Socialstyrelsen
THE NATIONAL BOARD OF HEALTH AND WELFARE

Conference programme

ANCR Symposium
Stockholm, 9–11 September 2026

Wednesday September 9

Pre-symposium meetings

10:00–13:00	**ANCR Board meeting** Coffee is served at arrival, 10:00	Birka or Ekerö, ground floor
10:00–13:00	**PREVENT workshop** (for pre-registered participants)	Birka or Ekerö, ground floor

Registration and pre-symposium workshops

12:30–13:00	Registration	Indoor garden (next to reception and lobby)
13:00–14:00	Lunch	Restaurant
14:00–15:30	Workshops	Säby, Birka and Ekerö

Workshop 1: Coding and registration: Central guidelines and recommendations and effects on local coding with a CNS focus

Welcome to a workshop aimed at those who work with coding and registration in cancer registries. During this workshop, we will learn more about TNM9 and the ongoing work on developing the ENCR-JRC recommendations. We will also discuss the ENCR recommendations for coding CNS tumors and how the new coding principles have been implemented in Sweden. Various coding cases will be discussed to identify potential differences in practice between countries.

Workshop 2: Enabling the use of cancer registry data

The workshop looks at different ways of making cancer registry data accessible, starting with a short intro to the main approaches. We'll get a bit hands-on with APIs—using the NORDCAN API as a concrete example—so expect some real data interaction. The second half is more discussion-based, where we'll compare different models like public statistics, self-service solutions, federated analysis, and secure access to individual-level data. The overall theme is how we can enable more use of cancer registry data, how to balance privacy and usability in ways that actually work in practice, and what we can learn from each other.

Workshop 3: The future of cancer screening in the Nordic countries

The session examines emerging developments in cancer screening across the Nordic region and is structured in two parts: expert presentations followed by a panel discussion. The presentations may e.g. address leading candidates for new screening programmes, advances in risk-stratification and targeted approaches within current screening programmes and opportunities for Nordic collaboration for programme improvement. The panel, featuring one representative from each Nordic country, will discuss shared priorities, implementation challenges and a collective vision for future of cancer screening in the Nordic region.

15:30–16:00	Coffee break	Indoor garden (next to reception and lobby)
16:00–17:00	Workshops, continued.	Säby, Birka and Ekerö

Social programme

17:00–17:30	Check-in and free time	
17:30–18:00	Welcome reception and joint walk to Stallet	Outside Sånga main entrance
18:00–19:30	Games in Sånga's own game arena	Stallet (5 min walk from the main venue)
20:00–22:00	Dinner	Restaurant

Thursday September 10

Conference opening and keynote presentation

Room: Södra (main conference hall), 1st floor

08:00–08:55	Registration in Café Gudrun (outside Södra) Set-up for posters outside Södra and in Vardagsrummet	
09:00–09:10	Welcome from the National Board of Health and Welfare and The Swedish Cancer Register	Mona Heurgren and Björn Eriksson (pre-recorded)
09:10–09:15	Brief information, introduction to the keynote speaker	The organising committee
09:15–09:55	Keynote presentation: 20 Years of the Belgian Cancer Registry: From Paper Records to Data-Driven Impact	Elisabeth Van Eycken
09:55–10:00	Short break	

Session 1 – Registration and Diagnosis

10:00–10:10	**Siri Larønningen** Quick and privacy-preserving linkage of cancer registry and socioeconomic data – is it possible?	S1O1
10:10–10:20	**Trude E Robsahm** Validating clinical assumptions for characterizing prostate cancer aggressiveness utilizing historical cancer registry data	S1O2
10:20–10:30	**Matthew Barclay** or **Georgios Lyratzopoulos** International variation in how patients with oesophageal, stomach, colon, rectal, liver, pancreas, lung & ovarian cancer were diagnosed and treated in the mid-2010s: Population-based evidence from the International Cancer Benchmarking Partnership Phase 2	S1O3
10:30–11:00	Coffee break	

Poster Session 1

11:00–11:25 **Poster pitches, S1P1–S1P20**

11:25–11:55 **Poster walk:** Poster presenters of posters with ID S1P1–S1P20 are present by their posters 11:25–11:50

Sixten Borg: The Swedish National e-library for standardized chemotherapy regimens – a study outline for a combined registry and empirical study of its development and use. S1P1

Thea E. Hetland Falkenthal: Characteristics, Treatment, and Survival of Older Women with Cervical Cancer: A Registry Based Study S1P3

Eetu Mäkinen: Treatment of Finnish multiple myeloma in 2019-2023 S1P4

Salla Eliisa Toikkanen: Assessing lung cancer patient pathways in Finland: multi-state modelling using a discrete-time split-state framework S1P5

Marta Berglund: Time trends in inequalities in diagnosis of lung cancer as an emergency in England: 2013 vs 2019 S1P6

Marcus Westerberg: Regional variation in PSA testing intensity and its association with incidence of lower and higher risk prostate cancer: A natural experiment in Sweden S1P7

Charline Jean: Use, timing and sequence of cancer surgery, chemotherapy and radiotherapy in patients with oesophageal cancer in England 2013-2022 by stage at diagnosis and related inequalities S1P8

Brita Sandvik Kvalen: How Common Is Systemic Anticancer Treatment at the End of Life? A Norwegian Population-Based Analysis by Cancer Type S1P9

Marta Berglund, Georgios Lyratzopoulos or **Matthew Barclay**: Global perspectives on diagnosis of cancer as an emergency as a new measure of cancer control: Insights from international collaborations and emerging evidence from multiple countries and health systems S1P10

Nadine Zakkak or **Georgios Lyratzopoulos:** Associations between presenting symptoms and stage at diagnosis of cancer: Evidence from the English National Cancer Diagnosis Audit S1P11

Hans Garmo: Evaluation of completeness of prostate cancer in the National Cancer Register of Sweden S1P12

Minna Merikivi: Registration of Central Nervous System Tumors in the FCR S1P13

Dominik Glombik: Cohort profile: Penile Cancer Data Base Sweden (PenCBaSe) 2.0 S1P14

Karolin Isaksson: Validation of data quality in the nationwide, population-based Swedish Melanoma Registry (SweMR) S1P15

Anna Maria Ostenrath: Automating routine tasks: creating a dataset description for data deliveries S1P16

Tor Åge Myklebust: Non-response bias in a longitudinal population-based survey of prostate cancer patients S1P17

Gabrielle Gran: Implementing ENCR recommendations and guidelines: an example from Sweden S1P18

Siri Larønningen: Towards EHDS-compatible metadata: a practical tool for European population-based cancer registries S1P19

Anna Skog: The Cancer Registry of Norway as a Data Partner in DARWIN EU® S1P20

Session 2 – Survival and survivorship

12:00–12:10	**Hjalti Gunnlaugur Skúlason** Unmet healthcare needs post-cancer treatment and association with health-related quality of life and health literacy: An Icelandic population-based cross-sectional study	S2O1
12:10–12:20	**Søren Friis** Do patients with rare cancers have a poorer prognosis?	S2O2
12:20–12:30	**Magdalena Claeson** Contrasting patient characteristics and survival outcomes in stage II-III melanoma: A population-based study from the Swedish Melanoma Register (SweMR)	S2O3
12:30–12:40	**Ylva Maria Gjelsvik** Experiences of cancer care: Hospital-level reports from the Cancer Registry of Norway's nationwide population surveys on health-related quality of life	S2O4
12:40–12:50	**Tom Børge Johannesen** Patient reported outcome measures in five-year breast cancer survivors	S2O5
13:00–13:55	Lunch at the restaurant	

Session 3 – Trends in incidence and prevalence

14:05–14:15	**Rolf Gedeborg** Trends in long-term population burden of prostate cancer: 25-year stage-specific prevalence and 10-year prediction	S3O1
14:15–14:25	**Rafael Cardoso** Incidence and mortality trends in early-onset colorectal cancer in the Nordic countries: a population-based study from NORDCAN	S3O2
14:25–14:35	**Frida Lundberg** Cancer in Sweden – estimation and visualisation of national cancer statistics	S3O3
14:35–14:45	**Simon Mathis Kønig** Cancer incidence and mortality trends in Greenland compared with the Nordic countries	S3O4

Poster Session 2

14:45–15:10	**Poster pitches, S2P1–S2P22**
15:10–15:30	**Poster walk:** Poster presenters of posters with ID S2P1–S2P22 are present by their posters 15:05–15:25

Stefanie Antonilli: Treatment Strategy and Thrombotic Status Shape Bleeding Risk in 15,495 patients with Myeloproliferative Neoplasms	S2P1
Sixten Borg: Mortality in Standardized Cancer Patient Pathways in Sweden - where early palliative approaches may be relevant	S2P2

Mats Lambe: Depression, intoxication, suicide and the use of anxiolytics, hypnotics, sedatives and antidepressants following a diagnosis of Non-Small Cell Lung Cancer. A population-based study (Sweden) S2P3

Sigríður Gunnarsdóttir: Health literacy and symptom outcomes among haematological cancer survivors: a population-based cross-sectional study S2P4

Qiwen He: Comparison of Loss in Life Expectancy (LLE) and Years of Life Lost (YLL): A Monte Carlo Simulation Study S2P5

Magdalena Claeson: Occult metastasis size and mortality in stage IIIA melanoma: A study from the Swedish Melanoma Register S2P6

Karri Seppä: Long-term survival in hematologic malignancies by morphologic subtypes: population-based study in Finland S2P7

Toni Myllyaho: Educational inequalities in incidence and mortality trends of four common cancers in Finland: A nationwide register-based study S2P8

Karolin Isaksson: Multiple and synchronous cutaneous melanoma - incidence, disease characteristics, risk and survival S2P9

Leo Gkekos: Socioeconomic differences in age-specific risk of breast cancer subtypes in Sweden S2P10

Freya Pollington: Characterising the risk of oesophago-gastric cancer in patients registered with primary care who present to their GP with a relevant symptom or sign, or who are diagnosed with a symptomatically similar disease S2P11

Sanna Lappi-Heikkinen: Diabetes as a risk factor for cancer: evidence from 7 pooled cohorts S2P12

Mats Lambe: Biological age and risk of cancer in young and old adults S2P13

Anne Declunder: Number of children affected by parental cancer across socioeconomic groups in Finland S2P14

Katrín Ásta Gunnarsdóttir: Comparison of cause-specific and relative survival approaches to estimating net survival of breast cancer subtypes S2P15

Filip Siegfrids: Microsimulation calibration of the natural history of breast cancer for economic evaluation of risk-based screening S2P16

Shane Johnson: Using multiple imputation to account for missing stage and generate a population-based late-stage incidence rate from the English cancer registry data S2P17

Maija Vahteristo: Artificial Intelligence for Risk Assessment (AIRA): Protocol for a randomised trial of AI-assisted breast cancer screening in Finland S2P19

Sirpa Heinävaara: Pilot study on applying extended HPV genotyping in cervical cancer screening in Finland S2P20

Maiju Pankakoski: Piloting an analysis pipeline for standardized cancer screening indicators – EUCanScreen S2P21

Yngvar Nilssen: Projected cancer burden and implications for treatment capacity in Norway through 2046 S2P22

15:30–15:50 Coffee break

Session 4 – Risk factors

15:50–16:00	**Álfheiður Haraldsdóttir** Rising breast cancer incidence in Iceland: the role of parity and age at first birth	S4O1
16:00–16:10	**Yann Becker** Tackling alcohol, smoking, physical inactivity and obesity: projected impact of public health policies on cancer across six Nordic countries.	S4O2
16:10–16:20	**Areti Papadopoulou** Improving risk prediction of lung cancer in primary care patients presenting with cough using common blood test result data	S4O3

Social programme

17:20	Meet-up and joint walk to bus	Outside Sånga main entrance
17:30–18:00	Bus to Drottningholm – Royal Palace and UNESCO World Heritage Site	
18:00–19:00	Explore Drottningholm Palace park and surroundings	Drottningholm
19:00–22:00	Conference dinner	Restaurant Karamellan, Drottningholm
22:00–22:40	Bus to Sånga	

Friday September 11

Introduction and keynote presentation

Room: Södra (main conference hall), 1st floor

09:00–09:05	Welcome to the final day of the conference, introduction to keynote speaker	The organising committee
09:05–09:45	Keynote presentation: Registry-based elimination of cervical cancer	Joakim Dillner

Session 5 – Methods

09:50–10:00	**Aapeli Nevala** Bayesian multi-state model for case-fatality benefit and incidence reduction in screening-type interventions	S5O1
10:00–10:10	**Ruijun Hou; Mark J. Rutherford** Investigating Inequalities in Cancer Survival through Mediation Analysis with Limited Interventions	S5O2

10:10–10:20	**Sigrid Leithe** Measuring Synthetic Data Privacy: What, Why and How	S5O3
10:20–10:30	**Letizia Orsini** Estimation of Subtype-Specific Tumour Growth Rate Distributions and Interval Cancer Proportions in Breast Cancer Using Biology-Inspired Natural History Models	S5O4
10:30–11:00	Coffee break	

Session 6 – Screening

11:00–11:10	**Alessandra Grotta** First participation in mammography screening among women with disabilities	S6O1
11:10–11:20	**Anna M Forsberg** Colonoscopy and fecal immunochemical testing vs usual care in diagnostic colorectal cancer screening: the SCREESCO randomized controlled trial	S6O2
11:20–11:30	**Jad Abuhamed** Invitation strategies in European cancer screening programs: Results from the EUCanScreen Joint Action	S6O3
11:30–11:40	**Miriam Elfström** Evidence to action - data-based optimization of real-life cancer screening programs	S6O4
11:40–11:50	**Anna Plym** Lifestyle factors and mortality across cancer types in the STHLM3 prostate cancer screening trial	S6O5
11:50–12:00	**Veli-Matti Partanen** The Risk of Cervical Cancer Following hrHPV and Cytological Screening within the Finnish Cervical Cancer Screening Program: A Population-based Cohort-study	S6O6
12:00–12:20	**Closure (incl. a few words from Denmark), ACTA poster award and information about lunch and buses**	
12:30–13:00	Lunch in Café Gudrun and Vardagsrummet, 1st floor	
13:30	Buses departing from Sånga	

Socialstyrelsen
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Abstract Book

ANCR Symposium
Stockholm, 9–11 September 2026

ANCR 2026 is organised by the National Board of Health and Welfare, Sweden

Organising committee: Gustav Arvidsson, Shiva Ayoubi, Åsa Hedman, Johanna Jonsson, Anders Ledberg, Åsa Persson

Scientific committee: Anna Johansson, Therese Andersson, Mats Lambe and Elisavet Syriopoulou, Karolinska Institutet

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Session 1 – Registration and Diagnosis

Abstract S1O1

Quick and privacy-preserving linkage of cancer registry and socioeconomic data – is it possible?

