Torres' Patient Care in Imaging Technology

Ninth Edition

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To Lil Torres, mentor, friend, and the original author of Medical Techniques and Patient Care*, who helped launch our successful careers as faculty in diagnostic imaging. Lil invited us to begin as contributing authors for the fifth edition—we thank you for your professional guidance.*

In loving memory of Eliseo Guillen and Mary Ann Salgado Guillen

In memory of Leslie Linn

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Preface

DEVELOPING SKILLS FOR SAFE, PERCEPTIVE, AND EFFECTIVE PRACTITIONERS

The ninth edition of *Torres' Patient Care in Imaging Technology* not only provides you with the knowledge and skills that will empower you to become safe, perceptive, and effective in providing excellent patient care but also alerts the student to real consequences of failed actions. *Focused on connecting classroom learning to clinical practice*, the text is designed to present key concepts effectively for beginning students as well as more advanced students and practitioners who want to improve their skills in patient care and imaging technology.

UPDATED, ENGAGING, AND EFFECTIVE

Torres' Patient Care in Imaging Technology will engage you with its focused, visually attractive, comprehensive approach. Outlining key concepts, current trends, and advances in imaging technology and patient care, this book uses a concise style and logical organization to ensure that crucial topics are addressed effectively and efficiently. Chapter 18 provides an introduction to patient care for other modalities such as computed tomography (CT) and sonography. The appealing full-color design breaks up the text with illustrations and pedagogic features in a way that enhances learning.

CULTURAL CONSIDERATIONS AND OTHER REAL-WORLD EXPERIENCE

Torres' Patient Care in Imaging Technology's student-centered approach is designed to take you from theory to practice quickly. The *Cultural Considerations* feature helps you become aware of the diverse cultural and ethnic backgrounds of your patients. This complements the strong pedagogic approach of *Torres' Patient Care in Imaging Technology*, which includes online situational judgment questions, skills checklists, and laboratory activities. The newly added legal considerations enforce the learning component regarding consequences of actions that are not effectively carried out and care falls below the standard practice.

AN INTEGRATED, EFFICIENT, AND EFFECTIVE LEARNING SYSTEM

Torres' Patient Care in Imaging Technology is designed to help every course become a dynamic learning experience. The concise text enables coverage of key concepts in a limited amount of time, yet it is also integrated with rich pedagogic resources that engage students, present concepts in a relevant way, and provide many ways in which to practice and build important skills. The new edition includes *real-world case studies, demonstration videos,* and *laboratory activities* to put you in situations that you will face every day on the job.

FROM THE AUTHORS

It has been almost 40 years since the first edition of this book was published. It was first named *Basic Medical Techniques and Patient Care for Radiologic Technologists*. The author, Lillian Torres, and her consultants had no idea of the degree or magnitude of changes that would take place in the profession of radiologic technology. Each edition of this book has made contributions to the profession by meeting the changing needs of students and educators in this field and by making improvements in patient care. Patient care is the foundation of medical imaging, and although health care may change, high-quality patient care should not.

The ninth edition of this book has been altered to serve the needs of the beginning student in this profession as well as those who desire advanced courses in imaging technology. It includes the latest techniques used in imaging and meets the current requirements of the American Society of Radiologic Technologists (ASRT) and the American Registry of Radiologic Technologists (ARRT). A new component of the ARRT examination is cultural diversity, and this is addressed in each chapter. With the changes in the ARRT examination that have now resulted in more questions on Patient Care, the authors feel that this book, which focuses solely on patient care, will provide the student with all aspects of knowledge needed to excel in the patient care category.

HIGHLIGHTS OF THE NINTH EDITION

- Cultural diversity is addressed in each chapter appropriately. This helps the student understand the differences in patient care that are sometimes required to respond to certain beliefs and behaviors.
- Legal considerations have been added to reaffirm the standard practice of care and that lawsuits can and do happen to the radiographer. Real-life case studies show how the radiographer can be held accountable for a "mistake" that resulted in harm to the patient.
- All chapters have been reviewed and updated to include the most current and relevant information.
- The pharmacology and drug administration chapters have been enhanced to increase the students' knowledge in these areas.
- All tables and displays have been updated; more color photos have been added and more radiographic images included to enhance information presented.
- Procedures are placed in a step-by-step format for quick and easy reference for student and instructor use.
- More call out and warning boxes have been added to provide students with notice of vital concepts.
- Infection control in imaging is stressed and includes the current threats to the health care of patients and all health care workers. Methods of protecting all involved in patient care from nosocomial infections are emphasized.
- A de-emphasis on those procedures that are less likely to be done in the imaging departments because of advances and changes in technology has been made to be more in line with real-life situations.

It is the hope of the authors that the changes in the ninth edition will assist radiologic technology students to be safe and sensitive practitioners in every aspect of patient care.

Andrea Guillen Dutton, *MEd, ARRT (R, M), CRT (R, F)*
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Acknowledgments

A textbook like this, even a revision, does not come together without the help of many people working to pull it all together. The authors would like to extend a special thankyou to those people at this time.

To the students at Blackhawk Technical College in Janesville, WI, and Chaffey College in Rancho Cucamonga, CA—Thank you! You have been the best teachers for us in helping to determine what needed to be deleted and what needed to be enhanced. You read for us and commented on the style of writing and the ease of understanding. While helping us, we hope that we have allowed you to understand the importance of your actions as a radiographer on patient care.

To Beth Pierce, RN, of Mercyhealth System in Janesville—Thank you! You provided many tools and informational resources for the cultural diversity sections of the chapters. You organized a class on patient transport that was extremely helpful and allowed pictures to be taken of the use of the disc and lateral transfer board. TerriAnn thanks you on a personal level for the guidance you provided for putting together the power points that were necessary for review.

To the reviewers who read the chapters and commented on the content, style, and organization—Thank you! You provide an invaluable service to those of us who are trying to make learning fun but still need to assure that the necessary information is presented in an educational manner.

For the professional advice from the acquisitions editors, production managers, and editorial coordinators at Wolters Kluwer/Lippincott Williams & Wilkins—Thank you! Amy Millholen, Jeremiah Kiely, Sharon Zinner, Marian Bellus, and Bharathi Sanjeev stayed on top of us with constant phone calls and reminders to keep on target. They provided encouragement when we needed it and appreciation when we deserved it.

To our families—Thank you! We owe the most to you. Without your support and understanding when we missed weekend outings and various get togethers, we could not have completed this project. We love you.

TerriAnn Ryan
Andrea Guillen Dutton

Brief Contents

Contents

User's Guide

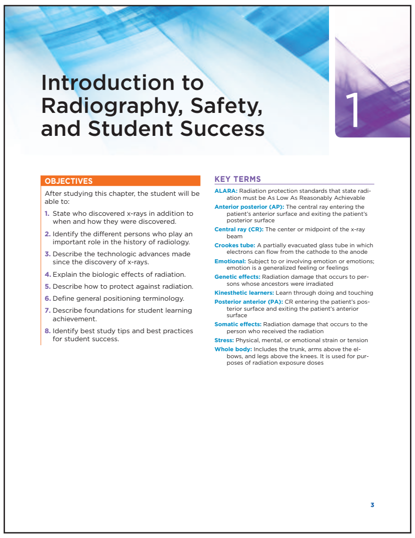
This User's Guide shows you how to put the features of *Torres' Patient Care in Imaging Technology*, Ninth Edition, to work for you.

CHAPTER-OPENING ELEMENTS

Each chapter begins with the following elements, which will help orient you to the material.

Objectives provide a quick overview of the content to be covered.

Key Terms are listed and defined at the beginning of each chapter.



Introduction to Radiography, Safety, and Student Success

1

OBJECTIVES

After studying this chapter, the student will be able to:

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2. Identify the different persons who play an important role in the history of radiology.
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5. Describe how to protect against radiation.
6. Define general positioning terminology.
7. Describe foundations for student learning achievement.
8. Identify best study tips and best practices for student success.

KEY TERMS

ALARA: Radiation protection standards that state radiation must be As Low As Reasonably Achievable

Anterior posterior (AP): The central ray entering the patient's anterior surface and exiting the patient's posterior surface

Central ray (CR): The center or midpoint of the x-ray beam

Crookes tube: A partially evacuated glass tube in which electrons can flow from the cathode to the anode

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Genetic effects: Radiation damage that occurs to persons whose ancestors were irradiated

Kinesthetic learners: Learn through doing and touching

Posterior anterior (PA): CR entering the patient's posterior surface and exiting the patient's anterior surface

Somatic effects: Radiation damage that occurs to the person who received the radiation

Stress: Physical, mental, or emotional strain or tension

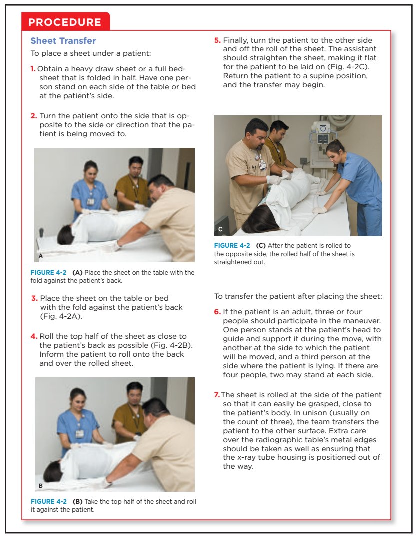
Whole body: Includes the trunk, arms above the elbows, and legs above the knees. It is used for purposes of radiation exposure doses

3

SPECIAL FEATURES

Unique chapter features will aid readers' comprehension and retention of information—and spark interest in students and faculty.

Procedure Boxes with accompanying online videos help you master the steps needed to ensure the safety of both you and your patient.



PROCEDURE

Sheet Transfer

To place a sheet under a patient:

1. Obtain a heavy draw sheet or a full bedsheet that is folded in half. Have one person stand on each side of the table or bed at the patient's side.
2. Turn the patient onto the side that is opposite to the side or direction that the patient is being moved to.

FIGURE 4-2 **(A)** Place the sheet on the table with the fold against the patient's back.

3. Place the sheet on the table or bed with the fold against the patient's back (Fig. 4-2A).
4. Roll the top half of the sheet as close to the patient's back as possible (Fig. 4-2B). Inform the patient to roll onto the back and over the rolled sheet.

FIGURE 4-2 **(B)** Take the top half of the sheet and roll it against the patient.

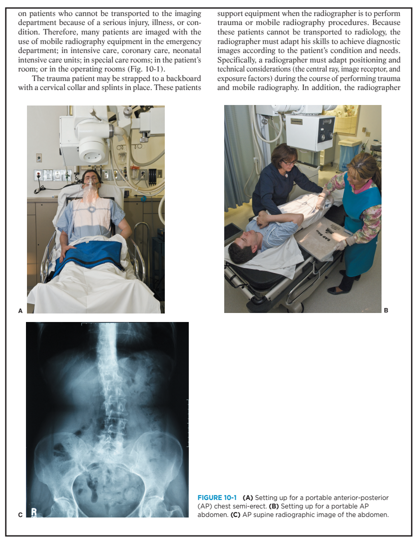
5. Finally, turn the patient to the other side and off the roll of the sheet. The assistant should straighten the sheet, making it flat for the patient to be laid on (Fig. 4-2C). Return the patient to a supine position, and the transfer may begin.

FIGURE 4-2 **(C)** After the patient is rolled to the opposite side, the rolled half of the sheet is straightened out.

To transfer the patient after placing the sheet:

6. If the patient is an adult, three or four people should participate in the maneuver. One person stands at the patient's head to guide and support it during the move, with another at the side to which the patient will be moved, and a third person at the side where the patient is lying. If there are four people, two may stand at each side.
7. The sheet is rolled at the side of the patient so that it can easily be grasped, close to the patient's body. In unison (usually on the count of three), the team transfers the patient to the other surface. Extra care over the radiographic table's metal edges should be taken as well as ensuring that the x-ray tube housing is positioned out of the way.

Full-Color Photos and Radiographic Images enable you to visualize key techniques and procedures.

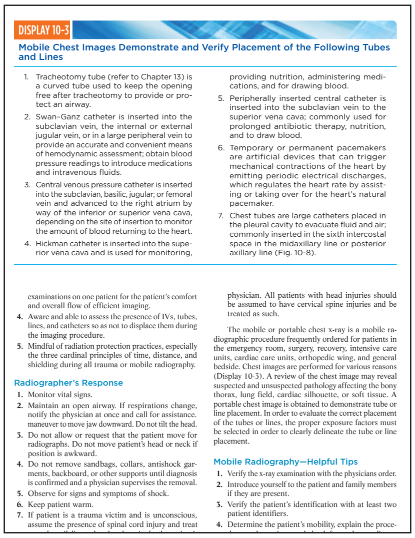


on patients who cannot be transported to the imaging department because of a serious injury, illness, or condition. Therefore, many patients are imaged with the use of mobile radiography equipment in the emergency department; in intensive care, coronary care, neonatal intensive care units; in special care rooms; in the patient's room; or in the operating rooms (Fig. 10-1).

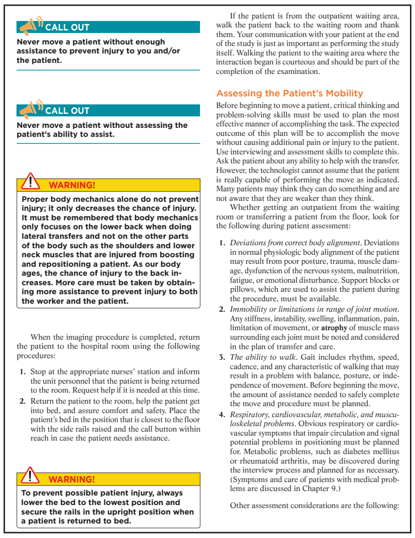
The trauma patient may be strapped to a backboard with a cervical collar and splints in place. These patients support equipment when the radiographer is to perform trauma or mobile radiography procedures. Because these patients cannot be transported to radiology, the radiographer must adapt his skills to achieve diagnostic images according to the patient's condition and needs. Specifically, a radiographer must adapt positioning and technical considerations (the central ray, image receptor, and exposure factors) during the course of performing trauma and mobile radiography. In addition, the radiographer

FIGURE 10-1 **(A)** Setting up for a portable anterior-posterior (AP) chest semi-erect. **(B)** Setting up for a portable AP abdomen. **(C)** AP supine radiographic image of the abdomen.

