

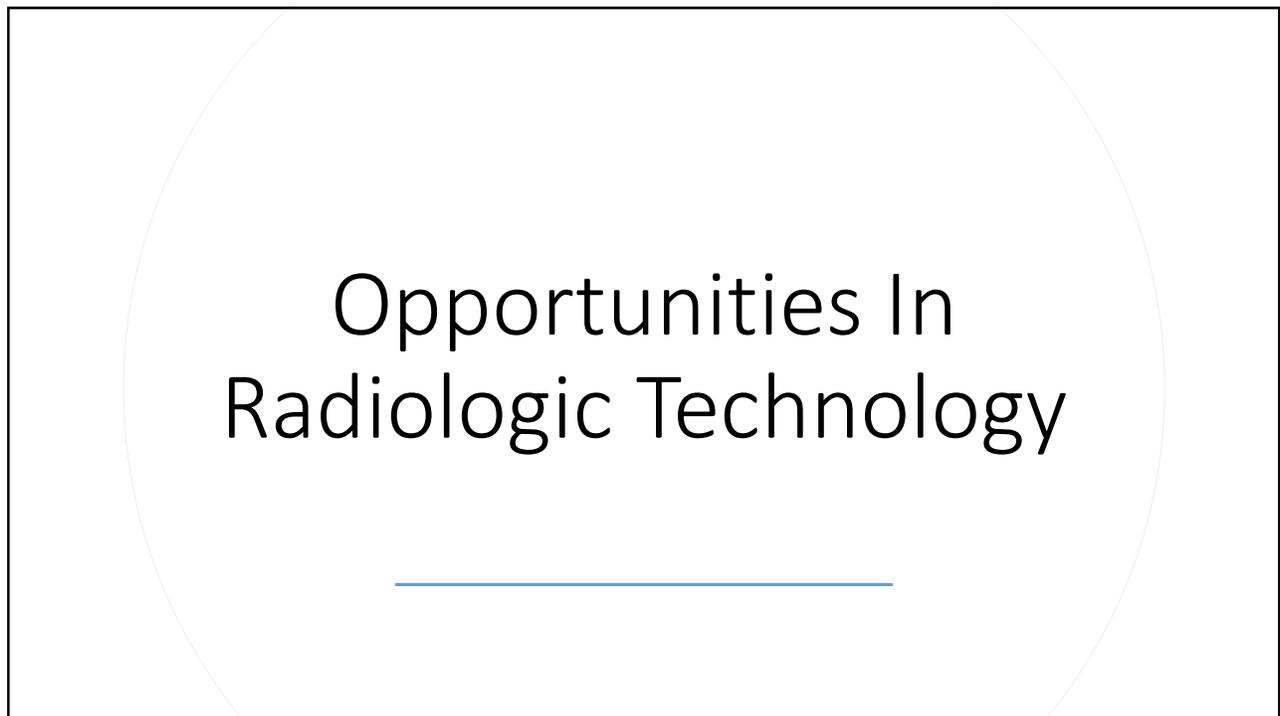


Reading Hospital
School of Health
Sciences
Medical Imaging
Program

MI 110: Introduction to Medical Imaging
Unit 1 – Opportunities in Medical Imaging

Ms. Shartle M.S. R.T. (R)

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Opportunities In Radiologic Technology

