THE SOCIETY OF RADIOGRAPHERS OF SOUTH AFRICA

PRESS RELEASE: WORLD RADIOGRAPHY DAY

8th November of each year, has been declared World Radiography Day. On this day, radiographers all over the world, commemorates the discovery of x-rays by Professor Wilhelm Conrad Roentgen in 1895. It is an annual international initiative which is intended to raise awareness of and stimulate an interest in radiography as a profession. This initiative is further aimed at highlighting the importance of radiography and the indispensable function it plays in the health care environment. Many hospitals and health care centres participate in these celebrations by having open days and sharing information about radiography as a career.

History of Radiography

On 8th November 1895, Professor Wilhelm Conrad Röentgen, was working with cathode rays using evacuated glass bulbs. He noted that when a current was passed across the bulb, a barium platinocyanide screen was seen to fluoresce (light up). He realized the significance of this observation and simultaneously noted the effect of these phenomena on photographic plates. He termed this unknown phenomena as “X-rays”.
X-rays made sensational news due to their ability to penetrate wood, clothing and human skin. Home-made x-ray machines sets were built immediately after the discovery and was used to produce medical x-rays. Within three months of Roentgen’s discovery, radiographs were generated in all major cities on four continents.

This discovery has not only won him the Nobel Peace Price for Physics in 1901, but herald the start of a very important change in the way patients were treated in medicine. The discovery of x-rays has led to the realization of careers such as radiography, radiology and oncology. Patients today are not just only diagnosed with the use of x-rays, but many cancers are treated by the use of high energy x-rays.

Wilhelm Conrad Roentgen

Radiography in South Africa has four disciplines; namely, diagnostic (use of x-rays to produce diagnostic images), nuclear medicine, radiotherapy and ultrasound. Radiography is a very diverse career and there are lots of different areas that one can super-specialize in after qualification in one or more disciplines, for example, Computed Tomography [CT] mammography, Magnetic Resonance Imaging [MRI], or PET imaging. Radiographers are integral to and at the heart of modern medicine.

Diagnostic radiographers employ a range of sophisticated equipment to produce high quality images to diagnose injury or disease. They use a wide range of techniques including ordinary x-rays to diagnose broken limbs or image the inside of the thorax, to more specialised examinations such as CT, angiography, mammography.

Radiography has, as with other technological advances, also undergone rapid technological changes. Radiographers today operate CT scanners that can produce up to 64 images as thin as 1mm in less than one second in almost any plane and at any level of the human body. Dual source CT is currently state of the art technology where two x-ray tubes are employed in a scanner to produce still images of the fast moving heart, an option not possible four years ago. This allow specialists such as radiologists to view these images and make diagnosis that extend far better than was possible a decade ago.

There has been a world wide shift away from conventional processing of x-ray images. Digital radiography is now becoming the norm where x-ray images are produced by and stored on computers. Many state departments are now slowly introducing filmless departments, negating the need for processing of x-ray images in a darkroom. The need for processing images in darkrooms will in be obsolete in many hospitals, within the next five years. Digital radiography now allow doctors to view x-ray images on a television

monitor in wards, theatres or even a remote location a few hundred kilometers away. Patients are also allowed to have a copy of their images on compact disc which can be viewed on personal computers at home.

Magnetic Resonance Imaging (MRI) another widely used imaging modality, is a sub-speciality of diagnostic radiography used to produce 2 or 3 dimensional images of the body using magnetic waves and not x-rays as with all other modalities within diagnostic radiography.

Nuclear medicine radiographers administer radioactive tracers to prevent, diagnose, and treat disease. The tracers are used to facilitate the examination of the physiology of certain organs such as the kidneys or the heart. Radioisotopes are utilized in diagnosis as a standard practice nation-wide, and have been for over 60 years. An example of this service is bone scans performed to detect spread of cancers to the bony skeleton. Therapeutic uses of radioisotopes are growing and as more treatments are discovered and developed, radioisotopes are administered to treat various diseases such as thyroid cancer.

PET/CT is currently state of the art technology in which the CT technology is combined with that of PET imaging. This allows specialist to evaluate excellent anatomical detail of the body but at the same time physiological abnormalities caused by cancers. As this is a new and expensive modality, only one state hospital, the Inkosi Albert Luthuli Central Hospital in Durban boats with this technology.
The nuclear medicine radiographer is highly skilled in the preparation and administration of radioactive chemical compounds, known as radiopharmaceuticals. Performing patient imaging procedures using sophisticated radiation-detecting instrumentation, for example, gamma cameras and PET scanners, accomplishing computer processing and image enhancement. All these examinations require radiographers to provide images, data analysis, and patient information for diagnostic interpretation.

Radiotherapy radiographers play a vital role in the treatment of cancer where they plan and deliver radiotherapy. Therapeutic radiographers are trained in the many aspects of radiotherapy including simulation. Simulation uses specialist x-ray fluoroscopy machines to target the area to be treated whilst minimising the amount of exposure to surrounding healthy tissue

CT/MR Simulation - producing scans to be used for the planning of a course of radiotherapy. Computer planning is a procedure where a 2-D or 3-D plan of the dose distribution across the area to be treated are established. External beam treatment uses ionising radiation, such as high-energy x-rays, to deliver accurate doses of radiation to the tumour in order to shrink or destroy the tumour. Brachytherapy uses a small radioactive source placed in theatre on or in tumors to deliver a high dose to a cancer, while avoiding normal tissues. On treatment review radiographers regularly assess patients while they are undergoing radiotherapy, referring them to medical doctors to prescribe drugs to counteract side effects where necessary.

Ultrasound radiographers use high frequency sound waves to produce diagnostic images. Ultrasound is increasingly used due to its versatility in fetal monitoring throughout pregnancy, gynaecology, abdominal, paediatrics, cardiac, vascular and musculo-skeletal

imaging. Ultrasound examinations can help to diagnose a variety of conditions, for example, to assess organ damage following illness, pain, swelling, infection or cancers. Ultrasound may be used to: guide procedures such as needle biopsies, in which needles are used to extract sample cells from an abnormal area for laboratory testing, image the breasts, and to guide biopsy of breast cancer to diagnose a variety of heart conditions and to assess damage after a heart attack or other illness.

Doppler ultrasound images can help the physician to see and evaluate, blockages to blood flow, narrowing of blood vessels, tumors and congenital malformation.

Skills

Radiographers need good interpersonal skills to communicate with other members of the health care team and need to be compassionate towards patients who may be afraid or uncertain about what is going to happen. They require the confidence to work with leading-edge technology with excellent attention to detail. As radiography is a very dynamic field, radiographers need the ability to learn new skills quickly and to be able to make decisions quickly and independently with new technological advances. Radiographers are bound by a code of professional conduct which underpins values and principles to promote and maintain the highest standards of behavior in order to enhance the reputation of the radiographic profession

Training

Radiography undergraduate education in South Africa is a minimum three year professional qualification offered at seven tertiary institutions in South Africa. Radiographers must have a basic knowledge of the sciences such as radiation physics, biology, anatomy and physiology. Post graduate studies in the honours, masters and doctoral fields are also available. Specialised courses in the various radiographic disciplines are also offered by some training institutions.

Employment

Currently there is a dire shortage of radiographers in South Africa as many seek employment overseas. South African trained radiographers are in high demand in countries such as the UK, Ireland, Canada and Australia. Radiographers in South Africa are classified by the Department of Health as a ‘scarce-skill’. Radiographers may find employment in state facilities, the private sector and may also open their own private practices. Radiographers can also be employed by educational institutions or at research units attached to some universities.