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Medical Physics

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The medical application of X-ray imaging has dramatically expanded since its discovery in 1895 by Roentgen. Initially only used for specific medical diagnosis, they soon became a routine part of patient care and seen as central to patient diagnosis by the 1930s<sup>1</sup>. As its application expanded, many new technologies and techniques to enhance body imaging through X-rays were developed in the 20<sup>th</sup> century; however, when prolonged exposure to high radiation levels were found to be harmful, newer safety and protective measures began to be introduced to reduce dosage while maintaining image quality. The Quality Assurance (QA) program for diagnostic X-ray machines is a systematic and organized process that monitors the X-ray imaging equipment, aiming to provide assurance to the end users that the equipment's apparatus and performance is in compliance with the safety standards set by a competent authority, such as the Queensland Radiation Safety Standard HR001:2010<sup>2</sup>. Since a certain amount of radiation is unavoidable, therefore the exposure to the rays has to be as low as possible to achieve a reasonably good image while ensuring the accuracy of the diagnosis, according to the objectives of the interventional or the diagnostic procedure. The program evaluates X-ray equipment from the manufacturing stage till after the installation at a medical facility to ensure that all processes conform to QLD HR001:2010. The program thus aims to obtain optimal diagnostic information and radiograph quality with the lowest risk of radiation to the patient and the avoidance of unnecessary costs. In this regard, the aim of the report is to examine the compliance of the X-ray equipment with respect to the QLD HR001:2010 safety standards by means of a range of tests, as specified in the standard, such as its linearity, reproducibility, beam quality and accuracy, exposure time, and the reproducibility of results<sup>2</sup>. The report will therefore provide a clear assessment as to

whether all the necessary safety protocols are implemented when manufacturing, installing and operating the machine unit in the medical institution.

## References

1. Howell, J. D. (2016). Early Clinical Use of the X-Ray. *Transactions of the American Clinical and Climatological Association*, 127, 341-349.
2. Queensland Government. (2010). *HR001:2010 Standard for Radiation Apparatus Used to Carry*. Radiation Safety Act 1999. Retrieved from [https://www.health.qld.gov.au/\\_\\_data/assets/pdf\\_file/0031/146893/25336.pdf](https://www.health.qld.gov.au/__data/assets/pdf_file/0031/146893/25336.pdf)

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