Siri Larønningen

Siri Larønningen[1], Sigrid Leithe[1], Jan Nygård[1], Giske Ursin[1]

[1] Cancer Registry of Norway, Norwegian Institute of Public Health

Introduction

Linking data from the Cancer Registry of Norway (CRN) with socioeconomic data from Statistics Norway (SSB) is traditionally a time consuming process requiring formal applications and extensive manual handling. In 2020, CRN was involved in a project to include cancer registry data in the existing self service platform microdata.no, developed by SSB and Sikt (Norwegian Agency for Shared Services in Education and Research). The objective was to enable fast and privacy preserving analysis of data from multiple data providers, where only metadata and anonymised aggregate results are accessible to users.

Methods

The project involved key roles from the cancer registry, including IT architects, information security personnel, statisticians, data managers, and legal advisers. For testing of statistical disclosure control (SDC), a “purple team” methodology was applied, combining planned attacks and defensive responses. Legal interpretations were discussed internally and with national authorities, and a realistic test pipeline using real data was established to evaluate functionality and disclosure protection.

Results

A complete data management pipeline was established to transform CRN data and metadata to the microdata.no data model. Extensive testing confirmed robust linkage restrictions, satisfactory data utility, user friendliness, and – after further development – a well functioning SDC layer.

Conclusion

The project demonstrates that fast, application free and privacy preserving linkage of cancer registry data with socioeconomic and demographic information is feasible, and will hopefully serve to decrease the workload for personnel responsible for data access management and extraction.

Abstract S1O2

Validating clinical assumptions for characterizing prostate cancer aggressiveness utilizing historical cancer registry data

Trude E Robsahm

Kaitlyn M Tsuruda[1], Hilde Langseth[1,2], Lauren M Hurwitz[3], Stella Koutros[3], Trude E Robsahm[1], Rune Kvåle[1,4]

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Introduction

The prognosis of prostate cancer is highly dependent on disease characteristics at diagnosis, and dilution effects can compromise etiological studies that are not stratified by disease aggressiveness. However, such classifications are often hindered by missing staging data. This study aimed to develop and validate clinical assumptions to consolidate information about clinical TNM stage and Gleason score (GS) for improved classification of aggressive and non-aggressive disease.

Methods

17,551 males diagnosed with prostate cancer (1974–2022) in the Norwegian Janus Serum Bank cohort were included. The developed clinical assumptions were validated using positive predictive values (PPVs) among males with non-missing data, and long-term cancer-specific mortality. Cases were classified as aggressive (cT4, N1, M1, or GS ≥8) or non-aggressive (complete information without aggressive features) with and without applying the clinical assumptions.

Results

Eight of the 14 developed clinical assumptions had a PPV >95%. Applying these assumptions nearly halved the proportion of cases with unclassifiable aggressivity (from 59% to 32%). Fifteen-year cumulative mortality [95%CI] was higher for previously unclassifiable cases newly as classified aggressive (53.4% [47.6–59.7]) than for cases originally classified as aggressive (42.6% [40.5–44.8]).

Conclusions

Clinical assumptions to consolidate TNM and GS information can substantially improve the classification of aggressive and non-aggressive prostate cancer.

Abstract S1O3

International variation in how patients with oesophageal, stomach, colon, rectal, liver, pancreas, lung & ovarian cancer were diagnosed and treated in the mid-2010s: Population-based evidence from the International Cancer Benchmarking Partnership Phase 2

Matthew Barclay or Georgios Lyratzopoulos

Matthew Barclay , Georgios Lyratzopoulos , Collaborative ICBP Phase[2]- Module[9] Study Group

University College London (UCL)

Introduction

Since the publication of the Eurocare-1 study (1995), around 200 publications have documented persistent international variation in cancer survival, but the likely determinants of such variation are unclear.

Methods

We aimed to establish the degree of variation in the frequency of emergency diagnosis and the use of chemotherapy and radiotherapy in patients with eight cancers across International Cancer Benchmarking Partnership (ICBP) Phase-2 jurisdictions. The ICBP facilitated collaborative inter-jurisdictional research based on novel cancer registry linkages with healthcare administration data. Analysis was conducted per protocol locally, and

aggregate results were tabulated for meta-analysis (federated analysis) and visualisation.

Results

Large international variation was apparent in how often patients were diagnosed as emergencies. There was large international variation in the proportion of patients treated with chemotherapy (including in colon cancer stage III patients) or radiotherapy (including in rectal cancer stages II-III patients). Across the eight cancer sites, older patients had substantially lower use of either treatment, particularly chemotherapy, with such age gradients being highly variable across jurisdictions. Stage-specific analysis for lung and ovarian cancer patients provided concordant granular evidence. Jurisdictions with higher-than-average survival tended to have fewer emergency diagnoses and higher chemotherapy and radiotherapy use.

Conclusion

The ICBP Phase 2-Module 9 studies have established large international variation in how patients are diagnosed and treated, identifying patterns consistent with the hypothesis that diagnostic care and management are at least partially responsible for international variation. Updating and deepening of these enquiries is ongoing to establish the role of surgery and that of variation in other stage-specific treatment patterns.

Poster Session 1

Abstract S1P1

The Swedish National e-library for standardized chemotherapy regimens – a study outline for a combined registry and empirical study of its development and use.

Sixten Borg

Sixten Borg[1], Ulrika Landin[1]

[1] Regional cancer centre South, Lund.

Introduction

The Swedish National e-library was established in 2014. It contains to date ~800 different antitumoral regimens for the treatment of 30+ cancer diagnoses. The settings in which regimens are given and the modes of drug administration may have changed over time, e.g. from infusion in inpatient settings to self-administred tablets and injections at home. Knowledge of empirical use of regimens, the complexity of the regimens and associated healthcare resource use can inform where to aim resources to support patients, users of the e-library, and healthcare overall, and further development of the e-library.

Methods

We plan to determine, from 2014 to 2025, the number of existing regimens in the e-library, over time. Using healthcare administrative systems, we will also examine empirical use of regimens in the e-library as well as use of regimens not represented in the e-library, in the same period of time. In both cases, we will study the volume of used regimens, single/combinations of drugs in regimens, modes of adminstration, healthcare setting, and associated healthcare resource use, and describe changes over time.

Results

We expect to describe in the period 2014-2025:

- The regimens existing in the e-library and the regimens empirically used.
- The resource use associated with the used regimens in different settings from specialized cancer care to primary care, in terms of inpatient stays, visits and contacts.

- We further plan to discuss potential changes in patient burden and necessary extension of the e-library called for by the development of the antitumoral regimens and their empirical use.

Abstract S1P3

Characteristics, Treatment, and Survival of Older Women with Cervical Cancer: A Registry Based Study

Thea E. Hetland Falkenthal

Thea Eline Hetland Falkenthal[1], Elen Lahlum[1], Ane Gerda Zahl Eriksson[2], Ståle Nygård[1]

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Objective

Using nationwide registry data, this retrospective study aimed to characterize older women diagnosed with cervical cancer (CC) in terms of patient characteristics, screening attendance and disease features and identify determinants of primary treatment receipt and survival.

Methods

The study included 485 CC women ≥65 years. Registry data included age, race/ethnicity, screening history, histology, Charlston comorbidity index (CCI), disease stage and treatment. Cancer specific survival and the likelihood of receiving optimal treatment was assessed using univariate and multivariate analyses.

Results

Mean age was 74.1 years. The women had low screening attendance in the final years of the program and about 70% of the women presented with advanced disease. 51.8% had a CCI score of 0-1, 43.5% had 2-4 and 5.4% had ≥5. Squamous carcinoma (SCC) was most common histology (71.5%), followed by adenocarcinoma (AC) (18.3%) and non-SCC/AC (6.6%). Higher age and non-SCC/AC histology were independent predictors of no treatment and suboptimal treatment, respectively. Total 5-year cancer specific survival rate was 71%. Higher age (HR: 1.06 95% CI: 1.02-1.09), higher CCI (HR 1.31, 95%CI: 1.14-1.51), non-SCC/AC histology (HR 3.38, 95% CI: 1.84-6.21) and higher FIGO stage (HR 1.4, 95% CI: 1.00-1.96) were independently associated with worse survival.

Conclusions

Older women had low screening attendance and were often diagnosed at advanced stages. Although many received appropriate treatment, survival was independently influenced by older age, comorbidity, histology type and advanced disease. These findings underscore the need for earlier detection—through both HPV/precancer and early identification of invasive cancer—to improve outcomes in an aging population.

Abstract S1P4

Treatment of Finnish multiple myeloma in 2019-2023

Eetu Mäkinen

Eetu Mäkinen[1], Salla Toikkanen[1], Nea Malila[1], Mervi Putkonen[2], Timo Nykopp[3], Jonna Salonen[4], Janne Pitkäniemi[1]

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[4] Finnish Institute for Health and Welfare, Finland

Introduction

The survival rate of multiple myeloma (MM) in Finland remains lower than in other Nordic countries, with a 5-year relative survival of 50%. On the grounds of researching the establishment of a national clinical quality register, we aim to describe the treatment of MM in Finland.

Methods

We received information on new rights to reimbursement for the medication of MM between 2019 and 2023 from the Social Insurance Institution of Finland (Kela). Information on health care visits and treatments were obtained from the Care Register of Health Care and classified by procedure type. We considered chemotherapy, radiotherapy, autological stem cell transplants and palliative care. Information on drug purchases were received from Kela. MMs were followed until the earliest of death and one year after diagnosis. We estimated age-standardized treatment rates, also stratified by sex, age group and region.

Results

A total of 2336 new reimbursements were granted in Finland during the study period. Most common treatment was drugs (Age-standardized rate 64.0 per 100 patients during first year after diagnosis), followed by chemotherapy (51.2), radiotherapy (21.2) and autological stem cell

transplant (19.2), the latter confined to younger patients (44.6% among patients under 70 years old; 3.6% among those over 70). Fewer patients received palliative care (6.4) during the first year of follow-up. The treatment incidences varied regionally, with lower rates more often observed in Southern Finland.

Conclusions

Description of treatment practices considering MM patients is needed for enhanced assessment of clinical processes and quality of care, to achieve improved outcomes.

Abstract S1P5

Assessing lung cancer patient pathways in Finland: multi-state modelling using a discrete-time split-state framework

Salla Eliisa Toikkanen

Salla E. Toikkanen[1], Karri Seppä[1], Janne Pitkäniemi[1]

[1] Finnish cancer registry

Introduction

In 2023, the Finnish Cancer Registry, Finnish Institute for Health and Welfare and FICAN initiated a joint research programme to develop national cancer quality registries. This study seeks to adapt statistical multi-state models for analysing individual cancer patient pathways while accounting for patient's prior treatments, using lung cancer as the example.

Methods

The study population comprised lung cancer patients diagnosed in Finland between 2019 and 2023. Individual patient pathways were constructed by linking data from the Finnish Cancer Registry and the Care Register for Health Care. A patient pathway was defined as the individual sequence of treatments following diagnosis. Treatments were classified as curative, non-curative, or palliative. Follow-up was limited to the first year after diagnosis.

Patient pathways were analysed using a multi-state, discrete-time split-state model which incorporates previous treatment history through conditioning. We estimated the number and duration of treatments and transition rates between subsequent treatments.

Results

Among the 14 873 diagnosed patients, 73% received at least one treatment within one year. Three dominant pathways were identified: diagnosis to death without treatment (3244 patients); diagnosis to one or more curative treatments (2898 patients); and diagnosis to one or more palliative treatments followed by death (2904 patients). These pathways accounted for 61% of patients. Pathways combining different treatment types were uncommon (1583 patients). Detailed results will be presented at the ANCR conference.

Conclusions

The study provides novel insights into lung cancer treatment pathways in Finland and supports evidence-based health-care planning and resource allocation.

Abstract S1P6

Time trends in inequalities in diagnosis of lung cancer as an emergency in England: 2013 vs 2019

Marta Berglund

Marta Berglund[1], Georgios Lyratzopoulos[1], Matthew E Barclay[1]

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Introduction

Patients with lung cancer are often diagnosed through an emergency presentation (EP), associated with poorer prognosis. EPs declined in England in 2006-2013, but changes since 2013 and whether changes are similar in different subgroups remains unclear.

Aim

To investigate whether sociodemographic inequalities in EPs among lung cancer patients in England widened or narrowed between 2013 and 2019.

Methods

Adults aged ≥25 years with a first primary lung cancer diagnosis in 2013 or 2019 in the national cancer registry. We used logistic regression to measure associations between EP risk and sex, age, deprivation and ethnicity, producing average marginal predictions to give interpretable summaries.

Results

The proportion of EPs decreased from 35.5% (13,051/36,930) in 2013 to 33.6% (12,261/36,533) in 2019. EPs declined across most groups in 2019 compared to 2013, at different magnitudes. Sex differences decreased from 1.1 in women vs. men to 0.2 percentage points (pp). Differences by deprivation between the most and least deprived widened substantially from 4.9pp (37.2% vs 32.2%) to 7.6pp (36.9% vs 29.3%). The age gap between patients aged 80+ and 60-69 narrowed from 19.0pp (47.2% vs 28.2%) to 17.4pp (44.4% vs 27.0%). Ethnicity patterns were broadly stable but sensitive to small subgroup sizes.

Conclusion

Lung cancer EPs are declining overall but inequalities by age and ethnicity have persisted and widened by deprivation level. Equitable progress to reduce EPs will likely require targeted interventions for disadvantaged groups. Future work will extend this analysis across cancer sites, the post-COVID period and quantify excess cases due to inequalities.

Abstract S1P7

Regional variation in PSA testing intensity and its association with incidence of lower and higher risk prostate cancer: A natural experiment in Sweden

Marcus Westerberg

Marcus Westerberg[1], Hans Garmo[1], Pär Stattin[1], Rolf Gedeborg[1]

[1] Department of Surgical Sciences, Uppsala University, Uppsala, Sweden

Introduction

Prostate-specific antigen (PSA) testing continues at high rates among older men and remains low among healthy, middle-aged men most likely to benefit. We aimed to leverage the substantial historical variation in testing intensity across regions to study consequences of different PSA testing intensity in routine care.

Methods

All men aged 45-89 in Sweden with data on PSA testing from PCBase Xtend were included. The proportion of men that took a PSA among all men without prior prostate cancer (PCa) diagnosis in combinations of calendar year, age and region was considered an ecological exposure. The annual risk of death and of diagnosis of lower risk and higher risk PCa was modelled

using generalized additive models based on age, PSA testing proportion and 5-year PSA testing proportion history. Risk of PCa was estimated cumulatively between age 50 and 89 under various testing scenarios in a hypothetical cohort.

Results

Over 2.5 million men were included between 2013 and 2024. At 35% annual PSA testing between ages 50-75, the estimated cumulative risks of lower risk and higher risk PCa diagnosis at age 89 were 23% and 6%, respectively. Higher testing proportions increased the risk of lower risk PCa and decreased the risk of higher risk PCa. With increasing testing proportions up to 50%, roughly a 10-percentage point increase in lower risk PCa equated to a 1-percentage point decrease in higher risk PCa.

