

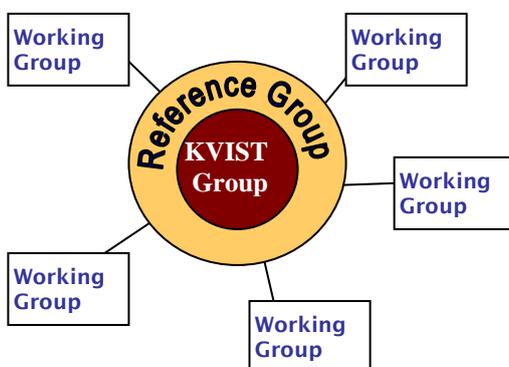


Quality Assurance in Radiotherapy – eight years outcome



In 2000, the Norwegian Radiation Protection Authority (NRPA) initiated work to develop a national quality assurance programme in radiotherapy. The program was named KVIST: i.e. Norwegian abbreviation of Quality Assurance in Radiotherapy (KValitetSikring I STRåleterapi). The programme is performed by the multidisciplinary “KVIST Group” and aims to stimulate collaboration by focussing on clinical, technical and administrative problems that can be addressed and solved on a national level. An important objective is to establish a positive attitude towards quality assurance and better communication between centres and the various professions and professionals involved in radiotherapy, i.e. the oncologists, medical physicists and radiation therapy technologists. Information is also provided to other stakeholders such as health authorities, hospital administrators and patients. This bulletin summarizes the outcome from the KVIST initiative per 2008.

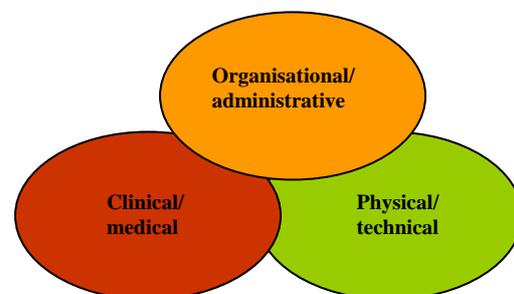
The KVIST Group has, since 2005, comprised of 3 physicists, 2 oncologists and 1 radiation technologist, all professionals in shared positions between a radiation therapy department in a hospital and the NRPA. The KVIST Group has established a Reference Group with 13 members evenly split between different radiotherapy centres, everyone with considerably experience in radiotherapy. All the professions involved in radiotherapy are represented in the Reference Group. The Reference Group functions as an advisory body for the KVIST Group and the group’s members act as a link between the NRPA and the individual departments.



The organization of the KVIST programme

Working Groups are defined and prioritised by the Reference Group. The Working Groups aim to establish consensus with respect to various problem areas within radiotherapy and work out recommendations. This will in turn form the basis for discussion and development of national recommendations. In addition, professionals from all of Norway’s radiotherapy centres are engaged in various thematic activities.

The costs for the KVIST initiative are shared between the NRPA and the radiotherapy centres: NRPA covers the meeting arena and travel costs for the delegates, the centres cover the staff hours, in the understanding that this represents a mutual effort to help them improve the internal quality systems.



The KVIST initiative deals with extensive topics relevant for many groups of stakeholders

Reporting of activities in radiotherapy

The KVIST Group has, in collaboration with the Reference Group, defined parameters for comprehensive and unambiguous reporting within the field of radiotherapy (StrålevernRapport 2003:10), and reporting of radiotherapy activities using this template has been conducted since. StrålevernRapport 2004:6 and 2006:11 includes data for 2001/02 and 2003/04 respectively. Since then an extranet solution has been constructed for more automatically reporting. This includes a database solution and a web portal serving the KVIST reference group and the working groups. This system of annual reporting and documentation of radiotherapy activities in Norway provides useful statistics for the hospitals in evolving their own quality systems and useful information to the health authorities. The data will also be used to define indicators for utilisation of expertise, need and quality within radiotherapy.



Treatment of a patient on a linear accelerator

Volume and dose specification

Common definitions for volume and dose are prerequisite for an unambiguous documentation and reporting of radiation treatment for individual patients. Various recommendations have been published both nationally and internationally. These have, over time, become gradually better and more specific. A Working Group has prepared national recommendations for volume and dose specifications (StrålevernRapport 2003:12) based on international recommendations (ICRU). These recommendations comprise of definitions, guidance for reporting and clinical examples. New recommendations from ICRU on the basic definitions are anticipated soon.

