

# Why Radiography as a Career?

*An International Perspective  
from ISRRT – the Society representing  
Radiographers and Radiological Technologists  
worldwide*

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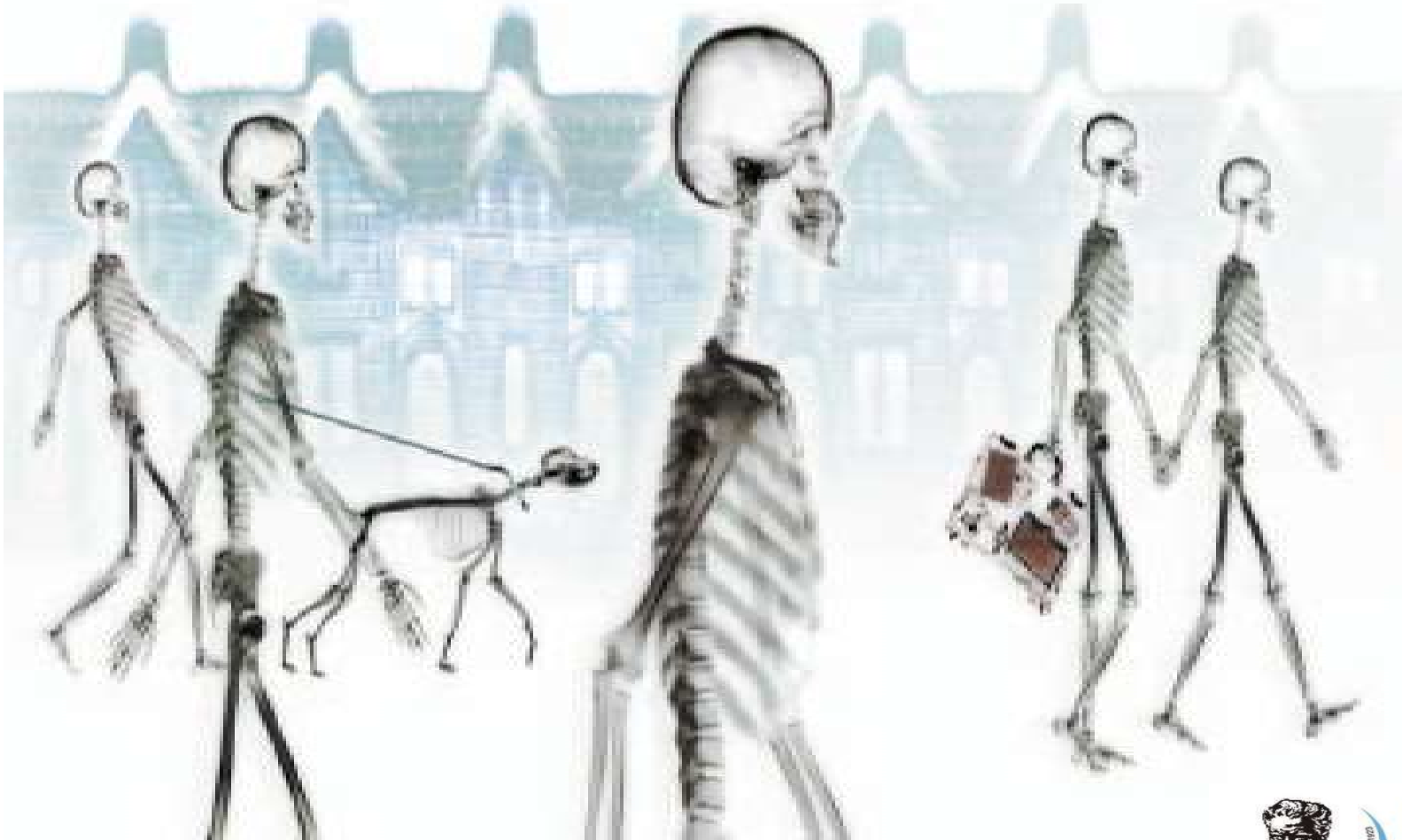


ISRRRT  
representing over 400 000  
Technologists Globally



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INTERNATIONAL  
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RADIOGRAPHERS  
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# A Radio....What?



# Radiographic Categories

- Radiographers are at the heart of modern medicine. In some countries they are known as Radiologic Technologists or Medical Imaging Technologists and also as Radiation Therapists.
- There are 4 Technologist categories:
  - diagnostic**
  - nuclear medicine**
  - therapeutic**
  - ultrasound**
- Radiographers provide essential services to millions of people
- Radiographers are an important member of the healthcare team, producing diagnostic images of the human body

# Diagnostic Radiography

**Diagnostic Radiographers** employ a range of different imaging techniques and sophisticated equipment to produce high quality images of an injury or disease. They use:

- X-rays– to look through tissue to examine bones/cavities/ foreign objects
- Fluoroscopy – to image the digestive system providing live motion x-ray
- CT (computed tomography) –provides cross-sectional views (slices) of the body
- MRI (magnetic resonance imaging) – builds a 2-D or 3-D map of different tissue types within the body
- Angiography – to investigate blood vessels

Without detailed images of what is happening inside the body, treatments would not be as effective, or valuable time may be lost

