



ANNUAL REPORT 2011

Objective

The Nederlandse Commissie voor Stralingsdosimetrie (NCS, Netherlands Commission on Radiation Dosimetry) was established on the 3rd of September 1982 with the main objective of promoting the appropriate use of radiation dosimetry, both for radiation research and for practical applications. The NCS is chaired by a board of scientists, installed in consultation with the supporting societies:

- Nederlandse Vereniging voor Radiotherapie en Oncologie (NVRO, Dutch Society for Radiotherapy and Oncology);
- Nederlandse Vereniging voor Nucleaire Geneeskunde (NVNG, Dutch Society for Nuclear Medicine);
- Nederlandse Vereniging voor Klinische Fysica (NVKF, Dutch Society for Medical Physics)
- Nederlandse Vereniging voor Radiobiologie (NVRB, Dutch Radiobiological Society);
- Nederlandse Vereniging voor Stralingshygiëne (NVS, Society for Radiological Protection of the Netherlands);
- Nederlandse Vereniging Medische Beeldvorming en Radiotherapie (NVMBR, Dutch Society for Medical Imaging and Radiotherapy);
- Nederlandse Vereniging voor Radiologie (NVvR, Radiological Society of The Netherlands);
- Société Belge des Physiciens des Hôpitaux/Belgische Vereniging voor Ziekenhuisfysici (SBPH/BVZF, Belgian Hospital Physicists Association);
- Nederlandse Vereniging van Klinisch Fysisch Medewerkers (NVKFM, Dutch Society of Technicians and other Specialists in the field of Medical Physics)

To pursue its aims, the NCS has the following tasks:

- Participation in dosimetry standardization and promotion of dosimetry inter-comparisons;
- Drafting of dosimetry protocols;
- Collection and evaluation of physical data related to radiation dosimetry;
- Maintain or establish links with national and international organizations concerned with ionizing radiation;
- Promulgate information on new developments in the field of radiation dosimetry.

Websites:

<http://www.stralingsdosimetrie.be>, <http://www.radiationdosimetry.eu>,
<http://www.stralingsdosimetrie.nl>, <http://www.radiationdosimetry.org>

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Board

On December 31, 2011 the members of the board of the NCS were:

Dr. J.B. van de Kamer	chairman	(NVRO)
T.W.M. Grimbergen	vice chairman	(NVS)
Dr. J.A. de Pooter	secretary	(VSL)
Dr. A. Van Der Plaetsen		(SBPH/BVZF)
J.M.J. Hermans	treasurer	(NVKFM)
Prof. Dr. A.A. Lammertsma		(NVNG)
Dr. P. Sminia / Dr. K. Franken		(NVRB)
Dr. A. Spilt		(NVvR)
Dr. Ir. F.W. Wittkämper		(NVKF)
D. Zweers		(NVMBR)

The board of the NCS met three times in 2011, i.e., on 20 January, 14 April, and 1 September.

The main subjects raised at the board meetings were:

- Monitoring the progress of activities by the subcommittees and the platform;
- Initiate the publication of NCS-reports;
- Development of new activities.

Subcommittees

1. Subcommittee on “Quality control of low -energy-photon emitting seeds in Brachytherapy”

The goals of the subcommittee are:

- To draft a report with recommendations for QC on the use of low-energy-photon (LEP) emitting sources in brachytherapy
- To study the current clinical practice and use this as a basis for the report.
- To stimulate the development of a standard for such sources in Belgium and The Netherlands, and promote efforts to make calibration methods at each center traceable to (inter)national measurement standards.

The subcommittee has gathered one time in 2011, on January 27th in Utrecht (UMC).

The subcommittee has performed earlier on-site visits to study the clinical practice in the institutions in Belgium and The Netherlands that were using I-125 seeds for prostate implants. During these visits the results of a previously mailed TPS test procedure were collected and source strength measurements on a number of sources were performed.

In beginning 2011 the subcommittee finalized the preparation of the report on recommendations for quality control of low energy photon emitting sources in brachytherapy. The results of the on-site visits are incorporated and discussed in this report. The manufacturing process and quality control performed by the manufacturer are described. Dosimetric reference data for the most commonly used LEP sources in our countries are given as an appendix, and safety issues with respect to the use of LEP sources for permanent prostate brachytherapy are addressed.

The draft version of the report was sent to two external reviewers (Dr. M. Rivard and Dr. J.L.M Venselaar). The valuable comments and suggestions of these reviewers were incorporated in the report, and a final draft will be presented to the NCS board in January 2012.