Display Boxes highlight important accreditation, competency, or skills information.

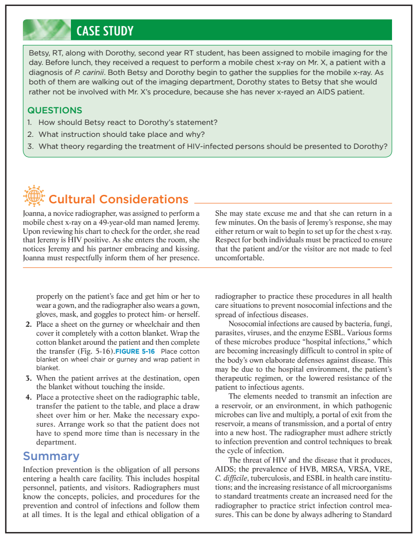


Call Out and Warning Boxes alert you to important facts and steer you away from common pitfalls.



Case Studies with Critical Thinking Questions provide practice responding to real-world situations you will encounter every day on the job.

Cultural Considerations Boxes help teach you to be aware of the diverse cultural and ethnic backgrounds of your patients.

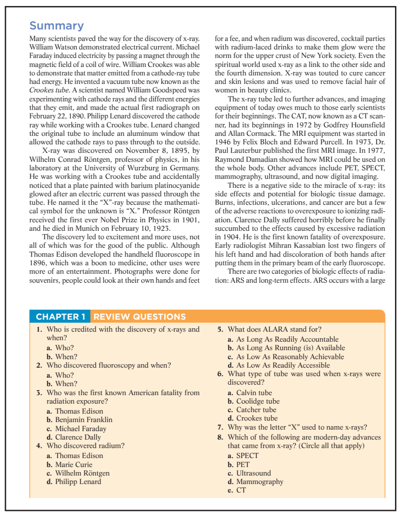


CHAPTER-CLOSING ELEMENTS

Each chapter closes with the following elements, which will help aid in further study.

A **Summary** highlights the important topics that were discussed in the chapter.

A **Chapter Test** at the end of each chapter lets you assess your knowledge and put your new skills into practice.



ADDITIONAL LEARNING RESOURCES

This powerful tool also includes a host of resources for instructors and students on companion website at http://thepoint.lww.com. See the inside front cover for details on how to access these resources.

Student Resources include videos, a question bank, audio glossary, skills checklists, lab activities, and more!

Instructor Resources include PowerPoint slides, lesson plans, an image bank, a test generator, and answers to the chapter tests and situational judgment questions.

PART I

INTRODUCTION TO IMAGING TECHNOLOGY AND PATIENT CARE

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1

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Stress: Physical, mental, or emotional strain or tension

Whole body: Includes the trunk, arms above the elbows, and legs above the knees. It is used for purposes of radiation exposure doses

Welcome to the world of diagnostic imaging technology. As you enter the classroom and begin your course of study, you will often wonder what culture and language you will encounter on the day's class session's presentation of the course's(s') content lesson. If you are studying radiologic sciences, you might believe that learning a new language might indeed be easier. The challenges that await you over your next 2 years may be intimidating, but they can be overcome with due diligence and an eye on the goal of becoming a licensed health care professional.

This chapter is an introduction to some of the elements that you will encounter in other classes that are more specifically related to the in-depth study required to pass the American Registry of Radiologic Technologists (ARRTs) examination. The remainder of the book is devoted to different types of patients that you will encounter in the imaging department and how to care for them in a compassionate and professional manner.

Now it is time to settle in and begin. Patient care will become natural to you when you realize that it is the same "language" you already speak, except for a little "adjustment to the grammar."

IN THE BEGINNING

Although one man is credited with the discovery, there were actually many pioneers who paved the way by using equipment and making improvements on the equipment that eventually led to the actual discovery.

In the early 19th century, many scientists were experimenting with electricity (discovered by Benjamin Franklin) and little else. William Watson demonstrated electrical current. Michael Faraday induced electricity by passing a magnet through the magnetic field of a coil of wire. This led to experimentation with electromagnetic induction and the advent of generators and transformers with higher voltages.

A scientist named William Goodspeed was experimenting with cathode rays and the different energies that they emit. He made the actual first radiograph on February 22, 1890; however, he did not publish his work and was therefore not credited with the actual discovery of x-ray. In the mid-1890s, Sir William Crookes, an English physicist, was studying gas, and in order to continue with his work, he created a vacuum tube. It was a glass tube that contained both positive and negative electrodes and an induction coil (Fig. 1-1). He passed high-voltage electrical currents through the tube, which would allow him to study the conductivity of gases that had been put into the tube. Crookes was able to demonstrate that matter emitted from a cathode-ray tube had enough energy to turn a wheel that was located in the tube. Shortly afterward, Philipp Lenard, a German scientist, discovered the cathode ray while he was working with a **Crookes tube**. Lenard changed the original tube to include an aluminum window that allowed the cathode rays to pass through to the outside. During one of his experiments, a piece of barium platinocyanide soaked paper glowed when the rays were directed at it. Unfortunately for him, Lenard failed to further investigate what made the paper glow, thus allowing Wilhelm Conrad Röntgen to make the discovery only a few months later.

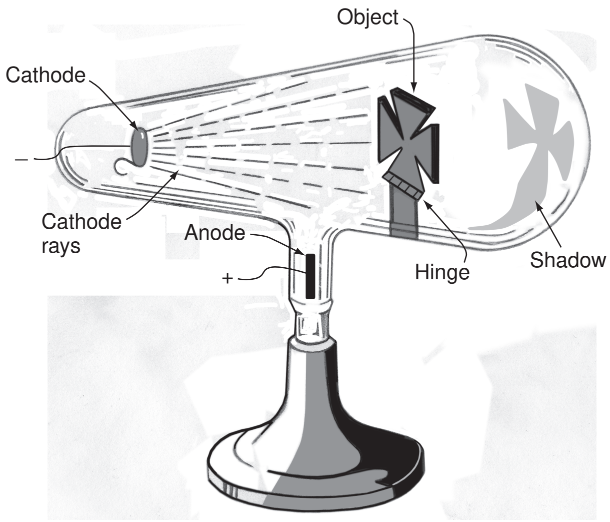

FIGURE 1-1 An early tube created by Dr. Crookes and used by scientists to investigate the nature of light.

A New Kind of Ray

The discovery of x-ray has had a significant effect not only on medicine but also on travel, the food industry, industrial equipment, sterilization of products and insects, and other commercial uses.

Dr. Wilhelm Conrad Röntgen was not the model of scientists. He never received his high school diploma, was well known to be absentminded, and would spend his time alone rather than with others in the pursuit of science. Röntgen was an assistant to Dr. August Kundt, a physicist at the University of Zurich. Later, he became an instructor at the University of Strasbourg. Although he was not well thought of as an instructor, he enjoyed and excelled at creating laboratory experiments that held outstanding results.

In 1888, Röntgen was offered the job of head of the physics department at the University of Wurzburg in Germany. He kept up his projects of cathode ray experiments with the Crookes tube after he accepted this offer of employment. On the evening of November 8, 1895, Röntgen was working with his Crookes tube in his basement laboratory. The tube was sitting on a bench, and across the room lay a plate that had the letter "A" painted on it with barium platinocyanide. The lights were dim so that he could see any change in gas color or electric current through the tube. When an electric current was passed through the tube, Röntgen noticed that the plate on the opposite side of the room was "glowing" and he could readily see the letter "A." Röntgen knew that this was not from any kind of light or electricity but had to be caused by something coming from the tube. Röntgen did not know what he had produced, but only that it was some type of ray, which he named the "X"-ray because the mathematical symbol for the unknown is "X."

Continuing with his experimentation over the next 6 weeks, he was able to reproduce the fluorescence with each passage of current through the tube despite the various objects that were placed between the plate and the tube. One of the things that were placed in front of the plate was a wooden box with metal weights inside. The ray did not pass through the entire box, but left a shadow on the plate. In December, Röntgen held a metal pipe in front of the plate and noticed the fingers of his hand were reflected on the screen. It was at this time that he persuaded his wife to allow him to take the now famous radiograph of her hand. On December 28, 1895, Röntgen submitted his report called "On a new kind of rays" to the Wurzburg Physico-Medical Society. Wilhelm Röntgen received the first ever Nobel Prize in Physics in 1901 for this world-changing discovery. He died in Munich on February 10, 1923, just a month shy of his 78th birthday.

Early Uses

In those early years, the scientific world talked of nothing but x-ray and cathode-ray tubes. Thomas Edison was just as caught up in the mania as everyone else. In 1896, he developed a handheld Crookes tube with a screen at one end and an eyepiece at the other. He called this new invention a *Vitascope*. It was the first fluoroscope and the forerunner of all of today's fluoroscopy tubes.

Everyone wanted in on the excitement. Demonstrations were held in Bloomingdale's and Macy's in New York City; entertainment came in the form of x-ray machines that allowed the patron to view the bones of his or her hand for a coin put in the slot. Portrait studios offered x-rays of hands entwined to newly married couples to give as wedding souvenirs. At this time, the dangers were not known, and the novelty of seeing bones of the body continued to increase the demand for the phenomenon. Even the spiritual world used x-ray as a link to the other side and the fourth dimension. After the discovery of radium by Marie Pierre Curie in 1898, the upper crust of society would throw radium parties where the cocktails were laced with radium, the lights would be lowered, and the guests could watch their drinks glow in the dark!

X-ray was touted to cure cancer and skin lesions and was used to remove facial hair of women in beauty clinics. However, x-ray did have the most obvious use in medicine. As the negative side of x-ray use became apparent, it was soon realized that hospitals had to take control of the use of x-ray. Boston Hospital was the first to take control by making actual rooms for the use of x-ray and "training" people to take those x-rays. By 1905, Boston Hospital had five full-time technicians operating the equipment and taking medical x-rays.

Advances

As the gas tubes were improved and a vacuum was created, the modern tube was born. The newer tubes were stable, more flexible, and safer than the traditional tube used in the past. It was these advances that made possible the invention of the new imaging equipment used today. One such piece of equipment is the computerized axial tomography (CAT) machine. In 1972, Godfrey Hounsfield and Allan Cormack created an x-ray tube that encircled the patient who was lying on a table. Although the first scans took hours to complete, the advances have improved the equipment to today's standards that ensure an entire body is scanned in less than 5 minutes.

In similar fashion, the magnetic resonance imaging (MRI) equipment was started in 1946 by Felix Bloch and Edward Purcell. In 1972, Dr. Paul Lauterbur first described the MRI technique in medicine and published the first MRI image in 1973. In 1977, Raymond Damadian showed how MRI could be used on the **whole body**. MRI works similarly to computer tomography (CT) but does not use radiation to image the body. Other advances in the field of x-ray are positron emission tomography (PET), single-photon emission CT (SPECT), mammography, and ultrasound. Not only has the field advanced with new modalities, but x-ray itself has gone from film to digital images. More than a century after it was discovered, the importance of x-ray continues to grow and the technology continues to amaze.

EARLY EFFECTS OF RADIATION

The x-ray was seen as a miracle to the world of medicine when it was discovered in 1895. In fact, it was the negative side of the miracle that was beginning to show itself. In the early 1900s, many problems, such as burns, infections, swelling, and cancer, finally forced the scientists to reinvestigate the whole process of x-ray and how it worked. Even amputations had to occur because of the lesions caused by overexposure to x-ray. Thomas Edison's assistant and good friend Clarence Dally lost all of his hair, all of the fingers on both hands, and finally both of his hands before he finally succumbed to the effects caused by excessive radiation. He was in constant pain and finally died in 1904. He is the first known fatality of overexposure. Edison himself complained of skin rashes and sore eyes. It was this event that caused Edison to stop his work on radiation and start to look at the problems it caused. X-ray technicians fell victim to the terrible side effects. Twenty-eight Americans suffered the fatal effects from experimentation.

Early radiologist Mihran Kassabian photographed the horrible effects to his hands in hopes that future technicians would not suffer the same deformities. Kassabian was an early radiologist who would hold the fluoroscope with his right hand and put his left hand into the beam to show the patient that there was nothing to be afraid of. After months of constant exposure, the third and fourth fingers of the left hand had to be amputated.

The public was frightened when it became aware of these deaths and demanded that something be done. Physicians tried to calm the patients by telling them that they could not be harmed. The damage had been caused by overexposure to electricity, allergies, and even circumstances of the ozone created by static, excessive heat, and moisture. Scientists, on the other hand, knew that the x-ray was the cause and warned against its unwarranted use. If it must be used, lead shielding should be applied. Figure 1-2 shows the early protective suits and metal helmets that were introduced to protect against x-radiation.

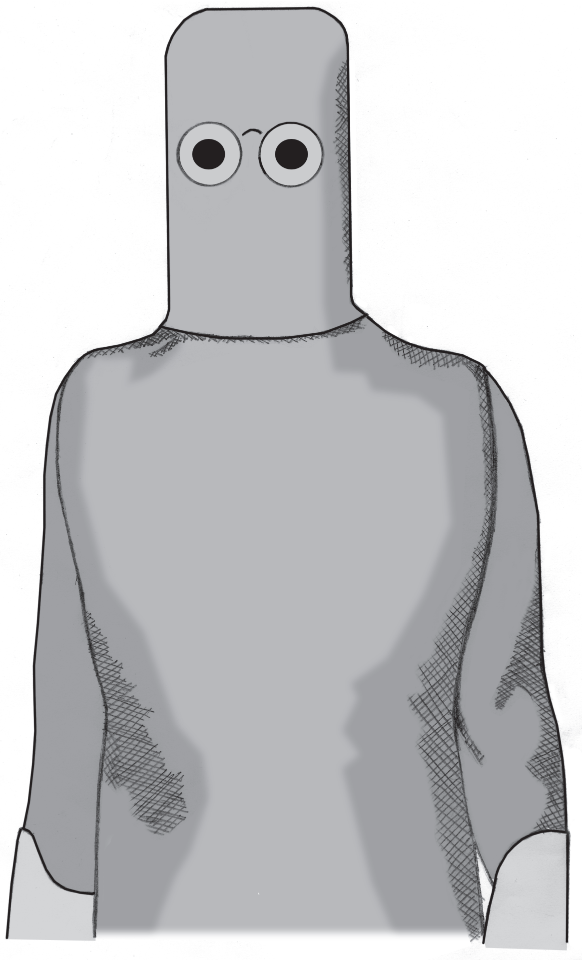

FIGURE 1-2 Early protective suits and metal helmets. These met with little enthusiasm for use.

