NCS 018-001 Delft, April 30, 2018

ANNUAL REPORT 2017

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 (Dutch Society for Radiotherapy and Oncology);
- Nederlandse Vereniging voor Nucleaire Geneeskunde (Dutch Society of Nuclear Medicine);
- Nederlandse Vereniging voor Klinische Fysica (Society for Medical Physics of the Netherlands);
- Nederlandse Vereniging voor Radiobiologie (Netherlands Radiobiological Society);
- Nederlandse Vereniging voor Stralingshygiëne (Netherlands Society for Radiological Protection);
- Nederlandse Vereniging voor Medische Beeldvorming en Radiotherapie (Dutch Society for Medical Imaging and Radiotherapy);
- Nederlandse Vereniging van Klinisch Fysisch Medewerkers (Dutch Society for Medical Physics Engineers);
- Nederlandse Vereniging voor Radiologie (Radiological Society of the Netherlands)
- Belgische Vereniging voor Ziekenhuisfysici/Société Belge des Physiciens des Hôpitaux (Belgian Hospital Physicists Association);

expanded with a representative from the Dutch Metrology Institute VSL.

To achieve its aims, the NCS carries out the following tasks: participation in dosimetry standardisation, promotion of mutual comparisons of dosimetry, drafting of dosimetry protocols and the collection and evaluation of physical data related to dosimetry. Furthermore, the commission shall establish or maintain links with national and international organisations concerned with ionising radiation and promulgate information on new developments in the field of radiation dosimetry.

Website: https://www.radiationdosimetry.org

Board

On December 31, 2017 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. Rijnders		(SBPH/BVZF)
J.M.J. Hermans	treasurer	(NVKFM)
Dr. J. R. de Jong		(NVNG)
N. de Graaf		(NVvR)
Dr. P. Sminia/ Dr. K. Franken		(NVRB)
Dr. Ir. F.W. Wittkämper		(NVKF)
M.K. Zeeman		(NVMBR)

The board of the NCS met three times in 2017 on 22 March, 28 June and 6 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;
- Organisation of the 7th NCS lustrum symposium.

In 2017 NCS report 27 Quality Assurance for Tomotherapy Systems was published. Two new subcommittees have been installed; Quality control for linear accelerators and MRI QA for RT. The 7th NCS lustrum symposium was organised with the topic ‘proton therapy’ with more than 120 attendees. Four papers based on the work of the NCS subcommittees were accepted for publication in 2017:

1) Van de Kamer JB, Lammertsma AA, Sminia P. Straling: de balans tussen beschermen en benutten. Een bespreking van NCS rapport 26, “Human Exposure to Ionising Radiation for Clinical and Research Purposes”. Nederlands Tijdschrift voor Stralingsbescherming jaargang 8, nummer 1, 2017.
2) Van de Kamer JB, Lammertsma AA, Sminia P. Is het middel erger dan de kwaal? Memorad 22, nummer 3, 2017.
3) Seravalli, E, Houweling, AC, van Battum, L, Raaben, TA, Kuik, M, de Pooter, JA, Van Gellekom, MPR, Kaas, J, De Vries, JHW, Loeff, EA, Van de Kamer, JB, Auditing local methods for quality assurance in radiotherapy using the same set of predefined treatment plans, Physics and Imaging in Radiation Oncology, p19, 5, 2018.
4) De Prez, LA, Heukelom, S, Jansen, B, Jansen, W, van de Kamer, J, van Klink, W, Kok, E, Perik, T, de Pooter, JA, Wittkämper, F An on-site dosimetry audit for high-energy electron beams, Physics and Imaging in Radiation Oncology, p44, 5, 2018

Subcommittees

1. Subcommittee on Guidelines for Quality Assurance of Helical Tomotherapy

Helical Tomotherapy is a modality for radiation therapy treatment with integrated systems for treatment planning, imaging, image registration and dose delivery. It has several differences compared to conventional linear accelerators, which imply that general Quality Assurance guidelines are not always applicable or sufficient. For example, current dosimetric protocols, based on the absorbed dose (NCS 18, AAPM TG-51), require calibration measurements under reference conditions. These reference conditions cannot be met. New methodologies are proposed in literature and are currently under discussion. Other specific QA issues concern the acceptance testing and commissioning of the integrated system, verification of dose planning and delivery, mechanical QA and patient safety. Since the publication of TG148 on Tomotherapy Quality Assurance (Langen et al, Med.Phys. 2010) new functionality has been added to the system, like the dose control system, a new type of linac and target, the VoLO optimization and dose calculation using GPU architecture, calibration of the MVCT HU units to density, TomoDirect (treatment with fixed gantry angles), TomoEdge (treatment with dynamic collimation in cranio caudal direction) and TQA (integrated and automated tool for QA using the build in detector array). The goal of this report is to provide an updated guideline for QA and dosimetric calibration of the Helical Tomotherapy system.

