

CCRI webinar:
X-ray Imaging Dosimetry Challenges
28 May 2024

Calibration Laboratory Perspectives

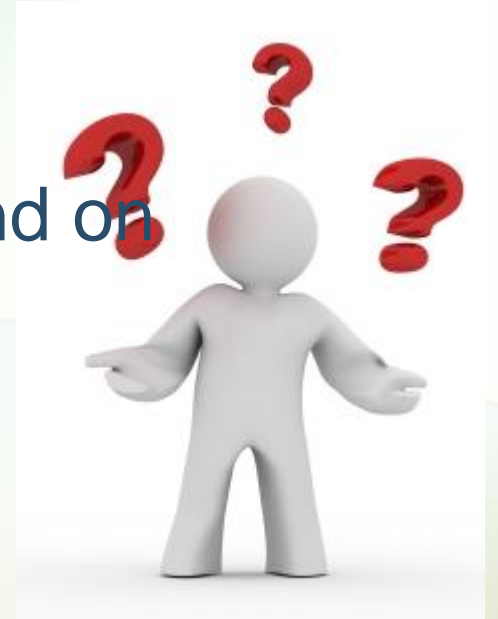
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Why calibration of x-ray Imaging dosimeters is necessary?

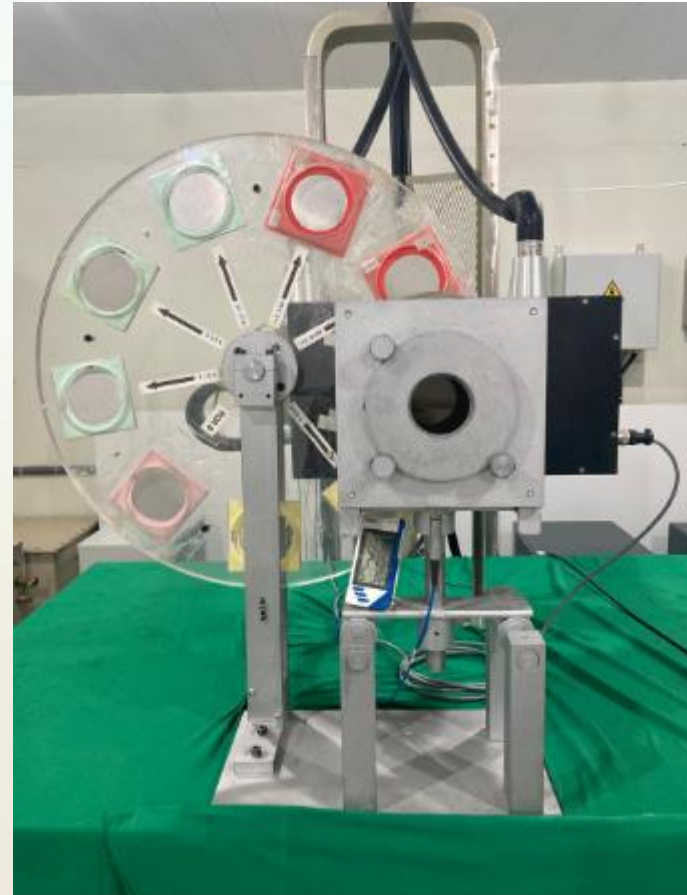
- Image quality and patient dose depend on several factors such as:

- X-ray beam Energy (kV)
- Tube current and time exposure
- Collimation
- Radiation dose
- .



Importance of calibration for x-ray imaging dosimetry

- It is necessary to perform calibration to ensure that readings from the dosimeters are consistent.
- Guarantee the quality control of the x-ray equipment that is essential to obtain image quality.



What are the challenges in X-ray imaging dosimetry?