Genetic and Somatic Effects of Radiation

Studies done on people throughout the years who were exposed to radiation have led to a greater understanding of what effects can happen through the use of radiation. Scientists concluded that the effects of radiation had to be broken down into two categories: acute (early) radiation syndromes (ARS) and long-term effects. ARS occurs with a large dose (larger than 100 R) to the whole body. These effects will cause varying degrees of damage to the body up to and including death.

Long-term effects will occur years after the radiation was administered, sometimes as long as 25 to 30 years afterward. There are two main categories of long-term effects: genetic and somatic effects.

Genetic effects are those that are manifested in persons born of people who were actually irradiated. They might not show for several generations because several criteria must be met before the mutations can be seen. Genetic effects were first studied on fruit flies in 1927 by Hermann Muller. After exposing both male and female flies to radiation in increasing doses, Muller studied the effects it had on the offspring. Others studied irradiated mice in 1946 to continue the investigation into the effects of the offspring.

Somatic effects are those damages that will occur to the person who received the radiation. The types of cells that receive the radiation will help determine the type of effect that manifests itself. Cells that are young, rapidly dividing, undifferentiated, and oxygen rich are more radiosensitive than others. The effects that are considered long term are carcinogenesis, cataractogenesis, and life-span shortening. Each of these conditions will occur based on the location of the radiation received and the amount of radiation that passed through the patient.

RADIATION PROTECTION

Protection from radiation exposure is two-fold: protection for the patient and protection for the occupational worker. The National Council on Radiation Protection and Measurement (NCRP) established dose limits for both the patient and the occupational personnel. These dose limits must not be exceeded. The current annual occupational dose limit is 5 rem (50 mSv). In 2009, NCRP no. 160 determined that the new annual dose limit should be 2 rem because continuing long-term studies have continued to indicate that radiation is three to four times more damaging than originally thought. Although the NCRP is currently reviewing the dose limits, the limit remains at 5 rem. The annual dose limit for the general public is one-tenth the amount of the occupational dose: 0.5 rem (5 mSv). Students in radiology training younger than 18 years have an annual dose limit of 0.1 rem (1 mSv).

DISPLAY 1-1

Effective Dose Limits for Different Populations Receiving Radiation

The following groups of people have maximum annual effective dose limits:

Occupational	5 rem	50 mSv
General public	0.5 rem	5 mSv
In training <18	0.1 rem	1 mSv
Pregnant worker	0.5 rem	5 mSv (in a 9-month period)
	0.05 rem	0.5 mSv (in any given month)

Pregnant workers are allowed to receive 0.5 rem (5 mSv) in a 9-month gestation period and 0.05 rem (0.5 mSv) in any given month. Radiation workers are allowed to receive more per year than the general population because the workforce is a much smaller group as compared with the general public. In addition, radiation personnel are taught the safety measures necessary to protect themselves from large doses. Display 1-1 shows the effective dose limits for each of the different populations receiving radiation.

In order to observe these protection standards, the concept of **A**s **L**ow **A**s **R**easonably **A**chievable (ALARA) must always be practiced. The three parts of this concept include time, distance, and shielding.

Occupational Protection

First, it is important to know that the major source of radiation dose to the occupational worker is the patient! Scatter radiation coming from the patient travels in all directions. Looking at each one of the three concepts of ALARA will provide insight into the logic of personnel protection. "Time" refers to the time in the radiography room while the beam is energized—known as *beam on-time*. The longer the patient is irradiated, the more scatter that is produced and the more radiation the worker receives. The obvious solution is not to be in the same room as the patient; however, this is not always possible. When it is not, the technologist and other personnel should be in the room for no more than the required amount of time necessary to achieve a quality image.

If the technologist and others are not able to leave the room, then the second concept of ALARA should be practiced—distance. The farther away from the source (the patient) the technologist is, the less radiation that is received. A law that will be memorized and must be completely understood by the student is the inverse square law, which states that the intensity of the radiation is inversely proportional to the square of the distance of the object from the source. In other words, if the technologist stands 2 ft from the patient and receives an exposure of 1 mR per hour, the technologist will receive one-fourth of the exposure if he or she moves back to 4 ft from the patient. It is not hard to see that the farther away from the patient the technologist is, the lesser the radiation dose that the latter will receive.

Finally, shielding is a concept that must always be adhered to. Shields are aprons that can be worn over the arms and tied in the back, or short overcoat and skirt type that will protect the worker from all sides. The shields are made of lead and must be no less than 0.25 mm of lead (Pb) (Fig. 1-3). Shields of this lead weight will absorb 97% of all radiation below 50 kVp. An apron of 0.5 mm Pb will absorb 99% of the radiation. Any time the technologist or other personnel must be in the room, an apron must be worn as added protection in addition to staying away from the primary beam if the patient must be held in place for the image. Other protective apparel includes lead goggles, gloves, and thyroid shields, as pictured in Figure 1-4.

Patient Protection

The dose received by the patient will depend not only on the exposure factors (kVp and mAs) set by the technologist but also on the size of the field irradiated, sometimes known as the field of view, the number of images taken, and the location of the area of interest. Patients can be protected by two of the three ALARA concepts: time and shielding. Distance cannot play a part in protection for the patient because the patient must be in the primary beam at specific distances that will produce a diagnostic radiographic image. Therefore, the other two concepts plus two other important factors are the main ways to provide protection for the patient.

Time is also a limited means of providing protection for the patient. The technical factors that are set include mA (current) and s (time). The higher the current, the shorter the time; however, this does not lessen the dose to the patient because the dose is related to the mAs

FIGURE 1-3 Lead aprons and thyroid shields that are worn today during radiographic and fluoroscopic procedures. Note that the radiation monitor is *outside* the lead apron and thyroid shield.

(combined factors), not the individual parts. How then does time provide protection? In fluoroscopic examinations, time being exposed to the radiation is certainly a factor; however, in conventional radiography, time can be reduced by the number of images (exposures) that are taken. Repeat images create repeat exposures and thus increase the dose.

Shielding is an excellent means to protect the patient if the shield will not interfere with the anatomy of interest. If there is a possibility that the shield will be in the way and obscure the anatomy, it is best not to use the shield and avoid a repeat exposure. National law requires that gonadal shielding be used if the gonads of the patient are within 5 inches of the primary beam.

CALL OUT

It is best to get into the practice of always shielding every patient for every examination, regardless of age or gender.

FIGURE 1-4 Lead gloves should also be worn as indicated for increased protection.

There are two other important concepts that must be discussed that will provide for the patient at least as much protection as ALARA. The first is communication. Basic communication with the patient about the procedure, what to expect, and directions on moving and breathing before the exposure is made can go a long way in preventing repeat exposures caused by patient movement. The second concept is collimation of the primary beam. In fact, collimation is the most important concept in providing radiation protection to the patient. Collimation reduces scatter, increases contrast, and provides a more quality image than one that has the collimation open to the size of the image receptor (IR). Collimating off body parts that are not of interest keeps those parts from being exposed. There is no need to expose to unnecessary radiation parts of the patient's body that are not part of the examination.

CALL OUT

Collimation is not the same as cropping with the postprocessing manipulation of digital equipment. Anything that is done after the exposure has not reduced the amount of radiation that the patient originally received. Collimate—do not crop!

INTRODUCTION TO GENERAL RADIOGRAPHIC POSITIONING TERMINOLOGY

Standard terminology is used to describe positioning a patient for various examinations and procedures that physicians order for the diagnosis and treatment of injuries

DISPLAY 1-2

General Radiographic Positioning Terms and Definitions

Anatomic position	The patient is standing upright, facing forward with arms fully extended and palms forward.
Supine	The patient is lying face up.
Prone	The patient is lying face down.
Recumbent	The patient is lying face up, face down, or in any position.
Upright or erect	The patient is standing or sitting.
Decubitus	The patient is lying in any position, and the CR is horizontal.
AP	The CR enters the patient's anterior and exits the patient's posterior.
PA	The CR enters the patient's posterior and exits the patient's anterior.
Right lateral	The patient's right side is closest to the image receptor (IR) or detector.
Left lateral	The patient's left side is closest to the IR or detector.
Right anterior oblique (RAO)	The patient is rotated toward the right with the right side closest to the IR and the left side away from the IR or detector.
Left anterior oblique (LAO)	The patient is semiprone or rotated with the patient's left side closest to the IR and the right side farthest from the IR or detector.
Right posterior oblique (RPO)	The patient is semiprone or rotated with the patient's right posterior side closest to the IR and left side farthest from the IR or detector.
Left posterior oblique (LPO)	The patient is semiprone or rotated with the patient's left posterior side closest to the IR and the right side farthest from the IR or detector.
Dorsal decubitus	The patient is lying on his or her back, and the CR is horizontal.
Ventral decubitus	The patient is lying face down, and the CR is horizontal.
Right lateral decubitus	The patient is lying on his or her right side, and the CR is horizontal.
Left lateral decubitus	The patient is lying on his or her left side, and the CR is horizontal.

or illness. The ARRT has defined radiographic position and radiographic projection. The radiographic position refers to a specific body position, such as supine, prone, recumbent, erect, or Trendelenburg (Display 1-2). These terms refer to the patient's physical position and describe the way the patient is placed to achieve an outcome radiographic image. Radiographic projection is limited in the definition as the path of the x-ray **central ray** (CR). The CR enters and exits the patient before the image is captured, which is the radiographic position. **Posterior anterior** (PA) is an example of radiographic projection, because the CR would be entering the patient's back, or posterior, and exiting the patient's front side, or anterior, thereby forming a PA projection. Just the opposite would be an **anterior posterior** (AP) projection. Other radiographic body positions used for various examinations include lateral, obliques (right and left), decubitus (ventral, dorsal, right, and left lateral), axial, and tangential. The obliques are further described as right and/or left anterior obliques or right and/or left posterior obliques (Fig. 1-5).

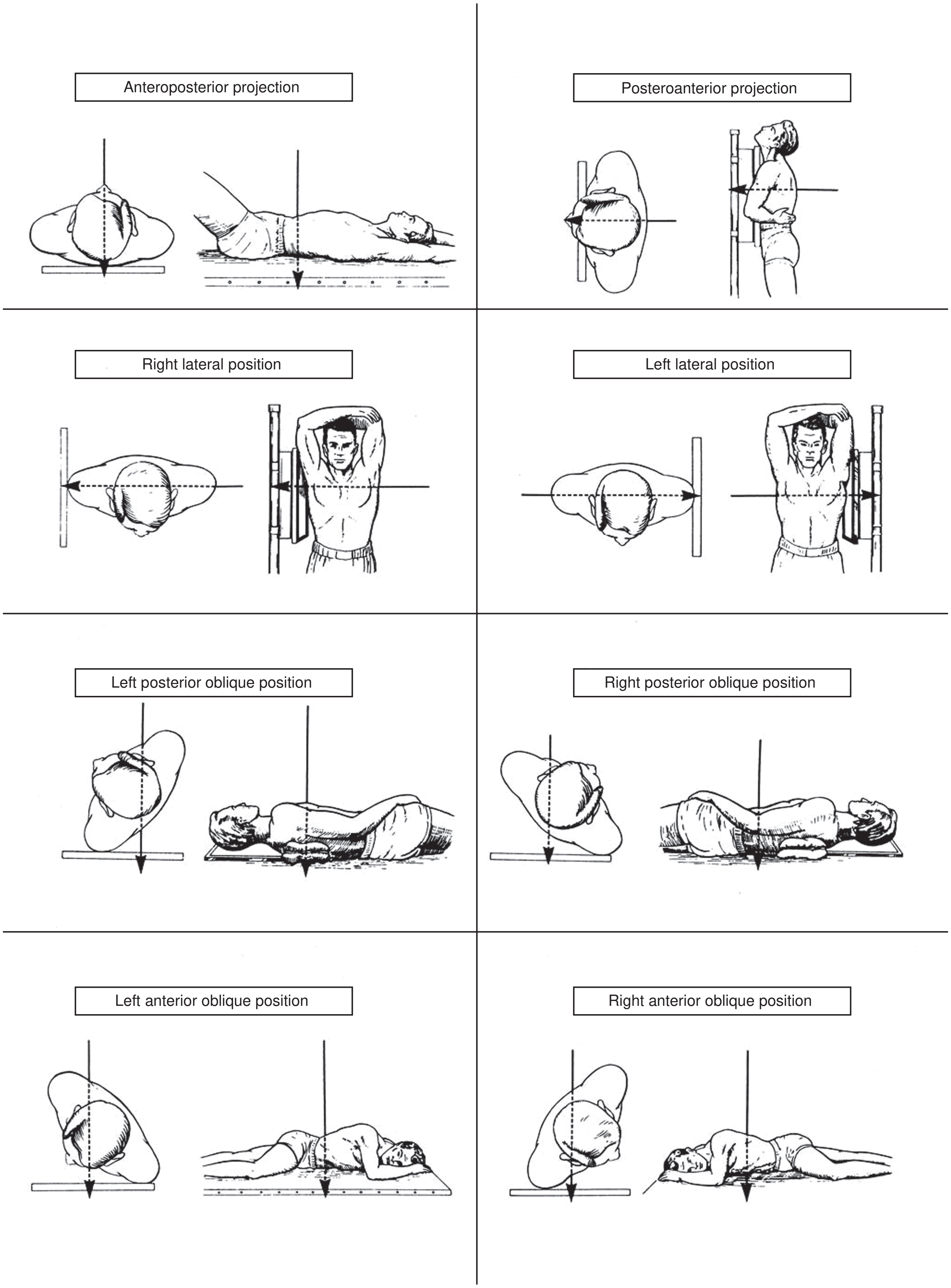

FIGURE 1-5 Projections and positions. (Used with permission from The American Registry of Radiologic Technologists. © 2007. The ARRT does not review, evaluate, or endorse publications or other educational materials. Permission to reproduce ARRT copyrighted materials should not be construed as an endorsement of the publication by the ARRT.)

