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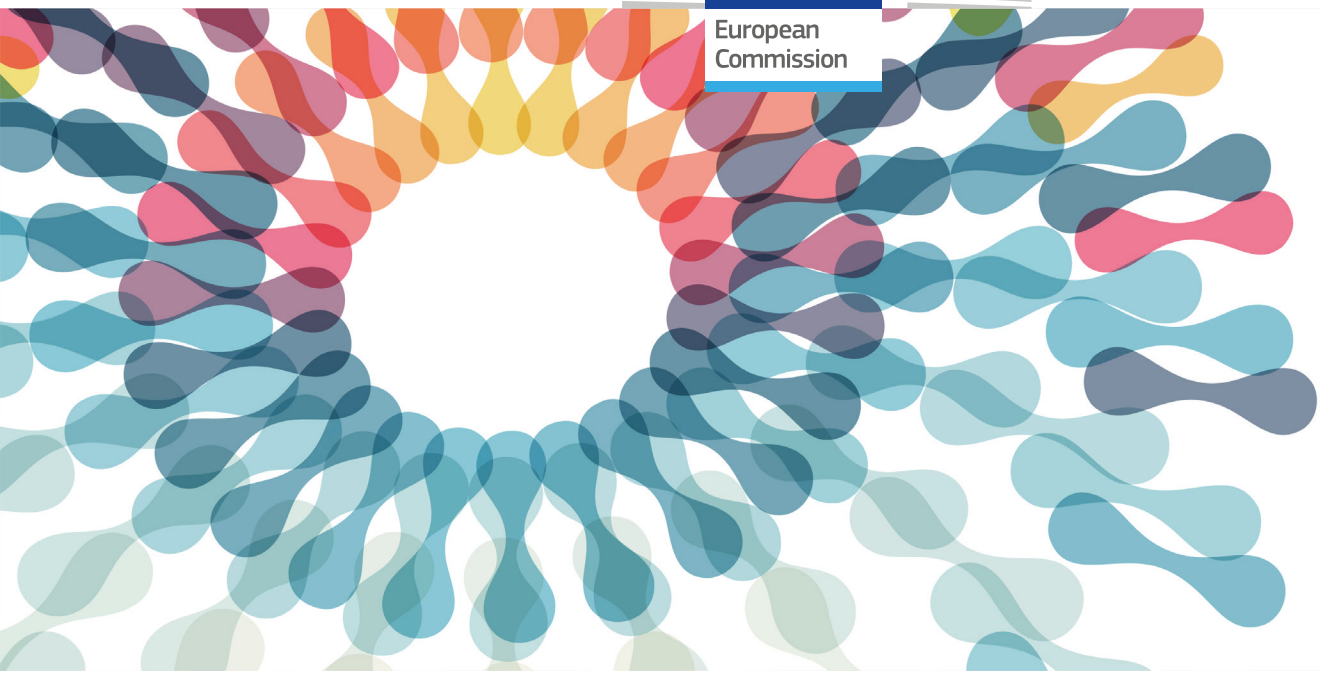

Cancer Registration saves lives

ENCR Scientific Meeting 2021

16-18 November 2021
Virtual Event

European Network of Cancer Registries

Joint Research Centre

Contact information
Name: ENCR Secretariat / JRC-Cancer Information Group
Address: Joint Research Centre, Directorate F: Health, Consumers and Reference Materials–Health in Society
Via Enrico Fermi 2749, TP 127, 21027 Ispra (VA), Italy
E-mail: jrc-encr@ec.europa.eu
Web site: http://encr.eu/

JRC Science Hub
https://ec.europa.eu/jrc/

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Cancer Registration saves lives

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European Network of Cancer Registries

Joint Research Centre

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Practical information

Official language

The official language of the will be English.

Certificate of attendance

A certificate of attendance will be sent after the meeting.

Enrico Anglesio Prize 2021

The ENCR is pleased to announce the winners of the *Enrico Anglesio Prize 2021* and the Virtual and Satellite Prizes *Elvo Tempia* and *Sharon Whelan*. The winners will be presented by Dr. Roberto Zanetti at the Closing ceremony.

For more information: https://www.fondoelenamoroni.org/en/the-prize/.

Enrico Anglesio Prize

The Enrico Anglesio Prize, offered by the Fondo Elena Moroni was awarded to:

> Marissa Corine van Maaren, MSc, PhD, Netherlands Comprehensive Cancer Organisation (IKNL), The Netherlands, for her work on: *Socioeconomic inequalities in young breast cancer patients: jointly modelling recurrences and mortality using registry data*.

Elvo Tempia Special Prize

The Elvo Tempia Special Prize, offered by the Tempia Foundation, was awarded to:

> Federica Zamagni, MSc, Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (IRST), IRCCS Epidemiology Unit and Emilia-Romagna Cancer Registry, section of Romagna University, Italy, for her work: *Decreasing thickness and enhanced therapy have both contributed to the 2010s increase in survival from melanoma in Italy*.

Sharon L Whelan Special Prize

The Sharon L Whelan Special Prize, offered by the International Association of Cancer Registries, was awarded to:

> Rym Mallekh, MD, MsPH, National Institute of Health, Tunisie, for her work: *Burden of cancer attributable to excess body weight in Tunisia in 2019*.

Welcome

The European Commission's Joint Research Centre (JRC) and the European Network of Cancer Registries (ENCR) warmly welcome you to the 2021 ENCR Scientific Meeting, from 16 to 18 November. This meeting will be our first virtual event which you will not want to miss!

Indeed, it would have been our pleasure to welcome you last year in Granada, Spain, but due to the coronavirus pandemic worldwide we decided first to postpone the conference to 2021 and then change it into a virtual setting.

The COVID-19 pandemic has disrupted cancer burden surveillance in Europe and worldwide, severely impacting on registries operations and therefore possibly mining not only diagnosis and care, but also cancer monitoring. These challenges highlighted like never before the need for guidance and support to the registries, as one of the main aims of the JRC-ENCR collaboration in the frame of and subsidiary to an expanding European Cancer Information System.

The JRC and the ENCR provide continuous opportunities for mutual learning and exchange of best practices in cancer registration, for the sustainability of European registries and ultimately to the benefit of the European population.

Our ENCR 2021 virtual conference will be an opportunity to reach even a wider audience, with live and recorded broadcast for participants joining the conference.

The three half-day event will feature sessions on the COVID-19 impact on cancer registration, on estimation of the cancer burden, stage and treatment information, cancer control and cancer inequalities. We have developed a very attractive programme, including three keynote speakers, 28 oral presentations and 53 e-Poster carefully selected by the ENCR Steering Committee.

On top of this, you will have the opportunity to explore and learn more about the several activities and opportunities the JRC team together with the ENCR Steering Committee make available to the registries community, navigating through the information booths in the platform hall.
The digital conference platform offers multiple means of communication, which will dynamise discussions and exchanges between all participants. *We hope this new 100% virtual experience will stimulate a creative exchange of ideas, and provide an opportunity for establishing new collaborations or strengthening existing ones in an exciting and dynamic environment.*

We hope you will enjoy your time in this virtual scenario, with pretty much engagement and also a bit of fun! Thank you for joining this.

Elizabeth van Eycken
ENCR Chairperson

Otto Visser
ENCR Chairperson

Manola Bettio
European Commission
JRC

Tue

16 Nov

ENCR Scientific Meeting 2021 Programme

DAY 1*	Tuesday	16 November 2021
08:00-09:00	*Connection check-ups and informal chat groups*	
09:00-09:20	**Welcome session** • **Manola Bettio** (JRC) • **Otto Visser** and **Elizabeth van Eycken** (ENCR)	Chair **Sandra Caldeira** (JRC)
09:20-09:35	Keynote Speaker **John F. Ryan** (European Commission)	Chair **Sandra Caldeira** (JRC)
	Session 1 **COVID-19 pandemic and cancer registration I**	Chair **Volker Arndt, Liesbet van Eycken**
09:35-09:50	Impact of the COVID-19 pandemic on cancer registration: results of surveys among ENCR members	**Luciana Neamtiu**
09:50-10:05	The impact of the COVID-19 outbreak on cancer diagnoses, stage and treatment	**Sabine Siesling**
10:05-10:20	Incidence of gynaecological cancer during the COVID-19 pandemic	**Eline Oymans**
10:20-11:00	*ENCR Café: Coffee break*	
	Session 2 **COVID-19 pandemic and cancer registration II**	Chair **Otto Visser, Mats Lambe**
11:00-11:15	Prostate cancer diagnosis, staging, and treatment in Sweden during the first year of the COVID-19 pandemic	**Johan Styrke**
11:15-11:30	Excess mortality in a nationwide cohort of cancer patients during the COVID-19 pandemic in Belgium	**Freija Verdoodt**
11:30-11:45	Impact of the COVID-19 pandemic on incidence, stage, and treatment of head and neck cancer patients in the Netherlands	**Dominique de Jel**
11:45-12:00	The impact of the COVID-19 pandemic on cancer reporting rates in the Nordic countries during 2020	**Anna Johansson**
12:00-12:15	The impact of the coronavirus disease 2019 on the diagnosis and treatment of cancer in Northern Portugal	**Samantha Morais**
12:15-12:30	*Coffee Break*	
	Poster session	
12:30-13:00	Poster exhibition and individual poster chats	
13:00-14:00	*ENCR Café: Networking and discussions*	

* Time indications are in Central European Time (CET).

ENCR Scientific Meeting 2021 Programme

Wed

17 Nov

DAY 2*	Wednesday	17 November 2021
08:00-09:00	*Connection check-ups and informal chat groups*	
09:00-09:15	Keynote Speaker **Dr. Elisabete Weiderpass** (IARC)	Chair **Freddie Bray**
	Session 3 **Estimation of cancer burden**	Chair **Francesco Cuccaro, Freddie Bray**
09:15-09:30	Cancer incidence trends in Estonian adolescents and young adults, 1970-2018	**Keiu Paapsi**
09:30-09:45	Burkitt lymphoma: survival analysis, Poland, 1999-2020	**Florentino Caetano Santos**
09:45-10:00	Cure fraction and time to cure after cancer in Europe for 32 cancer types: results from the EUROCARE-5 study	**Luigino Dal Maso**
10:00-10:15	Bridging information gaps on cancer survivors in Europe: results from the iPAAC Joint Action	**Elena Demuru**
10:15-10:30	Trends in population-based cancer survival in Slovenia 1997–2016	**Katarina Lokar**
10:30-11:00	*ENCR Café: Coffee break*	
	Session 4 Collection and use of stage and treatment data	Chair **Liesbet van Eycken, Anna Gavin**
11:00-11:15	Exploring endometrial cancer treatment patterns and outcomes in Europe: an analysis with population-based cancer registry data	**Francesco Giusti**
11:15-11:30	Machine learning algorithm to estimate distant breast cancer recurrence at the population-level with administrative data	**Hava Izci**
11:30-11:45	Population based patient reported outcomes after cancer treatment	**Ylva Maria Gjelsvik**
11:45-12:00	Social determinants of primary treatment in breast cancer patients in Estonia: a register-based study	**Kaire Innos**
12:00-12:15	An updated electronic staging tool for population-based cancer registries: CANSTAGING+	**Isabelle Soerjomataram**
12:15-12:30	*Coffee Break*	
	Poster session	
12:30-13:00	Poster exhibition and individual poster chats	
13:00-14:00	*ENCR Café: Networking and discussions*	

* Time indications are in Central European Time (CET).

Thu 18 Nov — ENCR Scientific Meeting 2021 Programme

DAY 3*	Thursday	18 November 2021
08:00-09:00	*Connection check-ups and informal chat groups*	
09:00-09:15	Keynote Speaker **Dr. Josep M. Borràs** (Director of the Catalonian Cancer Plan)	Chair **Alain Monnereau**
	Session 5 **Cancer control**	Chair **Maciej Trojanowski, Alain Monnereau**
09:15-09:30	Survival of myeloid malignancies in France from 1989 to 2018 in general population: what's news?	**Morgane Mounier** **Marc Maynadie**
09:30-09:45	The ICBP: the importance of international collaboration in addressing areas of cancer control to improve outcomes	**Charlotte Lynch** **Harriet Hall**
09:45-10:00	Comparing explainable machine learning for breast cancer survival prediction using registry data	**Arturo Moncada-Torres**
10:00-10:15	Differences in tumor characteristics and the net survival of women diagnosed with different breast tumors	**Nena Karavasiloglou**
10:15-10:30	Bayesian kernel machine regression for estimating prostate cancer risk of heavy metal mixtures in the EPIC-Spain cohort	**Miguel Rodríguez-Barranco**
10:30-11:00	*ENCR Café: Coffee break*	
	Session 6 **Co-morbidities and cancer inequalities**	Chair **Anna Gavin, Otto Visser**
11:00-11:15	Exploring cancer outcomes in Northern Ireland: the association between cancer mortality and pre-existing heart disease	**Ciaran O'Neill**
11:15-11:30	Socioeconomic inequalities in colorectal, lung, and breast cancer incidence in Spain	**Daniel Redondo-Sánchez**
11:30-11:45	Cardiovascular disease prevalence in patients diagnosed with six curable tumours: a vicori national registry analysis	**Catherine Welch**
11:45-12:00	Geographical variation in brain and CNS tumor incidence: a comparison between a middle-income and a high-income country	**Miriam Wanner**
12:00-12:15	An aggregated comorbidity measure based on the history of filled drug prescriptions	**Rolf Gedeborg**
12:15-12:30	*Coffee Break*	
12:30-13:00	**Closing session** • **Roberto Zanetti** Enrico Anglesio & Satellite Prizes • **Mats Lambe** ENCR 2021 Awards	Chair **Liesbet van Eycken, Otto Visser**
13:00-14:00	*ENCR Café: Networking and discussions*	

* Time indications are in Central European Time (CET).

The ENCR Steering Committee 2021-2024

ELECTED MEMBERS

Dr Volker Arndt
Cancer Registry Baden-Württemberg
Heidelberg, Germany

Dr Francesco Cuccaro
Cancer Registry of Puglia
Trani, Italy

Dr Alla Egorova
Samara Cancer Registry
Samara, Russian Federation

Dr Anna Gavin
N. Ireland Cancer Registry
N. Ireland

Dr Mats Lambe
Regional Cancer Registries
Sweden

Dr Alain Monnereau
Haematological Malignancies Registry of Gironde
Gironde, France

Dr Maciej Trojanowski
Greater Poland Cancer Registry
Poland

Dr Otto Visser
Netherlands Cancer Registry
Utrecht, Netherlands

The ENCR Steering Committee 2021-2024

NOMINATED MEMBERS

Dr Freddie Bray
Representative of the International Agency for Research on Cancer (IARC)
Section of Cancer Information
Lyon, France

Dr Elizabeth van Eycken
Representative of the International Association of Cancer Registries (IACR)
Belgium Cancer Registry
Belgium

John F. Ryan

is Director of the Commission Public Health directorate since September 2016.

He is currently the Commission representative on the Board of the European Centre for Disease Prevention and Control.

Current priorities include management of the Covid pandemic, implementation of an EU cancer plan, antimicrobial resistance, vaccination policies, and the implementation of financial instruments to support health, including research.

The importance of cancer registries in European policy making

John F. Ryan, *European Commission*

Abstract

To support the move towards digital transformation, the work and input by the European Network of Cancer Registries is key in collecting and providing reliable, up-to-date and comparable data-registry data. An organised and comprehensive system for the collection, storage and analysis of the registries will help to better design and implement policies and actions that can effectively address cancer and that will help to identify where additional support is needed.

The health sector is 'data-rich but information-poor'. Europe's Beating Cancer Plan – together with the Mission on Cancer – will look into the potential of data and new technologies. The planned European Health Data Space and the new Knowledge Centre on Cancer will provide the necessary infrastructures and networks to make the most of data and digitalisation in cancer prevention and care.

Elisabete Weiderpass

MD, MSc, PhD, is a Brazilian cancer researcher who is a naturalized Swedish and Finnish citizen. She is an expert in cancer epidemiology and cancer prevention.

In January 2019, Dr Weiderpass took office as elected Director of the International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization (WHO), based in Lyon, France. The Agency welcomes about 350 staff dedicated to cancer research. Its membership and governance is made up of 27 countries (or 'participating States').

Dr Weiderpass previously served as Head of the Department of Research at the Cancer Registry of Norway, and of the Genetic Epidemiology Group at the Folkhälsan Research Center in Finland. She was a Professor of Medical Epidemiology at the Karolinska Institutet in Stockholm, Sweden, and a Professor of Cancer Epidemiology at the Arctic University of Norway. She held visiting professorship positions in cancer epidemiology in Brazil, China, the Islamic Republic of Iran, and Kuwait and is an honorary Adjunct Professor at the Yale School of Public Health in the USA.

Dr Weiderpass has authored over 900 scientific publications in peer-reviewed international journals.

The role of cancer data in supporting public health decision-making

Dr Elisabete Weiderpass, *Director of the International Agency for Research on cancer (IARC)*

Abstract

Millions of people suffer from cancers that are preventable. **Data** are essential to know what actions are needed and which groups should be targeted. Cancer data are the cornerstone of cancer control. A population-based cancer registry collects all reportable cancer occurrences from multiple sources in a defined area and is best suited to capture population-level disease burden, and inform priorities for national cancer control. Coordinated by the International Agency for Research on Cancer (IARC), the Global Initiative for Cancer Registry Development (GICR) aims to markedly increase the coverage, quality, and use of data from population-based cancer registries in low- and middle-income countries (LMICs). Dr Elisabete Weiderpass, Director of IARC, will highlight the crucial role of cancer data in supporting public health decision-making, and will illustrate her lecture with key data on the global cancer burden.

Josep M. Borràs

Director of the Catalonian Cancer Plan, is a graduate of UAB in Medicine (1981), holds a PhD in Epidemiology (UAB, 1989) and a Master in Methodology of Health Sciences (UAB, 1988). From 1997 to 2006 he served as director of the Catalan Institute of Oncology, playing a key role in its re-organization, and since 2006 he directs the Catalonian Cancer Strategy for the Catalan Department of Health. In 2008 he became the Scientific Coordinator of the Spanish Cancer Strategy for the Spanish Health Ministry. His research activity focuses on health services research, specifically in the determinants of utilization of cancer services, and in the application of epidemiology to cancer services planning and evaluation. He has authored or co-authored more than 225 peer-reviewed papers and serves in the editorial boards of the *European Journal of Cancer Prevention*, *Journal of Cancer Policy* and *Radiotherapy and Oncology*.

Using population-based data to assess cancer care needs

Josep M. Borràs, *Cancer Plan, Barcelona, Spain and University of Barcelona, Spain*

Abstract

Population-based cancer registries have been the cornerstone of the information system in planning cancer control priorities, jointly with vital statistics. In recent years, new challenges have been developed in cancer control that require to review the potential use of population-based data. For instance, the need to assess future resources for cancer care, the analysis of the use of cancer services with special interest in the use of innovative therapies, the evaluation of unmet needs for therapy or the impact of survivors on health services, among other examples. All these aspects have resulted in new demands to the population information systems, beyond the traditional analysis of incidence and mortality. Real world data also offers new opportunities to expand the role of cancer registries, but also poses new demands on the way data could be linked, or ethical aspects. In this presentation, using examples from radiation oncology, potential uses of cancer registries will be analyzed and potential avenues of cooperation between population-based and real-world data from health services, applicable to planning cancer services, will be discussed. Examples of the estimates of what is optimally needed to serve the population concerned, compared to a blueprint of the actual situation in terms of patients treated, their individual outcome and access to RT will be discussed to demonstrate the usefulness of population data for cancer planning and its role in supporting policy makers to take evidence-based decisions on planning cancer resources.

Impact of the COVID-19 pandemic on cancer registration: results of surveys among ENCR members

Luciana Neamţiu,[1] Carmen Martos,[1] Francesco Giusti,[1] Raquel Negrão Carvalho,[1] Giorgia Randi,[1] Nadya Dimitrova,[1] Manuela Flego,[1] Tadeusz Dyba,[1] Manola Bettio[1]

[1]European Commission, Joint Research Centre (JRC), Ispra, Italy

Background
The COVID-19 pandemic influenced healthcare services, including the ones involved in screening and care. In many European countries citizen's and patient's access to routine diagnostic and therapeutic services were restricted. Cancer registries (CRs) operations were also affected.

Aim
The aim of the study is to present the impact of the first wave of the pandemic on the activities of the CRs as well as cancer screening, diagnosis and care in the areas covered by cancer registries affiliated to ENCR.

Methods
A survey was prepared and was sent to the directors of 108 cancer registries affiliated to ENCR in June 2020. The questionnaire was organised around four topics: (1) general information about COVID-19 pandemic in the country or the region covered by the CR, and impact of the pandemic on cancer screening, diagnosis and treatment; (2) impact on cancer registration; (3) participation of CRs in COVID-19-related studies; (4) collection of additional variables related to the assessment of the pandemic impact on cancer patients.

Results
Forty CRs (37% response rate) from 22 European countries responded to the survey. The majority of the regions covered by the CRs were under lockdown from mid March 2020. The majority of the CRs did not report significant disruptions in receiving notifications or accessing the sources. Main sources of disruption were due to pathology laboratories and hospital discharge notifications. The main reasons for data collection disruptions were the remote settings. More than half of the CRs (56%) reported a negative of impact on data processing, mainly due to personnel reduction and limitations in accessing resources or databases when working remotely. Several CRs reported that they were investigating the impact of COVID-19 on cancer care via dedicated studies.

Conclusions
CRs can perform studies measuring the impact of COVID-19 on cancer care. More information will be retrieved from the second survey run in 2021 referring to the following periods.

Acknowledgement: to the ENCR Steering Committee members (2018-2020, 2021-2024) and to the cancer registries participating in the survey.

The impact of the COVID-19 outbreak on cancer diagnoses, stage and treatment

Sabine Siesling,[1,2] Otto Visser,[3] Peter Prinsen,[1] Harm Buisman,[1] Marieke Louwman,[1] Anouk Eijkelboom,[1] Marloes Elferink,[1] Iris Nagtegaal,[4,5] Joost Bart,[6,7] Avinash Dinmohamed,[1] IKNL COVID research group, COVID and Cancer-NL consortium and cancer specific working groups

[1]Department of Research and Development, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands [2]Department of Health Technology and Services Research, Technival Medical Centre, University of Twente, Enschede [3]Department of Registration, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands [4]PALGA Foundation, Houten, The Netherlands [5]Department of Pathology, Radboud University Medical Center, Nijmegen, The Netherlands [6]Netherlands Pathology Association (NVVP), Utrecht, The Netherlands [7]Department of Pathology and Medical Biology,University Medical Center Groningen, Groningen, The Netherlands

Introduction
The first confirmed COVID-19 case in the Netherlands was diagnosed the 27th of February 2020. As from the 16th of March societal measures were taken to prevent the spreading of the virus, screening programs were halted and health-care services were reprioritized to tackle the initial surge of critically ill COVID-19 patients. The aim of this study was to determine the effect of the COVID-19 outbreak and the measures taken on cancer diagnosis, stage and treatment.

Methods
For this nationwide cohort study we used data from the Netherlands Cancer Registry (NCR) and data from the pathology laboratories derived via the Nationwide Network of Histopathology and Cytopathology (PALGA). Cancer diagnosis, stage and treatment were compared between 2020 to April 2021 (observed) and the average of 2017-2019 (expected).

Results
During the first outbreak a significant decline in cancer diagnoses up to 25% was seen in all ages and regions. Skin cancer diagnoses (basal and squamous cell carcinoma) decreased more than 50%. A decline in breast and colorectal cancer was mainly seen in patients eligible for screening (ages 50-74 and 55-75 respectively). Up to April 2021 there were still fewer breast and colorectal cancer diagnoses than expected. No stage shift could be observed. General treatment changed for e.g. breast cancer according to specific clinical guidelines but remarkably time to first treatment was shorter in many cancer types.

Conclusions
Due to e.g. reluctance of patients with complaints to go to the general practitioner, suboptimal diagnostic pathways and temporary halt of the screening programs cancer diagnoses declined. Despite the campaign to urge patients with complaints to visit their GP and the gradual restart of the screening, fewer people are diagnosed with cancer than expected. The possible effect of the delay in diagnosis on stage and, in combination with altered treatment strategies, on prognosis depends on the cancer type and will be monitored closely.

Incidence of gynaecological cancer during the COVID-19 pandemic

Eline Oymans,[1] Cor de Kroon,[2] Jos Bart,[3] H.W. Nijman,[4] Maaike van der Aa[1]

[1]Department of Research, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht [2]Department of Gynaecological Oncology, Leiden University Medical Center, Leiden [3]Department of Pathology, University Medical Center Groningen, Groningen [4]Department of Gynaecological Oncology, University Medical Center Groningen, Groningen

Background
On the 11th of March 2020, the novel severe acute respiratory syndrome corona virus 2 (SARS-COV-2) was declared a pandemic. We studied the incidence in gynaecological oncology as a result of the impact of the COVID-19 pandemic, consequent lockdown and overcrowded hospitals in the Netherlands.

Materials and Methods
We performed a retrospective cohort study using data from the Netherlands Cancer Registry (NCR) on women of 18+ years diagnosed with invasive endometrial, ovarian, cervical or vulvar cancer in the period 2017-2020. Incidence of these four types of cancer was calculated for the period before the COVID-19 pandemic (mean number of the period 2017-2019) and compared with the incidence during the COVID-19 pandemic (2020). The number of lagged behind diagnoses was calculated as the difference in incidence between the period before and during the pandemic. Analyses were stratified for age, socioeconomical status (SES) and region.

Results
The incidence rate of gynaecological cancer was 56/100 000 (n=4830) before and 53/100 000 (n=4612) during the pandemic. Comparing the incidence of the two periods for the types of cancer showed no significant difference (chi2 p=0.24). A clear decrease in incidence was visible for all types during the first wave of COVID-19 (March-June). Subsequently, large increases in incidence were visible. A total of 277 diagnoses were lagged behind during the pandemic (5.7%). The largest number was observed in ovarian cancer (11.1%, n=160), followed by cervical cancer (6.1%, n=51), vulvar cancer (7.1%, n=31) and endometrial cancer (1.7%, n=35). No significant differences in incidence were found for different age groups, SES and between regions.

Conclusions
In the Netherlands, a clear drop in incidence was visible for all four types of gynaecological cancers during the first wave. However, due to the catch up in the second part of the year, there was no significant decrease in gynaecological cancer diagnoses in 2020.

Prostate cancer diagnosis, staging, and treatment in Sweden during the first year of the COVID-19 pandemic

Johan Styrke,[1] Giuseppe Fallara,[2,3] Fredrik Sandin,[4,5] Ingela Franck-Lissbrant,[6] Johan Ahlgren,[4] Ola Bratt,[7,8] Mats Lambe,[4] Pär Stattin[3]

[1]Department of Surgical and Perioperative Sciences, Urology and Andrology, Umeå University, Umeå, Sweden [2]Division of Experimental Oncology/Unit of Urology, URI, IRCCS Ospedale San Raffaele, Vita-Salute San Raffaele University, Milan, Italy [3]Department of Surgical Sciences, Uppsala University, Uppsala, Sweden [4]Regional Cancer Centre, Uppsala/Örebro, Uppsala University Hospital, Uppsala, Sweden [5]Department of Molecular Medicine and Surgery, Section of Urology, Karolinska Institutet, Stockholm, Sweden [6]Department of Oncology, Institute of Clinical Sciences, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden [7]Department of Urology, Institute of Clinical Science, The Sahlgrenska Academy, University of Gothenburg, Sweden [8]Department of Urology, Sahlgrenska University Hospital, Gothenburg, Sweden

Background
The COVID-19-pandemic strongly affected Sweden with a death toll tenfold higher than that of neighbouring countries. Consequently, much other health care was postponed. The aim was to describe the impact of the pandemic on prostate cancer diagnosis and treatment in Sweden during 2020.

Materials and Methods
The National Prostate Cancer Register of Sweden (NPCR) was used to compare the number of diagnoses and treatments in different ages and cancer risk categories in 2020 with the mean numbers in 2017-2019, as reported until 30th April of the year after each study period. Risk categories were defined as low/intermediate (T1-T2, Gleason score 6-7, PSA ≤ 20 ng/ml) or high risk/metastatic (all others).

Results
The number of prostate cancers was 15% lower in 2020 than in 2017-2019. The drop was more pronounced during the first (March-June) than the second wave (November-December) of the pandemic. Low/intermediate risk cancers dropped 19% and high risk/metastatic cancers 14%. The drop was 15% in men aged <70 years, 13% in men aged 70-74 years and 16% in men aged >75 years. The number of radical radiotherapy courses increased by 15% and the number of radical prostatectomies decreased by 10%. The median time from diagnosis to radical treatment decreased from 86 days in 2017-2019 to 77 days in 2020.

Conclusions
The number of diagnosed prostate cancers decreased but the number of curative treatments were unaffected in 2020 compared with the previous years. The decrease of diagnosed cancers was probably caused both by altered healthcare seeking behaviours and a national recommendation during the first wave to postpone investigations of men with a moderately raised PSA value and a clinically benign prostate. The increase in radiation therapy and decrease in surgical therapy could be explained by difficulties to perform surgery during the pandemic along with an increasing trend in radiation therapy since a few years in Sweden.

Excess mortality in a nationwide cohort of cancer patients during the COVID-19 pandemic in Belgium

Geert Silversmit,[1] Freija Verdoodt,[1] Nancy Van Damme,[1] Harlinde De Schutter,[1] Liesbet Van Eycken[1]

[1]Belgian Cancer Registry, Brussels, Belgium

Background
The impact of coronavirus infectious disease-19 (COVID-19) on cancer patients is often studied in a hospital setting and thus based on a frail subset of patients. In this study, we evaluate excess mortality in a nationwide prevalent cancer cohort during the first wave of the COVID-19 pandemic in Belgium.

Materials and Methods
Mortality was studied among almost 240 000 cancer patients, diagnosed during 2013-2018 and alive on January 1st, 2020. The observed number of deaths in the months January to June 2020 was compared with the expected number of deaths applying the monthly mortality rates observed in the cancer cohort during the previous years. To compare excess mortality during the COVID-19 pandemic in the cancer cohort and the general Belgian population, excess mortality rates from the latter were applied to the cancer cohort, stratified by age and sex.

Results
Mortality increased above expected levels in March and April 2020. In April, excess mortality peaked at 33% or around 400 excess deaths, coinciding with a peak of COVID-19 diagnoses in Belgium. A comparable number of excess deaths were estimated if the excess mortality rates from the general Belgian population were applied to the cancer cohort.

