical advancement or discovery that has been in the news recently. Discuss with your counselor how this can affect patient care.

9. With approval of your counselor and parents/guardian, serve as a volunteer at a health-related event or facility in your community (e.g. blood drive, health fair, blood pressure screening event). Report to your counselor what you did and learned from the experience.

Introduction

There are dozens of careers in the domain of health care! Often, when one thinks about a career in health care, the first thing that comes to mind is being a doctor or nurse. However, there are many other careers to consider. The opportunities for satisfying work in health care are endless! Jobs in the professional careers you will learn about while working on this merit badge are available in local communities across the nation, in the military services, public health agencies, and the private sector. Current government estimates show that demand for all health care professionals will create one of the fastest growing segments of the work force in the future. Today nearly all of these professions are facing shortages due to the aging population in the United States. Incomes in each of these professions are good, and scholarships for the training/education required to enter into many of these professions are available to students.

Most of these professionals that you will learn about while working on this merit badge have a number of things in common:

- Each has specific educational requirements. Some will require technical-school certification or Associate of Arts degree, while others may require a bachelor's or doctorate degree.
- People interested in health careers may major in a variety of areas, though it is most common that they major in one of the sciences
- Most have specific licensing or certification requirements
- Each has specific standards of practice that guide performance
- Most will be bound by laws covering their profession in the state where they work
- Most require continuing education every year to maintain practice credentials
- There are a variety of settings where they can work. For example, hospitals, out-patient clinics, schools, homes, rehabilitation or nursing home settings are just a few of the possibilities
- Most provide education of the patient to help them in their recovery from illness or injury and in prevention of health problems
- Each profession needs teachers for the next generation

So, if this sounds both exciting and challenging, then let's get started learning about the varied world of **Health care Professions**.

Information provided in this pamphlet was current as of January 2020. Information was obtained from professional societies and schools that support/prepare each of the professionals discussed. Some material was included in the 2017 and 2019 *Medicine* merit badge pamphlets.

Contents

Physician's Oath

(As adopted by the World Medical Association — 2017)

AS A MEMBER OF THE MEDICAL PROFESSION:
I SOLEMNLY PLEDGE
to dedicate my life to the service of humanity;
THE HEALTH AND WELL-BEING OF MY PATIENT
will be my first consideration;
I WILL RESPECT
the autonomy and dignity of my patient;
I WILL MAINTAIN
the utmost respect for human life;
I WILL NOT PERMIT
considerations of age, disease or disability, creed, ethnic origin, gender, nationality, political affiliation, race, sexual orientation, social standing, or any other factor to intervene between my duty and my patient;
I WILL RESPECT
the secrets that are confided in me, even after the patient has died;
I WILL PRACTISE
my profession with conscience and dignity and in accordance with good medical practice;
I WILL FOSTER
the honour and noble traditions of the medical profession;
I WILL GIVE
to my teachers, colleagues, and students the respect and gratitude that is their due;
I WILL SHARE
my medical knowledge for the benefit of the patient and the advancement of health care;
I WILL ATTEND TO
my own health, well-being, and abilities in order to provide care of the highest standard;
I WILL NOT USE
my medical knowledge to violate human rights and civil liberties, even under threat;
I MAKE THESE PROMISES
solemnly, freely, and upon my honour

The History of Health Care

Health care has a rich history that spans centuries. Since the first use of plants and other items as simple medicines and healing ointments, many people have contributed to the advancement of the healing arts. Methods to improve techniques and make use of new technologies are developed nearly every day as researchers strive to find additional ways to combat disease and promote health. Remedies to treat illness have gone from simple plant-based remedies (and many medications are still derived from plants!) to medicines that can be delivered to a very specific part of the body using nanobot technology!

One constant through the ages is the dedication of health care providers to live and practice their "craft" in an ethical and honorable manner. Similar to the Scout Oath and Law for Scouts BSA members, the earliest physicians promised to provide medical care and personally live by an oath to their profession. The original physician's oath was the **Hippocratic Oath** written in 5th Century BC. Today, physicians continue to affirm that they will provide ethical care to all persons based on the best knowledge possible. Many medical schools now use the **Physician's Oath**, approved by the World Medical Association in 2017.

Patient Relationships, Confidentiality, and HIPAA

The relationship between the patient and the health care professional is critically important. Patients may share information that is very personal. Communication between the professional and the patient is a key element in discovering what the health problem or diagnosis could be. If the patient does not trust the professional to keep information confidential, the patient might not share information that could be critical to establishing a diagnosis. The patient may be especially reluctant to admit to drug or alcohol abuse, or to provide specifics about their sexual activity. With some exceptions, the expectation is that **discussions between a patient and a health care professional are privileged** — which means it is protected from disclosure to third parties, including law enforcement. However, health insurance companies usually require the patient to share their health information with the company in

order to determine what, if any, of the expenses will be paid for by the insurance company.

So, the confidentiality of information that is shared between the patient and the professional is very important. The law passed in 1996 that dictates what can and cannot be shared is called HIPAA which stands for the **Health Insurance Portability and Accountability Act**. It is a very complicated law, and health professionals, hospitals and health care offices have to comply with this or lose their ability to receive federal funds. Part of the law includes the importance of confidentiality of health records as well as the security of those records.

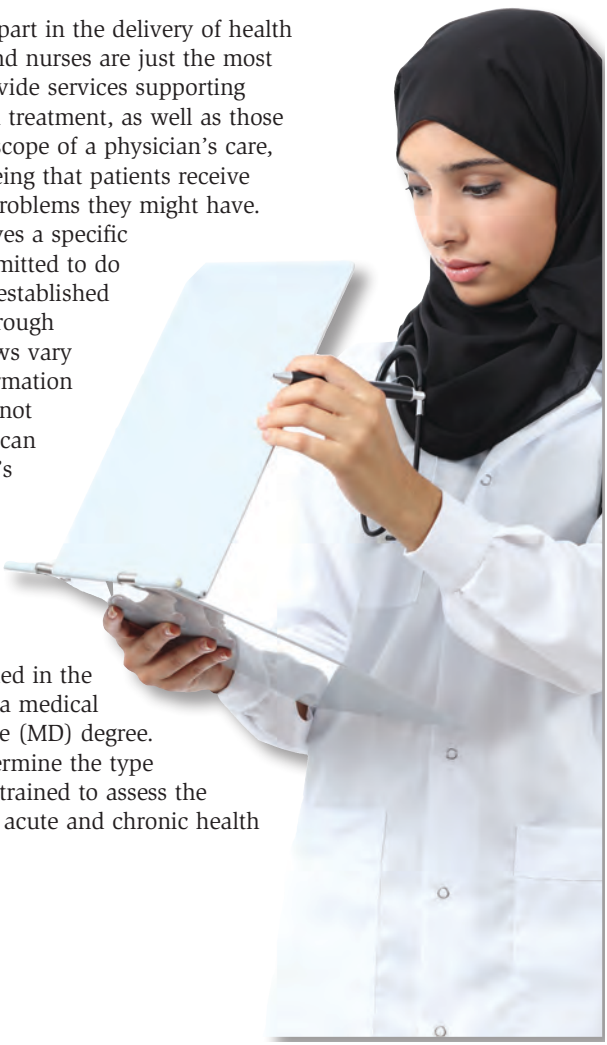
It defines what information can be shared without the patient's permission, as well as that which can be shared with the patient's permission. These laws address confidentiality. Confidentiality refers to personal information shared with a physician, therapist, or other individual that generally cannot be divulged to third parties without the permission of the patient. The patient determines who else can receive information — for people 18 years and older, only the patient has access to their information, unless the patient gives permission for specific individuals to also have access to that information.

Health professionals can share information about the patient with other health professionals who are or will be ***directly*** involved in the patient's care. For example, the nurse in a pediatrician's office can speak to the nurse in the optometrist's office about a child who is coming for a consultation without the family's permission. However, the nurse cannot share information with other professionals in the pediatrician's office who are not involved in caring for that child.

PHYSICIANS and PHYSICIAN ASSISTANTS

Many different professionals play a part in the delivery of health care in the United States. Doctors and nurses are just the most visible; other professionals who provide services supporting the various aspects of diagnosis and treatment, as well as those who may be consulted outside the scope of a physician's care, also play very important roles in seeing that patients receive assistance with the various health problems they might have.

Each of these professionals serves a specific function, and what he or she is permitted to do within that field is defined by laws established by state governments, frequently through the granting of licenses. As these laws vary somewhat around the country, information on licensing for each profession cannot be included here. Such information can usually be obtained from your state's professional licensing board or the equivalent.



Physician (Allopathic) MD

Role: This professional is trained in the practice of medicine and surgery at a medical school granting a Doctor of Medicine (MD) degree.

Their area of specialty will determine the type of patients they will treat. They are trained to assess the patient and diagnose and treat both acute and chronic health

conditions. They might order tests to help in the diagnosis of the person's complaint.

Education: Completion of an undergraduate college degree followed by four years of medical school education leading to a Doctor of Medicine degree. Some universities offer highly competitive, accelerated premedical medical degree programs in which students can complete the requirements for both an undergraduate and a medical degree in six or seven years.