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Diagnostic Radiography

- General Diagnostic
- Fluoroscopy
- Portable
- Operating Room
- Trauma







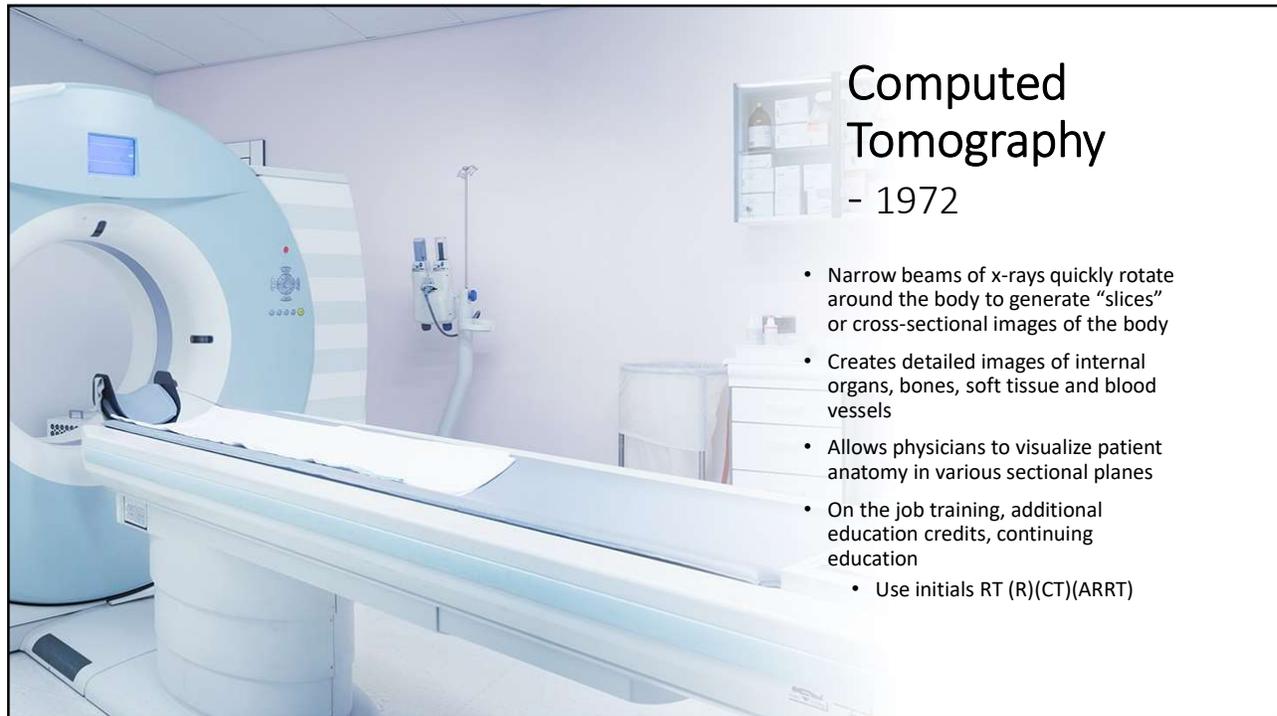
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Advanced Imaging Modalities

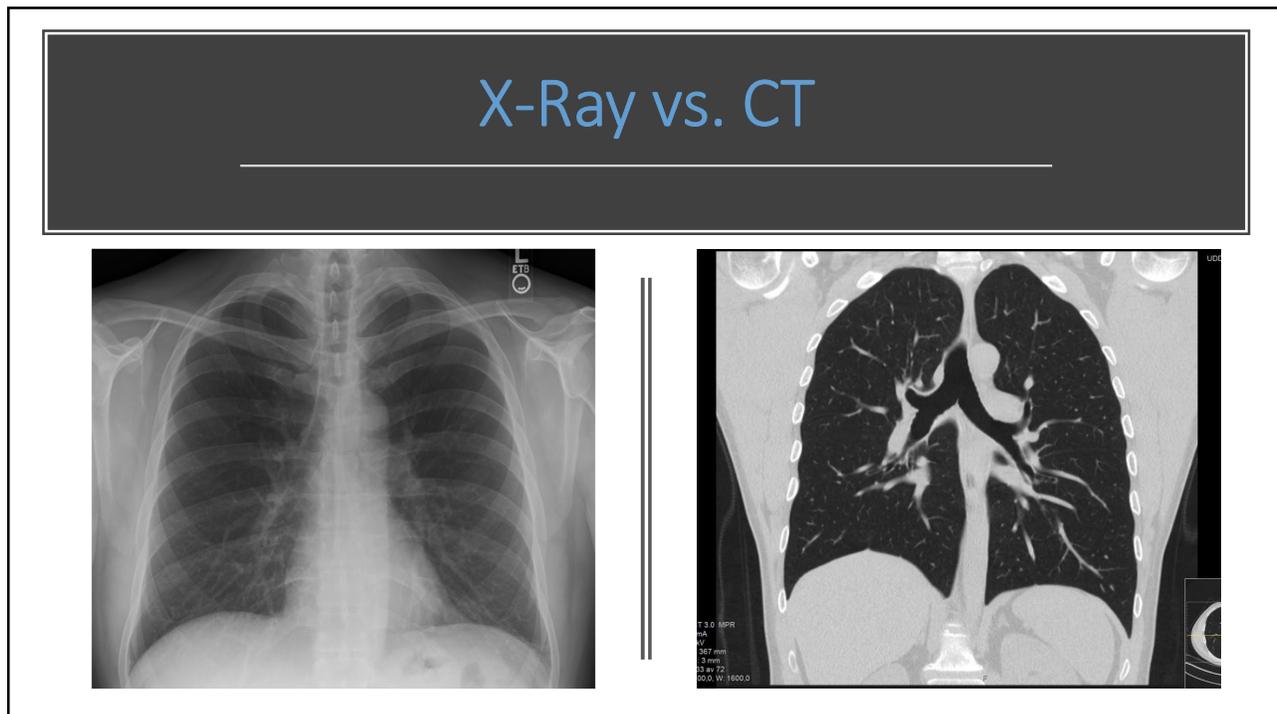
- Computed Tomography
- Magnetic Resonance Imaging
- Interventional and Cardiovascular Radiology
- Mammography
- Bone Dosimetry
- Diagnostic Medical Sonography *
- Radiation Therapy *
- Nuclear Medicine *
- Fusion Technology *

