



Appraising Occupational Radiation Protection in Medicine and the Nigerian Radiation Safety in Nuclear Medicine Regulation 2006

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1. Background and Goal of the present work

The goal of radiation protection in medicine continues to be focused on ways to lessen unwarranted exposure to radiation thereby curbing as much as possible the injurious consequences of ionizing radiation.

This paper focuses on the laws put in place to protect patients, workers and the general public from the risks associated with exposure to ionizing radiation in the course of nuclear medicine practice in Nigeria, and to assist licensees in meeting radiation safety and protection requirements in nuclear medicine practice for the attainment of adequate radiation protection and safety of patients. This paper will examine the extent to which these regulations governing radiation safety in nuclear medicine protects the health professionals in Nigeria whose work involves radiation exposure.

2. Legal Framework on Occupational Radiation and Nuclear Safety in Nigeria

2.1. The Nigerian Atomic Energy Commission Act came into existence through the enactment of Decree No. 46 in August 1976 leading to the establishment of the Nigerian Atomic Energy Commission, and launching of the national nuclear programme in Nigeria. The clause in Section 2 dealing with the use and dispose of atomic energy encompasses the use of nuclear energy for medical reasons.

2.2 The Nuclear Safety and Radiation Protection (NSRP) Act of 3rd August, 1995 established the Nigerian Nuclear Regulatory Authority (NNRA) in 1995, and the Nigerian Safety and Nuclear Medicine Regulation (NSNMR) 2006.

2.3 The NNRA's action plan is targeted at protecting workers against exposure to ionizing radiation. Workers in this respect are those who encounter radiation or radioactive substances in the course of their job. This includes both health workers and their patients.

2.4 In keeping with IAEA safety standards, the recommended dose limits for occupational exposures in radiation workers was stipulated by the NNRA as 20 mSv per year (averaged over a period of 5 years consecutively).

2.5 The NSRP Act in Section 47 provides that: the Authority may, with the approval of the President make regulations, prescribing anything required to be prescribed under the Act, hence the adoption of the Nigerian Safety and Nuclear Medicine Regulation to provide for what the principal Act did not cover as it related to safety and the practice of nuclear medicine in Nigeria Experimental cross-section database.

3. Administrative Requirements and Authorization of Practices under NSNMR, 2006

3.1 Administrative Requirements and Authorization of Practices constitutes Part II of the Principal Requirements of the NSNMR. The Regulation provides that: any legal person who intends to utilize radiation sources in nuclear medicine shall notify his intention to the NNRA and shall apply for authorization in the form of a licence for in vivo use and a registration for in vitro use.

3.2 The regulation also provides for: Renewal of Authorization for the Utilization of Radiation Sources in Nuclear Medicine; Personal Accreditation and Educational Requirements; Requirements for Obtaining Personal Accreditation; Authorization/Inspection/Withdrawal of Authorization and other Activities Related to Nuclear Medicine

4. Radiation Safety and Protection Requirements

4.1 The radiation safety and protection requirements on justification of the practice, dose limitation and optimization of protection and dose constraints of

Section 25 of the Nuclear Safety and Radiation Protection Act and Regulation 15 of Nigeria Basic Ionizing Radiation Regulations shall be applied in nuclear medicine. The dose limits for occupational and public exposure are reproduced in the first Schedule.

4.2 Section 25 of the NSRPA which deals with control of exposure to radiation provides that the Authority shall, in the performance of its functions and for the protection of radiation workers and the general public, ensure that no practice is adopted, unless its introduction produces a positive net benefit; and the dose equivalent to individual, shall in no way exceed the established limits prescribed by the Authority.

5. Who is Responsible for Applying Safety Standards?

5.1 Specifically to medical exposure, the Nigerian government has the responsibility to ensure that as a result of consultation between the health authority, relevant professional bodies and the regulatory body: the relevant parties are authorized to assume their roles and responsibilities; a set of diagnostic reference levels is established for medical exposures.

5.2 In the case of medical exposures, primary responsibility for protection and safety for patients lies with the health professional responsible for delivery of medical exposure. Only persons with the appropriate competencies are allowed to take particular roles and responsibilities; this applies in particular to persons undertaking the role of radiological medical practitioner, medical radiation technologist, or medical physicist.

5.3 Other parties also bear certain responsibilities or can influence safety, such as suppliers of radiation generators and radioactive sources, technical standards associations, medical devices regulatory agencies, and health technology assessment agencies, health insurance or reimbursement companies and standards accreditation bodies.

6. Quality Assurance Indicators and Effectiveness of Regulatory Bodies

6.1 The NNRA has its occupational radiation dose assessment program, which evaluates annually the average effective exposure doses, specifically exposure doses accrued by the occupational exposure of workers in diverse enterprises in Nigeria. The essence is to evaluate the capacity of the regulatory measures to abide by the principles of occupational radiation protection, as well as ensure adherence to international standards.

6.2 The NNRA received the International Atomic Energy Agency (IAEA) Expert Team for the Occupational Radiation Protection Appraisal Service (ORPAS) Mission to Nigeria in July, 2022.

7. Conclusion

The legal framework for occupational radiation protection in Nigeria is essentially embodied in the Nigerian Atomic Energy Commission Act 1976 and Nuclear Safety and Radiation Protection (NSRP) Act of 1995. The Nigerian Nuclear Regulatory Authority (NNRA) has established a sound regulatory framework to guarantee the safety of all workers involved in the use of ionizing radiation; there is a prescribed dose limit at per with international standards, and radiation exposure is maintained As Low As Reasonably Achievable (ALARA). Potentially, the Nigerian regulations governing radiation safety in the medical industry are adequate to protect the health professionals whose work involves radiation exposure; however, compliance and quality assurance should remain key areas of focus for optimum application. The Nigerian government should be aware of key stakeholders who bear certain responsibilities or can influence safety in the country and utilize their influence to improve the practice of radiation protection and safety in medical uses of ionizing radiation.