Conclusions
In a nationwide cancer cohort diagnosed between 2013 and 2018, considerable excess mortality was observed during the initial wave of the COVID-19 pandemic in Belgium. The pattern of excess mortality was, however, not markedly different from that observed in the general population. The results suggest that the susceptibility of this cancer cohort (diagnosed during 2013-2018) to COVID-19 induced mortality was comparable to the general population during the first wave of the pandemic.

Impact of the COVID-19 pandemic on incidence, stage, and treatment of head and neck cancer patients in The Netherlands

Rosanne C. Schoonbeek,[1] Dominique V.C. de Jel,[2,3] Boukje A.C. van Dijk,[1,4] Matthias A.W. Merkx,[4,5] Sabine Siesling,[4,6] Remco de Bree,[7] Robert P. Takes,[5] on behalf of the Dutch Head and Neck Society and the COVID and Cancer-NL consortium

[1]University Medical Centre Groningen, Groningen, The Netherlands [2]Dutch Institute for Clinical Auditing, Leiden, The Netherlands [3]Netherlands Cancer Institute/Antoni van Leeuwenhoek, Amsterdam, The Netherlands [4]Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands [5]Radboud University Medical Centre, Nijmegen, The Netherlands [6]University of Twente, Enschede, The Netherlands [7]University Medical Center Utrecht, Utrecht, The Netherlands

Background
Since the emergence of COVID-19, measures have been taken to restrict further spread, while hospitals had to change healthcare delivery to manage intensive care capacity. This impacted non-COVID care. Especially for head and neck cancer (HNC) patients, with fast growing tumours in a functional and aesthetic important area, timely treatment is essential. This study aims to quantify the impact of the COVID-19 pandemic on the HNC care in a centralised setting in the Netherlands.

Materials and Methods
This population-based study selected all first primary mucosal HNC patients diagnosed in January-June of 2018, 2019 and 2020 from the Netherlands Cancer Registry. Incidence, patient-, tumour- and treatment characteristics and time intervals were compared for the COVID-period in 2020 (March 15th and June 1st, 2020) and corresponding months in 2018 and 2019 (pre-COVID). Time-to-treatment interval (TTI) and care pathway interval (CPI) were defined as time from diagnosis (TTI) or first visit of a head and neck oncology centre (CPI) until start of first treatment.

Results
The number of patients decreased with almost a third (N = 433 in 2020 versus pre-COVID; N = 595 in 2019 and N = 598 in 2018). The incidence in April/May 2020 was significantly lower for patients with oral cavity and larynx carcinomas compared to pre-COVID. A shift in tumour stage or treatment modalities was not observed.

The median TTI was 30 days during the first COVID-19 wave versus 37 days pre-COVID ($p < 0.001$). Only 32% of patients started treatment more than 30 days after first consultation (CPI), compared to 51% pre-COVID ($p < 0.001$).

Conclusions
The significant decrease in incidence of HNC raises the question whether these patients will present later, and, if so, when and in which disease stage. For HNC patients diagnosed during the first lockdown, timely treatment could be facilitated, despite the overloaded healthcare system, probably because HNC care was prioritised in expertise centres.

The impact of the COVID-19 pandemic on cancer reporting rates in the nordic countries during 2020

Anna Johansson,[1,2] Siri Larønningen,[3] Charlotte Wessel Skovlund,[4] Marnar Fríðheim Kristiansen,[5] Janne Pitkäniemi,[6,7] Tomas Tanskanen,[6] Laufey Tryggvadóttir,[8] Giske Ursin,[1] Mats Lambe[2,9]

[1]Cancer Registry of Norway, Oslo, Norway [2]Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden [3]Department of Registration, Cancer Registry of Norway, Oslo, Norway [4]Danish Cancer Society, Copenhagen, Denmark [5]Center of Health Science, Thorshavn, Faroe Islands [6]Finnish Cancer Registry, Helsinki, Finland [7]School of Health Sciences, University of Tampere, Tampere, Finland [8]Cancer Registry of Iceland, Reykjavík, Iceland [9]Regional Cancer Center, Uppsala, Sweden

Background
While the COVID-19 pandemic has affected the healthcare systems in all Nordic countries, there have been marked differences across countries in the severity of the pandemic and containment strategies. In a joint Nordic effort, we aimed to quantify and compare patterns of cancer reporting in the Nordic countries during 2020.

Materials and Methods
Using information available in national and regional cancer registries in the Nordic region (Denmark, Finland, the Faroe Islands, Iceland, Norway and Sweden), we counted monthly numbers of reported pathology notifications of malignant and in-situ tumors from January to December, 2020. We compared the percentage change in the number of notifications per month in 2020 with the same month in 2019 (average of 2017-2019 for Iceland and the Faroe Islands). Additionally, we compared crude estimates of cancer cases based on the number of unique individuals that had pathology notifications of invasive tumors in the same month of 2020 and 2019. Country-specific analyses were performed and pooled at an aggregated level in one node (Norway).

Results
During the first six months of 2020, the number of malignant notifications and cases was reduced in all the Nordic countries, except for the Faroe Islands. The smallest reduction in numbers was reported in Iceland and the largest reduction in Sweden. Reporting was closer to normal levels during the second half of 2020, but did not fully compensate for the deficit early in the year. Similar patterns were observed in-situ tumors.

Conclusions
The COVID-19 pandemic affected rates of cancer reporting in all Nordic countries with the most pronounced reductions observed in Sweden, the country hardest hit by the pandemic. In all Nordic countries, observed temporal variations in the number of cancer notifications are likely to reflect societal restrictions, changes in healthcare-seeking behavior and screening activities, and may lead to a future increases in late-stage cancers.

The impact of the coronavirus disease 2019 on the diagnosis and treatment of cancer in northern Portugal

Samantha Morais,[1,2] Luis Antunes,[3] Jéssica Rodrigues,[3] Filipa Fontes,[1,2,4] Maria José Bento,[3,5] Tomas Tanskanen,[6] Nuno Lunet[1,2]

[1]EPIUnit–Instituto de Saúde Pública, Universidade do Porto [2]Departamento de Ciências da Saúde Pública e Forenses e Educação Médica, Faculdade de Medicina da Universidade do Porto [3]Grupo de Epidemiologia do Cancro (CI-IPOP), Instituto Português de Oncologia do Porto [4]Instituto Português de Oncologia do Porto [5]Instituto de Ciências Biomédicas Abel Salazar da Universidade do Porto

Background
Since the outbreak of the coronavirus disease 2019 (COVID-19), many healthcare settings implemented minimal services, with programmed activity, including routine and specialist appointments as well as elective procedures, being cancelled, postponed or replaced by telemedicine whenever possible. This study aims to quantify the impact of COVID-19 on the care of patients with cancer by comparing a period of four months after the outbreak began (2 March 2020) with an equal period from 2019.

Materials and Methods
This study includes data from Portuguese Oncology Institute of Porto (IPO-Porto), which is one of the largest cancer-dedicated hospitals in Portugal, receiving patients from any part of the country. Cancer cases of the oesophagus, stomach, colon and rectum, pancreas, lung, skin-melanoma, breast, cervix, prostate, non-Hodgkin lymphoma, and leukaemia, and diagnosed between 2 March and 1 July 2019 (before COVID-19) and 2020 (after COVID-19) were identified. Those with a first treatment outside IPO-Porto were excluded. Sociodemographic, clinical and treatment characteristics were obtained from the cancer registry and clinical files.

Results
The absolute number of new cancer cases decreased nearly 40% after the COVID-19 pandemic (from 1430 to 866). The largest decreases were observed for cervical (-74.3%) and prostate (-71.7%) cancers. Cases were more often diagnosed at more advanced stages in 2020 ($p=0.001$), and the proportion of patients not starting any treatment until 1 July was just under 20% in 2019 and nearly 40% in 2020. The median times from symptoms onset, first medical exam and first appointment to diagnosis, and from diagnosis to first appointment, multidisciplinary tumour board meeting and first treatment were shorter after COVID-19.

Conclusions
There was a notable overall decrease in cancer diagnoses after COVID-19, with changes in the characteristics of incident cases.

Cancer incidence trends in Estonian adolescents and young adults, 1970-2018

Keiu Paapsi,[1] Kaire Innos,[1] Aleksei Baburin,[1] Margit Mägi[2]

[1]Department of Epidemiology & Biostatistics, National Institute for Health Development, Tallinn, Estonia [2]Estonian Cancer Registry, National Institute for Health Development, Tallinn, Estonia

Background
This study was undertaken to describe the unique spectrum of cancers diagnosed among Estonian adolescent and young adult (AYA) population and to examine long-term incidence trends of 49 years.

Materials and Methods
Data on all malignant tumours, diagnosed in AYA aged 15 to 39 during 1970-2018, were derived from the Estonian Cancer Registry. Cancer sites were grouped as defined by the SEER AYA Site Recode/ WHO 2008 Definition based on ICD-O-3 topography and morphology. Age standardized (World) incidence rates were determined by age group, cancer site, and sex. Trends were examined with joinpoint regression analysis.

Results
Between 1970 and 2018, 11575 new cases of malignant cancer were diagnosed among AYA in Estonia. The overall age standardized incidence was 422.0 per million, with rates of 182.8 and 625.3 per million in the 15-24 and 25-39-year age groups, respectively. Lymphomas (28.7%) and carcinomas (15.6%) were the two most common cancers diagnosed in age group 15-24, which were replaced by carcinomas (51.0%) and melanomas and skin carcinomas (15.0%) at age 25-39. Gonadal germ cell tumours (10.4%) and breast cancer (18.5%) were the most common sex specific cancers. For all sites and ages combined, cancer incidence in AYAs increased significantly by 1.4% annually, increasing more in women (1.6% vs 1.2% in men). Change in annual percentage change was most prominent in gonadal germ cell tumours (4.7%) in the younger and in skin carcinomas (4.8%) in the older age group. A downward trend was seen for all subgroups of unspecified cancers.

Conclusions
The distinct range of cancers affecting AYA population and the steadily increasing incidence, most notably of cancers linked to environmental factors, highlight the need for targeted interventions, to raise awareness and reduce the burden of preventable cancers in this vulnerable age group. This comprehensive overview of Estonian AYA incidence from 1970 to 2018 provides an evidence-base for informed decisions to plan future AYA cancer control services.

Burkitt lymphoma: survival analysis, Poland, 1999-2020

Florentino Luciano Caetano dos Santos,[1] Irmina Maria Michalek,[1] Urszula Wojciechowska,[1] Joanna Didkowska,[1] Jan Walewski[2]

[1]Polish National Cancer Registry, Maria Sklodowska-Curie National Research Institute of Oncology, Warsaw, Poland [2]Department of Lymphoid Malignancies, Maria Sklodowska-Curie National Research Institute of Oncology, Warsaw, Poland

Background
Burkitt lymphoma (BL) is an aggressive B-cell lymphoma, primarily manifesting in extranodal locations. Since 2000, intensive therapy regimens have emerged as a powerful therapeutic prospect for BL patients. There is sparse research on BL patients' survival, deploying the whole national population. We estimated the survival of Polish BL patients diagnosed in 1999-2017, considering multiple covariates and periods to reflect changes in BL treatment.

Materials and Methods
We identified all BL patients registered in the Polish National Cancer Registry in 1999-2017. Observed survival (OS) was estimated with the life table method. Multivariate Cox proportional hazards regression model was fit to generate hazard ratios (HR) and the corresponding 95% confidence intervals (95% CI), describing the association between exposures (sex, age at the diagnosis, year of diagnosis, region of residence) and time-to-event (death). Two-sided log-rank test was applied to assess the significance of exposures.

Results
Overall, 937 BL cases were included (654 men, 283 women). Between 1999 and 2017, the 3-year OS changed from 56.0% (95%CI 50.4%-62.2%) to 73.8% (68.1%-80.0%; $P<0.001$), and the 5-year OS from 53.8% (48.2%-60.0%) to 73.0% (67.1%-79.3%; $P<0.001$). In the multivariate Cox proportional hazards regression, age at diagnosis was associated with the higher death risk, both in adolescents and young adults (HR 3.00, 95%CI 2.05-4.39, $P<0.001$) and adults age groups (HR 7.30, 95%CI 5.14-10.37, $P<0.001$). Also, compared with the earliest period, cases diagnosed between 2006-2014 and 2015-2017, had lower risk of death (HR 0.77, 95%CI 0.61-0.97, P 0.028; and HR 0.64, 95%CI 0.47-0.88, P 0.006, respectively).

Conclusions
In the years 1999-2017, the survival of Polish BL patients was systematically improving. The age at diagnosis influences the death hazard ratio most significantly, with the adults' group being at the highest risk of death.

Cure fraction and time to cure after cancer in Europe for 32 cancer types: results from the EUROCARE-5 study

Luigino Dal Maso,[1] Stefano Guzzinati,[2] Andrea Tavilla,[3] Sandra Mallone,[3] Laura Botta,[4] Diego Serraino,[1] Roberta De Angelis,[5] Silvia Francisci,[3] EUROCARE-5 Working Group

[1]Cancer Epidemiology Unit, Centro di Riferimento Oncologico (CRO), IRCCS, Aviano, Italy [2]Veneto Tumour Registry, Azienda Zero, Padua, Italy [3]National Center for Prevention and Health Promotion, Italian National Institute of Health (ISS), Rome, Italy [4]Evaluative Epidemiology Unit, Research Department, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy [5]Department of Oncology and Molecular Medicine, Italian National Institute of Health (ISS), Rome, Italy

Background

In a context of increasing numbers of people living after a cancer diagnosis (i.e., cancer prevalence), mounting evidence of cure has emerged for some cancers, though heterogeneous risks of recurrence or late effects still exist according to cancer type and host factors.

The study aims to estimate population-based indicators of cancer cure in Europe by type, sex, and age.

Materials and Methods

Data from 7.2 million cancer patients, diagnosed at ages 15-74 years in 1990-2007 with follow-up to 2008, from population-based cancer registries in 17 countries were extracted from the EUROCARE-5 study dataset. Mixture-cure models were used to estimate:

a) cure fraction (CF), as the proportion of patients with death rates equal to the general population;
b) time to cure (TTC), as the time to reach five-year conditional relative survival >95% (similar life expectancy of the general population);
c) median life expectancy of fatal (LEF) cases, those who die for their specific cancer.

Results

For patients diagnosed in 2000 at ages 15-74, the CF was 94% for testis, 87% for thyroid cancer in women (70% in men), 86% for skin melanoma in women (76% in men), 66% for breast, 63% for prostate, and <10% for liver, lung, and pancreatic cancers. TTC was <5 years for testis and thyroid cancer patients, <10 years for stomach, colorectal, corpus uteri, and melanoma patients, and >15 years for breast and prostate cancer patients. LEF ranged from 10 years for patients with chronic lymphocytic leukemia to <6 months for those with liver, pancreas, brain, gallbladder, and lung cancers.

Conclusions

These results may help to improve patients' care management. Moreover, they further document that a cure for several cancer types is possible. Such considerations lead to the 'right to be forgotten' law, adopted in France, Belgium, The Netherlands, and Luxembourg to help cancer survivors access to loans and insurance.

Details by period and age groups in Dal Maso et al, DOI:10.1093/ije/dyaa128.

Bridging information gaps on cancer survivors in Europe: results from the iPAAC Joint Action

Elena Demuru,[1] Silvia Rossi,[1] Leonardo Ventura,[2] Stefano Guzzinati,[3] Luigino Dal Maso,[4] Paolo Baili,[5] Manola Bettio,[6] Giorgia Randi,[6] Roberta De Angelis,[1] EUROCARE-6 Working Group

[1]Istituto Superiore di Sanità, Roma, Italy [2]Istituto per lo Studio, la Prevenzione e la Rete Oncologica (ISPRO), Firenze, Italy [3]Registro Tumori Veneto, Azienda Zero, Padova, Italy [4]Centro di Riferimento Oncologico (CRO) di Aviano, Italy [5]Fondazione IRCCS Istituto Nazionale dei Tumori, Milano, Italy [6]European Commission, Joint Research Centre (JRC), Ispra, Italy

Background
Cancer survivors are a growing population challenging the sustainability of public health systems in Europe. Despite accurate indicators are increasingly needed, cancer prevalence is not systematically available. The Joint Action 'Innovative Partnership for Action Against Cancer' (iPAAC) aims at bridging this gap relying on the EUROCARE-6 dataset.

Materials and Methods
Complete cancer prevalence is derived for 29 European countries (23 with national registration coverage) through the completeness index method from registries' observations up to the latest common index date (1st Jan 2013). Complete and limited duration prevalence are extrapolated to 2020 by linear regression based on the most recent 3-year trend. Projected estimates are validated against observed prevalence up to 2016 available from NORDCAN.

Results
On 1st Jan 2020 in the European population covered by the study (478 million), 22.7 million people are estimated to survive a past cancer diagnosis, 4.7% of the resident population. Similar results (21.4 million, 4.8%) are estimated for EU-27 countries (447 million). Cancer survivors are more frequently women (54%) and people over 65 (65%). From 2010 to 2020 prevalent cases increased by 46% (60% for the eldest over 75). The highest crude prevalence proportions in women are estimated for breast, colon-rectum, corpus uteri, skin melanoma and thyroid cancers (from 2.2% to 0.3%). Prostate, colon-rectum, bladder, skin melanoma and kidney cancers are the leading tumours among men (from 1.7% to 0.25%). Between-country differences are wide, consistently with varying demographic structure, incidence and survival patterns. Impact of long-term survivorship strongly depends on the disease lethality.

Conclusions
Cancer survivors are a growing and heterogenous population to be monitored in public health. Detailed and comparable indicators on cancer prevalence should be systematically integrated in the European Cancer Information System (ECIS) through improved collaborative efforts.

Trends in population-based cancer survival in Slovenia 1997-2016

Katarina Lokar,[1] Tina Žagar,[1] Sonja Tomšič,[1] Amela Duratović Konjević,[2] Nika Bric,[1] Branko Zakotnik,[1] Vesna Zadnik[1]

[1]Epidemiology and Cancer Registry, Institute of Oncology Ljubljana, Slovenia [2]Institute of Oncology Ljubljana, Ljubljana, Slovenia

Background
In 2020, the Slovenian Cancer Registry (SCR) concluded and published the fourth overall survival analysis of cancer patients in Slovenia. The aim of the study was to describe the survival of Slovenian cancer patients diagnosed in the last twenty years. An insight with clinicians' commentaries was given into the improvements of survival in different cancer types, population groups and prognostic factors.

Materials and Methods
The principal data source was the population-based SCR. The survival analysis included individual records for 192 533 patients diagnosed with cancer aged 0 to 94 in twenty-year period from 1997 to 2016 divided into four consecutive five-year periods. The analysis was stratified by 26 cancer types, gender, age and stage at diagnosis. The survival was estimated using net survival calculated by the Pohar-Perme method and the complete approach has been applied.

Results
The survival of Slovenian cancer patients is increasing over time. In the last 20 years the 5-year net survival increased by more than 11 percentage points (pp). Significantly higher growth was observed in men (17 pp) than in women (6 pp). Age and stage at diagnosis remain key factors for the survival of cancer patients. For both sexes, 5-year net survival has increased significantly over the past 20 years for three common cancers: colorectal cancer (14 pp), cutaneous melanoma (12 pp) and lung cancer (8 pp). There is significant progress of survival in the two most common gender specific cancers: breast cancer in women (10 pp) and prostate cancer in men (20 pp).

Conclusions
The presented study is the fourth comprehensive analysis on the survival of Slovenian cancer patients and shows the progress of Slovenian oncology and health care system in the last 20 years. To monitor the effectiveness of cancer management, the cancer burden needs to be regularly followed and reported also in the future. In this process a well-organized population-based cancer registries play a key role, which is already the case in Slovenia.

Exploring endometrial cancer treatment patterns and outcomes in Europe: an analysis with population-based cancer registry data

Francesco Giusti,[1] Carmen Martos,[1] Luciana Neamţiu,[1] Giorgia Randi,[1] Manuela Flego,[1] Tadeusz Dyba,[1] Raquel N. Carvalho,[1] Nadya Dimitrova,[1] Manola Bettio[1]

[1]European Commission, Joint Research Centre (JRC), Ispra, Italy

Background
While surgery (SG) is the main treatment for endometrial cancer (EC), optimal adjuvant options are debated. Radiotherapy (RT) and chemotherapy are evaluated in trials for specific groups (stage, grade, histology). Many cancer registries (CRs) gather treatment data, which can be used to assess care patterns at population level and assist clinical research.

Materials and Methods
Stage I-III ECs diagnosed in 1995-2014 from CRs contributing to the European Cancer Information System (ECIS) with stage and treatment data were analysed. Treatment type proportions and 10-year relative survival (RS) were calculated by period, stage, grade.

Results
157436 cases from 19 CRs in 11 countries were analysed. 58% of stage IA cases had SG, 32% SG+RT in 1995-1999; in 2010-2014 figures were 71% and 22%. Stage IB had 32% SG and 61% SG+RT in 1995-2014. SG was 27% in 1995-2014 for stage IIIA, SG+RT went from 51% in 1995-1999 to 34% in 2010-2014 and SG+RT+systemic therapy (ST) went from 8% to 25%. SG+RT was 36% and SG+RT+ST was 15% in 1995-2014 while SG went from 14% in 1995-1999 to 24% in 2010-2014. In stage IIIC SG was 23% in 1995-2014; SG+RT decreased from 37% to 30% and SG+RT+ST went from 15% to 26% between 1995-1999 and 2010-2014. SG and SG+RT RS was 93% in stage IA. For stage IB RS was 83% for SG+RT and 72% for SG. Stage I mortality risk was still higher than in the general population at after 10 years. RS was SG+RT+ST 60%, SG+RT 54%, SG 36% for stage IIIA, SG+RT+ST 39%, SG+RT 41%, SG 16% for stage IIIB, SG+RT+ST 44%, SG+RT 42%, SG 34% for stage IIIC. Stage I G1/2 RS was 92% for SG+RT and SG. Stage I G3 RS was 73% for SG+RT, 66% for SG. Stage III G1/2 RS was SG+RT+ST 68%, SG+RT 62%, SG 49%, while stage III G3 RS was SG+RT+ST 37%, SG+RT 35%, SG 18%.

Conclusions
An SG+RT+ST increase in stage III was observed. RT had a survival impact in stage IB and stage I G3. ST with SG+RT had 6% benefit in stage IIIA and stage III G1/2. CRs are a powerful tool to monitor care patterns in relevant risk subgroups.

Machine learning algorithm to estimate distant breast cancer recurrence at the population-level with administrative data

Hava Izci,[1] Gilles Macq,[2] Tim Tambuyzer,[2] Harlinde De Schutter,[2] Hans Wildiers,[1,3] Freija Verdoodt,[2] Patrick Neven[1,4]

[1]KU Leuven–University of Leuven, Department of Oncology, Leuven, Belgium [2]Belgian Cancer Registry, Research Department, Brussels, Belgium [3]University Hospitals Leuven, Department of General Medical Oncology, Leuven, Belgium [4]University Hospitals Leuven, Department of Gynaecological Oncology, Leuven, Belgium

Background
Exact numbers of breast cancer recurrences are currently unknown at the population-level, because they are challenging to actively collect. Previously, real-world data such as administrative claims have been used within expert- or data-driven (machine learning) algorithms for estimating cancer recurrence. In Belgium, reimbursement data of health insurance companies covering medical acts and medications, and hospital discharge data are available at the population-level, creating a unique setting to develop recurrence algorithms. We developed a machine learning algorithm to estimate breast cancer recurrence at the population-level using administrative data.

Methods
Data from patients diagnosed between 2009-2014 with breast cancer stage I-III were collected from medical files of University Hospitals Leuven (UHL). Recurrence was defined as distant metastases within 10 years after diagnosis, and follow-up was available until 31st of December 2018. In the course of an extensive data linking process, recurrence data was linked to administrative data. Potential features to detect recurrences were extracted from administrative data based on expert opinion from breast oncologists and subsequently selected using stepwise multivariable logistic regression. Based on the selected features, classification and regression tree (CART) analysis was performed for classifying patients as having a recurrence or not.

Results
A total of 2530 patients were included of whom 166 had a recurrence. After feature extraction and selection, 4 features were used to build the CART model. The performance of the model showed a sensitivity of 83.9%, specificity of 99.6%, positive predictive value of 94%, negative predictive value of 98.7%, accuracy of 98.4%, F1-score of 88.7% and AUC of 97.7%.

Conclusions
This is a first attempt which we will refine with clinicians and analyses. It will not cover all circumstances however, it will enable the better understanding and thus influence decision makers and service designers to recognise the group and provide services for them.

Population-based patient-reported outcomes after cancer treatment

Ylva Maria Gjelsvik,[1] Sophie Dorothea Fosså,[2] Tor Åge Myklebust,[1,3] Tom Børge Johannesen[1]

[1]Cancer Registry of Norway, Oslo, Norway [2]Oslo University Hospital, Oslo universitetssykehus HF, Oslo, Norway [3]Department of research and innovation, Møre and Romsdal Hospital Trust, Helse Møre og Romsdal HF, Ålesund, Norway

Background
Knowledge on post-treatment health outcomes (PTAHOs) assessed by Patient Reported Outcome Measures (PROMs) may guide cancer patients and doctors in treatment choice, especially for cancers with similar survival outcomes but different PTAHOs. Here we report initial findings in an unselected population based cohort of prostate cancer (PCa) patients undergoing radical prostatectomy (RP), definitive radiotherapy (RT) or following Active Surveillance (AS).

Materials and Methods
The Cancer Registry of Norway (CRN) invited all PCa patients (2017-2019) shortly after diagnosis to a 3-year longitudinal survey on their PTAHOs using EPIC-26. 57% completed the baseline questionnaire. PROMs data at baseline and the 1-year follow-up were linked with medical data from the CRN. EPIC-26 domain summary scores (DSSs) were calculated to examine the changes in the urinary continence (UCD), sexual (SD) and bowel (BD) domains.

Results
Among men with AS (n=325), there was no significant change in either domain. Men treated with RP (n=663) reported a lower UCD DSS (-20.1 points, $p<0.001$) as well as a lower SD DSS (-31.7 points, $p<0.001$), and to a lesser extent change in BD DSS (-2.0 points, $p<0.001$). Men who had undergone RT (n=658) reported lower SD DSS (-19.9 points, $p<0.001$) and BD DSS (-7.7 points, $p<0.001$), and to a lesser extent lower UCD DSS (-3.3 points, $p<0.001$), not accounting for start of hormone treatment. Within treatment groups, no significant differences emerged when comparing individual hospitals to country averages after adjusting for age at diagnosis and extent of the primary tumor (cT <3 vs. ≥ 3).

Conclusions
Our study shows that PROMs data can be collected by a cancer registry on a national basis and linked with medical data. This provides useful information for cancer patients and their doctors. The CRN now collects PROMs data regularly from patients with breast cancer, colorectal cancer, melanoma as well as PCa, and plans PROMs collections for lung cancer, gynaecologic cancer and lymphoma.

Social determinants of primary treatment in breast cancer patients in Estonia: a register-based study

Kaire Innos,[1] Fereshteh Shahrabi Faharani,[2] Keiu Paapsi[1]

[1]Department of Epidemiology & Biostatistics, National Institute for Health Development, Tallinn, Estonia [3]Department of Health Technologies, School of Information Technologies, Tallinn University of Technology, Tallinn, Estonia

Background
Breast-conserving surgery with adjuvant radiotherapy (BCS+RT) has been associated with better survival outcomes in women with early breast cancer (BC). The aim was to examine the social determinants of BCS+RT in BC patients in Estonia, using linkage of cancer registry data to administrative databases.

Materials and Methods
Estonian Cancer Registry provided data on women diagnosed with T1-2 No-2 BC in Estonia in 2007-2018. Surgical treatment and RT within 12 months of diagnosis were identified from cancer registry and Estonian Health Insurance Funds claims; sociodemographic characteristics from population registry. Poisson regression with robust variance was used to calculate univariate and multivariate prevalence rate ratios (PRR) with 95% confidence intervals (CI) for receipt of BCS+RT among patients age <70 years who underwent primary surgery, with age, period of diagnosis, prognostic group (T1No; T1N1; T1-2N2), and sociodemographic factors as covariates.

Results
Overall, of 4175 women included in the study, 2473 (59%) received BCS+RT. Multivariate regression analysis showed that compared to women with T1No BC, those with more advanced stage were less likely to receive BCS+RT. Receipt of BCS+RT was 30% higher in 2016-2018 than in 2007-2009. Use of BCS+RT was significantly lower for women aged 15-49 compared to age group 50-59 (PRR 0.88, 05% CI 0.83-0.95), and for women with the lowest level of education compared to the highest level (PRR 0.84, 95% CI 0.75-0.94). Region of residence, nationality and marital status were not associated with receipt of BCS+RT.

Conclusions
The study showed considerable increase in the use of BCS+RT in Estonia over the study period, which is in line with increases in available RT equipment. The lack of geographic variations suggests equal access to therapy for patients living in remote regions. However, educational level was significantly associated with receipt of BCS+RT, suggesting social barriers in access to care.

An updated electronic staging tool for population-based cancer registries: CanStaging+

Isabelle Soerjomataram,[1] Morten Ervik,[1] Colin Fox,[2] Sinead Lardner,[2] Abigail Jeyaray,[2] Kenneth Yeung,[2] Minal Solanki,[3] Joanne Aitken,[3] Freddie Bray,[1] Anna Gavin[2]

[1]International Agency for Research on Cancer, Lyon, France [2]Northern Ireland Cancer Registry, Belfast, Northern Ireland [3]Cancer Council Queensland, Brisbane, Australia

Background
While cancer staging is important for treatment planning and likely prognosis discussion with patients it is also important to facilitate monitoring of cancer outcomes at population level. Population-based cancer registries (PBCR) are key partners in assigning stage at diagnosis while adhering to internationally agreed, complex and regularly updated staging rules.

Materials and Methods
We developed a user-friendly electronic staging tool, CanStaging+, for PBCRs based on UICC TNM classifications for adult cancers and on Toronto Paediatric Cancer Stage guidelines for childhood cancers, publicly available both online and as an offline tool, which will be demonstrated during the presentation. We also assessed variations in staging data collection across PBCRs from submissions to Cancer Incidence in 5 continents.