Physician (Osteopathic) DO

Role: This professional is trained in the practice of medicine and surgery from a school granting a Doctor of Osteopathy (DO) degree. Osteopaths use a system of diagnosis and treatment that emphasizes the role of the musculoskeletal system in the healthy functioning of the body. Their training is nearly identical to that of allopathic physicians, with additional focus on the relationship between parts of the body and manipulative therapy, a hands-on approach to alleviating symptoms, reducing pain, and preventing health problems.

Education: Completion of an undergraduate college degree followed by four years of medical school education leading to a Doctor of Osteopathic Medicine degree. DOs, like MDs, continue their training with Residency and Fellowships in any of the specialty areas listed below.

Both allopathic (MD) and osteopathic (DO) physicians diagnose and treat illnesses and injuries and advise patients on preventive measures to help them lead a safe, healthy life. To arrive at a diagnosis and decide on a treatment, physicians

Interested in a Career in Medicine?

Ask questions. Pursuing a health-professional career is rewarding, but it also takes a lot of hard work and dedication. Talk to your own health care provider and other health care professionals about the kind of work they do, what their schooling and training was like, what they like best about the career, and what some of the challenges they face are. Their answers can help you determine if a health-professional career is right for you and can help you choose the specific profession that interests you most.

Study hard. Try your best to do well in school, no matter the class. Science and math classes are important if you hope to pursue a health-professional career, but so are other types of classes, such as English. Some classes teach valuable skills, such as good communication, and some classes help you become well rounded. It is also a good idea to choose advanced level classes in school if they are available.

Get involved. Through extracurricular activities, hobbies, and volunteering, you can demonstrate your curiosity, dedication, and uniqueness. Team sports and group activities give you experience working with others, and they may also offer leadership opportunities. Volunteering at a health-related event or facility in your community is a good idea. This kind of public service offers you an opportunity to learn more about health care and shows your interest in helping others through that field.

usually take a patient's medical history, perform a physical examination of the patient, and may order laboratory or diagnostic tests. Their training incorporates evidence-based care, in which physicians consider the findings of biomedical research and their own clinical knowledge as well as their patients' preferences to develop a plan of care.

Physicians might work in hospitals, outpatient clinics, or in a setting where they visit people in their homes or offices. They might volunteer at Scout camps such as Philmont Scout Ranch and local council camps. They might volunteer to provide care to people who struggle to afford care, or they might visit countries outside the United States to provide very specialized care that isn't available in those countries. They might volunteer in disasters or war zones with organizations like Doctors Without Borders.

Physicians work with any number of different professionals as they develop a diagnosis and treatment plan. The team approach to patient care, particularly for the patient with a complex medical problem usually results in better outcomes for the patient. For example, the team might include a physician, nurse, physical and occupational therapist for a person who has had a stroke.

Physicians as well as other health professionals usually choose a specific area of care in which to practice — **both MDs and DOs can choose from among any of the following specialties:**

Primary Care

- Internal medicine
- Family medicine
- Obstetrics/gynecology
- Pediatrics
- Psychiatry
- Surgery

Specialization

With increasing knowledge about health, disease, illness, and treatments, it has become impossible for one person to know everything they need to know to treat the many different conditions that people have. Thus, we have specialization — doctors and other health care professionals (such as Nurses and Physician Assistants) specialize in many, many different areas. However, there continues to be a need for primary care physicians (pediatricians, internists, family medicine physicians, nurse practitioners and physician assistants) who can provide care to the vast majority of people in both rural and urban settings. Specialists may be more available in developed countries and urban areas, which can present obstacles to getting timely care from a specialist when needed in rural areas and developing countries.

Here are examples of the different kinds of specialists available.

After physicians have completed their formal training, they are expected to stay up-to-date in their field. All states require allopathic physicians and osteopathic physicians to earn continuing medical education credits to maintain their license to practice medicine.

Subspecialty Care

- Allergy/immunology (immune system disorders)
- Anesthesiology
- Cardiology (heart and blood vessels)
- Colorectal surgery (surgery of the colon and rectum)
- Critical Care Medicine (or Intensive Care Medicine)
- Dermatology (care of skin/hair)

- Emergency medicine
- Endocrinology (diseases involving hormones, such as diabetes, thyroid disorders)
- Gastroenterology (disorders of esophagus, stomach, intestines)
- Geriatric medicine (care of the elderly)
- Hematology/oncology (blood disorders, such as sickle cell disease, leukemia, anemia)
- Hospitalist (care of people in the hospital)
- Infectious disease
- Nephrology (kidneys)
- Neurosurgery (brain and spine surgery)
- Neurology (disorders of brain and nervous system, such as epilepsy, Parkinson's, Alzheimer's)
- Nuclear medicine (evaluates the body using radioactive substances to view soft tissues)
- Oncology (cancer of solid tissues)
- Ophthalmology (Eyes)
- Orthopedic surgery

- Otolaryngology (ear, nose and throat/head and neck surgery)
- Pathology (study of tissue to identify causes of illness or death)
- Physical medicine and rehabilitation
- Plastic, reconstructive, and maxillofacial (face/jaw) surgery
- Preventive medicine
- Pulmonology (lung diseases)
- Radiology — images using many different techniques
- Rheumatology (joint diseases such as arthritis)
- Thoracic/cardiothoracic surgery (surgery of heart, chest, lungs)
- Urology (surgery of bladder, ureters, prostate)
- Vascular surgery

Education

Both allopathic (MD) and osteopathic (DO) physicians complete graduate school training. Each will require training (residency) after graduation to prepare them to practice in a particular specialty. Applicants to medical school take an entrance examination, the **Medical College Admission Test (MCAT)**, in addition to submitting their undergraduate records, along with a personal statement and recommendations. The MCAT tests one's ability to solve problems, based on content from biology, chemistry, physics, biochemistry, psychology and sociology. Medical school for both allopathic and osteopathic medicine is very similar.

During the first two years of medical school, students primarily study the basic biomedical sciences. This includes **anatomy** (gross and microscopic), **embryology, biochemistry, physiology, genetics, pathology, pharmacology, microbiology and immunology,** and **biostatistics**. These might be taught individually or on a coordinated basis (by organ; for example, information about each of the above subjects regarding the heart is presented at one time).

In years three and four, the focus is on clinical training in hospital and outpatient settings. Most schools introduce clinical experiences beginning in the first year of study so that the basic science material is more relevant. The clinical experiences include exposure to certain "core" specialties, which are believed necessary to provide a foundation upon which to build, regardless of which specialty is eventually chosen.

Core clinical areas include **internal medicine** and/or **family medicine, obstetrics and gynecology, pediatrics, psychiatry,** and **surgery**. The fourth year is usually composed of a series of elective courses or rotations, allowing the soon-to-be-graduated student to explore specialties he or she might be interested in entering. As this final year progresses, more and more clinical responsibility is placed on the student to prepare for the postgraduate training that will follow.

Choosing a Specialty and the "Match"

During medical school, students choose elective rotations in the specialty they are interested in at institutions offering graduate medical education in that particular specialty. After deciding on a specialty, a medical student submits applications to training programs for that specialty — much in the way one applies to college and medical school. After applications have been submitted and applicants have been interviewed, students and institutions submit their ranked lists to a computer matching system. The Match is the **National Resident Matching Program**, a computerized service that pairs students with postgraduate (residency) training programs. After some calculations, a list of matched candidates and programs is released. On "Match Day" medical students find out which training program they have "matched" with.

Residency and Fellowship

After medical school, residency or graduate medical education begins. This period is called "**residency**" because long ago, physicians lived at the hospital facility where they were training and were actually "**resident**" there. For a few specialties, such as dermatology, radiology, ophthalmology, and neurology, a one-year internship providing broad, general overview of practice is required. Postgraduate training requires several years of study in the field chosen by the new physician, depending on the requirements of each discipline.

Careers in the Military

Health care professionals in the military work for the United States through the Department of Defense and the Department of Health and Human Services. They serve in times of war and peace, wherever they are needed in the U.S. and abroad. Military physicians, nurses, and other health care professionals care for active members of the military and their in-garrison (at a permanent base) and in-field medical units, and to retirees in veteran's hospitals. Sometimes, military health care personnel are deployed to provide humanitarian aid around the world.

This work requires not only traditional health care professionals education, but also preparation in areas that are particularly important to military service, including combat-casualty care, field training, and aspects of preventive health. Their efforts help keep troops in good condition. Those interested in a military career can find detailed information on at these websites:

www.usuhs.mil/vpe/USUFactSheet.pdf
www.armymedicine.army.mil/about/introduction.html
www.navy.com/healthcareopportunties/
www.airforce.com/careers/specialty-careers/healthcare/overview
www.militaryspot.com/marines/marine-corps-healthcare-careers

Chiropractor (DC)

Role: Chiropractors focus on the diagnosis and treatment of neuromuscular disorders, with an emphasis on treatment through manual adjustment and/or manipulation of the neck and spine. A specialist in this area practices a theory of healing based on the belief that disease results from a lack of normal nerve function. In some states they may be allowed to perform physical examinations and do some minor surgery.

