



ANNUAL REPORT 2005

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, Netherlands Society for Radiotherapy and Oncology);
- Nederlandse Vereniging voor Nucleaire Geneeskunde (NVNG, Netherlands Society for Nuclear Medicine);
- Nederlandse Vereniging voor Klinische Fysica (NVKF, Netherlands Society for Medical Physics);
- Nederlandse Vereniging voor Radiobiologie (NVRB, Netherlands Society for Radiobiology);
- Nederlandse Vereniging voor Stralingshygiëne (NVS, Netherlands Society for Radiological Protection);
- Nederlandse Vereniging Medische Beeldvorming en Radiotherapie (NVMBR, Dutch Society 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).

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

- Participation in dosimetry standardization and promotion of dosimetry intercomparisons;
- 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.

The Commission's website: <http://www.ncs-dos.org/>

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Board

On December 31, 2005 the members of the board of the NCS were:

Prof.dr. S. Vynckier, chairman	(SBPH/BVZF)
Dr. B.J.M. Heijmen, vice chairman	(NVRO)
Mr. E. van Dijk, secretary	(NMI)
Dr. J. Zoetelief, treasurer	(NVRB)
Dr. A.J.J. Bos	(NVS)
Prof.dr. A.A. Lammertsma	(NVNG)
Drs. J.M. Schut	(NVvR)
Dr.ir. F.W. Wittkämper	(NVKF)
Mr. D. Zweers	(NVMBR)

The board of the NCS met four times in 2005, on March 7, June 13, October 3 and December 19. The main subjects raised at the board meetings were:

- monitoring the progress of activities by subcommittees;
- initiate the publication of NCS-reports;
- development of new activities.

At the meeting of December 19, Ir. W. de Vries (NMI) was succeeded by Mr. E. van Dijk (NMI) as secretary.

Subcommittees

1. Subcommittee "Uniformity of Dosimetry Protocols"

The subcommittee 'Uniformiteit Dosimetrie protocollen' has held one "full subcommittee" meeting in 2005, on April 25 at the University of Gent. The "subgroup", composed by members of the Subcommittee in 2004, has met at UCL, Brussels on 17 February, at NPL, Teddington on 28 and 29 June and at NMI, Delft on 19 October.

The goals of the subcommittee are:

- To achieve uniformity of photon and electron dosimetry protocols, based on absorbed dose-to-water standards.
- To draft a Code of Practice (CoP) that is concise, clear, and easy to use in practice.
- To draft a CoP that applies to ionization chambers and photon and electron beam qualities that are being used in Belgium and the Netherlands.
- To give recommendations for Belgian and Dutch clinical physicists in the final NCS report.

In 2005 meetings concentrated on the analysis of the data of k_Q beam quality correction factors and beam quality specifiers $TPR_{20,10}$ and $\%dd(10)_x$, measured in the selected clinical photon beams, topics related to the dosimetry in high-energy electron beams, the status of the absorbed dose standards in LSDG (Laboratorium voor Standaarddosimetrie Gent) and NMI (including the move of the ionising radiation standards from Utrecht to the new premises in Delft) and the structure of the report describing the new Code of Practice.

From a first analysis of the results of the k_Q data it was concluded that selected published experimental data will be added to the NCS data to derive a generic fitting model. After the transfer of NMI equipment and facilities to Delft, measurements were reassumed in August 2005 with the NMI water calorimeter in the Co-60 reference facility in Delft. One of

the goal is to prepare for the recalibration of all 24 ionisation chambers in the new Co-60 facility in Delft.

A proposal has been made of the plane-parallel ionisation chambers to be recommended in the new NCS Code of Practice for high-energy electron beams. The NACP-02 (Wellhöfer-Scanditronix) and the Roos-type (PTW) are proposed for recommendation. The subcommittee intends also to select the Roos-type plane-parallel chamber from Wellhöfer. A decision will be taken after the results of experimental tests in Co-60 and high-energy photon beams are available. NACP-01 and Markus-type chambers will not be recommended for absolute reference dosimetry.

The subcommittee intends to complete and analyse the results of the measurement program in 2006 including the recalibration of all ionization chambers in the Co-60 reference beam at NMI.

It is intended to produce a final draft CoP for the dosimetry of high-energy photon beams and high-energy electron beams before November 2006.

Nick Reynaert (LSDG) was appointed as member of the Subcommittee in 2005.