Work of this subcommittee will be presented by Prof. Dr. S. Vynckier at the annual meeting of the Belgian Hospital Physicist Association in Brussels, February 2012.

A. Rijnders submitted an abstract for the GEC-ESTRO World Congress of Brachytherapy, Barcelona 2012. Drs. A.H.L. Aalbers submitted a paper “On the quality control of low-energy photon brachytherapy sources: current practice in Belgium and The Netherlands” to be published in the proceedings of the International Symposium on Standards, Applications and Quality Assurance in Medical Radiation Dosimetry (IDOS), IAEA, Vienna, 2010.

Members of the subcommittee:

A. Rijnders, M.Sc. (Chairman)
Drs. A.H.L. Aalbers (VSL)
B. Schaeken, M.Sc. (UZA)
M. Debrabandere, M.Sc. (UZ Leuven Gasthuisberg)
Dr. K. Koedooder (AMC)
Dr. R. Moerland (UMCU)
B. Thissen, M.Sc. (CHU Liège)
Dr. Ir. A. van't Riet (RISO)
Prof. Dr. S. Vynckier (UCL, representative NCS board)

2. Subcommittee on “Quality control of stereotactic radiotherapy: recommendations on dosimetry procedures and quality control”

A rapidly growing number of radiotherapy centres in The Netherlands and Belgium are being equipped for stereotactic radiotherapy, i.e. stereotactic surgery (SRS) and stereotactic radiotherapy (SRT) In radiotherapy centres the development is focused on imaged guided “frameless” high-dose high precision techniques with standard and dedicated linear accelerators, e.g. Novalis and Cyberknife. “Frameless” here means “without an invasive or relocatable localizer and treatment frame fixed on the skull of the patient with the aim to fix the patient on the treatment couch”. On other hand, in a free-market concept in health care non-image guides stereotactic treatment with a GammaKnife might become popular for non-radiotherapy enters due to its apparent simplicity relative to linac-based stereotactic treatment.

In stereotactic treatments very high fraction doses are delivered while a high accuracy in (re)positioning of the tumor with respect to the isocenter is required. Irrespective of devices used. Therefore, stereotactic treatments require higher accuracy levels in equipment and processes compared to standard radiotherapy treatments. This necessitates more attention to the quality assurance of both treatment devices and treatment process than for other complex treatments. Experiences from well-established stereotactic treatment centres learn that the introduction and maintenance of stereotactic radiotherapy in the clinic means the acceptance, commissioning and QA of a stereotactic treatment system as an entity, both in devices and in process. So, on one side this includes the acceptance, commissioning and QA of the hardware (e.g. linac, mMLC, cone, frames, couch), and software (TPS), as well as the imaging-system and systems for detection and (re)position tumor at isocentre. On other side QA of the treatment process itself is important. But often overlooked: manpower trained at expert-level is required, working as a team and embedded in a well-structured organization.

The goal of the subcommittee is to compose a report that provides recommendations for Belgian and Dutch medical physicists on dosimetry procedures and quality assurance for add-on stereotactic equipment, dedicated fully integrated systems and the treatment process.

The subcommittee “Quality Control of stereotactic radiotherapy” was started in January 2006. In 2011 the subcommittee had 2 meetings alternately held in Belgium and The Netherlands. A first draft compiled in 2008 was totally revised in 2010, to obtain a better integration between quality assurance aspects of devices and processes. In 2011 the “2010-line” was continued.

In 2008 a prototype phantom is designed and constructed for end to end tests based on EBT radiochromic film dosimetry in the hospitals of the members of the subcommittee. This purpose of this prototype is to show the feasibility of such a phantom for the various SRS/SRT treatment techniques. Due to instabilities in dosimetrical accuracy of radiochromic film, nowadays still present, it was not possible to start with the end to end tests.

Members of this NCS subcommittee are:

Stan Heukelom (VUMC, Chairman)
Hans Marijnissen (Erasmus MC),
An Nulens (UZ Leuven, Gasthuisberg)
Geert Pittomvils (UZGent)
Esther Raaijmakers (Verbeeten Institute)
Dirk Verellen (UZ-Brussel)
Sandra Vieira (VUMC, Secretary),
Nienke Holtzer ((VUMC, Amsterdam)

Joep Hermans (Maastrro, Maastricht representative from the NCS-board).

3. Subcommittee on "Film dosimetry"

No activities.

4. Subcommittee on "Dosimetry audits"

The goal of the subcommittee is to design and administer an audit on absolute dosimetry in radiotherapy institutes in the Netherlands and Belgium. The audit is based on the new NCS dosimetry protocol #18. In first instance, this audit will be limited to high-energy photon beams. In the future the subcommittee expects to include high-energy electron beams.