Education: Completion of at least two years of college education followed by four years of training from a school granting a Doctor of Chiropractic Medicine degree.

Practice Environment: Most often DCs work in a private practice environment.

Optometrist (OD)

Role: These specialists are trained to examine, diagnose, and manage diseases and disorders related to the eye and vision. They prescribe glasses, contact lenses, and other vision aids, as well as vision therapy and in some states may prescribe

medicines for the treatment of eye diseases like infections or glaucoma. Optometrists also are trained to identify when it might be necessary to refer a patient to an Ophthalmologist (physician specializing in eyes) for medical or surgical treatment. In some states they are permitted to monitor selected patients for chronic conditions.

Education: Completion of an undergraduate college degree followed by four years of education leading to a Doctor of Optometry degree.

Practice Environment: Private or group practice, often partners with ophthalmologists.

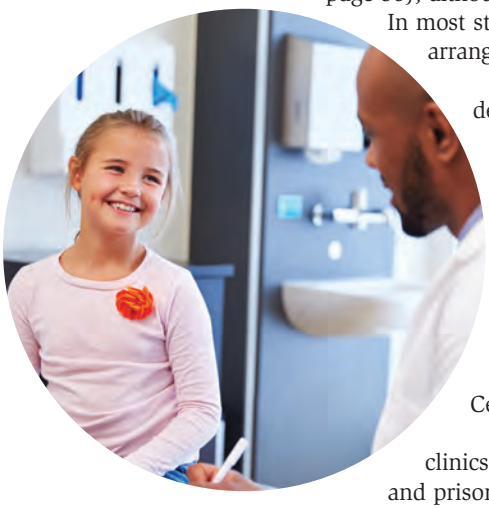
Podiatrist (DPM)

Role: A podiatrist, also known as a podiatric physician and surgeon, is a specialist who deals with the examination, diagnosis, treatment, and prevention of diseases and malfunctions of the foot, ankle, and related structures of the leg. The DPM treats, through medical or surgical means, different types of foot, ankle, and lower-leg problems, including gait disturbances in children and adults; ankle injuries and fractures among athletes and others; bunions and hammertoes; and foot ulcers, abnormal toenails, and skin, soft tissue, and bone abnormalities in people who have diabetes, circulatory disorders, or other conditions associated with risk of amputation.

Education: Completion of an undergraduate college degree; four years of education in a college of podiatric medicine leading to a Doctor of Podiatric Medicine degree; and a mandatory three-year, hospital-based residency program. Following residency, additional optional training may include completion of a fellowship or other postgraduate training.

Practice Environment: Private or group single specialty, multispecialty, or orthopedic practice; hospitals and academic health centers; military and veteran health centers.

Physician Assistants (PA)



Roles: PAs are health care providers who are licensed to diagnose and treat illness and disease and to prescribe medication for patients. They work in physician offices, hospitals and clinics in collaboration with a licensed physician. PAs work in primary care, sub-specialty care, and surgical care. The roles of PAs and Advanced Practice Registered Nurses (APRNs) are very similar (see the APRN section on page 30), although their educational pathway is different. In most states, the PA must have a formal working arrangement with a physician in order to practice.

Education: PAs complete a master's degree that includes coursework similar to that in medical school and clinical rotations in a variety of areas including family medicine, internal medicine, surgery, pediatrics, psychiatry and more. Undergraduate education in a variety of science/health disciplines will prepare the student for the graduate program. Some PA programs will require the applicant to have had some experience in a health care setting. Certification and licensure are required.

Practice settings: Hospital, outpatient clinics, community health clinics, private practices, and prisons. Many work in the operating room assisting in surgical procedures and then follow the patient during their recovery. PAs may choose to practice in a specific specialty area (see the list on pages 19-20).

Tools of the Trade

Special tools frequently are needed to examine some parts of the body that could otherwise not easily be studied, and to obtain certain useful responses or measurements.

Ophthalmoscope. Used to examine the inside of the eye. Special mirrors and lenses allow light to enter the eye through the small pupil and be reflected back to the eye of the observer, so that the retina can be seen. This allows inspection of the arteries, veins, and the optic nerve head of the eye.

Otoscope. Used to examine the ear. It includes a magnifying lens, a light, and a speculum (a funnel-shaped tip that is inserted into the ear canal). The instrument allows easy inspection of the outer ear canal and the eardrum, as well as some structures or the presence of fluid behind the semitransparent drum.

Reflex hammer. Used to apply a "pulse" of force (short quick blow) to a stretched tendon (e.g., in the knee). This stimulates the central nervous system and frequently causes a response (e.g., the knee jerk). It is used to examine the nervous system, as abnormal reflexes may indicate disease.

Sphygmomanometer. An instrument for measuring blood pressure. It consists of a cuff with an inflatable bladder, a rubber bulb for inflating the bladder, and a gauge for indicating the pressure. Repeated measurements allow monitoring of changes that might require beginning or modifying therapy.

Stethoscope. An instrument used to concentrate and amplify sounds from various parts of the body so that they can more easily heard by the listener. It is most frequently used to listen to the heart, lungs, and abdomen. Abnormal sounds can be clues to various problems.

NURSING PROFESSIONALS

Registered Nurses (RN)

RNs comprise the largest group of health care professionals in the United States. More than half of all employed registered nurses work in hospitals, but they are increasingly working in other settings, especially in ambulatory care settings (such as physicians' private practices) and public health or community health settings (such as health departments).

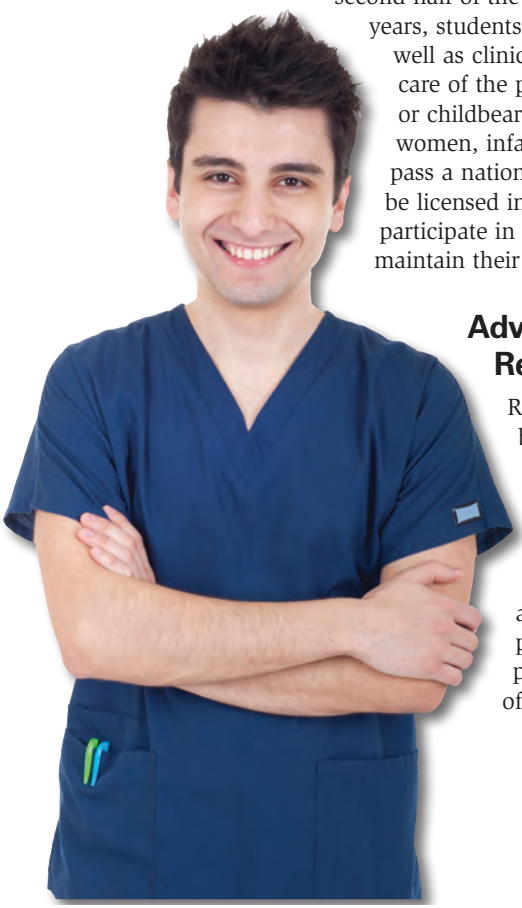
Roles: These health care professionals are trained to care for the sick and to promote health. Their focus is on the patient's response to a medical condition, not merely the condition itself; they often act as patient advocates. They take patients' medical histories, discuss their health issues, and check their vital signs. They may perform diagnostic tests; organize and implement care plans; give patients information about medical conditions, medical treatments and home care, and preventive health measures; and treat patients by administering medications or assisting with other therapies. They may also offer emotional support and comfort. Registered nurses may specialize in a particular field and may choose to obtain additional training to become an advanced practice registered nurse.

Educational requirements: Two to four years of training leading to a diploma in nursing, an associate degree in nursing, or a Bachelor of Science degree in nursing.

The education of registered nurses has changed considerably in the past 25 years. Previously, the majority of registered nurses obtained their initial education through diploma programs, only 10 of which exist today. If you are interested in becoming a nurse, the preferred route is via a

A nurse may decide to work in a particular setting. For example, some nurses choose to work in a specific part of a hospital, such as the emergency department or an intensive-care unit, and some nurses offer medical care in patients' homes through home health care services.

bachelor's degree in nursing. The majority of nurses obtain education through associate degree or baccalaureate degree programs. Registered nurses also have the opportunity to pursue advanced nursing programs. Associate degree programs take two to three years to complete and are usually offered at a community college or junior college. Associate degree and bachelor's degree programs include classroom instruction and clinical training, but their curriculums differ. Associate degree programs include courses in nursing theory and the liberal arts, and they tend to emphasize training for technical proficiency. Baccalaureate degree programs usually take four years to complete and are offered at a college or university. During the first two years of the program, students receive classroom instruction emphasizing basic biomedical sciences such as biology, anatomy, physiology, as well as nutrition, human development, and psychology. Students also take courses in the liberal arts. Clinical training generally occurs in the second half of the program. During these last two years, students continue to receive classroom as well as clinical instruction regarding nursing care of the person with medical, surgical, or childbearing concerns as well as care of women, infants and children. Nurses must pass a national examination to be registered, be licensed in their state, and in most states participate in continuing education activities to maintain their license.



