



## ANNUAL REPORT 2001

### Objective

The Nederlandse Commissie voor Stralingsdosimetrie (NCS, Netherlands Commission on Radiation Dosimetry) was established on 3 September 1982 with the main objective of promoting the appropriate use of radiation dosimetry, both for radiation research as 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 Clinical Physics);
- Nederlandse Vereniging voor Radiobiologie (NVRB, Netherlands Society for Radiobiology);
- Nederlandse Vereniging voor Stralingshygiëne (NVS, Netherlands Society for Radiological Protection);
- Nederlandse Vereniging van Radiologisch Laboranten (NVRL, Netherlands Society of Radiographers and Radiological Technologists);
- Nederlandse Vereniging voor Radiologie (NVvR, Netherlands Society for Radiology);
- 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 established a website: <http://www.ncs-dos.org/>

secretary:

ir. W. de Vries, Nederlands Meetinstituut  
Dept. Temperature and Radiation  
POBox 654, NL-2600 AR DELFT, The Netherlands  
Tel. +31 30 253 9098, Fax. +31 30 253 9095  
Website: <http://www.ncs-dos.org/>  
E-mail: [WdeVries@NMI.nl](mailto:WdeVries@NMI.nl)

## Board

On December 31, 2001 the members of the board of the NCS were:

Prof.dr. S. Vynckier, chairman	(SBPH/BVZF)
Prof.dr. J.J. Broerse, vice-chairman	(NVRO)
Ir. W. de Vries, secretary	(NMI)
Dr. J. Zoetelief, treasurer	(NVRB)
Dr. A.J.J. Bos	(NVS)
Prof.dr. A.A. Lammertsma	(NVNG)
Drs. A. van Dalen	(NVvR)
Dr.ir. F.W. Wittkämper	(NVKF)
Mr. D. Zweers	(NVRL)
Dr. B.J.M. Heijmen	(NVRO)

The board of the NCS met three times in 2001, on 26 February, 7 May and 10 October. The main subjects raised at the board meetings were:

- monitoring the progress of activities by subcommittees;
- initiate the publication of NCS-reports;
- the development of new activities;
- the organization of the fourth NCS Lustrum Symposium in November 2002;

No NCS-reports were published in 2001.

Several subcommittees have set the date for publication of their report in the year 2002.

## Subcommittees

### 1. *Subcommittee "Uniformity of Dosimetry Protocols"*

The subcommittee 'Uniformiteit Dosimetrieprotocollen' has gathered four times in 2001, namely on February 21st, April 25th, June 22nd, and October 2nd. In 2001 André Minken of RTIL (Heerlen, NL) joined the NCS subcommittee.

The goals of the subcommittee are:

- To achieve uniformity of dosimetry protocols.
- To publish a self-contained new Code of Practice (CoP).
- To draft a CoP that is concise, clear, and easy to use in practice.
- To draft a CoP that applies to ionization chambers and beam qualities used in the Netherlands and Belgium.
- To give recommendations for Dutch and Belgian clinical physicists in the final report and in the CoP.

In 2001 the subcommittee sent out a questionnaire to all Dutch and Belgian radiotherapy institutes. Out of 21 Dutch institutes 19 have responded, and out of 25 Belgian institutes 17 have responded. By means of this questionnaire information was gathered about clinical treatment units, dosimetry equipment (for both photon and electron beams), beam qualifiers, and the willingness of the institutes to cooperate in the subcommittee's measurement program.

This measurement program involves the experimental determination of  $k_Q$  beam quality correction factors for high-energy photon beams in selected clinical beams (of Dutch and Belgian radiotherapy institutes) for selected types of ionization chambers using the NMI water

calorimeter. These  $k_Q$  factors will become part of the new CoP.

Four types of chambers were selected by the subcommittee for the  $k_Q$  measurement program. All manufacturers (PTW, NE, and Wellhöfer) have agreed to provide six ionization chambers of each type for the study period. Eight radiotherapy institutes were selected, covering a representative range of clinical accelerator types and beam energies. Measurements of  $k_Q$  factors will probably commence in June 2002. Test measurements at the Netherlands Cancer Institute (NKI) will be performed on April 5-7.

