

IAEA supports quality assurance through comprehensive clinical and dosimetry audits

Independent quality audits, as part of comprehensive quality assurance programmes, are recognized to be an effective means of verifying the quality of radiation medicine practices. Quality audits include a range of types and levels of review; this article summarizes those provided by the IAEA, including auditing of dose levels delivered in radiation oncology clinics.

The IAEA promotes the need for regular audits in radiation medicine, in the form of peer review missions by experts, and has developed comprehensive guidelines that can support the auditing process in all disciplines, namely radiation therapy, nuclear medicine and diagnostic radiology. It develops guidelines setting out the principles and criteria for good practice of the various components of the clinical service, followed by guidelines for the conducting of the audits.

QUAADRIL

The **Quality Assurance Audit for Diagnostic Radiology Improvement and Learning (QUAADRIL)** methodology, published in 2010, assists hospitals and diagnostic facilities in assessing the effectiveness of their diagnostic radiology services and reviews practices and procedures to better identify shortcomings and suggest ways to improve quality. The results of a QUAADRIL audit include specific recommendations towards:

- improving clinical practice;
- strengthening the quality assurance programme;
- ensuring that patient protection requirements are met;
- developing local (internal or national) clinical audit programmes.

As the purpose of clinical audit is quality improvement, the facility is expected to develop an action plan in response to the QUAADRIL audit recommendations. This action plan can then be used to monitor the facility's response and could include provision for a follow-up review or audit.

QUATRO

The **Quality Assurance Team for Radiation Oncology (QUATRO)** audits help radiotherapy centres attain the best level of practice achievable in their economic circumstances. The operation of QUATRO is based on the use of three experts in the audit teams: a medical physicist, a radiation oncologist and a radiotherapy technologist.

QUATRO experts have a broad experience in the field and receive specialized training in the auditing methodology. The team reviews the entire radiotherapy programme, including the organization, infrastructure, as well as clinical, medical physics and safety aspects of the radiotherapy process. It also includes reviewing the departmental professional competence, with a view for quality improvement. Auditors acknowledge strengths in radiotherapy practices and identify gaps in technology, human resources and procedures, allowing the audited centres to document areas for improvement. As of July 2017, the IAEA has conducted 91 such audits globally.

QUANUM

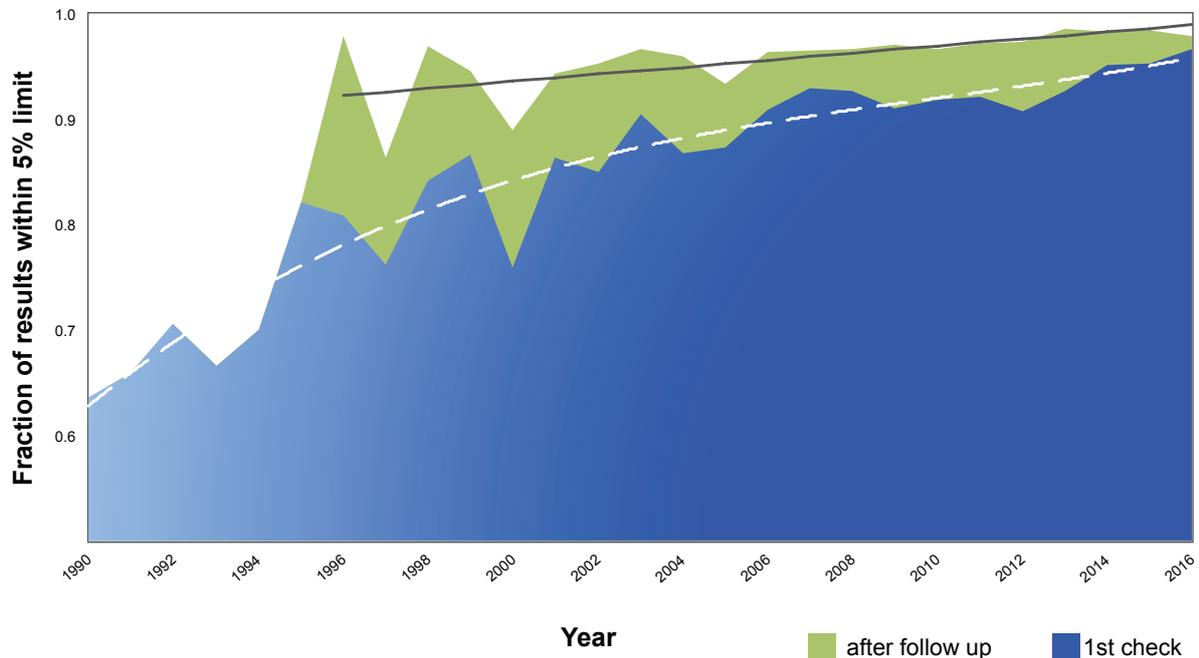
The **Quality Management Audits in Nuclear Medicine Practices (QUANUM)** programme developed by the IAEA in 2009 provides a specific, harmonized and comprehensive evaluation of the quality of the nuclear medicine clinical services provided in Member States. It includes identifying strengths and weaknesses, and supporting facilities to establish priority needs, undertake planning and properly manage resources. The ultimate goal of the audits is to improve clinical practice.