Advanced Practice Registered Nurses (APRN)

Registered nurses become APRNs by completing a Master's (MN) or Doctorate in Nursing Practice (DNP). Education includes advanced pathophysiology, advanced health assessment, pharmacology and prescribing, and clinical experiences doing physical assessment, and clinical preceptorships in the specialty of interest such as pediatrics or

gerontology. The coursework is tailored to the specific type of advanced practice the student wants to complete — Nurse Practitioner, Certified Nurse Midwife, Clinical Nurse Specialist or Certified Registered Nurse Anesthetist. They practice in all kinds of medical specialties and settings both independently and interdependently under the supervision of physicians depending on state law. Certification is required in most states, and licensure is required in all states.

These are the four categories of Advanced Practice Registered Nurses:

Nurse Practitioner (NP)

This APRN provides either primary or subspecialty care to a panel of patients. The NP can assess and manage acute and chronic medical conditions, order and interpret diagnostic tests, and prescribe medications. Many provide preventive health care. They may practice independently of physicians in most states. Some studies report that the Primary Care Nurse Practitioner can do 80% or more of those things that a physician might do, including performing physical examinations, minor procedures, and prescribing

medication for their patients. Usually, the NP will choose a specific population to work with for example, the Pediatric Nurse Practitioner works with children from infancy through adolescence; the Geriatric NP works with older adults; a Psychiatric/Mental Health NP works with those having behavioral or emotional health problems; a Women's Health NP may care for women of all ages related to reproductive health. If an APRN wants to deliver babies, they would pursue education as a Certified Nurse Midwife (CNM).

Clinical Nurse Specialist (CNS)

This APRN lends clinical expertise caring for a very specific patient population focusing on a particular specialty (such as oncology or psychiatry). In addition to obtaining a graduate degree, they must be certified in their area of expertise — such as oncology, psychiatry, or pain management. Obtaining specialty certification demonstrates an advanced level of knowledge as well as advanced clinical skills in a niche area of nursing. They do not work independently, but with a team of professionals. They are experts in educating other professionals and patients with complex health problems. One might be CNS certified in pain management — who consults with the health care team on best strategies to help a patient's particular type of pain and who might work with a health care system on approaches to assessment of every patient's pain. The CNS certified in Endocrinology might work with patients who have diabetes on a plan of care that will prevent complications. In some states, but not all, they may also prescribe medication.

Men in Nursing Careers

Historically nursing careers have been primarily filled by women but now more men are joining this profession. Currently, about 10% of all nurses are men, up from 3% in 1984. Men practice in every nurse specialty alongside of their female counterparts from pediatrics to obstetrics to geriatrics to sexual assault examiners. https://nurse.org/articles/Male-Nurses-And-The-Profession/

The Need for Nurses

There is a shortage of nurses in the United States. The problem is serious, as the proportion of nurses available to care for patients affects the time a nurse can spend with each patient and the quality of care the nurse can provide. The Bureau of Labor Statistics predicts employment to increase by 12 % between 2018 and 2028, faster than any other occupation. As a result of the shortage, employers may offer lucrative salaries, sign-on bonuses, scheduling flexibility, and opportunities for advancement and further education. In addition, some state laws and the federal Nurse Reinvestment Act of 2002 are in place to help employers attract and retain nurses. For example, some states laws prohibit mandatory overtime, and some set minimum patient-to-nurse ratios to help keep nurses from being over-worked. The Nurse Reinvestment Act provides for financial aid for nursing education and offers special loan repayment options for nursing students who commit to teach nursing.

https://www.bls.gov/ooh/healthcare/registered-nurses.htm

Certified Nurse-Midwife (CNM)

This APRN, who may be a man or a woman, assists women in pregnancy and childbirth. He or she provides care and education to women throughout pregnancy, supervises labor and delivery, and cares for both the mother and the baby during the period immediately following childbirth. The majority of nurse-midwives practice in hospitals or birthing centers, usually with physician backup in case of complications or emergencies requiring advanced obstetric care or caesarian delivery.

Certified Registered Nurse Anesthetist (CRNA).

This APRN cares for patients who require anesthesia for a procedure or delivery of a baby. The CRNA assesses the anesthesia needs of a patient, administers anesthetics, and monitors the patient's recovery from anesthesia. They usually work in a hospital or surgical center.

Nursing Specialties

Nurses often specialize in specific aspects of care, similar to those specialties that Physicians and Physician Assistants may choose. Nurses may specialize in care of patients with a specific medical condition, or in care of a specific patient population (children, women, elderly). Nurses work in a variety of settings within the hospital or outpatient settings.

Work settings for nursing professionals:

Within the hospital:

- Emergency department
- Specialized intensive-care units (cardiac, surgical, neurosurgical, medical)
- Recovery room (patients recovering from anesthesia)
- General medical or surgical areas — where patients are stable and recovering, or learning how to manage an acute or chronic issue before being dismissed from the hospital
- Radiology department — preparing and monitoring patients during specialized procedures
- Mother/Infant care — assisting women in labor and delivery of their infants — caring and monitoring mother and baby after birth

In the community:

- Medical offices — providing assessment of patients, assisting with procedures, coordinating care of patients with complex health care needs, educating patients

- Home health — visiting patients in their home setting, providing care and education; supervising home-health care assistants, providing hospice care (comfort care for end-of life)
- Public health clinics — providing care to those coming for a wide variety of services offered in public health clinics e.g. vaccinations, pregnancy care, care for sexually transmitted illness and more
- School nurse — providing care to children in the school setting — monitoring vision, hearing, vaccinations, providing first aide, administering medication for chronic conditions such as asthma, or diabetes, teaching students about healthy lifestyle practices
- Prison nurse — providing assessment, first aid, monitoring of inmates, assisting with management of acute and chronic health conditions of inmates

In the community:

- Legal consultant — working with attorneys on medical malpractice cases
- Occupational health — working on-site at a business or industry/factory
- Informatics — working with computers, electronic health records and other computer-based aspects of health care
- Teacher — in schools of nursing
- Researcher in a variety of settings to learn more about best practices in care of patients or conditions
- International health / mission work

Licensed Practical Nurses (LPN) and Licensed Vocational Nurses (LVN)

LPNs and LVNs represent the other classification of nurses

Roles: Activities might include providing basic bedside care of the patient, taking vital signs, wound care, and administering some medications. LPNs are under supervision of RNs or Physicians. Many will continue their education to become Registered Nurses.

Educational requirements: To enter an LPN program, you need a high school diploma or GED. LPN programs usually include one year of coursework, providing classroom and clinical education. One must pass a national LPN exam and be licensed in your state. These programs are found at hospitals, vocational technical schools, and community colleges.

Practice settings: In contrast to RNs, the majority of licensed practical/vocational nurses work outside the hospital in nursing care homes, ambulatory care settings, or through in-home health care services.


JOHN SMITH, MD

A Sample "Simple" Patient

These pages contain a sample health visit and medical record for a patient who appears to have a relatively simple problem—likely the "common cold." It is presented to give you a feeling for how a team of health care professionals might provide care and record the information obtained during a visit. Obviously, a complicated problem might warrant more elaborate description, extensive examination, and sophisticated testing, but the key is to understand how the history, physical exam, and evidence-based recommendations fit together, providing the family with a diagnosis and the best approach to treatment is the desired outcome.

The medical assistant leads the teenaged boy and his mom to an exam room. The medical assistant takes his vital signs and asks him to take off his shirt and put on an examination gown. She reports to the provider that the child has had a stuffy nose and fever for two days. The child and his mom are interviewed by a physician, physician assistant, or a pediatric nurse practitioner.

History of Present Illness (what has happened so far): The patient is a 13-year-old boy with a three-day history of nasal congestion, a non-productive cough (no mucus comes up with the coughing), and fever for two days. His mother has been giving him over-the counter cough syrup and decongestant that haven't helped much. His fever at home was 100°F. Acetaminophen (Tylenol) has helped him feel better. Several classmates have been ill with similar symptoms. The patient did get his influenza vaccine, and his other vaccinations are up to date.

Past Medical, Family, and Social History: No relevant findings

Medications: Pseudoephedrine, a decongestant, cough syrup, and acetaminophen for fever

Allergies: Allergic to penicillin (reaction: hives)

Physical examination: Temperature 99.8°F; pulse 85, respirations 16, blood pressure 110/65

HEENT (head, ears, eyes, nose, throat):

Ears — tympanic membranes are retracted
Nose — mucosa pink, moist, clear drainage noted
Throat — minimal erythema (redness)
Neck — no palpable lymph nodes
Heart — no murmurs

Lungs: Normal breath sounds, no wheezing, no rales (sounds of moisture in the lung tissue), no evidence of pneumonia
Abdomen: Soft, non-tender
Skin: No rashes
Tests: None are indicated, though the mother wondered about a chest X-ray. The provider explained that the child's breath sounds and breathing effort were normal, so there was no indication of pneumonia or other lung problem. The provider explained that mucus produced with a cold drains from the nose down the throat and is an irritant, causing cough.
Diagnosis: Upper respiratory infection (common cold)
Treatment: Provide comfort care, encourage fluids, rest, acetaminophen every 4-6 hours as needed for fever; and honey or honey-based remedies for cough. Antibiotics will NOT help the common cold get better
Follow-up: Parents are instructed to call the office if fever persists beyond the third day, cough becomes worse rather than better, breathing becomes fast or labored. The nurse gives them a handout about care of the common cold.

