



MEDICAL PHYSICS Newsletter

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Inside This Issue

Application of Physics in Medical Field

Medical Physicists' Roles and Responsibilities

What is Radiation?

Radiation in Daily Life

An Overview of Development of Radiotherapy Facilities in Malaysia

International Day of Medical Physics (IDMP) 2020 Webinar

Radiation Safety Awareness Talk

Application of Physics in Medical Field

RADIATION ONCOLOGY

Radiation oncology is the treatment of cancer using radiation therapy. It uses high doses of external or internal radiation beam to kill cancerous cells.



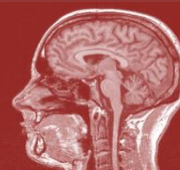
NUCLEAR MEDICINE

Nuclear medicine uses radioactive substances to diagnose and treat various diseases in humans.



BIOMEDICAL IMAGING

Biomedical imaging uses radiation to create visual representations of internal structures of human body to diagnose and treat disease.



What is Radiation?

Radiation is the emission or transmission of energy in the form of waves or particles through space or through a material medium.

Editorial Members

Advisor

Mrs Azleen Mohd Zain

Editor

Mrs Aminah Mohamed

Contributing authors

Mrs Zamzarinah Kamarul Zaman

Mrs Anis Suhana Ahmad Sabri

Contact us:

aminah@ummc.edu.my
03-79494875/3110

Medical Physicists' Roles and Responsibilities

By Aminah Mohamed

Medical physicists are the experts in physics and instrumentation with a good knowledge of relevant biology, and provides technical support for diagnostic and therapeutic medical procedures. They create innovations to improve patient care by making radiation usage more effective and safer. Medical physicist's roles often also include radiation protection responsibilities.



Medical physicists perform quality assurance and quality control by ensuring that all medical imaging and radiation equipment accurately calibrated and functions at optimal levels, and that the procedures and treatments are safe.

They ensure that cancer patients receive prescribed doses of radiation treatment, targeted to kill the cancerous cells, while protecting healthy tissues. To improve patient care, medical physicist use innovative ways to consult with patient about the benefits and potential risks of radiation doses in medical imaging and radiation treatment.

"The true sign of intelligence is not knowledge but imagination"

Albert Einstein

Medical imaging benefits from the knowledge and skills of the medical physicists in determining protocols that improve image quality and effectiveness while minimizing radiation risk to patient. The roles and responsibilities of medical physicists oriented toward clinical service, management, education and research.

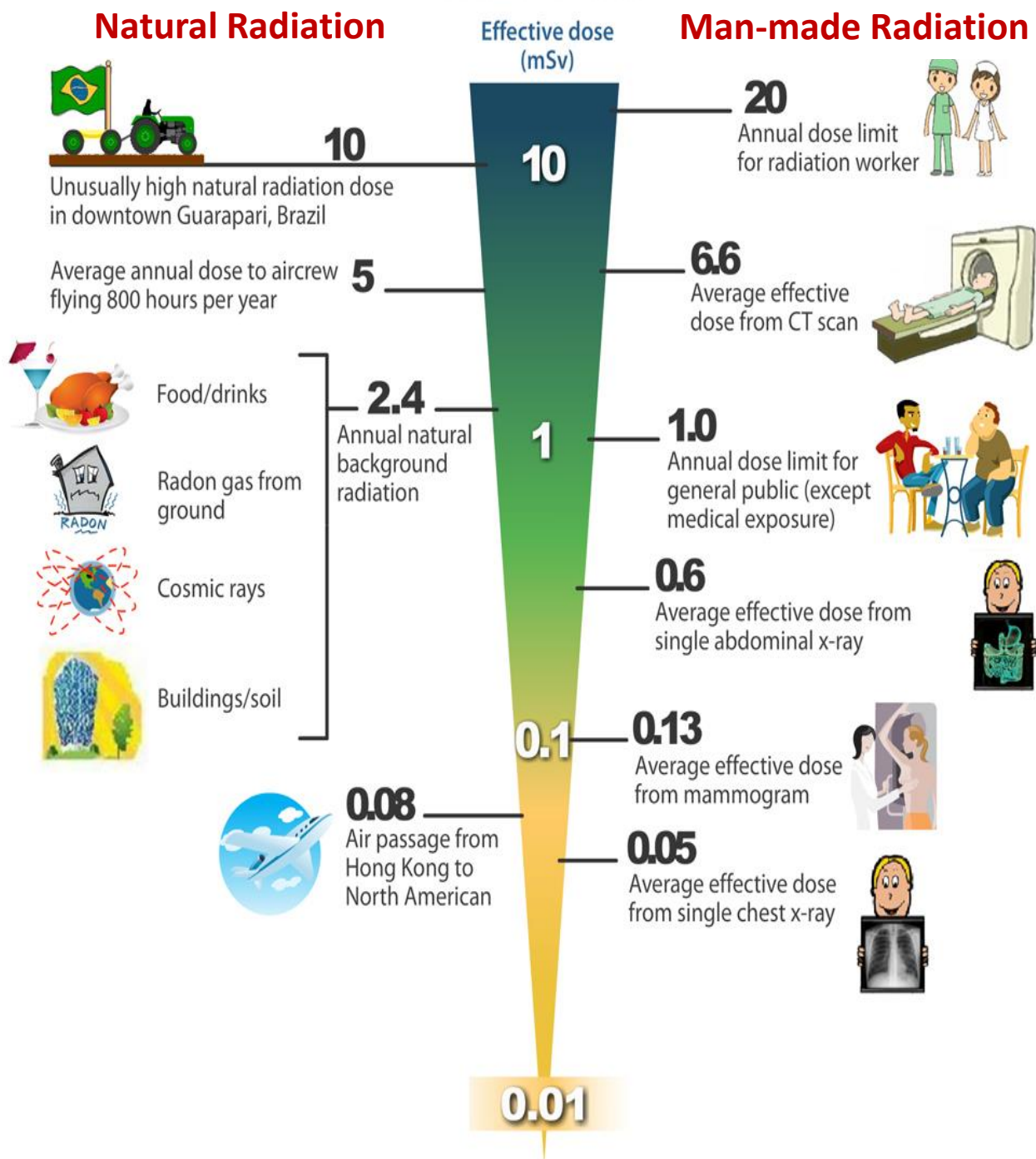
References:

*International Atomic Energy Agency, humanhealth.iaea.org
International Organization of Medical Physics, www.iomp.org*



Radiation In Daily Life

By Anis Suhana Ahmad Sabri



Reference: <http://www.dbcp.gov.hk/eng/safety/knowledge.html>



An Overview of Development of Radiotherapy Facilities in Malaysia

By Zamzarinah Kamarul Zaman

Radiotherapy (RT) describes the procedure of treatment that uses ionizing radiation to kill cancerous cells. The high energy linear accelerator or linear accelerator is the foremost modality unit used in oncology management either for curative or palliative treatment, apart from chemotherapy and surgery.

The RT machine uses a high energy linear accelerator (LINAC) generating both high energy x-rays (photon beams) and electron beams or a combination of both beams. It has the capability to change and ionize atoms and molecules inside the living tissue thus killing the cancerous cells by damaging their DNA. Photon energy has been widely used for deep-seated tumor and electron energies are beneficial for superficial cancers. Thus, many of the LINAC-based radiotherapy machines provide the option of using photon beams as well as electron beams for cancer treatments.



The early of Radiotherapy and Oncology Department in General Hospital Kuala Lumpur

Installation of the first radiotherapy machine in Malaysia began in 1914 with the procurement of Crookes x-ray tube in Singapore. This disclosure initiated the next installation of a superficial x-ray machine, Philips Dermopan 50 (Philips NV, Netherlands), and Muller x-ray machine in the country later in the 1950s. (Abd. Aziz & Bradley, 1995)

The early state of radiotherapy services started at Kuala Lumpur General Hospital. During that year, the radiotherapy team was only a small group operated in a single wooden building house consisted of radiotherapists from Singapore, two radiographers, a staff nurse, a secretary, and one attendant.

*Malaysian
consultant
radiotherapist,
Dato' Dr. S.K.
Dharmalingam*



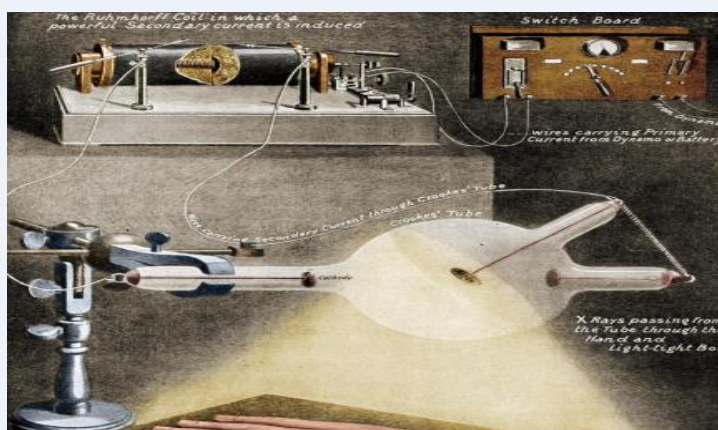
After a few years, Dato' Dr. S.K. Dharmalingam was the first Malaysian to be appointed as a Consultant Radiotherapist and he was driving the radiotherapy one step ahead with some help from the expert practitioners from European country. (Lim, 2006)

