

Note

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Eva Onjukka¹, Giovanna Gagliardi¹, Tufve Nyholm²
¹Karolinska University Hospital, Karolinska Institutet
²Umeå University

The power of local and nationwide radiotherapy quality registries



**Karolinska
Institutet**



Karolinska Comprehensive Cancer Center



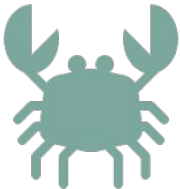
Quality registries in Sweden

1975 – the first national quality registry (knee prosthesis registry)

Purpose of registries – quality/equality of healthcare, research



>150 national registries
Generally 80-100% compliance

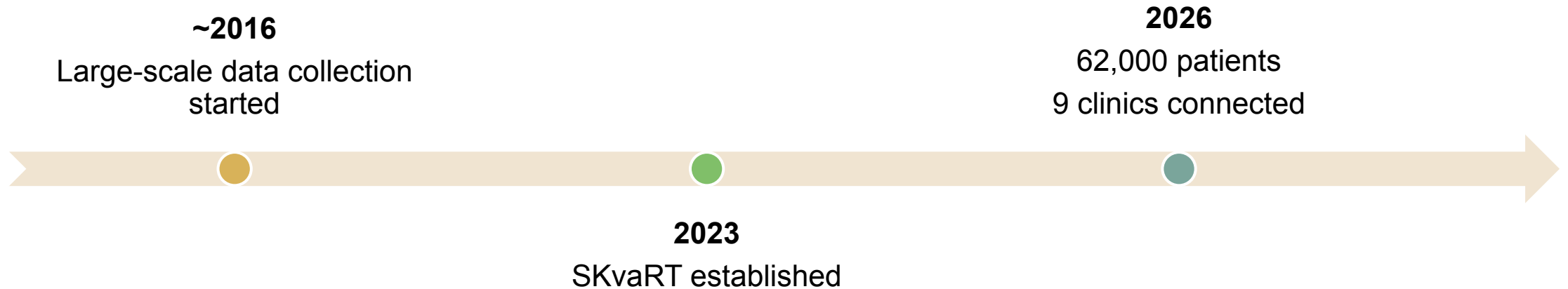


38 national cancer registries
- **SKvaRT (Swedish quality registry for radiotherapy)**



Registry data inform the management of healthcare
1000 research articles published per year

SKvaRT



Variables:

- General treatment-related (e.g. treatment intent, ICD code)
- Treatment fraction-related (e.g. treatment technique, energy)
- Structure level-based
 - E.g. name, type, volume
 - Sparsely sampled DVH (V1%,V2%,V5%,V10%...V90%,V95%,V98%,V99%)
 - Minimum-, mean-, and maximum dose

SKvaRT infrastructure

National standard nomenclature

- Implemented in 2014
- Based on Santanam et al. and ICRU 83
- Mostly in line with AAPM TG 263 (2018)

MIQA – Medical Information Quality Archive

- Intermediate local storage
- Checks compliance with nomenclature
- Automatic reporting to SKvaRT

➤ *Int J Radiat Oncol Biol Phys.* 2012 Jul 15;83(4):1344-9. doi: 10.1016/j.ijrobp.2011.09.054. Epub 2012 Jan 13.

Standardizing naming conventions in radiation oncology

Lakshmi Santanam¹, Coen Hurkmans, Sasa Mutic, Corine van Vliet-Vroegindeweij, Scott Brame, William Straube, James Galvin, Prabhakar Tripuraneni, Jeff Michalski, Walter Bosch

➤ *Radiother Oncol.* 2016 May;119(2):344-50. doi: 10.1016/j.radonc.2016.04.007. Epub 2016 Apr

A national approach for automated collection of standardized and population-based radiation therapy data in Sweden

Tufve Nyholm¹, Caroline Olsson², Måns Agrup³, Peter Björk⁴, Thomas Björk-Eriksson⁵, Giovanna Gagliardi⁶, Hanne Grinaker⁷, Adalsteinn Gunnlaugsson⁸, Anders Gustafsson⁹, Magnus Gustafsson¹⁰, Bengt Johansson¹¹, Stefan Johnsson¹², Magnus Karlsson¹³, Ingrid Kristensen⁸, Per Nilsson⁸, Leif Nyström¹³, Eva Onjukka⁶, Johan Reizenstein¹¹, Iohan Skönevik¹³, Karin Söderström¹³, Alexander Valdman¹⁴, Björn Zackrisson¹³, Anders Montelius¹⁵

➤ *Clin Oncol (R Coll Radiol).* 2025 Jan;37:103657. doi: 10.1016/j.clon.2024.10.009. Epub 2024 Oct 12.

