



ANNUAL REPORT 2022-2024

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 National 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, 2024, the members of the board of the NCS were:

| | | |
|--------------------|---|-------------|
| Dr. G. Pittomvils | chairman | (SBPH/BVZF) |
| P. Brands | vice chairman and representative NCS platform | |
| Dr. J.A. de Pooter | secretary | (VSL) |
| T. Perik | treasurer | (NVKFM) |
| E. Raaijmakers | | (NVRO) |
| N. de Graaf | | (NVvR) |
| P. van der Tol | | (NVKF) |
| A. Vegter | | (NVMBR) |
| M. van der Vlies | | (NVNG) |
| Dr. F. Dekkers | | (NVRB) |
| R. Kollaard | | (NVS) |

The board of the NCS met three times in 2022 on 1 February (in person), 24 May (online) and 7 September (in person), three times in 2023 on 18 January (in person), 12 June (online) and 5 October (online) and three times in 2024 on 18 January (in person), 22 May (online) and 28 August (in person). 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;
- NCS potential contribution to the cluster MedTech of the FMS
- Updating the NCS articles of association in the context of the WBTR

In 2022-2024 three NCS reports have been published.

- NCS-35: Quality Assurance of Treatment Planning Systems (<https://doi.org/10.25030/ncs-035>)
- NCS-36: Quality Assurance of MRI for Radiotherapy (<https://doi.org/10.25030/ncs-036>)
- NCS-37: Code of Practice and Recommendations for Stereotactic Body Radiotherapy (<https://doi.org/10.25030/ncs-037>)

One new subcommittees has been installed in 2023: Quality Assurance of fan-beam CT for Radiotherapy

The board welcomed five new board members. Esther Raaijmakers, Pieter van der Tol, Robert Kollaard, Alie Vegter, Thijs Perik who will be the representatives for the NVRO, NVKF, NVS, NVMBR and the NVKFM respectively. To ensure appropriate engagement between NCS board and platform after the departure of Jeroen van de Kamer, it was decided to make Peter Brands, as NCS platform chair, NCS board member.

Subcommittees

1. Subcommittee on Dosimetry for Scanned Pencil Beam Proton Therapy

No activities took place in the years 2022-2023. January 2024 the working group met again and continued it's work on the report. Every 2 months an online meeting was organized. End of 2024 most of the chapters are in a final draft.

Members of the subcommittee are:



Marco Schippers (PSI/UMCG, advisor)

Marc-Jan van Goethem (UMCG)

Frank Verhaegen (MAASTRO)

Enrica Seravalli (UMCU)

Steven Habraken (HPTC/ErasmusMC)

Jasper Kouwenberg (HPTC)

Gloria Vilches Freixas (MAASTRO, secretary)

Petra Trnkova (Medical University of Vienna)

Hugo Palmans (Medaustron, Austria and National Physical Laboratory, UK)

Jacco de Pooter (VSL, representative NCS board)

2. Subcommittee on Quality Assurance of Treatment Planning Systems

The subcommittee finished their report beginning of 2022. The report was published on the NCS website in July 2022.

3. Subcommittee on MRI QA for radiotherapy

Magnetic Resonance Imaging (MRI) is increasingly used in the process of radiation therapy (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 2022, the subcommittee had multiple online meetings. The writing of the chapters was finalized and an internal review was done. The draft of the report was sent to a selection experts in the field (both radiotherapy and radiology) for an external review. The suggestions from this review round were implemented.

End of 2022, the report was submitted to the NCS board for review and the associated societies were given the opportunity to review the manuscript. In the beginning of 2023, the review of the associated societies was finalized and the suggestions were implemented in a final version of the report. We celebrated the finalization of the report with a dinner. The report was published on the NCS website in March 2023.

Members of the subcommittee are:

Zdenko van Kesteren (AmsterdamUMC (AMC), Amsterdam, chairman)

Rob Tijssen (Catharina Ziekenhuis, Eindhoven)

Ellen Brunenberg (RadboudMC, Nijmegen)

Joost Kuijer (AmsterdamUMC (VUmc), Amsterdam)

Steven Petit (Erasmus MC, Rotterdam)

Mariska de Smet (Catharina Ziekenhuis, Eindhoven)



Mariëlle Philippens (UMCU, Utrecht)

Jeroen van der Kamer (NKI AVL, Amsterdam, representative from the NCS board)

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

The subcommittee finished their report beginning of 2024. The report was published on the NCS website in November 2024.