Results
346 registries out of 464 (75%) reported having collected cancer staging information between 2008 and 2012. The proportion varied greatly by world region, with 96% of some North America and Europe registries reporting collecting any staging information to only 52% in Latin America and the Caribbean. The collection of staging data also varied by cancer site, being higher for breast and cervix and lower for lung cancer.

CanStaging+ with anatomical drawings is designed to help maximise availability, standardisation and comparability of cancer staging internationally. The tool provides automatic calculation of the international TNM staging classification editions 7 and 8 for a variety of tumour sites. CanStaging+ also provides the two-tiered approach of Toronto childhood cancer staging for various childhood cancer types. In addition it also hosts guideline for the Essential TNM including its diagram. In the future we aim to expand the tool to include translation in multiple languages.

Conclusions
We present an electronic, staging tool for cancer registries available on and offline to enhance the completeness and comparability of cancer staging internationally.

Survival of myeloid malignancies in France from 1989 to 2018 in general population: what's news?

Morgane Mounier & Marc Maynadie,[1,2] Zoé Uhry,[3,4] Alain Monnereau & Sebastien Orazio,[2,5,6] Xavier Troussard & Edouard Cornet,[2,7] Camille De Brauer,[8] Florence De Maria,[3] Nadine Bossard,[4,9] Brigitte Tretarre,[2,10,11] Gaëlle Coureau,[2,6,12] for French Network of Cancer Registries (FRANCIM)[2]

[1]Registre des Hémopathies Malignes de Côte-d'Or, CHU Dijon-Bourgogne, Inserm UMR INSERM 1231 SAPHIHR, Dijon, France [2]FRANCIM, Network of French Cancer Registries, Toulouse, France [3]Département des Maladies Non-Transmissibles et des Traumatismes, Santé Publique France, France [4]Hospices Civils de Lyon, Pôle Santé Publique, Service de Biostatistique-Bioinformatique, Lyon, France [5]Registre des Hémopathies Malignes de Gironde, Institut Bergonié, Bordeaux, France [6]EPICENE Team, Inserm U1219, Bordeaux Population Health, University of Bordeaux, France [7]Registre régional des hémopathies malignes de Basse-Normandie, CHU Caen-Normandie [8]Institut National du Cancer, Boulogne-Billancourt, France [9]Université de Lyon, Université Lyon 1, CNRS, UMR 5558, Laboratoire de Biométrie et Biologie Évolutive, Équipe Biostatistique-Santé, Villeurbanne, France [10]General Cancer Registry of Hérault, ICM, Montpellier, France [11]CERPOP, Université de Toulouse, Inserm, UPS, Toulouse, France [12]General Cancer Registry of Gironde, Public Health pole, University Hospital, Bordeaux, France

Background
With 14 236 new cases in 2018 in France and an incidence rate increasing for some subtype, updated survival for myeloid malignancies is essential to assess the curative actions of health system. We present for the first time, survival for new entity like myeloproliferative neoplasm BCR-ABL-negative subtype and long-term survival 20-year net survival (NS) for Acute Myeloid leukaemia (AML) and Chronic Myeloid Leukaemia (CML).

Materials and Methods
All myeloid malignancies diagnosed from 2003 (1989 for AML, CML) to 2015 in a French metropolitan area covered by a population-based registry were included. (Follow-up June 30, 2018). 9 myeloid subtypes (5 majors and 4 subtypes) were defined according to the ICD-O-3. NS at 1, 5, 10 and 20-year (for AML,CML) was estimated using a novel approach based on multidimensional penalized splines to model simultaneously complex effect of covariables on the excess mortality rate (EMR) allowing to visualize survival trends over age and year of diagnosis. (R software, package survPen.)

Results
A third of myeloid malignancies diagnosed between 2010 and 2015 had a favorable prognosis at 5-year, 43% had an intermediate prognosis, 24% were defavorable. Age-standardized-NS at 5-year varied from 27% to 93% respectively for AML and Polycythaemia vera (PV). Prognosis for PV, and Essential Thrombocythaemia (ET) was favorable whatever the age at diagnosis while for Primary myelofibrosis, survival decreased after 60-years-old. The largest survival improvement was observed for CML (+42% from 1990 to 2015). Despite a survival increase in youngest patients after 2005, older AML patients keep the poorer prognosis. Since 2005, no improvement was observed for CMML or Myelodysplastic syndrome survival which remain low whatever ages.

Conclusions
This last update of survival allows to visualize the impact of progress in Myeloid malignancies management in general population and highlight profiles that need urgently improvement such as AML.

The ICBP: the importance of international collaboration in addressing areas of cancer control to improve outcomes

Harriet Hall,[1] Mathura Vithyananthan,[1] Charlotte Lynch,[1] Ellen Nolte,[2] Georgios Lyratzopoulos,[3] Sean McPhail,[4] Samantha Harrison[1]

[1]Cancer Research UK, London, UK [2]London School of Hygiene & Tropical Medicine, London, UK [3]University College London, London, UK [4]Public Health England, Wellington House London, UK

Background
The current pandemic emphasises how data and its translation into intelligence is vital for understanding and addressing areas of need within healthcare. The International Cancer Benchmarking Partnership (ICBP) is a unique partnership which quantifies and triangulates international differences in key cancer metrics–incidence, mortality, survival and stage at diagnosis–and explores factors influencing observed variations. We now highlight emerging data exploring differences in health system structures and cancer patient pathways, with commentary on how findings might explain cancer outcome differences. The session will consolidate 12 years of research and impact work and highlight successes and challenges in communicating cancer data to influence policy and practice.

Materials and Methods
The ICBP employ various methods, including novel data linkage and analysis exploring patient pathways, key informant interviews with cancer control stakeholders, and outcome analysis by International Agency for Research on Cancer. Policy impacts are derived from semi-structured interviews with 17 Programme Board members from Denmark, Norway, the United Kingdom (Northern Ireland, Wales, Scotland), Australia, Canada, New Zealand.

Results
International variation exists in health system structures, and in configuration and movement through cancer patient pathways. We will report on emerging findings from novel cancer data linkage work, and in-depth qualitative work. Impacts will be crystallised and presented, with line of sight on what outcomes may have improved as a result.

Conclusions
International differences in cancer outcomes persist, but our understanding of drivers of variation is growing. Narrowing cancer differences internationally requires a multi-pronged, multi-disciplined approach. Findings from the ICBP provide evidence on areas of need as well as recommendations for effective cancer data communication and visualization.

Comparing explainable machine learning for breast cancer survival prediction using registry data

Foppe Crezee,[1,2] Marissa C. van Maaren,[2,3] Mathijs P. Hendriks,[2,4] Sabine Siesling,[2,3] Annette ten Teije,[1] Arturo Moncada-Torres[2]

[1]Department of Computer Science, Vrije Universiteit Amsterdam, The Netherlands [2]Department of Research and Development, Netherlands Comprehensive Cancer Organization (IKNL), Eindhoven, The Netherlands [3]Department of Health Technology and Services Research, Technical Medical Centre, University of Twente, Enschede, The Netherlands [4]Department of Medical Oncology, Northwest Clinics, Alkmaar, The Netherlands

Background
It has been shown that machine learning (ML) tools can be great complements to traditional statistical analyses for predictions based on oncological registry data. Unfortunately, they are often disregarded due to their black-box approach. This makes it difficult to understand how the models obtain their estimates. This is particularly important in clinical adaptation and implementation by medical professionals, where decision-making processes need to be well documented for follow-up treatment and transparent to the clinician as well as to the patient.

Materials and Methods
In this study, we used data from the Netherlands Cancer Registry containing patients that were diagnosed with non-metastatic breast cancer between 2005 and 2015 who received at least one surgical intervention as treatment. We predicted ranked survival using a multiple Cox Proportional Hazards (CPH) model. Then, we compared its performance with state-of-the-art ML-based methods using Harrell's concordance index . Finally, we used Shapley Additive exPlanations (SHAP) values to generate an explicit knowledge representation of the models' performance differences.

Results
Preliminary results showed that the performance of ML-based models can be at least comparable to that of classical survival analysis methods, such as the CPH model. More importantly, ML models were capable of capturing non-linearities and interaction effects present in the data out-of-the-box. Additionally, SHAP values allowed us to explain how the models reached their output, quantifying how much a particular feature (and its values) contributed to the models' predictions.

Conclusions
In this study, we showed that ML-based techniques can be attractive alternatives to the classical methods used in research based on cancer registry data. Moreover, adding an explainability layer and making their predictions more humanly interpretable has the potential to bridge the gap between ML models and clinics.

Differences in tumor characteristics and the net survival of women diagnosed with different breast tumors

Nena Karavasiloglou,[1,2] Eleftheria Michalopoulou,[1,2] Manuela Limam,[1,2] Dimitri Korol,[2] Miriam Wanner,[1,2] Sabine Rohrmann[1,2]

[1]Division of Chronic Disease Epidemiology, Institute for Epidemiology, Biostatistics and Prevention, University of Zurich, Zurich, Switzerland [2]Cancer Registry of the Cantons of Zurich, Zug, Schaffhausen, and Schwyz, University Hospital Zurich, Zurich, Switzerland

Background
The incidence of breast cancer in situ (BCIS) has been increasing in the past decades; however, the prognosis of BCIS patients has not been investigated extensively. We aimed to compare the characteristics of invasive breast tumors preceded by BCIS with those that were not and to estimate the 5-year net survival of patients diagnosed with different breast tumors.

Materials and Methods
Women diagnosed with different (BCIS, invasive) breast tumors between 2003 and 2016 were included in our study. We compared the characteristics of invasive breast tumor characteristics descriptively. The nonparametric Pohar Perme estimator was used for the net survival analyses within a relative survival framework.

Results
Invasive breast tumors preceded by a BCIS were more frequently detected via breast cancer screening, at an earlier stage and had less missing information in tumor-specific variables compared to tumors not preceded by a recorded BCIS. BCIS patients had a 5-year net survival of 1.02 (95% confidence interval [CI]: 1.01-1.03). Among patients diagnosed with invasive breast cancer, those without a previously recorded BCIS had a 5-year net survival of 0.89 (95% CI: 0.88-0.90), whereas those diagnosed first with BCIS and then with invasive breast cancer had a 5-year net survival of 0.92 (95% CI: 0.85-1.01). We detected some differences when stratifying these analyses by the age at diagnosis and the stage of the invasive breast tumor.

Conclusions
Invasive breast tumors preceded by a recorded BCIS showed more favorable tumor characteristics compared to tumors that were not. The 5-year net survival of patients with different breast tumors was overall good, with small differences detected based on the tumor diagnosed, age, and stage. Future studies should further assess the survival of BCIS patients and investigate factors linked with more favorable breast cancer-specific survival outcomes.

Bayesian kernel machine regression for estimating prostate cancer risk of heavy metal mixtures in the EPIC-Spain cohort

Karen dos Santos Gonçalves,[1] Miguel Rodríguez Barranco,[2,3,4] José Juan Jiménez Moleón,[3.4.5] José Luis Gómez Ariza,[6] Nicolás Francisco Fernández Martínez,[7,8] María José Sánchez Pérez[2,3,4,5]

[1]National School of Public Health, Oswaldo Cruz Foundation–ENSP/FIOCRUZ, Rio de Janeiro, Brazil [2]Escuela Andaluza de Salud Pública (EASP), Granada, Spain [3]Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain [4]Centro de Investigación Biomédica en Red de Epidemiología y Salud Pública (CIBERESP), Madrid, Spain [5]Departamento de Medicina Preventiva y Salud Pública, Universidad de Granada, Granada, Spain [6]Departamento de Química, Facultad de Ciencias Experimentales, Universidad de Huelva, Huelva, Spain [7]Unidad de Gestión Clínica Interniveles de Prevención, Promoción y Vigilancia de La Salud, Hospital Universitario Reina Sofía, Córdoba, Spain [8]Instituto Maimónides de Investigación Biomédica de Córdoba (IMIBIC), Córdoba, Spain

Background
The association of the exposure to several heavy metals with prostate cancer risk has been assessed in some studies, but the effects of complex interactions between heavy metals remains unclear. We aim to examine the association between metal mixtures exposure and prostate cancer risk in the European Prospective Investigation into Cancer and Nutrition cohort.

Materials and Methods
The concentrations of 8 heavy metals (As, Cd, Cu, Hg, Se, V, W, Zn) was assessed in serum samples of 304 males from EPIC-Granada cohort (62 prostate cancer cases and 242 controls) by means of ICP-ORS-MS. We applied a Bayesian kernel machine regression distributed lag models (BKMR-DLM) to estimate the association between log-centered serum metal concentrations with prostate cancer risk adjusted by potential confounders. BKMR-DLM were used to account for nonlinear, interactive, joint metal effects and time varying cumulative effect of heavy metals mixture exposures.

Results
Four heavy metals (W, Cu, Hg, V) were significantly and positively associated with prostate cancer risk in the adjusted models for age, education, physical activity, waist-to-hip ratio, body mass index, dietary patterns, smoking, and alcohol drinking habits. Using BKMR-DLM analysis, the mixture V+Hg+Cu combined with another metal (As, Zn or Cd) showed the higher associations with prostate cancer risk (RR from 1.59 to 1.46). The mixture V+Hg had also positive significant association in combination with Cd, Zn, As or Se. The overall mixture of 8 metals was also significantly associated with the prostate cancer risk (RR=1.40; 95% CI: 1.36 to 1.45).

Conclusions
In summary, we found positive associations between the serum levels of four metals and prostate cancer risk using BKMR-DLM models. The overall mixture concentrations was also associated with increased prostate cancer risk. Future studies are warranted to validate these findings in other prospective studies.

Exploring cancer outcomes in Norther Ireland: the association between cancer mortality and pre-existing heart disease

Ciaran O'Neill,[1] David Donnelly,[2] Therese Kearney,[1] Gerard Walls,[3] Mark Harbinson,[4] Anna Gavin[2]

[1]Centre for Public Health, Queens University Belfast, UK [2]Northern Ireland Cancer Registry, UK [3]Patrick G. Johnston Centre for Cancer Research, Queen's University Belfast, Belfast, UK [4]School of Medicine, Dentistry and Biomedical Sciences, Queens University Belfast, UK

Background
While cancer outcomes have improved over time, in Northern Ireland they continue to lag behind those of many other developed economies. The role of co-morbid conditions has been suggested as a potential contributory factor in this but issues of data comparability across jurisdictions has inhibited efforts to explore relationships. We use data from a single jurisdiction–the Northern Ireland Cancer Registry–where consistent coding operates, to examine the association between mortality (all-cause and cancer specific) and pre-existing heart disease among patients with cancer.

Materials and Methods
All patients diagnosed with cancer (excluding non-melanoma skin cancer) between 2011 and 2014 were identified from Registry records. Those with a pre-existing diagnosis of heart disease were identified by record linkage using ICD10 codes. Survival in the five years following diagnosis was examined using descriptive statistics and Cox proportional hazards regression analyses. Analyses examined all-cause mortality and cancer specific mortality for lung, colorectal, breast and prostate cancer. As well as heart disease, regression models controlled for a range of covariates.

Results
Almost 35000 incident cases of cancer were diagnosed during the study period of which approximately 23% had a prior heart condition. The pan-cancer hazard ratio for death in the presence of pre-existing heart disease was 1.28 (95% CI 1.18-1.40). All-cause and cancer specific mortality was higher for patients with heart disease across lung, female breast, prostate and colorectal cancer groups after controlling for the various covariates.

Conclusions
Pre-existing morbidity may compromise patient resilience to cancer and limit the range of available treatments. In this Northern Irish cohort, patients with cancer and pre-existing heart disease had poorer outcomes than those without heart disease. A high prevalence of heart disease may contribute to poorer cancer outcomes at a national level.

Socioeconomic inequalities in colorectal, lung, and breast cancer incidence in Spain

Daniel Redondo-Sánchez,[1,2,3] Rafael Marcos-Gragera,[2,4,5] Marià Carulla,[6,7] Arantza Lopez de Munain,[8] Consol Sabater Gregori,[9] Rosario Jiménez Chillarón,[10] Marcela Guevara,[2,11,12] María-José Sánchez,[1,2,3,13] Miguel Ángel Luque-Fernández,[1,2,3] DESOCANES-HiReSIC Working Group[1,2,3,4,5,6,7,8,9,10,11,12,13,14]

[1]Instituto de Investigación Biosanitaria de Granada, Non-communicable Disease and Cancer Epidemiology Group, ibs.GRANADA, Granada, Spain [2]Consortium for Biomedical Research in Epidemiology and Public Health (CIBER Epidemiología y Salud Pública, CIBERESP), Madrid, Spain [3]Andalusian School of Public Health, Granada, Spain [4]Epidemiology Unit and Girona Cancer Registry, Oncology Coordination Plan, Department of Health, Autonomous Government of Catalonia, Catalan Institute of Oncology, Girona, Spain [5]Descriptive Epidemiology, Genetics and Cancer Prevention Group, Biomedical Research Institute (IDIBGI), Girona, Spain [6]Tarragona Cancer Registry, Cancer Epidemiology and Prevention Service, Hospital Universitari Sant Joan de Reus, Reus, Spain [7]Pere Virgili Health Research Institute (IISPV), Reus, Spain [8]Basque Country Cancer Registry, Health Department, Basque Government, Vitoria-Gasteiz, Spain [9]Castellón Cancer Registry, Comunitat Valenciana Cancer Information System, Department of Health, Autonomous Government of Comunitat Valenciana, València, Spain [10]Registro de Cáncer de Cuenca, Cuenca, Spain [11]Navarra Public Health Institute, Pamplona, Spain [12]IdiSNA, Navarra Institute for Health Research, Pamplona, Spain [13]Department of Preventive Medicine and Public Health, University of Granada, Granada, Spain [14]Cancer and Environmental Epidemiology Unit, National Center for Epidemiology, National Institute of Health Carlos III Madrid, Spain

Background
Socioeconomic inequalities in cancer incidence are not well documented in Southern Europe. We aim to study the association between socioeconomic status (SES) and incidence for colorectal, lung, and breast cancers in Spain.

Materials and Methods
We conducted a multilevel study using data from Spanish population-based cancer registries. We included incident cancer cases diagnosed for the period 2010-2013 in nine Spanish provinces. We used Poisson mixed-effects models, including the census tract as a random intercept, to derive cancer incidence rate ratios by SES adjusted for age and calendar year. We calculated and mapped the cancer incidence smoothed rates adjusted by SES and age.

Results
Male adults with the lowest SES compared to those with the highest SES showed a borderline-significant increased risk of lung cancer of 18% (risk ratio -RR-: 1.18 95% CI: 0.94-1.46) but showed a 16% reduced risk of colorectal cancer (RR: 0.84, 95% CI: 0.74-0.97). Female adults with the lowest SES compared to those with the highest SES showed strong evidence of lower breast cancer incidence with 24% decreased risk (RR: 0.76, 95% CI: 0.68-0.85). Among females, we did not find evidence of an association between SES and lung or colorectal cancer.

Conclusions
The associations found between SES and cancer incidence in Spain are consistent with those obtained in other European countries. Understanding the reasons behind the association between cancer incidence and SES could help develop appropriate public health programs to promote health and reduce socioeconomic inequalities in cancer incidence in Spain.

Cardiovascular disease prevalence in patients diagnosed with six curable tumours: a VICORI national registry analysis

Catherine A. Welch,[1] Nicolò Matteo Luca Battisti,[2,3] Mark DeBelder,[4] John Deanfield,[5] Clive Weston,[6,7] Michael D. Peake,[8,9] Michael Sweeting,[1] David Adlam,[10,11] Alistair Ring,[2,3] Virtual Cardio-Oncology Research Initiative (VICORI)

[1]Biostatistics Research Team–Department of Health Sciences University of Leicester, UK [2]Breast Unit–Department of Medicine, The Royal Marsden NHS Foundation Trust, Sutton, London, UK [3]Breast Cancer Research Division, The Institute of Cancer Research, Sutton, London, UK [4]National Institute for Cardiovascular Outcomes Research, Barts Health NHS Trust, London, UK [5]Institute of Cardiovascular Sciences, University College London, London, UK [6]Myocardial Ischaemia National Audit Project, School of Medicine, Swansea University, Institute of Life Science 2, Sketty, Swansea, UK [7]Glangwili General Hospital, Carmarthen, UK [8]Cancer Division, University College London Hospitals, London, UK [9]University of Leicester, Leicester, UK [10]Cardiovascular Biomedical Research Unit–Leicester NIHR Biomedical Research Centre–Department of Cardiovascular Sciences, University of Leicester, Leicester, UK [11]University Hospitals of Leicester NHS Trust, Leicester, UK

Background
Cardiovascular disease (CVD) in cancer patients may explain outcomes disparities. However, its prevalence in cancer patients is unknown. We describe CVD prevalence in adults with curable tumours and investigated factors associated with CVD.

Materials and Methods
From the UK National Cancer Registration and Analysis Service we retrieved data on patients with curable stage I-III breast cancer (BC), stage I-III colon/rectal cancer (CC/RC), stage I-III prostate cancer (PC), stage I-IIIA non-small cell lung cancer (NSCLC), stage I-IV diffuse large B cell lymphoma (DLBCL) and stage I-IV Hodgkin lymphoma (HL) in England in 2013-2018.

We identified hospitalised CVD diagnoses from Hospital Episode Statistics (HES) and National Institute for Cardiovascular Outcomes Research (NICOR) datasets up to 5 years prior to cancer diagnosis. We investigated CVD rates in tumour cohorts and evaluated the impact of patient and disease characteristics on its prevalence using logistic regression analysis to find association between CVD prevalence and cancer site after adjustment.

Results
Among 634240 patients included, 104035 (16.2%) had CVD. Men, older patients and those with higher CCI, more advanced stage cancer or higher IMD had higher rates of CVD. Prevalence was highest for NSCLC (36.1%) and lowest for BC patients (7.7%). After adjustment for age, sex, IMD and CCI, compared to BC patients CVD remained higher in NSCLC (OR 3.06, 95% CI 2.98, 3.14), RC (OR 1.86, 95% CI 1.79, 1.94), CC (OR 1.64, 95% CI 1.60, 1.68), PC (OR 1.82, 95% CI 1.68, 1.97), DLBCL (OR 1.26, 95% CI 1.22, 1.31) and HL (OR 1.01, 95% CI 0.98, 1.04). NSCLC patients had the highest prevalence of individual CVD categories.

Only 230 additional CVD diagnoses not included in HES were retrieved from the NICOR datasets (0.2%).

Conclusions
The co-existence of cancer and CVD is significant and this should be considered when interpreting cancer outcomes. HES has a good coverage of CVD diagnoses compared with NICOR datasets.

Geographical variation in brain and CNS tumor incidence: a comparison between a middle-income and a high-income country

Miriam Wanner,[1,2] Sabine Rohrmann,[1,2] Dimitri Korol,[1,2] Nino Shenglia,[3] Teimuraz Gigineishvili,[3] David Gigineishvili[3]

[1]Cancer Registry Zurich, Zug, Schaffhausen and Schwyz, Institute of Pathology and Molecular Pathology, University Hospital Zurich, Zurich, Switzerland [2]Epidemiology, Biostatistics and Prevention Institute, University of Zurich, Zurich, Switzerland [3]Department of Neurology & Neurosurgery, Tbilisi State University, Tevdore Mgvdlis 13 B, Tbilisi, Georgia

Background
There is large variability in reported incidence rates of primary brain/CNS tumors across the world, with mostly higher rates in higher-income countries. The aim of this study was to compare malignant and benign brain/CNS tumor incidence between Georgia, a lower middle-income country, and Zurich (Switzerland), a high-income country.

Materials and Methods
For the three-year period from March 2009 to February 2012, we included the following tumors based on topography according to ICD-O3: C70.0-C72.9, and C75.1 (pituitary gland). Data were categorized into histology groups based on the WHO 2007 histological classification. Age-standardized rates per 100 000 person-years were calculated by subgroups.

Results
We included 1476 and 1104 cases of primary brain/CNS tumors for Georgia and Zurich, respectively. Mean age of patients was significantly lower in Georgia compared to Zurich (50.0 versus 58.3 years). The percentage of women was similar (57.7% in Georgia, 57.4% in Zurich). Overall age-standardized incidence rates for malignant and benign brain/CNS tumors were 10.5 per 100 000 person-years (95% CI 9.9-11.0) for Georgia and 23.3 (95% CI 21.9-24.7) for Zurich. The ratio of benign to malignant tumors was 1.656 for Georgia and 1.946 for Zurich. Overall incidence rates were higher in women (10.5 versus 9.2 in Georgia, 25.3 versus 21.1 in Zurich), although this difference was only significant in Zurich. The most frequent histology types were meningiomas in both regions (around 40%), followed by pituitary tumors in Georgia and glioblastomas in Zurich.

Conclusions
Age-adjusted incidence rates of brain/CNS tumors were considerably lower in Georgia compared to Zurich, both for benign and malignant tumors. This is in line with other studies reporting higher rates in high-income than in low- and middle-income countries. The frequency distribution may be related to differences in diagnosing techniques and the population age structure.

An aggregated comorbidity measure based on the history of filled drug prescriptions

Rolf Gedeborg,[1] Malin Sund,[2] Mats Lambe,[3] Anna Plym,[3,4,5] Irma Fredriksson,[6,7] Johan Syrjä,[1] Lars Holmberg,[1,8] David Robinson,[9] Pär Stattin,[1] Hans Garmo[1,8,10]

[1]Department of Surgical Sciences, Uppsala University, Uppsala, Sweden [2]Department of Surgery and perioperative sciences/Surgery, Umeå University, Umeå, Sweden [3]Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden [4]Urology Division, Department of Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA [5]Department of Epidemiology, Harvard T. H. Chan School of Public Health, Boston, Massachusetts, USA [6]Department of Molecular Medicine and Surgery, Karolinska Institutet, Stockholm, Sweden [7]Department of Breast-, Endocrine tumors and Sarcoma, Karolinska University Hospital, Stockholm, Sweden [8]Translational Oncology and Urology Research (TOUR), King's College London, Guy's Hospital, London, UK [9]Department of Urology, Ryhov Hospital, Jönköping, Sweden [10]Regional Cancer Center, Uppsala/Örebro, Uppsala University Hospital, Uppsala, Sweden

Background
The accuracy of estimated survival probability in cancer populations could be improved by using a drug comorbidity index (DCI) based on filled drug prescriptions.

Materials and Methods
We created a DCI from age-stratified univariable associations between Anatomical Therapeutic Chemical (ATC) codes for filled prescriptions and survival in 326 450 males randomly selected from the general population as controls to males with prostate cancer. The DCI was also applied to 272 214 females randomly selected from the general population as controls to females with breast cancer.

Results
While 73% were categorized as free of comorbidity according to the Charlson comorbidity index (CCI), 84% had received at least one prescription during the year before the start of follow-up. These men tended to be older and had a lower educational status. Receiving at least one prescription was associated with a 60% increase in mortality rate (HR = 1.60, 95% CI 1.56 to 1.64) than not receiving any prescription.

The DCI predicted survival better than the CCI and a previously published prescription index during 11 years of follow-up. The C-index for the DCI was 0.73 in males and 0.76 in females, as compared to a C-index of 0.67 in males and 0.69 in females for the CCI. In men aged 75-84 years with CCI = 0, the median survival time was 7.1 years (95% confidence interval (CI) = 7.0 to 7.3) in the highest DCI quartile. Comparing the highest to the lowest DCI quartile resulted in a hazard ratio (HR) of 2.2 among men (95% CI: 2.1 to 2.3) and an HR of 2.4 among women (95% CI: 2.3 to 2.6).

Conclusions

A new DCI based on filled drug prescriptions improved prediction of survival beyond that of age and the CCI. This will allow more accurate baseline estimation of expected survival time for comparisons of treatment outcomes and evaluation of treatment guidelines in cancer populations where baseline comorbidity is of importance.

Topic: Cancer control CC01_Zamagni

Decreasing thickness and enhanced therapy have both contributed to the 2010s increase in survival from melanoma in italy

Federica Zamagni,[1] Lauro Bucchi,[1] Silvia Mancini,[1] Emanuele Crocetti,[1] Luigino Dal Maso,[2] Stefano Ferretti,[3] Ignazio Stanganelli,[4] Fabio Falcini,[1,5] and the AIRTUM Working Group A

[1]Romagna Cancer Registry, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy [2]Cancer Epidemiology Unit, Centro di Riferimento Oncologico di Aviano (CRO) IRCCS, Aviano, Italy [3]Romagna Cancer Registry, section of Ferrara, Local Health Authority, and University of Ferrara, Ferrara, Italy [4]Skin Cancer Unit, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy [5]Cancer Prevention Unit, Local Health Authority, Forlì, Italy

Background
This study aimed to determine the relative role that the improvement in tumour thickness has played in the favourable trend in survival from cutaneous malignant melanoma (CMM) in Italy over the last two decades.

Materials and Methods
Eleven local cancer registries, covering a population of 8 056 608 (13.5% of the Italian population) on 1 January 2010, provided data for primary CMM cases registered between 2003 and 2017. Age standardized 5-year net survival (NS) was calculated. Multivariate analysis of 5-year NS was done by calculating the relative excess risk of death (RER). The relative contribution of the decrease in tumour thickness to the trend in RER was evaluated with a forward stepwise Poisson regression model.

Results
Over the study period as a whole, tumour thickness was inversely associated with 5-year NS and multivariate RER in both genders. The median tumour thickness was 0.90 mm in 2003-2007, 0.85 mm in 2008-2012 and 0.75 mm in 2013-2017 among men, and 0.78 mm, 0.77 mm and 0.68 mm among women. The 5-year NS was 89.4%, 90.7% and 95.2% among men and 92.9%, 93.5%, and 95.2% among women, respectively. For both genders, the increasing survival trend was more pronounced with increasing tumour thickness. For men, the inclusion of tumour thickness into the forward stepwise Poisson regression model made the RER in 2013-2017 versus 2003-2007 to increase from 0.64 (95% confidence interval, 0.46-0.90) to 0.72 (0.56-0.93). A sensitivity analysis confirmed this finding. For women, the results were not significant. With multiple imputation of missing tumour thickness values, however, the RER rose from 0.74 (0.58-0.94) to 0.82 (0.66-1.03).

Conclusions
The marked decrease in tumour thickness accounted for 25-30% of the improvement in survival observed in 2013-2017. The introduction of immunotherapy and targeted therapy in the last decade is the most likely explanation for the remaining component.

