



Occupational Radiation Protection in Diagnostic and Therapeutic Nuclear Medicine

Mrs. Karima OUCHAHMI

Agence Marocaine de Sûreté et de Sécurité Nucléaires et Radiologiques (AMSSNuR), Rabat – Morocco
k.ouchahmi@amssnur.org.ma

Poster #159

1. Nuclear Medicine in Morocco : Inventory

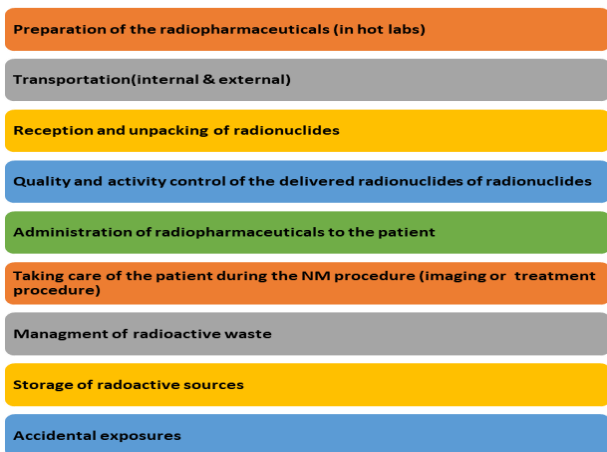
With the advance of the medical sector in Morocco, the practice of Nuclear Medicine is also getting developed, as a fundamental tool in the diagnosis and treatment of many diseases and disorders. Its development is perceived in terms of the number of nuclear medicine centers operating in the country, the occurrence of new nuclear medicine units implemented with the latest technologies and human resources' availability and qualification, in order to respond to medical issues on the national and regional scale.

- Nuclear medicine in Morocco in numbers :

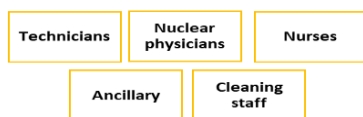
25 Nuclear medicine centers
13 PET CT
10 SPECT CT
15 Gammas cameras
44 Radioactive Iodine (I-131) therapy rooms

2. Radiation risk for staff in nuclear medicine

Employees in the nuclear medicine services are subject to the risk of exposition to radiation during :

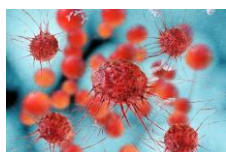
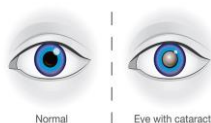


This risk is incurred by :



according to the tasks carried out, and it consists of external exposure when using radiopharmaceuticals and when performing conventional radiological examinations, and to the risk of contamination when handling unsealed sources. The patient is a source of exposition too, when intake of radiopharmaceuticals.

Common hazards and safety concerns includes: Formation of Cataracts and cancer



3. International recommendations : IAEA, ICRP & UNSCEAR

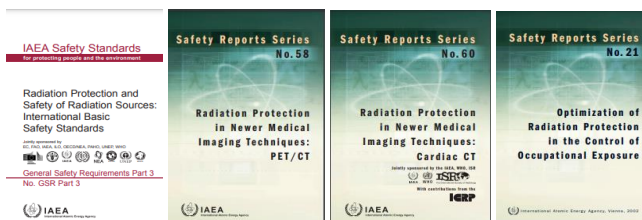
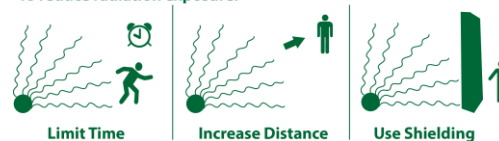
According to the International Commission on Radiological Protection (ICRP) report number 103, the radiation dose to workers is expressed in terms of effective dose and equivalent dose for extremities and eye lens

Type of Dose Limit	Limit on Dose from Occupational Exposure
Effective Dose	20 mSv per year, averaged over defined periods of 5 years, with no single year exceeding 50 mSv After a worker declares a pregnancy, the dose to the embryo/fetus should not exceed about 1 mSv during the remainder of the pregnancy
Equivalent Dose to the Lens of the Eye	20 mSv per year, averaged over defined periods of 5 years, with no single year exceeding 50 mSv
Equivalent Dose to the Skin Averaged over 1 cm ² of skin regardless of the area exposed	500 mSv in a year
Equivalent Dose to the Hands and Feet	500 mSv in a year

Dose limits are primarily from ICRP Publication 103 Table 6. The recommendation for pregnant workers is from ICRP Publication 103 Paragraph 186. The occupational limit for the lens of the eye is from Paragraph 3 of the ICRP Statement on Tissue Reactions in ICRP Publication 118.

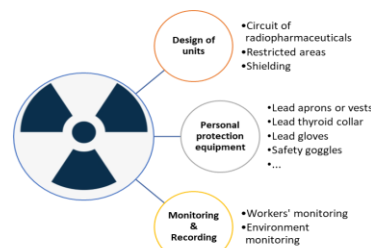
Following and applying all the requirements established in the International Basic Safety Standards for Protection against Ionizing Radiation and the Safety of Radiation Sources based on the principles of radiation protection : Justification - Optimization – Limitation , contributes to ensuring the implementation of radiation protection measures within nuclear medicine departments.

To reduce radiation exposure:



Currently, the **linear no-threshold model** is used in radiological protection. This model assumes that even the smallest increase in dose may have a negative health effect. For years, there has been discussion about health effects of small doses of ionizing radiation. However, according to common legislations, employer is obligated to ensure radiation protection of workers at a level, which will eliminate occupational exposure.

4. Means to ensure radiation protection of workers :



5. Good practices in Nuclear Medicine

- Established procedures
- Organization of the work
- Calibrated monitoring devices