You are probably beginning to see that the job of a physician is sort of like the job of a detective. Every cough, sneeze, ache, pain, bump, swelling, redness, or other abnormality that a patient has, as well as how long each symptom has been present or how long it took to develop, is a "clue" in the "mystery" of diagnosing the patient's illness. It is therefore important not to miss anything.

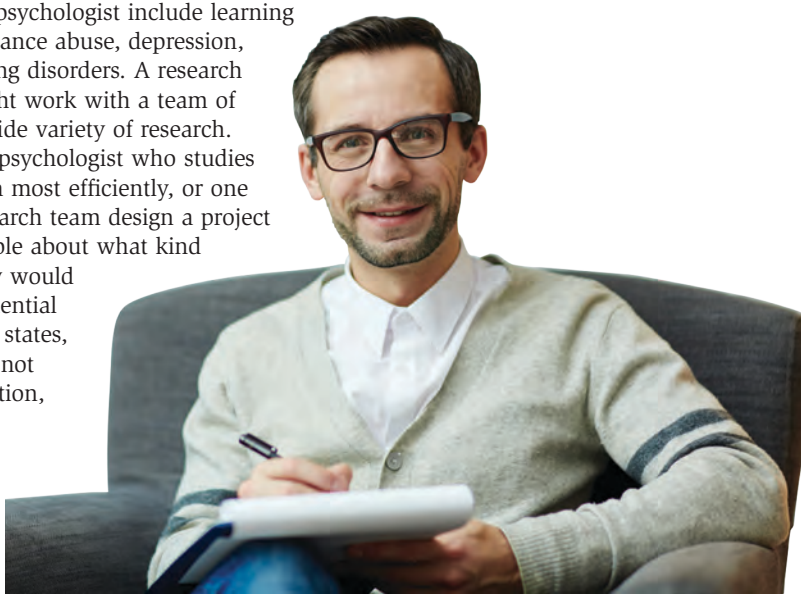
ALLIED HEALTH PROFESSIONALS

Allied Health Professionals are **non-nurse, non-physician health care professionals**.

There are dozens of professionals in these roles — some of which are listed below. However, there are many, many more allied health professions. If you're curious, and with your parent's or guardian's permission, do an Internet search for "Allied Health Professions".

Psychologist (PhD of PsyD)

Roles: These professionals specialize in the diagnosis and treatment of behavioral disorders and mental and emotional illness. Psychologists may focus on a variety of areas including: developmental, clinical, health, industrial, sports, and forensic psychology, in addition to specializing in the design, implementation and evaluation of research. Some of the more common disorders that might be treated by a licensed clinical psychologist include learning disabilities, substance abuse, depression, anxiety, and eating disorders. A research psychologist might work with a team of scientists on a wide variety of research. An example is a psychologist who studies how people learn most efficiently, or one who helps a research team design a project to interview people about what kind of candidate they would prefer in a presidential election. In most states, psychologists do not prescribe medication,



but would refer to a psychiatrist or primary care health provider if medication were deemed necessary.

Education: Education takes about 7 years or more, depending on whether or not one does a fellowship (extra training in a specialty area). First, there are four years of undergraduate study, typically in related fields — psychology, sociology, anthropology or pre-med — as these majors include many of the pre-requisites for graduate school. The next step is completing the PhD or PsyD in graduate school, which is very competitive. Courses include human growth and development, cultural bases of behavior, therapeutic communication, courses on different types of therapy and research design and statistics. After completing graduate school, the psychologist who wants to be a therapist will have one to two years of supervised practice prior to taking a licensing examination that enables the clinical psychologist to be a therapist.

Practice settings: Hospitals; schools, working with students; nursing homes; rehabilitation centers; addiction centers; prisons; private practice; sports teams; businesses; police departments or FBI as a forensic psychologist; and in research centers.

Emergency Medical Technician (EMT)/Paramedic

EMTs and Paramedics work in Emergency Services.

Roles: They are trained to perform immediate lifesaving measures for treating or stabilizing sick or injured people on the scene — such as in person's home, or at the site of an accident. They learn how to safely transport the sick/injured person to a higher level of care, such as an emergency room or hospital. Their level of training determines what specific measures they are allowed to perform. EMTs and Paramedics may also be cross-trained as firefighters, park rangers, police officers and search and rescue professionals.

Education: There are three levels of EMT — education builds on each level. All require high school graduation / GED as a pre-requisite. Coursework includes assessment of the patient's condition, how to respond to cardiac and injury emergencies, and those trained at the highest levels learn how to administer medications, intravenous fluids, and use specialized equipment to support the patient's breathing. Training also includes emergency management and rescue

techniques. Each level of training advances what the EMT is allowed to do for the patient. At each level, licensing examination is required, and continuing education is required to maintain licensure.

- **EMT-Basic —** must complete a certificate programs typically offered at junior colleges or private providers. Be sure the program you enroll in is accredited.
- **EMT-Intermediate —** additional training that teaches advanced techniques such as administering medications and intravenous fluids, under a physician's orders.
- **EMT-Paramedic —** associate or bachelor's degree is required for the most advanced medical first responders. One learns techniques to control bleeding, how to use more advanced equipment to help the patient's breathing, and how to administer intravenous fluids and medications.

Practice settings: Emergency Services Departments; Fire Departments; Air ambulance transport services; Emergency Rooms as techs

Emergency medical technicians learn to respond to hazardous material situations.

Medical assistants perform a variety of duties throughout a medical practice.

Medical Assistant

Roles: The Medical Assistants support nurses and physicians in direct care of patients as well as with administrative tasks. They are trained to take vital signs (pulse, respiratory rate, blood pressure and oxygen saturation) and measurements of the patient (height and weight). In addition, they will learn how to manage medical records, patient scheduling, insurance claims and other administrative tasks. For many Medical Assistants, this is a starting point to other careers in health care — nursing, medicine, laboratory techs and others.

Education: High school diploma/GED and a certificate program, often offered at vocational-technical high schools, junior colleges or independent vocational-technical training centers. Coursework might include: accounting; anatomy; clinical and diagnostic procedures; ethics; first aid; insurance processing; laboratory techniques; medical administration; medical law; medical terminology; patient relations; pharmaceutical principles; physiology; and record keeping.

Practice settings: Outpatient clinics, doctors' offices, nursing homes, rehabilitation centers, home health

Health care Research — Discovery and Advancement

Health care professionals, and scientists in related fields (like **microbiology** and **immunology**) also influence the health care through research. Many advancements in health care have resulted from this type of research. Some research focuses on learning more about an illness or medical condition in order to develop ways to prevent, detect, and treat it. **Other research tests treatments, including new drugs, surgical procedures, and other therapies**. Research projects oftentimes will require many of the various health care professionals identified in this merit badge pamphlet working together as a team.

Research can take many different forms. For example, researchers may work in scientific laboratories, analyzing blood or tissue samples. They may test new drugs and treatments on animals before testing them in people. Researchers may review information (data) gathered from patients' records. They may even use computer programs to model how a disease develops in the body. In clinical trials, volunteer patients, known as "subjects", help researchers test a particular drug or device.

Research must be conducted with special care to protect subjects' health, safety, and privacy. Regulations set forth by the Federal Drug Administration for drug trials, regulations of the Office for Human Research Protection (OHRP), as well as guidelines described by the National Institutes of Health for research involving human subjects describe ethical conduct of research. **The Health Insurance Portability and Accountability Act of 1996** protects the privacy of patients' medical records. Medical research involving human subjects paid for with any federal government funds or monitored by the Federal Drug Administration requires approval by an institutional review board. The person who is going to participate in a research study must give informed consent prior to beginning their participation. If one wants to publish research in a medical journal, it is best practice to have the project approved by a review board.

Results from research studies are shared with others so that they can learn from and build upon each other's work. Professional societies, academic centers, and other organizations publish journals that report research. They also host conferences and seminars where researchers can present their work and answer questions about it. Unfortunately, not all research is high quality. So, **health care professionals and policymakers must view each study with a critical eye.** Some medical journals help filter out lower-quality research by requiring all submitted research to be peer-reviewed—in other words, others in the same field read and comment on each research paper. Only research papers that reach a certain standard of quality are considered for publication as articles. Even so, each published article must be read carefully before it can be permitted to influence practice.