Topic: Cancer control CC02_Tomšič

70 years of Slovenian Cancer Registry

Sonja Tomšič,[1] Katarina Lokar,[1] Amela Duratović Konjević,[2] Vesna Škrbec,[2] Frančiška Škrlec,[1] , Tina Žagar,[1] Nika Bric,[1] Vesna Zadnik[1]

[1]Slovenian Cancer Registry, Institute of Oncology Ljubljana, Ljubljana, Slovenia [2]Public Relations, Institute of Oncology Ljubljana, Ljubljana, Slovenia

Background

Slovenian Cancer Registry (SCR) was founded in 1950 at the Institute of Oncology Ljubljana and is one of the oldest population-based cancer registry in the world. Visionary leadership and devoted work of all employees has made SCR a reputable professional institution.

Materials and Methods

In 2020 as a part of its 70th anniversary SRC prepared an overview of its development in a brochure, a short video and an interactive timeline (available at www.onko-i.si/rrs).

Results

The main aim of SRC is to compile and make complete, accurate, and timely data available to a wide range of users. The collection of data has developed from manual manipulation, through a semi-automated system (punch cards), to a modern computerized database, which enables an online connection to state administrative databases and constant availability of data via an interactive web portal. SCR has evolved from a registry with passive registration to a registry with active registration and established clinical cancer registries for main cancers sites.

Since 1950, it produces regular annual reports (also in English) and various in-depth analyses at the initiative of clinicians, cancer epidemiologists or the civil society. This work has led to some innovative methodological approaches that have become internationally recognised.

Its directors recognised the benefits of international collaboration early on. SCR has been a member of International Association of Cancer Registries (IACR) since its founding. It is also a member of the European Association of Cancer Registries (ENCR) and participates in different international projects.

Conclusions

SCR is one of the oldest population-based cancer registry in the world. With its keen and professional work, it has been an important part of the international society, but foremost it has played an important role on the national level. For example, in the current COVID-19 epidemic it provided the evidence for keeping cancer control activities up and running.

Topic: Cancer control CC03_Rodríguez-Barranco

Evaluation of the effectiveness of the breast cancer screening programme in south Spain through a population-based cancer registry

Miguel Rodríguez Barranco,[1,2,3] Óscar Mendoza García,[1] Pilar Carrasco Rodríguez,[4] Patricia Ferre Curtido,[5] Maria José Molina,[6] María José Sánchez Pérez[1,2,3,7]

[1]Escuela Andaluza de Salud Pública (EASP), Granada, Spain [2]Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain [3]Centro de Investigación Biomédica en Red de Epidemiología y Salud Pública (CIBERESP), Madrid, Spain [4]Área de Gestión Sanitaria Sur de Granada, Servicio Andaluz de Salud, Motril, Spain [5]Área de Gestión Sanitaria Nordeste de Granada, Servicio Andaluz de Salud, Baza, Spain [6]Distrito Sanitario Granada-Metropolitano, Servicio Andaluz de Salud, Granada, Spain [7]Departamento de Medicina Preventiva y Salud Pública, Universidad de Granada, Granada, Spain

Background

Population-based screening programmes (SP) are the most important tools for secondary prevention of breast cancer. In Spain, they began in the 90s, reaching complete coverage in Andalusia (south Spain) from the year 2000. The objective of the SP is the early detection of tumours that has an impact on a greater probability of survival and cure. Population-based cancer registries are an essential element for evaluating the effectiveness of a SP.

Materials and Methods

All women identified through the Granada Cancer Registry between 50-69 years old who were diagnosed with breast cancer in the period 2002-2016 in the province of Granada were included. Data of participants and results in the breast cancer SP were provided by the Regional Health Government for the same period. Both databases were linked in order to classify patients into 5 categories: cases detected by the SP; interval cancers detected by the SP; interval cancers not detected by the SP; cases not participating in the SP; cases not invited to the SP.

Frequency distribution and 1 to 5 years observed and net survival were calculated across that classification and for age group, stage at diagnosis and year of incidence. Net survival was computed using the Pohar-Perme method, adjusting for smoothed life-tables of the overall mortality in Granada by year and age.

Results

2709 women of 50-69 years of age diagnosed with breast cancer in the period 2002-2016 were included. 43% of them were cases detected by the SP, 26% no-participants, and 13% not invited to the SP. 18% of cases were interval cancers. 88% of the cases detected by the SP were stage I and II, compared to 73% of those not detected ($p < 0.001$). 5-year net survival of cases detected by the SP was 97.3% (95% CI: 95.6-98.3), in contrast with 87.2% in cases not detected (95% CI: 85.1-89.0).

Conclusions

The breast cancer SP in Granada proved to be effective for the early detection of breast cancer and had a positive impact on the survival of diagnosed women.

Topic: Cancer control CC04_Wills

10-year cancer net survival by stage for patients diagnosed in the east of England, 2007-2017

Lorna Wills,[1] Clare Pearson,[1] John Broggio,[2] Lizz Paley,[2] Kwok Wong,[2] Lucy Ironmonger,[3] Jodie Moffat,[3] Jon Shelton,[3] Georgios Lyratzopoulos,[4] Fahmina Fardus-Reid[1]

[1]Cancer Research UK–Public Health England partnership, Public Health England Wellington House, London, UK [2]Public Health England, Public Health England Wellington House, London, UK [3]Cancer Research UK, London, UK [4]University College London, Department of Behavioural Science and Health University College London, London, UK

Background

Currently published net survival estimates by stage for England are available for 1- and 5-year survival but not for longer time periods. However, there is evidence that survival of patients diagnosed with some cancers continues to fall faster than the general population beyond 5 years after diagnosis. Hence, longer term survival information would be useful for estimating the impact of diagnosing cancer earlier on cancer survival.

Materials and Methods

The period approach was used to estimate 10-year non-standardised net survival by stage using cancer registration data (2007-2017) for adults diagnosed with breast, colorectal, kidney, lung, melanoma, ovary, prostate and uterine cancer within the catchment area for the former Eastern Cancer Registration and Information Centre (ECRIC) cancer registry.

The former ECRIC registry has higher historic stage completeness than the rest of England and so allowed 10 years of diagnosis data to be used.

Results

10-year net survival estimates decreased with later stage at diagnosis across all sites. 10-year net survival for the key four cancer sites ranged from 96.0% (stage 1) to 11.6% (stage 4) for breast cancer, 87.7% (stage 1) to 6.5% (stage 4) for colorectal cancer, 29.0% (stage 1) to 4.2% (stage 3) for lung cancer, and 101.4% (stage 1) to 18.6% (stage 4) for prostate cancer. 10-year net survival was generally lower than 5-year net survival and the relative difference between 5- and 10-year net survival increased with later stage at diagnosis. There was variation in survival by age, with survival generally poorer for older age groups.

Conclusions

This work quantifies the potential longer-term prognostic benefits of achieving earlier diagnosis. However, for some cancer sites 10-year survival is low even when diagnosed at an earlier stage highlighting an ongoing need for improving treatment. The variation in net survival by age suggests further research into potential reasons behind this.

Topic: Cancer control CC05_Giusti

Exploring colorectal cancer stage distribution in Europe, 1993-2015

Francesco Giusti,[1] Carmen Martos,[1] Luciana Neamţiu,[1] Giorgia Randi,[1] Manuela Flego,[1] Tadeusz Dyba,[1] Raquel N. Carvalho,[1] Nadya Dimitrova,[1] Manola Bettio[1]

[1]European Commission, Joint Research Centre, Ispra, Italy

Background

Colorectal cancer screening programmes (SPs) aim to detect precancerous lesions or early stage cancers and decrease mortality.

This analysis reports stage distribution trends for patients aged 50-74 years in Europe, which are often the target of SPs.

Materials and Methods

Data from cancer registries (CRs) contributing to the European Cancer Information System (ECIS), reporting stage and covering areas with a SP was analysed. Colorectal (C18-C20) patients–including in situ tumours–diagnosed in 1983-2014 were selected. Two stage groups were considered: stage 0 or I and stage IV. Proportions by CR, stage and year were calculated. Average Annual Percent Change (AAPC) of proportions was computed with the Joinpoint Trend Analysis Software.

Results

564550 cases from 55 CRs in 7 countries were analysed. Stage 0 was available in 7 CRs. Stage 0 proportion increased before and after SP introduction (AAPC from 6% to 51%) in 6 CRs, while in one CR it increased only after SP start (AAPC 25%). Stage I proportion increased before and after the SP in 6 CRs (AAPC 2% to 9%), increased only after SP start in 2 CRs (AAPC 13% and 14%) and increased only before the SP in 2 CRs (AAPC 5% and 9%). Stage I had no statistical significant increase in one CR. Stage IV proportion decreased in 6 CRs before and after SP start (AAPC 1% to -6%) and decreased only after SP start in 4 CRs (AAPC -3% to -8%). Stage IV increased before SP start but did not decrease significantly after in 2 CRs (AAPC 4% and 7%), increased after SP start or both before and after in 3 CRs (AAPC 2%-16%). Stage IV proportion had a non-statistically significant decrease in 3 CRs.

Conclusions

An increase in Stage 0/Stage I was observed in the majority of selected CRs. The increase happened both before and after SP start or only after. Stage IV proportion decreased in the majority of CRs, but increased in 3 CRs. Further analyses are necessary to explain the possible association between this results and SP related factors.

Solid cancer survival in France, 1989-2018: a population-based study

Brigitte Trétarre,[1,8,9] Emmanuelle Dantony,[2,3] Morgane Mounier,[4,9] Camille De Brauer,[5] Florence De Maria,[6] Florence Molinié,[7,8,9] Laurent Remontet,[2,3] Gaëlle Coureau,[9,10,11] for French Network of Cancer Registries (FRANCIM)[9]

[1]General Cancer Registry of Hérault, ICM, Montpellier, France [2]Hospices Civils de Lyon, Public Health Pole, Biostatistics Service–Bioinformatic, Lyon, France [3]University of Lyon, University Lyon 1, CNRS, UMR 5558, Laboratoire de Biométrie et Biologie Évolutive, Équipe Biostatistique-Santé, Villeurbanne, France [4]Malignant Hematologic Diseases Registry of Côte-d'Or, CHU Dijon-Bourgogne, UMR INSERM 1231 SA-PHIHR, Dijon, France [5]National Cancer Institute, Boulogne-Billancourt, France [6]Department of Non-Communicable Diseases and Trauma, Santé Publique France, Saint-Maurice, France [7]Loire-Atlantique/Vendée Cancer Registry, INCA-DGOS-Inserm_12558, CHU Nantes, Nantes, France [8]CERPOP, University of Toulouse, Inserm, UPS, Toulouse, France [9]FRANCIM, network of French Cancer Registries, Toulouse, France [10]General Cancer Registry of Gironde, Public Health Pole, University Hospital, Bordeaux, France [10]EPICENE Team, Inserm U1219, Bordeaux Population Health, University of Bordeaux, Bordeaux, France

Background

Among the indicators used in public health to describe cancers, survival is essential to assess the impact of prevention, screening and management actions over time. This is the fourth survival study carried out using data from the metropolitan registers of the FRANCIM network in France.

Materials and Methods

All solid cancer diagnosed from 1989 to 1989 in one of the metropolitan departments covered by a register are included. (Vital status at June 30, 2018). Net survival at 1, 5, 10 and 20 years (when it was possible) and trends over year of diagnosis were estimated for 50 solid tumors (28 major locations and 22 anatomical or histological sub-locations) using a novel approach based on penalized multidimensional splines to model excess mortality rates.

Results

The results show a great disparity in net survival between the different locations. The 5-year standardized net survival (SNS) ranges from 96% for thyroid cancers to 10% for mesothelioma. For a major part of cancer sites, the SNS at 5 years is higher in women and the risk of dying is high during the first year of follow-up and then decrease after. Trends of net survival over year of diagnosis show a globally significant improvement in net survival at 5 years for a majority of locations. Prostate cancer is the location for which we observe the greatest improvement in SNS at 5 years (+21 points) between 1990 and 2015, followed by sarcomas of the soft tissues (+19 points). Colorectal cancer is the one for which survival changes the least between 5 and 20 years of follow-up (decrease of 10 points in 15 years), with a survival >52% at 20 years.

Conclusions

These overall positive survival results observed in the french general population make it possible to visualize the progress made in the healthcare system both in the detection of cancers but also in their post-diagnosis management. This gain is nonetheless contrasted depending on the location and can only be observed in a portion of the patients depending on the age at diagnosis.

Topic: Cancer control CC07_Luyendijk

De novo metastatic cancer: an overview of changes in survival and novel drugs from 1989-2018

Marianne Luyendijk,[1,2] Otto Visser,[1] Hedwig Blommestein,[2] Agnes Jager,[3] Frank Hoebers,[4] Gabe Sonke,[5] Ignace de Hingh,[6] Carin Uyl-de Groot,[2] Sabine Siesling[1,7]

[1]Netherlands Comprehensive Cancer Centre, Utrecht, The Netherlands [2]Erasmus School of Health Policy and Management, Erasmus University, Rotterdam, The Netherlands [3]Department of Medical Oncology, Erasmus MC Cancer Institute, Rotterdam, The Netherlands [4]Department of Radiation Oncology (MAASTRO), Research Institute GROW, Maastricht University, Maastricht, The Netherlands [5]The Netherlands Cancer Institute, Amsterdam, The Netherlands [6]Department of Surgery, Catharina Hospital, Eindhoven, The Netherlands [7]Department of Health Technology and Services Research, Technical Medical Centre, University of Twente, Enschede, The Netherlands

Background

This study describes changes in survival and the introduction of novel treatments by cancer type for patients with distant metastases at presentation over a period of 30 years. Objective is to improve insight into the effectiveness of care for patients with metastatic malignancies.

Materials and Methods

Patients diagnosed in 1989-1993 and 2014-2018 with a solid cancer and distant metastases at presentation were selected from the Netherlands Cancer Registry. The Pohar-Perme method was used to estimate 1-year and 5-year net survival (NS) which is the survival that would be observed if cancer was the only possible cause of death. NS was estimated per cancer type and per period and changes over time were calculated as the difference in survival between the two time periods. Trends in the proportion of patients with distant metastases were reported. Information on novel drugs introduced during the period was obtained from different sources including the European Medicines Agency.

Results

From 1989-1994 to 2014-2018 significant increases in 1-year NS were observed for most metastatic cancers and increases in 5-years NS for a few. Survival increases at 1 year ranged from 1% to 50% and at 5 year from 0% to 46%. The largest increases in 5-year NS were observed in patients with metastatic Gastrointestinal Stromal tumours, Neuroendocrine tumours, prostate and breast cancer. For many cancer types, the increases in 5-year NS were modest. During the period of our study, over 80 novel drugs were approved for a variety of metastatic malignancies included in our study.

Conclusions

Over a 30 year time period, survival of patients with distant metastases at presentation show increases but persistent differences between cancer types. With the advent of multiple novel drugs, the management of patients changed for many cancers. For some cancers these advances likely contributed to the survival increases observed in our study whereas for others, survival increases appeared disappointing.

Topic: Cancer control CC08_Feller

The relative risk of second primary cancers in Switzerland: a population-based retrospective cohort study

Anita Feller,[1] Katharina Matthes,[2] Andrea Bordoni,[3] Christine Bouchardy,[4] Jean-Luc Bulliard,[5,6] Christian Herrmann,[7,8] Isabelle Konzelmann,[9] Manuela Maspoli,[6] Mohsen Mousavi,[7,8] Sabine Rohrmann[2,10]

[1]Foundation National Institute for Cancer Epidemiology and Registration (NICER), University of Zurich, Zurich, Switzerland [2]Cancer Registry Zurich and Zug, University Hospital Zurich, Zurich, Switzerland [3]Ticino Cancer Registry, Instituto cantonale di patologia, Locarno, Switzerland [4]Geneva Cancer Registry, Institute of Global Health, University of Geneva, Geneva, Switzerland [5]Vaud Cancer Registry, Centre for Primary Care and Public Health (Unisanté), University of Lausanne, Lausanne, Switzerland [6]Neuchâtel and Jura Cancer Registry, Neuchâtel, Switzerland [7]Cancer Registry East Switzerland [8]Cancer Registry Grison & Glarus, Chur, Switzerland [9]Valais Cancer Registry, Health Observatory Valais, Sion, Switzerland

Background

More people than ever before are currently living with a cancer diagnosis. Cancer survivors are at risk of developing a second primary cancer (SPC). This study aims to investigate the risk of SPC in Switzerland.

Materials and Methods

The study cohort included all cancer patient recorded in 9 Swiss population-based cancer registries 1981-2009 who had a minimum survival of 6 months, and a potential follow-up until the end of 2014. Standardized incidence ratios (SIR) were calculated to estimate relative risks (RR) of SPC in cancer survivors compared with the general population.

Results

A total of 33793 SPC were observed in 310113 cancer patients. Both male (SIR 1.18, 95%CI 1.16-1.19) and female (SIR 1.20, 95% CI 1.18-1.22) cancer survivors had an elevated risk of developing a SPC. RR varied substantially according to type of first cancer and were highest in patients initially diagnosed with cancer of the oral cavity and pharynx, Hodgkin lymphoma, laryngeal, oesophageal, or lung cancer. Age-stratified analyses revealed a tendency towards higher RR in patients first diagnosed at younger ages. Stratified by survival period, risk estimates showed a rising trend with increasing time from initial diagnosis. We observed strong associations between particular sites of first and SPC, i.e. cancers sharing common risk factors such as smoking or alcohol consumption (e.g. repeated cancer of the oral cavity and pharynx (SIRmales 20.12, 95% CI 17.91-22.33; SIRfemales 37.87, 95% CI 30.27-45.48).

Conclusions

Swiss cancer survivors have an increased risk of developing a SPC, particularly patients first diagnosed before age 50 and those surviving more than 10 years. Cancer patients should remain under continued surveillance not only for recurrent cancers but also for new cancers. Some first and SPCs share lifestyle associated risk factors making it important to promote healthier lifestyles in both the general population and cancer survivors.

Topic: Cancer control CC09_Monnereau

Is survival of major lymphoid malignancies subtypes still increasing in the French population?

Alain Monnereau & Sébastien Orazio,[1,2,3] Emmanuelle Dantony & Laurent Remontet,[4,5] Morgane Mounier & Marc Maynadie,[3,6] Xavier Troussard & Edouard Cornet,[3,7] Lionel Lafay,[8] Camille Lecoffre,[9] Gaëlle Coureau,[2,3,10] Brigitte Tretarre,[3,11,12] for French Network of Cancer Registries (FRANCIM)[3]

[1]Registre des Hémopathies Malignes de Gironde, Institut Bergonié, Bordeaux [2]EPICENE Team, Inserm U1219, Bordeaux Population Health, University of Bordeaux, France [3]FRANCIM, network of French Cancer Registries, Toulouse, France [4]Hospices Civils de Lyon, Pôle Santé Publique, Service de Biostatistique–Bioinformatique, Lyon, France [5]Université de Lyon, Université Lyon 1, CNRS, UMR 5558, Laboratoire de Biométrie et Biologie Évolutive, Équipe Biostatistique-Santé, Villeurbanne, France [6]Registre des Hémopathies Malignes de Côte-d'Or, CHU Dijon-Bourgogne, Inserm UMR INSERM 1231 SAPHIHR, Dijon, France [7]Registre régional des hémopathies malignes de Basse-Normandie, CHU Caen-Normandie [8]Institut National du Cancer, Boulogne-Billancourt, France [9]Direction des Maladies Non-Transmissibles et Traumatismes, Santé Publique France, Saint-Maurice, France [10]General Cancer Registry of Gironde, Public Health pole, University Hospital, Bordeaux, France [11]General Cancer Registry of Hérault, ICM, Montpellier, France [12]CERPOP, Université de Toulouse, Inserm, UPS, Toulouse, France

Background

Lymphoid malignancies (LM) comprise 2/3 of all hematological malignancies with about 30 000 new cases in 2018 in France and improvement in incidence for most subtypes. Here, we update survival and trends for the major LM subtypes based on the most recent population-registry data.

Materials and Methods

All LM subtypes diagnosed from either 1989 1995 2003 (depending on their recognition by WHO classification), to 2015 in a French metropolitan area covered by a population-based registry were included (follow-up June 30, 2018). 14 LM subtypes were defined according to the ICD-O-3 classification. Age-standardized net survival (SNS) at 1.5 and 10 were estimated for all subtypes. Long-term survival at 20-year (only for HL and LL/CLL) was estimated using a novel approach based on multidimensional penalized splines to model excess mortality rate allowing to visualize survival trends over age and year of diagnosis (R software, package survPen).

Results

One half of incident LM diagnosed between 2010 and 2015 had a favorable prognosis (ie 5-year SNS higher than 75%). 5-year survival decreased with age for all LM subtypes with biggest gap between youngest and oldest for Hodgkin Lymphoma (HL: 50%) and Diffuse large B-cell lymphoma (DLBCL: 40%).

From 2005 to 2015, the largest 5-year SNS improvements were observed for non-cutaneous T-cell lymphoma (T-NHL-NC: +18%), Multiple Myeloma/Plasmocytoma (MM/P: +12%), Follicular lymphoma (FL: +10%) and Mantle-cell lymphoma (MCL: +10%). Most of these improvements were observed in elderly, particularly for FL, HL whereas improvements were observed in youngsters for MM/P and at the same magnitude regardless of age for DLBCL.

Conclusions

Despite relatively high survival in major LM subtypes, survival trends in 2005-2015 show positives improvements particularly in elderly in LM subtypes that were usually considered as moderate or poor prognosis like MM/P. Survival didn't improve significantly in various subtypes like HL, Cutaneous T-cell NHL, Marginal Zone Lymphoma.

Topic: Cancer inequalities CI01_Petrova

Socio-demographic inequalities in the awareness of cancer lifestyle risk factors: a Spanish population-based survey

Dafina Petrova,[1,2,3] Ana Ching-López,[1,2,3] Josep Maria Borràs,[4,5,6] Marina Pollán,[1,7] Eloísa Bayo-Lozano,[8] José Juan Jiménez Moleón,[1,3,9] Maria José Sánchez[1,2,3,9]

[1]CIBER of Epidemiology and Public Health (CIBERESP), Madrid, Spain [2]Escuela Andaluza de Salud Pública (EASP), Granada, Spain [3]Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain [4]Department of Clinical Sciences, University of Barcelona, Barcelona, Spain [5]Bellvitge Biomedical Research Institute, Hospitalet, Spain [6]NHS Cancer Strategy, Ministry of Health, Spain [7]National Center for Epidemiology, Health Institute Carlos III, Madrid, Spain [8]University Hospital Virgen Macarena, Seville, Spain [9]University of Granada, Granada, Spain

Background

Lower knowledge of cancer risk and prevention factors related to lifestyle could lead to lower adherence to risk reducing behaviors and thus be one of the multifactorial mechanisms driving disparities in cancer incidence and survival. The goal of the current study was to describe the awareness of lifestyle risk factors for cancer in the Spanish population and identify potential inequalities in awareness based on sex, age, and socioeconomic position.

Materials and Methods

We analyzed data from the 2020 Spanish Oncobarometer (n=4769), a representative population-based survey of the Spanish adult population. Awareness of the role of 10 risk factors in cancer development was measured: four lifestyle risk factors (tobacco, alcohol, diet, and weight) and six other factors (family history of cancer, atmospheric pollution, radiation, sexually-transmitted diseases, sunlight exposure, and toxic substances). Multiple logistic and Poisson regressions were used to identify sociodemographic groups with lower awareness.

Results

Lifestyle factors, with the exception of smoking, were among the least recognized cancer risk factors, unfortunately more so among those at highest risk from cancer: men, older individuals (65+), and individuals from lower socioeconomic groups. Lower awareness was consistently related to perceiving very low risk from cancer. One in three Spaniards was unaware of the role of weight and 1 in 4 of alcohol and diet. Recognition of diet was especially low among older individuals (65+) and among those who reported leading an unhealthy lifestyle.

Conclusions

Lifestyle factors including diet, weight, and alcohol consumption continue to be among the least recognized cancer risk factors in the population, unfortunately more so among those at highest risk from cancer. Differences in the awareness of risk factors and cancer prevention guidelines may underlie some of the documented demographic and socio-economic disparities in cancer incidence.

Topic: Cancer inequalities CI02_Gatta

The international benchmarking of childhood cancer survival by stage (BENCHISTA Project)

Gemma Gatta,[1] Laura Botta,[1] Riccardo Capocaccia,[2] Fabio Didonè,[1] Kathy Pritchard-Jones,[3]
BENCHISTA Working Group

[1]Fondazione IRCCS "Istituto Nazionale dei Tumori", Milan, Italy [2]Editorial board of the journal *E&P*, Milan, Italy [3]University College London, London, UK

Background

The BENCHISTA collaborative study collects data from population-based cancer registries (CRs) across Europe to compare tumour stage and survival and where available data on relapse and treatments in six cancers among children. We aim to understand why there are differences in chances of survival from childhood cancer (CC) between some countries. We will compare how far cancer has spread at diagnosis and test if differences in tumour stage explains any survival differences between countries. We anticipate possible distribution by stage and/or survival by stage to explain the EUROCARE-6 CC survival differences.

Materials and Methods

From the JARC pilot study we used the distribution by stage and the 3-year survival by stage for Neuroblastoma (NB). We use the 3-year survival by EUROCARE-6 for West (Western European countries, UK and Ireland) and East of Europe for NB.

Results

For NB in EUROCARE-6, we found a 4% difference in survival between Western and Eastern European countries (77% vs 81%), This could be explained by a 4% difference in stage specific survival (with same stage distribution), or by a 21% higher proportion of localized cancers in Western countries (with same stage-specific survival), or by a combination of the two (distribution of stage and stage specific survival).

Conclusions

Up to now about 80 European CRs have agreed to participate at the BENCHISTA and we expect to provide information on tumour stage and survival for a total of approximately 8000 children with cancers across Europe and followed up for at least 3 years. To understand the reasons of CC survival differences will benefit future children to be diagnosed more quickly and help health service planners and clinical teams improve the care they provide and chances of successful treatment.

Topic: Collection and use of treatment data TD01_Hawkins

Laparoscopic surgery rates for major colorectal cancer surgery in NI in 2018

Sinead T Hawkins,[1] Jamie Roebuck,[1] Barry McAree,[3] Damian McKay,[4] Mark Lawlor,[2] Anna Gavin,[2] Helen Coleman[2]

[1]Northern Ireland Cancer Registry (NICR), Centre for Public Health, Queen's University Belfast, Northern Ireland [2]Patrick G Johnston Centre for Cancer Research, Queen's University Belfast, Northern Ireland [3]Antrim Area Hospital, Northern Health and Social Care Trust, Northern Ireland [4]Craigavan Area Hospital, Southern Health and Social Care Trust, Northern Ireland

Background
United Kingdom National Institute for Health Care Excellence guidance currently favours using laparoscopic access in major colorectal cancer (CRC) surgery, due to decreased post-operative inpatient stays and a faster patient recovery. Laparoscopic access rates in CRC surgery are routinely produced for England and Wales, we report the first data for Northern Ireland (NI).

Materials and Methods
Clinical data on 1097 patients with unique primary CRC diagnosed in 2018 in NI were evaluated by the N. Ireland Cancer Registry (NICR). Details on surgery were completed by clinicians in each Health and Social Care Trust and forwarded to the NICR for analysis. Data were compared with that published for England/Wales in the National Bowel Cancer Audit for patients diagnosed in 2018/2019.

Results
Of the 1097 CRC patients in NI in 2018, 727 (66.3%) underwent major CRC surgeries. Of these, 317 (43.6%) were attempted laparoscopically and 280 (38.5%) were completed laparoscopically with 37 patients converted to open surgery. The proportion of laparoscopic completed surgeries ranged from 18.8-53.0% across the 5 NI Trusts, compared to ranges of 45-80% in England/Wales. Four out of five NI Trusts had the lowest laparoscopic access rates when compared with all Cancer Alliances/ Trust areas of England/Wales. Based on these results NI would be considered an outlier for this type of access for CRC surgery.

Conclusions
NI laparoscopic access rates for major CRC surgeries are amongst the lowest in the UK (excluding comparisons with Scotland), These data provide value for population based audits in highlighting areas for improvement in care and will be used to drive change according to standard practice.

Acknowledgements: the NICR is funded by the NI Public Health Agency, who also provided funding for the audit on which these findings are based. This audit has been co-produced with the input of the NI Cancer Network's Colorectal Cancer Clinical Reference Group, analysis was conducted independently of clinicians.

Topic: Collection and use of treatment data TD02_Enerly

Collecting systemic anti-cancer treatment to the Cancer Registry of Norway

Espen Enerly,[1] Anna Skog,[2] Kristin Oterholt Knudsen,[2] Lena Holmstrøm[2]

[1]Department of Research, Cancer Registry of Norway, Oslo, Norway [2]Department of Registration, Cancer Registry of Norway, Oslo, Norway

Background

The Cancer Registry of Norway has extensive overview of patients' surgical procedures and the radiotherapy treatments. Information on prescribed systemic anti-cancer treatment (SACT), have been available via Norwegian Prescription Database (NorPD) and recently also at the Patient Registry, but data on hospital administered treatment has not been registered in any national registry. The INSPIRE (INcreaSe PharmaceutIcal REporting) project was started to automatically and electronically collect data on SACT to the Cancer Registry. It is a collaboration between 12 pharmaceutical companies, the Association of Pharmaceutical Companies in Norway, the Norwegian Cancer Society, the technology transfer office Inven2, the Cancer Registry of Norway and the four Regional Health Trusts.

Materials and Methods

The data is obtained from hospital systems used for ordering/administering medical oncological treatment and from the Patient Registry, and integrated with other data in the Cancer Registry at the individual patient level. The information is partly unstructured and non-standardized and extensive processing is therefore done at the registry after the data is received. Processing of SACT data for lung cancer patients have been done.

Results

SACT administered at hospitals for three out of four health regions have been collected. The data dates back to 2008 for two regions, while for the third region complete data back to 2008 is missing as some hospitals started using cancer medication systems at a later date. Prescribed SACT data dates back to 2019. Infrastructure for continuous collection of SACT have been established.

Conclusions

Collection of patient level data on SACT have been established at the Cancer Registry of Norway. Data from lung cancer patients have been made available to describe the national standard of care, measure adherence to clinical guidelines, and for research purposes.