Conclusions

The large variation in testing intensity can be leveraged to study consequences of different PSA testing intensity in routine care.

Abstract S1P8

Use, timing and sequence of cancer surgery, chemotherapy and radiotherapy in patients with oesophageal cancer in England 2013-2022 by stage at diagnosis and related inequalities

Charline Jean

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Introduction. Despite clinical guideline recommendations to standardise and improve care for patients with oesophageal cancer, real-world management remains poorly described. We aimed to characterise care patterns among oesophageal cancer patients and investigate their clinical and social determinants. Methods. Retrospective cohort study of patients diagnosed with oesophageal cancer in England 2013–2022 using linked English cancer registry and hospital data. We considered the timing and sequence of major surgery, chemotherapy, radiotherapy, and chemoradiotherapy received within one year of diagnosis. Associations with age, sex, stage, socioeconomic status, ethnicity, performance status, comorbidities, and frailty risk were examined using logistic regression. Results. Among the 63,284 included patients, 45,813 had adenocarcinoma (median age 71 years;

18.9% women; 44.2% metastatic) and 17,471 had squamous cell carcinoma (median age 71 years; 51.4% women; 36.4% metastatic). Standalone surgery was most common in stage I adenocarcinoma (35.5%), while standalone radiotherapy predominated in stage I squamous cell carcinoma (26.1%). Chemotherapy was the most frequent treatment for advanced disease. Patients receiving no treatment were older, more deprived, frailer, had greater comorbidity, were less likely to be of White ethnicity, were more often diagnosed as emergencies and with advanced disease. Among adenocarcinoma patients, untreated individuals were more often women. Conclusion. While variation in treatment patterns by stage and oesophageal cancer type strongly concords with expected management, we found marked social and clinical inequalities exist in such pathways. Ongoing analyses aims to examine the determinants of these inequalities and the potential to narrow them by adherence to guideline-concordant treatment pathways.

Abstract S1P9

How Common Is Systemic Anticancer Treatment at the End of Life? A Norwegian Population-Based Analysis by Cancer Type

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Introduction

Systemic anticancer treatment (SACT) is intended to cure cancer or prolong survival. Its use near end of life (EOL) remains controversial due to potential adverse effects including increased symptom burden, hospitalizations, and reduced quality of life. Consequently, the European Society for Medical Oncology recommends avoiding SACT close to death.

Population-based evidence on its use near EOL remains limited. The aim of the study was to describe the proportion of patients receiving EOL SACT.

Method

The study is based on Norwegian registry data and includes all cancer deaths between 2020 and 2024, among patients aged ≥18 years at diagnosis. SACT at EOL was defined as hospital-administered SACT or a filled cancer medication prescription (ATC-codes: L01 and L02) during the last 30 days of life.

Results

Among 51 734 patients EOL SACT was observed in 14%, whereas EOL SACT excluding endocrine therapy was observed in 12%. The prevalence of any SACT varied by cancer type, with highest prevalence in leukemia (30%) and non-Hodgkin lymphoma (26%), as well as breast (24%) and ovarian (17%) cancers. Lower prevalence was observed in lower gastrointestinal (9%), urinary tract (8%) and CNS (7%) cancers.

Conclusions

Despite recommendations to avoid SACT near EOL, 14% of cancer patients received such treatment. This proportion was substantially higher than the 3% previously reported in a Norwegian registry-based study, but similar to the 16% reported in a Danish study. Overall, the use of EOL SACT in Norway appears to be higher than previous national estimates, but does not exceed levels reported in comparable international studies.

Abstract S1P10

Global perspectives on diagnosis of cancer as an emergency as a new measure of cancer control: Insights from international collaborations and emerging evidence from multiple countries and health systems

Marta Berglund, or Georgios Lyratzopoulos, or Matthew Barclay

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Introduction

With increasing recognition of the importance of early diagnosis, emergency diagnosis has emerged as a potentially novel cancer control measure.

Methods

We reviewed evidence on cancer diagnosis occurring during or shortly after emergency hospital admission or emergency department attendance, identifying population-based studies and extracting information on inequalities.

Results

Evidence production has accelerated rapidly, with many more studies published post-2020. The largest study (~800,000 patients with oesophageal, stomach, colorectal, liver, pancreatic, lung and ovarian cancers) was conducted by the International Cancer Benchmarking Partnership (ICBP) Phase 2-Module 9, using data from jurisdictions of Australia, Canada, and the UK, alongside Denmark, New Zealand and Norway. The second largest study used USA SEER–Medicare data. The number of countries contributing relevant evidence has expanded markedly, including Canada, Denmark, New Zealand, Norway, Scotland, Taiwan and the USA, all having had little or no relevant evidence pre-2020. Consistent patterns show substantial variation in emergency diagnosis frequency by cancer site across jurisdictions. Higher emergency diagnosis rates are reported in older adults and more socioeconomically deprived patients. Across studies, emergency diagnosis is associated with excess mortality, particularly in the short term, even after adjustment for stage at diagnosis. Evidence on pre-diagnostic primary care use and on preventability of emergency diagnosis remains limited. Measures of emergency diagnosis have been incorporated into routine surveillance in England, New Zealand, Northern Ireland and Scotland.

Conclusion

Global interest in emergency cancer diagnosis is rapidly increasing. Emergency diagnosis varies systematically by cancer site, age and deprivation, and is strongly associated with poorer survival. It therefore holds promise as a novel cancer control measure across health systems.

Abstract S1P11

Associations between presenting symptoms and stage at diagnosis of cancer: Evidence from the English National Cancer Diagnosis Audit

Nadine Zakkak or Georgios Lyratzopoulos

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Introduction

Public awareness campaigns and expedited referral pathways aim to reduce prolonged diagnostic intervals in these patients. However, concerns persist that symptomatic presentation often reflects advanced disease, limiting the benefits of timely diagnosis.

Methods

Using the English National Cancer Diagnosis Audit data, we examined associations between presenting symptoms recorded by general practitioners and stage at diagnosis, obtained from the national cancer registry, across 36 cancers. We also explored variation by cancer site, use of primary care blood tests pre-diagnosis, and number of presenting symptoms.

Results

Among 45,785 patients, at least a third were diagnosed with non-metastatic cancer (TNM stages 1-3) for 43 of 45 presenting symptoms in men and 46 of 47 in women.

Metastatic (stage 4) disease was more common following vague than organ-specific symptoms (for example, in women, 63% were diagnosed at stage 4 after back pain presentation, compared with 39% after haemoptysis).

Symptom-stage associations varied by cancer (for example, 52% compared with 36% of lung and colon cancer patients presenting with weight loss had

metastatic disease, respectively). In strata with more than 100 observations, pre-diagnosis primary care blood test use was weakly or not associated with stage at diagnosis.

The % of metastatic disease increased with the number of recorded symptoms, being 30%, 42% and 50% in men with one, two, or three or more symptoms, and 21%, 35% 46% in women, respectively).

Conclusion

Using clinician-curated symptom data linked to high quality cancer registry information in a large, representative, sample, we mapped presenting symptom–stage associations. Substantial proportions of symptomatic patients, including those with non organ specific symptoms, are diagnosed at potentially curable stages. These findings support policies for prompt diagnostic evaluation of patients with new symptoms.

Abstract S1P12

Evaluation of completeness of prostate cancer in the National Cancer Register of Sweden

Hans Garmo

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Background and aim

Completeness of cancer registration is essential for valid estimates of incidence and survival and for comparisons between countries. Despite mandatory reporting, registration in the National Cancer Register (NCR) has been shown to be incomplete. We assessed the completeness of registration of incident cases with prostate cancer (Pca) by use of data on prostate-specific antigen (PSA) and androgen deprivation therapy, i.e prostate cancer-specific drugs as proxies of a prostate cancer diagnosis.

Methods

In PCBaSe Xtend, we identified men during 2015–2021 who were not registered in NCR but had proxies for Pca, i.e. PSA ≥50 ng/mL or receipt of androgen deprivation therapy (ADT). Estimates of Life expectancy (LE) was based on age and two comorbidity indices and cumulative incidence of

death from Pca and other causes was based on data in the Cause of Death Register.

Results

We identified 3,143 men with proxies for Pca who had not been registered in NCR (4% of all cases), detected by elevated PSA values (38%) or use of ADT (61%). Compared with men with Pca in NCR, men not in NCR were older (median age at diagnosis 87 vs 70 years), had shorter life expectancy (4 vs. 15 years), higher 8-year Pca mortality (35% vs. 6%) and mortality from other causes (50% vs. 15%). Adding men with proxies for Pca to men in NCR with Pca increased 5-year Pca mortality by 1.2% and all-cause mortality by 2.4%.

Conclusion

Approximately 4% of Swedish men with Pca were not registered in The National Cancer Register. These men were much older and had much shorter survival than men in NCR. Inclusion of these men in analysis of NCR only marginally increased estimates of Pca mortality.

Abstract S1P13

Registration of Central Nervous System Tumors in the FCR

Minna Merikivi

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Introduction

The Finnish Cancer Registry (FCR) has recorded all tumors since the early 1950s by using the Manual of Tumor Nomenclature and Coding (MOTNAC) together with a national topography coding system. In 2008, the FCR adopted ICD O 3, and historical data were converted using a translation matrix. We examined the registration of central nervous system (CNS) tumors, focusing on changes in coding practices, compliance with international recommendations, and their impact on long term data comparability. Several systematic recoding efforts were done during 1994, 2010 and 2020, especially affecting tumors diagnosed from 1990 onwards. In cases from the early decades, data quality is poor, and diagnostic methods did not allow for very precise registration.

Methods

We included all tumors registered in topography codes C70–C72, excluding lymphomas. Registration practices were compared to European Network of Cancer Registries (ENCR) guidelines.

Results

Relevant inconsistencies were identified, particularly regarding the basis of diagnosis, non-registration of tumor progression, and the continued use of obsolete morphology codes. Registration was most affected by the use of the outdated MOTNAC classification. The number of CNS cases increased markedly after 1990. The proportion of meningeal tumors increased significantly, while the relative proportion of brain tumors decreased. Earlier years may have been characterized by underdiagnosis of CNS tumors and incomplete reporting to the cancer registry.

Conclusions

The observed temporal trends likely reflect findings indicate that diagnostic advances and changes in coding systems and recoding activities. These factors should be taken into account when interpreting CNS tumor data and when comparing FCR data with other populations.

Abstract S1P14

Cohort profile: Penile Cancer Data Base Sweden (PenCBaSe) 2.0

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Purpose

Penile Cancer Data Base Sweden (PenCBaSe) 2.0 is an update of PenCBaSe 1.0, which was established in 2013 to address a wide range of epidemiological research questions in a population-based cohort of men with penile cancer.

Participants

PenCBaSe 2.0 includes 3883 penile cancer cases registered in the Swedish National Penile Cancer Register (NPECR) between 2000 and 2023 and two separate comparison cohorts with 38 448 penile cancer-free comparators matched on birth-year, sex and region of residence. The median age at inclusion was 69 years (range 18-101).

Findings to date

The database contains register-based information collected from standardised forms in the NPECR on diagnostic evaluation, tumour characteristics, primary treatment, lymph node management, postoperative complications and follow-up with high completeness (95% between 2000 and 2023) and validity. Moreover, by means of record linkage to six national healthcare and sociodemographic registers, data on socioeconomic factors, comorbidity and patterns of filings of prescribed drugs are available. The comorbidity burden was lower in the comparison cohort.

Future plans

PenCBaSe 2.0 will be used to investigate a multitude of research questions within three principal domains: socioeconomic status and demographic factors, risk factors for disease and stage, respectively treatment related outcomes and complications. The steering committee of PenCBaSe welcomes new collaborations. For more information, please contact the chairman of the steering committee of PenCBaSe (https://cancercentrum.se/diagnosbehandling/cancerdiagnoser/penis/kvalitetsregister.3518.html).

Abstract S1P15

Validation of data quality in the nationwide, population-based Swedish Melanoma Registry (SweMR)

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Introduction

Reporting to cancer registries is key for evaluating outcomes and improving care. The nationwide, population-based Swedish Melanoma Registry (SweMR), established in 1990, includes data on more than 100,000 invasive primary cutaneous melanomas. Ensuring the accuracy of these data is essential to support future international comparisons of melanoma data. This work sought to validate the quality of SweMR data and to describe its structure.

Methods

Data on the diagnosis, tumour and patient characteristics, and surgical treatment of all incident new melanomas from 2016–2020 were

comprehensively evaluated using international guidelines, focusing on four key quality dimensions. Completeness was analysed through cross-referencing with the Swedish Cancer Registry. Timeliness was defined as the interval from diagnosis or histopathology availability to registry entry. Comparability was evaluated by reviewing coding, criteria, and reporting forms. Validity was assessed through a re-abstraction of the original medical records of 488 randomly selected melanomas in eleven hospitals, using measures of exact agreement and concordance.

Results

SweMR demonstrated near-complete (99.2%) coverage of all incident melanomas. Timeliness was moderate to high, with room for improvement: 48% of cases were reported within 3 months, 73% within 6 months, and 91% within 12 months. Coding practices were compliant with international standards. Overall, the agreement between registry and re-abstracted data was strong, with 42 of 48 variables showing high agreement, for example, ‘Breslow thickness’ (exact agreement 94.5%) and ‘Ulceration’ (95.8%).

Conclusion

This comprehensive validation confirms that SweMR, the Swedish population-based cancer quality registry for melanoma, provides overall robust, high-quality data, demonstrated by its completeness, timeliness, comparability, and validity.

Abstract S1P16

Automating routine tasks: creating a dataset description for data deliveries

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Background

With the expansion of data in the Cancer Registry of Norway (CRN) and associated quality registers, projects are requesting bigger datasets. Faster access to data is one of the main goals in the Norwegian Institute of Public Health’s health data strategy. The task of documenting each data delivery has become more complex and the pressure to deliver data quickly rises. Producing this documentation manually is inefficient and increases the risk of errors. Automating this task improves both efficiency and quality. This leads to less time spent copy-pasting variable descriptions, bringing us closer to accessing data faster.

Methods

A custom-made Stata program automatically obtains a list of all variables, as well as the number of patients and cancer cases included in each file. All variables are then matched with the CRN metadata catalogue, ELVIS (Electronic List of Variables in Systems), where both the variable description and the corresponding URL to its entry are combined into a table. Including the URL lets the recipient of the dataset easily find public available information and value descriptions of each variable. This process is then repeated for each file in the specific project. Finally, all tables are collected in a final document that is included in the data delivery alongside the data.

Conclusion

Automating tasks facilitate the data delivery process, which in turn enhances the accessibility of health data. Here, a previously manual routine task is automated by utilizing the existing infrastructure of CRN, thereby increasing the efficiency and quality of data deliveries.