** Require additional formal schooling*

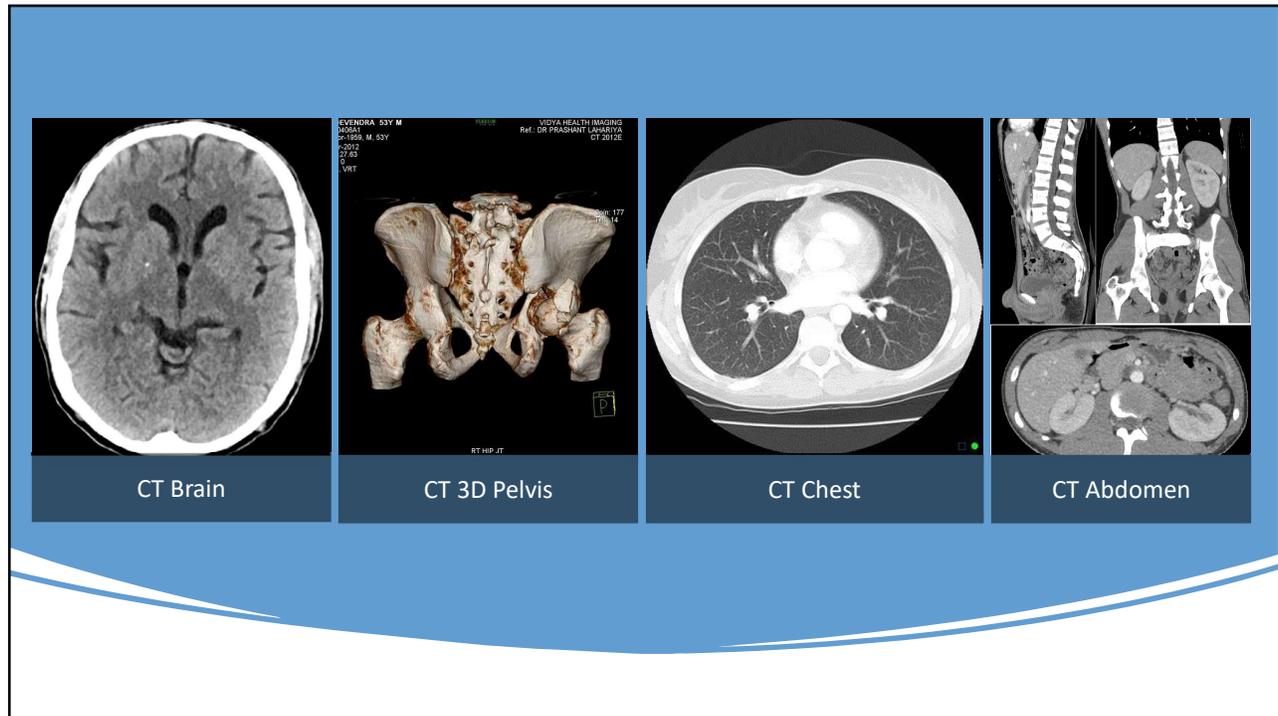
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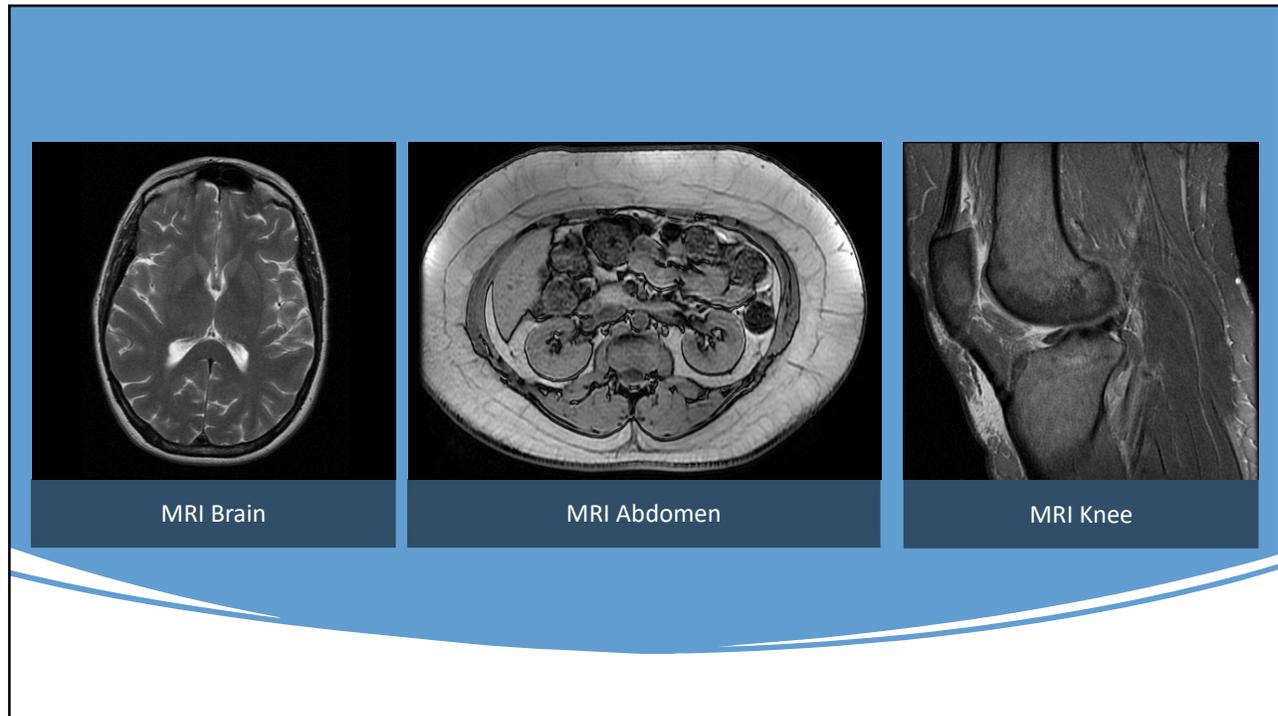
7