FOUNDATIONS FOR STUDENT LEARNING ACHIEVEMENT

One must consider several essential elements before beginning any course of study to achieve student success. Four elements are presented in this section for students to take into account for their learning achievement. It is recommended that one take time to review his or her educational, **emotional**, physical wellness, and financial preparedness before beginning the rigor of an imaging program. Maintaining a healthy balance with your education, family, friends, emotions, physical wellness, and financial obligations is a goal the imaging student should not take for granted. Although students have been successful in completing courses required to begin an imaging program, imaging students often state that they were not prepared for the impact the imaging program has on their entire life. Often cited is the amount of time the successful student must spend each week in lectures, laboratories, clinical hours, and study for 2 concurrent years.

Educational and Emotional Preparedness

There will be much to balance in terms of time commitment for the educational demands in attending classes, laboratories, clinical time, and study time, which will impact you emotionally at one time or another. A full-time load translates into more than 40 hours dedicated to attending the required courses and study time. It is important to share with significant family members and friends as much as possible about the new program and career you are about to embark on, because the time you are able to spend with them will most probably be reduced. Initially, the time you are able to spend with them will be impacted, because you will need more of a time commitment for studying than what is anticipated. Without the understanding and support of your close circle of family and friends, it will be very challenging to be successful. Your family and friends will need to be a strong support system during your tenure as an imaging student, so that you can successfully achieve your goal of becoming a radiographer. It is essential to include your loved ones in your educational pursuits by sharing your course materials, such as course descriptions, syllabi, texts, assignments, or any information available that will give them insight into the content and complexities of what you are studying.

CALL OUT

An excellent opportunity to include your significant other in your educational process is available in practicing positioning skills on willing family members or friends.

In addition to your existing support system of family and friends, you will develop new relationships with your classmates. You will need your family and friends to understand the importance of these new relationships to facilitate your learning. It is imperative you inform your family that you will be expected to collaborate on group projects and form study groups throughout the program.

You will spend many hours with your classmates in and out of class studying. Some family members and friends realize the importance of classmates studying together to facilitate the learning process, and thus they recognize the time you spend with classmates is valid. It is your responsibility to alleviate the anxiety your family members and friends may experience as a result of the new collegial relationships that will develop by explaining its importance for your effective learning.

Physical Wellness and Financial Preparedness

Physical and mental health balance will affect your ability to be successful as a student and later in the workplace. Before beginning a program, students are required to undergo a physical examination conducted by a physician, which includes immunizations, laboratory work, and passing drug testing to ensure health status. By maintaining physical wellness, students will have the energy needed to complete the 2-year program. At times, students relate being tired as a result of the demands of studying, clinical hours, and life in general. Toward the end of the semester, some students feel run down and tired, and become ill or comment that they are not getting enough sleep. At all times, it is important for the radiography student to keep physical wellness in mind, which includes eating balanced meals, sleeping right, exercising, and managing **stress**.

A contributing factor to stress is often financial. The amount of savings needed to supplement your income for 2 years is sometimes underestimated. You will need to develop a realistic budget that subtracts housing (rent or mortgage), utilities, transportation/vehicle, clothing allowance, student costs (tuition, texts, supplies, and other fees), child care, food, entertainment, and electronic media (smartphones) from your income. Remember most students cannot realistically work full time the entire 2 years they are in the program, and therefore the income that can be generated as a full-time student must be carefully analyzed to forecast realistically. Students should consider exploring the financial services and resources available through the colleges and universities. Many students are eligible for fee waivers, grants, scholarships, and loans. Taking advantage of the financial resources can help you augment your budget plan and reduce your financial stress.

How Does the Successful Student Prepare to Begin a Program?

- Taking a learning styles survey inventory test
- Managing stress using a variety of strategies
- Identifying how to effectively manage your time for your academic and personal growth
- Using study tips best practices that are most effective for you

Learning Styles

What are learning styles? Learning styles are various approaches of learning. Learners are tactile or **kinesthetic learners**, auditory learners, and visual learners. Learning styles can easily be evaluated with an online inventory test. After taking a learning style assessment, the results will identify your strengths and weakness and provide you with specific strategies to help individuals learn. Knowing your learning style(s) informs you how you learn and what works best that will translate into effective and efficient learning tools one can use throughout the program. Identifying strengths and weaknesses with a learning styles assessment has two benefits: taking advantage of strengths for learning and developing coping strategies in areas of weakness.

Managing Stress

Taking a stress management course before beginning the program would be extremely advantageous. Stress will occur at various times throughout the program, whether in your life as an imaging student or your personal life. The ability to positively control stress by taking an action developed as a result of practicing stress reduction strategies will alleviate expending unnecessary emotions, time, and energy. Stress reduction activities include physical activities (walking, running, or exercising), yoga, meditation, relaxation, imagination, listening to music, journaling, and spending time with a friend; breathing exercises help manage or reduce stress.

Being organized will greatly impact stress reduction. The well-organized student learns better and eliminates a contributing factor to stress. All students can benefit from organization skills as simple as organizing a notebook binder or electronic files for each course with sections for the syllabus, lecture notes, handouts, quizzes, tests, and study notes. Once the course has been completed, the notebook binder or electronic file will be organized and ready for review in preparation for the ARRT examination after the program completion.

Organize by developing a master calendar of important dates for quizzes, exams, written report, presentation, or other assignments for each course for the semester or quarter. This will give you an overview of what is expected of you and when assignments are due. Knowing and reviewing the calendar periodically leaves no room for surprises and therefore less stress.

Keeping track of all grades in terms of points and/or percentage for each course will give you an exact view of your standing in each course. It is important to compare your calculations with the instructor of record for validation. By knowing your grade at any given time, you can reduce your stress because you will know the facts instead of stressing the unknown. In some cases, the grade may be higher than perceived, but the student may be experiencing undue stress from not knowing the actual grade. If your grade needs improvement, you will need to set goals to do what it takes to meet higher benchmarks for higher grades. You will need to determine whether your study time is sufficient for success in the program throughout the program.

Time Management

The ability to manage time so as to allocate sufficient and appropriate time to activities for both the personal and the academic life is essential for the successful student. Learning or study time is a valuable commodity, and, therefore, maximum use of available time must be fundamentally managed. Students have full lives, jobs, families, and other responsibilities and obligations in addition to their full-time academic commitments. Priorities must hence be established before the start of the program, and once established, these priorities should be honored by removing obstacles that get in the way. Eliminate distractions by finding ways to free up your time for what is important to you. Included in this section is a time management grid to help track your daily activities for a week (Display 1-3).

Be realistic when estimating the time you spend on the following activities:

- Sleeping
- Eating
- Working
- Caring for children or other family members
- Performing school activities (class and study time)
- Running errands
- Traveling to and from destinations
- Conducting personal activities (personal hygiene, shopping, exercising)
- Social media and gaming activities
- Performing household chores (meal preparation, cleaning, and laundry)
- Socializing (church, clubs, etc.)

The weekly overview of the time spent in a typical week hour by hour will assist you in determining whether you have an adequate amount of time to undertake and accomplish your day-to-day activities with the additional responsibility of being a successful full-time student. Typically, adjustments are made after having a visual of

DISPLAY 1-3

Time Management Grid

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
5:00 a.m.							
6:00 a.m.							
7:00 a.m.							
8:00 a.m.							
9:00 a.m.							
10:00 a.m.							
11:00 a.m.							
12:00 p.m.							
1:00 p.m.							
2:00 p.m.							
3:00 p.m.							
4:00 p.m.							
5:00 p.m.							
6:00 p.m.							
7:00 p.m.							
8:00 p.m.							
9:00 p.m.							
10:00 p.m.							
11:00 p.m.							
12:00 a.m.							
1:00 a.m.							
2:00 a.m.							
3:00 a.m.							
4:00 a.m.							

how time is being spent for a week. Some find that they can successfully complete all responsibilities and still have time left over. This scenario will reduce anxiety and stress, especially if there was a perception of not having enough time before tracking daily activities. On the other hand, if the time management results show not enough time is spent on the highest priorities, adjustments to the time spent on specific activities can be made. It is important to ensure that once you have a workable schedule, stick to it. It is also recommended that you assess your time management schedule every so often according to short- and long-term goal adjustments.

Study Tips Best Practices

To complete a radiology technology program, the successful student must keep the goal of becoming an imaging technologist first and foremost. Being persistent, realistic, and conscientious in pursuing your goal will be accomplished with the right attitude and practices. Some of the fundamentals for successfully completing a program include using methods that are well known to provide the greatest impact for student learning. Good examples of study tips best practices are listed on Display 1-4. These activities will support results for course completion and overall program completion.

DISPLAY 1-4

Study Tips Best Practices

1. Read the reading assignments before the class session at least once.
2. Know what are the overall course objectives and specific class session objectives to use as a road map for your learning.
3. Take notes during the class sessions and use color highlighters to emphasize topics.
4. Ask questions during class if you are not sure about something, or make an appointment to meet with the instructor to ask questions.
5. Make notations in your textbooks, whether hard copies or e-texts.
6. Study at least 2 hours for each class hour, but break up your study time into segments.
7. Attend the instructor's office hours or make an appointment to meet with the instructor even if you think you know and understand the material.
8. Join a study group and meet once a week. The recommendation is a maximum of three participants. Each participant should come prepared to contribute to the study session and to keep on task studying.
9. Independent study time should take place in a comfortable environment as identified in your learning styles assessment.
10. Play music in the background; for some, the music will help you to focus.
11. Determine whether you learn the material best by writing it down or word processing the information.
12. Keep your study material organized at all times to minimize the time it takes to get organized before you begin to study.
13. Plan on studying every day instead of studying once or twice a week for 10 to 12 hours at a time.
14. Develop acronyms or statements to recall information.

Summary

Many scientists paved the way for the discovery of x-ray. William Watson demonstrated electrical current. Michael Faraday induced electricity by passing a magnet through the magnetic field of a coil of wire. William Crookes was able to demonstrate that matter emitted from a cathode-ray tube had energy. He invented a vacuum tube now known as the *Crookes tube*. A scientist named William Goodspeed was experimenting with cathode rays and the different energies that they emit, and made the actual first radiograph on February 22, 1890. Philipp Lenard discovered the cathode ray while working with a Crookes tube. Lenard changed the original tube to include an aluminum window that allowed the cathode rays to pass through to the outside.

X-ray was discovered on November 8, 1895, by Wilhelm Conrad Röntgen, professor of physics, in his laboratory at the University of Wurzburg in Germany. He was working with a Crookes tube and accidentally noticed that a plate painted with barium platinocyanide glowed after an electric current was passed through the tube. He named it the "X"-ray because the mathematical symbol for the unknown is "X." Professor Röntgen received the first ever Nobel Prize in Physics in 1901, and he died in Munich on February 10, 1923.

The discovery led to excitement and more uses, not all of which was for the good of the public. Although Thomas Edison developed the handheld fluoroscope in 1896, which was a boon to medicine, other uses were more of an entertainment. Photographs were done for souvenirs, people could look at their own hands and feet for a fee, and when radium was discovered, cocktail parties with radium-laced drinks to make them glow were the norm for the upper crust of New York society. Even the spiritual world used x-ray as a link to the other side and the fourth dimension. X-ray was touted to cure cancer and skin lesions and was used to remove facial hair of women in beauty clinics.

The x-ray tube led to further advances, and imaging equipment of today owes much to those early scientists for their beginnings. The CAT, now known as a CT scanner, had its beginnings in 1972 by Godfrey Hounsfield and Allan Cormack. The MRI equipment was started in 1946 by Felix Bloch and Edward Purcell. In 1973, Dr. Paul Lauterbur published the first MRI image. In 1977, Raymond Damadian showed how MRI could be used on the whole body. Other advances include PET, SPECT, mammography, ultrasound, and now digital imaging.

There is a negative side to the miracle of x-ray: its side effects and potential for biologic tissue damage. Burns, infections, ulcerations, and cancer are but a few of the adverse reactions to overexposure to ionizing radiation. Clarence Dally suffered horribly before he finally succumbed to the effects caused by excessive radiation in 1904. He is the first known fatality of overexposure. Early radiologist Mihran Kassabian lost two fingers of his left hand and had discoloration of both hands after putting them in the primary beam of the early fluoroscope.

There are two categories of biologic effects of radiation: ARS and long-term effects. ARS occurs with a large dose to the whole body and can cause death. Long-term effects will occur up to 30 years after the radiation was administered. There are two main categories of long-term effects: genetic and somatic effects.

Genetic effects are those that are manifested in persons born of people who were the ones actually irradiated. Somatic effects are those damages that will occur to the person who received the radiation. The effects that are considered long term are carcinogenesis, cataractogenesis, and life-span shortening.

Radiation protection must include both the patient and the occupational worker. The NCRP established the following dose limits:

- Annual dose limit for occupational worker is 5 rem.
- Annual dose limit for general public is 0.5 rem.
- Annual dose limit for radiology students younger than 18 years of age is 0.1 rem.
- Nine-month dose limit for pregnant workers is 0.5 rem.
- Monthly dose limit for pregnant workers is 0.05 rem.

The major source of radiation dose to the occupational worker is the patient. Scatter radiation coming from the patient travels in all directions. ALARA must always be practiced to prevent excessive radiation doses and, possibly, their exceeding the set limits. The three parts of this concept include time, distance, and shielding.