Abstract S1P17

Non-response bias in a longitudinal population-based survey of prostate cancer patients

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Introduction

Since 2020, the Cancer Registry of Norway (CRN) have routinely invited all men diagnosed with prostate cancer to participate in a longitudinal survey on quality of life. Patients are invited to the survey shortly after diagnosis, and 1, 3 and 5 years thereafter. The aim of this project is to examine which sociodemographic and disease-specific factors are related to survey response.

Method

All patients diagnosed with prostate cancer in the period 2020-2024 (N=20,491) were included in the study. Information on sociodemographic factors were collected from Statistics Norway, and information on disease specific factors were collected from the Norwegian prostate cancer registry. Descriptive statistics, comparing responders and non-responders are

presented and multivariable logistic regressions were used to analyze all factors combined. All analyses are done separately for each survey round.

Results

Response rates were stable between 53%-54% for all survey rounds. Overall, higher level of education, higher personal income, being born in a Western country and being married was associated with a higher probability of response. The only disease specific factor that predicted response was higher ISUP grade (only at 1 and 3 year surveys) and lower ECOG status.

Conclusions

Prostate cancer patients that participated in the CRN national population-based survey on quality of life had a higher socioeconomic status and were healthier. Disease-specific factors were largely unrelated to survey response, apart from higher ISUP grade at diagnosis.

Abstract S1P18

Implementing ENCR recommendations and guidelines: an example from Sweden

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Introduction

High-quality, comparable data are essential for population-based cancer registries to monitor trends, evaluate interventions, and support research. Advances in cancer diagnostics provide increasingly detailed tumour information, and registries must adapt accordingly. Changes to coding practices, however, must be introduced cautiously to preserve comparability over time, particularly in long time series. In December 2024, the European Network of Cancer Registries (ENCR) published updated recommendations for coding central nervous system (CNS) tumours. Implementing these recommendations required changes to CNS tumour registration in the Swedish Cancer Register, including clearer decision rules and alignment of national routines.

Methods

Swedish Cancer Register coding principles were mapped against the ENCR recommendations. Discrepancies were reviewed with relevant stakeholders,

and proposed changes were assessed to ensure longitudinal comparability and consistent nationwide application.

Results

Based on the ENCR recommendations, a national manual for coding and registration of CNS tumours was developed. To support consistent application by coding staff, it was supplemented with a flowchart and case examples. The registry system was also updated to enable recording of tumour progression.

Conclusions

The implications of changing coding principles must be carefully evaluated, including potential effects on trends and data quality. Broad stakeholder engagement is important to ensure that the updated principles and manual are adopted by all coders, enabling consistent and simultaneous implementation nationwide.

Abstract S1P19

Towards EHDS-compatible metadata: a practical tool for European population-based cancer registries

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Introduction

The European Health Data Space (EHDS) requires European population-based cancer registries (PBCRs) to share metadata according to harmonised European requirements. This includes descriptive metadata as well as information on data quality and the maturity of data holders. Within EHDS, metadata for secondary use of health data is to be shared using the HealthDCAT-AP standard.

Methods

Within the CancerWatch Joint Action, led by the Norwegian Institute of Public Health, a dedicated task under WP6 addresses metadata. The task comprises four subtasks: (1) assessing EHDS requirements and their implications for PBCRs; (2) developing a PBCR-specific metadata standard; (3) developing a metadata management tool; and (4) establishing a governance framework for the standard and tool. The workgroup includes 29

participants from 11 European countries. The metadata tool is developed by the Cancer Registry of Norway and builds on its existing metadata system, ELVIS.

Results

The metadata landscape across European PBCRs is highly heterogeneous and shows limited alignment with EHDS requirements. Metadata is mainly documented in Excel and Word files, PDFs, local in-house tools, and a few national metadata systems. Interpretations of the term “metadata” vary considerably, and metadata serves multiple purposes, including documentation of registry operations, legal compliance, data access support, provenance, and general documentation. Overall, metadata has limited machine-readability. The metadata tool therefore needs to support conversion of local metadata from different formats into a common PBCR metadata standard, facilitate metadata management, and enable exchange with HealthData@EU in the required format

Conclusion

The assessment of the PBCR metadata landscape provides a strong basis for adapting and extending ELVIS for shared metadata management across European PBCRs. However, sustainable governance of the metadata standard and tool over time remains to be addressed.

Abstract S1P20

The Cancer Registry of Norway as a Data Partner in DARWIN EU®

Anna Skog

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Introduction

DARWIN EU (Data Analysis and Real World Interrogation Network) is an initiative established by the European Medicines Agency (EMA) and the European Medicines Regulatory Network (EMRN) to provide timely and reliable real-world evidence to support regulatory decision-making in Europe. The network connects data partners across countries through a common data structure, enabling large-scale, multi-country analyses. Since March 2025, the Cancer Registry of Norway (CRN) has been a data partner in DARWIN EU.

Methods

Cancer registry data from the CRN have been transformed to the Observational Medical Outcomes Partnership (OMOP) Common Data Model. Source data are mapped to a shared structure and standard terminology, allowing identical analyses to be executed across countries. Analyses follow a federated model. Study code is created and distributed from DARWIN EU Coordination Centre to data partners. The code is executed locally, and only aggregated, anonymous results are shared with the DARWIN EU Coordination Centre.

Results

CRN is currently part of five studies within the network, with approximately 21 ongoing studies across DARWIN EU overall. For the studies in which CRN participates, the focus is on clinical characterization of specific cohorts of cancer patients, with a particular interest in treatment patterns of current standards of care. The first finalised study report, including data from CRN, covered the prevalence of selected cancers.

Conclusions

As a data partner in DARWIN EU, the Cancer Registry of Norway enables the use of high-quality national cancer registry data in European real-world evidence work. This collaboration improves insights into cancer and treatment patterns across countries. The CRN OMOP database is also used outside the Darwin EU, and may also be useful in other Nordic collaboration, showing how cancer registries can align data to a shared model (OMOP) and carry out similar analyses across countries.

Session 2 – Survival and survivorship

Abstract S2O1

Unmet healthcare needs post-cancer treatment and association with health-related quality of life and health literacy: An Icelandic population-based cross-sectional study

Hjalti Gunnlaugur Skúlason

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Introduction

The number of cancer survivors is increasing, and many experience challenges affecting health-related quality of life (HRQoL). This study examined healthcare needs, unmet needs, health literacy (HL), and HRQoL among cancer survivors in Iceland.

Methods

This study is part of the SURV-ICE cohort, a population-based study of Icelandic cancer survivors. Individuals who had completed treatment ≥12 months prior were included (n = 3,585). HRQoL was assessed using the EORTC QLQ-SURV100, HL using the HLS-EU-Q16, and healthcare needs using a 17-item checklist. Unmet needs were defined as reported needs without adequate support.

Results

Overall, 64% reported ≥1 healthcare need and 39% reported ≥3 needs; while 47% experienced ≥1 unmet need, with 23% reporting ≥3 unmet needs. The most reported needs concerned physical symptoms, mental health, and fear of cancer recurrence. Unmet needs were most frequent in cognitive-, social-, and recurrence-based domains. Unmet needs were more common among

younger survivors and women. A gradient was observed for HL (≥3 unmet needs: 57% with inadequate HL vs. 20% with sufficient HL). Global health status was lower among those with more unmet needs (77.7 [no unmet needs]; 59.6 [≥3 unmet needs]) and lower HL (53.6 [inadequate HL]; 73.6 [sufficient HL]). Younger age, female sex, and breast cancer diagnosis were associated with lower HRQoL.

Conclusions

Unmet healthcare needs are common, likely associated with lower HRQoL, and concentrated among younger survivors, women, and those with lower HL, suggesting inequalities in survivorship outcomes. Addressing unmet needs and HL will assist in developing effective survivorship care.

Abstract S2O2

Do patients with rare cancers have a poorer prognosis?

Søren Friis

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Introduction

Patients with rare cancers have consistently been reported to have poorer survival than patients with common cancers. We speculated whether this could be ascribed to differences in tumour histology and stage at diagnosis, or a broader association between cancer incidence and prognosis.

Methods

In a nationwide, population-based cohort study, we included all adults diagnosed with a first primary solid cancer in Denmark between 2004 and 2023. Cancers were classified according to Tier 2 of the RARECAREnet classification (rare cancer: incidence <6/100.000). Hazard ratios (HRs) of mortality according to rarity were estimated using Cox regression with adjustment for age, period and sex. Additional analyses further adjusted for tumour histology and stage at diagnosis. To examine survival across the full incidence continuum, we further grouped tumour entities into six categories according to incidence.

Results

Overall, 20.6% of cancer patients were diagnosed with a rare cancer. Patients with rare cancers had a 74% (HR: 1.74, 95% CI: 1.72-1.76) higher

mortality than those with common cancers, but mortality did not generally increase with increasing rarity. When adjusting for histology and stage, patients with rare cancers had no apparent higher mortality risk (HR: 0.95, 95% CI: 0.93-0.96).

Conclusions

Patients with rare cancers experienced higher overall mortality than patients with common cancers, but this excess mortality was largely explained by differences in tumour histology and stage at diagnosis. These findings suggest that improving outcomes for patients with rare cancers should primarily focus on earlier diagnosis and tumour-specific factors, rather than on cancer rarity alone.

Abstract S2O3

Contrasting patient characteristics and survival outcomes in stage II-III melanoma: A population-based study from the Swedish Melanoma Register (SweMR)

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Introduction

Stratification of prognosis in melanoma patients is essential for guiding treatment and follow-up. Prior international observations have suggested that patients with localized stage IIC melanomas have poorer survival than those with lymph node involvement in stage IIIA. Yet, Swedish clinical

guidelines recommend more frequent follow-up for stage II compared to stage III patients. This study assessed characteristics and survival of Swedish patients with stage II-III melanoma.

Methods

Data were obtained from MMBaSe, a database that links the Swedish Melanoma Register to several other population-based registers, e.g., the National Patient Register and the Cause of Death Register. All adult patients in Sweden diagnosed with a stage II-III cutaneous melanoma from January 1, 2001, to December 31, 2018, were included in the cohort. Clinicopathological characteristics, comorbidities, socioeconomic status, and melanoma-specific survival (MSS) rates were analysed for substages IIA-IIID.

Results

The cohort included 5,845 stage II-III melanoma patients (male: 56%), with a mean age of 63.3 years and a mean follow-up time of 4.3 years. Stage IIC patients were older, more likely male, had more comorbidities (e.g., hypertension and type 2 diabetes) and lower socioeconomic status than stage IIIA patients. During the study period, 1,750 patients had died, of which 1,227 (70.1%) were melanoma-specific deaths. The 10-year MSS rates were: IIA: 86%, IIB: 73%, IIC: 61%, IIIA: 78%, IIIB: 56%, IIIC: 43%, and IIID: 19%.

Conclusions

Patients with localized stage IIC melanoma have poorer melanoma-specific survival than those with lymph node involvement in stage IIIA. There were also stage-specific differences in age, sex, comorbidities, and socioeconomic status. These findings highlight the need for better treatment for thick, localized melanoma, and suggest an update of current Swedish clinical guidelines, where stage IIC is recommended less frequent follow-up than stage IIIA.

Abstract S2O4

Experiences of cancer care: Hospital-level reports from the Cancer Registry of Norway's nationwide population surveys on health-related quality of life

Ylva Maria Gjelsvik

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Cancer Registry of Norway

Introduction

The Cancer Registry of Norway (CRN) conducts longitudinal, population-based surveys on health-related quality of life among patients with one of eleven cancer types. The questionnaire includes eight patient-reported experience measures (PREMs) from the Cancer Patient Experiences Questionnaire. In 2026, the CRN produced hospital-level PREM reports for Norwegian hospitals for the first time.

Methods

Patients were assigned to hospitals based on residence and hospital catchment areas. Five response options were collapsed into three categories: not at all/to a small extent, to some extent, and to a large extent/to a very large extent. For each cancer type, hospital-level results were reported as percentages in each category and compared with the regional health authority (RHA) and national results.

Results

Approximately one year post-diagnosis (six months for lung cancer), results varied mainly by cancer type. At the national level, 78–92% of patients were satisfied with care and information on treatment, but 18–44% reported dissatisfaction with information on adverse effects. Fifty-six to seventy-one percent wanted shared decision making (SDM), and most reported being involved at least to some extent. Sixty-two to seventy-three percent were satisfied with general practitioner (GP) follow-up, although 11–41% reported poor hospital-GP co-operation. Hospital-level results generally mirrored RHA and national results, with some variation.

Conclusions

In 2026, the CRN reported hospital-level PREMs to 22 hospitals. Results should be interpreted with some caution due to response rates of <50% and because some patients received care outside their catchment-area hospital.

Nevertheless, the findings provide insights to support hospital quality improvement.

Abstract S2O5

Patient-reported outcome measures in five-year breast cancer survivors

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Introduction

Patient reported outcome measures (PROMs) are essential for evaluating long-term health health-related quality of life (HRQoL). We compared PROMs among five-year breast cancer survivors with women without breast cancer, focusing on age and chemotherapy.

Methods

This nationwide study included breast cancer survivors who had completed the five-year follow-up PROMs as part of the Cancer Registry of Norway's ongoing population survey on HRQoL. Outcomes were compared with controls without breast cancer recruited through the same survey. The EORTC QLQ-C30 questionnaire and established threshold values reflecting clinically meaningful negative effects on HRQoL were used. Results show the proportion of patients and controls reporting problems. All comparisons were statistically significant at $p < 0.05$.

Results

The response rate was 50% in the age group 18-49, with 126 patients responding. In total, 606 patients and 395 controls were included. Patients reported a higher burden than controls across all age groups. The highest burden was observed among patients aged 18–49 years treated with chemotherapy; 81.0 % reported clinically negative effects in one or more of the five domains and 43.7% reported problems in 4-5 domains. The proportion reporting negative effects in each domain was: memory and concentration (69.8% vs 33.3%), emotional functioning (56.3% vs 36.0%), family and social life (52.4% vs 9.0 %), physical functioning (52.4% vs 19.8%) and everyday functioning (38.1% vs. 16.2%). The level of burden generally decreased with increasing age, except physical functioning, which was greatest among older patients receiving chemotherapy (age 50-66:55.4%, 67+:61.9%).

Conclusions

Breast cancer survivors—particularly younger women and those treated with chemotherapy—experience substantial long-term functional limitations compared with women without breast cancer. PROMs have important implications for pretreatment counselling, treatment considerations, and follow-up care.

Session 3 – Trends in incidence and prevalence

Abstract S3O1

Trends in long-term population burden of prostate cancer: 25-year stage-specific prevalence and 10-year prediction

Rolf Gedeborg

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Introduction

Prostate cancer, a disease with a highly variable and often decade-long trajectory, is the most common malignancy among men in many countries. Although incidence and mortality are well characterised, prevalence more accurately reflects the long-term public health burden because of the variable and often prolonged disease course.

Methods

Men aged ≥30 years in Sweden diagnosed with prostate cancer were identified in The National Prostate Cancer Register and The Cancer Register and linked to other national healthcare and demographic databases. Stage-specific prevalence was estimated at 6 month intervals from 2000 to 2025, and, using a state-transition microsimulation model, prevalence was projected up to 2035.