The image shows a Philips MRI scanner in a clinical setting. The large, white, circular gantry is open, revealing the patient bed which is covered with white linens and pillows. The Philips logo is visible on the top of the gantry. To the right of the scanner, there is a control panel with various buttons and a small screen.

Magnetic Resonance Imaging - 1977

- Strong magnetic fields, radio waves, and computer are used to create cross sectional images in different planes
- Well suited to image the non-bony parts or soft tissues of the body
- On the job training, additional educational credits, continuing education
 - Uses initials RT (R)(MR)(ARRT)
 - ** If not registered in radiography only uses (MR)

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Advanced Interventional Radiography (AIR)

- Medical imaging is used to guide doctors during minimally invasive procedures that diagnose, treat, and cure many conditions
- High application of sterile technique
- Less expensive, less risky, and less painful option than traditional surgery
- C-arm type equipment is used as radiologists work alongside registered radiologic technologists

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Advanced Interventional Radiography (AIR)

- Cardiac Interventional Radiography
- Vascular Interventional Technology
- On the job training, continuing education
 - Must be certified in Radiography for at least one year before taking boards
 - Cardiac Interventional Radiography
 - Vascular Interventional Radiography
 - Uses initials RT (R)(CI)(ARRT)
or RT (R)(VI)(ARRT)

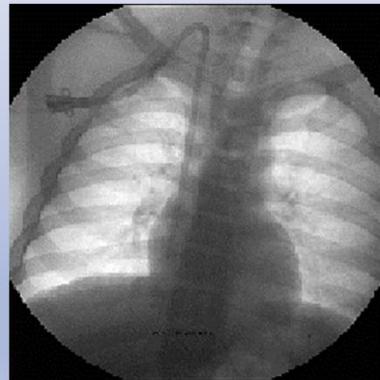


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Advanced Interventional Radiography (AIR)

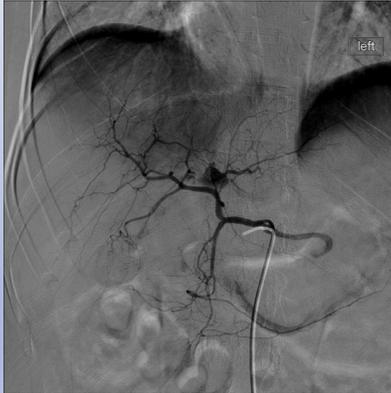


Renal Angioplasty

Hemodialysis Catheter
Insertion

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Advanced Interventional Radiology (AIR)