The report is published in April 2017 and is available now at the NCS website (https://radiationdosimetry.org/ncs/publications). The report covers the following topics:

- Treatment delivery – mechanics - TQA
- Dosimetry
- Treatment planning
- Imaging and set up verification
- Miscellaneous (adaptive, patient transfer and DQA)

Members of this NCS subcommittee:

Vincent Althof (Radiotherapiegroep, Deventer, chairman)
Jeroen van de Kamer (NKI/AvL, Amsterdam, representative from the NCS-board)
Bie De Ost (UZA/ZNA, Antwerpen, secretary)
Nick Reynaert (Centre Oscar Lambret, Lille)
Kay Schubert (DKFZ, Heidelberg)
Edmond Sterpin (UCL, Brussel)

2. Subcommittee on quality assurance of cone-beam CT

Cone-beam CT scanners integrated with linear accelerators have become increasingly important tools for image guidance of radiotherapy treatments. The application of cone-beam CT based image guidance is very diverse, ranging from bony anatomy based offline correction protocols to online stereotactic tumor based correction strategies. Although most institutions have presently implemented QA procedures for CBCT, the frequency and methods vary widely.

The aim of the subcommittee is to develop uniform guidelines for the commissioning and quality assurance of cone x-ray based image guidance systems on conventional linacs, i.e. cone-beam CT (XVI, OBI), and portal imagers. The guidelines will be based on current literature as well as clinical experience from the participating members of this subcommittee.

Two meetings of the committee have been held in March (UMCN, Nijmegen) and May (AMC, Almere) 2017, and several more meetings by two members of the committee (Kirsten Deurloo and Peter Remeijer). The first two meetings were focused on finalizing draft versions of all chapters. The subsequent meetings were dedicated to editing the manuscript into the NCS format and preparing it for review. At the end of December 2017, the report was sent for review to two external experts.

Members of the subcommittee
- Peter Remeijer (NKI/AVL, Amsterdam, chairman)
- Kirsten Deurloo (MCA, Alkmaar, secretary)
- Heleen van Herpt (UMCG, Groningen)
- Martijn Hol (LUMC, Leiden)
- Martijn Kusters (UMC St Radboud, Nijmegen)
- Greet d'OlieSlager (BVI, Tilburg)
- Marianna Sijtsema (UMCG, Groningen)
- Niek van Wieringen (AMC, Amsterdam)
- Koos Geleijns (LUMC, Leiden, advisor CT dosimetry)
- Joep Hermans (MAASTRO, Maastricht, representative of the NCS board)

3. Subcommittee on "IMRT & VMAT Audit"

The subcommittee conducts a voluntary audit of IMRT and VMAT/RapidArc delivery modalities in the radiotherapy institutes in the Netherlands. The goal of the audit is to independently validate patient-specific quality assurance (QA) methods, clinically used in the Netherlands, for IMRT and VMAT plans using the same set of treatment plans for all institutes.

For a limited set of RT plans, defined by the committee, the dose distribution computed by an institution's treatment planning system is compared with the dose measurements performed by the audit team at the institution's linear accelerators. This is done independently from the treatment planning optimization process. Each plan is measured by an ionization chamber (pinpoint), Gafchromic film and a 2D ionization chamber array (Octavius, PTW). Additionally, the results are compared to the QA measurements done by each institute according to their local protocol. The final report was finalized and a manuscript was submitted and accepted in PhiRo.

Members of the subcommittee are:
- Enrica Seravalli (UMCU, Utrecht, chair)
- Anette Houweling (AMC, Amsterdam, secretary)
- Marion van Gellekom (ARTI, Arnhem)
- Leo van Battum (VUmc, Amsterdam)
- Jochem Kaas (NKI-AVL, Amsterdam)
- Erik Loeff (Erasmus MC, Rotterdam)
- Thom Raaben (MST, Enschede)
- Marc Kuik (MCA, Alkmaar)
- Jacco de Pooter (VSL, Delft, representative from the NCS board)
- Wilfred de Vries (UMCU, Utrecht)

4. Subcommittee on QA of brachytherapy with Ir-192 afterloaders

Goal of the subcommittee is to prepare a code of practice for Quality Assurance of Ir-192 afterloaders for HDR and PDR brachytherapy, as used in The Netherlands and Belgium. The code of practice will update and partially replace three previous reports of the NCS on

Brachytherapy with Ir-192.