Results

Between 2000 and 2025, prostate cancer prevalence increased from 17 to 42 cases per 1000 men. This increase was driven primarily by men whose most recent management was radical or deferred treatment. In contrast, the prevalence of advanced disease, indicated by systemic treatment, remained stable. Projections showed a continued increase in prevalence, with a peak around 2030, followed by a gradual, modest decline.

Conclusion

Prostate cancer prevalence in Sweden has more than doubled over the past 25 years and is expected to peak around 2030, followed by a slight decline.

These trends were related to a birth cohort effect among men born between 1940 and 1949, coinciding with increased PSA testing. These findings can inform healthcare policy, resource planning, and survivorship care for ageing men living decades after diagnosis.

Abstract S3O2

Incidence and mortality trends in early-onset colorectal cancer in the Nordic countries: a population-based study from NORDCAN

Rafael Cardoso

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Introduction

Colorectal cancer (CRC) incidence is increasing among younger adults (<50 years) in many countries. We aimed to comprehensively describe temporal trends in CRC incidence and mortality among younger adults (20-49 years) compared with older adults (50-84 years) across the Nordic countries.

Methods

We used CRC incidence and mortality data from NORDCAN for the period 1983-2023. Joinpoint regression and age-period-cohort models were used to estimate the average annual percent change (%) in incidence and mortality rates over the most recent 20-year period (2004-2023) for individuals aged 20-49 and 50-84 years.

Results

Between 2004 and 2023, CRC incidence increased by about 2.5% annually in the age group 20-49 years in both sexes, while remaining largely stable in the age group 50-84 years. CRC mortality remained stable or slightly decreased among younger adults, while declining by about 2% annually among older adults. There was some heterogeneity across countries in both absolute rates and temporal patterns. In Finland, the increase in CRC incidence in the age group 20-49 years was less pronounced than in the other Nordic countries. In Denmark, CRC mortality decreased more markedly across all age groups, albeit from higher absolute rates in earlier years.

Conclusions

The increasing CRC incidence and the comparatively modest reductions in CRC mortality among younger adults relative to older adults across the Nordic countries call for strengthened preventive strategies, increased clinical vigilance, and targeted research to elucidate the underlying aetiologic factors and biological mechanisms.

Abstract S3O3

Cancer in Sweden – estimation and visualisation of national cancer statistics

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Introduction

Inspired by other Nordic initiatives, a team of statisticians at the National Board of Health and Welfare set out to present national cancer statistics for Sweden in new and innovative ways.

Methods

The project utilises data from the Swedish National Cancer Register, linked to several other national registers. We estimated age-standardised and crude measures of incidence, mortality, prevalence, and relative survival, as well as predictions of incidence and mortality for 20 cancer types. The analyses were stratified by sex, and either age at diagnosis, healthcare region, county of residence, education level, socioeconomic disparity or stage at diagnosis.

Results

Comprehensive national cancer statistics are presented in an interactive data visualisation tool, enabling regional and socioeconomic comparisons. Popular summaries for each measure are available on the website, together with more in-depth thematic reports, describing the methodology and providing guidance for interpretation. The project is under development in dialogue with the user groups, and will be updated annually.

Conclusions

Cancer in Sweden provides an overview of the state of cancer care in Sweden aimed at decision- and policymakers, health-professionals, patient organisations and researchers. Descriptive cancer statistics at the national level are needed to identify trends and disparities and evaluate effects of prevention, early detection, diagnostics and treatment. The data can also be used to support capacity planning decisions in cancer care.

Abstract S3O4

Cancer incidence and mortality trends in Greenland compared with the Nordic countries

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Introduction

Greenland is undergoing rapid lifestyle and healthcare transitions affecting cancer patterns. Geographic and structural barriers may influence outcomes. We examined recent incidence and mortality trends compared with other Nordic countries, 2014-2023.

Methods

We conducted a population-based study using NORDCAN data, including all individuals in Greenland diagnosed with or dying from cancer during 2014-2023. Age-standardized incidence and mortality rates were estimated. Incidence rate ratios (IRR) and mortality rate ratios (MRR) were calculated using Poisson regression, comparing rates in Greenland with the other Nordic countries.

Results

Between 2014 and 2023, 2,373 incident cancer cases and 1,289 cancer deaths were recorded in Greenland. Gastrointestinal and respiratory cancers accounted for most cases and deaths in both sexes. Compared with other Nordic countries, Greenland had higher incidence and mortality for several cancer groups. The largest disparities were observed for cancers of the lip, oral cavity and pharynx (IRR 2.8 and 2.7; MRR 6.0 and 3.6 in women and men, respectively), respiratory cancers (IRR 2.6 and 2.5; MRR 3.2 and 2.9), gastrointestinal cancers (IRR 2.3 and 2.0; MRR 2.6 and 2.3), and cancers of unknown site (IRR 3.8 and 2.2; MRR 4.3 and 3.5). Overall incidence was similar to that in the Nordic countries (IRR 1.2 and 1.0 in women and men, respectively), whereas mortality remained elevated in Greenland in both sexes (MRR 2.2 and 1.9).

Conclusions

Despite similar overall incidence, markedly higher mortality and site-specific disparities in Greenland suggest later diagnosis, higher risk factor burden, and inequities in access to timely, effective cancer care.

Poster Session 2

Abstract S2P1

Treatment Strategy and Thrombotic Status Shape Bleeding Risk in 15,495 patients with Myeloproliferative Neoplasms

Stefanie Antonilli

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Background

Patients with myeloproliferative neoplasms (MPNs) have elevated risks of thrombosis and bleeding. How treatment strategies and thrombotic events influence bleeding risk in real-world populations remain insufficiently explored. We aimed to characterise bleedings across therapies and assess how thrombosis modifies the impact.

Methods

We identified 15,495 patients diagnosed with MPN 2006-2021, aged 18-90, using nationwide registers. Treatment strategies included anticoagulant, antiplatelet, and cytoreductive monotherapy, and combination therapy (≥2 agents). Treatment and thrombosis were modelled as time-varying exposures in a Cox regression adjusted for age, sex, diagnosis year, and MPN subtype.

Results

Patients were 52% female, with a median age of 71 years. The most common MPN subtypes were polycythaemia vera (39%) and essential thrombocythemia (38%). Among the 10,505 patients who at some point

received combination therapy, antiplatelet was the most common agent (79%).

In absence of thrombosis, bleeding rates were increased with anticoagulant (HR=1.59, 95% CI: 1.33-1.90) and cytoreductive monotherapy (HR=1.48, 95% CI: 1.19-1.84) compared with no treatment. No differences were observed among patients receiving antiplatelet monotherapy or combination therapy. Post-thrombosis, bleeding rates were increased across all treatments compared to untreated patients without thrombosis; relative rates ranged from 1.50 (95% CI: 1.23-1.83) for antiplatelets to 3.90 (95% CI: 1.93-7.87) for cytoreductive therapy.

Conclusion

This nationwide study suggests that treatment strategy and thrombosis jointly influence bleedings in patients with MPN. Antiplatelet-containing strategies were consistently associated with no increased bleeding rates. These findings suggest a potential protective role of antiplatelets and may support individualized treatment decisions and bleeding risk assessment in MPN.

Abstract S2P2

Mortality in Standardized Cancer Patient Pathways in Sweden - where early palliative approaches may be relevant

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Background

Standardized cancer patient pathways (CPPs) were introduced in Sweden in 2015 to ensure timely, well organised, and patient centred cancer care. Every CPP has a primarily suspected cancer diagnosis, except the CPPs for serious non specific symptoms, and cancer of unknown primary tumour. Our aim was to study survival within each CPP, by diagnostic outcome, to identify high-mortality CPPs where early palliative approaches may be particularly relevant.

Methods

CPP data were linked to the Cancer Registry and the Population Registry to obtain diagnoses, and dates of death. Survival was estimated from date of well founded suspicion up to five years, for everyone entering the CPP (overall survival). We also estimated stratified survival in subgroups of those diagnosed with the primary suspected diagnosis; other cancer diagnoses, or not diagnosed with cancer at all.

Results

Overall survival differed significantly between CPPs. The five CPPs with the lowest one year overall survival were pancreatic cancer, acute leukemia, oesophageal/gastric cancer, brain tumours, and hepatobiliary cancer (range 53-64%). Long term survival in patients diagnosed with the primary suspected diagnosis was significantly lower compared to other patients, in the CPPs for pancreatic cancer, oesophageal/gastric cancer, and brain tumours, but no different in the hepatobiliary cancer CPP.

Conclusions

Survival differs significantly between and within CPPs, with high mortality affecting both patients diagnosed with cancer, and patients not diagnosed with cancer, e. g. in the hepatobiliary cancer CPP. This suggests early integration of palliative approaches which may support prognostic awareness and more holistic, patient centred care.

Abstract S2P3

Depression, intoxication, suicide and the use of anxiolytics, hypnotics, sedatives and antidepressants following a diagnosis of Non-Small Cell Lung Cancer. A population-based study (Sweden)

Mats Lambe

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Introduction

A cancer diagnosis affects quality of life, including psychological wellbeing. The risk of depression and suicide has been found to be increased in cancer patients, especially in cancers with poor prognosis. The aim of this study was to examine a broad range of indicators of psychological distress pre- and post-diagnosis in patients with non-small cell lung cancer (NSCLC).

Methods

We used data in a population-based lung cancer research database to compare diagnostic events of depression, anxiety, intoxication and suicide as well as filled prescriptions for anxiolytics, hypnotics, sedatives and antidepressants between patients with non-small cell lung cancer (NSCLC) and individuals free of lung cancer (comparators).

Results

The study population encompassed 47,625 patients diagnosed with NSCLC between January 2006 and May 2022 and 236,492 lung cancer free individuals. Diagnostic rates indicating psychological distress (depression, intoxication, suicide attempt, suicide) were higher in NSCLC patients after diagnosis. Already three months prior to diagnosis, fillings of prescriptions

for anxiolytics, hypnotics and sedatives were more common in patients with NSCLC than in comparators and remained higher in the cases during the first year post diagnosis. Following diagnosis, rates of prescriptions for antidepressants were also higher in cases. For all medications except antidepressants, rates of filled prescriptions correlated with severity of disease.

Conclusion

We found evidence of increased rates of both diagnostic events related to psychological distress and use of psychiatric medications after a diagnosis of NSCLC. Our findings underscore the importance of symptom monitoring post-diagnosis and preparedness to provide adequate support and treatment.

Abstract S2P4

Health literacy and symptom outcomes among haematological cancer survivors: a population-based cross-sectional study

Sigríður Gunnarsdóttir

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Background

Health literacy (HL) influences patients' ability to understand and manage health information, yet its association with symptom outcomes among survivors of haematological malignancies is understudied. This study

investigates the role of HL on symptom outcomes in this population and examines whether these associations differ by symptom domain.

Methodology

A cross-sectional study was conducted among survivors of haematological malignancies in Iceland (N=541), as part of the nationwide 2025 SURV-ICE cohort. HL was assessed using HLS-EU-Q16, symptoms and quality of life (QoL) were measured using the EORTC-QLQ-C30 and the EORTC-SURV100 questionnaires. Multivariate linear regression was used to examine associations between HL, QoL and symptom outcomes, adjusting for demographic and clinical variables.

Results

Among participants, 23.7% had insufficient HL. Sufficient HL was independently associated with improved outcomes across all domains, including higher global QoL, physical functioning, improved social functioning and lower pain and fatigue (all $p<0.001$). Strongest associations were observed for symptoms, with each one-point increase in HL associated with reductions of approximately 3–4 points in pain and fatigue scores. Comorbidity burden was strongly associated with reduced physical functioning ($p<0.001$) and increased fatigue but was not associated with pain or emotional functioning. Age was negatively associated with physical functioning but positively associated with emotional functioning, while female gender was associated with higher pain and fatigue and lower physical and emotional functioning.

Conclusion

HL is a consistent and independent determinant of QoL, particularly for symptom outcomes and psychosocial domains, whereas physical functioning is more strongly influenced by clinical and demographic factors. The reported findings will support the integration of HL into patient-centred care strategies in haematology.

Abstract S2P5

Comparison of Loss in Life Expectancy (LLE) and Years of Life Lost (YLL): A Monte Carlo Simulation Study

Qiwen He

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Introduction

Years of Life Lost (YLL) and Loss in Life Expectancy (LLE) are two widely used measures for quantifying the burden of cancer. YLL is calculated based on the remaining life expectancy at the time of death due to cancer, while LLE is obtained as the difference in life expectancy between cancer patients and comparable individuals in the general population. Although both measures aim to quantify the years of life lost due to cancer, they rely on different assumptions and use different approaches for estimation. Our study explores how the different assumptions influence the estimates obtained from each measure.

Methods

This study compares YLL and LLE using a Monte Carlo simulation framework under multiple scenarios. Additionally, data on seven cancers from the Swedish Cancer Registry are used to further illustrate how much the estimates of YLL and LLE differ in practice.

Results

Our simulation results show that YLL and LLE produce comparable results under a baseline scenario. However, notable differences arise in some scenarios, such as in settings with misclassification of cause-of-death information, or when an aging population is observed, reflecting the two measures' sensitivity to different factors. When analyzing the cancer registry data, LLE estimates are substantially higher compared to YLL for all cancers considered.

Conclusions

While both YLL and LLE provide valuable measures for assessing cancer burden, the estimates tend to differ due to various factors. Their differences

highlight the importance of carefully considering the underlying assumptions when interpreting results in population-based cancer studies.

Abstract S2P6

Occult metastasis size and mortality in stage IIIA melanoma: A study from the Swedish Melanoma Register

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Introduction

The current melanoma staging system includes the number of involved lymph nodes and whether metastases are detected on clinical examination or identified as micrometastases in the sentinel lymph node (SLN), i.e., occult metastases. However, the size of the occult metastasis (measured in millimetres by the pathologist) is not included in the staging system, despite evidence from institution-based studies suggesting prognostic impact. This population-based study from the Swedish Melanoma Register (SweMR) aimed to assess whether risk stratification in stage IIIA melanoma could be further improved by investigating the association between occult metastasis size and mortality.

Methods

Data were analysed from a previously published cohort of adults with stage II-III cutaneous melanoma in the SweMR, January 1, 2001-December 31, 2018, who had all undergone SLN biopsy. Associations between the registry

variable occult metastasis size (≤1.0 vs >1.0 mm) and melanoma-specific mortality were explored and Cox proportional hazards models were used to estimate hazard ratios (HRs) with 95% confidence intervals (CIs) .

Results

In the SweMR cohort of N=5,815 melanoma patients, registry data on occult metastasis size were available for 217 stage IIIA patients. Among those, 11 (5.1%) had died from melanoma during follow-up, while 206 were either alive at 2018-12-31 or had died from other causes. Occult metastasis size of >1.0 mm was associated with increased risk of melanoma-specific mortality (HR 9.34, 95% CI 1.18-73.68) in a model adjusted for common confounders like age, sex, tumour thickness, and the presence of ulceration.