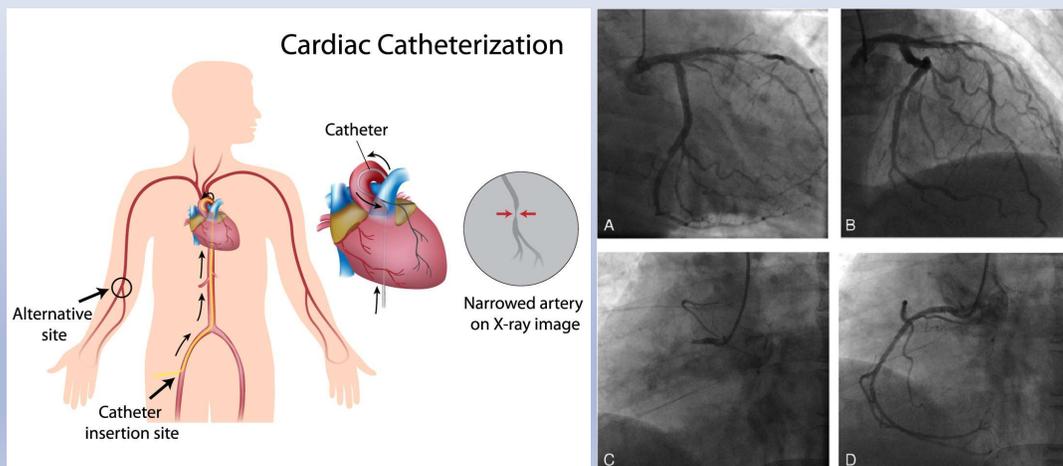
Biliary Injection



Vertebroplasty

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Cardiac Interventional Radiography



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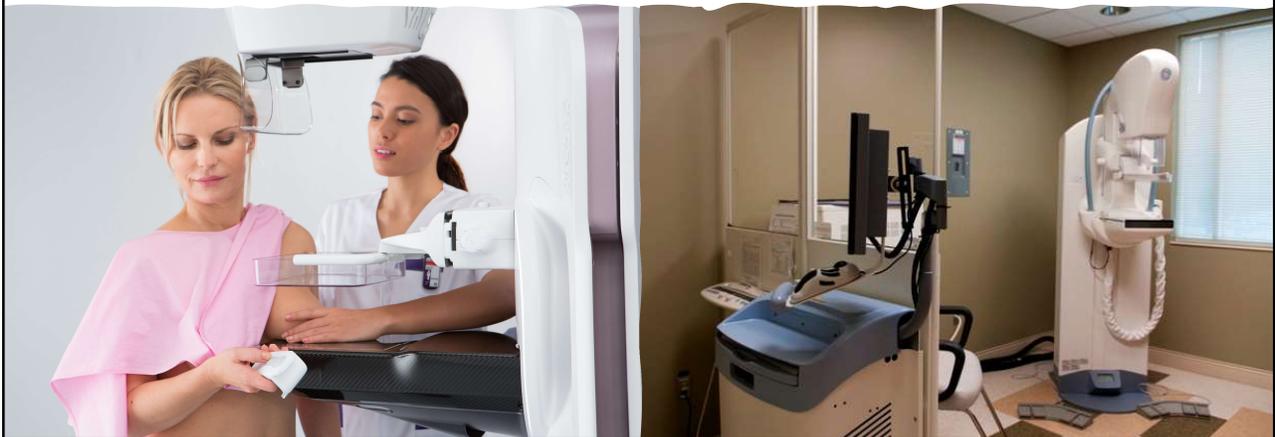
Mammography

- Radiographic examination of the breast for early detection of breast diseases (breast cancer)
- American Cancer Society (ACS) recommends a screening mammogram yearly for every woman over 40 years of age
- High level of Quality Control
- On-the job training and continuing education requirements
 - Must be certified in Radiography before taking mammography boards
 - Use initials RT(R)(M)(ARRT)



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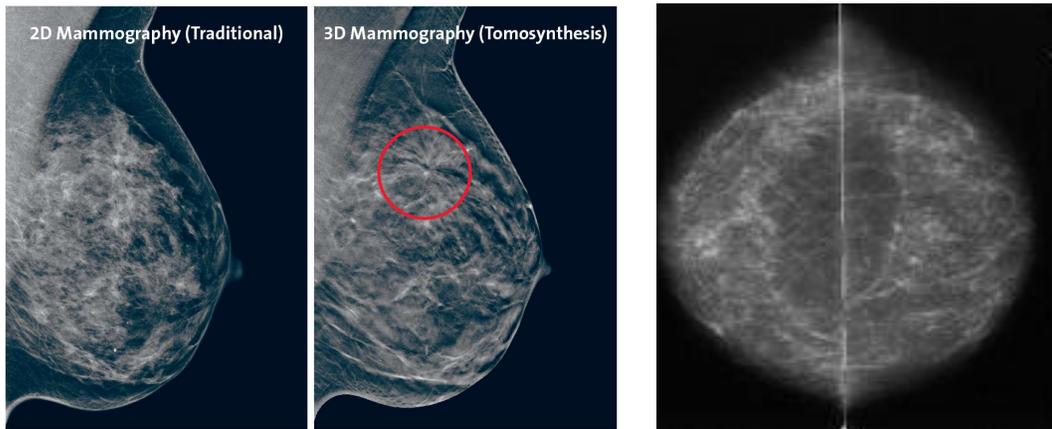
Mammography Equipment