In 2017 the committee had 8 meetings, 4 of which were teleconferences. The committee finished a draft version of the report, which was sent to external readers for comments. After updates the report was sent to the NCS-committee for final approval. Final approval is anticipated in 2018.

Rita Reymen has left the committee, due to illness. Jacco Steenhuijsen gave a presentation on the contents of the report for members of the NVKF. Marja Harbers gave a presentation on the contents of the report for members of the NVKFM.

Members of the subcommittee are:

Jacco Steenhuijsen (Catharina ziekenhuis, Eindhoven, chairman)
Marja Harbers (Medisch Spectrum Twente, Enschede)
Aswin Hoffmann (University Hospital Carl Gustav Carus, Technische Universität Dresden)
Astrid de Leeuw (UMCU, Utrecht)
Mirko Unipan (MAASTRO, Maastricht)
Alex Rijnders (Europa Ziekenhuizen, Brussel, representative of the NCS board)

5. Subcommittee on Code of Practice and recommendations for Total Body Irradiation and Total Skin Irradiation

The goals of this NCS subcommittee is to investigate the status of treatment protocols and quality control for total body and total skin irradiation in the Netherlands and Belgium. Most centres use AAPM reports 17 and 23 as a starting point, but deviate from this after a few decades. Recent technological evolution allows new treatment and treatment planning techniques, creating a need for a guidance report for individual centres in order to compare their current way of practice to the state of the art practice.

The workgroup had two meeting during this year. The initial draft of the report was discussed and modified. The intermediate results of the workgroup were presented at an RKF themamiddag at Nijmegen University Medical Center op 15 december.

Heleen Van Herpt and Maxime Coevoet left the workgroup, Nicolas Hermand left Leuven for Charleroi but remains as member of the workgroup. Contacts will be made to include a Physicist of the UZ Leuven. The responses of the questionnaire were summarised and presented at the RKF themamiddag.

Members:

Geert Pittomvils (UZ Gent, Gent, chairman)
Wim Jansen (LUMC, Leiden, secretary)
Nicolas Hermand (UZ Leuven, Leuven)
Phil Koken (VUMC, Amsterdam)
Daan Martens (NKI-AvL, Amsterdam)
Lars Murrer (Maastro Clinic, Maastricht)
Peter Van der Hulst (UMCG, Groningen)
Ruud Van Leeuwen (UMC St Radboud, Nijmegen)
Francoise Vanneste (Saint Luc UCL, Brussels)
Jeroen Van de Kamer (NKI-AvL, Amsterdam, representative of the NCS Board)

6. Subcommittee on Audit for high-energy Electron beams

In the first months of 2017 the report was finalized. It was decided to publish the results also in the PHIRO journal. Therefore, the report was rewritten as article and it was accepted for

publication. Based on the reports of the referees, some changes were applied to the original text. the Subcommittee will review the report so that the text corresponds with the publication. This is planned for the first quarter of 2018.

Members of this NCS subcommittee:

Frits Wittkamper (NKI/AvL, Amsterdam, chairman and representative of the NCS board)
Thijs Perik (NKI/AvL, Amsterdam)
Stan Heukelom (VUmc, Amsterdam)
Wenze van Klink (VUmc, Amsterdam, Past member)
Wim Jansen (LUMC, Leiden)
Elfried Kok (RdGG, Delft)
Leon de Prez, (VSL, Delft, secretary)
Bartel Jansen (VSL, Delft)
Jacco de Pooter, (VSL, Delft, advisor)

7. Subcommittee on Radiation Protection and Dosimetry of the Eye Lens

Evaluation of the eye lens dose is of increasing importance due to the growing insight in the sensitivity of the organ. The European BSS directive of 2013 has implemented the recommendations of the ICRP and limited the annual eye lens dose to 20 mSv. This directive will be implemented in the national legislation in February 2018.