The subcommittee has gathered only once in its entirety in February in Eindhoven to discuss the final measurements reports. However, in the course of the year, small groups met to review the progress of the measurement reports and set up the final report.

In February 2011 a presentation about the audit results was given at the annual BHPA symposium in Charleroi.

In May 2011 all the official measurements reports have been send to the participating institutes together with a survey about the audit.

The survey shows that the audit was very well received and that an expansion to a periodic audit in conjunction with an electron audit is greatly appreciated.

Following this survey, the Board of NCS supported the suggestion of the subcommittee to perform a periodic audit in the upcoming years.

For this, the equipment used during the audit will be upgraded for measurements with high-energy electron beams. The equipment will be purchased by the NKI-AVL in Amsterdam with the agreement that the NCS can rent this equipment for the upcoming audits.

The focus of the subcommittee in 2012 is the reporting of the audit. Furthermore, a start will be made with designing the next audit including electrons.

Members of the subcommittee are:

T. Perik (NKI-AVL, Chairman)
J. Martens (Maastrro, Treasurer)
M. Dwarswaard (Secretary)
E. Loeff (Erasmus MC)
S. v/h Schip (CZE)
J. Hermans (Maastrro)
N. Planteydt (ZRTI)
T. Aalbers (Advisor)
L. de Prez (VSL)
F. Wittkamper (NKI-AVL, Advisor)
A. Monseux (CHU Charleroi)
F. Sergent (CMSE)
K. Feyen (AZ St. Maarten)

5. Subcommittee on "Guidelines for Quality Assurance of Helical Tomotherapy"

The goals of the subcommittee: Tomotherapy is a relatively new modality for radiation therapy treatments with integrated systems for treatment planning, imaging and image registration and dose delivery. There are several differences compared to conventional

linear accelerators, which imply that general Quality Assurance guidelines are not always applicable or sufficient. The goal of this report is to provide guidelines for QA and dosimetric calibration of the Tomotherapy system.

Progress made in 2011: Due to personal circumstances Hans Marijnissen had to stop his good work for the subcommittee. Replacement could not be arranged; therefore the number of experienced Cyberknife users became too limited. In consultation with the NCS board, it was decided to skip the development of a guideline for the Cyberknife (for the moment) and to limit the scope of the current assignment to the development of a guideline for Tomotherapy.

We welcomed Edmond Sterpin in our subcommittee. He is an experienced researcher and has done projects using Monte Carlo, in the development of an analytical model for small and variable fields delivered by Tomotherapy. In the subcommittee he will focus on treatment planning.

Since the start in September 2009, the subcommittee came together for 9 meetings. Drafts have been produced for QA of Treatment Delivery and for Dosimetric Calibration. In 2012 the other chapters will be addressed: Imaging, Treatment Planning and Miscellaneous (DQA, planned adaptive and transfer).

Members of the NCS subcommittee:

Vincent Althof (RISO, Chairman),
Bie De Ost (UZA/ZNA, Secretary),
Nick Reynaert (Centre Oscar Lambret),
Koen Tournel (UZ),
Edmond Sterpin (UCL)
Stefaan Vynckier (UCL, representative from the NCS-board).

6. Subcommittee on "Dosimetry for clinical particle beams"

Since a final decision on the realization of proton facilities in the Netherlands is delayed, the urgency and the need of an NCS report on dosimetry for clinical particle beams has decreased. Therefore it was proposed to put the subcommittee temporarily in an inactive state. When the realization of new facilities will start the subcommittee will restart its work. In the meanwhile several research projects are running on this topic in which several of the subcommittee members are involved. The knowledge and experience gathered in these projects can be used for the report later on. There were no meetings in 2011.

Members of the subcommittee:

Prof. Dr. Ir. M. Schippers (UIMCG, Chairman)
Prof. Dr. Ir. F. Verhaegen (Maastru, Secretary)
Prof. Dr. S. Brandenburg (KVI)
Dr. H. Palmans (NPL)
Dr. J. de Pooter (VSL)
Dr. A. van't Veld (UMCG)
Prof. Dr. S. Vynckier (UCL)
Dr. F. Wittkämper (NKI-AVL)

7. Subcommittee on "IMRT Quality Assurance"

The last decade, IMRT has evolved into a standard treatment modality within the Dutch and Belgian radiotherapy communities. So far, most institutes have implemented IMRT, static or dynamic, for one or more tumour sites with varying degrees of complexity. This NCS subcommittee focuses on the quality assurance required to introduce and maintain