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Mammograms

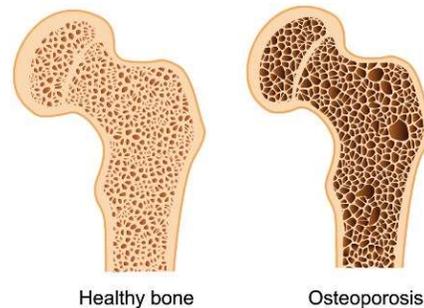


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Bone Densitometry

DEXA Scan – Dual-energy X-ray Absorptiometry

- Measures bone mineral density (BMD) – calcium/bone mineral content in the bone
- Useful in diagnosis of osteoporosis (gradual loss of calcium)
- On-the-job training
 - Need to be registered in Radiography, Nuclear Medicine, or Radiation Therapy and meet clinical requirements to take ARRT exam
 - Use initials RT(R)(BD)(ARRT)



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Bone Densitometry

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Diagnostic Medical Sonography

The visualization of structures of the body by recording reflections of pulses of high-frequency sound waves directed into tissue.

- No ionizing radiation
- Types of exams include pregnancy, abdominal, transvaginal, testicular, breast, carotid doppler, cardiac, venous, biopsy etc....
 - 3D/4D imaging advancements



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Diagnostic Medical Sonography – Equipment

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Diagnostic Medical Sonography

- Completion of accredited program for sonography preferred or less commonly on the job training
 - Previous radiography experience not required to attend sonography program
- Credentialing
 - **ARDMS** - American Registry of Diagnostic Medical Sonography board certification; Credentials: RDMS
 - Registered Vascular Technologist-- RVT
 - Registered Diagnostic Cardiac Sonography --RDCS
 - **ARRT** offers certification
 - Must be certified in Radiography, Nuclear Medicine, or Radiation Therapy
 - Credentials: RT(R)(S)(ARRT)
 - Vascular Sonography certification (VS)
 - Breast Sonography certification (BS)
 - Also, can be certified by the Cardiac Credentialing International; initials CCI



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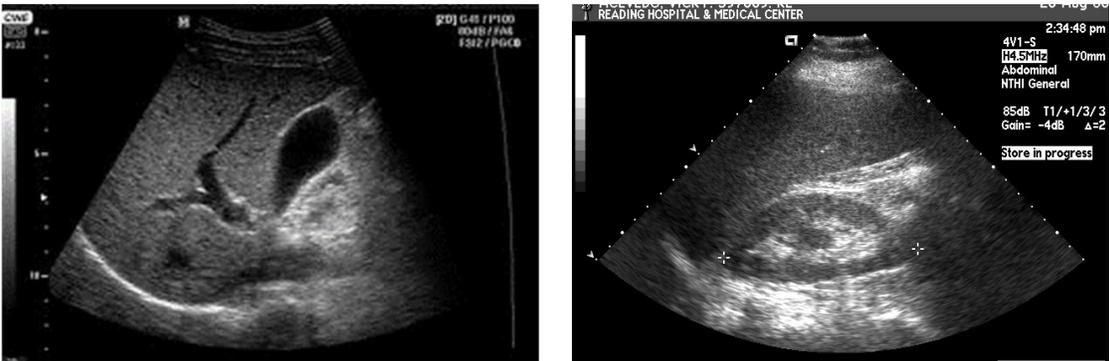
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Diagnostic
Medical
Sonography



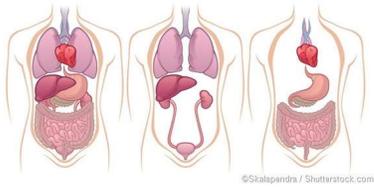
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Diagnostic
Medical
Sonography



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Diagnostic Medical Sonography