Conclusions

In this Swedish nationwide registry study, we found that in stage IIIA melanoma, the occult metastasis size was strongly and independently associated with melanoma-specific mortality. Yet, the estimates lacked precision and larger studies are needed to confirm its utility for risk stratification in stage IIIA.

Abstract S2P7

Long-term survival in hematologic malignancies by morphologic subtypes: population-based study in Finland

Karri Seppä

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Background

Haematological malignancies (HMs) are a heterogeneous group of cancers that can be categorised according to the HAEMACARE classification. Population-based data on long-term survival across detailed subtypes, particularly non-Hodgkin lymphoma (NHL) subtypes, are limited. The aim of this study was to estimate long-term survival among patients with haematological malignancies by morphological subtype and age in Finland.

Methods

We conducted a population-based study including 46,122 patients diagnosed with HMs in Finland during 2007–2021, who were followed until the end of 2025. We estimated net survival at 5, 10, and 15 years after diagnosis by HM subtype and age group using the Pohar Perme estimator, age-standardised to the International Cancer Survival Standards.

Results

Overall net survival was 66% at 5 years, 55% at 10 years, and 47% at 15 years after diagnosis. Survival varied by subtype, ranging from 27% in acute myeloid leukaemia to 95% in essential thrombocythemia. Among NHL subtypes, five-year survival ranged from approximately 40% to 90%. Long-term excess mortality was observed in most subtypes, including those with favourable short-term survival. The relative decrease in survival after the first five years was greatest among patients aged over 75 years at diagnosis.

Conclusions

Haematological malignancies show substantial variation in survival by age and morphological type, including across NHL subtypes, with persistent excess mortality observed in most HM types up to 15 years after diagnosis.

Abstract S2P8

Educational inequalities in incidence and mortality trends of four common cancers in Finland: A nationwide register-based study

Toni Myllyaho

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Finnish Cancer Registry

Background

Socioeconomic inequalities in cancer outcomes persist also in high-income countries. There is a lack of up-to-date, long-term population-based cohort studies examining educational differences in cancer incidence and mortality, which would cover extended time periods and multiple cancer sites.

Purpose of the study

The aim of this study was to investigate breast, lung, prostate, and colorectal cancer incidence and mortality by educational level in Finland between 1976 and 2023.

Methods

Data on cancer incidence and mortality were obtained from the Finnish Cancer Registry and data on educational level from Statistics Finland. Individuals were classified into basic, secondary or high education group based on the highest completed educational qualification. Age-standardized rates (ASRs) and annual percentage changes (APC) by education group and hazard ratios (HR) between them were estimated to assess differences in cancer incidence, mortality and their trends.

Results

The greatest increase in incidence was found in women with basic education for lung cancer (APC 3.9, [3.6, 4.2] in 2002–2023), resulting in the widest educational disparity among women (HR 0.45, [0.43–0.47] for high vs basic education). Overall, those with high education had the most favorable mortality trends. The largest mortality reductions were seen in lung cancer among those with high education (APC -3.0 [-3.2, -2.8] in men, 1976–2023; -4.3 [-7.3, -1.1] in women, 2017–2023). In the most recent period, mortality was lowest in the high education group for all cancer sites except breast cancer, with HRs ranging from 0.37 for male lung cancer to 0.82 for female colorectal cancer.

Conclusions and implications

The widening of educational inequalities in cancer mortality emphasizes the need for targeted prevention, equitable access to screening and timely treatment, as well as broader population-level policies to reduce socioeconomic differences and promote health equity.

Abstract S2P9

Multiple and synchronous cutaneous melanoma - incidence, disease characteristics, risk and survival

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Introduction

To support patient communication and optimize surveillance of melanoma patients, understanding the risk and survival implications of multiple primary melanomas (MPM) and synchronous primary melanomas (SMPM) is essential. This study aimed to determine the incidence of single primary melanoma (SPM), MPM, and SMPM in Denmark and Sweden; describe disease characteristics and patterns in MPM; identify risk factors for MPM and SMPM; and assess melanoma-specific survival (MSS) and risk factors for melanoma-related death.

Methods

This retrospective cohort study used prospectively collected nationwide population-based register data from the Danish Melanoma Database and the Swedish Melanoma Register. A total of 101,666 adults diagnosed with first-time cutaneous melanoma between January 1, 2000, and December 31, 2021, were included and followed until December 31, 2023. Main outcomes were time-trends in incidence of SPM, MPM and SMPM, disease characteristics and patterns in and risk factors of MPM and SMPM, MSS following MPM and SMPM in comparison with SPM and risk factors of melanoma-related death in MPM and SMPM.

Results

Incidences of MPM and SMPM increased over time. Risk factors included older age (MPM and SMPM), and for SMPM, male sex, greater tumor thickness, and tumor location on the trunk or upper extremities. In MPM, subsequent melanomas tended to be of the same or lower tumor thickness and T-stage. When compared to SPM, MPM was a risk factor of melanoma related death, while SMPM was not; the lower survival observed in SMPM patients was driven by male sex and older age in SMPM patients.

Conclusions

This binational population-based study found an increased hazard of melanoma-related death in MPM patients, but with a too small difference in 20 years MSS rates to necessitate increased surveillance. Poorer survival in SMPM patients was driven by underlying patient and disease characteristics, suggesting a possible benefit of focused preventive strategies.

Abstract S2P10

Socioeconomic differences in age-specific risk of breast cancer subtypes in Sweden

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Background

Women of a higher socioeconomic position (SEP) are more likely to be diagnosed with breast cancer, but less is known about the associations between socioeconomic factors and breast cancer subtype risk.

Methods

In a population-based matched case control study utilising Breast Cancer Database Sweden (BCBaSe 3.0) including the Swedish National Quality Register for Breast Cancer, we identified 85,944 women with invasive

breast cancer at ages ≥18 years during 2008-2019. Each case was matched 1:5 to 429,720 healthy women by region, age and year of diagnosis. The SEP measures included highest attained education, the individual share of disposable household income three years before diagnosis, country of birth, and civil status. Conditional logistic regression estimated odds ratios comparing levels of SEP variables. Multiple Imputation with Chained Equations (MICE) accounted for missing subtype information.

Results

We found a significant socioeconomic gradient over both education and income with especially high risks of luminal tumours among women with high education and high income compared to those with low education or income. This gradient was mainly present in post-menopausal women aged ≥55. Women of immigrant background, especially of Asian and African decent, had a lower risk of any subtype compared to Swedish women. Compared to current cohabitation, women with a previous spouse/partner had a higher risk of luminal A-like and luminal B-like tumours.

Discussion

High socioeconomic position was associated with higher risks of post-menopausal breast cancer, especially the luminal subtypes. Socioeconomic differences can reflect differences both in risk factors and uptake of screening.

Abstract S2P11

Characterising the risk of oesophago-gastric cancer in patients registered with primary care who present to their GP with a relevant symptom or sign, or who are diagnosed with a symptomatically similar disease

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Oesophago-gastric (OG) cancer diagnosis is complicated by its often vague symptomatic nature, resulting in late diagnosis and high mortality. National UK guidelines for cancer referral are based on risk estimates for symptoms, which lack granularity when it comes to sex, age groups, comorbidity and smoking status.

OG cancer risk was examined in CPRD GOLD for adults aged 30-100 presenting with one of four symptoms (dyspepsia, dysphagia, upper abdominal pain, vomiting) or one of five new-onset symptomatically similar diseases to OG cancer (Barrett's oesophagus, diaphragmatic hernia, gastritis/duodenitis, gastro-oesophageal reflux disease, oesophageal ulcer) between 2007-2018. Analysis was stratified by age and sex, with smoking status, BMI, alcohol status, Elixhauser comorbidity score, each other index symptom or disease, and seven non-specific cancer symptoms extracted six months prior to diagnosis.

Baseline risk was highest for dysphagia, Barrett's oesophagus and oesophageal ulcer. The co-occurring features with the largest odds ratios include dysphagia (2.84), dyspepsia (2.11), ever smoker status (2.06). Vague features such as cough and fatigue reduced the OG cancer risk (OR: 0.73, 0.65). Risk exceeded 3% in a number of patient groups depending on the combination of primary feature, co-occurring features, age and sex e.g. dyspepsia with co-occurring weight loss at age 85 in men: 3.5%. The risk patterns over age varied between cohorts, highlighting that the 55-year-old cut-off for NICE guideline urgent referral may be overly simplistic. Co-occurring feature effects varied depending on the primary feature e.g. dysphagia in the vomiting vs. gastritis/duodenitis cohorts (OR:10.1 vs. 6.45).

The findings support current NICE guideline recommendations for oesophageal and gastric cancer urgent referral, whilst highlighting the potential for consideration of SSDs and more granular age bands, and the importance of considering clinical features in combination.

Abstract S2P12

Diabetes as a risk factor for cancer: evidence from 7 pooled cohorts

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Introduction

Diabetes mellitus has been linked to an increased risk of cancer, but evidence remains insufficient. We examined whether diabetes is an independent risk factor for cancer using data from the Prospective METa Cohort Study of CAncer Burden in Finland (METCA), combining seven Finnish health surveys.

Methods

The sample included 214,949 participants, of whom 12,586 were excluded due to missing diabetes status. During a median follow-up of 5.6 years, 20,562 incident cancers were identified from the Finnish Cancer Registry. Incidence rate ratios (IRR) were estimated using Poisson regression adjusted for sex, age, calendar time, body mass index, smoking, alcohol intake, and education.

Results

In women, diabetes was associated with increased incidence of liver cancer (IRR 3.19, 95% CI 1.71–5.96), breast cancer at ages 30–50 (2.51, 1.24–5.08), and colorectal cancer (1.45, 1.08–1.93). In men, the risk was increased for liver (3.13, 2.02–4.86), colorectal (1.39, 1.06–1.81), and

pancreatic cancers (1.78, 1.18–2.69). After excluding first two years of follow-up, pancreatic cancer in men and breast cancer in younger women were no longer statistically significant. The overall IRR for any cancer was 1.21 (1.09–1.34) in women and 1.11 (1.01–1.21) in men aged ≥30 years.

Conclusions

The findings support evidence of diabetes as an independent risk factor for certain cancers. As diabetes prevalence continues to rise, recognizing its link to cancer is increasingly important. Public health strategies should integrate cancer prevention with diabetes care, emphasizing lifestyle interventions and early detection to reduce the dual burden of these diseases.

Abstract S2P13

Biological age and risk of cancer in young and old adults

Mats Lambe

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Background

While chronological age (CA) is a major risk factor for cancer, biological age (BA) may provide a more precise measure of cancer risk. Results from several studies have linked estimates of advanced BA to cancer risk, but only a few studies have specifically examined associations between advanced biological age and the risk of several types of early-onset cancer.

Methods

Using a modified PhenoAge algorithm based on routine clinical markers available in the Swedish Apolipoprotein-related MOrtality RISk (AMORIS) cohort, we investigated associations between BA and cancer risk. The study population encompassed 243 551 individuals with a mean follow-up of 25·7 years. Cox proportional hazards, adjusted for demographic and socioeconomic factors were applied to assess associations between BA and overall and site-specific cancer risks, stratified by sex and age at diagnosis.

Results

A total of 49 337 individuals were diagnosed with cancer during follow-up. High BA gap was associated with elevated risks of any cancer (HR 1·07; 95

% CI 1·06-1·08), colorectal (HR 1·11; 95% CI 1·08-1·14), lung (HR 1·35; 95% CI1·32-1·38) and endometrial cancer (HR 1·15; CI 1·09-1·21), but was inversely associated with the risk of prostate (HR 0·96; 95% CI 0.94-0.98) and ovarian cancer (HR 0·88); 95% CI 0.78-0.98), findings that were attenuated following exclusion of diabetics and non-fasting individuals. For most cancers, risk estimates were similar for both early (<50 years) and late onset (≥50 years) disease. Compared to individuals born in the 1940´s, there was evidence of higher gap between BA and CA in more recent birth cohorts.

Conclusion

In this large Swedish cohort, advanced BA was associated with an increased risk for any cancer, lung, colorectal and endometrial cancer. Risk estimates were largely consistent across both early-onset and late-onset cancers, indicating that BA influences cancer susceptibility across adulthood.

Abstract S2P14

Number of children affected by parental cancer across socioeconomic groups in Finland

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Introduction

Cancer incidence during the reproductive years is increasing, meaning that a growing number of families will be affected by parental cancer diagnosis in the future, contributing to an increasing intergenerational burden of cancer. A parental cancer diagnosis or death following cancer disrupts families. However, knowledge about the extent of children affected by parental cancer in Finland remains limited. This study aims to investigate the incidence of children under 18 years of age affected by parental cancer or death following a cancer diagnosis across different socioeconomic groups.

Methods

This population-based registry study will utilise several national registries. Individuals diagnosed with cancer at ages 15-60 years, as well as individuals who died following a cancer diagnosis at ages 15-64 years, will be identified

from the Finnish Cancer Registry for the period 1980-2022. Information on biological children under 18 years of age will be retrieved for these individuals, together with data on family socioeconomic position. The incidence of minors affected by parental cancer will be modelled using Poisson regression to examine variation across socioeconomic groups. Segmented regression will be applied to study cut points in calendar time trends.

Expected results

Based on previous estimates on maternal cancer in Finland, there were 300 incident and 1,850 prevalent maternal orphans in 2022. The study is expected to provide a more comprehensive assessment of children affected or orphaned by maternal or paternal cancer.

Conclusions

The findings will contribute to understanding the extent of the intergenerational cancer burden in Finland.

Abstract S2P15

Comparison of cause-specific and relative survival approaches to estimating net survival of breast cancer subtypes

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Introduction

Relative survival of breast cancer is prone to bias, as the breast cancer patient population may over-represent women of high socioeconomic position compared to the general population. We compared cause-specific

and relative survival approaches to estimating net survival following different breast cancer subtypes while adjusting the population life-tables.

Methods

From Breast Cancer Database Sweden (BCBaSe 3.0), which includes the Swedish National Quality Register for Breast Cancer (NKBC), we selected 76,081 women diagnosed with invasive breast cancer 2008-2019 at ages 18-84. We estimated net survival by age and subtype in the cause-specific and relative survival frameworks, using non-parametric (Kaplan-Meier, Pohar-Perme) and model-based (flexible parametric models) methods. We adjusted the life-tables by socioeconomic position and comorbidity, while removing the contributions of breast cancer death in the background population. Multiple imputation with chained equations addressed missingness of subtype.