Danish and Swedish National Data Collections for Cancer – Solutions for Radiotherapy

C E Olsson¹, S L Krogh², M Karlsson³, J G Eriksen⁴, T Björk-Eriksson⁵, C Grau⁶, D Norman⁷, V V Offersen⁸, T Nyholm³, J Overgaard⁹, B Zackrisson³, C R Hansen¹⁰

Review ➤ *Int J Radiat Oncol Biol Phys.* 2018 Mar 15;100(4):1057-1066.

doi: 10.1016/j.ijrobp.2017.12.013. Epub 2017 Dec 15.

American Association of Physicists in Medicine Task Group 263: Standardizing Nomenclatures in Radiation Oncology

Charles S Mayo¹, Jean M Moran², Walter Bosch³, Ying Xiao⁴, Todd McNutt⁵, Richard Popple⁶, Jeff Michalski³, Mary Feng⁷, Lawrence B Marks⁸, Clifton D Fuller⁹, Ellen Yorke¹⁰,

Abstracts at ESTRO 2026: 1836 and 2300



Sahlgrenska Comprehensive Cancer Centre



Promising coverage of the new Swedish national quality register for radiotherapy

Caroline E Olsson^{a,b}, David B Norman^c, Josef A Lundman^d, and Magnus G Karlsson^d; On behalf of the SKvaRT steering group

^a Medical Radiation Sciences, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

^b Regional Cancer Centre West, Western Sweden Healthcare Region, Gothenburg, Sweden

^c Regional Cancer Centre North, Northern Sweden Healthcare Region, Umeå, Sweden

^d Department of Diagnostic and Intervention, Umeå University, Sweden



Saturday

May 16

10:30 - 11:30

K2

Breast cancer 1

Co-Chair: Fatjona Kraja, *Albania*; **Chair:** Orit Kaidar-Person, *Israel*

Session Type: Poster Discussions Track: Clinical Journey:

10:30 - 11:30

Breast cancer research potential of the new Swedish national quality registry for radiotherapy