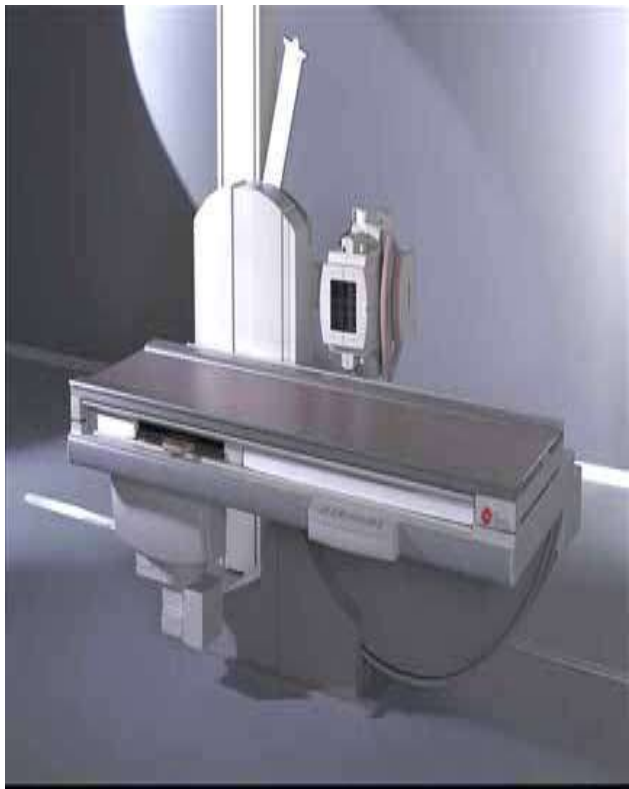
# Detailed Images



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# Diagnostic Plain Film Imaging