Clinical guidelines

There have been no national guidelines in the field of radiotherapy until recently. The implementation of a system for clinical audits in radiotherapy prompted the requirement for both national and local guidelines. To facilitate development of standards for radiotherapy of different types of cancer, the KVIST Group has prepared a framework for Guidelines in Radiotherapy in collaboration with National Cancer Groups and physicists experienced in the field. The work is based upon national recommendations for volume and dose specifications (StrålevernRapport 2003:12). A template was published in 2007, and guidelines are now provided for the treatment of various groups of cancer diagnosis:

- gastro intestinal cancer (oesophagus, rectum pre- and post operative)
- lung cancer (small cell, non-small cell, mesoteliom, palliation)
- urological cancer (prostate)
- lymphomas (draft version)

The guidelines for radiation therapy are provided as a part of the national directives for treatment of cancer issued by the Directorate of Health.

Clinical audit

In 2002 a KVIST Working Group was established for the purpose of implementing clinical audits in Norwegian radiotherapy. In collaboration with experienced radiation oncologists, radiation technologists and physicists a system for clinical audits was developed and tested in 2002–2004, involving the review of about 300 patients treated for skeletal metastases in 8 of the 9 radiotherapy centres in Norway. The radiation treatment process was thoroughly reviewed for each individual patient. Potential errors and omissions were reported back to the individual departments. The Group concluded, in Strålevernrapport 2004:9, that clinical audits based on “peer review” methodology are feasible within Norwegian radiotherapy centres, and should be further developed in collaboration with the health trusts and the National Cancer Groups. The National Breast Cancer Group has long traditions in developing clinical guidelines in their field. KVIST are therefore planning clinical audits in 2008/09 with breast cancer as subject.

Radiotherapy prescription

Radiotherapy prescription is necessary to initiate radiotherapy. In addition, it should function as a tool to register intended treatment. A Working Group has prepared a requirement of criteria/parameters with a view to fulfil this objective. This is based on existing classification systems and upon the definitions provided in StrålevernRapport 2003:10. The working group has been re-appointed from 2008 to develop a template for an electronic audit tailored to local and national requirements.

The annual “Norwegian Radiotherapy Meeting”

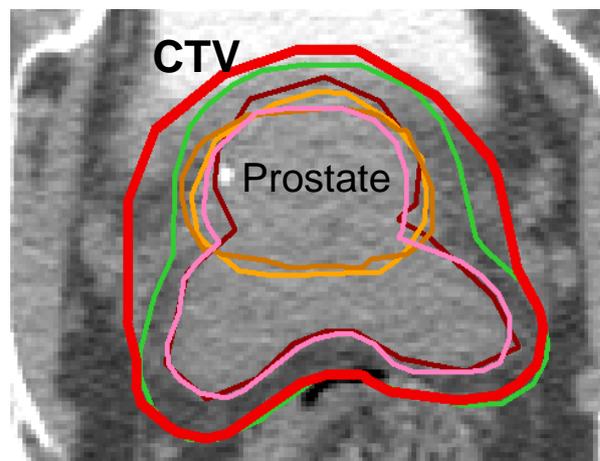
The KVIST Group has established the Norwegian Radiotherapy Meeting, an annual meeting where oncologists, radiation technologists and physicists meet to discuss radiotherapy related issues. A multidisciplinary radiotherapy forum is conducive to improve professional discussion and to form a basis for a tighter collaboration and communication among the professionals. National and international expertise has been invited to provide new knowledge, strengthen interest for radiotherapy and place Norwegian radiotherapy within an international context. Participation at the meeting has been large and the response from the participants has been very positive.



ESTRO-President Michael Brada at the Norwegian Radiotherapy meeting in Oslo 2005.

Workshops dedicated on specific cancer diagnoses are also arranged as part of these meetings. Planning of the workshop includes choice of diagnosis and preparing clinical cases for centre home work before the workshop. The

clinical cases consist of two or three anonymized patient histories and CT-image sets for treatment planning. The first workshop focused entirely on delineation of target volumes and organs at risk. Later meetings have also included treatment planning with field set-up and dose distribution. Data from all centres have been collocated by the KVIST group. So far plans for rectal, lung, prostate and breast cancer have been examined. The exercises reveal differences which indicate the potential for improvements.