Topic: Collection and use of treatment data TD03_Bernasconi

Predicting cardiovascular risk after breast cancer at young age: a machine learning method fusing cancer registries and clinical data

Alice Bernasconi,[1] Annalisa Trama,[1] Laura Botta,[1] Gemma Gatta,[1] Fabio Stella,[1] Ada Working Group A

[1]Evaluative Epidemiology Unit, Department of Research, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milano, IT [2]Department of Informatics, Systems and Communication, Università degli Studi of Milano-Bicocca, Piazza dell'Ateneo Nuovo 1, Milano, IT

Background

Artificial Intelligence and Machine Learning (ML) techniques are getting more and more used in the healthcare domain to help clinicians in predicting patients' future trajectories. Cancer Registries (CRs) can access several data sources to collect information on cancer patients' including long-term comorbidities and risk factors. CR data are a unique opportunity for predictive studies focused on long-term impact of cancer.

Materials and Methods

We will focus on Bayesian Networks (BNs), a group of probabilistic graphical models that represents a set of random variables and their conditional dependencies via a directed acyclic graph, according to the experts' knowledge. They have three main strengths: they are easily interpretable, could fuse data from different studies and be applied to study time-dependent variables. BNs will be used to integrate the Italian cohort of Adolescents and Young adults (AYAs, 15-39 years at diagnosis) cancer survivors ('Ada cohort') with clinical data available in the breast registry of 'Istituto Nazionale dei Tumori di Milano' to predict cardiovascular diseases risk (CVDs) in AYA breast cancer (BC) survivors.

Results

The 'Ada cohort' collects around 3500 AYA with BC linked to hospital discharge records, outpatient, and pharmaceutical source. In this cohort, we estimated that AYAs with BC have more than twice the risk of CVDs than the general population. Estimates of associations between treatment, cardiovascular risk factors and CVDs, defined using the Ada cohort data sources, are ongoing. In a second step, cohort data will be fused with the detailed clinical data to define the BNs.

Conclusions

We will show how ML techniques can exploit CRs data to provide results useful for clinicians to plan personalized follow-up strategies.

Topic: Communication and visualisation of cancer data CV01_Pla

Incidence of lymphoid neoplasms in Spain, 2002-2013: a population study from the Spanish Network of Cancer Registries

Clàudia Pla,[1] Marta de la Cruz,[2] Araceli Alemán,[3] Ana Isabel Marcos,[4] María José Sánchez,[5] Josefina Perucha,[6] María Dolores Chirlaque,[7] Amaia Aizpurua,[8] Virginia Menéndez,[9] Marià Carulla,[1] REDECAN Working Group A

[1]Tarragona Cancer Registry, Cancer Epidemiology and Prevention Service, Salut Sant Joan de Reus Baix Camp, Reus, Catalonia, Spain [2]Basque Country Cancer Registry, Health Department, Basque Government, Bilbao, Spain [3]Canary Islands Cancer Registry, Epidemiology and Prevention Service, Directorate General of Public Health, Canarian Health Service, Spain, Santa Cruz de Tenerife, Spain [4]Cuenca Cancer Registry, Department of Public Health, Autonomous Government of Castilla la Mancha, Cuenca, Spain [5]Granada Cancer Registry, Andalusian School of Public Health, CIBERESP, Instituto de Investigación Biosanitaria ibs.GRANADA, Department of Preventive Medicine and Public Health, University of Granada, Granada, Spain [6]La Rioja Cancer Registry, Epidemiology and Health Prevention Service, General Directorate of Public Health, Logroño, Spain [7]Murcia Cancer Registry, Department of Epidemiology, Murcia Health Council, CIBERESP, IMIB-Arrixaca, Murcia University, Murcia, Spain [8]Basque Country Cancer Registry, Health Department, Basque Government, San Sebastián, Spain [9]Asturias Cancer Registry, Public Health Directorate, Oviedo, Spain

Background

Lymphoid neoplasms (LNs) are a group of diverse entities with different incidence on the population. They encompass a heterogeneous group of lymphomas and leukaemias with predominance, in most developed countries, of non-Hodgkin lymphoma. The aim of this study was to describe incidence patterns of LNs and its subtypes in Spain in the period 2002-2013 using data from the Spanish Network of Cancer Registries (REDECAN).

Materials and Methods

Data were extracted from 16 Spanish population-based cancer registries. LNs incident cases were codified using the ICD-O-3 and grouped according to the WHO 2008 classification. Annual number of cases per year, relative frequency, crude (CR) and age-standardized incidence rates to the 2013 European standard population (ASRE) were obtained.

Results

LNs accounted for 69.0% (n=39156) of all haematological malignancies (n=56751) diagnosed during the period of study. Median age at diagnosis was 67 years (IQR 52-77). The overall ASRE was 34.23 (95% CI: 33.89, 34.57) and showed a marked male predominance in almost all subtypes (sex ratio=1.45). ASRE differed significantly across cancer registries, with the highest and lowest rates observed in Gran Canaria (41.70, 95% CI: 40.19, 43.21) and Cuenca (27.25, 95% CI: 25.07, 29.43), respectively. The ASRE was 2.84 (95% CI: 2.74, 2.93) for Hodgkin lymphoma and 31.39 (95% CI: 31.06, 31.72) for NHL. For NHL subtypes, the ASRE was 1.31 (95% CI: 1.24, 1.37) for precursor lymphoid neoplasms, 26.17 (95% CI: 25.87, 26.47) for mature B-cell neoplasms, 2.01 (95% CI: 1.93, 2.09) for mature T-cell and NK-cell neoplasms, and 1.90 (95% CI 1.82, 1.98) for not-otherwise specified (NOS) cases.

Conclusions

These population-based results provide relevant information to better understand the epidemiology of LNs in the Southern Europe. The next step of this project will be to study the trends and the projections of incidence, and the survival by subtype in order to support future health-care strategies for these neoplasms.

Topic: Communication and visualisation of cancer data CV02_Bruni

The childhood cancer section of the Puglia Cancer Registry

Danila Bruno,[1] Vanna Burgio,[1] Rossella Bruni,[1] Francesco Cuccaro,[2] Enzo Coviello,[2] Lucia Bisceglia,[1] Ivan Rashid,[1] Nicola Santoro[3]

[1]Area of Epidemiology and Care Intelligence, AReSS Puglia, Lungomare Nazario Sauro, Bari (BA), Italy [2]Unit of Statistics and Epidemiology – Cancer Registry of Health Local Unit BT, Barletta (BT), Italy [3]Unit of Oncohematology, Polyclinic of Bari, Bari (BA), Italy

Background
Childhood cancer registration needs strict procedures to reach the highest level of completeness and accuracy. Our objective is to create a specific section in the Puglia Cancer Registry (RTP) for the childhood cancer series and to estimate for the first time frequency indicators of these tumors in the whole regional population.

Materials and Methods
The linkage of hospital discharge, pathological reports of tumors and causes of death data defined an initial series of 2726 cases of childhood tumors for the period 2006-2017. Expert registrars of the RTP Coordination Center reviewed all cases and excluded 1285 tumors. RTP used the following additional sources: model 1.01 of the Italian Association of Pediatric Hematology and Oncology database, pharmaceuticals data, radiology reports, ticket exemptions, oncohematology, regional and extra-regional medical records and civil invalidity data. All tumors have been coded according to ICDO3 and the specific classification system ICCC. We produced crude and age standardized incidence rates (2013 European population as reference) of all childhood tumors and malignant ones for Puglia and for each of the 6 provinces, and rates of the main ICCC3 groups for the whole region, for the period 2006-2017 and subperiods 2006-2011 and 2012-2017.

Results
In the period 2006-2017 we registered 1441 tumors in children up to 14 years of age, 1221 of which with malignant behavior (/3). The standardized incidence rates of all childhood tumors per million were 203 (192-214, 95% CI) over the entire period, 207 (193-222) in 2006-2011 subperiod and 198 (183-213) in 2012-2017 subperiod. Those of all malignant tumors were respectively 172 (162-182), 180 (167-195) and 163 (149-177). Tables show provincial and regional rates for ICCC3 clusters.

Conclusions
In Puglia we produced and validated a complete and informative childhood cancer series that will be useful for comparisons between populations and over time and for further analytical studies.

Topic: Communication and visualisation of cancer data CV03_Bric

onKOvid: a platform summarizing the impact of COVID-19 on cancer burden and care in Slovenia

Nika Bric,[1] Tina Zagar,[1] Sonja Tomsic,[1] Katarina Lokar,[1] Ana Mihor,[1] Vesna Zadnik[1]

[1]Slovenian Cancer Registry, Institute of Oncology Ljubljana, Zaloska 2, SI-1000 Ljubljana

Background

In order to gain a quick and timely understanding of how cancer burden and cancer care in Slovenia have been affected by the COVID-19 epidemic, the Slovenian Cancer Registry (SCR) is continuously carrying out the analysis on readily available, up-to-date and reliable data sources. The indicators produced are reported through an online platform named onKOvid (oncology&covid).

Materials and Methods

We gathered data from the population-based SCR, the national e-referral system and the administrative hospital data of the Institute of Oncology Ljubljana (IOL). Using this data, we evaluated the number and the possible drops (compared to the year 2019) of new diagnoses for all cancers combined and for particular cancer sites, the referrals for first and control oncological examinations and treatments, as well as diagnostic procedures and treatments administered at IOL. The web-platform Slora (www.slora.si/en) that is routinely used by SCR for reporting the cancer burden indicators was extended for onKOvid.

Results

The indicators are available from January 2020 on and updated regularly with a two-month lag. The methodological explanations and description of the results are provided as well. The most substantial decrease in cancer diagnoses was recorded in April 2020. The overall cancer diagnoses burden was lower at that time for about 30%. But there are larger differences between cancer types, i.e. diagnosis of non-melanoma skin cancer dropped for more than 60%.

Conclusions

Considering the need for real-time analysis of data in order to inform decision-makers about the COVID-19 control measures, the up-to-date indicators of COVID-19 impact on cancer burden and care in Slovenia are available with a two-month delay at the dedicated web-portal Slora under section onKOvid that is maintained by the Slovenian Cancer Registry. Long-term monitoring of the COVID-19 impact on classical cancer burden indicators, such as poorer survival or a shift towards a more advanced stage at diagnosis has also been established.

Topic: Communication and visualisation of cancer data CV04_Vaamonde-Martín

Incidence evolution and main features of gastro-intestinal stromal tumours in Murcia (Spain) along a 15 years period

Ricardo José Vaamonde-Martín,[1] Mónica Ballesta-Ruiz,[1] Antonia Sánchez-Gil,[1,2] María Dolores Chirlaque-López,[1,3,4,5] Jacinta Tortosa-Martínez,[1] , Sandra Garrido-Gallego,[1] Mercedes Expósito-Castro,[1] María José Sánchez-Lucas[2]

[1]Servicio de Epidemiología, Consejería de Salud de la Región de Murcia, Murcia, Spain [2]Sistema Murciano de Salud, C/ Central, Murcia, Spain [3]Departamento de Ciencias Sociosanitarias, Universidad de Murcia, Murcia, Spain [4]IMIB, Campus de Ciencias de la Salud, Murcia, Spain [5]ICIBERESP, Madrid, Spain

Background

Gastro-Intestinal Stromal Tumours (GIST) are a kind of neoplasm whose diagnosis in common clinical practice did not start until 21st century, therefore implying rapidly evolving conceptions and uncertainty about their biological behaviour. A group of experts from Region of Murcia (Spain) were commissioned into a task by the EU Joint Action on Rare Cancers (JARC) regarding GIST Registration. Registry of Cancer of Murcia (RCM) led the group and conducted a pilot study in order to determine the feasibility of the recommendations to be issued to JARC.

Materials and Methods

We revised all the cases registered with histology code '8936' in the RCM during the 2001-2015 period. Because until our recommendations were made many GIST were considered non-registrable tumours, we additionally examined reports from Pathology, Oncology and Radiotherapy and discharge summaries. Variables collected were sex, date of diagnosis, age at diagnosis, primary location and recurrence risk level according to Joensuu´s Classification.

Results

We found 171 cases, all of them had an appropriate pathology report. 54.6% occurred in men and 45.4% in women. Mean age value was 64.8 years, while median was 67.3. Most frequently affected organ was stomach, accounting for 52.3% of cases. Risk level was determined as 'High' for 65.1% of the cases while just 8.1% were considered as 'Very Low'. The stratified analysis of the variables could not find any significant differences by sex.

Conclusions

In the Region of Murcia GISTs incidence for 2015 yr. doubled that of the 2001. This is consistent with trends observed in other European countries. During 2011-2015 period there has been an increase in the proportion of GIST that qualified as 'Low Risk' and, for the first time in our series, appeared cases of 'Very Low Risk', that is concordant with the improve in preoperative diagnostic capacities and awareness among surgeons of the importance of removing all incidental lesions suggestive of GIST whatever the size.

Topic: Communication and visualisation of cancer data CV05_Korat

A new tool for mapping cancer incidence data – CanMapTool

Sara Korat,[1] Tina Žagar,[1] Sonja Tomšič,[1] Paolo Baili,[2] Roberto Lillini,[2] Vesna Zadnik[1]

[1]Slovenian Cancer Registry, Institute of Oncology Ljubljana, Ljubljana, Slovenia [2]Analytical Epidemiology and Health Impact Unit, Fondazione IRCCS "Istituto Nazionale Tumori", Milan, Italy

Background

Using the data from the population-based cancer registries, many atlases have been prepared to present the cancer burden in specific areas over the last decades. The progress is supported by the development of analytical tools and computer power. The group of experts on spatial analysis was established in the framework of the European project WASABY – Water And Soil contamination and Awareness on Breast cancer risk in Young women (www.wasabysite.it/) to determine the methods suitable for presenting and analysis of cancer incidence.

Materials and Methods

The CanMapTool is developed by the Slovenian Cancer Registry in the framework of the WASABY project. The CanMapTool is developed in R Statistical Software. For modelling, the following packages were used: igraph, INLA, nimble and sf. Shiny package was used for building an interactive app. For preparing cancer incidence maps in the CanMapTool three groups of data are required: shapefile of the area, georeferenced cancer cases, and georeferenced background population.

Results

CanMapTool allows the users to visualise and analyse the georeferenced data on cancer incidence by producing reliable maps that are methodologically and epidemiologically sound. Therefore CanMapTool not only implements mapping of observed and age-standardized incidence data (direct and indirect standardization) but also three smoothing techniques (floating weighted averages and BYM Bayesian hierarchical modelling with Markov Chain Monte Carlo methods and with INLA).

Conclusions

Understanding spatial patterns of diseases in a population is at the very root of the field of epidemiology. Mapping allows with the aid of visualizations, to discover areas at high risk and can thus help in prioritizing areas for further investigation and areas that would benefit from public health actions. The CanMapTool is freely available and open source.

Topic: Communication and visualisation of cancer data CV06_Larønningen

NORDCAN–towards a new future for Nordic cancer statistics

Siri Larønningen,[1] NORDCAN-group, IARC cancer surveillance branch, NORDCAN IT-group

[1]Cancer Registry of Norway, Oslo, Norway

Background

Since 2002, NORDCAN has been a useful tool for comparable cancer statistics. In 2018, due to changes in technology and data protection rules, we started renewing the NORDCAN platform, and applied for a 3-year fund from NCU to bring NORDCAN into the future in two projects: (1) renewal of the database and visualization tool and (2) renewal of data management, including a risk analysis of the anonymity of data.

Materials and Methods

IARC cancer surveillance branch is responsible for project 1. The main focus is to create a more updated and flexible backend for the NORDCAN database, still providing high quality statistics. IARC has reused and further developed the technology in GCO with D3 JavaScript libraries as a core tool. The NORDCAN secretariat and IT-group is responsible for project 2. The main focus is to provide a tool for all countries to prepare and send anonymous counts and statistics to IARC. We developed an R/Stata-application running on pre-defined datasets. The R/Stata-application uses the IARCcrgTool for checks and conversions. GitLab and GitHub is used for development and documentation. Slack is used for communication within the group.

Results

The first version of the new database and visualization tool was available online in January 2020. New functionality and data were added in March 2021. The first version of the R/Stata-application was available in November 2020. All countries used the tool to send updated counts and statistics up to and including 2018 to IARC. The second version of the R/Stata-application is available for all users in June 2021.

Conclusions

We have been able to create new methods for both data management and data visualization which ensure that data are prepared in a harmonized way across the Nordic registries and that no sensitive data leave the safe boundaries of each registry. The tools are quite flexible and allow for changes so we can keep NORDCAN updated in the future.

Topic: Communication and visualisation of cancer data CV07_Wanner

37-year incidence and mortality time trends of common cancer types by sex, age, and stage in Zurich, Switzerland

Miriam Wanner,[1,2] Katarina Luise Matthes,[1,2] Nena Karavasiloglou,[1,2] Manuela Limam,[1,2] Dimitri Korol,[1,2] Sabine Rohrmann[1,2]

[1]Cancer Registry Zurich, Zug, Schaffhausen and Schwyz, Institute of Pathology and Molecular Pathology, University Hospital Zurich, Zurich, Switzerland
[2]Epidemiology, Biostatistics and Prevention Institute, University of Zurich, Zurich, Switzerland

Background
Population-based cancer registration in the canton of Zurich dates back to 1980 and offers, therefore, the opportunity to investigate long-term time trends. This study aimed to examine trends in incidence and mortality for the most common types of cancer from 1981 to 2017.

Materials and Methods
We included malignant tumours of the breast (ICD10 C50), prostate (C61), colon/rectum (C18-C21), lung (C33-C34), and melanoma (C43), diagnosed in the canton of Zurich between 1981 and 2017. Age-standardised incidence and mortality rates were computed per 100 000 person-years using the 1976 European Standard Population. Joinpoint regression analysis was used to model incidence and mortality trends over time.

Results
In men, we observed an increasing incidence trend for melanoma and a decreasing trend for colon/rectum and lung cancers. For prostate cancer, a joinpoint in 2002 indicated a reversal of the trend (from increasing to decreasing). In women, the trends for breast cancer, lung cancer, and melanoma were increasing over time but remained stable for colon/rectum cancer. There were some differences in trends by age group and stage at diagnosis. For example, the incidence trend increased for stage I and IV but decreased or remained stable for stage II and III colon/rectum tumours in both sexes. Cancer mortality decreased for all localisations and both sexes, except for melanoma in men (no clear trend) and lung cancer in women (increasing trend).

Conclusions
Increasing trends for the incidence of prostate cancer, breast cancer, and melanoma have been reported in other Western countries. The diverging trends in lung cancer incidence and mortality for men compared to women are at least partly explained by the later onset of smoking in women. Despite overall increasing incidence rates, the mortality rates are decreasing for all localisations (except for lung cancer in women), which may be due to better, more effective treatments and earlier detection.

Epidemiological situation of haematological malignancies in Belgium 2004-2018: report from the Belgian Cancer Registry

Tim Tambuyzer,[1] Kris Henau,[1] Bart Van Gool,[1] Geert Silversmit,[1] Frédéric Calay,[1] Liesbet Van Eycken1,[1] Hélène Antoine-Poirel[1]

[1]Belgian Cancer Registry, Brussels, Belgium

Background

Haematological malignancies (HM) are common (11% of the total cancer burden in Belgium in 2018) and, at the same time, rare and heterogeneous. We aim to analyse the epidemiological situation of HM in Belgium over a 15 year incidence period.

Materials and Methods

Population: all HM registered at the population-based Belgian Cancer Registry for the incidence years 2004-2018. Nineteen subtypes of HM were defined based on the Haemacare and the WHO 2017 classification, and divided into 4 major groups according to the cell lineage and differentiation: mature lymphoid neoplasms (MLN), precursor neoplasms (including acute lymphoblastic leukaemia/lymphoma [ALL] and acute myeloid leukaemia [AML]), chronic myeloid neoplasms (CMN) and histiocytic/dendritic cell neoplasms.

Methods: age-standardised (WSR) incidence, 5- and 10-year prevalence, 5- and 10-year relative survival (RS), incidence trends (Average Annual Percentage Change or AAPC), projections until 2025 and RS trends.

Results

The WSR incidence rates of HM are increasing in Belgium (AAPC: 1.2%) and mainly in the population aged 70+. The largest increase is observed for CMN with a WSR projected to double in 2025 compared to 2004 (highest AAPC in 2004-2018 for myeloproliferative neoplasms BCR-ABL1-negative: 5.4%).

The 10-yr RS varies by age group and HM type. The best prognosis is observed for MLN (66%) followed by CMN (53%). The worse prognosis is seen in AML (21%). ALL shows the greatest age variation, from >90% in children under age 10 to <20% in 70+ adults.

The 5-yr RS increases over the last years with +5 percentage point (pp) from 64% in 2004-2008 to 69% in 2014-2018. The highest improvement is seen in ALL (+14 pp), chronic myeloid leukaemia (+8 pp) and B-cell MLN (+7 pp).

Conclusions

The increase in incidence and survival can be partly explained by the diagnostic and therapeutic innovations over the 2 last decades. This study, however, also highlights entities that need more attention for improvement, such as AML.

Topic: Co-morbidities in cancer patients CM01_Niksic

The role of multimorbidity in short-term mortality of lung cancer patients in Spain: a population-based cohort study

Maja Niksic,[1] Daniel Redondo-Sánchez,[2,3,4] Yoe-Ling Chang,[2,4] Miguel Rodriguez-Barranco,[2,3,4] José Expósito-Hernández,[2,5] Rafael Marcos-Gragera,[3,6,7,8,9] Ester Oliva-Poch,[10] Joaquim Bosch-Barrera,[7] María-José Sánchez,[2,3,4,11] Miguel Ángel Luque-Fernández[1,2,3]

[1]Inequalities in Cancer Outcomes Network, Department of Non-Communicable Disease Epidemiology, London School of Hygiene and Tropical Medicine, UK [2]Non-Communicable Disease and Cancer Epidemiology Group, Instituto de Investigación Biosanitaria de Granada (ibs.GRANADA), Granada, Spain [3]Biomedical Network Research Centers of Epidemiology and Public Health (CIBERESP), Madrid, Spain [4]Andalusian School of Public Health (EASP), Granada Cancer Registry, Granada, Spain [5]Department of Oncology, HU Virgen de las Nieves, Granada, Spain [6]Research Group on Statistics, Econometrics and Health (GRECS), University of Girona, Girona, Spain [7]Department of Medical Oncology, Institut Català d'Oncologia, Hospital Universitari de Girona Dr. Josep Trueta, Girona, Spain [8]Descriptive Epidemiology, Genetics and Cancer Prevention Group, Biomedical Research Institute (IDIBGI), Girona, Spain [9]Epidemiology Unit and Girona Cancer Registry, Oncology Coordination Plan, Catalan Institute of Oncology, Girona, Spain [10]Radiation Oncology Department, Catalan Institute of Oncology, Hospital Trueta, Girona, Spain [11]Department of Public Health and Preventive Medicine, University of Granada, Granada, Spain

Background

Chronic diseases often occur simultaneously and tend to be associated with adverse health outcomes, but limited research has been undertaken to understand their role in lung cancer mortality. This study aims to describe the prevalence and patterns of having one (comorbidity) or ≥2 chronic diseases (multimorbidity) among lung cancer patients in Spain, and to examine the association between comorbidity or multimorbidity and short-term mortality risk six months after cancer diagnosis.

Materials and Methods

This population-based cohort study used data from two Spanish population-based cancer registries, Girona and Granada, and electronic health records. We identified 1259 adult lung cancer patients, diagnosed from January 2011 to December 2012. We identified the most common patterns of comorbidities and used a flexible parametric modelling to assess the overall mortality risk 6 months after diagnosis by levels of comorbidity after adjusting for age, sex, smoking, residence, surgery, stage, histology, and BMI.

Results

We found high prevalence of comorbidity in lung cancer patients, especially among the elderly, obese, men, smokers and those diagnosed with advanced-stage tumours. The most frequent comorbidities were COPD (37%), diabetes (21%) and heart failure (17%). The strongest pairwise correlation was the combination of heart failure with renal disease ($r=0.20$, $p<0.01$), and heart failure with diabetes ($r=0.16$, $p<0.01$). Patients with either comorbidity or multimorbidity had 40% higher overall mortality risk than those without comorbidities (aHR for comorbidity: 1.4, 95% CI: 1.1-1.7, aHR for multimorbidity: 1.4, 95% CI: 1.1-1.8).

Conclusions

The presence of comorbid diseases, rather than the number of comorbidities, was associated with increased risk of short-term lung cancer mortality in Spain. Comorbidity was a consistent and independent predictor of lung cancer mortality. Targeted preventive interventions and personalised clinical guidelines are required to address the needs of lung cancer patients with comorbidities.

Topic: Co-morbidities in cancer patients CM02_Ameijide

Risk of death by causes other than breast cancer by molecular subtype, stage and adherence to treatment in breast cancer

Alberto Ameijide,[1] Rebeca Font,[2] Maria Buxó,[3] Marià Carulla,[1] Ángel Izquierdo,[4] José Miguel Martínez,[5] Montse Puigdemont,[4] Rafael Marcos-Gragera,[4] Jaume Galceran,[1] Ramon Clèries[2]

[1]Registre de Càncer de Tarragona, Servei d'Epidemiologia i Prevenció del Càncer, Hospital Universitari Sant Joan de Reus, IISPV, Reus, Catalonia, Spain [2]Pla Director d'Oncologia, IDIBELL, Hospitalet de Llobregat, Catalonia, Spain [3]Institut d'Investigació Biomèdica de Girona, IDIBGI, Salt, Catalonia, Spain [4]Registre de Càncer de Girona, Unitat d'Epidemiologia i Registre de Càncer de Girona, Pla Director d'Oncologia, IDIBGI, Girona, Catalonia, Spain [5]MC MUTUAL, Departamento de Investigación y Análisis de Prestaciones, Barcelona, Catalonia, Spain

Background

Women with BC can show an excess of mortality (EM) due to cardiovascular problems and other long-term causes because of shared hormonal and genetic risk factors and secondary effects of treatments. The objective of this study is to assess the causes of mortality for causes other than BC in patients diagnosed with BC in Girona and Tarragona, estimating EM at 8 years, globally and by molecular subtype, stage and adherence to treatment.

Materials and Methods

Population-based cohort study with all women aged 15-84 years diagnosed with invasive BC in the provinces of Tarragona and Girona during the period 2007-2009 (N=2083) and followed up until December 31, 2017. The standardized mortality ratios (SMR) were evaluated at 8 years for causes other than BC excluding women who died due to BC. The analysis was performed globally, by molecular subtype (Luminal A, Luminal B, HER2-enriched, Triple Negative), by stage (I, II, III, IV) and by adherence to treatment.

Results

Globally, the SMR was 0.98 (95% CI: 0.83-1.15) and it only was statistically significant for the ovarian cancer (3.55). By molecular subtype, the SMR was 0.90 in Luminal A, 0.68 in Luminal B, 1.22 in HER2-enriched and 1.82 in Triple Negative. By stage, the SMR was 0.65, 0.74, 0.88 and 8.11 in stages I, II, III and IV respectively. We found statistically significant SMR for ovarian cancer in stage I breast cancers (4.55) and for diseases of circulatory system in stage IV breast cancers (15.63). By adherence to treatment, the SMR was 0.54 among patients with good adherence compared to 0.99 in patients with poor adherence.

Conclusions

Surviving BC women have a higher risk of dying from ovarian cancer and seems to have a lower risk of dying from other causes if their cancer is luminal type or if they have good adherence to hormonal treatment. The small sample size for some study groups and the use of official causes of death are limitations of our study

Topic: Co-morbidities in cancer patients CM03_Villavicencio

Comorbidity, survival and cause of death in patients with chronic lymphocytic leukemia: a population-based study

Alicia Villavicencio,[1,2,3] Marta Solans,[2,3,4] Lluís Zacarías-Pons,[5] Anna Vidal,[1,3] Montse Puigdemont,[1,3] Josep Maria Roncero,[6] Marc Saez,[2,4] Rafael Marcos-Gragera[1,2,3,4,7]

[1]Epidemiology Unit and Girona Cancer Registry, Oncology Coordination Plan, Catalan Institute of Oncology, Carrer del Sol 15, 17004 Girona, Spain [2]Research Group on Statistics, Econometrics and Health (GRECS), University of Girona, C/Universitat de Girona 10, 17003 Girona, Spain [3]Descriptive Epidemiology, Genetics and Cancer Prevention Group, Biomedical Research Institute (IDIBGI), 17190 Girona, Spain [4]Centro de Investigación Biomédica en Red: Epidemiología y Salud Pública (CIBERESP), Av. Monforte de Lemos 3-5, 28029 Madrid, Spain [5]Research Group on Aging, Disability and Health, Girona Biomedical Research Institute (IDIBGI), 17190 Girona, Spain [6]Hematological Service, Josep Trueta University Hospital, Catalan Institute of Oncology, Avinguda de França, S/N, 17007 Girona, Spain [7]Josep Carreras Leukemia Research Institute, 08916 Badalona, Spain

Background

Chronic lymphocytic leukemia (CLL) occurs mainly in elderly patients with comorbid conditions. However, the role of comorbidities in the course of CLL has been poorly studied. The aim of this study was to analyze the prevalence of comorbidities in patients diagnosed with CLL and to evaluate its influence on survival and cause-specific mortality at a population-based level.

Materials and Methods

Incident CLL cases diagnosed in the Girona province (Spain) during 2008-2016 were extracted from the Girona Cancer Registry. Rai stage and presence of comorbidities at diagnosis, were obtained from clinical records, further categorized using the Charlson comorbidity index (CCI). Observed (OS) and relative survival (RS) were estimated with Kaplan-Meier and Pohar Perme methods, respectively. Cox's proportional hazard models were used to explore the impact of comorbidity on overall, CLL-related, and CLL-unrelated mortality.

Results

400 incident CLL cases were included in the study. There were 230 (57.5%) men, and median age was 72 years. Except for 20 patients (0.5%), the rest presented at least one comorbidity at diagnosis, the CCI was 1-2 in 86 (21.5%) cases, 3-4 in 151 (37.7%), >4 in 118 (29.5%), and unknown in 25 (6.2%). Diabetes without end organ damage (21%) was the most common comorbidity at CLL diagnosis. Overall 5-y OS and RS were 68.8 (95% CI: 64.4-73.6) and 99.5 (95% CI 3.13-106.0), and decreased markedly with increasing CCI, particularly in patients with CCI ≥3 (47% and 52.7% OS and RS, respectively). Multivariate analysis identified no statistically significant association between the CCI diagnostic score and CLL-related and CLL-unrelated mortality.

Conclusions

A high CCI score negatively influences the survival of CLL patients. However, the association does not remain when further considering age and stage in predicting mortality (both CLL-related or CLL-unrelated) in newly diagnosed patients with CLL.