As a part of the clinical program of the NMI, a test of the performance of the water calorimeter was carried out using the BNM-LNHB Saturne 43 accelerator at 6, 12 and 20 MV. Measurements were hindered by the pick-up of noise from the RF-generator of the accelerator. Improvements of the water calorimeter are presently being implemented.

The program of the standard dosimetry lab of the Rijks Universiteit Gent (RUG) involves a comparison for formalisms based on a) absorbed dose to water and b) air kerma between Belgian hospitals.

#### Publication

H. Palmans, L. Nafaa, J. De Jans, S. Gillis, M-T. Hoornaert, C. Martens, M. Piessens, H. Thierens, A. Van der Plaetsen, and S. Vynckier, *Absorbed dose to water based dosimetry versus air kerma based dosimetry for high-energy photon beams: an experimental study*, *Physics in Medicine and Biology* **47**, 421-440 (2002).

Members of the subcommittee are:

Drs. A.H.L. Aalbers (chairman)

Mrs. M-T. Hoornaert

Dr. A. Minken

Dr. M.W.H. Pieksma (secretary)

Dr. H. Palmans

Prof. Dr. S. Vynckier

Dr. F.W. Wittkämper

## 2. Subcommittee "Dose Calculations in Megavoltage Photon Beams"

The aim of the Task Group is to publish recommendations for the methods of dose calculations in megavoltage photon beam therapy. The Task group assembled 5 times in the year 2001.

Attention mainly focused on the set-up of an accurate monitor unit (MU) calculation method for asymmetrical fields, with or without a wedge or additional shielding blocks. An algorithm has been formulated. To check assumptions and to test the formalism, measurements on different types of treatment units and for photon energies ranging from  $^{60}\text{Co}$  to 25 MV have been started. Analysis of measured data was still ongoing at the end of 2001; the outcome might influence the model.

The working method of the Task Group is to publish the results in separate papers, on which the report of MU calculation for asymmetrical fields can be based. In 2001 parts of the results were presented at several (inter)national meetings via posters and oral presentations.

#### Abstracts

J. Welleweerd; "Independent calculation of the dose in the reference point of asymmetrical photon fields"; 18-9-2002, ESTRO Sevilla, Radioth and Onc. 61 Suppl., S40.

S. Heukelom; "Head and phantom scatter in asymmetrical and symmetrical open and wedged photon beams"; 19-9-2002, ESTRO Sevilla, Radioth and Onc. 61 Suppl., S57.

Members of the subcommittee are:  
Dr. J.J.M. van Gasteren (chairman)  
Dr. S. Heukelom  
Ir. H.N. Jager  
Dr. R. van der Laarse  
Dr. B.J. Mijnheer  
Ir. J.P.C. van Santvoort  
Drs. M. Tomsej  
Dr.ir. J.L.M. Venselaar  
Drs. J. Welleweerd  
Ir. C.F. Westermann

### 3. Subcommittee "Dosimetry in Radiology"

The subcommittee on dosimetry in radiology prepared a nearly complete draft report by the end of 2000. A complication occurred due to a draft ICRU Report entitled "Patient Dosimetry for X-Rays Used for Medical Imaging". In this draft Report new symbols are proposed for quantities commonly used in patient dosimetry in radiology. This may imply that the chapter on radiation quantities and units has to be rewritten. The chairman of the ICRU (prof. A. Wambersie) has been approached through the ICRU Report sponsor (Dr. H. Paretzke). This however did not result in a decision concerning the use of the symbols proposed in the ICRU draft Report to be used in the future NCS report. A discussion between the NCS chairman (Prof. S. Vynckier) and the ICRU chairman led to the decision to adapt to the symbols proposed in the ICRU Report and to publish the NCS report and the ICRU Report approximately simultaneously, most likely in 2003.

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

### 4. 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 task group decided to make the existing material available as a pre-release by "electronic publication" on the website of the NCS ([www.ncs-dos.org](http://www.ncs-dos.org)) in March 2000.

After reading the material on the website a number of colleagues sent comments and gave also feedback after applying the report in practice. This information was used to improve the report and additional chapters were written. Work in progress in other task groups on QA of TPS, however, prompted a revision of the content of the report. In order to be complementary a very practical report with more specific test descriptions was required. Therefore a re-editing process was started in 2001. The task group now aims to finalize the report before July 2002.