Results

Relative survival (RS) estimates were higher than cause-specific estimates for older women and the difference increased with age, with substantial negative excess mortality (RS>100%) for women with Luminal A-like tumours (ages≥65). Removing breast cancer mortality in the background population and adjusting the life-tables for socioeconomic position yielded noticeably lower estimates of relative survival closer to cause-specific estimates. In contrast, RS estimates following comorbidity adjustment were inconsistent. Estimates on imputed data were lower than those from complete-case analyses, with the largest differences in luminal subtypes.

Conclusion

Our results show non-negligible differences in estimates of cause-specific and relative survival following breast cancer. Adequate adjustment of the life-tables and accommodating missing data on subtype is essential.

Abstract S2P16

Microsimulation calibration of the natural history of breast cancer for economic evaluation of risk-based screening

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Background

Breast cancer screening based on genetic risk according to Polygenic Risk Score (PRS) is a promising approach for maximizing benefits of and minimizing the negative effects introduced by screening. In order to maintain costs, resources of screening are redistributed from screening of low-risk women towards earlier and/or intensified screening of high-risk women.

Methods

The cost-effectiveness of screening strategies (i.e., starting age and interval) stratified on PRS is assessed through a decision-analytic microsimulation model. Calibration of parameters guiding the natural history and screening accuracy ensures consistency between modelled outputs and observed measures. However, microsimulation models with many parameters can be computationally demanding to calibrate. In order to increase computational efficiency, individual observations' disease trajectories are vectorized, allowing for simulation of the whole population one model cycle at a time. Furthermore, Incremental Mixture Approximate Bayesian Calibration (IMABC) is applied, overcoming the inefficiency of basic ABC rejection sampling when the prior and posterior distributions of calibrated parameters are poorly aligned. Natural history and screening accuracy parameters are obtained from the literature and calibrated against observed disease- and screening specific measures of different risk groups stratified on PRS.

Results

Results are presented as measures of goodness-of-fit between modelled outcomes and observed measures according to PRS, including age-specific incidence, stage distributions, detection mode and positive predictive values.

Conclusions

The calibrated microsimulation model allows for valid assessment of the cost-effectiveness of risk-based screening strategies, by applying age- and stage-specific costs and quality-of-life weights to the model health states.

Abstract S2P17

Using multiple imputation to account for missing stage and generate a population-based late-stage incidence rate from the English cancer registry data

Shane Johnson

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Background

Globally, reliable stage-at-diagnosis data, with consistent completeness, is key to monitoring late-stage diagnoses. We implemented and tested a multiple imputation model to mitigate the impact of varying stage completeness over time, enabling creation of late-stage incidence rates.

Methods

We extracted cancer diagnoses in England from 2014 to 2022 from the National Cancer Registration Dataset. Where stage was missing, we tested multiple imputation models which included: patient characteristics, sub-national geography, route to diagnosis, and vital status (at 12 months), and optionally treatment (chemotherapy, radiotherapy and/or surgery). Models were stratified by cancer site and diagnosis year, with pooled age-gender-standardised late-stage incidence rates calculated. To assess the imputation models, we used simulated data with 20% of known stages set to missing-completely-at-random. We examined stage distribution and used Cohen's kappa to assess concordance between complete-case and simulated data.

Results

Compared to late-stage incidence rates prior to imputation (203-232 cases per 100,000 people between 2014 and 2022, except 2020), rates using imputed stage data were higher and more consistent over time (280-284 cases, equivalently). Models with and without treatment produced similar stage distributions to the complete-case dataset, but average weighted Cohen's kappa showed better agreement when treatment was included (0.42 vs. 0.30).

Conclusions

Imputation can address challenges of missing data; with this work demonstrating the importance of survival and treatment information as predictors of stage at diagnosis. With further validation, use of imputation could bring more stability in the use of staging data for surveillance, including, monitoring trends in late-stage incidence rates.

Abstract S2P19

Artificial Intelligence for Risk Assessment (AIRA): Protocol for a randomised trial of AI-assisted breast cancer screening in Finland

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Introduction

Population-based mammography screening reduces breast cancer mortality, yet interval cancers remain a challenge and screening requires substantial radiologist resources. In Finland, 25% of breast cancers diagnosed among screening-aged women are interval cancers, and breast cancer is the leading cause of cancer death among working-age women. Artificial intelligence (AI) can improve cancer detection while reducing radiologist workload, however, prospective evidence from population-based programmes in diverse settings is still limited. The AIRA study evaluates the effectiveness and cost-effectiveness of AI triage within the Finnish breast cancer screening programme.

Methods

AIRA is a randomised, population-based trial embedded in routine screening, starting in 2027. Approximately 100,000 individuals eligible for breast cancer screening across multiple Finnish regions will be randomised 1:1 to AI-assisted screening or standard screening with double reading by two radiologists. In the AI arm, mammograms with high AI risk scores will be double-read with AI support, while low-risk examinations will be single-read by one radiologist. The control arm will follow conventional double reading. The trial will be conducted using mammography systems from multiple vendors, as in current screening programme. All analyses will be performed according to the intention-to-treat principle using individual-level registry data.

Results

Early outcomes include cancer detection rate, false-positive rate, radiologist workload, reading time, and screening costs. Primary outcomes are interval cancer rate, sensitivity, specificity, QALYs gained and incremental cost-effectiveness ratio.

Conclusions

AIRA will provide robust evidence on the performance, safety, and cost-effectiveness of AI-assisted breast cancer screening from a nation-wide population-based programme, informing future screening policies in Finland and internationally.

Abstract S2P20

Pilot study on applying extended HPV genotyping in cervical cancer screening in Finland

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Introduction

Primary human papillomavirus (HPV) testing is widely used in cervical cancer screening with cytology as a triage method. However, most current HPV assays detect pooled carcinogenic genotypes, despite substantial differences in genotype specific risks for cervical precancer and cancer. This has led to a high number of unnecessary colposcopy referrals. Extended

HPV genotyping offers an opportunity to improve risk stratification and optimize screening algorithms. In Finland, the need for refined triage strategies is further emphasized by the entry of the first HPV vaccinated cohort into screening in 2028. This implementation study aims to evaluate the feasibility and performance of extended HPV genotyping as a triage method within the Finnish population based cervical cancer screening program.

Methods

The study is designed as a population based trial embedded within routine screening. Individuals invited to screening are randomized by date of birth to either standard HPV screening without genotyping (control cohort) or HPV screening with extended genotyping–based triage (intervention cohort). Management in the intervention arm is stratified into genotype specific risk categories. The primary outcome is the colposcopy referral rate. Secondary outcomes include rates of histologically confirmed lesions, time to diagnosis, adherence to follow up, and HPV genotype prevalence. Outcomes will be analyzed using appropriate modelling following the intention to treat principle.

Results

The study will provide evidence to guide nationwide implementation of extended HPV genotyping in Finland.

Conclusions

By improving risk based management, genotyping is expected to reduce unnecessary colposcopies, optimize use of healthcare resources, and enable earlier identification of individuals at highest risk, particularly in vaccinated populations.

Abstract S2P21

Piloting an analysis pipeline for standardized cancer screening indicators – EUCanScreen

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Introduction

European cancer screening programmes collect data in heterogeneous formats, limiting cross-country comparability. Work package 5 (WP5) of the EUCanScreen Joint Action addresses this by developing a Common Data

Model (CDM) and a federated analysis pipeline for calculating standardised screening quality indicators. We are now piloting the pipeline with real data from participating European institutions.

Methods

The workflow has three components: the CDM, the eucs R package, and a pre-configured Docker image. Participating institutions (n=10) will provide data on breast, cervical, or colorectal cancer screening, convert it to CDM format, load it into the Docker image provided by the WP5 team, and run the analysis locally. Individual-level data never leaves institutional premises.

Results

Four indicators covering the primary screening phase will be calculated and stratified by calendar year, sex, and five-year age group. The results can be benchmarked against existing national statistics, offering an early validation of the approach. We will present the structure of the CDM and the step-by-step workflow of the pilot, along with initial experiences reported by participating institutions.

Conclusions/Discussion

The pilot will provide evidence on the feasibility of a Docker-based federated workflow with real-world data and generate feedback on the CDM structure across diverse programme settings — including both invitation-based and non-invitation-based programmes. This will inform further development of the tools and analysis pipeline.

Abstract S2P22

Projected cancer burden and implications for treatment capacity in Norway through 2046

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Introduction

Population ageing is expected to substantially increase the cancer burden in Norway over the coming decades. Understanding how projected changes in cancer incidence and mortality may affect future demand for cancer care is important for long-term healthcare planning. We aimed to describe projected trends in cancer incidence and mortality through 2046 and assess implications for future treatment capacity.

Methods

We used data from the NORDCAN for the ten most common cancers and all cancers combined in Norway. Projected incidence and mortality trends up to 2046 were assessed overall and stratified by sex and age group (<65, 65–74, 75–84, ≥85 years). Projections were based on both constant age-specific rates and the Nordpred approach. To explore implications for healthcare services, projected incident cases were combined with Norwegian data on current treatment patterns for surgery, radiotherapy, and systemic anticancer treatment. Scenario-based estimates of future treatment demand were calculated under different assumptions.

Results

Preliminary Nordpred-based projections indicate a substantial increase in the number of new cancer cases in Norway through 2046. Among women, increases are projected for breast cancer (+39%), colon cancer (+32%), and particularly non-melanoma skin cancer (+166%), while lung cancer remains stable (-2%). Among men, incidence is projected to increase for prostate cancer (+18%), colon cancer (+39%), and non-melanoma skin cancer (+151%), with a modest increase in lung cancer (+11%). Analyses of age-specific trends, mortality, and treatment demand are ongoing and will be presented at the conference.

Conclusions

The future cancer burden in Norway is expected to increase substantially, particularly in older age groups. Linking cancer projections with treatment utilisation provides a framework for planning future cancer service capacity.

Session 4 – Risk factors

Abstract S4O1

Rising breast cancer incidence in Iceland: the role of parity and age at first birth

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Introduction

The incidence of breast cancer in Iceland has increased by more than 50% over the past four decades. Changes in reproductive patterns, including later age at first birth and lower parity, have likely contributed to this rise incidence.

Objectives

To estimate the population attributable fraction (PAF) of breast cancer in Iceland attributable to parity and age at first birth between 1980 and 2020, and to examine how this contribution has changed over time.

Methods

Data on age at first birth and parity among women aged 40-69 years were obtained from the Icelandic Cancer Society's Cancer Detection Cohort for the decades 1970-2009 (n = 100.000). Combined risk estimates for age at first birth and parity were derived from literature and applied standardized PAF formula allowing for varying exposure levels. Population age distribution data from Statistics Iceland were used to estimate attributable cases, assuming 10-year lag between risk exposure and cancer development.

Results

The PAF for parity and age at first birth contributed 7.5 % of breast cancer cases during the years 1980–1989 and decreased to 5.9% in 1990–1999. This downward trend continued into the 2000s, when the PAF reached 5.0%, followed by a slight increase at 5.7% in 2010–2019.

Conclusion

The findings do not suggest that shifts in reproductive patterns explain the increasing incidence of breast cancer in Iceland among the birth cohorts contributing to cases between 1980-2020. Therefore, other known risk factors should be evaluated in order to account for the observed increase.

Abstract S4O2

Tackling alcohol, smoking, physical inactivity and obesity: projected impact of public health policies on cancer across six Nordic countries.

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Background

Approximately 30% of cancers in Norther Europe are attributable to modifiable risk factors. Despite progress in policy implementation, the comparative preventive potential of specific interventions on cancer incidence across six Nordic countries remains unquantified.

Methods

Using the new PREVENT2 modelling tool, established to estimate disease outcomes based on risk factor prevalence scenarios, we projected the cumulative number of cancers preventable until 2070 through implementation of policies targeting reduction of tobacco, alcohol, obesity and physical inactivity in Denmark, Finland, Iceland, Norway, Sweden and the Faroe Islands.

Results

Tobacco policies showed the greatest preventive potential. If optimum tobacco taxation levels were achieved, approximately 90 000 cancers could be prevented across the six countries, implementation of smoke-free area legislation could prevent around 73 000. Alcohol policies, particularly minimum unit pricing and retail monopoly systems, yielded the next highest impact. Obesity marketing bans showed consistent effects across countries, with around 23 000 cancers prevented. Denmark accounted for the largest

absolute numbers of preventable cancers, in part reflecting its larger population size.

Conclusions

Across six Nordic countries, implementing or enhancing evidence-based policies targeting alcohol, smoking, obesity and physical inactivity could together prevent tens of thousands of cancers. Full implementation across all four domains represents an unprecedented opportunity for cancer prevention in the region. This study provides an evidence-base for policy makers in cancer control to guide and focus on specific areas within each of these domains to maximise impact on reducing the cancer burden.

Abstract S4O3

Improving risk prediction of lung cancer in primary care patients presenting with cough using common blood test result data

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Introduction

Lung cancer survival declines sharply with advancing stage, from approximately 65% at stage I to 5% at stage IV, highlighting the importance of early detection. Non-specific symptoms like cough are not strongly predictive of cancer, and so do not require referral for diagnostic investigation, but their combination with common blood tests has not been previously evaluated.

Objectives

To develop and evaluate risk prediction models for lung cancer for patients presenting with cough in primary care, along with other non-specific symptoms, as well as evaluating how blood tests could be employed to update risk estimates and support decision-making.

Methods

We conducted a retrospective cohort study using Clinical Practice Research Datalink (CPRD) Aurum data between 1/1/2015 and 31/12/2017, linked to

National Disease Registration Service (NDRS) data on incident lung cancer cases. Eligible participants were adults between 30 and 90 years old, presenting with cough, registered at least 1 year with their clinical practice. We used age, gender, index of multiple deprivation (IMD), body mass index (BMI), ethnicity along with Haemoglobin and Platelet Count as risk factors. A logistic regression model with restricted cubic splines was trained in 80% of the patients and tested on the remaining 20%.

Results

In our cohort of 210,872 patients, 1,805 (0.9%) were diagnosed with lung cancer in the 24 months after their index cough presentation. In the test set, the model demonstrated good discrimination (AUC = 0.77) and very good calibration (calibration slope = 0.97).

Conclusions

The study demonstrates the value of linking cancer registration with primary care electronic data. The risk prediction model performs well on the test dataset. Within the Cancer Data Driven Detection (CD3) programme, we next validate the model on Welsh patients. Additionally, we will explore dynamic risk prediction models to take advantage of the longitudinal nature of our data.

Session 5 – Methods

Abstract S5O1

Bayesian multi-state model for case-fatality benefit and incidence reduction in screening-type interventions

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Introduction

Cancer-specific mortality reduction in the intervention arm has been the gold-standard endpoint for evaluating effectiveness in cancer screening trials. Some argue instead for all-cause mortality as the preferred estimand. We argue that both metrics share the same limitation: a typical screening trial offers the intervention to an entire population, while a screening programme can only benefit those who would have developed cancer. These population-level metrics are therefore averages that do not apply to any individual participant, which makes them unsatisfactory. Case-fatality rate has been proposed as an alternative, but existing estimation methods assume that screening only accelerates cancer detection. While this holds for breast or lung cancer screening, colorectal cancer screening also reduces incidence, rendering existing methods inappropriate in this setting.