The goals of the subcommittee are:

1) Provide guidance for reducing the exposure of the eye lens
2) Provide guidance for determination of the eye lens dose
3) Provide decision rules when to use eye lens dosimetry

The committee gathered 7 times during 2017. A report was drafted during the course of 2017. The draft report is submitted to several stakeholders for consultation on December 29th.

The report has the following content:

- Introduction
- Background
- Process for protection of the eye lens
- Overview of exposed workers groups
- Recommendations for measurement of the eye lens dose
- Eye lens exposure and protection in practice. Fields of interest: fluoroscopically-guided procedures, nuclear medicine, veterinary medicine, industrial radiography, isotope production and nuclear industry
- Recommendations for education and medical surveillance
- Summary of the recommendations
- The committee intends to finalise the report early 2018.

Bertine de Bes (Flevoziekenhuis, Almere, member NVMBR) left the subcommittee in June 2017. Wim Idema (Academisch Medisch Centrum, Amsterdam) replaced her as a member from NVMBR in August 2017.

<u>Presentations:</u>

- Werknemergroepen die mogelijk te maken krijgen met de nieuwe ooglens dosislimiet van 20 mSv, R.P. Kollaard, T.W.M. Grimbergen, P. de Jong, Nederlands Tijdschrift voor Stralingsbescherming 8(2), p. 36-39, 2017.

- Verslag van de NCS ooglens subcommissie, Robert Kollaard, NVS najaarssymposium, 10 november 2017.

Members of the subcommittee are:
Robert Kollaard (NRG, Arnhem, chairman)
Doreth Valk (RIVM, Bilthoven, secretary)
Mariska Damen (LUMC, Leiden)
Bart Goessens (Radboud University Medical Center, Nijmegen)
Tom Grimbergen (NRG, Arnhem, representative from the NCS board)
Kirsten Henken (St. Antonius Hospital, Nieuwegein)
Kitty Hoornstra (UMCU, Utrecht)
Wim Idema (AMC, Amsterdam)
Pierre Kicken (Astra Consultancy, Eindhoven)
Martine Lagerweij (Isala Hospital, Zwolle)
Alexander Maass (University of Groningen, University Medical Center Groningen)
Leo Schultze Kool (UMC St Radboud, Nijmegen)
Lara Struelens (SCK•CEN, Mol, Belgium)
Ischa de Waard (RIVM, Bilthoven)

8. Subcommittee on "Dosimetry for Scanned Pencil Beam Proton Therapy"

International codes of practice for reference dosimetry and recommendations for measurement of beam characteristics in proton therapy (TRS-398, ICRU 78) are mainly focused on passive scattering delivery technology. These reports do not address specific issues of pencil beam scanning. The aim of the subcommittee on "Dosimetry for Scanned Pencil Beam Proton Therapy" is therefore to develop uniform guidelines for the absolute and relative dosimetry of the pencil beam scanning modality with continuous and pulsed proton beams. The subcommittee focuses on the new proton therapy facilities that are currently being developed in the Netherlands and Belgium. The goal is to deliver a report that can be used as a code of practice in proton therapy not only in the Netherlands, but internationally as well. The report will be based on the current literature as well as clinical experience of the participating members of this subcommittee. Moreover, members of the subcommittee are in close contact with international committees working on the similar reports to be sure that NCS report will be in agreement with future international recommendations.

There was only one meeting in 2017 – 9th of January. During this meeting a detailed content of each chapter was discussed. Due to the heavy commissioning activities at proton therapy centres in Groningen and Delft, it was difficult to organize another meeting.

Petra Trnková and Carles Gomá have presented an intermediate consensus on the relative and absolute dose measurements in spot scanning proton therapy measurement at the 7th NCS lustrum symposium in Amsterdam on 27th of October 2017.

On November, 14th 2017 there was a dosimetry intercomparison at UMC Groningen. Physicists from UZ Leuven, MAASTRO, UMC Groningen and HollandPTC participated in the measurements. They have all measured the same fields with their own ionization chamber. All the centres were within 1 % agreement. The discussions during the intercomparison will be presented and re-iterated at the first NCS subcommittee meeting in 2018. Gloria Vilches from MAASTRO has joined the subcommittee.

The report is addressing the following topics: reference dosimetry, single pencil beam specific characteristics, time and space dependent dosimetry, neutron contamination and dosimetry equipment.