#### publication:

A.A. van 't Veld. Accuracy of treatment planning calculations for conformal radiotherapy.  
Thesis University of Groningen, The Netherlands.

Members of the subcommittee are:  
Dr. I.A.D. Bruinvis (chairman)  
Drs. R.B. Keus  
Drs. W.J.M. Lenglet  
Drs. G.J. Meijer  
Dr. B.J. Mijnheer  
Dr. A.A. van 't Veld  
Dr.ir. J.L.M. Venselaar  
Drs. J. Welleweerd  
Ir. E. Woudstra

#### 5. Subcommittee 'Electronic Personal Dosemeters'

The subcommittee 'Electronic Personal Dosemeters' met four times during 2001. Draft chapters became available on:

- application areas of EPDs
- international standards on EPDs
- results on comparison tests of EPDs

A questionnaire was sent to manufacturers of EPDs with the request for type test reports and other information.

In 2001 a presentation, partly based on the work of the task group, was given by J-W.E. van Dijk on 'Electronic Personal Dosemeters, Technique and Application', Symposium of the Netherlands Society for Radiological Protection, Amersfoort, 2 November 2001.

The subcommittee hopes to present a final report in the autumn of 2002.

Members of the subcommittee are:  
Dr. A.J.J. Bos (chairman)  
Dr. J.W.E. van Dijk  
Dr. J. Geleijns  
Ir. W. de Vries  
Mr. D. Zweers (secretary)

## Advisory platforms

### *Advisory platforms 'radiology and nuclear medicine' and 'radiotherapy'*

The advisory platforms were installed to provide advices on research projects in radiation dosimetry for medical applications. The platform on radiology and nuclear medicine convened once in 2001 to discuss a new initiative to formulate concise guidelines for quality control of diagnostic equipment, the project on reference values in posterior-anterior chest investigations and the LUMC demonstration project on patient dosimetry. There were no requests for advice in the area of radiotherapy.

#### Membership advisory platform 'Radiology and Nuclear Medicine':

Drs. J. van Unnik (chairman)  
Dr. J. Geleijns (secretary)  
Mrs. N. de Haan  
Mr. F. Felderhof  
Dr.ir. P.J.H. Kicken  
Ir. A.H.J. Renders  
Prof.dr. J.J. Broerse

#### 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

## NCS FINANCIAL OVERVIEW 2001

	<b>Income</b> (NLG)	<b>Costs</b> (NLG)
Savings-account on December 31, 2000	16255,51	
Current-account on December 31, 2000	5575.81	
Cheques and cash on December 31, 2000	449.00	
Contribution Netherlands Society for Radiology 2001	1000.00	
Contribution Netherlands Society for Clinical Physics 2001	225.00	
Contribution Netherlands Society for Radiotherapy and Oncology 2001	1500.00	
Contribution Netherlands Society for Nuclear Medicine 2001	200.00	
Contribution Netherlands Society for Radiological Protection 2001	225.00	
Contribution Netherlands Society for Radiobiology 2001	165.00	
Contribution Netherlands Society of Radiographers and Radiological Technologists 2001	250.00	
Belgian Hospital Physicists Association 2001	0.00	
Interest savings-account	411.35	
Sales of NCS Reports	2041.26	
Costs Chamber of Commerce		77.11
Banking costs		36.12
Costs of board and subcommittees meetings		354.78
Costs web site		626.61
Cheques and cash on December 31, 2001		514.00
Savings-account on December 31, 2001		16666.86
Current-account on December 31, 2001		<u>10022.45</u>
Total	<u>28297.93</u>	<u>28297.93</u>

## NCS BUDGET 2002

<b>Costs</b>	<b>Income</b>	
	(€)	(€)
Contributions scientific societies	1650.00	
Interest savings-account	200.00	
Sales of NCS Reports	250.00	
Contributions from others to printing costs of NCS Reports	1650.00	
Costs Chamber of Commerce		40.00
Banking costs		20.00
Costs of board and subcommittees meetings		300.00
Costs web site		340.00
Costs of printing NCS Reports		2050.00
Costs NCS fourth Lustre Symposium		<u>1000.00</u>
Total	<u>3750.00</u>	<u>3750.00</u>