5. Subcommittee on Quality control for linear accelerators

No report received

6. Subcommittee on Intra operative radiotherapy

No report received

7. Subcommittee on Clinical application of deformable image registration and auto-segmentation in radiotherapy

Sophisticated auto-segmentation and deformable image registration (DIR) toolboxes have become commercially available for clinical use in radiation oncology. A variety of clinical applications make use of both techniques. Still, their validity is not guaranteed in all circumstances and therefore one needs to be cautious when applying them in clinical use. These applications include auto-segmentation, contour propagation, re-irradiation and dose accumulation; also DIR typically plays a role in off-line and on-line plan adaptation.

This NCS subcommittee aims to give an overview of literature, possibilities and pitfalls of different techniques and provide guidance to commissioning and acceptance for various clinical applications. The subcommittee officially started in May 2019. In 2022 the committee has decided to stop their activities, because of lack of progress and the publication of reports overlapping with the scope of the committee.

8. Subcommittee on Radiation Protection and Dosimetry of the Extremities

The extremities and in particular the skin may be exposed to significant amounts of radiation, especially in workplaces where open radioactive sources are being produced or applied and in fluoroscopy guided procedures. Although several international recommendations have covered this topic (such as the ORAMED study, ISO 15382 and Annex E of ICRP-106), up to now there is little harmonization in the dosimetry and protection of the extremities in practice.

The aim of this NCS subcommittee is to develop guidelines with respect to the dosimetry and protection of the extremities, with special attention to applications of open radioactive sources and exposures in fluoroscopy guided procedures. The guidelines will be based on current literature as well as the experience of the participating members of this subcommittee.

There were 4 meetings in 2022, 4 meetings in 2023 and 4 meetings in 2024.

A large part of the report is now in draft or advanced draft, including a section on the medical surveillance. Ring dosimetry pilots have been completed for fluoroscopically guided procedures and procedures in small veterinary practices. Several interactions have taken place



with stakeholders in nuclear medicine (NVKF workshop) and amongst the cyclotron operators.

Changes in the subcommittee membership:

- Jeroen Schlieff (NRG, Arnhem) was replaced in 2022 by Ellis Winters (NRG, Arnhem)
- Johan de Jong and Ruud Brans were added to the committee in 2022 for the health physics chapter of the report.
- Emmy Meijne (UMCG, Groningen) was replaced in 2024 by Hans Boelens (UMCG, Groningen)
- Nanko de Graaf (Erasmus MC, Rotterdam) left the committee in 2023 and was not replaced.
- Mark van Mierlo (GE Healthcare, Eindhoven) left the committee in 2022 and was not replaced.

Dissemination:

- Kollaard, R. and Wiertz, R., Blootstelling van de extremiteiten in de nucleaire geneeskunde, workshop at NVKF Woudschoten, 13 October 2022.

Members of the subcommittee are:

Robert Kollaard (NRG, Arnhem, chairman)

Patricia Bekhuis (RIVM, Bilthoven, secretary)

Theo Adriaensen (Amphia Hospital, Breda)

Ruud Brans (Amsterdam)

Nanko de Graaf (2022-2023)(Erasmus MC, Rotterdam)

Tom Grimbergen (Mirion Dosimetry Services, Arnhem, representative from the NCS board)

Johan de Jong (Arbo Unie)

Alexander Maass (UMCG, Groningen)

Emmy Meijne (2022-2023) and Hans Boelens (since 2024)(UMCG, Groningen)

Mark van Mierlo (2022)(GE Healthcare, Eindhoven)

Jeroen Schlieff (2022) and Ellis Winters (since 2022) (NRG, Arnhem)

Pieter Nel van der Tol (Radboudumc, Nijmegen)

Filip Vanhavere (SCK.CEN, Mol, Belgium)

Alie Vegter (Treant Hospital, Stadskanaal)

Bart Vermolen (Gelderse Vallei Hospital, Ede)

Robert Westland (Amsterdam UMC, Amsterdam)

9. Subcommittee on Quality control and dosimetry for MRI-guided-radiotherapy

No report received



10. Quality Assurance of fan-beam CT for Radiotherapy

No report received



Advisory platform

The Netherlands Commission on Radiation Dosimetry covers a wide range of expertise through the participating scientific societies. In 1999 NCS platforms were established. Currently only the advisory platform on Radiation Protection in Hospitals is active. The task of the platform is 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*

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 2024 (live and online) and consultation by mail. Activities in 2024 include:

- The differences between the FMS guideline “Werken met therapeutische doses radio-nucliden” and the ANVS document “Handelingsperspectief uitvaartbedrijven”.
- The need to update the RIAS Format and the supporting spreadsheets.
- Radioactive waste after radionuclide therapy outside the treating hospital.

Progress is made in 2024 in updating the spreadsheets RIAS. This will result in updated spreadsheets for radiology and radiotherapy in 2025. The spreadsheet for nuclear medicine has not yet been updated.