Members of the subcommittee are:
Drs. Tony Aalbers, (chairman)
Mrs. Marie-Thérèse Hoornaert
Dr. André Minken
Dr. Hugo Palmans
Prof. dr. Stefaan Vynckier
Dr. Frits Wittkämper
Dr. Nick Reynaert

2. Subcommittee "Dosimetry in Radiology"

As indicated in previous NCS annual reports, a complication occurred due to a draft ICRU Report entitled "Patient Dosimetry for X-Rays Used for Medical Imaging". As agreed in 2001 between NCS and ICRU chairmen, the NCS and ICRU reports will be published approximately simultaneously. In March 2005 the chairman of the ICRU Main Committee and the Chairman of the Report Committee were planning to finalise the ICRU Report. This meeting was delayed to May 24, 2005 and followed by the real finalisation on September 1, 2005. The ICRU Report was accepted in December 2005.

The drafts of the chapters of the report on "Dosimetry in Radiology" were dating back to 2000. The chapters were brought into the format of the NCS reports. By the end of 2005 the authors of the various chapters were asked if they were still interested in the completion of the NCS report and be willing to update their chapters. It is foreseen that the NCS report will be published in 2005.

Membership of the subcommittee:
Dr. J. Zoetelief (chairman)
Prof. dr. J.J. Broerse
Dr. P.J.H. Kicken
Mr. W. Teeuwisse
Ir. W. de Vries
Mr. D. Zweers

3. Subcommittee "Treatment planning systems"

In 1996 the NCS installed the task group Treatment Planning Systems in order to produce a report with guidelines for the quality assurance (QA) of 3-D treatment planning systems (TPS). Early 2000 most chapters of this report had been written and the existing material was made available as a pre-release on the website of the NCS (www.ncs-dos.org) in March 2000.

In 2004 an overall revision of the report was carried out and a final version was submitted to the NCS board in September. In March 2005 after receiving comments from the NCS board, a corrected version was submitted to the board and was approved. The title of the report was changed into: "Quality assurance of 3-D treatment planning systems for external photon and electron beams; *practical guidelines for initial verification and periodic quality control of radiation therapy treatment planning systems*". The new report was printed in January 2006 and copies were sent to all radiotherapy physics departments in the Netherlands and Belgium. The members of the AAPM and IAEA task groups on treatment planning quality assurance were also sent a copy. With the publication of the report the subcommittee ends their activities.

The subcommittee consists of:

Dr. I.A.D. Bruinvis
Drs. R.B. Keus
Dr. W.J.M. Lenglet
Dr. G.J. Meijer
Dr. B.J. Mijnheer
Drs. A.A. van 't Veld
Dr.Ir. J.L.M. Venselaar
Drs. J. Welleweerd
Ir. E. Woudstra

4. Subcommittee "Monte Carlo Treatment Planning"

The first goal, was the completion of the report containing a literature overview and guidelines on Monte Carlo Treatment Planning (MCTP). The contents of the report were presented at the BHPA meeting in January 2005 in Namur and on the ESTRO meeting in September 2005 in Lisbon. The first draft was finished at the end of the year and will probably be printed in June 2006. A condensed version of the report was sent to Rad. Phys. Chem. as a review paper and will be published in 2006. In the next two years the group will focus on determining the added value of MCTP in the clinic, by comparing the MCTP dose engine of the Gent University (MCDE) with the best available conventional treatment planning systems, based on superposition/convolution algorithms (Helax, Pinnacle, AAA, ...). For this purpose planning information will be exchanged between different radiotherapy departments (Daniel den Hoed Rotterdam, NKI Amsterdam, UCL Brussels, UZ Gent) and the Belgian Lab for standard dosimetry (Gent University). An additional step is a direct comparison of MCDE against commercially released MCTP systems (XiO). This should lead to a second report, summarizing the obtained results.

Group meetings were held on the following dates: 28 February, 11 April, 5 September and 11 June.

Members of the subcommittee are:

Ir. M. Coghe,
Prof.Dr.Ir. C. De Wagter,
Prof. Dr. B. Heijmen,
Ir. J. Jansen
Dr. N. Reynaert (chairman)
Dr. Ir. D. R. Schaart,

Ir. M. Tomsej (secretary),
Dr. S. C. Van der Marck,
Dr. W. Van der Zee
Dr. Ir. C. Van Vliet Vroegindeweij

5. *Subcommittee “Loodschorten (Aprons): Protocols for personal dosimetry of workers wearing protective clothing”*

Discussions with the Ministry of Social Affairs and Employment during the second half of 2005 have resulted in a one-year research project assigned to this subcommittee in November. The purpose of the project is to formulate protocols for proper personal dosimetry when protective clothing is worn, enabling harmonized interpretation of dose values measured in the field for registration in the national database, and balancing correctness and simplicity of applied methods. The final recommendations –a code of practice– will be published as an NCS report. The composition of the subcommittee is representative for the various parties concerned. Furthermore, the NCS Advisory platform “radiology and nuclear medicine” is involved. Both bodies will meet in the beginning of 2006 to discuss the way to proceed. Work is in progress.