Presenter: Caroline Olsson, *Sweden*

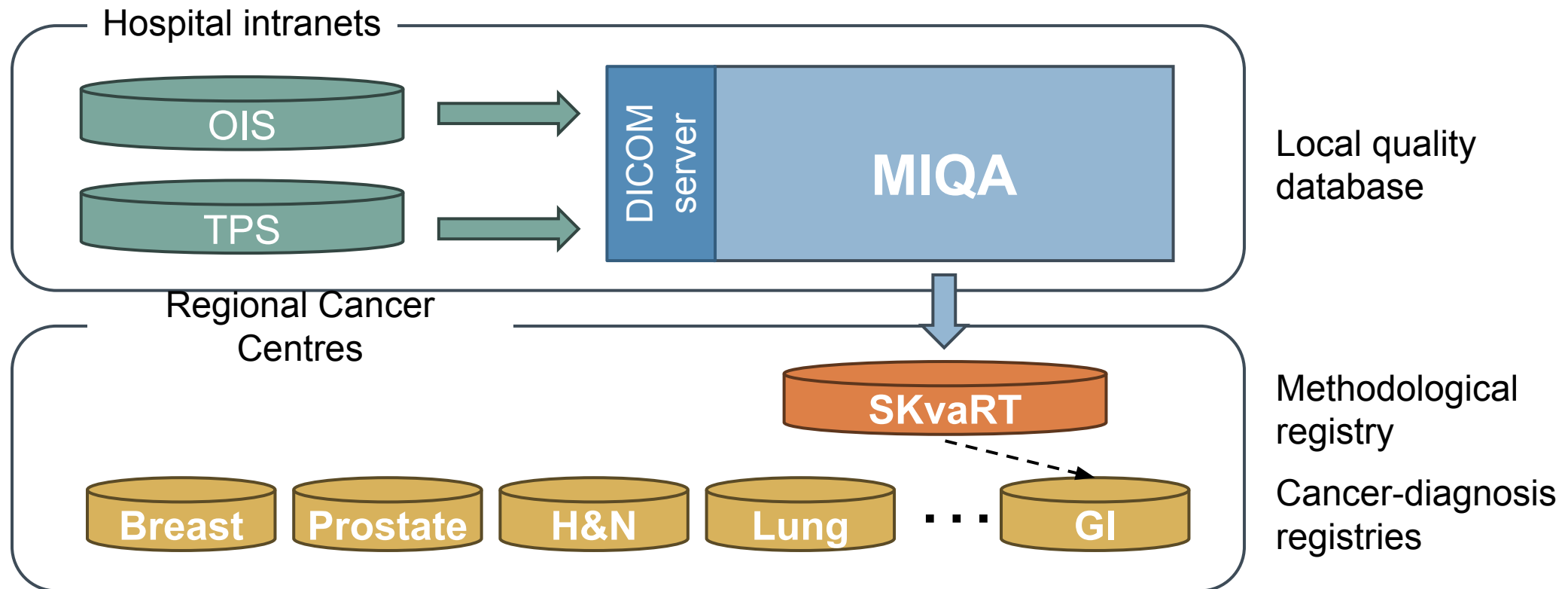
Presentation Number: -2300



Digital collection of RT data

Manual collection of data in cancer-diagnosis registries

Digital collection of radiotherapy data from all 17 radiotherapy clinics



SKvaRT

- Dose to target structures
- Dose to organs of interest



Cancer-diagnosis registries

- Demographics
- Diagnosis, TNM etc.
- Treatment (limited details)
- Follow-up (pathology, recurrences, death) – side effects lacking
- Waiting times



Combining treatment and outcome data

- Dialogue ongoing with other registries



Risk assessment *Tools* for severe side *Effects* after breast *Radiotherapy*:
radiation safety through biological extended models and *digital twinS*



EU-funded project to **support patients and doctors in communication about severe late side effects** after breast cancer radiotherapy

PI: Tiziana Rancati (Fondazione IRCCS Istituto Nazionale dei Tumori, Milan)

Retrospective cohort of 6900 patients:

- REQUITE/RADprecise – 2000 patients
- Università Vita-Salute San Raffaele cohort – 1000 patients
- Fondazione IRCCS Istituto Nazionale dei Tumori cohort – 1000 patients
- **Region Stockholm cohort – 2400 patients from national registries**
- Spanish cohort, from Val d'Hebron Institute of Oncology and Fundacion Publica Galega de Medicina Xenomica – 500 patients



EU Grant Agreement n. 101166699



TETRIS workpackage 2

Validation of published models for late cardiac- and pulmonary side-effects, and second cancers

Registries consulted for the Stockholm cohort:

- Breast cancer registry
- 4 registries from the Board of Health and Welfare:
- Cancer registry
 - Cause of Death registry
 - Patient registry
 - Drug registry

Severe side effects identified from registered diagnoses or surrogate variables like prescription of drugs

Support from MD's: Andri Papakonstantinou and Mattias Hedman



Filippo Schiavo

Karolinska H&N side-effect registry

National registries largely lack side-effect data.

2014 - local quality registry initiated by Claes Mercke, Ingmar Lax, Signe Friesland

- Including all patients receiving H&N radiotherapy
- Focus on late side effects
- Oncologists complete RTOG-based form at each follow-up session (year 1-2: 6-monthly, year 3-5: annually), and at baseline
- Xerostomia, dysphagia, osteoradionecrosis, trismus, mucositis, skin effects
- >3000 patients recorded

25% of Swedens H&N patients treated at Karolinska University Hospital, Stockholm (450-500/year)



From the Department of Oncology-Pathology
Karolinska Institutet, Stockholm, Sweden

RADIOTHERAPY IN ADVANCED HEAD AND NECK CANCER

Anna Embring



**Karolinska
Institutet**

Stockholm 2023

> [Front Oncol.](#) 2020 Aug 14;10:1647. doi: 10.3389/fonc.2020.01647. eCollection 2020.

Modeling of Xerostomia After Radiotherapy for Head and Neck Cancer: A Registry Study

> [Radiat Oncol.](#) 2020 Jun 8;15(1):147. doi: 10.1186/s13014-020-01587-3.

Overlapping volumes in re-irradiation for head and neck cancer - an important factor for patient selection

> [Cancers \(Basel\).](#) 2021 Jun 25;13(13):3173. doi: 10.3390/cancers13133173.

Re-Irradiation for Head and Neck Cancer: Cumulative Dose to Organs at Risk and Late Side Effects

Comparative Study > [Radiat Oncol.](#) 2023 Apr 7;18(1):65. doi: 10.1186/s13014-023-02256-x.