Topic: Co-morbidities in cancer patients CM04_Lasalvia

Late mortality and chronic health conditions in long term survivors of adolescent and young adult haematological cancers

Paolo Lasalvia,[1] Alice Bernasconi,[1] Claudia Vener,[2] Annalisa Trama,[1] Ada Working Group B

[1]Evaluative Epidemiology Unit, Department of Research, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milano, Italy [2]Department of Oncology and Hemato-Oncology, University of Milan, Milano, Italy

Background

Cancer survival of adolescent and young adult (15-39 years at cancer diagnosis [AYA]) improved since the last century, however long-term outcomes in AYA cancer survivors are not well understood. The aim of the current analysis is to describe chronic health conditions and all-cause late mortality among AYA survivors of haematological cancers within the Italian Adolescent and young adult (Ada) nationwide cohort compared with non-cancer populations.

Materials and Methods

The Ada cohort is a retrospective cohort of AYA cancer survivors, derived from population-based cancer registries (CRs). Each CR identified patients with primary tumours linked them to all their subsequent tumours and to health databases: mortality registries, hospital discharge records (HDR), outpatient and pharmaceutical flow. The current analyses will focus on haematological tumours, some of the most frequent AYA tumours, defined using the International Classification of Childhood Cancer, Third Edition, including Lymphomas, Leukaemia, Myeloproliferative diseases, and Myelodysplastic Diseases.

Results

AYA survivors (alive 5-years after diagnosis) correspond to 5 426 haematological cancer survivors, diagnosed between 1997-2006 (last follow-up at 2016), average follow-up time of 13 years (range 10-20 years). We will estimate the excess risk of second malignant neoplasm (SMN), hospitalizations and all-cause mortality in AYA haematological cancer survivors by standardized incidence ratios (SIRs) and absolute excess risk (AER). We will provide SIR and AER for all-SMN, all-hospitalizations and all-cause mortality by time since diagnosis and attained age. We will estimate the observed cumulative incidence of SMNs and hospitalizations using competing-risks.

Conclusions

The current analyses will provide the substantial burden of long-term health complications in AYA haematological cancer survivors. The results can be used to underscore the need for targeted interventions to ensure life-long, risk-based follow-up care for this population.

Topic: COVID-19 pandemic and cancer registration C19P01_Mitchell

Investigating the impact of COVID-19 on routes to hospital admission for cancer patients in a UK region

Helen Mitchell,[1] Ben Alford,[2] Eamon O'Callaghan,[1] Colin Fox,[1] Anna Gavin[1]

[1]Northern Ireland Cancer Registry (NICR), Centre for Public Health, Queen's University Belfast, Northern Ireland [2]Centre for Public Health, Queen's University Belfast, Northern Ireland

Background

The COVID-19 pandemic has led to global impacts, especially on those with cancer. The pandemic significantly disrupted oncology services as resources were reallocated to care for COVID-19 patients. This has the potential to impact the survival of cancer patients, many of whom require time critical care. Late-stage diagnosis and emergency presentations are linked with poorer survival and patient outcomes. The Northern Ireland Cancer Registry (NICR) has been tracking the impact of the changes to cancer services on a monthly basis using pathology data. This has shown that there were significant reductions in the numbers of pathologically diagnosed cancers during the pandemic. These data indicate a shortfall of 1280 patients during March-December 2020 compared to the expected number based on the same period in 2017-2019.

Materials and Methods

The aim of this study is to explore the impact of COVID-19 on routes to hospital admission for cancer patients. Using Patient Administration System (PAS) data, this study will investigate the impact of COVID-19 on cancer patients, with a focus in emergency presentations to hospital. This study aims to determine i) change over time in emergency admissions during the pandemic and ii) socioeconomic and sex differences in emergency admissions, compared with the pre-covid period.

Hypothesis

The expected number of admissions will be calculated based historic data for years 2017-2019. It is hypothesised that early in the pandemic there will be a drop in emergency presentations compared to previous years, due the stay-at-home messaging and shielding guidance, followed by an increase in presentations later in the year.

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Topic: COVID-19 pandemic and cancer registration C19P02_Rudolph

Patient-reported experiences and outcomes among cancer patients in northern Germany during the COVID-19 pandemic

Christiane Rudolph,[1] Ron Pritzkuleit,[1] Linda Aagaard Thomsen,[2] Susanne Oksbjerg Dalton,[2] Alexander Katalinic[1,3]

[1]Institute for Cancer Epidemiology, University of Lübeck, Ratzeburger Allee 160, 23562 Lübeck, Germany [2]Danish Cancer Society, Strandboulevarden 49, 2100 København, Denmark [3]Institute of Social Medicine and Epidemiology, University of Lübeck, Ratzeburger Allee 160, 23562 Lübeck, Germany

Background

The COVID-19 pandemic hit Europe in spring 2020 and lockdowns were implemented in order to control the spread of the novel disease. It also required measures to restructure health care in order to accommodate COVID-19 patients in intensive care units–but also to minimize the risk of infection for vulnerable groups such as cancer patients at hospitals. In Germany, the years 2020-2021 were marked by changing restrictions depending on the occurrence of SARS Cov-2 infections. The present study aims to assess patient experiences in oncological care related to e.g. treatment continuity or psycho-oncological support during the COVID-19 pandemic.

Materials and Methods

The survey will be conducted in the northernmost German federal state Schleswig-Holstein in July 2021. Cancer patients of all entities (except patients with non-melanoma skin cancer (C44), malignant neoplasms of ill-defined or unspecified sites (C76, C80) or malignant neoplasms of lymphoid, hematopoietic and related tissue (C81-C96) diagnosed between August 2020 and January 2021 will receive the German adaptation of the Danish National Cancer Patient Questionnaire as well as thirteen newly developed COVID-19-related questions. In total, 1044 patients will be contacted via the Schleswig-Holstein Cancer Registry.

Results

We will present whether cancer diagnoses were delayed due to patients postponing visits to physicians as well as whether treatment appointments were cancelled or rescheduled by either patients or treating physicians due to the pandemic. Moreover, we will present whether cancer patients received adequate psycho-social and psycho-oncological support during the health crisis.

Conclusions

The results will elicit information on cancer patient-specific needs during an emerging global infectious disease crisis and will inform future health care planning for cancer patients in case of recurring epidemics or pandemics.

Topic: COVID-19 pandemic and cancer registration C19P03_Slotman

Impact of the COVID-19 pandemic on non-melanoma skin cancer in the Netherlands: trends in diagnoses and magnitude of diagnostic delays

Ellis Slotman,[1] Kay Schreuder,[2] Tamar Nijsten,[3] Marlies Wakkee,[3] Loes Hollestein,[3] Antien Moyaart,[3] Marieke Louwman,[2] Sabine Siesling,[1,2] on behalf of the COVID and Cancer-NL project (ZONMW number 10430022010014) and cancer specific working groups

[1]Department of Health Technology and Services Research, University of Twente, Enschede, The Netherlands [2]Department of Research and Development, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands [3]Department of Dermatology, Erasmus Medical Center, Rotterdam, The Netherlands

Background
The COVID-19 pandemic and associated measures impacted the Dutch society and healthcare system. Focus switched to care for patients with COVID-19 and patients were reluctant to visit healthcare services. This study aimed to investigate the impact of the COVID-19 pandemic on the trends in diagnoses of non-melanoma skin cancer (cutaneous squamous cell carcinoma (cSCC), basal cell carcinoma (BCC)) and to assess the magnitude of diagnostic delays.

Materials and Methods
The number of diagnoses cSCC and BCC in each month of 2020 was compared to the expected number of diagnoses for these months, using data from the Netherlands Cancer Registry. Comparisons were further stratified by age, sex and region. Expected diagnoses for 2020 were used as a reference to take the yearly increasing trend in non-melanoma skin cancer incidence into account and were calculated by extrapolating the trends observed in 2017-2019. Estimates of diagnostic delays were calculated for both cSCC and BCC and corrected for the influence of excess mortality due to the pandemic on non-melanoma skin cancer incidence.

Results
The number of diagnoses of both cSCC and BCC decreased substantially when compared to the number of diagnoses expected during March to May 2020 (cSCC -29%, BCC -50%). These decreases were observed across all age groups (particularly in older patients), both sexes, and all regions. In June to September the number of diagnoses cSCC and BCC was higher than expected, after which it slightly dropped below expected again in October to December. Total 2020 non-melanoma skin cancer diagnoses continued to trail those expected, with a backlog of around 1150 cSCCs and 11767 BCCs remaining at the end of the year.

Conclusions
Diagnosis of non-melanoma skin cancer was suboptimal during the COVID-19 pandemic, with diagnostic delays likely resulting from both patient and health system related delay. Further studies will need to determine the effects of these diagnostic delays on outcomes.

Topic: COVID-19 pandemic and cancer registration C19P04_Van Hoogstraten

The impact of the COVID-19 pandemic on the bladder cancer care in the Netherlands

Lisa M.C. van Hoogstraten,[1] Lambertus A. Kiemeney,[2,3] Richard P. Meijer,[4] J. Alfred Witjes,[2] Katja K.H. Aben,[1,3] et al., on behalf of the BlaZIB study group and the COVID and Cancer-NL consortium

[1]Department of Research and Development, Netherlands Comprehensive Cancer Organisation, Utrecht, the Netherlands [2]Department of Urology, Radboud University Medical Centre, Nijmegen, the Netherlands [3]Radboud Institute for Health Sciences, Radboud University Medical Centre, Nijmegen, the Netherlands [4]Department of Oncological Urology, University Medical Center Utrecht, Utrecht, The Netherlands

Background
Due to the COVID-19 pandemic spreading to the Netherlands in February 2020, the number of hospitalized COVID-19 patients increased, leading to downscaling of regular health care. Bladder cancer care guidelines were adapted to ensure continuity of uro-oncological care. We aimed to evaluate the impact of COVID-19 in the Netherlands on bladder cancer diagnoses, disease stage, initial treatment and time to start treatment.

Materials and Methods
Patients newly diagnosed with or treated for bladder cancer in January-May 2020 (COVID-19 period) and patients diagnosed or treated between January-May 2018/2019 (reference period) were identified in the Netherlands Cancer Registry and compared.

Results
A 10% decline in bladder cancer diagnoses was observed in the COVID period compared to the reference period. This decrease was most pronounced in patients ≥70 years and patients with non-muscle invasive disease. Treatment remained largely similar for patients diagnosed between January-May of 2020 compared to the reference period, with the exception that less patients with muscle-invasive bladder cancer underwent radical cystectomy (RC). During the entire COVID-19 period, the number of radical cystectomies (RC) performed for bladder cancer remained largely similar compared to 2018-2019 (2.3% more RCs in January-May 2020 relative to the reference period). For patients who underwent RC, the average time from diagnosis to RC seemed to be shorter compared to 2018/2019.

Conclusions
Due to the first COVID-19 wave, the number of new bladder cancer diagnoses decreased, mostly for older patients and patients with non-muscle invasive disease. Effects on uro-oncological care and operating capacity appeared to be limited. It is possible that delayed diagnoses has led to a stage shift and thereby might have an impact on survival.

Topic: COVID-19 pandemic and cancer registration C19P05_Petrova

Effect of the coronavirus pandemic on how long people wait to consult for cancer symptoms: a population-based survey

Dafina Petrova,[1,2,3] Marina Pollán,[1,4] Miguel Rodríguez-Barranco,[1,2,3] Josep Maria Borrás,[5,6] Dunia Garrido,[7] Daniel Redondo-Sánchez,[1,2,3] Esther Ubago-Guisado,[1,2,3] María José Sánchez[1,2,3,7]

[1]CIBER of Epidemiology and Public Health (CIBERESP), Madrid, Spain [2]Escuela Andaluza de Salud Pública (EASP), Granada, Spain [3]Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain [4]National Center for Epidemiology, Health Institute Carlos III, Madrid, Spain [5]IDIBELL, University of Barcelona, Barcelona, Spain [6]Department of Health, Catalonian Cancer Strategy, Barcelona, Spain [7]University of Granada, Granada, Spain

Background
Several studies have documented decreases in new cancer diagnoses during the SARS-CoV-2 pandemic, suggesting important diagnostic delays. Besides the changes in the functioning of the health system, the time patients wait before consulting their physician after noticing cancer symptoms could also have increased during the pandemic. To explore this possibility, we compared anticipated help-seeking times for cancer symptoms before and after the pandemic.

Materials and Methods
Two waves of the nationally representative Spanish Oncobarometer survey were analyzed: Pre-Coronavirus (N=3269) collected in February 2020 and Post-Coronavirus (N=1500) collected in August 2020. Anticipated times to help-seeking (i.e., consulting with one's physician) and perceived barriers were measured with the international ABC questionnaire. Pre-post comparisons were performed for individual symptoms, barriers, and sum scores using multiple logistic and Poisson regressions.

Results
There was a consistent and significant increase in anticipated times to help-seeking from Pre to Post for 12 of 13 cancer symptoms, with important increases for breast changes (OR=1.54, 95% CI 1.22-1-96) and unexplained bleeding (OR=1.50, 95% CI 1.26-1.79). Respondents were also more likely to report barriers to help-seeking in the Post wave (e.g., worry about wasting the doctor's time). Both help-seeking times and perceived barriers increased more strongly among women and older individuals.

Conclusions
Patients experiencing cancer symptoms may be waiting longer to consult with their physicians during the pandemic, which could contribute to late cancer diagnoses. Cancer registries are in a unique position to collaborate in studies estimating how the pandemic has influenced the different intervals on the cancer care pathway. Besides the diagnostic and pre-treatment intervals, the patient interval should also be considered to fully understand any pandemic-related changes in cancer diagnoses.

Topic: COVID-19 pandemic and cancer registration C19P06_Tanskanen

Cancer detection and screening attendance in Finland before and during the COVID-19 pandemic

Tomas Tanskanen,[1] Milla Lehtinen,[1] Nea Malila,[1] Tytti Sarkeala,[1] Sirpa Heinävaara,[1] Janne Pitkäniemi[1,2,3]

[1]Finnish Cancer Registry, Helsinki, Finland [2]Faculty of Social Sciences, University [3]Faculty of Medicine, University of Helsinki, Helsinki, Finland

Background

The COVID-19 pandemic, declared by the World Health Organization in March 2020, has affected the availability and accessibility of health services in many settings, and people may have postponed or canceled health care visits due to the pandemic. A specific concern among cancer patients is potential diagnostic delay. The aim of this nationwide, population-based study is to investigate cancer detection and screening attendance in Finland before and during the COVID-19 pandemic.

Materials and Methods

The Finnish Cancer Registry provided preliminary data on cancer notifications from January to June 2020, as well as the respective periods in 2018-2019. A Poisson regression model was used to estimate the expected monthly numbers of new cancer samples from March to June 2020 based on the earlier periods. The Finnish Mass Screening Registry provided preliminary data on cancer screening attendance.

Results

Between March and June 2020, there were 12% (2610) fewer new cancer samples observed than expected. The difference between the observed and the expected number of new cancer samples was greatest in May 2020 (-26%). For breast cancer screening, the attendance rate between January and November (the proportion screened among those invited during the period) was 83% in 2019 and 82% in 2020. For cervical cancer screening, the attendance rate between January and October was 63% in 2019 and 52% in 2020. The proportion of missing data was estimated to be at least 22% for cancer samples, 26% for breast cancer screening, and 50% for cervical cancer screening.

Conclusions

The reduction in new cancer samples in spring 2020 may indicate diagnostic delay. However, this delay may be temporary and can be evaluated with more complete data and cancer incidence figures later. Screening attendance appeared to decrease mostly for cervical cancer screening, the impact on breast cancer screening was modest. The results will be updated before the ENCR Scientific Meeting in November 2021.

Impact of COVID-19 on cancer diagnosis in Girona, Spain

Arantza Sanvisens,[1] , Montse Puigdemont,[2] Eugeni López-Bonet,[3] Ferran Martín-Romero,[4] Gemma Renart-Vicens,[5] Anna Vidal,[2] Rafael Marcos-Gragera[1,2]

[1]Unitat d'Epidemiologia i Registre del Càncer de Girona, Institut de Recerca contra la Leucèmia Josep Carreras, Girona, Spain [2]Unitat d'Epidemiologia i Registre del Càncer de Girona, Pla Director d'Oncologia, Institut Català d'Oncologia, Girona, Spain [3]Servei d'Anatomia Patològica, Hospital Universitari Dr. Josep Trueta, Girona, Spain [4]Servei d'Anatomia Patològica, Hospital de Figueres–Fundació Salut Empordà, Girona, Spain [5]Research Group on Statistic, Econometrics and Health (GRECS), University of Girona, Girona, Spain

Background
The recent COVID-19 pandemic has compromised the health care services leading to consequences for the diagnosis and follow-up of other pathologies. The objective of this study was to evaluate the impact of COVID-19 in the diagnosis of cancer in Girona.

Materials and Methods
Observational study of samples received in two pathological anatomy departments in province of Girona, 2019-2020. Date of collection, type of sample, and location and morphology coded according to the Systematized Nomenclature of Medicine, were available. Samples were recoded for malignancy using the ICD-O-3.1 and grouped based on sample location. Comparisons were made by calendar year and by period of exposure to COVID-19.

Results
A total of 102360 study samples were included, 80517 from the Josep Trueta Hospital in Girona and 21843 from Figueres. The reduction in the activity in the pathological anatomy departments in 2020 compared to the previous year was 25.4% in Girona and 27.5% in Figueres. The reduction in cancer diagnoses in 2020 with respect to 2019 was 6.8% in Girona and 20.7% in Figueres, with marked differences depending on the type of neoplasia. Specifically, a decrease was observed in the diagnoses of thyroid gland (-40%), central nervous system (-22%) and stomach (-23%) in Girona and bones or larynx (-75%), esophagus (-56%) or lip, oral cavity and pharynx (-50%) in Figueres while the diagnosis of other types of tumor was increased. Globally, the probability that a sample received in the pathological anatomy department presented malignancy in the COVID-19 era compared to free COVID period was statistically significantly higher in both hospitals (Girona: OR=1.28, 95% CI: 1.23-1.34, $p<0.001$, Figueres: OR=1.10, 95% CI: 1.01-1.20, $p=0.023$).

Conclusions
Pathology department activity fell significantly during the COVID-19 pandemic era and resulted in an overall decrease in cancer diagnoses. However, this decrease was not observed for all tumor locations.

Topic: COVID-19 pandemic and cancer registration C19P08_Trewin

Effect of COVID-19 pandemic on diagnosis of invasive breast cancer by age, detection mode and tumour size in Norway

Cassia B. Trewin,[1] Solveig Hofvind,[2] Lars A. Akslen,[3,4] Hilde Bjørndal,[5] Inger Kristin Larsen,[1] Jan F. Nygård,[6] Sunil Xavier Raj,[7] Kjersti Østby,[1] Giske Ursin,[8,9,10] Helle Kristine Skjerven[5]

[1]Cancer Registry of Norway, Department of Registration, Oslo, Norway [2]Cancer Registry of Norway, Section of Breast Screening, Oslo, Norway [3]Centre for Cancer Biomarkers CCBIO, Gade Laboratory for Pathology, Department of Clinical Medicine, University of Bergen, Norway [4]Department of Pathology, Haukeland University Hospital, Bergen, Norway [5]Vestre Viken Hospital Trust, Drammen Hospital, Drammen, Norway [6]Cancer Registry of Norway, Department of Registry Informatics, Oslo, Norway [7]Cancer Clinic, St. Olavs University Hospital, Trondheim, Norway [8]Cancer Registry of Norway, Oslo, Norway [9]Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA 90033, USA [10]Department of Nutrition, Institute of Basic Medical Sciences, University of Oslo, Oslo, Norway

Background
Due to the COVID-19 pandemic, Norway went into lockdown and BreastScreen Norway closed down on March 12th 2020. Clinical mammography aimed to continue as usual. BreastScreen recommenced with reduced volume in mid-May and normal volume from September. We describe how the pandemic influenced diagnosis of invasive breast cancer in Norway in 2020.

Materials and Methods
Information from the Cancer Registry of Norway was used to compare the cumulative number of first invasive breast cancers diagnosed each month in 2020 compared to the average per month in 2017-2019. We stratified by age at diagnosis (0-49, 50-69, 70+), clinical tumor size (small cT1-2, large cT3-4, unknown) and detection mode (screen detected or symptomatic). Interval cancers were considered symptomatic.

Results
Preliminary analyses found 207 fewer first invasive breast cancers diagnosed in 2020 (N=3 401) compared to the average for 2017-2019 (N=3 608). Among 50-69 year olds, there were 295 fewer screen-detected cases but 69 more symptomatic cases in 2020 versus 2017-2019. For 0-49 and 70+ year olds, there were 19 more symptomatic cases in 2020 versus 2017-2019. Among screen-dectected cases, there was a clear decline in number of small tumours (cT1-2), but no difference in number of large tumours (cT3-4) in 2020 compared to 2017-2019. For symptomatic cases, preliminary analyses found no substantial difference in number of small or large tumours in 2020 compared to 2017-2019.

Conclusions
We found a decline in number of women diagnosed with a first invasive breast cancer in Norway in 2020 compared to the previous three years. The deficit was primarily small, screen-detected tumours, most likely related to the lockdown in mammography screening. Detection of symptomatic breast cancer did not appear to be hindered or delayed by the COVID-19 pandemic. We need more time to fully understand the consequences of the pandemic and delayed screening invitation on tumour size and stage.

Topic: COVID-19 pandemic and cancer registration C19P09_Lambe

The impact of the COVID-19 pandemic on cancer registration in Sweden

Mats Lambe,[1,2] Anna Genell,[3] Chenyang Zhang,[3] Gabrielle Gran,[4] Sandra Irenaeus,[1] Johan Ahlgren[1]

[1]Regional Cancer Center of Central Sweden, Uppsala, Sweden [2]Department of Medical Epidemiology and Biostatistics, Stockholm, Sweden
[3]Regional Cancer Center West, Gothenburg, Sweden [4]Regional Cancer Center South East, Linköping, Sweden

Background
Because of changes in healthcare seeking behaviours and re-allocation of health care resources to COVID-19 care the pandemic has had major impacts on public health, including declines in number of patients seeking care for life-threatening conditions. We explored patterns of cancer registration during the different phases of the pandemic in Sweden, a country with high COVID-19 death rates and where regional screening programs were temporarily halted and attendance reduced.

Materials and Methods
Data from six regional population based cancer registers were used to compare reporting in 2020 through March 2021 with patterns of reporting in earlier years.

Results
Recently updated results for cancer reporting overall (all cancers) and for major cancer forms by sex and age will be presented.

Conclusions
The COVID-19 pandemic has affected patterns of diagnosis of cancer in Sweden with the most pronounced declines in number of reported cases observed for prostate cancer, cervical cancer in-situ and breast cancer.

Topic: Data quality, control, and standards for cancer registries DQ01_López

Quality indicators of the population-based cancer registry of Madrid

Raquel López González,[1,2] David Parra Blázquez,[2] Belén Zorrilla Torras,[2] Nuria Aragonés Sanz,[2]

[1]Fundación para la Innovación e Investigación Biosanitaria en Atención Primaria, Spain [2]Servicio de Vigilancia y Registro del Cáncer, Subdirección General de Epidemiología, Spain

Background
The Population-Based Cancer Registry of the Community of Madrid (Spain) aims to have accurate and complete information on the incidence of cancer in the region, following the quality standards of the International Agency for Research on Cancer and the World Health Organization. Surveillance of childhood cancer is very important despite being a rare disease, because it is the second leading cause of death in those under 20 years of age.

Materials and Methods
We analyzed all pediatric and adolescent cancers diagnosed in 2015 and 2016 in the Community of Madrid. We also performed an internal coherence analysis to detect unlikely or implausible combinations of topographic-morphological codes, unlikely tumors at certain ages, and other verifications using the IARCTools program. In addition, we analyzed other data quality indicators proposed by IARC.

Results
489 tumors were registered. There were 9.3% of cases under one year of age over the cases of 0-14 years and 90% of the cases had microscopic confirmation. The only diagnostic groups with a percentage lower than 90% were CNS tumors (70%) and retinoblastomas (35.7%) due to the low frequency of tumor biopsies or excision performed in neoplasms in these locations. Only one DCO case (0.2%) and 6.3% of unspecified cases were identified. The proportion of non-malignant neoplasms of the CNS over the total number of cases in groups 3 and 10a was 46.4%, outside the reference range, because pilocytic astrocytomas were classified as benign according to ICD-O-3.1. Finally, the standardized incidence rates in the 0-14 year-old group were slightly above the reference ranges (183.93/million) for pituitary adenomas, although the global standardized rate for 0-19 years was within the reference range (190.31/million).

Conclusions
These indicators are similar to those provided by other childhood cancer registries in our environment, suggesting that our registry provides data with high internal validity.

Use of death certificates in the Castilla y León Population-Based Cancer Registry (Province of Salamanca)

Pilar Gutiérrez Meléndez,[1] Enrique Cabrera Torres,[2] Rufino Álamo Sanz,[1] Lorena Estevez Iglesias,[1] José Eugenio Lozano Alonso[1]

[1]Castilla y León Population-Based Cancer Registry, Public Health Office, Castilla y León Government, Valladolid, Spain [2]Castilla y León Population-Based Cancer Registry (province of Salamanca), Public Health Office, Castilla y León Government, Salamanca, Spain

Background

The use of Death Certificates (DCs) as an information source is quite relevant to ensure cancer registries' completeness and validity. This study aims to describe the process of using DCs that mention cancer to identify new cases in the Castilla y León Population-Based Cancer Registry (CLPBCR) belonging to the province of Salamanca.

Materials and Methods

All DCs that mention cancer (excluding non-melanoma skin) in Salamanca during the years 2011-2016 were linked to the cancer registry (2006-2016) data in order to determine whether a death certificate case is already in the registry. The cases that were not matched were labelled as Death Certificate Notified (DCN). As all relevant notifications to the registry were received before performing the matching, the trace-back procedures could be initiated. The trace-back cases were grouped into confirmed not to be cancer and Death Certificate Initiated (DCI). These last ones were divided in three groups: cancer confirmed from other source with incidence data previous or later the start of the registry and cases for which no other information than a DC could be obtained, labelled as Death Certificate Only (DCO) cases.

Results

Around 80.0% of the 6387 DCs notifications during the period from 2011 to 2016 were included already in the registry with a corresponding cancer. The rest of the cases (1275 DCN) were classified as follows: 168 (13.2%) were traced as not-cancer cases, 283 (22.2%) were DCI cancer cases previous the start of the registy, 735 (57.6%) were DCI cancer cases later the start of the registy and 89 (7.0%) were not-traced cases (DCO).

Conclusions

Among the DCNs cases, only 13.2% were not-to be cancer and 7.0% were DCO cases. These facts indicate relatively high-quality of the certificate methods in Castilla y León as well as the efficiency in the trace-back of DCN cases. The proportion of the DCI cancer cases later the start of the registy, similar to other registries in Spain, provides an estimate of our registry's completeness.

Topic: Data quality, control, and standards for cancer registries DQ03_Kolari

Automated quality check for clinical notifications at the Finnish Cancer Registry

Ida-Liisa Kolari,[1] Henna Degerlund,[1] Minna Merikivi,[1] Nea Malila[1]

[1]Finnish Cancer Registry, Unioninkatu 22, 00130 Helsinki, Finland

Background

The Finnish health care organizations and practitioners are obliged to submit cancer notifications to the Finnish Cancer Registry (FCR). Organizations supply cancer information as an extract from their information system or clinician may submit an individual cancer notification. One of the 11 organ-specific programs or educated person interpret the notification(s) and register a cancer case according to inhouse instructions that follow international guidelines.

Clinical notifications have been mostly electronic since 2020. In 2020 FCR received 25000 clinical notifications. While IARC/ENCR quality tools are available for checking the quality of the cancer cases, there is no readymade tool for inspecting the data at the notification level. Currently a specialist reviews the incoming data manually. In 2021 FCR plans to pilot an automated quality check for clinical notifications. The aim is to apply reproducible and systematic review process, enhance feedback to the data providers and maintain a high-quality registry that relies on structural data and automation.

Materials and Methods

A specialist reviews clinical notifications for contradictory contents in information such as combination of ICD-10 diagnosis and ICD-O-3 morphology/behavior, ICD-10 diagnosis and spreading, or ICD-O-3 morphology and basis of diagnosis. Automation of this process is currently under development. In the pilot phase the implementation is built on database functions. In 2021 FCR will check incoming data automatically in parallel with manual review and performance and accuracy will then be reported.

Results

Results from the above review are expected in autumn 2021.

Conclusions

An automatic quality check strives to respond to the changes in the Finnish health care system and to improve the data quality at the beginning of the registration process.

Topic: Data quality, control, and standards for cancer registries DQ04_Prinsen

Using a common data model to create more impact–conversion of Norwegian and Dutch Cancer Registry data to the OMOP-CDM

Peter Prinsen,[1] Chiara Attanasio,[1] Espen Enerly,[2] Susan Evans Axelsson,[3] Gijs Geleijnse[1]

[1]Department of Research and Development, Netherlands Comprehensive Cancer Organisation (IKNL), Utrecht, The Netherlands [2]Department of Research, Cancer Registry of Norway, Oslo, Norway [3]Division of Urological Cancers, Institution of Translational Medicine, Lund University, Malmö, Sweden

Background

The Cancer Registry of Norway (CRN) and The Netherlands Cancer Registry (NCR, maintained by the Netherlands Comprehensive Cancer Organization (IKNL)), contain rich population-based clinical data, including treatments. These data sets are mainly used nationally, but their value on the international stage should not be underestimated, especially when combined with other data. Harmonization of data is important, thus CRN and IKNL are exploring ways to stimulate international use of their data beyond the standards and data items in ENCR and IARC data calls.

Materials and Methods

CRN and IKNL are converting their data to the Observational Health Data Sciences and Informatics (OHDSI) Observational Medical Outcomes Partnership Common Data Model (OMOP-CDM) with the added Oncology Extension. IKNL has joined PIONEER, the Big Data for Better Outcomes in Prostate Cancer (PCa) project, which uses the OMOP-CDM to facilitate research on multiple PCa data sets to answer 56 research questions covering all stages of PCa. The European Health Data & Evidence Network (EHDEN) supports the data conversion process.

Results

IKNL has converted standard items for their ~3M patients. It has mapped its ~1000 treatments to standard concepts and converted additional items for prostate and colorectal cancer patients. CRN has started conversion of standard items and of systemic antineoplastic treatment for lung cancer. IKNL participated in and shared study results with PIONEER for their first studyathon investigating the natural history of PCa in patients managed with Watchful Waiting.