"Time" refers to the time in the radiography room while the beam is energized. If at all possible, the technologist or other occupational workers should not be in the room with the patient. If this is not possible, then distance from the patient must be maintained as seen by the inverse square law. As the distance from the source increases, the intensity of the beam decreases by the square of the distance. Personnel protective apparel includes lead aprons, gloves, thyroid shields, and eye goggles. The minimum thickness for these is 0.25 mm of lead.

The dose received by the patient will depend on the exposure factors selected (kVp and mAs), the size of the field irradiated, the number of images taken, the location of the area of interest, and whether collimation and shielding were used. Basic communication with the patient about the procedure, what to expect, and directions on moving and breathing before the exposure is made can help prevent repeat exposures.

General positioning terminology is used in radiology to describe a variety of positions the patient will be placed in to demonstrate specific areas of interest for examinations as ordered by physicians. The outcome images will assist in making the diagnosis for the treatment of injuries or illness.

Before beginning a 2-year radiography program, the student must reflect on how his or her learning can be maximized for effectiveness and efficiency, how to better manage their time and use study tip best practices for success.

CHAPTER 1 REVIEW QUESTIONS

1. Who is credited with the discovery of x-rays and when?
   a. Who?
   b. When?
2. Who discovered fluoroscopy and when?
   a. Who?
   b. When?
3. Who was the first known American fatality from radiation exposure?
   a. Thomas Edison
   b. Benjamin Franklin
   c. Michael Faraday
   d. Clarence Dally
4. Who discovered radium?
   a. Thomas Edison
   b. Marie Curie
   c. Wilhelm Röntgen
   d. Philipp Lenard
5. What does ALARA stand for?
   a. As Long As Readily Accountable
   b. As Long As Running (is) Available
   c. As Low As Reasonably Achievable
   d. As Low As Readily Accessible
6. What type of tube was used when x-rays were discovered?
   a. Calvin tube
   b. Coolidge tube
   c. Catcher tube
   d. Crookes tube
7. Why was the letter "X" used to name x-rays?
8. Which of the following are modern-day advances that came from x-ray? (Circle all that apply)
   a. SPECT
   b. PET
   c. Ultrasound
   d. Mammography
   e. CT

9. What were the early uses of x-ray? (Circle all that apply)
   a. Hair removal
   b. Cocktail parties
   c. Souvenirs
   d. Spiritual connections
10. What law describes the relationship between intensity of the beam and distance from the source?
11. What is better for patient protection, collimation, or cropping of the digital image?
12. Fill in the chart with the annual dose limits for each group of individuals.

Groups of Individuals	Rem/year
Radiology students younger than 18 years	
General public	
Occupational workers	
Pregnant workers	Rem/gestational period

13. What is the minimum thickness used for lead aprons, gloves, and thyroid shields?
   a. 2.5 mm Pb
   b. 2.5 mm Al
   c. 0.5 mm Pb
   d. 0.25 mm Pb
14. What are the two categories of effects that can result from exposure to ionizing radiation? (Circle the two right answers)
   a. Genetic effects
   b. Somatic effects
   c. Long-term effects
   d. ARS
15. Which of the following relates to the persons who are exposed to irradiation? (Circle the right answer)
   a. Genetic effects
   b. Somatic effects
16. What is the definition of CR?
17. For a left lateral decubitus, the patient is
   a. Standing
   b. Recumbent
   c. Lying on their right side
   d. Lying on their left side
   e. b, c, and d
18. Name four elements to consider for student success.
19. Why is it important to inform your family and friends about the demands of the radiology program?
20. Why should one practice stress reduction activities?
21. Define emotion.
22. When determining time management, which activities should be included?
23. What is the purpose of the time management grid?
24. In this situational judgment question, circle the answer that is most appropriate, and put an "X" through the answer that is the least appropriate.

    A young child is brought into the imaging department for a skull radiograph after having fallen. The child's mother and father have accompanied him. After assessing the situation, you realize that you need help immobilizing the child. The first thought is the parents. You question the mother regarding pregnancy and find out that she is 2 months pregnant. In regard to radiation protection for you, the patient, and the parents, you do which of the following? (Remember "X" for least appropriate; "O" for most appropriate)
   a. You give an apron to the mother and father to have them hold the infant while you take the first x-ray.
   b. You have the mother wait out in the waiting room, give an apron to the father to have him hold. You expose the first x-ray, but find motion on the image. It has to be redone.
   c. You have the mother wait out in the waiting room, give the father an apron, get another technologist to expose the images, and you put on an apron, gloves, goggles, and thyroid shield, and hold the patient.
   d. You send both parents into the waiting room, while you struggle with holding the infant still and have another technologist take the x-rays.
   e. You employ the help of a technologist to take the x-rays and another technologist to help immobilize the patient with you. You send the mother out of the room and give an apron to the father, so that he can calm the infant down by being in sight; while you and the other technologist wear aprons, lead gloves, thyroid shields, and goggles and both stay out of the primary beam.

Professional Issues

2

OBJECTIVES

After studying this chapter, the student will be able to:

1. List the criteria of a profession and explain how the profession of imaging technology has evolved to meet these criteria.
2. List the members of the health care team with whom the radiographer may frequently interact and briefly describe the role of each.
3. Discuss the purpose of professional organizations and explain why the radiographer should join the professional organizations in his field.
4. Explain Practice of Standards and professional growth in radiologic technology.
5. Define ethics and discuss ethics as it applies to radiologic technology.
6. Explain the legal obligations that the radiographer has toward patients, peers, and other members of the health care team.
7. Define the terms *respondeat superior, res ips loquitur.*
8. Define the *Patient Care Partnership,* and *A Patient's Bill of Rights*.
9. Explain the ethical and legal aspects of patients regarding confidentiality and informed consent.
10. Describe the legal responsibilities of the radiographer regarding patient identification, immobilization, and manipulation of electronic data.

Continued on next page

KEY TERMS

Adhere: To stay fixed or firm

Bias: An inclination or temperament based on personal judgment; prejudice

Bioethics: Moral issues dealing with the ethical issues of human life, health care, and death

Common law: Decisions and opinions of courts that are based on local customs and habits of an area within a particular country or state

Continuing education (CE): Professional education received following completion of a training program to maintain skills

Defaming: To attack or injure a person's reputation

Diagnostic imaging: Modern term for radiography, encompassing all specialties devoted to producing an image of a body part

Ethical: Conforming to the standards of conduct of a given profession or group

Holistic: The view that an organic or integrated whole has a reality independent of and greater than the sum of its parts

Immobilization device: A piece of equipment that ensures restricting patient movement

In-service: Training given to employees in connection with their work or profession to update or maintain knowledge

Liability: Something that a person is obligated to do or an obligation required to be fulfilled by law; usually an obligation of financial nature

Malpractice: Professional negligence that is the cause of injury or harm to a patient

Mentor: A teacher, coach, or advisor of conduct

Practitioner: Any individual practicing in a specific area or discipline

Preceptor: A teacher; directs action or conduct of another individual (a supervisory individual while involved in "on-the-job training")

Profession: A calling that requires specialized knowledge and intensive academic preparation

Continued on next page

11. Explain the need for professional malpractice insurance.
12. Describe the patient's need for confidentiality and the legal implications for the radiographer.
13. Explain the need for accurate documentation in health care and the radiographer's obligations in this aspect of health care.
14. List and define the current methods of health care delivery in the United States.

Radiographer: A radiologic technologist who uses critical thinking, problem solving, and judgment to perform diagnostic images

Regulatory compliance: Control of a situation or group of laws that supervise a profession

Statutory law: Established law that is enacted by a legislative body and punishable by the court system

Therapeutic: Healing or palliative

Unethical: Not conforming to the standards of conduct of a particular profession or group

A profession is defined as a body of work that meets specific criteria and characteristics. Any profession can be said to

- contain a unique body of knowledge;
- have relevance to social values;
- require long specialized education;
- be motivated to serve the needs of the community versus the needs of oneself;
- be organized into associations that help guide the profession;
- have set performance standards;
- maintain a level of public trust and confidence; and
- be made up of people who are motivated by a strong service desire and commitment to competence.

Radiologic technology has evolved to meet the criteria of a **profession**. As in all professions, radiographers are expected to **adhere** in conduct and behavior to the particular **ethical** and legal standards of the field. Any persons who do not adhere to this code may lose their license as well as the privileges of the profession.

As a **radiographer**, one will not work alone in caring for the patient. One will work and interact with members of a health care team whose goal is to improve or restore the patient to good health. The health care team consists of physicians, nurses, therapists, social workers, and others, all of who work within their scope of practice and are accountable for performing their professional responsibilities.

Students who have made the decision to enter the profession of radiologic technology need to understand that they are making the commitment to accept the code of ethics of this profession and must work within the scope of practice. They must also understand they are accountable for how they perform as a radiographer and may be held legally liable for any errors made while caring for patients.

Radiologic technology is a profession oriented toward the diagnosis and treatment of trauma and disease. This means the radiologic technologist (radiographer) will work in intimate contact with people on a daily basis. A technologist must be prepared to work collaboratively with people of all cultures, religions, and socioeconomic backgrounds and to relate to them in an unbiased, nonjudgmental manner.

Anyone contemplating a career in radiologic technology needs to examine the reasons why this profession was chosen. It would be helpful to ask oneself the following questions before proceeding:

- "Am I prepared to accept and practice the profession of radiologic technology and support the American Registry of Radiologic Technologists (ARRT) and American Society of Radiologic Technologist (ASRT) Standards of Ethics?"
- "Am I prepared to avoid violations of the law in practicing this profession?"
- "Will I be willing and able to learn to relate to my patients in a professional and nonjudgmental manner at all times?"

If these questions cannot be answered positively, this career choice should be reconsidered.

CRITERIA FOR A PROFESSION

Radiologic technology has evolved from an undereducated workforce of x-ray technicians in the early 1900s to the continued advances as a profession in the 21st century (Display 2-1). This progression took place over decades with the efforts and dedication of the persons who worked in this field. These dedicated people, known as **practitioners**, are united by criteria that identify them as a profession. These criteria were summarized by Chitty (2005) as the following:

1. A vital human service is provided to the society by the profession.
2. Professions possess a special body of knowledge that is continuously enlarged through research.
3. Practitioners are expected to be accountable and responsible.

DISPLAY 2-1

Chronology of Events in the History of the Radiologic Technology Profession

1895	Wilhelm Conrad Roentgen discovered x-rays in Wurzburg, Germany.
1920	The American Association of Radiological Technicians, the first society for the profession, was created by a group of technologists in Chicago, Illinois. The society was dedicated to the advancement of radiologic technology.
1921	The society's first annual meeting was held. Membership totaled 47.
1922	The American Registry of Radiological Technicians originated.
1930s–1940s	Radiographer education was primarily by apprenticeship.
1932	The name of the American Association of Radiological Technicians was formally changed to the American Society of X-ray Technicians (ASXT).
1936	The ASXT was authorized to make appointment to the Registry Board of Trustees.
1952	The ASXT provided a basic minimum curriculum for training schools.
1955	The ASXT created a new membership category—fellow of AXST—which recognized individual members who have made significant contributions to the profession.
1959	The ASXT membership reached 8,600.
1960	Registry applicants were required to have at least 2 years of training or experience.
1963	The American Registry of Radiological Technicians changed its name to the American Registry of Radiologic Technologists (ARRT).
1964	The ASXT changed its name to the American Society of Radiologic Technologists (ASRT).
1966	Registry applicants were required to be graduates of training programs approved by the American Medical Association's Council on Medical Education.
1967	The Association of University Radiologic Technologists was established to stimulate an interest in radiologic technology through the academic environment.
1968	The Society membership reached 14,000. 1970 Registry Certificate No. 1 was awarded by the Registry to Sister Mary Beatrice.
1984	The Association of University Radiologic Technologists changed its name to The Association of Educators in Radiological Sciences (AERS).
1988	The Summit on Radiologic Sciences and Sonography met in Chicago to develop strategies to alleviate the personnel shortage in the profession.
1995	The ARRT announced that, beginning in 1995, x-ray technologists would henceforth be obligated to obtain 12 CE units per year to maintain their licenses.
1996	The Society membership reached 47,000.
1997	ARRT marked its 75th anniversary.
1998	ASRT launched an aggressive campaign to protect patients from overexposure to radiation during radiologic procedures and help reduce the costs of health care.
2001	ASRT introduced a bill, known as the Consumer Assurance of Radiologic Excellence (CARE) bill, during the 2001 congressional session to ensure that the people performing radiologic examinations are qualified.
2002	ASRT membership reached 100,000.
2003	CARE bill reintroduced.
2005	CARE/RadCARE bill was enacted.
2006	RadCARE (S.B. 2322) bill was introduced and passed unanimously. AERS changes its name to reflect its commitment to educators in all modalities. It is now known as Association of Educators in Imaging and Radiological Sciences (AEIRS).
2009	CARE Bill reintroduced (HR 3652). Cited as the "Consistency, Accuracy, Responsibility, and Excellence in Medical Imaging and Radiation Therapy Act of 2009."

4. The education of professionals takes place in institutions for higher education.
5. Practitioners have an independent function and control their own practice.
6. Professionals are committed to their work and are motivated by doing well.
7. A code of ethics guides professional decisions and conduct.
8. A professional organization oversees and supports standards of practice.

All professions have a code of ethics and professional organizations that control the educational and practice requirements of its members. The two organizations that assume these roles for radiographers are the ASRT and the ARRT. If applicable, the professional radiographer is registered by ARRT and by state licensure or certification.

Radiologic technology fulfills the basic requirements of a profession and is becoming increasingly autonomous in professional practice. The status of a profession demands certain responsibilities and educational requirements that former "x-ray technicians" did not possess. An individual contemplating radiologic technology as a profession must examine the criteria of a profession listed above to make certain that there is a willingness to uphold the high standards of a professional. These standards include responsibility, accountability, competence, judgment, ethics, professionalism, and lifelong learning. The professional radiographer is expected to demonstrate all these qualities.