Dose escalation in oropharyngeal cancer: a comparison of simultaneous integrated boost and brachytherapy boost

> [Cancers \(Basel\).](#) 2023 Apr 30;15(9):2580. doi: 10.3390/cancers15092580.

Dose Escalation of Oropharyngeal Cancer: Long-Time Follow-Up and Side Effects

Predictive modelling with real-world data

> Acta Oncol. 2025 Aug 18;64:1087-1094. doi: 10.2340/1651-226X.2025.43462.

Validated prediction of xerostomia in a real-world population: a step toward model-guided radiotherapy

Emmy Dalqvist¹, Tiziana Rancati², Anna Embring³, Gabriella Alexandersson von Döbeln⁴, Ingmar Lax⁵, Signe Friesland⁵, Eva Onjukka⁶



Emmy Dalqvist

Saturday

May 16

10:30 - 11:30

K11

Functional biomarkers and prediction models 1

Chair: Anne Kiltie, *United Kingdom*; **Co-Chair:** Laura Rechner, *Denmark*

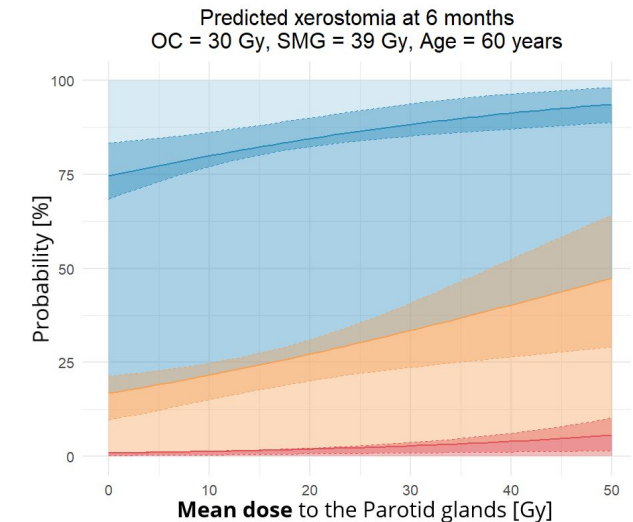
Session Type: Poster Discussions Track: Physics Journey:

10:30 - 11:30

Multigrade prediction model for xerostomia following radiotherapy in head and neck cancer

