Chapter 1

Introduction to Imaging and Radiologic Sciences

Objectives

1. Explain the use of radiation in medicine.
2. Provide an overview of the history of medicine.
3. Describe the discovery of x-rays.
4. Define terms related to radiologic technology.
5. Explain the career opportunities within the profession of radiologic technology.
6. Identify the various specialties within a radiology department.

7. Describe the typical responsibilities of the members of the radiology team.
8. Explain the career-ladder opportunities within a radiology department.
9. Discuss the roles of other members of the health care team.
Medical Radiation Sciences

- Medical radiation sciences uses energy to create images of the human body.
- Various energy forms may be used depending on the application.
- Some energies create ionizations in human tissue.

Energy Forms for Imaging

- Sound
  - Medical sonography
- Electrical
  - Electrocardiography
- Heat (thermal)
  - Thermography
- Magnetic
  - Magnetic resonance imaging
- Electromagnetic
  - X-rays
    - Radio waves
- Nuclear
  - Gamma radiation

Electromagnetic Energy Plays a Very Important Role in Radiologic Sciences
Radiography

• Uses electromagnetic energy in the form of x-rays to create medical images

Medical Sonography

• Uses high-frequency sound energy to create medical images
• Does not create ionizations
• Has wide variety of medical applications

Magnetic Resonance Imaging

• Uses the energy of high-strength magnetic fields and radio waves to create images of the human body
• Creates no ionizations
CT Scanning

- Uses x-ray energy and sophisticated software to create images of the human body

![Picture of CT Scanning]

Nuclear Medicine

- Uses the energy of the atom to create medical images
- Energy form is gamma radiation
- Uses radioactive isotopes to create gamma radiation

![Picture of Nuclear Medicine]

Cardiovascular Interventional Imaging

- Uses x-rays to visualize human blood vessels and heart anatomy
- Requires the use of a catheter and the injection of x-ray contrast material to visualize anatomy

![Picture of Cardiovascular Interventional Imaging]
Radiation Therapy

- Uses very-high-energy ionizing radiation to treat malignant tumors (cancer)
- Radiation therapists work with other team members to improve the quality of life of cancer patients

History of Radiology

- Discovered by Wilhelm C. Röntgen
- November 8, 1995
- Received Nobel Prize in Physics in 1901
- First known x-ray image is of wife’s hand

Radiologic Sciences as a Career

- Offers a wide variety of career paths
- Often begins with a general radiography background
- Specialty areas require additional education and certification
- Career opportunities are nearly limitless and demand initiative and a desire for professional success
Career Opportunities

- Radiography
- CT Scanning
- Medical Sonography
- Radiation Therapy
- MRI Scanning
- Mammography
- DEXA Scanning
- Radiologist Assistant
- Nuclear Medicine
- Cardiovascular Interventional Technology
- PACS Administrator
- Radiology Administration
- Education
- Research
- Commercial Firms
  - Sales
  - Applications
  - Service
- Nuclear Medicine
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  - Service

Radiology

- Can be referred to by a number of different names
  - Radiology
  - X-ray
  - Medical Imaging
  - Diagnostic services
  - Imaging services
  - Imaging
- Predominantly a diagnostic service that focuses on imaging of patients to diagnosis their medical condition

Health Care Team

- Team members:
  - Physicians
  - Nurses
  - Allied health
  - Supporting members
    - Nonclinical
- Most health careers are referred to as allied health
- Hospitals are communities within communities
Conclusion

- X-rays were discovered by W.C. Röntgen in 1895.
- Medical imaging consists of many diagnostic areas involving energy, and particularly, radiant energy.
- Radiologic sciences professionals perform as essential members of a healthcare team.
- Career opportunities are nearly limitless and demand initiative and a desire for professional success.