Conclusions

Both CRN and IKNL are initiating international collaborations made possible by their data being in the OMOP-CDM. It has enabled IKNL to join PIONEER and participate in a studyathon with >200 worldwide participants using 19 data sets from 6 countries (>1.4M patients). The federated approach of OHDSI is an additional benefit in light of patient privacy and allows cancer registries to better integrate into the health data ecosystem.

Topic: Data quality, control, and standards for cancer registries DQ05_Hackl

Implementing the European Data Protection Regulation within the Austrian National Cancer Registry (ANCR)

Monika Hackl,[1] Petra Ihle,[1] Ernst Leser,[1] Harald Wohlmuth,[1] Thomas Pascher[1]

[1]Austrian National Cancer Registry / Statistics Austria, Guglgasse 13, 1110 Vienna, Austria

Background

Austria has published Cancer Statistics Ordinance 2019, implementing the requirements of the European Data Protection Regulation. This fulfilled a long-standing requirement of Statistics Austria, operating the Austrian National Cancer Registry (ANCR): instead of personal identifiers, only unique, non-traceable pseudonyms will be stored, according to the e-Government Act (2004).

Materials and Methods

As a service provider for the hospitals, Statistics Austria, is now able to arrange the encryption of personal identifiers. This has been implemented in cooperation of Statistics Austria, the Federation of Social Insurances and the Federal Ministry of the Interior. These comprehensive changes made it necessary to redevelop the processing application. One major challenge was the conversion of patient names, social security numbers and addresses to the pseudonym for the entire database.

Results

Statistics Austria provides three options for reporting data: web form or file upload via electronic web questionaire and file transfer via SFTP. In the course of the conversion work, the classification was changed from ICD-O-3 edition 1 to 2. The plausibility checks integrated in the ANCR and the rules for the documentation of multiple tumors were updated to the latest European/international standards.

Conclusions

Key innovations for the ANCR include the following points:

- Cancer notifications must be submitted electronically only.
- Person identification by means of sector-specific personal identifier, official statistics (bPK-AS).
- Reporting after sufficiently confirmed initial diagnosis, discontinuation of subsequent reports.

The exclusively electronic transmission of data should also lead to an improvement in the quality of cancer statistics and thus also serves strategic goal No. 5 of the 2014 Cancer Framework Program, 'High-quality data and improved evidence-based information for decision-making by healthy individuals, patients, health care providers and political decision-makers'.

Towards the optimization of the Childhood Cancer Registry in Spain: new staging guidelines for childhood cancer

Blanca Martínez de las Heras,[1] Ana Fernández-Teijeiro,[2] Elena Pardo,[3] Adela Cañete,[4] WG-RET

[1]Hospital Universitario y Politécnico La Fe, Valencia, Spain [2]Hospital Virgen de la Macarena, Sevilla, Spain [3]Universidad de Valencia, Valencia, Spain [4]Hospital Universitario y Politécnico La Fe, Valencia, Spain

Background

Cancer registries are essential for proper planning and health care. To compare incidence and survival over time and between countries, an international standard cancer staging common to all registries is necessary. The Working Group of the Spanish Registry of Childhood Tumors (WG-RETI) of the Spanish Society of Pediatric Hematology and Oncology (SEHOP) in collaboration with the University of Valencia presents the translation into Spanish 'Childhood cancer staging for population registries according to the Toronto Childhood Cancer Stage Guidelines', by Aitken JF, et al, Cancer Council Queensland and Cancer Australia, 2017.

Materials and Methods

The Toronto Childhood Cancer Stage Guidelines were elaborated in 2014, in their original version in English, by the International Union Against Cancer (UICC), the Dana-Farber Cancer Institute and the Hospital for Sick Children of Toronto. The Guidelines have been endorsed by the TNM prognostic factors project of the UICC, the European Network of Cancer Registries (ENCR) and the International Association of Cancer Registries (IACR) and incorporated to the TNM classification. The 16 sections of the guidelines were distributed among the WG-RETI members for translation.

Results

The 16 sections of the staging guidelines, which in general correspond to the main diagnostic groups for childhood cancer, have been translated into Spanish. It is accessible by DOI: 10.7203/72724. On March and April 2021, the online course 'Staging of childhood tumors with the Toronto Guidelines' was held within the framework of the Spanish Network of Cancer Registries REDECAN at the Institute of Health Sciences of Castilla-La Mancha in Talavera.

Conclusions

The translation into Spanish of the Toronto Childhood Cancer Stage Guidelines will allow the progressive incorporation of a common international staging system for childhood cancer cases registered in the RETI. Its use will ensure meaningful comparisons with other countries.

Topic: Estimation of cancer burden ECB01_Hawkins

Rare cancer incidence in Northern Ireland 1993-2018

Sinead T Hawkins,[1] Gerard Savage,[1] Rasha Alhazzaa,[2] Helen Mitchell,[1] David Donnelly,[1] Anna T Gavin[1]

[1]Northern Ireland Cancer Registry (NICR), Centre for Public Health, Queen's University Belfast, Northern Ireland [2]Patrick G Johnston Centre for Cancer Research, Queen's University Belfast, Northern Ireland

Background

The Northern Ireland Cancer Registry (NICR) holds cancer incidence data since 1993. The Surveillance of Rare Cancers in Europe project RARECARENet created a list of rare cancers using International Classification of Diseases (ICD) for Oncology, 3rd edition (ICD-O-3) defined as an incidence rate of < 6 per 100 000 per person years across the European Union and the United Kingdom. 22% of all cancers diagnosed are rare. Rare cancers can require more specialised treatment and support.

Materials and Methods

The NICR dataset for cancer incidence 1993-2018 were converted from ICD-10 to ICD-O-3. The RARECARENet rare cancer list December 2015 was merged into the dataset and registrations assigned as a rare or non-rare cancer. Registrations that were outside of the RARECARENet list were excluded from analysis.

Results

2014-2018 there were an average of 1 228 males and 1 234 female rare cancers diagnosed in Northern Ireland (NI) annually. Rare cancers made up 25.5% of male cancers and 25.6% of female cancers. The risk of developing rare cancer before the age of 75 was 1 in 11.2 for men and 1 in 12.4 for women, while before the age of 85 the risk was 1 in 7.0 for men and 1 in 8.1 for women. The most common rare cancer types among men were haematological cancer (29.3%), digestive system cancer (19.9%) and head and neck cancer (18.9%), while the most common rare cancer types among women were female genital cancer (26.0%), haematological cancer (22.2%) and digestive system cancer (13.6%). Rare cancer incidence was 6% below n the NI average in the more affluent areas and 15% higher in the most economically deprived areas. 25year prevalence of rare cancer in 2018 is 17 546. Age standardised five-year net survival is 47.8%.

Conclusions

Rare cancer accounts for approximately a quarter of all male and female cancers in NI with highest rates for haematological malignancies and digestive tract malignancies. They are more common with socio-economic deprivation.

Acknowledgements: the NICR is funded by the NI Public Health Agency.

Topic: Estimation of cancer burden ECB02_Egorova

Assessment of the results of the implementation of regional programs Control and prevention of lung cancer in the Samara region (RF)

Alla Egorova,[1,2] Andrey Orlov[1]

[1]Samara Regional Clinical Oncology Dispensary [2]Samara Cancer Registry, Samara region

Background

According to Globocan, in 2012, the incidence of lung cancer in the Russian Federation was 24.0 per 100 thousand people, which is significantly lower than in European countries (29.8 ± 1.2, p = 0.95, t = 2). Died from this disease 21.5 per 100 thousand people, which is also significantly lower than in the European Region (24.8 ± 1.0, p = 0.95, t = 2).

Materials and Methods

For the scientific substantiation of the programs for the control and prevention of lung cancer, the quality of medical care for this group of patients was assessed in the period 2008-2018. Trends in morbidity, mortality and survival were studied using materials from CI5, Vol.XI, Concord 3 and the Samara Cancer Registry.

Results

In the Samara region in the period 2008-2012, lung cancer ranked second. The incidence rate in men (58.2 per 100 thousand people) was significantly higher than the European average (49.4 ± 1 = 3.6, p = 0.95, t = 2). In the period from 2012 to 2018, the indicator decreased from 52.6 to 48.1 per 100 thousand people (or 3.9%). Among women, the incidence was 7.2 per 100 thousand people, which is significantly lower than the average European level (15.6 ± 3.1, p = 0.95, t = 2). However, in the period from 2012 to 2018, the indicator increased from 6.2 to 8.3 per 100 thousand people (or 34.6%).

Mortality from lung cancer in the Samara region in 2012 was 21.5 per 100 tons of people, which is significantly lower than the European average (24.7 ± 2.0). Over the past 5 years, the indicator has decreased by 16.7% and in 2018 it was 17.1 per 100 thousand people. However, the 5-year relative survival rate in 2010-2014 was only 13.7%, which is significantly lower than the European average (15.2 ± 1.2, p = 0.95, t = 2).

Conclusions

Thus, with reliably high rates of lung cancer morbidity, reliably low rates of survival are recorded in the Samara region. This determines the need for further improvement in the region of measures for the control and prevention of lung cancer, which should help prevent the disease and ensure timely diagnosis and effective treatment.

Topic: Estimation of cancer burden ECB03_Whiteside

The descriptive epidemiology of male breast cancer in Northern Ireland between 1993-2018

Emma Whiteside,[1] Anna Gavin,[1] Helen Coleman,[1] Nick Orr[1]

[1]Queen's University Belfast, Northern Ireland

Background

Male breast cancer (MBC) is considered a rare disease, but little is known about its epidemiology in the UK. A paucity of MBC research has led to treatments typically being extrapolated from female breast cancer. We performed epidemiological analysis of MBC in Northern Ireland (NI) between 1993 and 2018, to help inform public health initiatives and health service planning.

Materials and Methods

Data on 204 MBC cases were provided by the NI Cancer Registry (NICR). Patient demographics, tumour characteristics, treatment and survival were summarised using descriptive statistics. Association analyses used chi-squared tests, t-tests, and Cox regression tests to explore relationships between variables. Male data were compared to female data taken from a 2012 NICR audit.

Results

Over the last 25 years MBC incidence in NI has remained stable, with a mean annual incidence of 1.23 cases per 100 000 males. Average annual MBC incidence was highest in men aged 75 years and older (10.16 per 100 000 males), different from female breast cancer (FBC), where incidence was highest in 50-64-year-olds. Cases aged 70+ years were often diagnosed with a later stage cancer compared to younger men ($P = 0.04$). Surgery was the most common treatment method. Observed 5-year survival was 65.7% for males compared to 77.4% for females. Survival was poorer with later stage diagnosis ($P < 0.001$).

Conclusions

The average annual incidence rate of MBC in NI was 1.23 per 100 000 males, meeting the definition of a rare cancer (defined as < 6 per 100 000 males). However, the MBC incidence in men aged over 75 years exceeds this threshold (10.16 per 100 000 males). Poorer observed survival relative to female breast cancer may be related to late presentation, highlighting a need for increased awareness of MBC, particularly in older men.

Acknowledgements: the NI Cancer Registry is funded by the Public Health Agency of NI. This work uses data provided by patients and collected by the health service as part of their care and support.

Topic: Estimation of cancer burden ECB04_Ameijide

2021 projections of hematological neoplasms incidence in Spain

Marta Solans,[1] Arantza Sanvisens,[2] Alberto Ameijide,[3] Paula Franch,[4] Visitación de Castro,[5] Matilde Chico,[6] Dolores Rojas,[7] Eva Ardanaz,[8] Antonia Sánchez,[9] Rafael Marcos-Gragera,[1,2] REDECAN Working Group A

[1]Research Group on Statistics, Econometrics and Health, University of Girona, CIBERESP, Girona, Spain [2]Epidemiology Unit and Girona Cancer Registry, Oncology Coordination Plan, Catalan Institute of Oncology–Josep Carreras Leukaemia Research Institute, Girona, Spain [3]Tarragona Cancer Registry, Cancer Prevention and Epidemiology Service, Salut Sant Joan de Reus University Hospital, Reus, Spain [4]Mallorca Cancer Registry, General Directorate of Public Health, Illes Balears Health Research Institute, Illes Balears, Palma de Mallorca, Spain [5]Basque Country Cancer Registry, Health Department, Basque Government, Bilbao, Spain [6]Ciudad Real Cancer Registry, Department of Public Health, Autonomous Government of Castilla la Mancha, Ciudad Real, Spain [7]Canary Islands Cancer Registry Epidemiology and Prevention Service, Directorate General of Public Health, Canarian Health Service, Las Palmas de Gran Canaria, Spain [8]Navarra Cancer Registry, Navarra Public Health Institute. IdiSNA. CIBERESP, Pamplona, Spain [9]Murcia Cancer Registry, Department of Epidemiology, Murcia Health Council, Murcian Health Service, Murcia, Spain

Background
Updated cancer incidence data are difficult to obtain due to a delay in the availability of registry data. The aim of this study was to estimate the incidence of hematological neoplasms (HM) in 2021 in Spain, using harmonized data from the Spanish Network of Cancer Registries (REDECAN).

Materials and Methods
Data were extracted from 16 Spanish population cancer registries, which cover ~26% of the total Spanish population. All HM incident cases diagnosed during 2002-2013 were included, classified following the WHO 2008 classification, and grouped according to the HAEMACARE scheme. Age-standardized incidence rates were calculated using the 2013 European standard population (ASR) and expressed per 100 000 person-years. Incidence trends were modeled using a Poisson regression model to estimate the annual percent change (APC). 2021 HM projections were calculated by applying the 2002-2013 APC to the last 5-year period of known incidence (2009-2013).

Results
A total of 56777 HM were registered during 2002-2013. Around 55% of patients were men and median age at diagnosis was 54 years. Based on these data, 25879 HM will be diagnosed in 2021 in Spain. Among them, 17285 lymphoid neoplasms (67.3%, ASR=35.7) and 8446 myeloid neoplasms (32.6%, ASR=8.446) are expected. Within the former, plasma cell neoplasms become the most frequent subtype, with a total of 3347 expected cases and an ASR of 6.89. Within myeloid neoplasms, essential thrombocythemia remains the most frequently diagnosed subtype, with a prediction of 1421 cases and an ASR of 2.81.

Conclusions
Changing classifications, improvement of the registration of HM over time, and the outbreak of the COVID-19 must be considered when interpreting our results. Nonetheless, in times of an unprecedented pandemic, which is expected to have caused delays in cancer diagnosis and an increase in the future burden of cancer, these data are relevant to public health policy making.

Topic: Estimation of cancer burden ECB05_Silversmit

Exploring the excess hazard in the Belgian cancer population

Geert Silversmit,[1] Freija Verdoodt,[1] Liesbet Van Eycken[1]

[1]Belgian Cancer Registry, Brussels, Belgium

Background
The total mortality hazard in a cancer patient cohort is the sum of the excess hazard due to cancer and the expected hazard due to other death causes. Net survival curves are based on the cumulative excess hazard. However, examining the excess hazard directly as a continuous function of the survival time and age at diagnosis allows a more detailed view of the cancer excess mortality. This study explores the excess hazard as a function of survival time and age at diagnosis in the Belgian cancer population 2004-2018 for cancers of the colorectum, pancreas, oesophagus, lung, prostate and female breast. Differences in excess hazard will be linked to age at diagnosis, clinical stage and main treatment received.

Materials and Methods
The excess mortality was modelled by regression splines, using the R package flexrsurv. Non-proportionality due to age at diagnosis was taken into account.

Results
For the cancer sites examined, the excess hazard mostly decreases fast during the first 6 months since diagnosis, followed by a broad peak or shoulder ranging up to 2-3 years since diagnosis. This peak is much broader for female breast cancer, up to 6 years, showing the long term impact of breast cancer on mortality. The excess hazard is higher for older patients, although this difference becomes much smaller after 2-3 years. However, excess hazard remains higher for older breast cancer patients (70+ years) compared to younger women. Deaths within the first 6 months are mainly due to clinical stage IV cases, while clinical stage I and II predominated at longer follow up. Mid and long term survivors received more curative oriented treatments.

Conclusions
The excess hazard as a continuous function of survival time and age at diagnosis reveals more details in the cancer excess mortality among cancers sites and between age groups, which remain hidden in the net survival curve that is based on the cumulative excess hazard.

Topic: Estimation of cancer burden ECB06_Žagar

Risk of cancer in Slovenian children and adolescents living near power lines and transformer substations

Tina Žagar,[1] Sonja Tomšič,[1] Sara Korat,[1] Katarina Lokar,[1] Peter Gajšek,[2] Blaž Valič,[2] Tadej Kotnik,[3] Vesna Zadnik[1]

[1]Slovenian Cancer Registry, Institute of Oncology Ljubljana, Ljubljana, Slovenia [2]INIS–Institute for Non-Ionizing Radiation, Slovenia [3]Faculty of Electrical Engineering, University of Ljubljana, Ljubljana, Slovenia

Background

Extremely low frequency magnetic fields (ELF-MF) are potentially carcinogenic, with increased risk of childhood leukaemia at an average daily exposure of more than 0.3 or 0.4 μT. Our aim was to investigate whether Slovenian children and adolescents living near power lines (PL) and transformer substations (TS) have a higher risk of cancer.

Materials and Methods

From Slovenian Cancer Registry we obtained georeferenced data on inhabitants and all cancer patients (age group 0-14 years), patients with leukaemia (aged 0-19) and with brain tumours (aged 0-29) in the period 2005-2016. Estimated values for ELF-MF near TS and PL (110, 220 and 400 kV lines combined) were modelled at the Institute for Non-Ionizing Radiation. Relative risk was assessed using a standardized incidence ratio (SIR).

Results

All 516 cancer cases in children aged 0-14 years were classified in the lowest category (ELF-MF < 0.1 μT) near PL, but near TS a total of 13 cases (2.5%) were not classified in the lowest category. The risk of children living in areas with a higher ELF-MF does not differ significantly from the risk of their peers living in other areas. For example, the SIR for the highest category (ELF-MF ≤ 0.4 μT) is 0.5 (95% confidence interval is 0.01-2.50). Out of 195 leukaemias, one case was classified in the 2nd category (0.1 ≤ NF MF < 0.2 μT) near PL: SIR is 2.4 (0.1-13.3). Near TS, 5 cases were classified in the 2nd category: SIR is 3.0 (0.97-7.0). Out of 196 brain tumours, one case was classified in the 3rd category (0.2 ≤ NF MF < 0.3 μT) near PL: SIR is 4.6 (0.1-25.4). Near TS, 3 cases were classified in the 4th category (0.2 ≤ ELF-MF < 0.3 μT): SIR is 2.5 (0.5-7.3). In all other unmentioned categories, there were no cases of analysed cancers, so we could not assess the relative risk.

Conclusions

Based on our research, we can conclude that in the period 2005-2016 in Slovenia we cannot attribute any case of analysed types of cancer to exposure to ELF-MF near power lines and transformers.

Morbimortality of multiple myeloma in Spain: a population-based study, between 1994 and 2016

Daysis Yoe-Ling Chang-Chan,[1] Rafael Ríos-Tamayo,[2,3,4,5] Miguel Rodríguez Barranco,[1,4,5] Daniel Redondo-Sánchez,[1,4,5] Yolanda González,[6] , Rafael Marcos Gragera,[4,7,8] María José Sánchez Pérez[1,4,5,9]

[1]Granada Cancer Registry, Andalusian School of Public Health, Granada, Spain [2]Monoclonal Gammopathies Clinical Trials Unit, Department of Hematology, University Hospital Virgen de las Nieves, Granada, Spain [3]Genomic Oncology Area, GENYO, Centre for Genomics and Oncological Research, Pfizer/University of Granada/Andalusian Regional Government, PTS, Granada, Spain [4]Centro de Investigación Biomédica en Red: Epidemiología y Salud Pública (CIBERESP), Madrid, Spain [5]Instituto de Investigación Biosanitaria de Granada (Ibs.GRANADA), Hospitales Universitarios de Granada / Universidad de Granada, Granada, Spain [6]Department of Hematology, Josep Trueta University Hospital, Catalan Institute of Oncology, Girona, Spain [7]Epidemiology Unit and Girona Cancer Registry, Catalan Institute of Oncology, Girona, Spain [8]Research Group on Statistics, Econometrics and Health (GRECS), University of Girona, Girona, Spain [9]Department of Preventive Medicine and Public Health, University of Granada, Granada, Spain

Background

Multiple myeloma (MM) is one of the most common haematological malignancies worldwide and remains an incurable disease. Since health care systems and patient management differ between countries, and regions within the same country, epidemiological data from high-quality population-based cancer registries (PBCRs) may provide further insight to better assess the heterogeneous landscape of the disease. Therefore, we aim to analyze of the MM incidence, mortality and survival trends over a period of 23 years in two Spanish PBCRs.

Materials and Methods

Incidence, mortality, including early mortality at six months (EM-3-m), and survival in MM were analyzed in Granada and Girona PBCRs, between 1994 and 2016, divided into three periods (1994-2001, 2002-2009, and 2010-2016). We estimate the annual percentage change (APC) in incidence and mortality with Joinpoint regression analysis and age-standardized net survival (ASNS) with the Pohar-Perme method.

Results

Between 1994 and 2016, 1957 Spanish were diagnosed with MM, with a median age of 72 years. Age-standardized incidence and mortality rates decreased in both sexes 4.37 to 4.09, and 2.83 to 2.16 /100 000 p-years, respectively. The evolution of survival was 32.4%, to 78.5%, for patients aged 15-49, 27.5% to 58.5% for those aged 50.69, and 24.8% to 26.3% for the older group. EM-6-m over the three periods was 23.72%, 24.17%, and 20.18%. Five-year ASNS was 27.4%, 38.8%, and 47.4%.

Conclusions

Incidence remained overall stable throughout the study, with only a small increase for men. Mortality was progressively decreasing in both sexes. Both incidence and mortality were higher in men. Age plays a critical role in survival, with impressive improvement in patients younger than 70 years, but only a minor benefit in those older than 70. The knowledge and monitoring of trends in incidence, mortality and survival is an important contribution of PBCRs that should be known by physicians and the entire MM community.

Topic: Estimation of cancer burden ECB08_Galceran

Cancer prevalence in Spain in 2020: estimates from the Spanish Network of Cancer Registries (REDECAN)

Jaume Galceran,[1] Arantza Lopez de Munain,[2] Marcela Guevara,[3] Miguel Rodríguez-Barranco,[4] Ana Vizcaíno,[5] Marta Rodríguez,[6] Montse Puigdemont,[7] Patricia Sancho,[2] Cristina Ramírez,[8] Alberto Ameijide,[1] REDECAN Working Group B

[1]Tarragona Cancer Registry, Cancer Epidemiology and Prevention Service, Salut Sant Joan de Reus Baix Camp, Institut d'Investigació Sanitària Pere Virgili, Reus, Spain [2]Basque Country Cancer Registry, Health Department, Basque Government, Vitoria-Gasteiz, Spain [3]Navarra Cancer Registry, Navarra Public Health Institute, IdiSNA, CIBERESP, Pamplona, Spain [4]Granada Cancer Registry, Andalusian School of Public Health, CIBERESP, Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain [5]Castellón Cancer Registry, Cancer Information System, Directorate General of Public Health, Comunitat Valenciana, Castellón, Spain [6]Asturias Cancer Registry, Public Health Directorate, Asturias, Oviedo, Spain [7]Epidemiology Unit and Girona Cancer Registry, Oncology Coordination Plan, Catalan Institute of Oncology, Girona, Spain [8]Albacete Cancer Registry, Health and Social Welfare Authority, Castile-La Mancha, Albacete, Spain

Background

The total and 5-year prevalence of cancer are essential indicators to know the burden of cancer. Objective: to calculate the estimates of the total and 5-year prevalence of cancer in Spain by tumour type and sex at December 31, 2020.

Materials and Methods

This study is based on previous data from the REDECAN projects on cancer incidence and survival in Spain. Using generalized linear mixed Bayesian models, the number of incident cases for each sex, age group and year between 2001 and 2020 were estimated. For each estimated case, 100 cases were simulated with their respective lifetimes and vital status as of 12/31/2020. The lifetime simulation was performed using a Weibull model based on the year of diagnosis and the age group, the parameters of which were previously calculated with the data from the estimation of cancer survival in Spain. From the database of simulated cases, total and 5-year after diagnosis cases and prevalence rates were estimated for each tumour type and sex.

Results

The estimated number of total prevalent cases at December 31, 2020 is 2265152 (men: 1066959, women: 1198193). This represents a total of 4611 per 105 men and 4961 per 105 women. Among men, 42.8% of cases (456366) are prevalent less than 5 years after diagnosis and among women, this percentage is 32.1% (384080 cases). The most prevalent cancers in men are those of prostate (259788), colon-rectum (191884) and urinary bladder (149795) and, in women, breast (516827), colon-rectum (148205) and corpus uteri (83099) cancers.

Conclusions

In Spain, near of 5% of its inhabitants have been diagnosed with cancer during their lifetime. Prevalent cases encompasses people in clinical treatment and other clinically considered cured after a long time after their diagnosis. The most prevalent tumours were the most incident tumours with the best prognosis (breast in women and prostate in men).

Topic: Estimation of cancer burden ECB09_Crocetti

Thyroid as first or second primary cancer in Italy, 1998-2012. A population-based study

Emanuele Crocetti,[1] Veronica Mattioli,[1] Luigino Dal Maso,[1] AIRTUM Working Group B

[1]Cancer Epidemiology Unit, Centro di Riferimento Oncologico di Aviano (CRO) IRCCS, Aviano, Italy

Background
The number of patients living after a cancer diagnosis is increasing, especially after thyroid cancer (TC). This study aims at evaluating both the risk of a second primary cancer (SPC) in TC patients and the risk of TC as a SPC.

Materials and Methods
Two population-based cohorts of cancer patients, incident in 1998-2012 (age <85 years), were selected from 28 cancer registries in the Italian Airtum network. The first cohort included TC patients, while the second included patients with cancers other than TC. Standardized incidence ratios (SIR) of SPC were stratified by sex, age, and time since first cancer. SPC diagnosed within 2 months since first (4% after TC and 8% for TC as second) were not included in the computation of cancer-specific SIRs.

Results
38535 TC patients and 1368159 patients with other primary cancers were included. Overall SIR for SPC in TC patients was 1.16 (95% CI: 1.12-1.21) and remained elevated after 5 years since TC (1.18, 95% CI: 1.12-1.25), but no increase was shown after follicular (1.06) and medullary TC (0.95). SIR was significantly increased for bone/soft-tissue (2.0), breast (1.2), prostate (1.4), kidney (2.2), and hemolymphopoietic cancers (1.4).

Among non-TC cancer patients, SIR for TC was 1.49 (1.42-1.55) and was less markedly elevated (1.32, 1.23-1.42) after 5 years since first tumor. SIR were similar for all TC subtypes and was significantly increased after head and neck (2.1), colon-rectum (1.4), lung (1.8), melanoma (2.0), bone/soft tissue (2.8), breast (1.3), corpus uteri (1.4), prostate (1.5), kidney (3.2), central nervous system (2.3), and hemolymphopoietic cancers (1.8).

Conclusions
TC patients have both an increased risk of developing a SPC and TC as a SPC. This study confirms the clinical usefulness of cancer registries. Our findings may help in designing surveillance programs for second cancers in TC patients, keeping into consideration the possibility of overdiagnosis of TC and, possibly, other malignancies.

Topic: Estimation of cancer burden ECB10_Randi

Impact of the different demographic scenarios and population ageing on long-term cancer estimates up to 2040 in European countries

Giorgia Randi,[1] Tadek Dyba,[1] Fabrizio Zaro,[1] Carmen Martos,[1] Francesco Giusti,[1] Luciana Neamţiu,[1] Nicholas Nicholson,[1] Manuela Flego,[1] Nadya Dimitrova,[1] Raquel Carvalho,[1] Manola Bettio[1]

[1]European Commission, Joint Research Centre, Ispra, Italy

Background

Among major risk factors, population ageing and population structure changes play a key role on long-term cancer incidence and mortality estimates. A total of 2.8 million new cancer cases and 1.3 million cancer deaths were predicted for 2020 in the EU and EFTA countries. This study estimates the variation of these numbers up to the year 2040, assuming that cancer incidence and mortality crude rates remain the same as for 2020 and considering different projected population structures.

Materials and Methods

We obtained long-term projected numbers of new cancer cases and cancer deaths in EU and EFTA countries using the cancer incidence and mortality crude rates estimated for 2020 and projected populations for years 2025, 2030, 2035 and 2040 released by Eurostat. Population structures under different scenarios are considered by Eurostat and include: a baseline scenario plus alternative ones for 20% lower fertility rate, lower mortality rate, 33% lower migration rate, no migration and 33% higher migration rate.

Results

The long-term cancer incident numbers are estimated to increase by up to 18% in 2040, reaching 3.4 million new cancer cases in EU and EFTA countries. The highest increase is estimated for the lower-mortality scenario (20%), whilst the lowest one is for the no-migration scenario (16%). The number of new cases increases more in the older population age brackets (50% for 75+ years, becoming 55% in the lower-mortality scenario) whilst it decreases for the younger population age brackets (12% in 0-19 years, becoming 28% in the lower-fertility scenario). Big variations are observed by cancer entity, with the largest decrease for testicular cancer and the largest increase for mesothelioma. The number of cancer deaths in the EU and EFTA countries is estimated to grow to 1.7 million by 2040 with an increment of 29% increasing further to 32% for the lower-mortality scenario.

Conclusions

Long-term cancer burden estimates are of particular relevance for forward health-policy planning in the EU.

Topic: Estimation of cancer burden ECB11_Botta

Childhood cancer survival: the EUROCARE 6 results

Laura Botta,[1] Gemma Gatta,[1] Riccardo Capocaccia,[2] Silvia Rossi,[3] EUROCARE-6 CHILD Working Group

[1]Epidemiologia valutativa, Fondazione IRCCS Istituto Nazionale dei Tumori, Milano, Milan, Italy [2]*Epidemiologia e Prevenzione*, editorial board, Milan, Italy [3]Department of Oncology and Molecular Medicine, Italian National Institute of Health (ISS), Rome, Italy

Background

The EUROCARE 5 study showed persisting childhood cancer survival disparities between European countries and important steps and position in Europe (SIOPE and European Union) have been taken to reduce disparities. The objectives of the EUROCARE-6 study, presenting an increasing coverage of the Eastern countries, were to analyse survival for the major childhood cancers in Europe by country, to discuss possible reasons for disparities, and make recommend further collaborative studies.