X-Ray Equipment



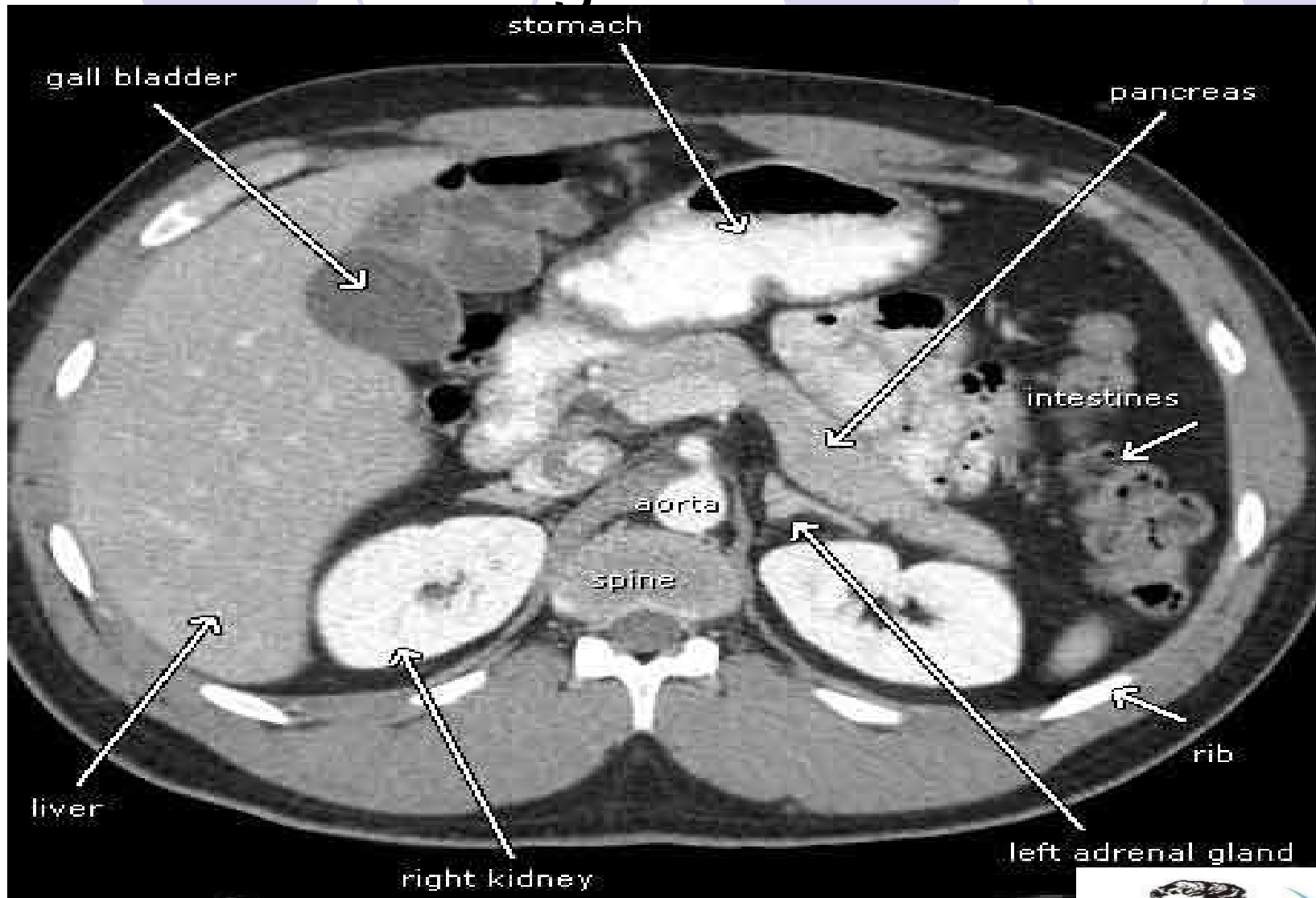
Lateral C-spine



Hand



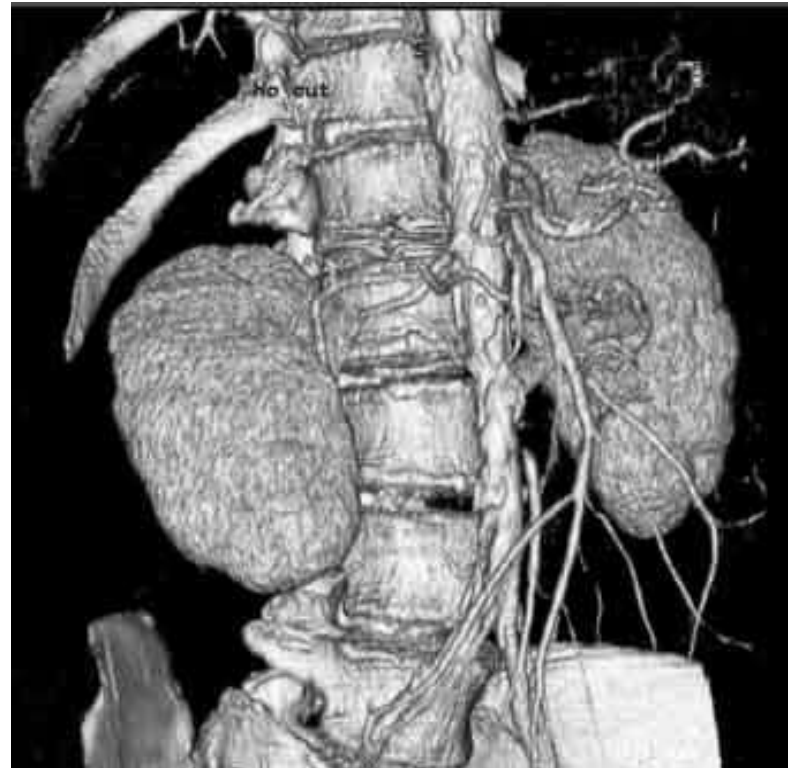
# CT slice through the mid-abdomen



# Computed Tomography (CT) - Angiography

CT - Scanner

3D-CT of the Aorta

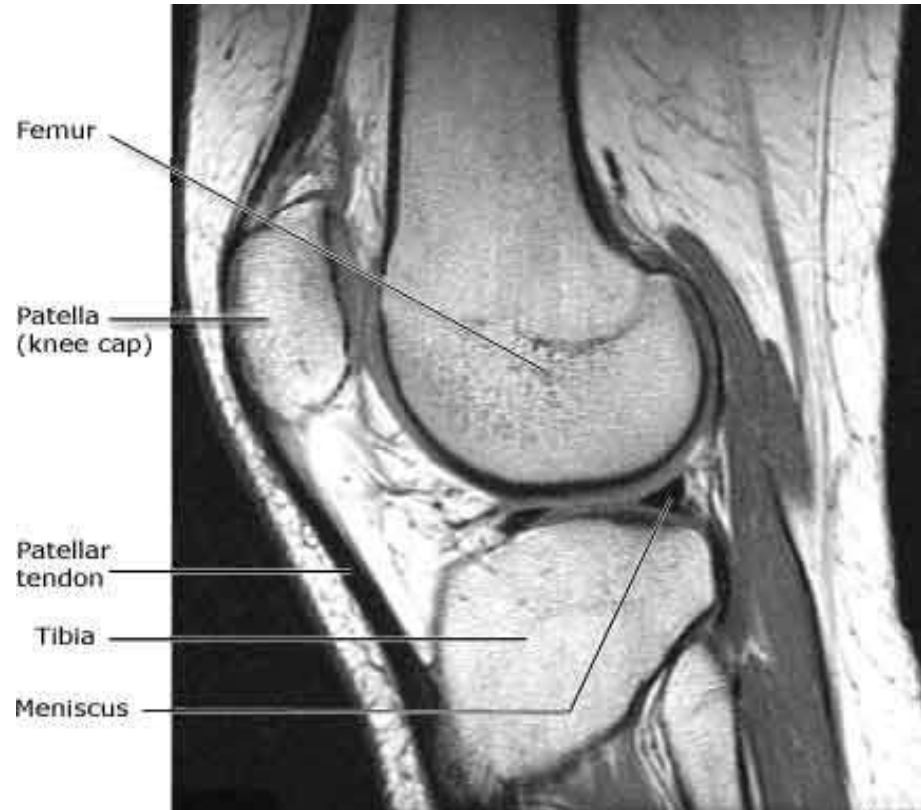


# Magnetic Resonance Imaging (MRI)

- MRI Equipment



## MR Image of the Knee

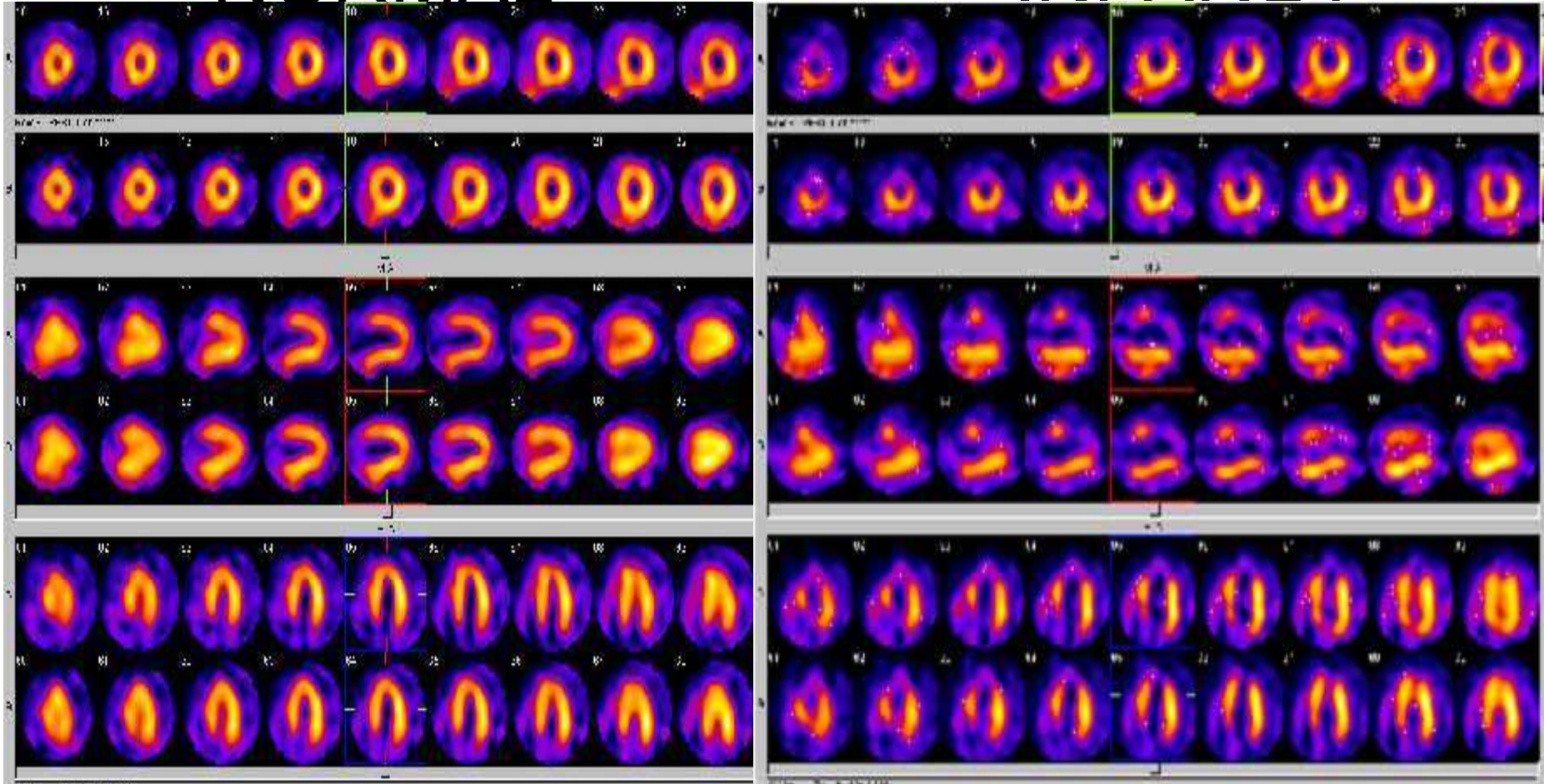


# Nuclear Medicine

- **Nuclear Medicine** involves the use of radioactive isotopes by **Nuclear Medicine Technologists** to:
  - prevent
  - diagnose
  - treat disease
- Radioisotopes are utilized in diagnosis as a standard practice nation-wide, and have been for over 65 years
- Therapeutic uses are growing as more treatments are discovered and developed. Certain radioisotopes are administered to treat particular cancers eg thyroid cancer