PRACTICE STANDARDS AND PROFESSIONAL GROWTH IN RADIOGRAPHY

The ASRT *Practice Standards for Medical Imaging and Radiation Therapy* is a guide for the appropriate practice, assists in developing job descriptions, and promotes role definition for practitioners. The Practice Standards define the practice and establish general criteria to determine compliance (Display 2-2). Practice Standards are authoritative statements established by the profession for judging the quality of practice, service, and education. It includes expected and achievable levels of performance against which actual performance can be assessed. Radiographers are the primary liaison between patients, licensed independent practitioners, and other members of the health care team. Radiographers must remain sensitive to the

DISPLAY 2-2

American Society of Radiologic Technologist—Radiography Practice Standards—June 25, 2017

Radiographer—General Requirements

Radiographers must demonstrate an understanding of human anatomy, physiology, pathology, and medical terminology.

Radiographers must maintain a high degree of accuracy in radiographic positioning and exposure technique. They must possess, apply and maintain knowledge of radiation protection and safety. Radiographers independently perform or assist the licensed practitioner in the completion of radiographic procedures. Radiographers prepare, administer, and document activities related to medications in accordance with state and federal regulations or lawful institutional policy.

Radiographers are the primary liaison between patients, licensed independent practitioners, and other members of the support team. Radiographers must remain sensitive to the needs of the patient through good communication, patient assessment, patient monitoring, and patient care skills. As members of the health care team, radiographers participate in quality improvement possesses and continually assess their professional performance.

Radiographers think critically and use independent, professional, ethical judgment in all aspects of their work. Radiographers engage in continuing education to include their area of practice to to enhance patient care, public education, and technical competence.

Radiographer Scope of Practice

The scope of practice of the medical imaging and radiation therapy professional includes:

- Providing optimal patient care.
- Receiving, relaying and documenting verbal, written and electronic orders in the patient's medical record.

DISPLAY 2-2

American Society of Radiologic Technologist—Radiography Practice Standards—June 25, 2017 (*continued*)

- Corroborating a patient's clinical history with procedure and ensuring information is documented and available for use by a licensed practitioner.
- Verifying informed consent for applicable procedures.
- Assuming responsibility for patient needs during procedures.
- Preparing patients for procedures.
- Applying principles of ALARA to minimize exposure to patient, self and others.
- Performing venipuncture as prescribed by a licensed practitioner.
- Starting, maintaining and/or removing intravenous access as prescribed by a licensed practitioner.
- Identifying, preparing and/or administering medications as prescribed by a licensed practitioner.
- Evaluating images for technical quality, ensuring proper identification is recorded.
- Identifying and responding to emergency situations.
- Providing education.
- Educating and monitoring students and other health care providers.
- Performing ongoing quality assurance activities.
- Applying the principles of patient safety during all aspects of patient care.

The scope of practice of the radiographer also includes:

1. Performing diagnostic radiographic and noninterpretive fluoroscopic procedures as prescribed by a licensed practitioner.
2. Optimizing technical exposure factors in accordance with the principles of ALARA.
3. Assisting the licensed practitioner with fluoroscopic and specialized radiologic procedures.

Radiography Clinical Performance Standards

The clinical performance standards define the activities of the individual responsible for the care of patients and delivery of diagnostic or therapeutic procedures. This section incorporates patient assessment and management with procedural analysis, performance and evaluation.

Standard One—Assessment: The radiographer collects pertinent data about the patient the procedure.

Standard Two—Analysis/Determination: The radiographer analyzes the information obtained during the assessment phase and develops an action plan for completing the procedure.

Standard Three—Education: The radiographer provides information about the procedure and related health issues according to protocol.

Standard Four—Performance: The radiographer performs the action plan.

Standard Five—Evaluation: The radiographer determines whether the goals of the action plan have been achieved.

Standard Six—Implementation: The radiographer implements the revised action plan.

Standard Seven—Outcomes Measurement: The radiographer reviews and evaluates the outcome of the procedure.

Standard Eight—Documentation: The radiographer documents information about patient care, the procedure, and the final outcome.

Quality Performance Standards

The quality performance standards define the activities of the individual in the technical areas of performance such as equipment and material assessment, safety standards, and total quality management.

(*continued*)

DISPLAY 2-2

American Society of Radiologic Technologist—Radiography Practice Standards—June 25, 2017 (*continued*)

Standard One—Assessment: The radiographer collects pertinent information regarding equipment, the procedures, and the work environment.

Standard Two—Analysis/Determination: The radiographer analyzes information collected during the assessment phase to determine the need for equipment, procedures, or the work environment.

Standard Three—Education: The radiographer informs the patient public, and other health care providers about procedures, equipment, and facilities.

Standard Four—Performance: The radiographer performs quality assurance activities.

Standard Five—Evaluation: The radiographer qualifies assurance results and establishes an appropriate action plan.

Standard Six—Implementation: The radiographer implements the quality assurance action plan for equipment, materials, and processes.

Standard Seven—Outcomes Measurement: The radiographer assesses the outcome of the quality management action plan for equipment, materials, and processes.

Standard Eight—Documentation: The radiographer documents quality assurance activities and results.

Radiography Professional Performance Standards

The professional performance standards define the activities of the individual in the areas of education, interpersonal relationships, self-assessment and ethical behavior.

Standard One—Quality: The radiographer strives to provide optimal patient care.

Standard Two—Self-assessment: The radiographer evaluates personal performance.

Standard Three—Education: The radiographer acquires and maintains current knowledge in clinical practice.

Standard Four—Collaboration and Collegiality: The radiographer promotes a positive and collaborative practice atmosphere with other members of the health care team.

Standard Five—Ethics: The radiographer adheres to the profession's accepted ethical standards.

Standard Six—Research and Innovation: The radiographer participates in the acquisition, dissemination of knowledge, and the advancement of the profession.

physical and emotional needs of the patient through effective communication, patient assessment, monitoring, education, documentation, and patient safety and care skills. Radiographers use independent, professional, ethical judgment and critical thinking. Quality improvement and customer service allow the radiographer to be a responsible member of the health care team by continually assessing professional performance (ASRT, 2016). Radiographers engage in **continuing education** (CE) to enhance patient care, public education, knowledge, and technical competence while embracing lifelong learning. In addition, the radiographer must include professional values in effective oral and written communication skills, critical thinking and problem-solving skills, and a broad knowledge base in developing technology.

The preparatory education for the radiographer has evolved from a hospital-based **preceptor** training to formal educational programs. Hospital-based programs, as well as college- or university-based programs of study, are now available. To become a registered radiographer, one must successfully complete an accredited educational program.

Programmatic accreditation by the Joint Review Committee on Education in Radiologic Technology (JRCERT) ensures that the program will provide the knowledge and skills for quality patient care in compliance with the JRCERT accreditation standards. Currently, approved and accredited programs operate under six standards, effective January 1, 2014. Included in the six standards are 53 objectives that educational programs must clearly present documentation ensuring compliance. The initial accreditation process for a program takes about 18 to 21 months from the receipt of the application/self-study reports. The accreditation process has several steps, which include a site visit, report of team findings, response to report of findings, and program notification of accreditation. Initial accreditation is for 3 years. Eight years is the maximum number of years awarded to established programs; thereafter, accredited programs provide periodic self-studies and interim reports. Site visits of the educational programs are conducted by JRCERT.

The formal educational programs include the didactic and clinical competency requirements. Two-year certificate, associate degree, and 4-year baccalaureate degree programs are available in the United States. Upon successful completion of a recognized, accredited formal educational program in radiologic technology, candidates are eligible to participate in the ARRT national certification examinations.

Radiography program curriculum includes an extensive set of courses for the production of diagnostic images for interpretation by a radiologist. The course work includes anatomy, patient positioning, exposure techniques, equipment protocols, radiation safety, radiation protection, and basic patient care. Entry-level radiographer's general requirements include the following skills and abilities:

1. Apply modern principles of radiation exposure, radiation physics, radiation protection, and radiobiology to produce diagnostic images.
2. Demonstrate knowledge of medical terminology, pathology, anatomy (cross-sectional and topographic), and physiology.
3. Maintain a high degree of accuracy in radiographic positioning.
4. Provide direct patient care.
5. Evaluate recognized equipment malfunctions.
6. Evaluate radiographic images.
7. Correctly document as required.
8. Effectively communicate with other members of the health care team.
9. Provide patient and family education.
10. Demonstrate knowledge of the use of contrast media and drug administration.

In addition, the entry-level radiographer must possess the following qualities: an ability to think in a critical manner; a willingness to participate in lifelong learning (including becoming an active member of professional organizations); ethical behavior (from a holistic caregiver perspective); a broad computer knowledge base; problem-solving skills; and the ability to communicate effectively orally and in writing.

As one becomes more experienced, the radiographer will possess all of the qualities and abilities listed above. With continued experience and training, radiographers may also obtain the abilities to

supervise, evaluate, and counsel staff;

plan, organize, and administer professional development activities;

utilize superior decision-making and problem-solving skills to assess situations and identify solutions for standard outcomes;

promote a positive, collaborative atmosphere in all aspects of radiography;

act as a **mentor**; and

provide knowledge in areas of **in-service** and/or CE, and **regulatory compliance**.

The knowledge to become a competent and independent radiographer is gained as the student nears the end of the educational process. Another guide is available to help the radiographer determine what is professional and what should be done in the work force. This document is called the ASRT Radiographer Scope of Practice (Display 2-3). It is closely related to the Standards of Practice. If there is any question as to the course of action that a radiographer should take, this document is a good guide.

As a health care professional, one must acquire and maintain current knowledge to preserve a high level of expertise. CE will provide educational activities to enhance knowledge, skills, performance, and awareness of changes and advances in the field of radiologic technology. CE supports professionalism, which fosters quality patient care.

Previously voluntary for radiographers, CE became a mandate in 1995 for all who are licensed by ARRT. The radiologic technologist is required to earn 24 CE credits. These credits must be accepted by ARRT and are to be earned every 2 years. The licensing body must verify these credits before license renewal. CE credits, such as seminars, conferences, lectures, departmental in-service education, directed readings, home study, and college courses, may be achieved by participating in educational activities that meet the criteria set forth by ARRT and approved by the ASRT. By participating in CE activities, professional knowledge and professional performance are enhanced, which ensures a higher standard of patient safety and care. Twenty-four credits may also be earned by taking an entry-level examination in another eligible discipline that was not previously passed. The entry-level examinations are in radiography, nuclear medicine, or radiation therapy. Another way to earn 24 credits is by passing an advanced-level examination in the field after proving eligibility. The advanced-level examinations are in mammography, cardiovascular-interventional technology, magnetic resonance, computed tomography, quality management, bone densitometry, and sonography.

In January 2018, the ARRT implemented the Continuing Qualification Requirements (CQR) for all technologists that were certified in 2011 and after. The ARRT stresses that this is not a test but a structured self assessment that evaluates the abilities and knowledge of the radiographer based on the examination content of that current year.

The candidate has three years to complete the requirements. While the continuing education requirements remain, most of the prescribed CQR until will serve as the required biennium CE.

DISPLAY 2-3

ASRT Radiographer Scope of Practice: Clinical Scope of Practice (Revised September 2017)

1. Obtains relevant information from all available resources and the release of information as needed.
2. Verifies patient identification and the procedure requested or prescribed.
3. Verifies that the patient has consented to the procedure.
4. Reviews all available patient medical record information to verify the appropriateness of the procedure requested or prescribed.
5. Verifies the patient's pregnancy status.
6. Assesses factors that may negatively affect the procedure, such as medications, patient history, insufficient patient preparation, or artifact-producing objects.
7. Recognizes signs and symptoms of an emergency.
8. Selects the most appropriate and efficient action plan after reviewing all pertinent data and assessing the patient's abilities and condition.
9. Employs professional judgment to adapt imaging and therapeutic procedures to improve diagnostic quality and therapeutic outcomes.
10. Consults appropriate medical personnel to determine a modified action plan.
11. Determines the need for and selects supplies, accessory equipment, shielding, positioning, and immobilization devices.
12. Determines the course of action for an emergent situation.
13. Determines that all procedural requirements are in place to achieve a quality diagnostic or therapeutic procedure.
14. Provides an accurate explanation and instructions at an appropriate time and at a level the patient and their care providers can understand. Addresses questions and concerns regarding the procedure.
15. Refers questions about diagnosis, treatment, or prognosis to a licensed independent practitioner.
16. Provides patient education.
17. Explains effects and potential side effects of medications.

PROFESSIONAL ORGANIZATIONS IN RADIOLOGIC TECHNOLOGY

Participation in professional organizations is the responsibility of all practicing professionals, regardless of their field. Membership in professional organizations provides a pathway to continued successful professional development. It also provides comprehensive opportunities to remain current in a constantly changing technologic career. Professional organizations provide pathways for technical growth and the development of leadership skills as well as an arena for professional interaction and problem solving, especially in career issues. The mission statement for ASRT is "to advance the medical imaging and radiation therapy profession and to enhance the quality of patient care." ASRT offers many program and member services, including CE opportunities, publications, career information and resources, events, meeting, conferences and seminars, government relations and legislative monitoring and advocacy, group professional **liability** insurance, and other member benefits and services. In addition, ASRT works with professional certification bodies and accreditation agencies for radiographers. Ultimately, membership in professional organizations enables the radiographer to continue providing quality patient health care in accordance with the standards of the profession.

The radiographer must understand that there are professional societies, certification and licensing boards, and accreditation organizations. The differences might seem obscure; however, it is important to know the difference if one is to be a professional. As an example, a radiographer cannot "belong" to the ARRT because it is not a society, but rather it is the certification board that determines if an individual is qualified to practice the profession of radiography. The different organizations and certification boards are listed below. Although this is not an exhaustive list, it will give the student radiographer an idea of the many different acronyms that one will hear while involved in the field.