Materials and Methods

We analyzed around 133 000 cancers (ICCC 3rd edition) from 80 population-based cancer registries (CRs) in 31 countries diagnosed in 2000-2013 and followed-up to the end of 2014. Observed 5-year survival was calculated by the period method.
We also analyzed long-term survival (maximum follow-up 15 years) with mixture cure models according to cancer type and age and 5-year survival trends over time using 62 and 49 CRs, respectively.

Results

In Europe 5-year survival for all childhood cancers combined (period of follow-up: 2010-2014) was 81% and increased, during the study period, by 5% points. The progress was significant, for the major cancers. For all cancers combined inequalities still persisting between European countries (range 71%-86%). Long-term mortality approached zero for many cancers as ALL, AML, nephroblastoma and some sarcomas. The cured fraction (P) for ALL patients was 85%, lower for the infants than for the older patients, for AML was 63%, but 58% for infants and patients diagnosed at age 10-14. For nephroblastoma (P=90%) and rhabdomyosarcoma (P=67%) children older than 10 has lower cure proportion than younger. The cured fraction was 70% for neuroblastoma, 94% for Hodgkin lymphomas, 84% for Non-Hodgkin lymphomas and 90% for Burkitt lypmhoma.

Conclusions

Monitoring childhood cancer survival through population based registry data is crucial for evaluating the effect of country cancer programs.

Topic: Estimation of cancer burden ECB12_Trama

Head and neck cancer survival differences between Europe and Asia: the results of the RARECAREnet Asia project

Analisa Trama,[1] Gijs Geleijnse,[2] Gemma Gatta,[1] Tomohiro Matsuda,[3] Young-Joo Won,[4] Chun-ju Chiang,[5] Jiwon Lim,[4] Matteo Cellamare,[2] Laura Botta[1]

[1]Fondazione IRCCS Istituto Nazionale dei Tumori, Research Department, Milan, Italy [2]Netherlands Comprehensive Cancer Organisation, The Netherlands [3]National Cancer Registry Section, Center for Cancer Registries, Center for Cancer Control and Information Services, National Cancer Center, Japan [4]Division of Cancer Registration and Surveillance, National Cancer Center, Republic of Korea [5]Taiwan Cancer Registry Center, Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan

Background

RARECAREnet Asia is a collaborative project including INT and the cancer registries (CR) of Japan, Taiwan and the Republic of Korea. It aims to define the burden of rare cancers in Asia and to compare it with Europe in terms of incidence and survival. We have shown that most rare cancers in Europe are also rare in Asia. Here, we report the survival differences between Europe and Asia for head and neck cancers because these tumours were the ones with the most relevant differences.

Materials and Methods

Analyses were performed by each CR using a standardized analysis tool kit. Therefore, the individual records were not shared outside the CR. We estimated the 5-year relative survival (cohort approach), years of diagnosis 2009-2011 and 2000-2007 in Asian and EU, respectively. Patients were followed-up until 2016 and 2008 in Asia and Europe, respectively. In Europe we used RARECAREnet, including 94 CRs.

Results

Survival in Europe was lower than in Asian countries for any head and neck cancer site but for nasal cavity cancers. Japan and Republic of Korea had the highest survival. Sub-sites of head and neck cancers are important prognostic factor as well as specific histological grouping (e.g., keratinising vs non keratinizing for nasopharyngeal cancers). Head and neck cancer sub-sites showed different survival and distribution among the countries involved. As data cannot be shared and pooled centrally, we are analysing the impact of the head and neck cancer sub-site and morphological grouping with federated learning (FL). FL enables us to compute a regression model based on data that remains in the four organisations. It is theoretically and experimentally demonstrated that federated analyses yield similar results as the conventional centralised analyses.

Conclusions

We will contribute to interpret the observed survival differences. We will show the feasibility and importance of the FL to analyse data without sharing them.

Working Groups list

Ada Working Group A: Stefano Guzzinati, Maria Teresa Greco, Giovanna Tagliabue, Adele Caldarella, Stefania Giorgetti, Salvatore Sciacca, Rosa Angela Filiberti, Cinzia Gasparotti, Giuliano Carrozzi, Walter Mazzucco, Pamela Mancuso, Silvia Iacovacci, Mario Fusco, Fabrizio Stracci, Silvano Piffer, Giuseppe Cascone, Sante Minerba, Giuseppe Sampietro, Anna Melcarne, Paola Ballotari, Lorenza Boschetti, Maria Letizia Gambino, Luca Cavalieri D'Oro, Francesco Cuccaro, Angelo D'Argenzio, Giancarlo D'Orsi, Anna Clara Fanetti, Fernanda Lotti, Tiziana Scuderi, Francesco Vetrano, Iolanda Grappasonni, Salvatore Bongiorno, Antonio Romanelli.

Ada Working Group B: Manuel Zorzi, Anita Andreano, Paolo Contiero, Gianfranco Manneschi, Fabio Falcini, Marine Castaing, Rosa Angela Filiberti, Cinzia Gasparotti, Claudia Cirilli, Rosalba Amodio, Isabella Bisceglia, Silvia Iacovacci, Maria Francesca Vitale, Fabrizio Stracci, Maria Adalgisa Gentilini, Rosario Tumino, Simona Carone, Giuseppe Sampietro, Anna Melcarne, Luciana Gatti, Lorenza Boschetti, Mariangela Corti, Magda Rognoni, Enzo Coviello, Maria Teresa Pesce, Giancarlo D'Orsi, Anna Clara Fanetti, Lucia De Lorenzis, Giuseppa Candela, Fabio Savoia, Cristiana Pascucci, Maurizio Castelli, Cinzia Storchi.

The AIRTUM Working Group A: Flavia Baldacchini (Romagna Cancer Registry, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy); Orietta Giuliani (Romagna Cancer Registry, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy); Alessandra Ravaioli (Romagna Cancer Registry, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy); Rosa Vattiato (Romagna Cancer Registry, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy); Angelita Brustolin (UOC PreSAL-Dipartimento di Prevenzione ASL Viterbo, c/o Cittadella della Salute, Viterbo, Italy); Giuseppa Candela (Trapani Cancer Registry, Dipartimento di Prevenzione della Salute, Servizio Sanitario Regionale Sicilia, Azienda Sanitaria Provinciale (ASP), Trapani, Italy); Giuliano Carrozzi (Modena Cancer Registry, Public Health Department, Local Health Authority, Modena, Italy); Ylenia Maria Dinaro (Siracusa Cancer Registry, Health Unit of Siracusa, Italy); Margherita Ferrante (Integrated Cancer Registry of Catania-Messina-Enna, Azienda Ospedaliero-Universitaria Policlinico "Rodolico-San Marco", Catania, Italy); Silvia Iacovacci (Latina Cancer Registry, Lazio, Italy); Carla Masini (Unit of Oncological Pharmacy, IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Forlì, Italy); Guido Mazzoleni (South-Tyrol Tumor Registry, Bolzano, Italy); Maria Michiara (Parma Cancer Registry, Medical Oncology Unit, University Hospital of Parma, Parma, Italy); Sante Minerba (Registro tumori di Taranto, Unità operativa complessa di statistica ed epidemiologia, Azienda sanitaria locale Taranto, Italy); Silvano Piffer (Trento Province Cancer Registry, Unit of Clinical Epidemiology, Trento, Italy); Umberto Scala (Cancer Registry - ASL Salerno, Salerno, Italy); Diego Serraino (Cancer Epidemiology Unit, Centro di Riferimento Oncologico di Aviano (CRO) IRCCS, Aviano, Italy); Fabrizio Stracci (Public Health Section, Department of Experimental Medicine, University of Perugia, Perugia, Italy); and Rosario Tumino (Cancer Registry and Histopathology Department, Provincial Health Authority (ASP), Ragusa, Italy).

The AIRTUM Working Group B: Carlotta Buzzoni, Silvia Franceschi, Diego Serraino, Salvatore Vaccarella, Stefano Ferretti, Susanna Busco, Ugo Fedeli, Massimo Varvarà, Fabio Falcini, Manuel Zorzi, Giuliano Carrozzi, Walter Mazzucco, Cinzia Gasparotti, Silvia Iacovacci, Federica Toffolutti, Rossella Cavallo, Fabrizio Stracci, Antonio Giampiero Russo, Adele Caldarella, Stefano Rosso, Antonino Musolino, Lucia Mangone, Claudia Casella, Mario Fusco, Giovanna Tagliabue, Daniela Piras, Rosario Tumino, Linda Guarda, Ylenia Maria Dinaro, Silvano Piffer, Pasquala Pinna, Guido Mazzoleni, Anna Clara Fanetti.

COVID and Cancer-NL consortium (ZONMW number 10430022010014): Prof. Dr. S. Siesling, Dept of research and development, Netherlands Comprehensive Cancer Organisation (IKNL) Utrecht, The Netherlands; Technical Medical Centre, Dept of Health Technology and Services Research, University of Twente, Enschede, The Netherlands. Dr. J.C. van Hoeve, Dept

of research and development, Netherlands Comprehensive Cancer Organisation (IKNL) Utrecht, The Netherlands. Prof. Dr. M.A.W. Merkx, Dept of research and development, Netherlands Comprehensive Cancer Organisation (IKNL) Utrecht, The Netherlands; Dept of Oral and Maxillofacial Surgery, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands. Prof. Dr. N.J. de Wit, Dept of General Practice, Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht (UMCU), Utrecht University, Utrecht, The Netherlands. M.Sc. I. Dingemans, Dutch Federation of Cancer Patient Organisations (NFK), Utrecht, The Netherlands. Prof. Dr. I.D. Nagtegaal, Dept of Pathology, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands, on behalf of the Automated Pathology Archive (PALGA). Drs. R. Saathof, Dutch Hospital Data (DHD), Utrecht, The Netherlands. Prof. Dr. C.H. van Gils, Dept of Epidemiology, Julius Center for Health Sciences and Primary Care, University Medical Center, Utrecht, The Netherlands. Prof. Dr. H.C.P.M. van Weert, Dept of General Practice, Amsterdam Public Health, Amsterdam UMC location AMC, Amsterdam, The Netherlands. Prof. Dr. M. Verheij, Department of Radiation Oncology, Radboud University Medical Center, Nijmegen, The Netherlands, on behalf of SONCOS (Dutch Multidisciplinary Oncology Foundation).

DESOCANES–HiReSIC Working Group: Daniel Redondo-Sánchez, Rafael Marcos-Gragera, Marià Carulla, Arantza Lopez de Munain, Consol Sabater Gregori, Rosario Jiménez Chillarón, Marcela Guevara, Olivier Núñez, Pablo Fernández-Navarro, Marina Pollán Santamaría, Dafina Petrova, Miguel Rodríguez Barranco, José Juan Jiménez Moleón, María-José Sánchez, Miguel Ángel Luque-Fernández.

The Dutch Head and Neck Society: 1. Stefan M. Willems, University Medical Centre Groningen, Groningen, The Netherlands. 2. Elisabeth Bloemena, Amsterdam UMC, Amsterdam, The Netherlands. 3. Frank J.P. Hoebers, Maastricht University Medical Center+, Maastricht, The Netherlands. 4. Esther van Meerten, Erasmus University MC Cancer Institute, Rotterdam, The Netherlands. 5. Berit M. Verbist, Leiden University Medical Center, Leiden, The Netherlands. 6. Ludi E. Smeele, Netherlands Cancer Institute/Antoni van Leeuwenhoek, Amsterdam, The Netherlands. 7. György B. Halmos, University Medical Centre Groningen, Groningen, the Netherlands. 8. Matthias A.W. Merkx, Netherlands Comprehensive Cancer Organisation (IKNL) Utrecht, The Netherlands; Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands. 9. Remco De Bree, University Medical Center Utrecht, Utrecht, The Netherlands. 10. Robert P. Takes, Radboud University Medical Centre, Nijmegen, The Netherlands.

EUROCARE-5 Working Group: Chiara Panato, Olayidé Boussari, Riccardo Capocaccia, Marc Colonna, Emanuele Crocetti, Agnes Dumas, Tadek Dyba, Silvia Franceschi, Gemma Gatta, Anna Gigli, Francesco Giusti, Valerie Jooste, Pamela Minicozzi, Luciana Neamtiu, Gaëlle Romain, Manuel Zorzi *Austria:* M Hackl, P Ihle (Austrian CR); *Denmark:* H Storm, G Engholm (Danish Cancer Society); *Estonia:* M Mägi (Estonian CR); K Innos* (National Institute for Health Development); *Finland:* N Malila, K Seppa (Finnish CR); *France:* M Velten (Bas Rhin CR), V Jooste* (Bourguignon Digestive CR), V Bouvier, G Launoy (Calvados Digestive Tract Registry), A V Guizard (Calvados, General CR), A S Woronoff (Doubs CR), A Monnereau* (Gironde Haematological Malignancies CR), N Bossard* (Hospices Civils de Lyon), Z Uhry (Hospices Civils de Lyon, Institut de Veille Sanitaire), M Colonna (Isère CR), B Lapotre-Ledoux (Somme CR), P Grosclaude (Tarn CR); *Germany:* H Brenner (German Cancer Research Center), B Holleczek (Saarland CR), A Katalinic* (Schleswig-Holstein CR); *Iceland:* H Birgisson, L Tryggvadòttir (Icelandic CR); *Italy:* C Buzzoni (Associazione Italiana Registri Tumori), S Ferretti (Ferrara CR), A Barchielli, G Manneschi (Firenze-Prato CR), G Gatta*, M Sant*, C Amati, P Baili*, S Bonfarnuzzo, L Botta, E Meneghini, A Trama (Fondazione IRCCS Istituto Nazionale dei Tumori, Milan), R De Angelis*, M Caldora, C Di Benedetto, S Francisci, F Galati, S Mallone, D Pierannunzio, M Tallon, S Rossi*, M Santaquilani, A Tavilla (Istituto Superiore di Sanità , Rome), R A Filiberti, E Marani (Liguria CR, Ospedale Policlinico San

Working Groups list

Martino IRCCS), G Spagnoli, C Cirilli (Modena CR), M Michiara (Parma CR), R Zanetti, S Rosso (Piemonte CR), R Tumino (Ragusa CR), F Falcini (Romagna CR, IRCCS AUSL-IRST Meldola), G Tagliabue, P Contiero (Varese Province CR, Fondazione IRCCS Istituto Nazionale dei Tumori), M Rugge, S Guzzinati (Veneto CR), F Berrino*, R Capocaccia*, *Norway:* T B Johannesen* (Norwegian CR); *Poland:* J Rachtan (Cracow CR), S Gòzdz, P Macek (Kielce CR), M Bielska-Lasota* (National Institute of Public Health-NIH, Warszawa), M Motnyk (Silesia CR, Gliwice); *Slovakia:* C Safaei Diba (Slovakian National CR); *Slovenia:* V Zadnik, T Zagar (Cancer Registry of Republic of Slovenia); *Spain:* A Lopez de Munain, L Gil (Basque Country, Euskadi-CIBERESP CR), R Marcos-Gragera* (Girona CR, CIBERESP, ICO, IDIBGI), E Ardanaz, M Guevara (Navarra- CIBERESP CR), J Galceran, M Carulla (Tarragona CR); *Sweden:* S Khan (Swedish CR); *Switzerland:* K Staehelin (Basel CR), S M Mousavi, E Walser-Domjan (East Switzerland CR), C Bouchardy, E Rapiti (Geneva CR), S M Mousavi, C Herrmann (Grisons-Glarus CR), M Lorez (NICER), I Konzelmann (Valais CR); *The Netherlands:* O Visser*, K Aben (The Netherlands CR); *UK England:* M Coleman, C Allemani, B Rachet (London School of Hygiene and Tropical Medicine), J Rashbass, J Broggio (Public Health England); *UK Northern Ireland:* A Gavin* (Northern Ireland CR); *UK Scotland:* D Morrison, R Black (Scottish CR); *UK Wales:* D W Huws*, R Thomas (Welsh Cancer Intelligence and Surveillance Unit); *European Commission, Joint Research Centre- JRC:* M Bettio.
*EUROCARE Steering Committee.

EUROCARE-6 Working Group: (Contributing registries, Steering Committee Members, Scientific Coordination) *Austria:* M Hackl (National CR); *Belgium:* E Van Eycken (National CR); *Bulgaria:* Z Valerianova (National CR); *Croatia:* M Sekerija (National CR); *Cyprus:* P Pavlou (National CR); *Czech Republic:* L Dušek (National CR); *Denmark:* H Storm (National CR); *Estonia:* M Mägi (National CR); *Finland:* N Malila (National CR); *France:* M Velten (Bas Rhin CR); A Woronoff (Doubs CR); K Hammas (Haut-Rhin CR); B Tretarre (Hérault CR); M Colonna (Isère CR); S Plouvier (Lille Area CR); S Bara (Manche CR); G Defossez (Poitou-Charentes CR); B Lapôtre-Ledoux (Somme CR); P Grosclaude (Tarn CR); N Bossard; *Germany:* R Stabenow (Berlin; Brandenburg; Mecklenburg-West Pomerania; Saxony; Saxony-Anhalt; Thüringen CR); S Luttmann (Bremen CR); A Nennecke (Hamburg CR); B Holleczek (Saarland CR); A Katalinic; *Iceland:* H Birgisson (National CR); *Ireland:* K Clough-Gorr (National CR); *Italy:* G Sampietro (Bergamo CR); V Coviello (Barletta-Andria-Trani CR); M Ferrante (Catania-Messina-Enna CR); S Iacovacci (Latina CR); G Spagnoli (Modena CR); L Cavalieri d'Oro (Monza-Brianza CR); M Fusco (Napoli ASL 3 Sud CR); M Usala (Nuoro CR); F Vitale (Palermo CR); M Michiara (Parma CR); E Borciani (Piacenza CR); R Tumino (Ragusa CR); L Mangone (Reggio Emilia CR); F Falcini (Romagna CR); S Ferretti (Ferrara CR); R Cesaraccio (Sassari CR); S Minerba (Taranto CR); A Madeddu (Siracusa CR); A Fanetti (Sondrio CR); F Stracci (Umbria CR); G Tagliabue (Varese CR); *Latvia:* S Pildava (National CR); *Lithuania:* G Smailyte (National CR); *Malta:* M Azzopardi (National CR); *Norway:* T Johannesen (National CR); *Poland:* J Didkowska (National CR); *Portugal:* A Miranda (Southern Portugal CR); *Slovakia:* C Safaei Diba (National CR); *Slovenia:* V Zadnik (National CR); *Spain:* C Sánchez-Contador Escudero (Balearic Islands (Mallorca) CR); (Canary Islands CR); A Lopez de Munain (Basque Country CR); A Vizcaíno (Castellón CR); R Marcos-Gragera (Girona CR); M Sánchez (Granada CR); J Galceran (Tarragona CR); *Switzerland:* B Camey (Fribourg CR); C Bouchardy (Geneva CR); S Mousavi (Graubünden and Glarus CR); C Herrmann (East Switzerland CR); A Bordoni (Ticino CR); *The Netherlands:* O Visser (National CR); *UK England:* J Rashbass (National CR); *UK Northern Ireland:* A Gavin (National CR); *UK Scotland:* D Morrison (National CR); *UK Wales:* D Huws (National CR); *Steering Committee:* N Bossard; A Katalinic; M Bielska-Lasota; *Scientific coordination:* R De Angelis; E Demuru; C Di Benedetto; S Rossi; M Santaquilani (Istituto Superiore di Sanità); P Baili; F Berrino; A Bernasconi; S Bonfarnuzzo; L Botta; R Capocaccia; G Gatta; R Lillini; M Sant; A Trama (Fondazione IRCCS Istituto Nazionale Tumori).

EUROCARE-6 CHILD Working Group: M. Hackl, N. Zielonke (Austria CR), E. Van Eycken, N. Van Damme (Belgium CR), Z. Valerianova

(Bulgaria CR), P. Pavlou, A.Demetriou (Cyprus CR), M. Sekerija (Croatia CR), Dušek Ladislav (Czech Republic CR), G. Engholm (Danish CR), M. Mägi, K Paapsi (Estonia CR), K. Innos* (Dept Epidemiology & Biostatistics National Institute for Health Development) N. Malila (Finland CR), V. Jooste* (Bourguignon Digestifs CR), N. Bossard* (Centre Hospitalier Universitaire de Dijon Bourgogne), A. Monnereau* (Gironde Haematological Malignancies, Bordeaux), J. Clavel (Childhood Hematological Malignancies CR), B. Lacour, E. Desandes (Childhood Solid Tumours CR), F. Erdmann, C. Spix (Germany Childhood CR), A. Katalinic* (Schleswig-Holstein CR), E.Petridou (Greece Childhood CR), Z. Jackab (Hugary Childhood CR), J. G. Jónasson(Iceland CR), K. Clough-Gorr (IrelandCR), *Italy:* G. Mazzoleni (Alto Adige CR), C. Buzzoni (Associazione Italiana Registri Tumori), E. Coviello (Barletta Andria Trani CR), (Biella CR), M. Magoni (Brescia CR), (Catania-Messina-Siracusa-Enna CR), A. Mazzei, A. Sutera Sardo (Catanzaro CR), A.Pisani, G.Gola (Como CR), P. Ricci (Cremona and Mantova CR), S. Ferretti (Ferrara CR), A. Caldarella (Firenze-Prato CR), P. Baili*, A. Bernasconi, F. Berrino*, S. Bonfarnuzzo, L. Botta, G. Gatta*, R. Lillini, M.C. Magri, M. Sant*, A. Trama, (Fondazione IRCCS Istituto Nazionale dei Tumori, Milan), D. Serraino, L. Dal Maso (Friuli Venezia Giulia CR), R. Filiberti (Genova CR), R. Capocaccia* (E&P), M. Caldora, R. De Angelis*, S. Rossi, M. Santaquilani, E. Demuru, C Di Benedetto (Istituto Superiore di Sanità), S. Busco (Latina CR) (Lodi CR), AG. Russo, A. Andreano (Milano CR), G. Spagnoli (Modena CR), L. Cavalieri D'oro (Monza e Brianza CR), M. Fusco, M. F. Vitale (Napoli 3 South CR), M. Usala (Nuoro CR), R. Cusimano, B. Ravazzolo (Palermo CR), M. Michiara (Parma CR), E. Borciani (Piacenza CR), C. Sacerdote, M.Maule (Piemonte Childhood CR), R. Tumino (Ragusa CR), L. Mangone, M. Vicentini (Reggio Emilia CR), F. Falcini (Romagna CR), A. Iannelli (Salerno CR), M. Budroni, O. Sechi (Sassari CR), S. Piffer, R.Rizzello (Servizio Epidemiologia Clinica e Valutativa, Trento), S. Minerba (Taranto CR), A. Madeddu, F. Tisano (Siracusa CR), A. C. Fanetti (Sondrio CR), P. Candela, T. Scuderi (Trapani CR), F. Bianconi, F. La Rosa (Umbria CR), P. Contiero, G. Tagliabue (Varese CR), M. Rugge, S. Guzzinati (Veneto CR), A. Brustolin (Viterbo CR), S. Pildava (Lativia CR), G. Smailyte (Lithuania CR), M. Azzopardi (Malta CR), T. Børge* (Norway CR), J. Kowalczyk* (Poland CR), Magdalena Bielska-Lasota* (National Institute of Public Health-NIH), *Portugal:* M. J. Bento (Northern Portugal CR), A. Mayer-da-Silva, A. Miranda (Southern Portugal CR), M. Silva (Central Portugal CR), C. Safaei Diba (Slovakia CR), V. Zadnik , T. Zagar (Slovenia CR), *Spain:* C. Sánchez-Contador Escudero (Balearic Islands CR), A. Lopez de Munain, N. Larrañaga (Basque Country CR), D. Rojas Martín, A. Alemán Herrera (Canary CR), F. Almela, C. Sabater (Comunidad Valenciana Childhood CR/Castellón CR), R. Marcos-Gragera* (Girona CR), M. J. Sanchez (Granada CR), M. D. Chirlaque (Murcia CR), E. Ardanaz, M. Guevara (Navarra CR/ CIBERESP), E. Pardo Romaguera, R. Fernández Delgado (Spanish National Registry of Childhood Tumours, RETI-SEHOP), J. Galceran (Tarragona CR), C. Kuehni (Swiss Childhood CR), O. Visser* (The Netherlands CR), L. Irvine (Public Health England), A. Gavin* (Northern Ireland CR), .D. Morrison (Scotland CR), D. Huws*(Wales National CR).
* EUROCARE Steering Committee

FRANCIM Network: Brice Amadeo, Isabelle Baldi, Simona Bara, Françoise Borson, Anne Marie Bouvier, Emmanuel Chirpaz, Jacqueline Clavel, Marc Colonna, Gaëlle Coureau, Sandrine Dabakuyo, Tania Dalmeida, Adeline Debreuve-Theresette, Gautier Defossez, Jacqueline Deloumeaux, Laure Manuella Desroziers, Pascale Grosclaude, Anne Valérie Guizard, Karima Hammas, Brigitte Lacour, Bénédicte Lapotre Ledoux, Sylvie Laumond, Guy Launoy, Marc Maynadie, Florence Molinie, Alain Monnereau, Zakia Nejjari, Jean Baptiste Nousbaum, Juliette Plenet, Sandrine Plouvier, Michel Robaszkiewicz, Claire Schvartz, Brigitte Tretarre, Xavier Troussard, Michel Velten, Anne Sophie Woronoff.

IARC cancer surveillance branch: Frederic Lam, Mathieu Laversanne, Morten Ervik, Jacques Ferlay, Freddie Bray.

IKNL COVID research group: Kay Schreuder, Linda de Munck, Boukje van Dijk, Katja Aben, Jolanda van Hoeve, Thijs Merkx, Maaike van der Aa.

NORDCAN-group: Anni Virtanen, Tomas Tanskanen, Charlotte Wessel Skovlund, Hans H. Storm, Gerda Engholm, Lina Steinrud Mørch, David Pettersson, Elinborg Olafsdottir, Henrik L. Hansen, Henrik Mulvad Hansen, Marnar F. Kristiansen, Tom Børge Johannesen, Johanne Jerven Hestad.

NORDCAN IT-group: Joonas Miettinen, Huidong Tian, Sasha Pejicic, Niklas Toorell, Bjarte Aagnes, Anna Skog.

REDECAN Working Group A: Cancer registries of Albacete (Cristina Ramírez), Asturias (Marta Rodríguez, Virginia Menéndez, Susana Merino), Canarias (Araceli Alemán, Dolores Rojas), Castellón (Javier Peñalver, Ana Vizcaíno, Emilia Banqueri), Ciudad Real (Matilde Chico), Cuenca (Ana Isabel Marcos, Rosario Jiménez), Euskadi (Arantza Lopez de Munain, Marta de la Cruz, Visitación de Castro, Amia Aizpurua, Patricia Sancho), Girona (Rafael Marcos-Gragera, Montse Puigdemont, Arantza Sanvisens), Granada (María José Sánchez, Miguel Rodríguez-Barranco, Daysi Yoe Ling Chang-Chan), La Rioja (Josefina Perucha), Mallorca (Paula Franch, Verónica Carrión, Patricia Ruiz), Murcia (María Dolores Chirlaque, Antonia Sánchez), Navarra (Eva Ardanaz, Marcela Guevara) and Tarragona (Jaume Galceran, Marià Carulla, Alberto Ameijide, Clàudia Pla).

REDECAN Working Group B: Cancer registries of Albacete (Cristina Ramírez), Asturias (Marta Rodríguez, Virginia Menéndez, Susana Merino), Canarias (Araceli Alemán, Dolores Rojas), Castellón (Javier Peñalver, Ana Vizcaíno, Emilia Banqueri), Ciudad Real (Matilde Chico), Cuenca (Ana Isabel Marcos, Rosario Jiménez), Euskadi (Arantza Lopez de Munain, Marta de la Cruz, Visitación de Castro, Amia Aizpurua, Patricia Sancho), Girona (Rafael Marcos-Gragera, Montse Puigdemont, Anna Vidal), Granada (María José Sánchez, Miguel Rodríguez-Barranco, Daysi Yoe Ling Chang-Chan), La Rioja (Josefina Perucha), Mallorca (Paula Franch, Verónica Carrión, Patricia Ruiz), Murcia (María Dolores Chirlaque, Antonia Sánchez), Navarra (Eva Ardanaz, Marcela Guevara) and Tarragona (Jaume Galceran, Marià Carulla, Alberto Ameijide, Jàmnica Bigorra).

The WASABY's group of experts on spatial analysis: Tina Žagar (Slovenian Cancer Registry, Institute of Oncology Ljubljana, Slovenia), Sara Korat (Slovenian Cancer Registry, Institute of Oncology Ljubljana, Slovenia), Vesna Zadnik (Slovenian Cancer Registry, Institute of Oncology Ljubljana, Slovenia), Sonja Tomšič (Slovenian Cancer Registry, Institute of Oncology Ljubljana, Slovenia), Andreja Kukec (Faculty of Medicine, University of Ljubljana, Slovenia), Ron Pritzkuleit (Institute for Cancer Epidemiology, Universitat zu Lubeck, Germany), Marc Colonna (Isere Cancer Registry, CHU de Grenoble–Pavillon E, France), Joséphine Bryere (Universite de Caen Normandie, France), Ludivine Launay (Universite de Caen Normandie France), Fortunato Bianconi (Umbria Cancer Registry, University of Perugia, Italy), Maurizio Zarcone (Palermo Cancer Registry, Palermo University Hospital, Italy), Martina Bertoldi (Varese Province Cancer Registry, Fondazione "Istituto Nazionale Tumori", Italy), Eero Pukkala (Finnish Cancer Registry, Institute for Statistical and Epidemiological Cancer Research, Finland), Marc Saez (Universitat de Girona, Spain).

WG-RETI: Ana Sastre (H. La Paz, Madrid), José Ignacio Gutiérrez (H. Virgen del Rocío, Sevilla), Luis Gros (H. Vall d'Hebron, Barcelona), Ricardo López Almaraz (H. de Cruces, Vizcaya), Ofelia Cruz Martínez (H. Sant Joan de Deu, Barcelona), Maria Tasso Cereceda (H. General Universitario de Alicante), Rafael Peris Bonet (Universidad de Valencia), Ana Muñoz López (Universidad de Valencia), Salvador Valero (Universidad de Valencia), Sara Porta (Universidad de Valencia).

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