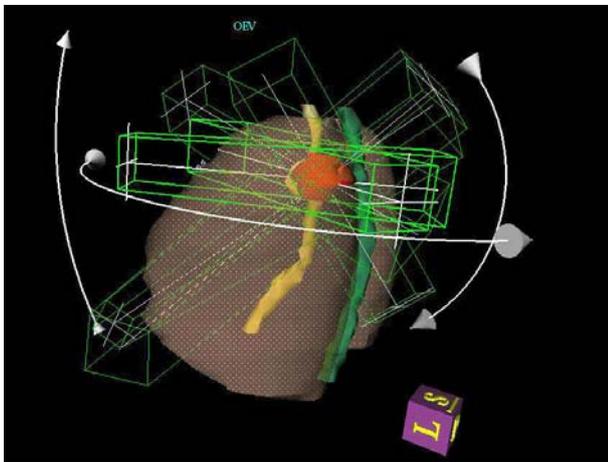
KVIST work-shop in 2007: The target volume in terms of “clinical target volume” (CTV) delineated at six different radiation therapy centres in Norway.

Incident management

The process of radiotherapy is complex with the result that errors and irregularities can occur. A Working Group has established a system for standardised management and registration of incidents (StrålevernRapport 2004:1, revised edition 2006:3). A low threshold has been established for all radiotherapy centres for registration of incidents, focusing on training and improvement. An important part of the work has been the creation of standard categories and codes for different types of deviation in such a way that national statistics can be derived. This helps professionals to learn from each another’s “mistakes”. Furthermore, the work involves collaboration with an international quality assurance project, entitled ROSIS, run by The European Society for Therapeutic Radiology and Oncology (ESTRO). This will provide feedback of information from many countries, at the same time as we can contribute with our experience.

Training of Medical Physicists

Medical Physics forms a large part of the basis for planning and conducting radiotherapy. There is no authorisation system for this profession in Norway. Physicists who are newly employed in a radiotherapy department are often qualified as M.Sc. in Physics and have little knowledge of radiotherapy. In order to achieve a consistent theoretical and practical training and ensure that competence within this group is satisfactory, a Working Group has prepared a national training programme for medical physicists. The programme, with concomitant training exercises, is provided in StrålevernRapport 2005:6 and 2005:6b.



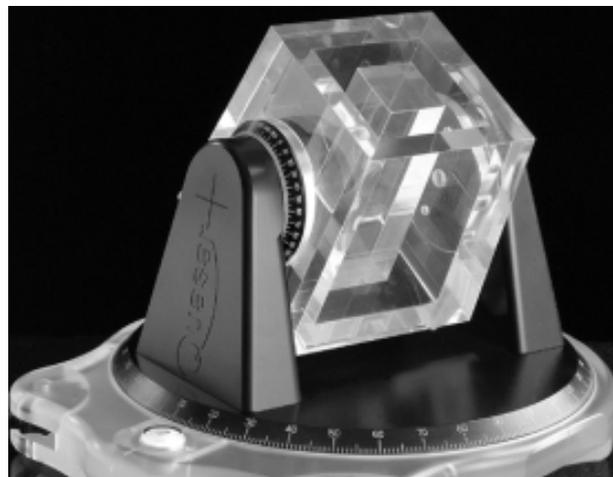
Three dimensional dose planning.

Control of dosimetric and geometric precision

A Working Group is dealing with dosimetric problems in close collaboration with the NRPA's secondary standard dosimetry laboratory (SSDL). All therapy centres were visited in 2002/03 in connection with the implementation of a new IAEA dosimetric protocol (TRS 398). Theoretical and practical training was provided in concurrence with a national dosimetric inter-comparison (StrålevernRapport 2003:11). A new dosimetry revision will be done in 2008/09, also including 2D dosimetry using radiochromatic films. This work is also connected to the Nordic and other international fora.

Requirements for geometric precision in radiotherapy are increasing in line with the development of new advanced treatment techniques. The KVIST Group provides two

phantoms for quality control of the non-dosimetric information exchange between different data systems in the radiotherapy chain.



Phantom for quality control of geometrical precision.

A tour to the radiotherapy centres has been completed in order to present the equipment and its use. A report with results evaluation and recommendations is being prepared. The quality control equipment will be available for loan from the NRPA on request. Further work will be on national guidelines for a quality control system that ensures both dosimetric and geometric precision within the radiotherapy process.

The KVIST group at NRPA



F.l. Hans Bjerke (physicist, SSDL), Taran Paulsen Hellebust (medical physicist), Sverre Levernes (medical physicist), Gunilla Frykholm (oncologist), Dag Clement Johannessen (oncologist) and Ingrid Espe Heikkilä (radiation technologist). In addition Eric Sundqvist (radiation technologist) and Bernt Rekstad (medical physicist) are engaged to the group in 2008.

Visit KVIST at the portal kvist.nrpa.no