- American College of Radiology (ACR) is the principal organization of radiologists, radiation oncologists, and clinical medical physicists in the United States.
- American Hospital of Radiology Administrators (AHRA) is the professional organization representing management at all levels of hospital imaging.
- American Medical Association (AMA) is a voluntary association of physicians, which sets standards for the medical profession and advocates on behalf of the physician and the patient.
- American Registry of Diagnostic Medical Sonographers (ARDMS) is an independent organization that administers examinations and awards to qualified ultrasound professionals.
- American Registry of Radiologic Technologists (ARRT) is the largest credentialing organization that seeks to ensure the highest quality patient care in radiologic technology.
- American Society of Radiologic Technologists (ASRT) is the professional organization for radiologic science professionals.
- Association of Collegiate Educators in Radiologic Technology (ACERT) is a society in which membership is voluntary (like the ASRT). This organization was founded to improve the quality of education in radiologic technology. It is one of several societies that have a focus on education. The annual conference normally has three educational tracks: one for the didactic educator, one for the clinical educator, and one for the student radiographer.
- Association of Educators in Imaging and Radiologic Sciences (AEIRS) is another society that was founded to meet the needs of the educator.
- International Society of Radiology (ISR) is a voluntary society with the mission to facilitate the global endeavors of the member organizations to improve patient care and population health through medical imaging. Joint Commission (aka the Commission [TJC]) accredits and certifies health care organizations and institutions in the United States.
- JRCERT is the accrediting board that recognizes the quality of education in radiology. Students graduating from a JRCERT-approved program will be allowed to sit for the qualifying certification exam.
- Nuclear Medicine Technology Certification Board (NMTCB) is a certification board that was formed for the purpose of creating and maintaining examinations in nuclear medicine. Once an individual successfully completes this examination, he or she will be given the right to have the initials NMT (nuclear medicine technologist) after his or her name.

THE HEALTH CARE TEAM

The radiographer will interact on a daily basis with peers in diagnostic imaging and with other members of the health care team. The list that follows is not exhaustive but will give the student a short list of some of the individuals that will be part of daily interactions (Display 2-4).

PROFESSIONAL ETHICS

Ethics may be defined as a set of moral principles that govern one's course of action. *Moral principles* are a set of standards that establish what is right or good. All individuals have a personal code of ethics that evolves on the basis of their cultural and environmental background—the same background that has taught us to place *values* on behaviors, as well as on objects in our environment, that is, to assign a judgment of either good or bad to an action, behavior, or object.

Ethics is a combination of the attributes of honesty, integrity, fairness, caring, respect, fidelity, citizenship, competence, and accountability. The terms "ethics," "principles," and "values" are closely linked and may be used interchangeably from time to time.

Bioethics is a branch of ethics that was established because of the advanced technical methods of prolonging life. Bioethics blends philosophy, law, history, and theology with medicine. When coined in 1971, it referred to biology and bioscience with knowledge. Now, it refers to much more complex and controversial choices that range from difficult decisions to prolong life or honor a "do not resuscitate" order, to stem cell research. An individual in the field of radiology may not be called upon to act upon these "bioethical decisions" that are found in health care; however, the radiographer's exposure to these ideas in the medical field may influence one's own beliefs and ethics.

The student entering the profession of radiologic technology brings a personal code of ethics, moral principles, and personal values. All professionals have a set of professional values, and all professionals have a set of ethical principles or a code of ethics that governs professional behavior. This is true of radiologic technology.

The Standard of Ethics is made up of two parts: the Code of Ethics and the Rules of Ethics. The Code of Ethics was developed, revised, and adopted by ASRT and ARRT on September 1, 2017. It serves as a guide in maintaining ethical conduct in all aspects of the radiologic sciences. Considered to be mandatory and enforced by ARRT, the 20 Rules of Ethics are designed to promote protection, safety, and comfort of the patient (Display 2-5).

Together, these documents represent the application of moral principles and moral values to the practice of the profession and are considered to be the minimum acceptable

DISPLAY 2-4

The Health Care Team

Members of other health care professions with whom the radiographer will interact are:

Physicians: A doctor of medicine or osteopathy. They often specialize in a specific area of practice and, following licensing, are able to prescribe and supervise the medical care of the patient.

Registered nurses: Provide patient care, which is often required 24 hours a day. They also provide home health care and case management, educate, act as a patient advocate, administer medications and treatments as ordered by physicians, monitor the patient's health status, and coordinate and facilitate all patient care when the patient is hospitalized. Advance practice nurses work as clinical nurse specialists and nurse practitioners.

Vocational nurses: Work with patients under the supervision of a registered nurse. The training is the same for these licenses. The term "vocational" nursing is used in the states of Texas and California, whereas the term "practical" nursing is used in the rest of the United States.

Occupational and physical therapists: Members of a profession who work in the rehabilitative area of health care.

Pharmacist: Prepares and dispenses medications and oversees the patient's drug therapy.

Respiratory therapist: Maintains or improves the patient's respiratory status.

Laboratory technologist: Analyzes laboratory specimens for pathologic conditions.

Social workers: Counsel patients and refer them for assistance to appropriate agencies.

There are also many unlicensed assistive personnel including nursing assistants, ward clerks, pharmacy technicians, ECG technicians, and many more.

standards of conduct. They are concerned with the duties and responsibilities that the radiographer must have toward self, patients, and professional peers and associates. These responsibilities deal with rights and correlated responsibilities and are discussed in the following section.

Unfortunately, as the world of health care becomes increasingly complex and the ability to prolong life expands, there are more difficult choices to be made. This leads to a growing number of ethical conflicts and dilemmas. The radiographer will not be immune to these. Professional standards of ethics must be adhered to at all times, even though doing so may, at times, present difficult problems to be resolved.

Ethical Philosophies

There are three basic ethical philosophies from which ethical principles are derived. These are *utilitarianism, deontology,* and *virtue*. Utilitarianism is often called *consequentialism* and advocates that actions are morally correct or right when the largest number of persons is benefited by the decision made. For example, a large accident occurs and a number of persons are critically injured. The triage team assigns a higher priority to the less injured patients and, since the chance of survival is less for the most severely injured, attends last to those who are critically injured. This is an acceptable philosophy if one benefits from the decision. In this example, the important element is the result of the action. This is based on the principle known as *teleological theory* (meaning end or completion). In other words, it is based on consequences with the highest good with the greatest happiness for the largest number of people.

Deontology upholds the philosophy that rules are to be followed at all times by all individuals. Deontology comes from a Greek word meaning "duty"; therefore, deontology requires that one judge an action by deciding if it is an obligation. When making decisions using this school of thought, one generally does not take consequences into consideration even if it proves to be beneficial to the patient. Following the rules at all times may be too restrictive, especially when specific circumstances surrounding a situation do not fit in a set of rules. An example of deontology is illustrated by the accident portrayed earlier. Because the health care provider has the duty to "do no harm," assigning a low priority number to the most critical patients would be wrong. Deontology and utilitarianism being more or less opposite, the more critically injured patients would get the highest priority and the most likely to survive would be attended to last, with the assumption that they would survive longest without care.

Virtue is a philosophical belief that focuses on using wisdom rather than emotional and intellectual problem

DISPLAY 2-5

American Registry of Radiologic Technologist—Standards of Ethics

Last revised: September 1, 2017

Published: September 1, 2017

Preamble

The *Standards of Ethics* of the American Registry of Radiologic Technologists shall apply solely to persons holding certificates from ARRT that are either currently registered by ARRT or that were formerly registered by ARRT (collectively, Certificate Holders), and to persons applying for examination and certification by ARRT in order to become Certificate Holders ("Candidates"). Radiologic Technology is an umbrella term that is inclusive of the disciplines of radiography, nuclear medicine technology, radiation therapy, cardiovascular-interventional radiography, mammography, computed tomography, magnetic resonance imaging, quality management, sonography, bone densitometry, vascular sonography, cardiac-interventional radiography, vascular-interventional radiography, breast sonography, and radiologist assistant. The *Standards of Ethics* are intended to be consistent with the Mission Statement of ARRT, and to promote the goals set forth in the Mission Statement.

A. Code of Ethics

The Code of Ethics forms the first part of the *Standards of Ethics*. The Code of Ethics shall serve as a guide by which Certificate Holders and Candidates may evaluate their professional conduct as it relates to patients, health care consumers, employers, colleagues, and other members of the health care team. The Code of Ethics is intended to assist Certificate Holders and Candidates in maintaining a high level of ethical conduct and in providing for the protection, safety, and comfort of patients. The Code of Ethics is aspirational.

1. The radiologic technologist acts in a professional manner, responds to patient needs, and supports colleagues and associates in providing quality patient care.
2. The radiologic technologist acts to advance the principal objective of the profession to provide services to humanity with full respect for the dignity of mankind.
3. The radiologic technologist delivers patient care and service unrestricted by the concerns of personal attributes or the nature of the disease or illness, and without discrimination on the basis of sex, race, creed, religion, or socioeconomic status.
4. The radiologic technologist practices technology founded upon theoretical knowledge and concepts, uses equipment and accessories consistent with the purposes for which they were designed, and employs procedures and techniques appropriately.
5. The radiologic technologist assesses situations; exercises care, discretion, and judgment; assumes responsibility for professional decisions; and acts in the best interest of the patient.
6. The radiologic technologist acts as an agent through observation and communication to obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient and recognizes that interpretation and diagnosis are outside the scope of practice for the profession.
7. The radiologic technologist uses equipment and accessories, employs techniques and procedures, performs services in accordance with an accepted standard of practice, and demonstrates expertise in minimizing radiation exposure to the patient, self, and other members of the health care team.
8. The radiologic technologist practices ethical conduct appropriate to the profession and protects the patient's right to quality radiologic technology care.
9. The radiologic technologist respects confidences entrusted in the course of professional practice, respects the patient's right to privacy, and reveals confidential information only as required by law or to protect the welfare of the individual or the community.
10. The radiologic technologist continually strives to improve knowledge and skills by participating in CE and professional activities, sharing knowledge with colleagues, and investigating new aspects of professional practice.

(*continued*)

DISPLAY 2-5

American Registry of Radiologic Technologist—Standards of Ethics (*continued*)

B. Rules of Ethics

The **Rules of Ethics** form the second part of the *Standards of Ethics*. They are mandatory standards of minimally acceptable professional conduct for all Certificate Holders and Candidates. Certification and Registration are methods of assuring the medical community and the public that an individual is qualified to practice within the profession.

Because the public relies on certificates and registrations issued by ARRT, it is essential that Certificate Holders and Candidates act consistently with these Rules of Ethics. These Rules of Ethics are intended to promote the protection, safety, and comfort of patients. The Rules of Ethics are enforceable. R.T.s are required to notify ARRT of any ethics violation, including state licensing issues and criminal charges and convictions, within 30 days of the occurrence or during their annual renewal of certification and registration, whichever comes first. Applicants for certification and registration are required to notify ARRT of any ethics violation, including state licensing issues and criminal charges and convictions, within 30 days of the occurrence.

Certificate Holders and Candidates engaging in any of the following conduct or activities, or who permit the occurrence of the following conduct or activities with respect to them, have violated the Rules of Ethics and are subject to sanctions as described hereunder:

The titles and headings are for convenience only, and shall not be used to limit, alter or interpret the language of any Rule.

1. Employing fraud or deceit in procuring or attempting to procure, maintain, renew, or obtain or reinstate certification and registration as issued by ARRT; employment in radiologic technology; or a state permit, license, or registration certificate to practice radiologic technology. This includes altering in any respect any document issued by ARRT or any state or federal agency, or by indicating in writing certification and registration with ARRT when that is not the case.
2. Engaging in false, fraudulent, deceptive, or misleading communications to any person regarding the individual's education, training, credentials, experience, or qualifications, or the status of the individual's state permit, license, or registration certificate in radiologic technology or certificate of registration with ARRT.
3. Knowingly engaging or assisting any person to engage in, or otherwise participating in, abusive or fraudulent billing practices, including violations of federal Medicare and Medicaid laws or state medical assistance laws.
4. Subverting or attempting to subvert ARRT's examination process, and/or the structured self-assessments that are part of the Continuing Qualifications Requirements (CQR) process. Conduct that subverts or attempts to subvert ARRT's examination and/or CQR assessment process includes, but is not limited to:
    i. disclosing examination and/or CQR assessment information using language that is substantially similar to that used in questions and/or answers from ARRT examinations and/or CQR assessments when such information is gained as a direct result of having been an examinee or a participant in a CQR assessment or having communicated with an examinee or a CQR participant; this includes, but is not limited to, disclosures to students in educational programs, graduates of educational programs, educators, anyone else involved in the preparation of Candidates to sit for the examinations, or CQR participants; and/or
    ii. soliciting and/or receiving examination and/or CQR assessment information that uses language that is substantially similar to that used in questions and/or answers on ARRT examinations or CQR assessments from an examinee, or a CQR participant, whether requested or not; and/or

DISPLAY 2-5

American Registry of Radiologic Technologist—Standards of Ethics (*continued*)

iii. copying, publishing, reconstructing (whether by memory or otherwise), reproducing or transmitting any portion of examination and/or CQR assessment materials by any means, verbal or written, electronic or mechanical, without the prior express written permission of ARRT or using professional, paid or repeat examination takers and/or CQR assessment participants, or any other individual for the purpose of reconstructing any portion of examination and/or CQR assessment materials; and/or

iv. using or purporting to use any portion of examination and/or CQR assessment materials that were obtained improperly or without authorization for the purpose of instructing or preparing any Candidate for examination or participant for CQR assessment; and/or

v. selling or offering to sell, buying or offering to buy, or distributing or offering to distribute any portion of examination and/or CQR assessment materials without authorization; and/or

vi. removing or attempting to remove examination and/or CQR assessment materials from an examination or assessment room; and/or

vii. having unauthorized possession of any portion of or information concerning a future, current, or previously administered examination or CQR assessment of ARRT; and/or

viii. disclosing what purports to be, or what you claim to be, or under all circumstances is likely to be understood by the recipient as, any portion of or "inside" information concerning any portion of a future, current, or previously administered examination or CQR assessment of ARRT; and/or

ix. communicating with another individual during administration of the examination or CQR assessment for the purpose of giving or receiving help in answering examination or CQR assessment questions, copying another Candidate's, or CQR participant's answers, permitting another Candidate or a CQR participant to copy one's answers, or possessing unauthorized materials including, but not limited to, notes; and/or

x. impersonating a Candidate, or a CQR participant, or permitting an impersonator to take or attempt to take the examination or CQR assessment on one's own behalf; and/or

xi. using any other means that potentially alters the results of the examination or CQR assessment such that the results may not accurately represent the professional knowledge base of a Candidate, or a CQR participant.