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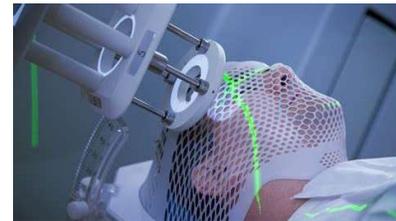
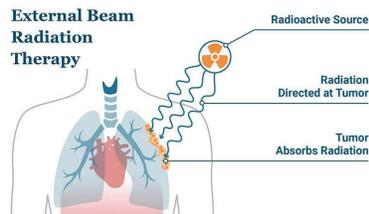
Radiation Therapy

- Use of high-energy radiation to treat primarily malignant tumors
 - A Radiation Therapist administers treatments from precise instructions of Radiation Oncologist
 - Internal therapy and external therapy
 - Radiation Oncologist/Radiation Physicist
 - Medical Dosimetrists help plan treatment / dose calculations
- Credentialing
 - Required completion of accredited Radiation Therapy program (1-4 years)
 - ARRT offers certification; Credentials: RT(T)(ARRT)



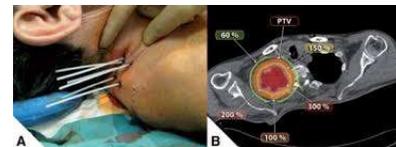
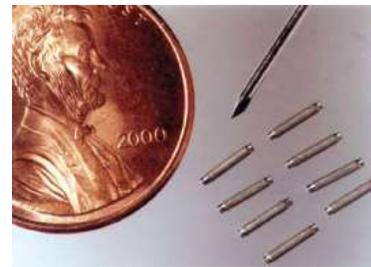
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External Radiation Therapy



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Internal Radiation Therapy



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Nuclear Medicine

The use of radioactive materials (radiopharmaceuticals) for diagnostic purposes

- Administered--Intravenously, orally, or inhaled
- Gamma Cameras – cameras do not emit radiation
- Credentialing
 - Necessary to complete accredited Nuclear Medicine program (1-4years)
 - **NMTCB** (Nuclear Medicine Technology Certification Board) offers exam
 - Credentials: (CNMT) –certified nuclear medicine technologist
 - **ARRT** offers exam
 - Credentials: RT(N)(ARRT)

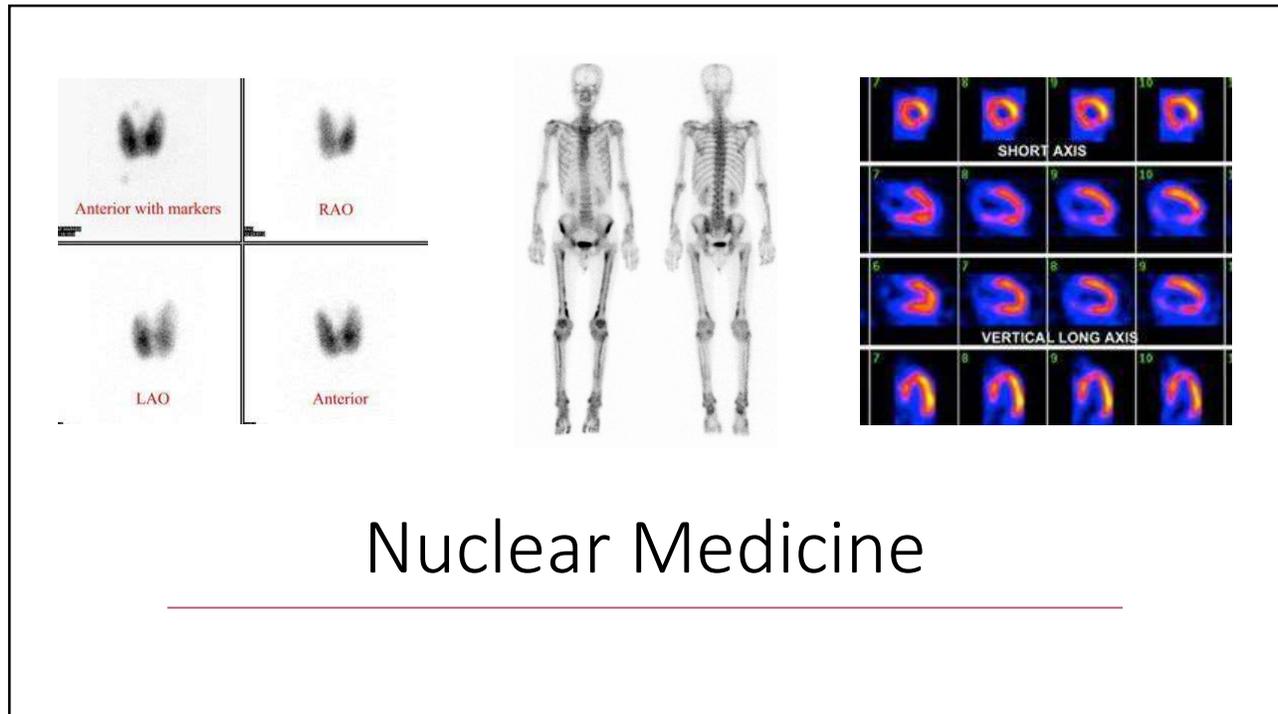


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Nuclear Medicine - Equipment