Certified Nursing Assistant (CNA)

Roles: The CNA helps patients with bathing, eating, and dressing. The CNA might check the patient's vital signs. Although the job is similar to that of a MA, the CNA would not have administrative type of responsibilities, rather only direct patient care responsibilities. They are under the supervision of nurses

Education: GED or high school diploma is required. Completion of a CNA training course provides the information needed to pass a certification exam. The course will include how to help the patient with basic activities of daily living and patient confidentiality. These programs are short — often 6-12 weeks, typically offered at a community junior college or a medical facility. For many, being a CNA is a first step to other health care careers.

Practice settings: Nursing home, rehabilitation centers, hospitals, home health agencies

Occupational Therapist (OT)

Roles: OTs help people of all ages function in their home, school, or work settings. They care for people who experience limitations in their abilities to care for themselves or engage in meaningful life/work activities. They assess the patient's home/school/work environment and develop plans to assist the patient function within those settings. This could include exercises, adaptive equipment, or adapting the environment. Common occupational therapy interventions include making splints to support hand function after injury or illness; working with speech pathologist to help people who have trouble with eating, providing special equipment to help people dress themselves or do other activities of daily living.

Education: Entry-level practice requires a master's degree. Courses may include: functional anatomy, neurobiology, kinesiology (science of movement), therapeutic communication skills, and fieldwork — where the student works full time in a particular area of clinical interest. OTs are licensed in the state where they practice. They also take national certification examination.

Types of Occupational Therapist Practices:

- **Hospital or outpatient care —** helping people develop/ recover activities of daily living such as bathing, dressing, toileting, eating, writing
- **Home health —** working with infants/toddlers with disabilities; working with adults recovering from illness/ injury
- **Schools —** work with children who have physical disabilities to optimize their ability to participate in school activities — e.g. help with writing, fine motor activities

Physical Therapist (DPT)

Roles: Physical Therapists are specialists in movement. They care for people from newborns to the elderly who have conditions that limit their mobility and may interfere with their ability to do activities necessary for taking care of themselves or participating in physical activities that they enjoy. This might be helping an athlete recover from a knee or ankle injury, a person recovering from orthopedic surgery, or someone re-learning

how to use their bodies after a stroke or other brain injury. The PT assesses the patient's movement, noting any difficulties with pain or limitation. Then a treatment plan is developed with the goal of restoring optimal musculoskeletal function. Treatment might include exercise, massage or manipulation of muscles and joints, ultrasound or other techniques. State licensure is required for Physical Therapists.

Education: There are two routes to becoming a DPT — the most common is completing bachelor's degree, and then completing a three-year Doctor of Physical Therapy program. Alternatively, there are programs which allow combining undergraduate and doctoral education in a 3 + 3 program. After receiving the DPT, and licensure, a person may continue their education with a clinical residency or fellowship program in a specialized area of practice. Specialty certification is also an option, but not a requirement to practice in a specialty area — such as pediatrics or sports medicine.

Types of Physical Therapy practice:

- **Hospital based —** prevent musculoskeletal complications of illness/ or prolonged bed rest; develop and manage a

plan for acute recovery from illness, stroke, brain, spine, or musculoskeletal injury

- **Home health —** visit patients at home to develop and monitor a plan to promote strength and recovery, and a plan for injury prevention
- **Rehabilitation center or nursing home —** develop and implement plans of care for rehabilitation from illness/injury
- **Sports injury care —** prevention and rehabilitation of sports related injuries

Orthotists and Prosthetists

Role: These professionals design, fabricate, and fit supports or prosthetic body parts to the patient. The orthotist primarily designs things such as splints or braces that can be removed, while the prosthetist designs, fabricates and fits prosthetic limbs — legs, arms and hands.

Education: Master's degree in orthotics/prosthetics is required. Coursework might include: anatomy and physiology, neuroscience and neuroanatomy, prosthetics and orthotics materials, prosthetic management of upper and lower limbs, gait pathokinesiology, histology and research. A one-year residency after graduation is required, and certification is required. Some states require licensure.

Practice settings: Hospitals, rehabilitation clinics or hospitals, private practice

Medical Appliance Technician

Roles: These technicians make appliances such as artificial limbs or braces.

Education: There is no specific college program for this specialty; rather training is on the job. They most likely would work under the supervision of an orthotist or prosthetist who would design the artificial limb, brace or removable splint.

Practice Settings: Hospitals, rehabilitation clinics or hospitals

Radiologic Technologist and Technician

Role: A Radiologic Technologist is certified and registered to perform diagnostic imaging examinations. These professionals perform imaging of patients using a variety of techniques. They may also provide radiation therapy treatments. They can specialize in a specific imaging technique such as bone densitometry, cardiovascular-interventional radiography, computed tomography, mammography, magnetic resonance imaging, nuclear medicine, quality management, sonography or general radiography. Radiologic Technologists work directly with physicians who are radiologists.

Education: Courses include anatomy, radiologic techniques, patient positioning, equipment protocols, radiation physics and radiation safety as well as basic patient care. Radiologic Technologists require four-year bachelor's degrees and Technicians require a two-year associate degree. To practice, one must pass a national certification examination. To remain certified, one must earn continuing education credits every year.

Practice settings: Hospitals, clinics and rarely, private practice offices that have radiology equipment.

Sonographer

Role: Sonographers use specialized equipment using high-frequency sound waves to generate images of a person's internal organs, tissues and blood. A transducer, or probe, is moved over the area of the body to be studied to obtain the sound wave images. Sonographers might specialize in obstetrics/gynecology — taking images of the developing fetus; cardiology — imaging the heart; and other specialty areas. The sonographer will be responsible for explaining the procedure to the patient.

Sonographers create pictures of babies in mothers' wombs

Education: There are a number of routes to becoming eligible for certification as a sonographer: Technical/certificate programs are available for students who already have experience in some area of health care and are interested in transitioning roles. The preferred route for long-term career development is via an associate degree program or a bachelor's degree program, that include opportunities for training in a specialty area such as cardiac, breast, obstetric, abdominal and others. Coursework focuses on anatomy/physiology; sound wave physics, and clinical opportunities to perform sonogram examinations of patients. Certification by one of three national certifying organizations will be helpful. The requirements of each certifying body are slightly different, but all require an associate or bachelor's degree education.

Practice Settings: Sonographers primarily work in a hospital or outpatient setting. They report directly to the physician who orders and interprets the results of the imaging study.

Pharmacist (PharmD)

Role: Responsibilities of the pharmacist include a range of care for patients. They dispense medications and may assist in monitoring patient health and progress in order to maximize their response to the medication. They educate patients on the use of prescriptions and over-the-counter medications, and advise physicians, nurses, and other health professionals on drug prescribing decisions. Pharmacists also provide expertise about the composition of drugs, including their chemical, biological, and physical properties and their manufacture and use. They ensure drug purity and strength and make sure that drugs do not interact in a harmful way.

Education: Two to four years of pre-pharmacy undergraduate study plus a three- to four-year graduate program in Pharmacy. Licensure is required to practice.

Pharmacy Technician

Role: The Pharmacy technician assists and is supervised by a licensed pharmacist. They may dispense prescription medication to customers or health professionals. They receive written prescriptions and confirm their accuracy, and can measure and package medications, and label prescriptions that are reviewed by the pharmacist. They may provide a variety of administrative services within a pharmacy as directed by the pharmacist.

Education: High school graduation/GED is required for entrance into a pharmacy technician training program. These are usually year-long programs — either at an independent vocational-technical school, or at a junior college. Coursework might include: mathematical calculations used in the pharmaceutical industry, recording keeping, medication dispensing, and health care laws, policies, and regulations regarding medication. Certification is recommended.

Practice setting Pharmacists and Pharmacy Technicians

- **Hospital —** participate in decisions on prescriptions for the hospitalized patient, with particular attention to drug-drug interaction. Dispense medication and educate patients regarding their medications
- **Retail pharmacy —** dispense medication, monitor drug-drug interaction, educate patient regarding their medication. May be responsible for administering selected vaccinations such as influenza (flu) vaccine or pneumonia vaccine.
- **Research pharmacist —** participate in drug development and testing, working for pharmaceutical company or a research center

Dietician (RD)

Roles: A dietician is an expert in food and in the role of food to promote health and manage chronic disease. A RD can assess, diagnose and treat nutritional problems. The RD may choose to get additional training/certification in specialty areas such as pediatrics, diabetes care, or kidney disease care.

Education: A bachelor's degree with courses that include: food and nutrition science, food service systems management, sociology, biochemistry, physiology, microbiology and chemistry. The RD candidate completes supervised practical courses of instruction in a variety of settings such as: hospital, school, or food-service business. They must pass a national registry exam and maintain the registration through continuing education.