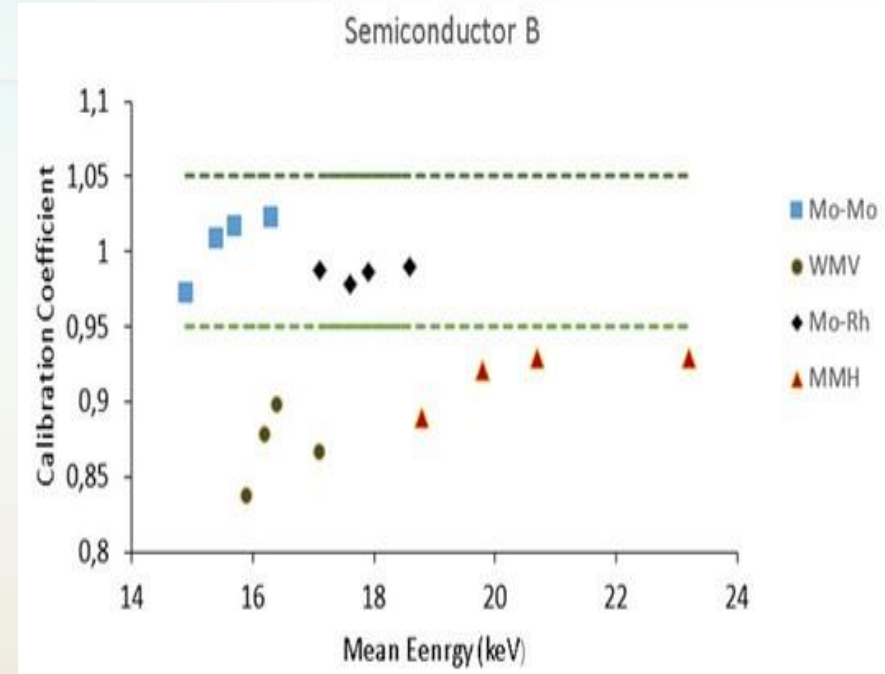
- **Rapid Technological Advancements**

Technological advances require studies into the characteristics of the equipment and the implementation of calibration protocols

Semiconductor detectors have different softwares and some are difficult to install and operate.

Dosimeter calibration in the laboratory and its use in the hospital

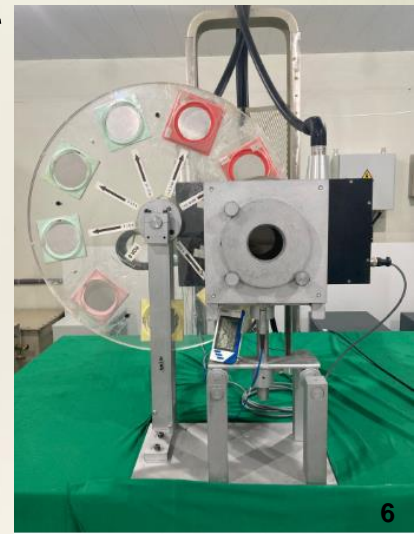
- The radiation quality used for calibration in the laboratory is different from that of the X-ray equipment in the hospital.
- This affect the response of semiconductor dosimeters that has a high energy dependence response



Dosimeter calibration in the laboratory and its use in the hospital

- For mammography, there are several radiation qualities available in the clinics. However, the calibration laboratories do not have all of them to perform the calibration.
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Although equipment calibration is mandatory, end users often do not use the certificate or are uncertain as to which calibration factors should be employed.



Challenges for laboratory operation

- Difficulty for some laboratories to access international standards (language, price, etc.)
- Calculating uncertainty becomes more challenging as measurements become more precise and complex.

Challenges for laboratory operation

- Difficulties in obtaining accreditation due to a lack of resources, both in terms of financial and human resources.
- Difficulties in performing proficiency testing and inter-laboratory comparisons
- Purchase and maintenance of equipment, especially x-ray systems.

Conclusion

- In conclusion, the challenges can be summarized as follows:
- Technological advances require constant improvement and adjustments to the calibration system.
- The impacts of measurements carried out in hospitals using different radiation qualities than those used in the calibration laboratory must be evaluated

Conclusion

- The challenges encountered by laboratories in certain countries in conducting inter-laboratory comparisons and/or performance tests.
- Some countries have encountered difficulties in training qualified personnel and maintaining calibration infrastructure in their laboratories

*Thank
you!*