The programme provides nuclear medicine practitioners with a tool to assess their compliance with international standards. Since its introduction in 2009, 53 audit missions to 39 countries have been conducted.

The IAEA regularly organizes training programmes in order to train multidisciplinary teams of auditors to implement a culture of quality among nuclear medicine practices.

Increase in the Accuracy of the Results of IAEA/WHO Postal Dose Audits

The graph shows the fraction of results within the acceptance limit of 5% recorded in the IAEA/WHO postal dose audit service from 1990 to 2016. The blue area shows the results of the first check and the green area the follow-up results after the dosimeter irradiations were repeated in the period mentioned. The graph demonstrates significant improvement during the period.



The IAEA/WHO (World Health Organisation) Dosimetry Audit for Radiotherapy

The IAEA Dosimetry Laboratory offers a dose audit programme, where dosimetry practices are checked regularly, to a high degree of accuracy. It aims to ensure that radiotherapy equipment worldwide is properly calibrated for accurate, reliable and effective cancer treatment.

The IAEA/WHO dosimetry audit programme, which has been in place since 1969, is free to the end-users. Small dose measuring devices called dosimeters are sent to a clinic by post, where a radiation dose is given as it would be to a patient. The dosimeter is then mailed back to the IAEA Dosimetry Laboratory, where it is accurately measured to compare the radiation dose the hospital intended to give with what it actually gave.

Differences as small as 5% from the intended radiation dose can change the outcome of radiation therapy. Lower doses than intended might jeopardize the effectiveness of treatment, while higher doses could lead to damage of patients' organs. By aiming for

high dosage accuracy, a dosimetry audit helps eliminate these risks.

To prevent mistakes in dosimetry from becoming radiation injuries, the Dosimetry Laboratory follows up whenever an audit result is outside acceptance levels. When there is a discrepancy, the clinic is alerted and asked to repeat the test. If the inaccuracy is reproduced in the audit, then the IAEA offers expert support to help the hospital fix the problem effectively.

Records of the dosimetry audit results since the programme's inception show a steady increase in hospitals' abilities to get the dose right, while in 2000, 94 of 391 (24%) audits results revealed a discrepancy, in 2016 only 21 of 623 (3%) results did. Credit for this improvement cannot be attributed solely to improvements in radiation equipment technology. The availability of accurate dosimetry checks made possible through the IAEA/WHO audit has contributed to this increase in accuracy, said Joanna Izewska, Head of the IAEA Dosimetry Laboratory. To date, over 2200 radiotherapy centres in 132 countries have participated in the audits.