Practice settings:

- **Health care facility (hospital, nursing home) —** develop meal plans for patients based on their disease state; supervise food service system for patients or employees; patient education regarding special dietary restrictions/ requirements
- **School —** establish menus for students from preschool to college aged that meet nutritional requirements for children; education of children regarding healthy nutrition; supervise school food kitchens to assure food safety guidelines are followed
- **Public health agency —** work with policy makers to develop, implement and manage programs focusing on health of the public such as Meals on Wheels, Women, Infant, and Children Nutrition programs (WIC) and Supplemental Nutrition Assistance Program
- **Private practice —** work with individuals on healthy nutrition plans for weight loss/gain or for chronic disease management
- **Food industry —** research and development of food products

Medical Laboratory Scientist (MLS)

(formerly known as Medical Technologist, Medical laboratory scientist or Clinical Laboratory Scientist)

Roles: Medical laboratory Scientists perform testing on blood and tissue samples to assist in diagnosing disease. They may specialize in doing very specific type of testing such as testing for blood diseases or preparing slides of human tissue for review by a Pathologist (physician who studies human tissue to diagnose disease). They will communicate results with the health care team responsible for the patient's care. The MLS will train other laboratory technicians. Those with advanced degrees may become laboratory administrators.

Education: A bachelor's degree is required. There are specific MLS four-year college programs, which are the gold standard for entering this field. Courses would include biology, chemistry anatomy math and then more complex laboratory courses. Some college programs offer what is called a 2 + 2 program — two years of basic science and two years learning about complex laboratory training with clinical rotations. Alternatively, one could get a degree in biology or other life science and get a graduate degree in MLS.

While laboratory tests are a critical part of the modern evaluation of a patient, they cannot be relied upon in isolation. Knowing how to order the appropriate tests, and to interpret the results of these tests, is an important part of the science and "art" of medical practice.

Medical Technician

Roles: This is person serves in an entry-level position and might perform tasks in the laboratory under the supervision of the Medical Laboratory Scientist.

They might prepare the patient for procedures, do routine laboratory tests, enter data and prepare equipment. Vocational training or an associate degree is required. If you're not sure you want to be an MLS — this is one way to explore the career without getting the four-year degree.

Practice settings for MLS and Technicians: laboratories in a variety of settings such as hospital, Community health center, Research laboratory, Pharmaceutical companies, Blood donation center

Histotechnologist (Histologist)

Roles: The histotechnologist prepares tissue obtained during a biopsy or autopsy for microscopic examination. This preparation might involve special stains or techniques that must be very precise. The histotechnologist will learn to identify normal versus abnormal findings on the slides that they look at. A pathologist, a physician who specializes in establishing diagnoses based on what is seen on these slides, works closely with the histotechnologist

Education: Bachelor's degree with coursework that will likely include: medical terminology, biology, chemistry, immunology, anatomy and physiology. You will learn how to prepare

specimens for microscopy. Certification is highly recommended and required by most employers.

Practice settings: most often, clinical laboratories in hospitals or private labs

Cytopathologist

Roles: Cytopathologists study cells under the microscope — some consider them to be cell detectives. They are trained to identify normal versus abnormal cells that might indicate pre-cancer, cancer or infection. They interpret Pap smears — the test of tissues used to screen for cervical cancer in women.

Education: Bachelor's degree, or a post-bachelor's degree certificate program. Coursework might include math, statistics, chemistry, and biological sciences, including molecular biology. Students usually enter the cytopathology program for their junior and senior years of college. Certification is required.

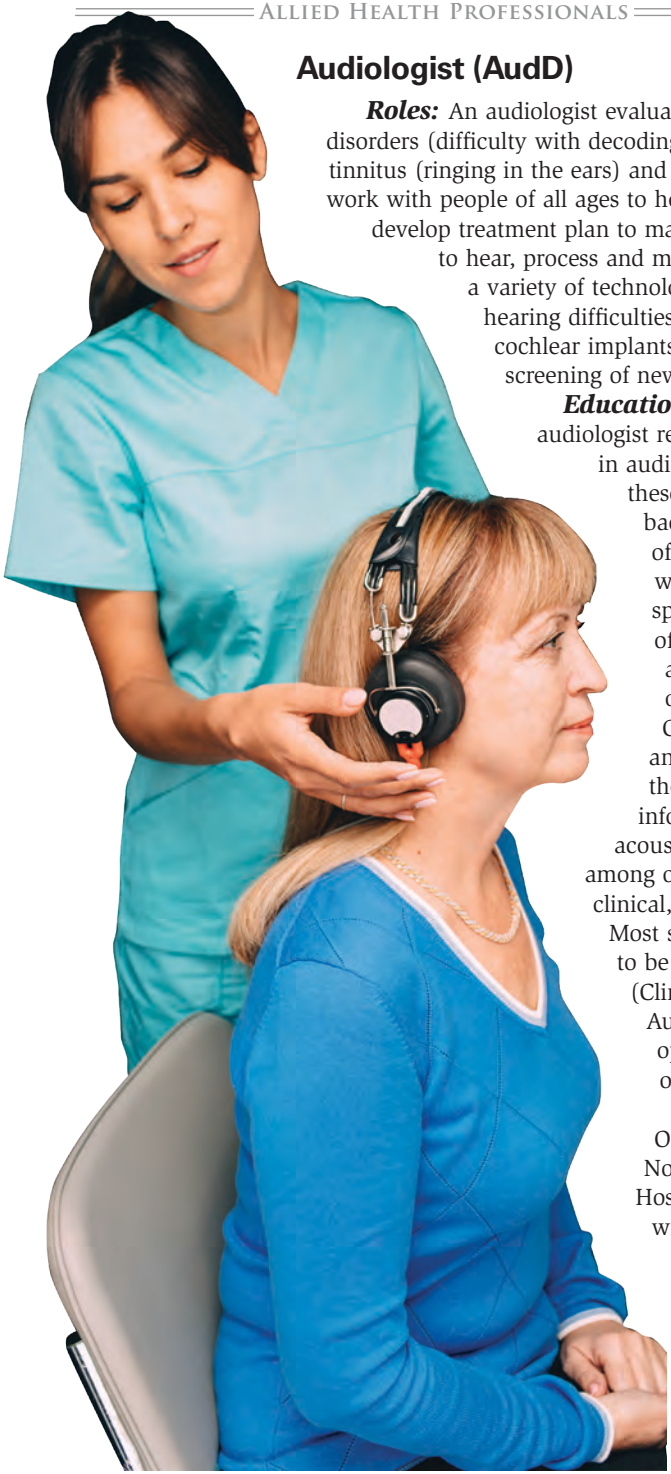
Practice settings: laboratories in hospitals or private medical laboratories are the most common settings

Phlebotomist

Role: A phlebotomist is the person who collects blood samples to be used for testing from people. They will explain to the person what is being done, they will be very careful about identifying the person, and putting the correct persons identifying information on the tube the blood was collected in. They will practice universal precautions to prevent blood exposure to themselves or others to avoid the risk of diseases passed through blood, like hepatitis or HIV.

Education: Training programs are usually a semester to one year in length. Coursework may include: anatomy and physiology, blood and cell composition, and blood sampling procedures. There will be hands on training to learn and practice the different methods of obtaining blood, including how to use fingerstick/heelstick methods for people from whom it is hard to get blood through a vein. Certification is optional, but highly recommended. Extra training and certification allow the phlebotomist to work in a blood donation center.

Practice settings: Hospitals, doctor's offices, community health centers, outpatient laboratories, blood donation centers.



Audiologist (AudD)

Roles: An audiologist evaluates hearing, processing disorders (difficulty with decoding things that one hears), tinnitus (ringing in the ears) and balance disorders. They work with people of all ages to help prevent disorders and develop treatment plan to maximize people's abilities to hear, process and maintain balance. They use a variety of technologies to help people with hearing difficulties such as hearing aids or cochlear implants. They supervise hearing screening of newborns.

Education: To become an audiologist requires a doctoral degree in audiology. One can begin these programs after getting a bachelor's degree in any field of interest. Some programs will allow students to specialize in a specific area of audiology practice such as working with children or with older adults. Coursework will include anatomy and physiology, the science of amplification, information about the acoustics of speech and music among others. There will be clinical, hands-on experience. Most states require audiologists to be licensed. Certification (Clinical Competence in Audiology — CC-A) is optional but may enhance one's ability to find a job.

Practice settings: Office practices, Ear/Nose/Throat practices, Hospitals, Schools, working with musicians to prevent hearing loss

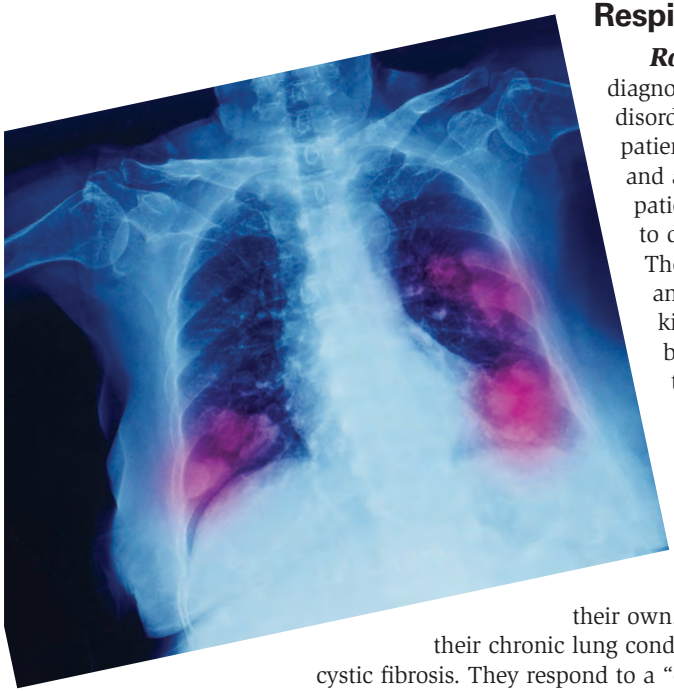
Speech and Language Pathologist (SLP)

Roles: Prevent, assess and treat difficulties with speech, language, communication and swallowing in people of all ages. One might work with people recovering from strokes, who have to re-learn speaking, children with autism, children with difficulty pronouncing certain sounds or with developmental delays in their speech and language skills and with people who have difficulty with swallowing safely. SLPs may work with premature or ill newborns to assess feeding and help them learn to breastfeed or bottle-feed effectively.