# NM CARDIAC SPECT STUDY

## NORMAL INFARCT



# Nuclear Medicine: PET-CT Camera

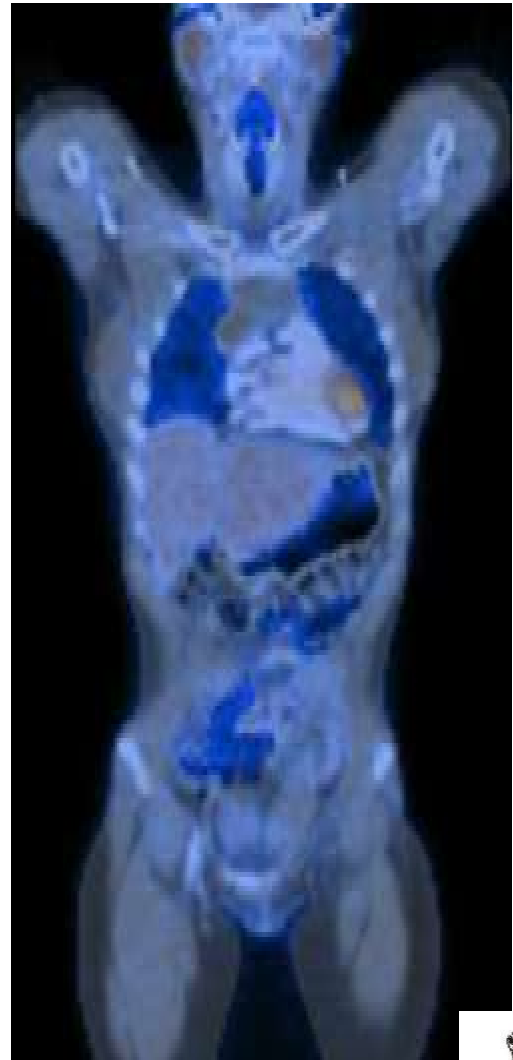


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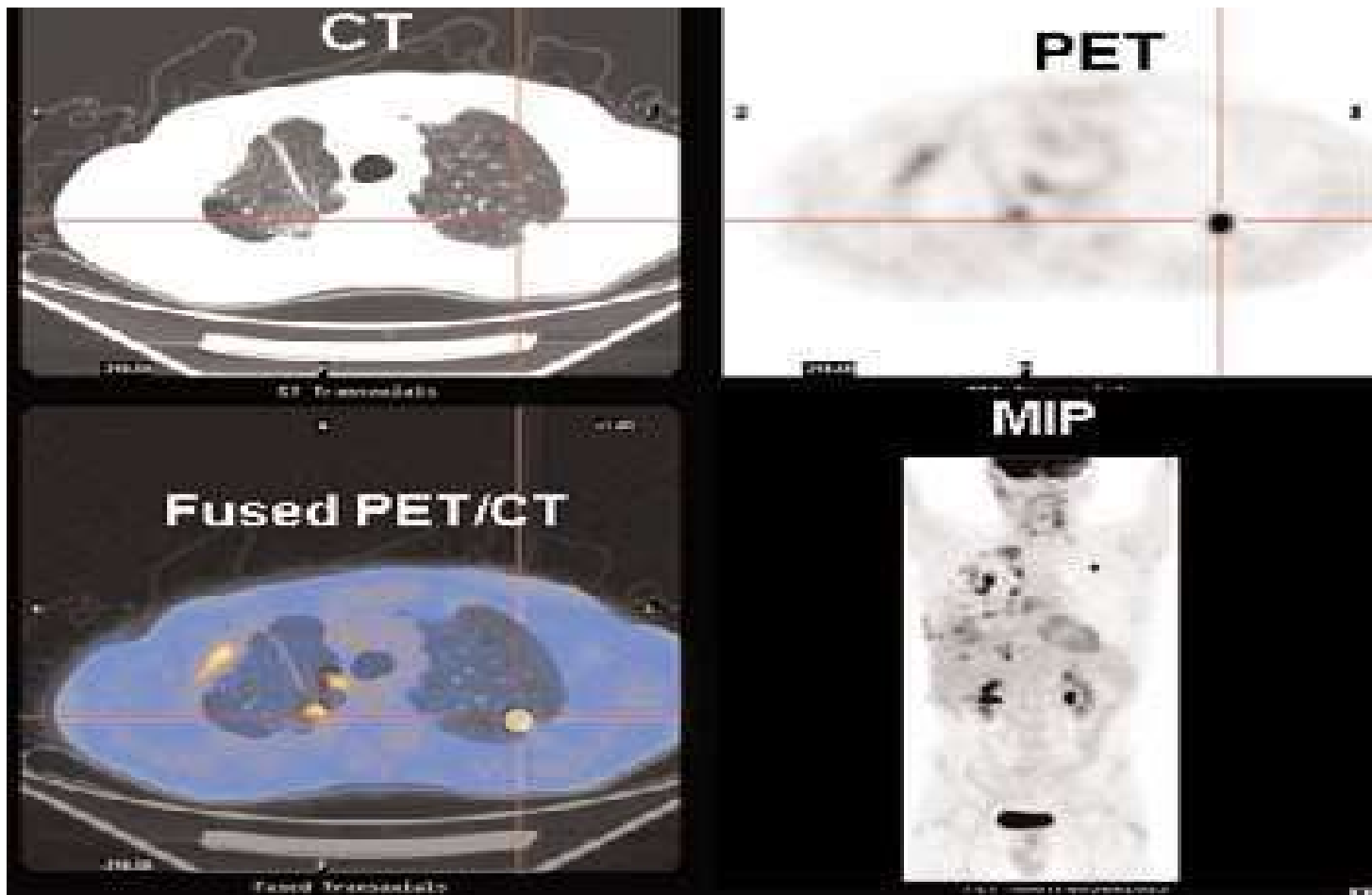
PET