Methods

In this work, we propose a Bayesian multi-state model for simultaneous estimation of reductions in incidence and case-fatality. We describe an ideal trial for evaluating these effects and show how it can be emulated using data from the Finnish randomised colorectal cancer screening study conducted in 2004-16.

Results

We estimated approximately 9 %-point (-3 to 20 %-point) reduction 5-year case-fatality rate due to screening in men. Additionally for men, we detected a 10 %-point (3 to 17 %-point) reduction in 10-year absolute cancer risk among men who would have undergone polypectomy in the screening group. For women, we observed practically no difference in either outcome.

Conclusion

For men, incidence reduction has an important role in colorectal cancer screening programme effectiveness. The lack of observed benefits in women is in line with earlier studies on this trial. The method provides a novel way to evaluate cancer screening randomised trial, but needs to be extended to an observational setting to allow use of larger data masses.

Abstract S5O2

Investigating Inequalities in Cancer Survival through Mediation Analysis with Limited Interventions

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Introduction

Socioeconomic inequalities in cancer survival are well documented, with individuals living in more deprived areas also more likely to be diagnosed at later disease stage. Mediation analysis provides a method to quantify to what extent survival inequalities are explained by differences in stage-at-diagnosis. While it is unlikely that inequalities in survival can be fully eliminated by a single intervention, we may eliminate part of the disparities through earlier cancer diagnosis.

Methods

By treating deprivation as the exposure and stage as the mediator, the total survival gap can be decomposed isolating how much is due to stage differences. Using mediation analysis in a non-parametric framework, we first estimate potential gains in survival if the most deprived patients had the same stage distribution as the least deprived. However, recognising that complete equalisation in stage is unlikely in practice, we extend the framework to partial interventions, where the differences in stage-at-diagnosis are partially reduced, but not eliminated. We illustrate this approach using population-based cancer registration data from England, covering 10 cancer sites for diagnoses between 2010 and 2022.

Results

Large socioeconomic disparities in cancer survival are seen across many cancer sites. The proportion of the effect that is driven by stage-at-diagnosis varies by cancer type, but even modest shifts in the stage distribution can have meaningful impact in terms of improved survival.

Conclusions

Our approach reports the survival benefits that could be achieved by more realistic partial shifts in stage-at-diagnosis, offering a simple approach to quantify the benefit of early diagnosis initiatives.

Abstract S5O3

Measuring Synthetic Data Privacy: What, Why and How

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Introduction

Synthetic cancer registry data has the potential to advance research by providing access to realistic datasets without exposing real individuals. When generation methods overfit, there is a risk of unintentionally reproducing details from specific patients rather than general patterns. Privacy risks have commonly been assessed using similarity-based privacy metrics or simulated inference attacks, which offer no formal guarantees against information leakage.

Methods

We introduce a new approach to evaluating the privacy of synthetic datasets from known probability distributions based on the maximal local privacy loss (MLPL). To demonstrate the method, we generate synthetic time-to-event data based on data from the Cancer Registry of Norway using sequential regressions including a flexible parametric survival model.

Results

The MLPL identifies increased risk associated with complex generation models, small sample size, and sparse data. This is not reliably detected by similarity-based privacy metrics or inference attacks.

Conclusions

The MLPL provides a theoretical upper bound for the privacy loss, which may aid data owners in identifying vulnerabilities and reduce disclosure risks.

Abstract S5O4

Estimation of Subtype-Specific Tumour Growth Rate Distributions and Interval Cancer Proportions in Breast Cancer Using Biology-Inspired Natural History Models

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Introduction

Breast cancer progression varies across molecular subtypes, influencing detection rates and prognosis. Differences in the proportion of interval cancers (PIC)—cancers detected symptomatically between scheduled screening rounds—have been observed across subtypes, likely reflecting heterogeneity in tumour growth dynamics.

Methods

We applied a continuous-growth natural history model to a cohort of 7,818 breast cancer patients diagnosed between 2007-2020 in Sweden. Using subtype-specific estimates, we quantified the incidence of interval cancers within the two-year period between screening rounds, differentiating by tumour sizes of missed interval cancers at their last negative screen. Additionally, the fitted model enabled estimation of subtype-specific tumour mean doubling times (MDT) and the average duration from tumour onset to symptomatic diagnosis.

Results

Triple-negative breast cancers (TNBC) exhibited the fastest growth (MDT: 126 days), followed by Luminal B-like (203 days) and Luminal A-like (332

days). Corresponding mean asymptomatic times (MAT) were 4.5, 7.6, and 11.8 years, respectively. Observed PICs among regular attenders were 48.9% (TNBC), 32.3% (Luminal B-like), and 22.0% (Luminal A-like), closely aligning with model-based expectations. Approximately 17% of TNBC interval cancers were estimated to have had diameters ≤ 1 mm at the last negative screen, versus 13% for Luminal B-like and 8% for Luminal A-like tumours.

Conclusions

Our model integrates tumour growth into the detection processes to estimate subtype-specific tumour dynamics and their impact on the PIC. The results support the hypothesis that higher PICs in more aggressive subtypes are driven by faster tumour growth and shorter asymptomatic periods. Our results may inform screening strategies tailored to patients' risk.

Session 6 – Screening

Abstract S6O1

First participation in mammography screening among women with disabilities

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Introduction

Non-attendance at the first invited mammography screening is a strong predictor of continued non-attendance. Worldwide, women with disabilities face barriers to screening participation, which influences their stage at diagnosis and survival. In Sweden, women with disabilities are more likely to be diagnosed at a later stage and have shorter survival compared to women without disabilities. Despite evident inequalities in cancer diagnosis and survival, the extent to which mammography screening is unequal by disability status in Sweden remains unclear.

Methods

Our study population included all women living in Region Stockholm who received their first invitation to the Swedish Mammography Screening Programme between 2010 and 2019 at age 40. Through linkage to several administrative registers containing information on disability-related social services and financial support, we identified women with a disability at the time of their first invitation. Stratified by disability status, we calculated the proportion of women who participated, cancelled, or were passive non-participants (did not attend, however had not declined participation).

Results

At the time of first mammography invitation, 7,201 (4%) women had a disability. Women with disabilities were less likely to participate in screening than women without disabilities (53% vs 70%). Moreover, women with disabilities were more likely to be passive non-participants than women without disabilities (34% vs 21%).

Conclusions

Women with disabilities have markedly lower participation in mammography screening, with higher levels of passive non-participation. Efforts should focus on understanding and addressing barriers to attendance in order to increase participation and improve long-term outcomes in this population.

Abstract S6O2

Colonoscopy and fecal immunochemical testing vs usual care in diagnostic colorectal cancer screening: the SCREESCO randomized controlled trial

Anna M Forsberg

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Introduction

There is a need to quantify the benefits and harms of colorectal cancer (CRC) screening using primary colonoscopy or faecal immunochemical testing (FIT) compared with usual care without screening. International guidelines recommend screening individuals aged 50–75 years with colonoscopy or FIT, and many programs use biennial one sample FIT. In this analysis, we compared CRC incidence and gastrointestinal and cardiovascular events between screening and usual care during the diagnostic phase (2014–2020) of the SCREESCO trial (ClinicalTrials.gov: NCT02078804).

Methods

A randomized block design assigned 278,280 individuals aged 60 years to once only colonoscopy, two rounds of two sample FIT with a low cut off (10 μg/g faeces), or usual care. Allocation ratios were 1:6 for colonoscopy versus control and 1:2 for FIT versus control. The analysis included 31,113 participants in the colonoscopy arm and 60,267 in the FIT arm, with 186,671 controls for the colonoscopy comparison and 120,521 for the FIT comparison.

Results

After a median follow up of 4.8 years, the CRC incidence rate was 107.9 per 100,000 person years in the colonoscopy arm versus 99.9 in controls (incidence rate ratio (IRR): 1.08, 95% CI: 0.91–1.28). In the FIT arm, the incidence rate was 96.0 compared with 103.9 in controls (IRR: 0.92, 95% CI: 0.81–1.05). Early stage (I–II) CRC was more frequently detected in both screening arms: IRR 1.38 (95% CI: 1.09–1.74) for colonoscopy and 1.19 (95% CI: 0.99–1.43) for FIT. Cardiovascular and gastrointestinal events were slightly more common in the intervention arms during the first year but approached control levels thereafter.

Conclusion

Overall, the increased CRC detection and the tendency toward a favourable stage shift indicate a screening benefit, while the temporary rise in adverse events reflects some initial harm.

Abstract S6O3

Invitation strategies in European cancer screening programs: Results from the EUCanScreen Joint Action

Jad Abuhamed

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Introduction

Effective invitation strategies are essential for well-functioning screening programs. In Task 7.4, we mapped how European countries invite eligible populations to participate in cervical, breast and colorectal cancer screening, while also conducting a review of the relevant literature.

Methods

Three structured surveys with multiple-choice and open-ended questions were distributed to national focal points between July 2025 and January 2026. Respondents included program coordinators, public health officials, and researchers. We received 28 responses for breast, 27 for colorectal, and 27 for cervical screening.

Results

Most responding countries report that screening programs are established or being rolled out (93% for breast, 81% for colorectal, and 74% for cervical screening). Population registers are used to identify eligible populations by 61% of countries in breast screening and 52% in colorectal screening, alongside health insurance databases. Physical letters remain the most common invitation method (used by 82% of countries in breast, 78% in colorectal, and 63% in cervical screening). Digital letters, patient portals, SMS, and email are also used. Pre-scheduled appointments are used by about half of countries in breast screening but are uncommon in cervical screening. Reminders are commonly sent (used by 68%, 74%, and 70% of countries in breast, colorectal, and cervical screening, respectively). Integrated screening is uncommon and mostly in development. Emerging strategies include HPV self-sampling, centralized digital platforms, and targeted outreach to underserved populations.

Conclusions

Invitation approaches vary considerably across European cancer screening programs. Population identification, appointment and reminder systems,

digitalization, self-sampling, and integration approaches remain key areas for development.

Abstract S6O4

Evidence to action - data-based optimization of real-life cancer screening programs

Miriam Elfström

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Introduction

Implementation of HPV-based screening in high-income countries is occurring while HPV epidemiology and test technologies are changing which means that optimization has to be rapid and reflect real-life data. We have established a national, register-based audit framework that produces annual, age- and screening-history specific incidence estimates to provide actionable feedback to the screening program.

Methods

All women in screening ages (23-70) during each calendar year from 2012 onward were identified through the Total Population Register. Incident invasive cervical cancer cases (ICC) were obtained from the Swedish Quality Register for Gynecological Cancer through 2024 and linked to the National Cervical Screening Registry (NKCx). Each woman was classified into mutually exclusive, dynamically defined screening-history strata. Age-standardized incidence rates (ASIRs) of ICC are calculated for each dynamically defined screening-history stratum using direct standardization with Poisson-based variance and confidence intervals according to Breslow & Day.

Results

In total, 6590 confirmed cases of ICC from 2012 to 2024 were included, with medical chart re-review for cases after 2018. A decline in the overall incidence of ICC has been observed in the most recent years as a greater proportion of the target population is reached by HPV-based testing. Elevated ASIRs (as compared to elimination targets) remain for long-term non-attenders and women with high-risk infections and missing follow-up.

Conclusions

The audit framework is updated annually so that new technologies and triage strategies can be incorporated as they enter practice. Results are used to

understand remaining groups at risk and identify where in the screening chain improvements can be made to facilitate rapid translation into screening outreach efforts as we near elimination targets.

Abstract S6O5

Lifestyle factors and mortality across cancer types in the STHLM3 prostate cancer screening trial

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Background

Lifestyle factors have been associated with cancer mortality, yet data from contemporary cohorts are limited. We examined associations between lifestyle factors and cancer-specific mortality among men in a prostate cancer screening trial.

Methods

We included 47,469 men with lifestyle data from the STHLM3 trial (2012–2015), followed through Swedish registers until December 31, 2023. A lifestyle score based on body mass index, tobacco use, and physical activity was constructed, categorized into unhealthy, moderate, or healthy. Hazard ratios (HRs) and 95% confidence intervals (CIs) were estimated using Cox regression with age as the time scale.

Results

Median age at entry was 60 years. Over 10 years of follow-up, 1,106 cancer deaths were observed. Compared with the unhealthy group, men with a healthy lifestyle had a lower rate of overall cancer mortality (HR 0.51, 95% CI 0.44–0.59). Similar associations were observed for lung (HR 0.15, 95% CI 0.09–0.24), pancreatic (HR 0.64, 95% CI 0.43–0.95), and colorectal cancer mortality (HR 0.63, 95% CI 0.42–0.94). No association was observed for prostate cancer mortality (HR 0.95, 95% CI 0.52–1.74), although a healthy lifestyle was associated with a reduced rate of aggressive disease before age 60 (HR 0.46, 95% CI 0.24–0.88).

Conclusions

In this contemporary cohort, a healthy lifestyle was associated with lower cancer mortality across cancer types, except for prostate cancer, which was subject to screening and had few observed deaths. Our findings highlight the continued relevance of lifestyle factors for cancer mortality, particularly for cancers lacking screening.

Abstract S6O6

The Risk of Cervical Cancer Following hrHPV and Cytological Screening within the Finnish Cervical Cancer Screening Program: A Population-based Cohort-study

Veli-Matti Partanen

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Introduction

In clinical trials, high-risk human papillomavirus (hrHPV) screening is more effective in preventing cervical cancer (CC) than traditional cytology. Nowadays, hrHPV screening is the recommended primary screening method. Its implementation in routine practice has resulted in an increase in colposcopy referrals along with detected precancerous lesions and invasive cervical cancers. However long-term results remain limited. We analysed cervical cancer incidence over 12 years, comparing hrHPV and cytology in routine five-year screenings in Finland.

Methods

This retrospective cohort-study included women aged 30 and older, invited for screening every five years from 2012 to 2024 as part of Finland's cervical cancer screening program. CC diagnoses were obtained from the Finnish Cancer Registry. A per-protocol (PP) analysis categorized participants by used screening method and participation status. Adjusted hazard ratios (aHRs) for CC were calculated by screening method and by baseline screening result across three time intervals: 0-1 years, 1-3 years, and 3 years onwards.

Results

PP-analysis covered 955 751 cytology-screening episodes with 556 CCs, 814 489 hrHPV-screening episodes with 375 CCs, and 492 974 non-attender episodes with 487 CCs. Preliminary analysis showed that hrHPV testing increases CC incidence in time intervals between 0-1 years and 1-3 years but shows reduced incidence after three years. More detailed results will be presented at the conference.

Conclusions

Within a well-established population-based national screening program, hrHPV accelerates detection of existing CCs and prevents new cancers. The CC incidence after a negative hrHPV-test at ten years equals to five years cumulative incidence after a negative cytology-test. That suggests that screening intervals in hrHPV-negative women should be extended beyond five years.