Education: First, one completes a bachelor's degree in Communication Science, and then a master's degree in Speech-Language Pathology and then a fellowship. One must pass a national examination in order to be licensed. Certification is optional, but it enhances one's professional opportunities.

Practice settings:

- **Health care facilities —** hospitals, rehabilitation centers, nursing homes
- **Schools —** helping children with communication or feeding challenges
- **Private practice —** working with people of all ages to facilitate their communication skills



Respiratory Therapist (RT)

Roles: A RT assists in diagnosing lung and breathing disorders. They interview the patient, do a chest physical exam, and always consult with the patient's health care provider to decide on a treatment plan. They analyze breathing, tissue and blood to determine what kind of therapy might be best. They perform tests that evaluate a person's breathing capacity. They also administer medications that are given with an inhaler or aerosol. They manage ventilators and artificial airway devices for people who cannot breathe on their own. They educate people about their chronic lung conditions such as asthma or cystic fibrosis. They respond to a "code blue" (situation that occurs when the patient has stopped breathing, or their heart has stopped) to help the medical team manage a breathing emergency.

Education: An associate degree may get you started in this profession, but the preferred and most common pathway is a four-year bachelor's degree program is preferred. Courses will include anatomy and pathophysiology, clinical respiratory care, procedures, pharmacology, mechanical ventilation, and advanced respiratory theory. There will be a clinical component to give you practical experience. All states also require either an entry-level Certified Respiratory Therapist—CRT credential or advanced-level Registered Respiratory Therapist—RRT credential through the National Board for Respiratory Care (NBRC) to qualify for licensure. Licensure is required in most states.

Practice settings: Hospitals are the most common sites — in intensive/critical care areas as well as in other areas, helping to manage the breathing needs / oxygen therapy and other treatments. Sleep clinic and skilled nursing facility or rehabilitation center

Medical Records Specialist

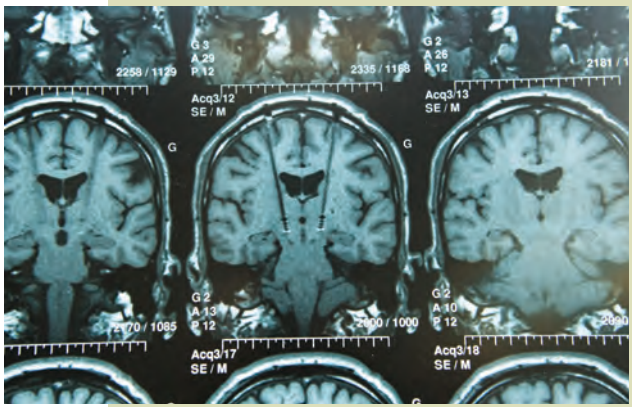
Role: The medical records specialist is responsible for organizing either paper or electronic patient records. This job requires attention to detail in order to appropriately do what is called "coding." Coding is assigning a number to the diagnosis or procedures that were done to the patient, based on the information in the health provider's notes on the patient's record. These codes then will dictate how much the service provided cost, and what will be billed to the insurance company or to the patient. They will consult with the health care provider to make sure that information in the chart is accurate, and that the assigned code actually reflects what was done. They must follow the HIPAA rules (see pages 11-13, which discuss confidentiality) to ensure confidentiality of the records. If the patient request records to be sent to another health care provider, a medical records specialist will oversee that transfer.

Education: High school graduation/GED is needed for entry level into this field. However, most employers will be looking for a person with medical records technician certification. An associate or bachelor's degree education in medical coding or health information technology is beneficial to career advancement. Coursework might include coding systems, health care reimbursement, anatomy, physiology, medical terminology and data systems.

Practice settings: hospitals and physician's office, community health clinics.

"Pacemaker" for the Brain

Cardiac pacemakers work to keep the heart beating at a steady, regular rhythm. This same technology called deep brain stimulation (DBS) has recently helped neurologists to develop a technique that helps reduce the frequency of seizures for people who have epilepsy that is not well controlled with medication. The first to use chronic deep brain stimulation as a therapy in motor disorders was Natalia Petrovna Bekthereva, neuroscientist at the Institute of Experimental Medicine and the Academy of Medical Sciences in Leningrad, in 1963. The first clinical trials of DBS done to see if it really helps people with epilepsy were completed in 2010. Research continues to be done to make sure the technique really works and is safe.



Epilepsy is a chronic condition seen in about 48 people out of 100,000. The person with epilepsy experiences unprovoked, recurrent seizures. A seizure is a sudden rush of electrical activity in the brain. Epilepsy cannot be cured and is treated with a number of different medications. For some people, medications do not stop the occurrence of seizures, and in some cases, deep brain stimulation may be the solution.

A thin metal electrode is surgically implanted in the brain and connected to a device—much like a pacemaker—inserted under the skin. The device delivers an electrical charge to a very specific target in the brain when it senses the beginning of seizure activity Research studies show that the delivery of electrical stimulation to certain brain targets can sometimes stop this electrical hyperactivity, and stop the seizure.

Source: The Cutting Edge: Research in Deep Brain Stimulation for Epilepsy
http://www.epilepsy.com/article/2014/3/cutting-edge-research-deep-brain-stimulation-epilepsy

Biomedical Engineer (BME)

Role: Biomedical engineers are engineers with special interest/expertise in technology related to health care. They apply engineering principles and design concepts to medicine and biology for healthcare purposes. They work to invent new machines/technologies to help with diagnosis and treatment of a variety of conditions. There are a number of specialty fields to think about. One is that of neural engineering — this explores how the body's nerves can interact with devices. Another is tissue engineering — figuring out how to make body parts from cells grown outside of the body. The lower limb prosthesis called "blade runners" was developed by biomedical engineers to enable amputees to continue running, and running very fast!

Education: Entry-level positions require a bachelor's degree in biomedical engineering. Coursework focuses on both engineering principles and material and biological sciences. Graduate degrees are available for those wanting to pursue a specialty are of biomedical engineering.

Practice settings: hospital, medical equipment companies, rehabilitation centers

Resources

Scouting Literature

Animal Science, Dentistry, First Aid, Personal Fitness, Public Health, Veterinary Medicine, and *Wilderness Survival* merit badge pamphlets

With your parent's permission, visit the Boy Scouts of America's official retail website, www.scoutshop.org, for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Websites

American Association of Men in Nursing
www.aamn.org

American Association of Pharmacy Technicians
www.pharmacytechnician.com

American Association of Physician Assistants
www.aapa.org

American Association of Women in Medicine
www.amwa-doc.org

American Dietetic Association
www.eatright.org

American Medical Association
www.ama-assn.org

American Nurses' Association
www.nursingworld.org

American Physical Therapy Association
www.apta.org/PTCareers/RoleofaPT

American Podiatric Medical Association
www.apma.org

American Psychology Association
www.apa.org/index

American Society of Radiologic Technologists
www.asrt.org/main/careers/careers-in-radiologic-technology

American Speech-Language-Hearing Association
www.asha.org

Bureau of Labor Statistics (information about jobs, job forecasts and more)
www.bls.gov/ooh/healthcare/home.htm

American Society of Cytopathology
cytopathology.org/page/careercytotechnology

ExploreHealthCareers.org
explorehealthcareers.org

Hearing and Speech Careers
hearingandspeechcareers.org

MedAssistantedu.org
www.medassistantedu.org

National Association of Emergency Medical Technicians
www.naemt.org

Johnson & Johnson Nursing
nursing.jnj.com

Pharmacists Advancing Health Care
www.ashp.org/Pharmacy-Technician/About-Pharmacy-Technicians/Pharmacy-Technician-Career-Overview

Top Medical Career
topmedicalcareers.net

National Phlebotomy Association
www.nationalphlebotomy.org

Ultrasound Technician and Sonographer
www.ultrasoundschoolsinfo.com/ultrasound-technician

Acknowledgments

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Michael Roytek/BSA, page 7

Wikipedia.org/FEMA/Win Henderson, courtesy—page 43 *(emergency workers)*

BSA Archives, page 65, 68

Volunteering at a local hospital or nursing home can be rewarding for you—and those you help.