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Tell me a little about yourself. How did you become interested in Medical Physics?

I am a woman passionate about science and technology, which prompted me to prepare myself both personally and professionally. I graduated from the National University Federico Villarreal with a degree in Medical Technology specializing in Radiology. I started my work activities at the Nuclear Medicine Service of Dos de Mayo National Hospital, where I discovered a field that fascinated me, "radiation protection". To learn more about this discipline, I began attending courses at the Centro Superior de Estudios Nucleares (CSEN) of the Peruvian Institute of Nuclear Energy (IPEN), where I met my radiation protection and medical physics teachers and mentors, to whom I am deeply grateful, not only for training me with their knowledge and experience but also for their advice and for believing in me.

After completing my master's studies, I did a practical internship in Spain, which allowed me to visit and learn about the hospital radio physics and radiation protection services of hospitals in Extremadura, Salamanca, and Madrid. It was an enriching experience thanks to my mentor and the Ibero-American Group of Radiation Protection Scientific Societies.

I returned to Peru with a new challenge, presenting to the management of Dos de Mayo National Hospital the project of "Creation of the First Radiation and Medical Physics Safety Unit in the country." Our journey was not easy. Throughout this time, the Radiation and Medical Physics Safety team has worked intensively to consolidate and position itself in the hospital, and now we can say that "we have achieved it". Likewise, our experience of almost 23 years has allowed us to become a reference in the country, as we support hospitals

and private clinics that require our advice and training of their professionals in radiation protection and medical physics.

Currently, I am also the Postgraduate Coordinator of the Professional School of Medical Technology at the Faculty of Medicine of the Cayetano Heredia University in Peru.

Can you tell me what a Medical Physicist does in medical X-ray diagnosis?

A Medical Physicist in the Radiodiagnosis Service must perform, among others, the following:

- Implements, in coordination with the head of the Radiodiagnosis Service, the Quality Assurance Program (QAP) of the Radiodiagnosis Service.
- Implements the physical, technical, and patient dose optimization aspects contained in the Radiation Protection Manual (RPM) of the Radiodiagnosis Service.
- Participates in the review of diagnostic and medical treatment procedures with X-rays, for the optimization of patient doses.
- Estimates patient doses in Radiodiagnosis Service procedures.
- Obtains and establishes reference levels for diagnosis in the Radiodiagnosis Service.
- Implements the Dose Optimization Program (DOP) and applies institutional diagnostic reference levels.
- Verifies compliance with acceptance tests, start-up, and calibration protocols of recently acquired equipment.
- Supervises the quality control service of X-ray equipment and auxiliary systems.
- Supervises the preventive and corrective maintenance of equipment and evaluates the report of the results of post-maintenance quality control tests.
- Participates in staff training through the annual program of continuous education and training in radiological procedures and radiation protection of the Radiodiagnosis Service.

Estimates doses in cases of improper, involuntary, or accidental exposure, and evaluates the involved risk.

Based on your own experience, what technical aspects would you consider are evolving in medical X-ray radiodiagnosis?

Technological development in medical radiodiagnosis means improving diagnosis while keeping radiation dose as low as possible and increasing efficiency to reduce costs. This development has led to increased productivity for radiodiagnosis services and professionals, improved accessibility to higher-quality medical images, reduced unnecessary testing and patient wait times, and access to studies and reports from anywhere with an internet connection through electronic devices.

The development of new technologies in radiodiagnosis, including digital detectors, has brought significant innovation to digital radiology.

It is worth noting that technological advances limit patient exposure. A report published by the National Council on Radiation Protection and Measurements in 2019 demonstrated that doses decreased between 15% and 20% in US patients between 2006 and 2016. The report attributes the decrease in doses to the development and improvement of equipment design (hardware) and configuration (advanced software), Image Gently and Image Wisely campaigns, along with increased utilization of the ACR Dose Index Registry, and mandatory accreditation requirements for imaging diagnostic centers.

How would you summarize the care to be taken for patient protection in X-ray radiodiagnosis medical services?

Radiation protection for patients in radiodiagnosis services must comply with the principles of justification and optimization, establishing and applying reference levels for diagnosis, to avoid exposing patients to unnecessarily high doses.

Similarly, procedures should always be optimized to reduce doses without affecting the quality of diagnostic information. Special attention should be paid to children's exposure due to their greater sensitivity to radiation. Measures must be taken to ensure fetal radiation protection, especially regarding justification, emergency cases, and procedure optimization.

On the other hand, to guarantee the optimization of the dose delivered to the patient, X-ray equipment must undergo regular maintenance and calibration to reduce the possibility of failure and ensure continuous, reliable, safe, and cost-effective equipment operation. Similarly, X-ray systems must undergo quality control annually and when required, to verify their stability, operability, and optimal performance, as well as their clinical performance.

Similarly, what can you tell us about the need to implement quality assurance programs in radiodiagnosis services?

The implementation of quality assurance programs in radiodiagnosis services is a priority to plan and systematize their administrative and assistance activities, aiming to ensure that the final product, the medical image produced and managed in their radiological facilities, has a high diagnostic quality that allows obtaining timely information that motivated the prescription, at the lowest possible cost, and with minimal patient exposure to radiation.

What challenges lie ahead for the future?

Challenges and difficulties will always be present. Therefore, I would love to consolidate the Radiation Safety and Medical Physics Research Area so that young students and professionals can carry out their research projects. Of course, there are often difficulties due to the lack of instrumentation and budget to complete these projects. However, we now have sponsors who collaborate by providing us with the necessary instrumentation or with the support of their engineering staff for a comprehensive evaluation. For example, for my research on the quality of reconstructed images in digital breast tomosynthesis, we needed phantoms to evaluate the modulation transfer function in the XY and Z directions, as well as to evaluate the artifact scattering function. Since we did not have them in Peru, the collaboration of our sponsors allowed us to develop the first phantoms of this type in the country.