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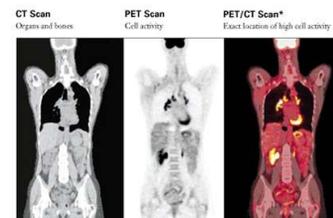
Nuclear Medicine

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PET CT OR MRI: Fusion Technology

Positron Emission Tomography and CT **OR** MRI

- Radiopharmaceutical used to detect function of the abnormality and then CT/MRI used to determine sizing and location
 - Measures blood flow, O₂ use, and sugar metabolism
- Used to precisely detect and stage cancer, learn the effects after a heart attack (MI), and even detect early signs of Alzheimer's disease

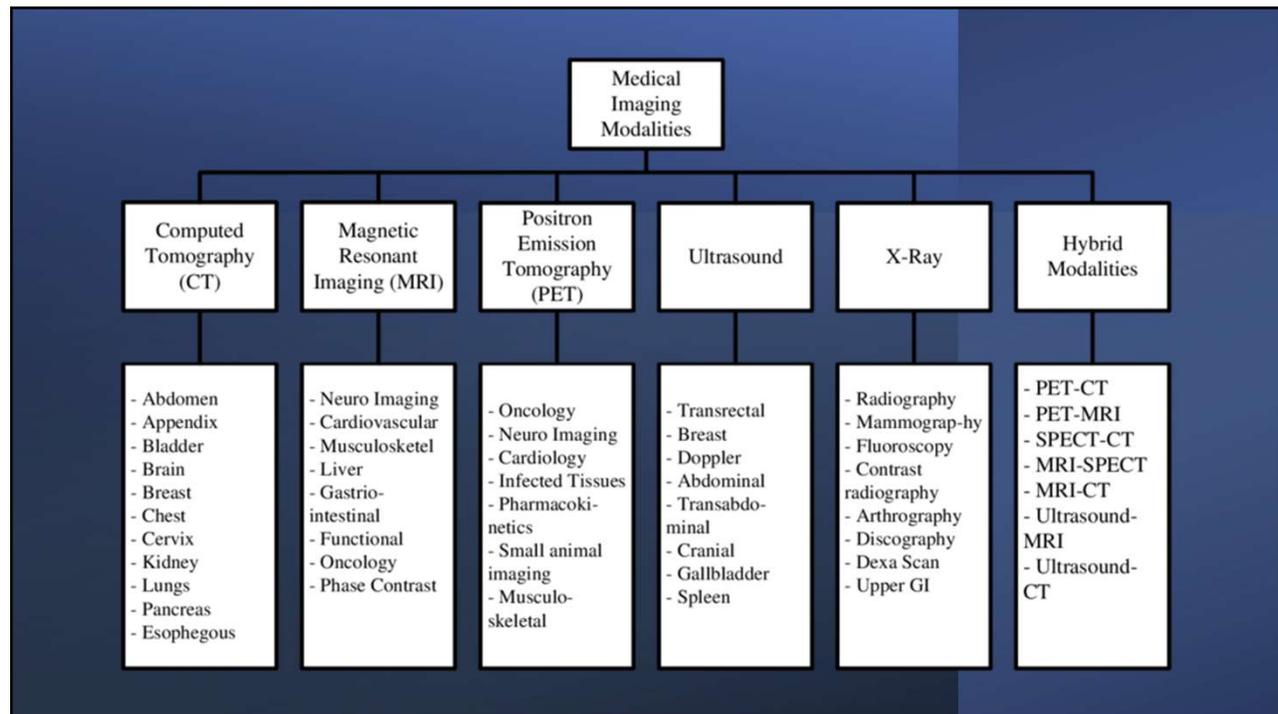


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Nuclear Medicine Advanced Associate (NMAA)

- Fill the gap in the nuclear medicine department from pre-testing assessment through pre-dictation assessment
- Conduct analysis of results and prepare preliminary description of findings for the supervising physician
- Order additional diagnostic procedures per the patients results of other studies
- Requirements
 - 2 or more years of Nuclear Medicine Experience
 - Bachelors Degree
 - Successful completion of an advanced academic program

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