Dissemination of results in the form of publications or symposia

- S. Rosomme, C. Gomá: *Dosimetry in PBS*; 7th NCS Lustrum Symposium, 27.10.2017; Amsterdam (NL)
- P. Trnková: *Relative dosimetry for scanned pencil beam proton therapy*; 7th NCS Lustrum Symposium, 27.10.2017; Amsterdam (NL)

Members of the committee are:
Petra Trnková (HPTC, chair)
Arturs Meijers (UMCG, secretary)
Marco Schippers (PSI/UMCG, advisor)
Jacco de Pooter (VSL, representative of the NCS board)
Marc-Jan van Goethem (UMCG, Groningen)
Arturs Meijers (UMCG, Groningen, secretary)
Frank Verhaegen (MAASTRO, Maastricht)
Enrica Seravalli (UMCU, Utrecht)
Steven Habraken (ErasmusMC, Rotterdam)
Carles Gomà (UZ, Leuven)
Severine Rossomme (UCLouvain)
Paul van Beers (HPTC, Delft)
Gloria Vilches (MAASTRO, Maastricht)

9. Annual Report of the NCS Subcommittee on MRI QA for RT

Magnetic Resonance Imaging (MRI) is increasingly used in the process of radiation therapy (RT). In the workflow of MRI-guided RT-planning the superior soft-tissue contrast of MRI is utilized for high-precision delineation of the target volume and organs at risk. In most cases, the MR images are co-registered to the planning CT scan, but MR-only based workflows are now also making their way into the clinic for specific indications. Furthermore, targeting uncertainties at the dose delivery phase can be reduced in an MR-integrated workflow, in the form of MRI-integrated brachytherapy and external beam RT.

A concern of integrating MRI into RT-planning is the spatial accuracy of these images, as they are affected by magnetic field inhomogeneities, magnetic susceptibility artefacts, chemical shifts and non-linearities in the gradient fields. Since these effects are system and patient dependent, dedicated procedures for quality assurance (QA) and quality control (QC) of MRI for RT are mandatory.

The subcommittee has been established in 2017. The goal of this subcommittee is to develop a code of practice for MRI QA/QC which is dedicated to RT purposes.

In 2017, the subcommittee had three meetings, in which an inventory was made of MRI QA/QC procedures that have been implemented by the subcommittee members at their respective departments. Furthermore, the scope of the report was conceived and the topics to be covered have been discussed. After Paul de Bruin had left the subcommittee, Joost Kuijer and Steven Petit joined the group.

Members of the subcommittee are:

Zdenko van Kesteren (AMC, Amsterdam, chairman)
Marloes Frantzen-Steneker (NKI/AVL, Amsterdam, secretary)
Ellen Brunenberg (UMC St Radboud, Nijmegen)
Aswin Hoffmann (University Hospital Carl Gustav Carus, Technische Universität Dresden)
Joost Kuijer (VUmc, Amsterdam)
Steven Petit (Erasmus MC, Rotterdam)
Mariska de Smet (BVI, Tilburg)
Rob Tijssen (UMCU, Utrecht)
Pieternel van der Tol (HollandPTC, Delft)
Arjan Verduijn (UMCU, Utrecht)
Jeroen van der Kamer (NKI/AVL, Amsterdam, representative from the NCS board)

10. Subcommittee on "Code of Practice and Recommendations for Stereotactic Body Radiotherapy "

The purpose of the committee is to provide the basic requirements and guidelines for providing safe and high-quality SBRT treatments according to state of the art international standards.

In 2018 the committee has organized 6 meetings. The subject of the meetings has been mainly to explore and compare the workflows of the centers represented in the committee and to discuss existing publications on guidelines for intra- and extracranial stereotactic treatments (NCS report 25, AAPM TG101, AAPM-RSS guidelines, ASTRO-, EORTC- and ESTRO-guidelines). Also, some key subjects were discussed more extensively like PTV margins in stereotaxy, end-2-end testing and motion management.

To start the main outline of the report relevant chapters were identified and authorship was distributed over the group members. For 2018 the committee will further elaborate on the contents of the chapters in order to construct the first draft of the code of practice on SBRT.

In 2018 three members were added to the committee: Chrysi Papalazarou (Erasmus MC, Rotterdam), Marloes Steneker (AvL-NKI, Amsterdam) and Petra Kroon (UMCU, Utrecht).