CT

PET-CT



# PET-CT Fused Imaging

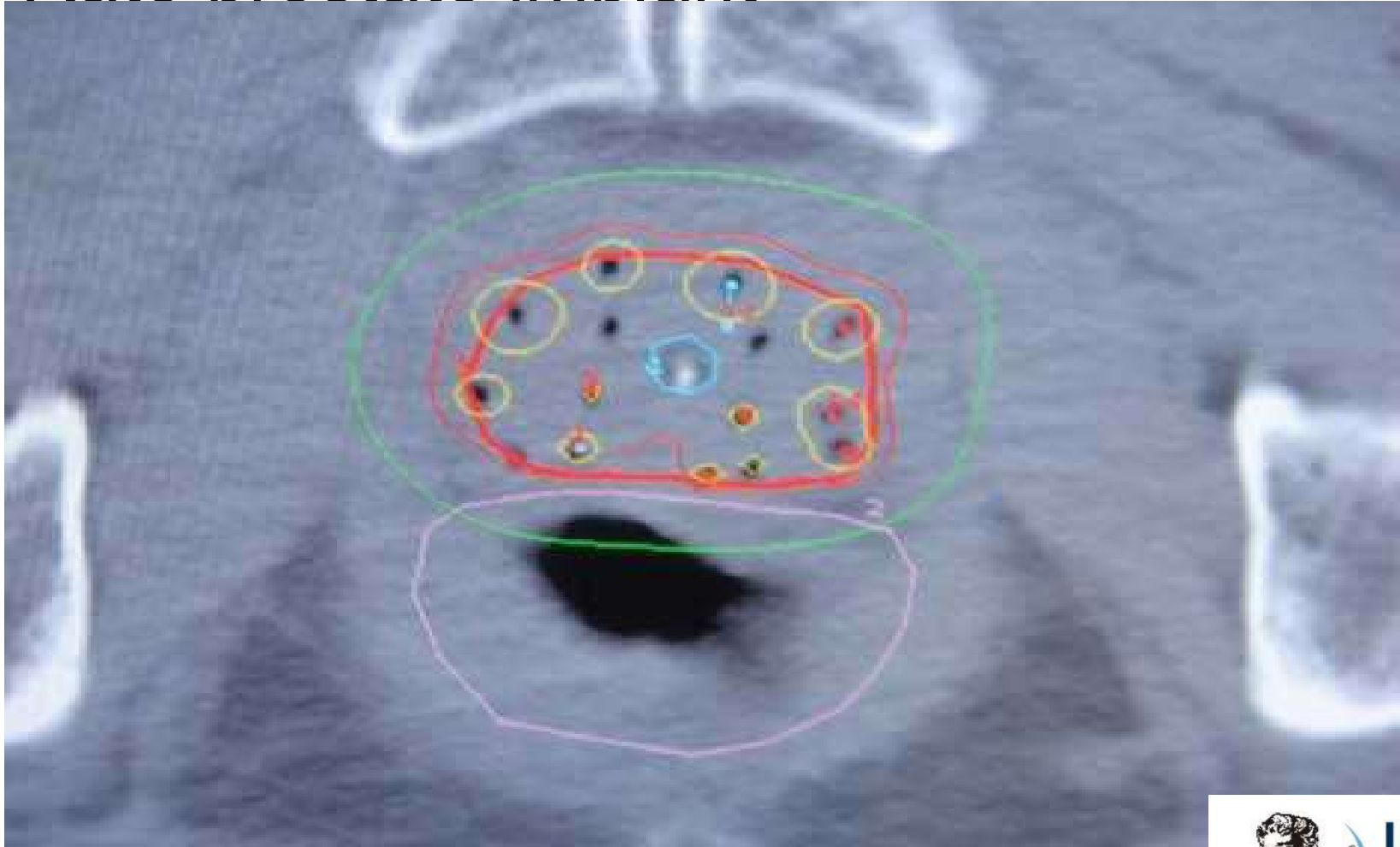


# Therapy

- **Radiation Therapists** play a vital role in the treatment of cancer
- Radiotherapy is used either on its own or in combination with surgery and/or chemotherapy.
- Therapeutic radiographers are trained in all the many aspects of radiotherapy including:
  - **Simulation** - using specialist x-ray fluoroscopy machines to target the area to be treated
  - **CT/MR Simulation** - producing scans to be used for the planning of a course of radiotherapy
  - **Computer planning** - producing a 3D plan of the dose distribution across the area to be treated
  - **External beam treatment** - using ionising radiation, such as high-energy x-rays to deliver accurate doses of radiation to the tumour
  - **Mould Room** - plan the treatment of and produce immobilisation / beam attenuation devices for radiotherapy to the head / neck
  - **Brachytherapy** - the use of small radioactive sources placed on or in tumors to treat to a high dose while avoiding normal tissues
  - **Stereotactic /IMRT** – High energy x-radiation focused onto tumor site with no/minimal dose to other structures



# Brachytherapy - Isodose distribution for a three dimensionally planned High Dose Rate prostate implant



# Radiotherapy Procedure - External Beam Therapy



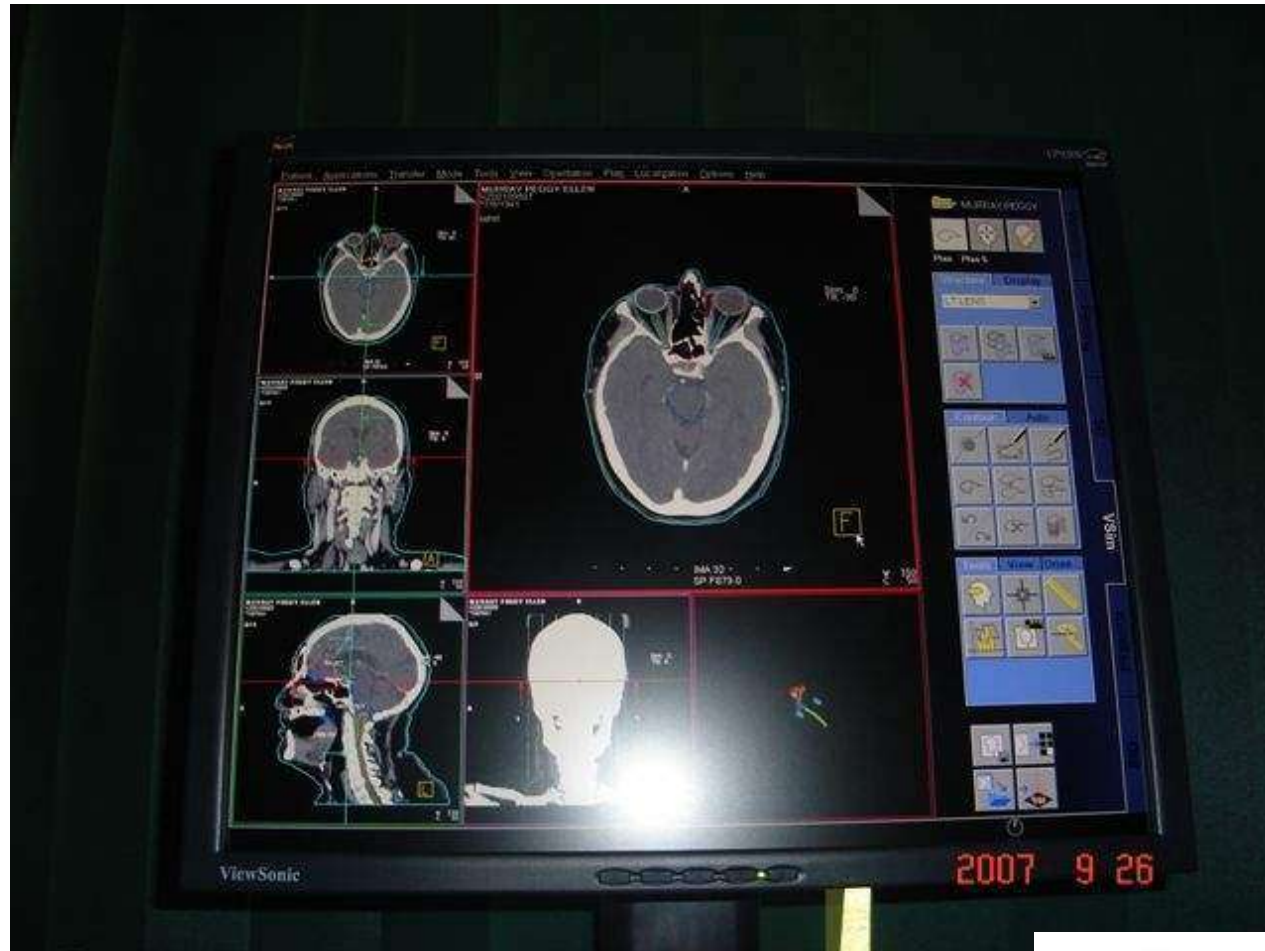
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# RADIOTHERAPY TREATMENT SYSTEMS