Two members of the Platform will leave in 2025: Kitty Hoornstra (NVS) and Alie Vegter (NVMBR). Mariska Sonneborn (NVS) will take over the position of secretary. Daniëlle Vialle (NVMBR) joined the Platform to replace Alie.

Members of the NCS-platform are:

Peter Brands (NVKF, chairman and representative from the NCS board)
Kitty Hoornstra (NVS, secretary)
Gitta Bleeker (NVvR)
Niels Veltman (NVNG)
Alie Vegter (NVMBR)
Jan Habraken (NVNG)
Bradley Pieters (NVRO)
Marja Harbers (NVKFM)
Louise Andrews (NVZA)
Daniëlle Vialle (NVMBR)
Mariska Sonneborn (NVS)



NCS FINANCIAL OVERVIEW 2022

| | Income (€) | Costs (€) |
|---|-------------------|------------------|
| Savings-account on January 1, 2022 | 38160.59 | |
| Current-account on January 1, 2022 | 30226.62 | |
| 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) | 0.00 | |
| Contribution Netherlands Society for Nuclear Medicine (NVNG) | 200.00 | |
| Contribution Netherlands Society for Radiological Protection (NVS) | 400.00 | |
| 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) | 0.00 | |
| Income NCS Istrument | 7156.00 | |
| Costs NCS Istrument | | 11053.06 |
| Interest savings-account | | |
| Banking costs current account | 145.62 | |
| Costs web site | | 980.10 |
| Costs meetings NCS board | 192.71 | 2946.70 |
| Costs NCS subcommittees | | 1162.19 |
| Savings-account on December 31, 2022 | 38160.59 | |
| Current-account on December 31, 2022 | 23387.66 | |
| Total | 77835.92 | 77835.92 |

NCS BUDGET 2023

| | Income (€) | Costs (€) |
|---|-------------------|------------------|
| Contributions scientific societies | 3100.00 | |
| Interest savings-account | 0.00 | |
| Banking costs | 200.00 | |
| Costs of board and subcommittees meetings | 1200.00 | |
| Website maintenance etc | 600.00 | |



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|--------------|----------------|----------------|
| Total | 3100.00 | 2000.00 |
|--------------|----------------|----------------|

NCS FINANCIAL OVERVIEW 2023

| | Income (€) | Costs (€) |
|---|-------------------|------------------|
| Savings-account on January 1, 2023 | 38160.59 | |
| Current-account on January 1, 2023 | 23387.66 | |
| 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) | 400.00 | |
| 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) | 200.00 | |
| Interest savings-account | 221.55 | |
| Banking costs current account | | 167.42 |
| Costs web site | | 883.30 |
| Costs meetings NCS board | | 1245.44 |
| Costs NCS subcommittees | | 689.05 |
| Savings-account on December 31, 2023 | | 38382.14 |
| Current-account on December 31, 2023 | | 23002.45 |
| Total | 64369.80 | 64369.80 |



NCS BUDGET 2024

| | Income (€) | Costs (€) |
|---|-------------------|------------------|
| Contributions scientific societies | 3600.00 | |
| Interest savings-account | 500.00 | |
| Banking costs | 200.00 | |
| Costs of board and subcommittees meetings | 3000.00 | |
| Website maintenance etc | 900.00 | |
| Total | 4100.00 | 4100.00 |

NCS FINANCIAL OVERVIEW 2024

| | Income (€) | Costs (€) |
|---|-------------------|------------------|
| Savings-account on January 1, 2024 | 38382.14 | |
| Current-account on January 1, 2024 | 23002.45 | |
| 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) | 400.00 | |
| Contribution Netherlands Radiobiological Society (NVRB) | 0.00 | |
| 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) | 200.00 | |
| Interest savings-account | 572.33 | |
| Banking costs current account | 193.33 | |
| Costs web site | 943.80 | |
| Costs meetings NCS board | 4085.67 | |
| Costs NCS subcommittees | 5833.41 | |
| Savings-account on December 31, 2024 | 38954.47 | |
| Current-account on December 31, 2024 | 14956.24 | |



| | | |
|-------|----------|----------|
| Total | 64966.92 | 64966.92 |
|-------|----------|----------|

NCS BUDGET 2025

| | <i>Income (€)</i> | <i>Costs (€)</i> |
|---|-------------------|------------------|
| Contributions scientific societies | 3100.00 | |
| Interest savings-account | 500.00 | |
| Banking costs | | 200.00 |
| Costs of board and subcommittees meetings | | 4000.00 |
| Notary fees | | 2000.00 |
| Website maintenance etc | | 1000.00 |
| Draw on reserves (savings account) | 3600.00 | |
| Total | 7200.00 | 7200.00 |