Members of the subcommittee are:

Johan Cuijpers (VUmc, Amsterdam, chairman)
Anke van Mourik (NKI-AvL, Amsterdam)
Marloes Steneker (NK-/AvL, Amsterdam)
Anna Pethoukova (HMC, Den Haag)
Richard Canters (MAASTRO, Maastricht)
Marcus Wendling (UMC St Radboud, Nijmegen)
Siete Koch (MST, Enschede)
Rens Vingerhoets (NWZ, Alkmaar)
Chrysi Papalazarou (Erasmus MC, Rotterdam)
Petra Kroon (UMCU, Utrecht)
Jeroen van de Kamer (NKI-AvL, representative of 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

In 2010 the NCS platforms was reinitiated with the aim to provide practical advice regarding legal aspects concerning the use of radiation in the clinical environment. For this, the platform is represented by the participating societies, expanded with the Dutch Society on Pharmacy in Hospitals. To achieve this goal, the platform has frequent contact with the Dutch Government.

The Platform advises on radiation safety laws and regulations. It establishes practical guidelines for existing and new laws and regulations. The Platform maintains close contacts with the Dutch ministries of VWS (Ministry of Health, Welfare and Sport) and SZW (Ministry of Social Affairs and Employment) and the ANVS (Authority for Nuclear Safety and Radiation Protection). The Platform plays a key role in effective and efficient implementation of European directives into national law.

The Platform had two meetings in 2017 and was represented at the ANVS relations day on September 28th. Other activities in 2017 include:

- Competencies of supervising radiation experts.
- Protocol for reporting dose when wearing protective clothing.
- Clearance of artificial radionuclides.
- Revision of Risk Analysis procedure in radiology.
- Member of committee for artificial radionuclides

In 2017 the Platform advised the Dutch government on the implementation of the Basic Safety Standards Directive (96/29/Euratom) and ministerial decrees. Their knowledge of the daily operations, and consultation of their adherents, enabled them to advise the lawmakers on the practical implications of new regulations. Due to this engagement, new regulations will be accepted and implemented more easily within the hospitals.

Publications:

- The IAEA abstract for the Conference 'International Conference on Radiation Protection in Medicine: Achieving Change in Practice', https://radiationdosimetry.org/documents/iaea-abstract-cooperation-between-national-scientific-societies-and-the-government-a-dutch-initiative

Christian van Swol as former chair and Paul Jonkergouw as former secretary left the NCS platform. Kitty Hoornstra and Peter Brands have joint the platform in the role of secretary and chair respectively.

Members of the NCS platform are:

Peter Brands (NVKF, chair)
Kitty Hoornstra (NVS, secretary)
Herman Pieterman (NVvR)
Niels Veltman (NVNG)
Alie Vegter (NVMBR)
Jan Habraken (NVNG)
Bradley Pieters (NVRO)
Marja Harbers (NVKFM)
Kirsten Schimmel (NVZA)
Jeroen van de Kamer (NVRO, representative from the NCS board)

NCS FINANCIAL OVERVIEW 2017

	Income (€)	Costs (€)
Savings-account on January 1, 2017	38038.36	
Current-account on January 1, 2017	7738.18	
Project-account on January 1, 2017	18355.18	
Contribution Netherlands Society for Radiology (NVvR)	600.00	
Contribution Netherlands Society for Medical Physics (NVKF)	400.00	
Contribution Netherlands Society for Radiotherapy and Oncology (NVRO)	800.00	
Contribution Netherlands Society for Nuclear Medicine (NVNG)	200.00	
Contribution Netherlands Society for Radiological Protection (NVS)	800.00	
Contribution Netherlands Radiobiological Society (NVRB)	100.00	
Contribution Dutch society of Medical Physics Engineers (NVKFM)	100.00	
Contribution Netherlands Society for Medical Imaging (NVMBR)	300.00	
Contribution Belgian Hospital Physicists Association (BHPA)	400.00	
Banking costs project account		103.00
Interest savings-account	91.02	
Banking costs current account		42.70
Costs web site		544.50
Costs meetings NCS board		676.33
Costs NCS subcommittees		739.15
NCS lustrum	10251.38	12384.76
Savings-account on December 31, 2017		38129.38
Current-account on December 31, 2017		11302.12
Project account on December 31, 2017		14252.18
Total	**78174.12**	**78174.12**

NCS BUDGET 2018

	Income (€)	***Costs (€)***
Contributions scientific societies	3100.00	
Contributions scientific societies	3500.00	
Interest savings-account	20.00	
Banking costs		150.00
Costs of board and subcommittees meetings		1500.00
Website maintenance etc		850.00
Total	**3520.00**	**2500.00**