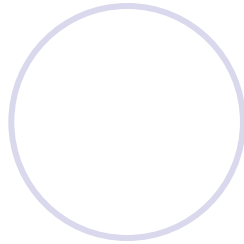
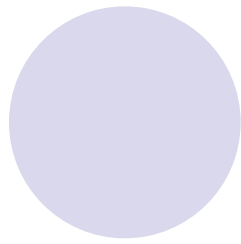


Dual energy linear accelerator

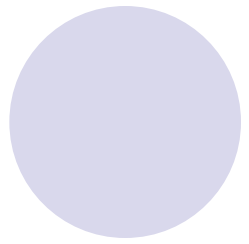
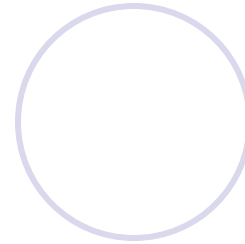
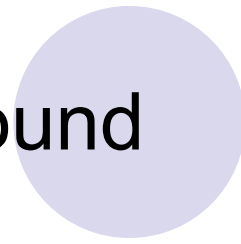
# Radiotherapy: Preparation & Computer Planning of Treatment of Tumors



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# Ultrasound



- **Sonographers** are the highly trained technologists who carry out Ultrasound examinations in many countries:
- Ultrasound uses high frequency sound to image structures within the body
- Increasingly used due to its versatility in:
  - obstetrics including fetal monitoring throughout pregnancy
  - gynaecology
  - abdominal
  - paediatrics
  - cardiac
  - vascular
  - musculo-skeletal