5. Subverting, attempting to subvert, or aiding others to subvert or attempt to subvert ARRT's *Continuing Education (CE) Requirements,* and/or ARRT's Continuing Qualifications Requirements (CQR). Conduct that subverts or attempts to subvert ARRT's CE or CQR Requirements includes, but is not limited to:

   i. providing false, inaccurate, altered, or deceptive information related to CE or CQR activities to ARRT or an ARRT recognized recordkeeper; and/or

   ii. assisting others to provide false, inaccurate, altered, or deceptive information related to CE or CQR activities to ARRT or an ARRT recognized recordkeeper; and/or

   iii. conduct that results or could result in a false or deceptive report of CE or CQR completion; and/or

   iv. conduct that in any way compromises the integrity of the CE or CQR Requirements such as sharing answers to the post-tests or self-learning activities, providing or using false certificates of participation, or verifying credits that were not earned.

(*continued*)

DISPLAY 2-5

American Registry of Radiologic Technologist—Standards of Ethics (*continued*)

6. Subverting or attempting to subvert ARRT's certification and registration processes by:
   i. making a false statement or knowingly providing false information to ARRT; or
   ii. failing to cooperate with any investigation by ARRT.
7. Engaging in unprofessional conduct, including, but not limited to:
   i. a departure from or failure to conform to applicable federal, state, or local governmental rules regarding radiologic technology practice or scope of practice; or, if no such rule exists, to the minimal standards of acceptable and prevailing radiologic technology practice;
   ii. any radiologic technology practice that may create unnecessary danger to a patient's life, health, or safety.
8. Engaging in conduct with a patient that is sexual or may reasonably be interpreted by the patient as sexual, or in any verbal behavior that is seductive or sexually demeaning to a patient; or engaging in sexual exploitation of a patient or former patient. This also applies to any unwanted sexual behavior, verbal or otherwise.
9. Engaging in any unethical conduct, including, but not limited to, conduct likely to deceive, defraud, or harm the public; or demonstrating a willful or careless disregard for the health, welfare, or safety of a patient. Actual injury need not be established under this clause.
10. Performing procedures which the individual is not competent to perform through appropriate training and/or education or experience unless assisted or personally supervised by someone who is competent (through training and/or education or experience).
11. Knowingly assisting, advising, or allowing a person without a current and appropriate state permit, license, registration, or an ARRT registered certificate to engage in the practice of radiologic technology, in a jurisdiction that mandates such requirements.
12. Delegating or accepting the delegation of a radiologic technology function or any other prescribed healthcare function when the delegation or acceptance could reasonably be expected to create an unnecessary danger to a patient's life, health, or safety. Actual injury to a patient need not be established under this clause.
13. Actual or potential inability to practice radiologic technology with reasonable skill and safety to patients by reason of illness; use of alcohol, drugs, chemicals, or any other material; or as a result of any mental or physical condition.
14. Adjudication as mentally incompetent, mentally ill, chemically dependent, or dangerous to the public, by a court of competent jurisdiction.
15. Improper management of patient records, including failure to maintain adequate patient records or to furnish a patient record or report required by law; or making, causing, or permitting anyone to make false, deceptive, or misleading entry in any patient record.
16. Revealing a privileged communication from or relating to a former or current patient, except when otherwise required or permitted by law, or viewing, using, releasing, or otherwise failing to adequately protect the security or privacy of confidential patient information.
17. Knowingly providing false or misleading information that is directly related to the care of a former or current patient.
18. Violating a state or federal narcotics or controlled substance law, even if not charged or convicted of a violation of law.
19. Violating a rule adopted by a state or federal regulatory authority or certification board resulting in the individual's professional license, permit, registration or certification being denied, revoked, suspended, placed on probation or a consent agreement or order, voluntarily surrendered, subjected to any conditions, or failing to report to ARRT any of the violations or actions identified in this Rule.

DISPLAY 2-5

American Registry of Radiologic Technologist—Standards of Ethics (*continued*)

20. Convictions, criminal proceedings, or military courts-martial as described below:
    - i. conviction of a crime, including a felony, a gross misdemeanor, or a misdemeanor, with the sole exception of speeding and parking violations. All alcohol and/or drug related violations must be reported; and/or
    - ii. criminal proceeding where a finding or verdict of guilt is made or returned but the adjudication of guilt is either withheld, deferred, or not entered or the sentence is suspended or stayed; or a criminal proceeding where the individual enters an Alford plea, a plea of guilty or nolo contendere (no contest); or where the individual enters into a pre-trial diversion activity; or
    - iii. military courts-martial related to any offense identified in these Rules of Ethics.
21. Knowing of a violation or a probable violation of any Rule of Ethics by any Certificate Holder or Candidate and failing to promptly report in writing the same to ARRT.
22. Failing to immediately report to the Certificate Holder's or Candidate's supervisor information concerning an error made in connection with imaging, treating, or caring for a patient. For purposes of this rule, errors include any departure from the standard of care that reasonably may be considered to be potentially harmful, unethical, or improper (commission). Errors also include behavior that is negligent or should have occurred in connection with a patient's care, but did not (omission). The duty to report under this rule exists whether or not the patient suffered any injury.

solving. With the popularity of **holistic** medicine, virtue ethics incorporates certain principles of both utilitarianism and deontology to provide a broader view of issues. Analysis, review of consequences, and societal rules are essential to forming decisions using virtue. Again, using the accident example to illustrate, with virtue ethics, the triage of the patients would take into account the significance of each individual. How the family and friends of the victims would be affected by the triage decisions would be the deciding factor in who gets first treatment.

Ethical Principles

To resolve ethical dilemmas, one may apply this established set of principles to decision making:

Autonomy: This refers to the right of all persons to make rational decisions free from external pressures. Patients have the right to make decisions concerning their lives, and all health care workers must respect those decisions. In practice, the radiographer will act as the liaison between the radiologist and the patient. In these circumstances, the radiographer must act on behalf of the patient.

Beneficence: This refers to the fact that all acts must be meant to attain a good result or to be beneficial. The radiographer must always plan patient care to ensure safe outcomes and avoid harmful consequences. Beneficence requires action that either prevents harm or does the greatest good for the patient. This may require one to side with the patient and against coworkers.

Confidentiality: This refers to the concept of privacy. All patients have the right to have information concerning their state of health; personal information should be kept in confidence without disclosing it to others unless it will be of benefit to the patient or unless there is a direct threat to society if not disclosed. The radiographer must not disclose facts concerning the patient's health or other personal information to anyone uninvolved with the patient's care.

Double effect: This refers to the fact that some actions may produce both a good and a bad effect. Four criteria must be fulfilled before this type of action is ethically permissible: that the act is good or morally neutral; that the intent is good, not evil, although a bad result may be foreseen; that the good effect is not achieved by means of evil effects; and that the good effect must be more important than the evil effect, or at least there is favorable balance between good and bad. For example, radiation exposure may be harmful; however, the diagnosis obtained by the exposure will aid in restoring the patient to health.

Fidelity: This refers to the duty to fulfill one's commitments and applies to keeping promises both stated and implied. The radiographer must not promise patients results that cannot be achieved.

Justice: This refers to all persons being treated equally or receiving equal benefits according to need. One patient must not be favored over another or treated differently from another, regardless of personal feelings.

Nonmaleficence: This refers to the duty to abstain from inflicting harm and also the duty to prevent harm. The radiographer is obligated to practice in a safe manner at all times.

Paternalism: This refers to the attitude that sometimes prompts health care workers to make decisions regarding a person's care without consulting the person affected. If one is tempted to make such a unilateral decision, one must consider whether the action is justifiable on the basis of potential outcomes. Within the scope of practice, the radiographer is justified in taking action in instances in which not acting would do more harm than the lack of patient input into the decision-making process.

Sanctity of life: This refers to the belief that life is the highest good and nobody has the right to judge that another person's quality of life is so poor that life is not of value and should be terminated. One cannot make life-and-death decisions for patients on the basis of personal values.

Veracity: This refers to honesty in all aspects of one's professional life. One must be honest with patients, coworkers, and oneself.

Respect for property: This refers to keeping the patients' belongings safe and taking care not to intentionally damage or waste equipment or supplies with which one works.

Ethical Issues in Radiography

All radiographers are expected to conduct themselves in a professional manner. They must be reliable and expected to report for work on time and complete the assigned share of the workload in a timely, competent, sensitive, and efficient manner. The radiographer is also expected to work as a cooperative member of the health care team. Speech must be articulate and free of vulgar expressions or inappropriate slang. All patients must be treated as persons of dignity and worth in a nondiscriminatory manner.

The student radiographer may observe behavior and patient care problems that may seem ethically questionable in clinical laboratory practice in health care institutions. Some of the problems that might be encountered are protecting professional colleagues who are violating codes of professional ethics, unequal medical resource allocation based on a patient's age or socioeconomic status, lack of respect for a patient, breaches of privacy and confidentiality, and over- or undertreatment of patients. In other words, what is observed is not what is taught in the classroom.

In such cases, the student radiographer should observe the issues that are believed to be violations of the ethical code and discuss them with supervisors and/or instructors in private conference. These issues can become learning situations to contemplate as a group and decide how they should be resolved.

As the scope of practice and the professional responsibilities of radiologic technology grow, so do the ethical responsibilities of radiographers. Often, an ethical decision involves a choice between two unsatisfactory solutions to a problem. This is often the case with health care. If one conscientiously follows the professional code of ethics and ethical principles previously listed to make difficult decisions as they arise, one will be able to resolve ethical dilemmas in a manner that allows for peace of mind.

For ethical dilemmas of some magnitude, most health care institutions have ethics committees that meet on a regular basis to solve problems and formulate policies that provide guidelines to facilitate decision making. If an ethical dilemma is encountered in the workplace that cannot be readily resolved by following one's professional code of ethics, a person is obliged to present the problem to such a body.

LEGAL ISSUES IN IMAGING TECHNOLOGY

Although ethics refers to a set of moral principles, law refers to rules of conduct as prescribed by an authority or group of legislators. Law can be defined as a "binding custom or practice of a community; a rule of conduct or action prescribed or formally recognized as binding or enforced by a controlling authority" (*Merriam-Webster*).

The authority, in the case of the radiographer, includes ARRT and ASRT. The rules of conduct refer to the Practice Standards in Display 2-2. These standards define the practice and establish general criteria to determine compliance with the law as it applies to imaging technology.

The standards are general in nature by design to keep pace with the rapidly changing environment in which we live and work. A short review of the standards here will help the student understand how the standards can be used in legal issues. The four sections are as follows:

1. The *Scope of Practice* that defines the limits of the radiography practice
2. The *Clinical Performance Standards* that define the activities of the practitioner in the care of patients and the delivery of diagnostic or **therapeutic** procedures and treatment. The section incorporates

patient assessment and management with procedural analysis, performance, and evaluation.

3. The *Quality Performance Standards* that define the activities of the practitioner in the technical areas of performance, including equipment and material assessment, safety standards, and total quality management
4. The *Professional Performance Standards* that define the activities of the practitioner in the areas of education, interpersonal relationships, personal and professional self-assessment, and ethical behavior

Reviewing the overall standards as outlined above allows the student radiographer to reflect on possible issues that could arise and become a legal situation. Remembering the code of ethics may help one always work inside the boundaries of the law. The two are inextricably tied together.

Patient Rights

The radiographer has a legal responsibility to relate to colleagues, other members of the health care team, and the patient in a manner that is respectful of each person with whom interaction occurs and to adhere to the *Patient's Bill of Rights* and *The Patient Care Partnership* (Displays 2-6 and 2-7). These bills delineate the rights of the patient as a consumer of health care. Because all health care workers are required to adhere to the provisions of these bills, they must be familiar to them. The radiographer must also be aware of the areas of practice in which health care workers may infringe upon the patient's rights and be held legally liable. Some examples follow:

- Acting in the role of a diagnostician and providing a patient with results, impressions, or diagnoses of **diagnostic imaging** examinations

DISPLAY 2-6

A Patient's Bill of Rights (© Used with permission of American Hospital Association.)

Introduction

Effective health care requires collaboration between patients and physicians and other health care professionals. Open and honest communication, respect for personal and professional values, and sensitivity to differences are integral to optimal patient care. As the setting for the provision of health services, hospitals must provide a foundation for understanding and respecting the rights and responsibilities of patients, their families, physicians, and other caregivers. Hospitals must ensure a health care ethic that respects the role of patients in decision making about treatment choices and other aspects of their care. Hospitals must be sensitive to cultural, racial, linguistic, religious, age, gender, and other differences as well as the needs of persons with disabilities.

The American Hospital Association presents A Patient's Bill of Rights with the expectation that it will contribute to more effective patient care and be supported by the hospital on behalf of the institution, its medical staff, employees, and patients. The American Hospital Association encourages health care institutions to tailor this bill of rights to their patient community by translating and/or simplifying the language of this bill of rights as may be necessary to ensure that patients and their families understand their rights and responsibilities.

Bill of Rights

These rights can be exercised on the patient's behalf by a designated surrogate or proxy decision maker if the patient lacks decision-making capacity, is legally incompetent, or is a minor.

1. The patient has the right to considerate and respectful care.
2. The patient has the right to and is encouraged to obtain from physicians and other direct caregivers relevant, current, and understandable information concerning diagnosis, treatment, and prognosis. Except in emergencies when the patient lacks decision-making capacity and the need for treatment is urgent, the patient is entitled to the opportunity to discuss and request information related to the specific procedures and/or treatments, the risks involved, the possible length of recuperation, and the medically reasonable alternatives and their accompanying risks and benefits.

   Patients have the right to know the identity of physicians, nurses, and others involved in their care, as well as when those

(*continued*)