IMRT and rotational techniques in clinical practice including the following topics:

- Introduction
- Linac commissioning, acceptance and QA
- Treatment planning
- Patient specific QA
- Delivery
- Risk analysis

The committee aims at a comprehensive set of tests, including frequency and tolerances, and practical guidelines or references to relevant literature. These guidelines should serve as a guide to good-practice, not as an exhaustive overview of all adequate procedures. They should provide a practical strategy to setup a QA framework for IMRT, and an overview of the current status of QA for rotational techniques. These recommendations can be used to benchmark in-house QA protocols.

In 2012, drafting of the report is in full progress. For the Risk analysis chapter, prospective risk inventories are being conducted at several Dutch / Belgian institutes.

The content and structure of the report has been coordinated with the subcommittees on stereotactic radiotherapy and on rotational therapy. It is the aim of this committee to finish the report before the end of this year.

Members of the subcommittee are:

Edwin van der Wal (RCWest, Chairman)

Jan Wiersma (AMC, Secretary)

Alle Henk Ausma (RIF, Leeuwarden)

Luc Bos (MCA, Alkmaar)

Johan Cuijpers (VUMC)

Lars Murrer (Maastru)

Geert Pittomvijs (UZGent)

Milan Tomsej (CHU)

Jeroen van de Kamer (NKI-AVL, representative from the NCS board)

8. Subcommittee on "QA for rotational IMRT"

The aim of our subcommittee is to produce a report with guidelines for introduction and maintenance of safe and high quality rotational IMRT (or VMAT) techniques in clinical practice. The report will be based on the experience present in Belgian and Dutch institutes as well as on available literature.

In 2011, we have organized six subcommittee meetings. In the first meetings the global scope of the report was discussed, together with a time schedule. Our aim is to finish the report in 2012. Since there is already a subcommittee on IMRT quality assurance, the demarcation between this and our subcommittee was made clear. Several times one of our members has visited the meetings of the IMRT QA subcommittee.

The core of our report will consist of three chapters: "machine QA", "plan QA" and "TPS issues". Each of these chapters was assigned to two or three members. Currently, the first chapter (machine QA) is reaching maturity, and drafts are produced of the other chapters.

During a meeting of the "Kring radiotherapeutische klinische fysica" on 11-11-2011 held in Utrecht, our chairman presented the status of the chapters and the proposed time schedule to an audience of the Dutch radiotherapy physics community.

Dr. Ir. A. Mans (NKI-AVL, Chairman)

Dr. M.P. Arends (RIF, Secretary)
Dr. J. Wolthaus (UMCU)
Dr. M. Admiraal (VUMC)
Dr. D. Schuring (CZE)
Dr. R. Louwe (UMCN)
Dr. H.T. Lotz (UMCG)
Dr. J.B. van de Kamer (NKI-AVL, representative from the NCS board)

Advisory platforms

The Netherlands Commission on Radiation Dosimetry covers a wide range of expertise through the participating scientific societies. In 1999 NCS platforms were established on dosimetry for radiology and nuclear medicine and dosimetry for radiotherapy. The tasks of these platforms are to give advice on specific research projects initiated by the Government. In case of future needs the NCS can be approached for consultation through its secretary under the condition of modest coverage of NCS experts in terms of attendance fee and travel costs for meetings.

1. Advisory platform on "Radiation Protection in Hospitals"

This platform was installed march 2010. The goals of the platform are:

- Giving advice to both government and the hospital community regarding the radiation legislation and regulation within the sphere of competence of the NCS.
- Coaching and initiating the making and implementation of practical guidelines for the compliance and implication of existing and new Radiation Safety regulations in the spheres of interest of the NCS. The platform operates from within the hospital community for the hospital community for the irradiating professions, working in university hospital, large community hospitals and/or independent institutes.