A few other linacs were installed with the incentives from the government that was made to the new Institute of Radiotherapy, Oncology, and Nuclear Medicine. The 6 MV linear accelerator (MEL-75) and electron accelerator, Siemens Betatron (Siemens AG, Germany) with electron energies ranging from 5 MeV to 43 MeV were installed, and by 1977 and over the next few years another single energy linear accelerator and a tele-caesium unit were installed to replace the existing orthovoltage machines. After the development phase II completed in 1955, another two new linear accelerators were installed in 1997 and 2001 in the same department. (Lim, 2006)

In 1997, the Clinical Oncology Department was opened at the University of Malaya Medical Centre (UMMC) and started serving the public in September that year. It is situated on the 1st floor of Menara Timur and occupies a floor area of 28,000 square feet with space including radiotherapy and treatment planning areas. The first state-of-the-art linac machines were installed in the same year. A single photon energy Varian Clinac 600 and dual energies Clinac IX 2100C/D which equipped with Multi-leaf Collimator (MLC) to shape the beam of radiation. The team consisted of two oncologists Dr. Ibrahim Wahid and Dr. Martin Melor, the physicists Nicky Whyld, Khoo Boon Huat, and Prema Rassiah, and the radiographer therapy, T. Yogarathnam.

“Radiotherapy has the capability to change and ionize atoms and molecules inside the living tissue thus killing the cancerous cells by damaging their DNA”

To date, there are growing numbers of Linac machine in Malaysia. Until November 2018, there are 59 centers have been registered in the Ministry of Health to own a license for linac either for public or private practice.



Crookes x-ray tube

References:

- Abd. Aziz, T., & Bradley. (1995). *Centennial of the X-ray an Account of Developments in Radiological Physics and Radiology in Malaya and Malaysia*. Penang: Universiti Sains Malaysia.
- Lim, G. (2006). *Clinical Oncology in Malaysia: 1914 to Present*. *Biomedical Imaging and Intervention Journal*, 2(1), e18-e18. doi:10.2349/bij.2.1.e18
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Medical Physics Unit Activities

International Day of Medical Physics (IDMP) 2020 Webinar

The World Health Organization (WHO) wishes to congratulate all medical physicists on their international day. The International Organization for Medical Physics (IOMP) organizes annually the International Day of Medical Physics (IDMP) to raise awareness about the role of medical physicists to improve safety and quality of health care for the benefit of patients.

Medical Physics Unit, UMMC has organized a webinar in conjunction with International Day of Medical Physics 2020 on

5th November 2020. This year IDMP's theme is "Medical Physicist as a Health Professional" to mark its significant contribution in healthcare profession, globally.

To create awareness and visibility of medical physicists' roles in healthcare, the Medical Physics Unit of UMMC celebrates IDMP 2020 with the cooperation of the Malaysian Association of Medical Physics (MAMP), Persatuan Pegawai Sains Fizik KKM (PERFEKS) and Malaysian Institute of Physics (IFM).



UMMC IDMP 2020 WEBINAR
"Medical Physicist as a Health Professional"

Host
Mrs Azleen Mohd Zain
Head, Medical Physics Unit, University of Malaya Medical Centre (UMMC)

Physicists' Career Updates in Malaysia
Prof Dr Kurunathan A/L Ratnavelu
President, Malaysian Institute of Physics (IFM)

Medical Physicists' Roles in Healthcare
Dr Mohd Hafiz Mohd Zin
President, Malaysian Association of Medical Physics (MAMP)

Future and Challenges in Medical Physics
Mr Nik Mohamed Hazmi Nik Husain
President, Persatuan Pegawai Sains Fizik KKM (PERFEKS)

5th November, 2020 (Thursday)
0900 - 1200

For webinar meeting please join us at:
<https://zoom.us/j/96906668521?pwd=STpUZWtRZkF0bndMSlBia2EvaENoZj09>

For registration and certification, please fill in the form at:
<http://shorturl.at/GGQUS>

Radiation Safety Awareness Talk



Radiation Protection Talk, Dewan Sekapur Sirih, UMMC, 11th September 2020



"We must believe that we are gifted for something, and that this thing, at whatever cost, must be attained"

Marie Skłodowska Curie
1867-1934



**PUSAT PERUBATAN
UNIVERSITI
MALAYA**



Radiation Safety Awareness Talk, Department of Emergency Medicine, UMMC, 8th October 2020

Medical
Physics
for
Patient
Benefit

Contact Us

Medical Physics Unit

10th Floor, Menara Selatan
University of Malaya Medical Centre
59100 Kuala Lumpur
Tel: 03-79494875/3110

e-mail: aminah@ummc.edu.my