# ULTRASOUND

Ultrasound Equipment



Abdominal Sonogram



# ULTRASOUND

Fetal Profile

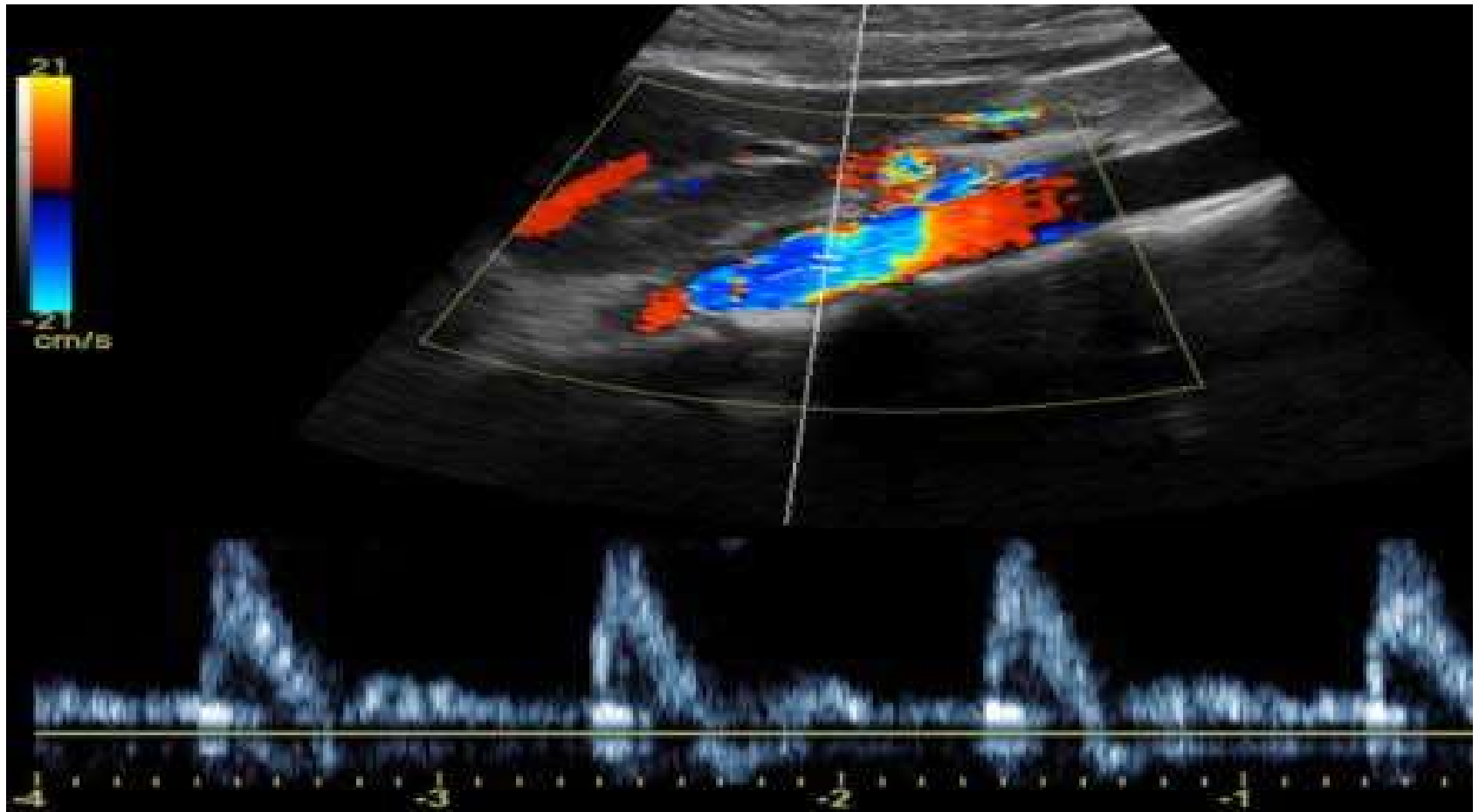
Fetal Face – 3D



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# Vascular Ultrasound of Abdominal Aorta

## Color flow and spectral doppler



# Why consider Diagnostic Radiography, Radiation Therapy, Nuclear Medicine or Ultrasound as a career ?

- You will be on the cutting edge of scientific progress
- Working with the latest advances in medical care
- You will also be a member of a growing profession
- Experts predict job openings for qualified radiographers will grow as technology expands, and opportunities to advance within the field increase
- You will be a vital member of the patient care team - providing the care that leads to diagnosis, treatment and cure
- Radiography - a career that makes a difference in others' lives while improving your own...

# Key Areas in Radiography

Radiographer plays a central role in linking the following important areas:

- patient care
- imaging technique
- treatment management
- radiation safety
- clinical responsibility
- organization
- quality assurance
- education and training
- health & safety

# SKILLS MIX

**Radiographers** need a range of skills:

- Good interpersonal skills to communicate with other members of the team and to provide support for patients who may be frightened or uncertain about what is going to happen
- Need to develop a rapport with the individual patient and often their family
- Knowledge of, and an interest in, the sciences such as biology, anatomy and physiology
- The confidence to work with leading-edge technology
- Excellent attention to detail
- The ability to learn new skills and adapt – radiography is constantly changing
- To make decisions quickly and independently
- To accept responsibility for actions





# Opportunity

A career in radiography can lead in many directions:

- Work in a large hospital or a suburban outpatient clinic or a rural practice
- Specialize in the different areas ranging eg CT, MRI, PET-CT
- Specialize in quality assurance
- Industry for overseeing the implementation of new technology
- Manage an entire radiology department, including its budget and personnel.
- Teach at a tertiary institute
- Further studies to become a radiologist assistant (USA) or radiographer consultant (UK)

The boundaries of your career in radiography may be determined by your own abilities and interests

# Study Programs

Students follow many paths into radiography:

- Two-year programs based in hospitals - earning a certificate when they graduate
- Two /three -year programs at community / technical colleges, earning a diploma/ associate degree.
- Three / four-year programs at universities and colleges, graduating with a diploma/ degree.

## Clinical Experience

Irrespective of the study program offered –

all students spend some time in the clinical environment where:

- one works side-by-side in departments with doctors, nurses and experienced radiographers.
- clinical rotation allows for hands-on opportunity to practice patient care skills and fine-tune the knowledge gained in the classroom

# Radiation Safety

Radiographers are in a key position regarding radiation protection of the patient, public and other staff members.

- Responsibility of radiographer to ensure amount of radiation delivered is kept as low as reasonably achievable (ALARA) to acquire high quality diagnostic images.
- Radiographer must ensure that correct dose of radiation is delivered to the prescribed tissue for therapeutic purposes
- Quality assurance programs must be efficient, caring and cost--effective with the objective of minimizing radiation to the patient, personnel and public

# Professional Conduct

- Radiographers work within their Code of Professional Conduct / Professional Ethics which sets out the underpinning values and principles to promote maintain and disseminate the highest standards of behavior in order to enhance the good standing and reputation of the radiography profession

# Outlook

## **Diagnostic Radiography, Radiation Therapy, Nuclear Medicine or Sonography**

- Offer a promising future
- Job stability
- Good salary

Due to advances in technology and aging populations, the demand for radiographic studies soar hence the need for a growing number of qualified professionals to provide medical imaging and radiation therapy

Salaries are competitive with other health professionals who have similar educational backgrounds.

entry-level radiographers

experienced radiographers

additional education / supervisory responsibilities,

Work flexible schedules: part-time / nights allowing time for family / friends, further studies / other activities.

# Job Functions of Extended Roles

- Radiographers reporting on x-rays
- Performing contrast studies and angiograms
- Injection of contrast/ radio-isotopes, veni-puncture
- Prescribing drugs in radiotherapy centres
- Reporting mammograms as first reader
- Senior hospital administrators, eg CEO, COOs, Directors

# INDUSTRIAL RADIOGRAPHY

- "*Industrial radiography*" refers to work involving the examination of the structure of materials by non-destructive methods utilizing ionising- radiation.
- Industrial radiographers must successfully complete a course in industrial radiography at an approved institution
- Post training they undergo a practical training period under the supervision of a qualified and authorised industrial radiographer

More Info:

- [www.isrrt.org/isrrt/Education\\_Standards](http://www.isrrt.org/isrrt/Education_Standards)

***‘Guidelines for the Education  
Of Entry-level Professional Practice  
In Medical Radiation Sciences’***



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# Greetings From the Board of the ISRRT



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