Members of the subcommittee are:
Dr. J. Zoetelief (Chairman)
Dr. J.W.E. van Dijk
Mr. L. Ebben
Ir. Y. Franken
Drs. T. Grimbergen
Mrs. Ir. W. Hummel
Dr. Ir. P.J.H. Kicken
Dr. Ir. F.W. Schultz (secretary)
Dr. G. Voorhout
Mr. D. Zweers

6. *NCS Subcommittee: Quality control of low-photon-energy emitting seeds in brachytherapy*

This subcommittee was formed in 2003 and has gathered four times in 2005, namely on April 6th, August 30th, October 15th and December 21st. Alternatively these meetings were held in Brussels (UCL-Woluwe) and Utrecht (UMC-U), with one meeting in Delft at the NMI.

In 2005 Sabine Bernard left the group as permanent member and was replaced by Bob Schaeken from the Middelheim Hospital, Antwerp.

The goals of the subcommittee are:

- Description of current practice : clinical, QC
- Comparison of different methods for QC
- Report on recommendations for QC
- Dosimetric recommendations, relevant principles and parameters
- Reference to the task of standard labs, traceability of calibration methods used at each centre
- Possibility to develop a visiting QA team : dosimetric intercomparisons

During the 2005 meetings attention mainly focussed on the preparation of the on-site visits to the institutions in Belgium and The Netherlands. The tasks, procedures and logistics for a visiting QA team have been thoroughly discussed.

Equipment for the determination of the source strength has been obtained on loan from two leading companies in this field, and in a first approach a well-type chamber (The Vinten chamber) available at the NMI will be used as secondary standard. These chambers will be

calibrated for the different Iodine seeds used in our countries using seeds that have been calibrated at NIST. For this the collaboration of the seed manufacturers has been asked. Possible collaboration with the German standard laboratory (PTB) is also investigated. A QC procedure for testing the treatment planning system has been elaborated. As reference data the consensus data suggested by AAPM TG43 (update) will be used. The chairman of this AAPM group has been contacted regarding their projects for sources that are at present missing in the consensus data sets. Unexpected delay in the preparation of the equipment caused the group to postpone the on-site visits until spring of 2006.

Finally preparation of a report on recommendations for quality control of low-photon-energy emitting seeds in brachytherapy has been initiated.

Members of the subcommittee are:

M.Sc. A. Rijnders, chairman

Drs. A.H.L. Aalbers

M.Sc. B. Schaeken

M.Sc. M. Debrabandere

Dr. K. Koedooder

Dr. R. Moerland

M.Sc. B. Thissen

Dr. Ir. A. van't Riet

Prof. Dr. S. Vynckier

Advisory platforms

The Netherlands commission on Radiation Dosimetry covers a wide field of expertise through the participating scientific societies. In June 1999 NCS platform was established on dosimetry for radiology and nuclear medicine (chairman J. van Unnik) and dosimetry for radiotherapy (chairman J.J. Broerse). The task of these platforms was to give advice on specific research projects initiated by the Government. Accordingly the NCS platforms have commented IMS reports (Informatiesystem Medische Stralingstoepassingen) of RIVM (Rijksinstituut voor volksgezondheid en Milieuhygiëne). The platforms can be approached through the secretary of the NCS for future consultation under the condition of modest coverage of the NCS experts in terms of attendance fee and travel costs for meetings.

Prof. Dr. J.J. Broerse, emeritus chairman

Advisory platform "radiology and nuclear medicine"

There were no requests for advice in this area.

Membership advisory platform 'Radiology and Nuclear Medicine':

Drs. J.G. van Unnik (chairman)
Dr. J. Geleijns (secretary)
Prof.dr. J.J. Broerse
Dr. J.A.K. Blokland
Mrs. I. van Helvoort
Dr. Ir. P.J.H. Kicken
Ir. A.H.J. Renders
Mr. W. Termorshuizen

Advisory platform "radiotherapy"

There were no requests for advice in this area.

Membership advisory platform 'Radiotherapy':

Prof.dr. J.J. Broerse (chairman)
Ir. W. de Vries (secretary)
Drs. E.N.J. van Lin
Mrs. F. Cavelaars
Dr. R.W. de Boer
Ir. C.F. Westermann