Activities:

The platform met in full strength once

- April 12th at the Antonius Hospital in Nieuwegein; regular meeting

Representatives of the platform attended the following meetings:

- January 27th in Den Bosch, April 2nd in Woudschoten, Workshop Risk Assessment Radiology in Hospitals for the NVKF, (Visscher)
- March 8th in Utrecht; Consultation with government officials; how to proceed with the Diagnostic Reference Levels; Visscher, Jonkergouw, Geleijns (NCS), van der Wiel and Stoop (government)
- June 30th in Utrecht; discussion session with governmental Inspectors on the NCS proposal for Risk assessment for Radiology in Hospitals; Visscher; van Swol (NCS), Mulder, Wijkamp (government)
- December 20th in Utrecht; brainstorm meeting with governmental health inspector on radiation risks in Pediatric Radiology; Visscher, Geleijns (NCS); Becht, Raaijmakers (NVKF) and Meijnders, Tamminga (Governmental Inspectors)

Achievements/progress

- Introduction C-class worker:
 - o *Concept of guideline finished, sent to participant for final comment*
- Risk analysis RA substances in de nuclear medicine
 - o *Guideline finished and ratified by NVKF en NVNG and NCS*
- Risk analysis radiological practices in hospitals.
 - o *Guideline finished in concept with consent of government*
- Risk analysis radiotherapeutic practices.
 - o *Guideline in preparation,*
- RA substances in (hospital)waste
 - o *Guideline hospital community/government/waste industry in concept, Fukushima accident halted (temporarily) discussion with government*
- Advice on composite material "lead" aprons
 - o *NCS subcommittee finished concept guideline*

Platform members

Chairman: K.J. Visscher PhD,

Secretary: P. Jonkergouw, MSc

- NVRO (Dutch Society of Radiation Oncology)
 - Klinisch Fysicus Radiotherapie: Kees Visscher, PhD
 - Radiation Oncologist: Bradley Pieters, MD, PhD
- NVNG (Dutch Society of Nuclear Medicine)
 - Klinisch Fysicus Nucleaire Geneeskunde: Lieke Poot, Ir, PhD
 - Nucleair geneeskundige: Roel Claessens, MD, PhD
- NVvR (Dutch Society of Radiology)
 - Klinisch Fysicus Radiologie: Koos Geleijns, PhD
 - Radioloog: Aart van de Molen, MD, PhD
- NVKF (Dutch Society of Clinical Physics)
 - Christiaan van Swol, PhD, Ir
- NZVA (Dutch Society of Hospital Pharmacist)
 - Kirsten Schimmel, PhD
- NVS (Dutch Society of Radiation Protection)
 - Paul Jonkergouw, MSc
- NVMBR (Dutch Society of Medical Imaging and Radiology)
 - Dirk Zweers,
- NVKFM (Dutch Society of Dosimetrist)
 - Marja Harbers
- Representative from NCS Board
 - Jeroen van de Kamer, PhD

Financial overview

NCS FINANCIAL OVERVIEW 2011

	Income (€)	Costs (€)
Savings-account on Januari 1, 2011	34833.25	
Current-account on Januari 1, 2011	3086.31	
Project-account on Januari 1, 2011	0.00	
Belgian current-account on Januari 1, 2011	0.00	
Contribution Netherlands Society for Radiology (NVvR) 2011	600.00	
Contribution Netherlands Society for Medical Physics (NVKF) 2009	400.00	
Contribution Netherlands Society for Medical Physics (NVKF) 2011	400.00	
Contribution Netherlands Society for Radiotherapy and Oncology (NVRO) 2011	800.00	
Contribution Netherlands Society for Nuclear Medicine (NVNG) 2011	200.00	
Contribution Netherlands Society for Radiological Protection (NVS) 2011	400.00	
Contribution Netherlands Radiobiological Society (NVRB) 2011	100.00	
Contribution Dutch society of Medical Physics Engineers (NVKFM) 2011	65.00	
Contribution Netherlands Society for Medical Imaging (NVMBR) 2011	300.00	
Contribution Belgian Hospital Physicists Association (BHPA) 2011	200.00	
Interest savings-account	712.09	
Interest current account		
Interest project account		7.17
Cost NCS/NVKFM audits based on NCS18		454.93
Costs Chamber of Commerce		26.64
Banking costs		117.51
Banking costs Belgian account		0.00
Costs web site		337.91
Costs meetings NCS board		295.12
Costs meetings lustre 2012		44.00
Savings-account on December 31, 2011		35545.34
Current-account on December 31, 2011		5275.20
Belgian current-account on December 31, 2011		0.00
Project account on December 31, 2011		-7.17
Total	42096.65	42096.65

NCS BUDGET 2012

	<i>Income</i> <i>(€)</i>	<i>Costs (€)</i>
Contributions scientific societies	3465.00	
Interest savings-account	800.00	
Costs Chamber of Commerce		40.00
Banking costs		150.00
Costs of board and subcommittees meetings		1000.00
Costs web site		350.00
Cost lustrum 2012		5000.00
Purchase audit equipment NCS18 electrons		35000.00
Total	<hr/> 4265.00	<hr/> 41540.00