

# Initial experience with clinical audits in radiology departments using QUAADRIL

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## Purpose

To assess quality of care, the effective use of resources, the provision and organisation of services and the professional education and training in the radiology departments of a regional hospital group and two university hospitals by means of a snapshot evaluation of the processes and procedures according to QUAADRIL.

## Methodology

Taking the QUAADRIL tool (Quality Assurance Audit for Diagnostic Radiology Improvement and Learning, IAEA 2010) as a reference, comprehensive clinical audits have been executed in the radiology departments of two university hospitals (Hospital Clinic Barcelona, Spain and Universitair Ziekenhuis Gent, Belgium) and a regional hospital group (JESSA hospitals, Hasselt, Belgium). A multidisciplinary team (radiologist, radiographer, medical physics expert and quality coordinator) used a commercially available software tool (*tqm*, QAE LUM NV, Leuven, Belgium) to collect all needed information and check for the quality of the management procedures and infrastructure, as well as patient-related and technical procedures and education, training and research programmes. For each quality indicator, a reliability score was given to all information captured from the medical imaging departments together with the time needed to retrieve this data. An existing quality system is considered good if most of the data can be retrieved automatically and the timespan for this retrieval is within several minutes. Interviews with relevant stakeholders in the radiology departments were performed to check the knowledge of and adherence to the available policies and procedures.



Fig. 3: Example interface showing the trend in patient radiation dose over time for a CT device. This is an example of automated data collection in medical imaging departments which can be used for both patient safety and for providing insights into the workload of the devices.

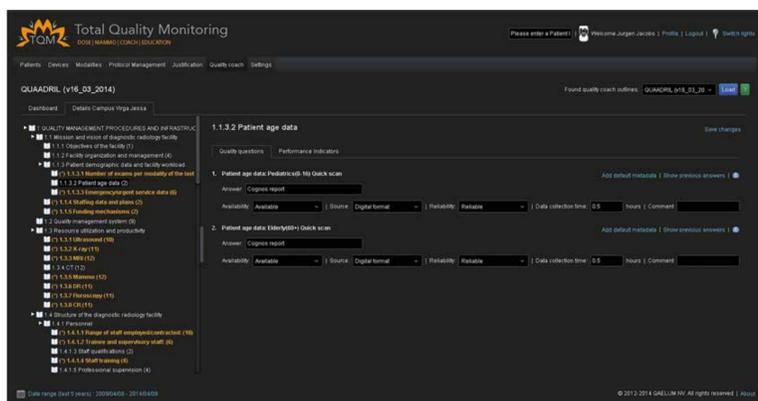


Fig. 1: Example interface of the digital collection of answers of the stakeholder's questionnaires with the possibility to score the answer in terms of reliability and time needed to collect the information

## Results

We managed to execute an independent quality assessment according to QUAADRIL. We could compare actual clinical practices with generally accepted good practices. Some of the collected data was entered manually (like the answers on the questionnaires for the stakeholders), while other data was collected automatically from the radiological IT infrastructure. Examples of this include: collecting data from the PACS system to define the used patient radiation dose levels and compare them against applicable standards or the evaluation of the workload on the different imaging devices.

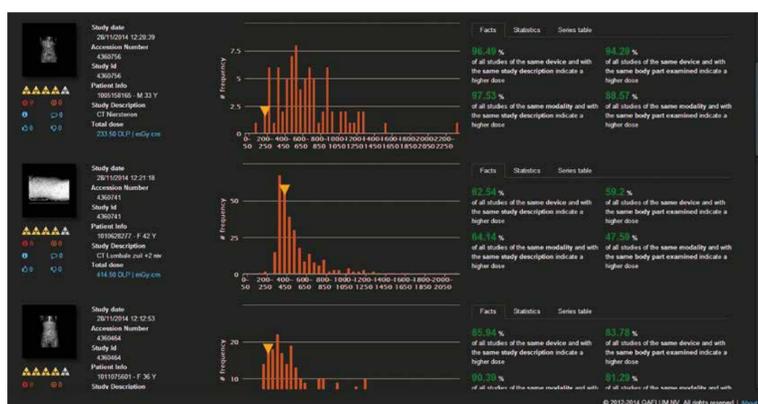


Fig. 2: Example interface showing the latest studies performed using the selected device. For each study users can see the study information and the dose histogram. This is an example of giving continuous relevant feedback to all stakeholders, which facilitates additional relevant training.

Although essential, the audits revealed that some quality management procedures and the quality manual, together with radiology department mission and vision, were incomplete and need to be better refined, communicated and understood by everyone in the radiology department. One central location and a uniform system to store all sources of information could help to simplify and speed up the retrieval of data, which is often spread over a department. The justification of the ordered examinations leaves room for improvement using clinical decision support systems to support the ordering of examinations and the communication with the patient could be better by capturing more patient feedback. Finally, it has been found that the process for reporting and tracking the further actions for critical, urgent and emergency findings needs to become more automated.

## Results in brief

- » QUAADRIL-based clinical audit performed
- » Automated and manual data collection
- » Digital handling of collected data
- » Good practices comparison
- » Formulation of department-specific observations
- » Presentation of the results - clinical audit report
- » Trend of the quality improvement after future audits



Fig. 4: Example of workload analysis chart for the actual usage per week of a selected device. This way the dose information is used for workload evaluation.



Fig. 5: Example of moment evaluation chart of the actual usage of a selected device with the corresponding dose (or total dose/total scan length) on a certain day and hour. Thus, the volume and dose trends are visualised to facilitate the analysis.

## Conclusion

Performing clinical audits using QUAADRIL as a reference seems to be an efficient method, especially in combination with automated tools for data capturing and analysis and as such can act as a tool to define baseline values for continuous quality monitoring. The result of this study underlines also the importance of a continuous patient radiation dose monitoring system as a way to automatically evaluate patient safety and as a source for additional workload or quality-related information.

## References

1. Comprehensive Clinical Audits of Diagnostic Radiology Practices: A Tool for Quality Improvement Quality Assurance Audit for Diagnostic Radiology Improvement and Learning (QUAADRIL), 2010, IAEA Human Health Series
2. Council Directive 2013/59/EURATOM of 5th December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation, and repealing Directives 89/618/EURATOM, 90/641/EURATOM, 96/29/EURATOM, 97/43/EURATOM and 2003/122/EURATOM