Presenter: Emmy Dalqvist, *Sweden*

Presentation Number: -2051



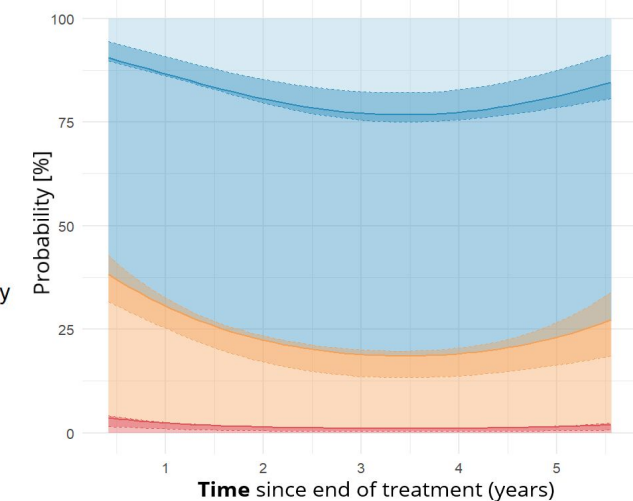
--- 95% CI
— Prediction

Xerostomia grade

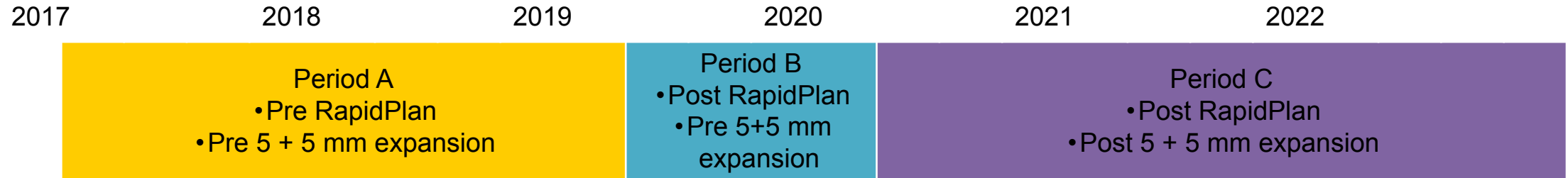
Grade 0
Grade 1
Grade 2
Grade 3

Cumulative probability

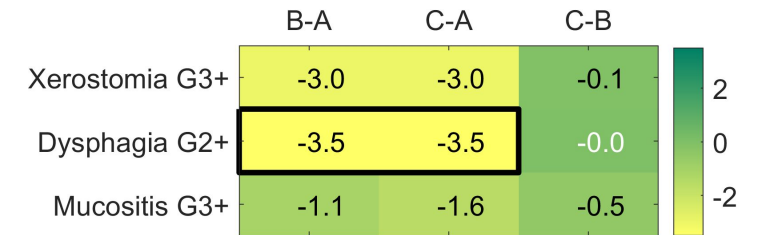
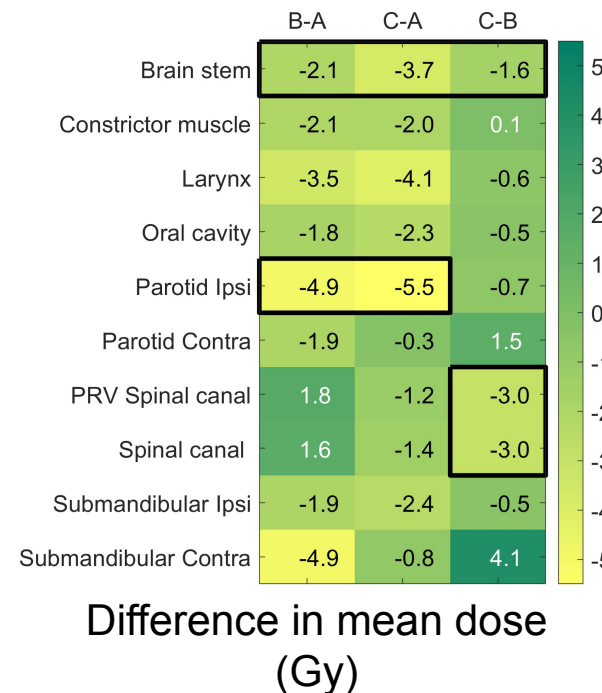
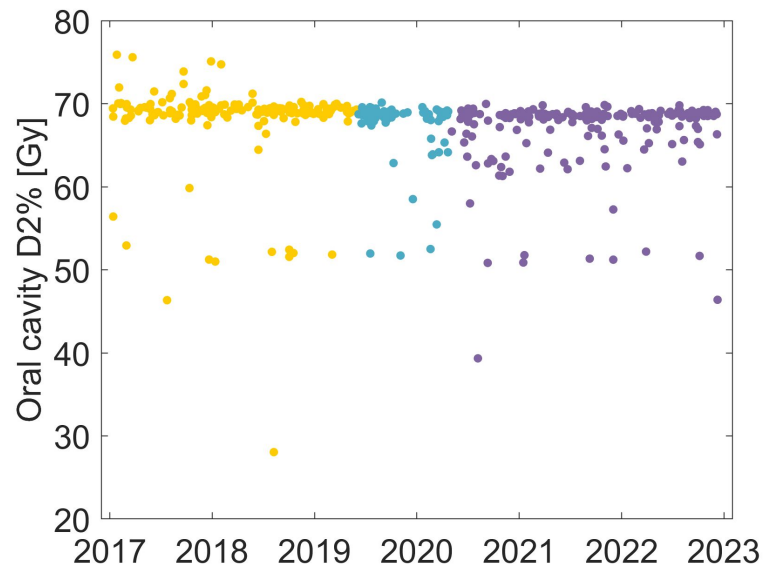
$P(Y \geq 1)$
 $P(Y \geq 2)$
 $P(Y \geq 3)$



Evaluating the effect of practice changes



Lower risk of dysphagia with the introduction of auto-planning, and new CTV guidelines
(Data not yet published)



Difference in NTCP (%-points)

□ - Statistically significant

Summary

- Swedish national cancer registries contain data relevant to radiotherapy research
- Data release application comprises a formal procedure
- Potential to create very large datasets
- Exploited in the EU-funded TETRIS project
- Infrastructure for digital collection of radiotherapy treatment data in SKvaRT
- Side effects not systematically/comprehensively captured
- Karolinska University Hospital's H&N side-effect registry covers 25% of Swedish patients
- Rich real-world data require/offer opportunities for different types of analyses