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**ORAL PRESENTATION**  
presented according to the conference sessions

### **Effectiveness of lung cancer screening using computed tomography: microsimulation modeling analysis in the French context**

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#### Background

In France, lung cancer is the first leading cause of cancer death in men and the second in women. As a complement of primary prevention, the question of lung cancer screening benefits has been raised for many years. Two randomized trials have shown that screening with low-dose helical computed tomography (CT) reduces mortality from this cancer in a population of smokers and ex-smokers. However, many questions remain to be answered before such a screening program can be implemented in the general population, such as the effectiveness and risks in the French context, the eligibility criteria for the target population, the number of screening rounds, and the periodicity of invitations.

#### Aim

The aim of the project was to simulate a lung cancer screening program with low-dose CT and to predict the effectiveness of such a screening program in the French context.

#### Methods

The simulation of a lung cancer screening program was based on the development of a model defining for each individual his or her smoking behavior and lung cancer risk, the occurrence of cancers, the natural history of cancers, participation in screening, treatment efficacy, deaths and their cause. The model was calibrated using data from literature and French cancer registries. Calibration involved estimating parameter values from observed incidence rates, using least squares method. After model calibration, predictions were made according to scenarios based on different characteristics of screening participant such as age, smoking status, duration of smoking, average number of cigarettes per day, etc.

#### Results

First, we simulated two clinical trials to validate our model and we obtained consistent findings with published trials. We then simulated screening programs in a French population and we found a lung cancer mortality reduction for all scenarios tested, from a few percent to a dozen, depending on participation rates and the characteristics of the target population. Notably, starting screening at 45 year of age reduces mortality more than starting at 55 or 65.

## Conclusion & Discussion

This new model could be used to simulate different clinical trial scenarios and population-based screening programs to help political decision-makers define the characteristics of a lung cancer screening program to be implemented in the general population.

Keywords: Lung cancer; simulation; tobacco; screening program;

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## **Early-Onset Colorectal Cancer in Belgium: Watchful Waiting**

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<sup>1</sup>Belgian Cancer Registry.

### Background

In 2021 in Belgium, nearly 7,900 new diagnoses of colorectal cancer (CRC) accounted for about 10% of all new cancer cases. CRC risk strongly correlates with age, peaking around 80 years. Several countries have reported rising incidence of early-onset CRC (in persons aged <50), and some even increasing CRC-related mortality.

### Aim

This study aims (1) to evaluate Belgian age-specific trends in early-onset CRC incidence and mortality, along with adenoma incidence for the period 2004-2021; and (2) to correlate these to the trends in the use of fecal immunochemical tests (FIT) and colonoscopy.

### Methods

CRC (both invasive and in situ) and colorectal adenomas were identified using the Belgian Cancer Registry databases covering all colorectal lesions regardless of behavior. Mortality data is registered regionally and was obtained from Statbel. Data on reimbursed FIT and colonoscopy is provided by the InterMutualistic Agency that covers all health insurance funds. Age-specific crude incidence rates were calculated per 100,000 person-years per 5-year age group. Joinpoint regression was used to analyze trends over time and to determine the average annual percent change (AAPC).

### Results

In general, each 5-year age group has about half the crude CRC incidence level of its respective older 5-year age-group.

All age groups between 25 and 39 years old showed increasing incidence of colorectal adenomas [AAPC 7-8%], in situ tumors [AAPC 25-29yo: 6%; 30-39yo: 14-15%] and invasive CRC [AAPC 25-34yo: 4-5%; 35-39yo: 2.5%].

For the age groups 40-44 and 45-49, there was an increase in the incidence of adenomas [AAPC 3-4.5%] and in situ tumors [AAPC 12-14%], but not in invasive CRC [AAPC <0%, NS]. These increases coincide with increasing use of FIT [AAPC 5%] and colonoscopy [AAPC 2.5-3%] seen in these age groups. Mortality significantly decreased in the age group 45-49 [AAPC -1.7%] while it remained stable in the 40-44yo and in the younger age groups.

### Conclusion & Discussion

The increasing incidence of adenomas and in situ tumors among 40-49yo is probably related to the increasing use of FIT and colonoscopy. In Belgium, the absence of an increase in invasive CRC incidence or in CRC-related mortality supports continued monitoring rather than lowering the starting age of organized screening (currently 50-74 years old).

Keywords: colorectal cancer, incidence, mortality, early-onset cancer

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## **Uterine cervix incidence and survival trends in South Portugal between 1998 and 2022. Overview evaluation and comparison analysis.**

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### Background

Cervical cancer is one of the major cancers that affect women's health. Updated incidence data allows trends and outcome analysis that can help planning new strategies and evaluate existing programs to reduce this burden.

### Aim

This study aims to present a regional population based long-term analysis of cervix cancer trends and survival in the southern Portugal region.

### Methods

Trends in incidence and survival of cervix uteri cancer between 1998 and 2022, in three geographic regions covered by Southern Portugal Cancer Registry were studied, evaluating annual percent changes (APC) with Join Point regression model. Kaplan Meier estimated survival and logrank test was used to compare survival.

## Results

A total of 20838 cancer cases were registered in the Southern Portugal Cancer Registry diagnosed between 1998 and 2022. Cervix uteri cancer crude rate had a significant average annual percent changes (AAPC) of -1.12 (CI: -2.05;-0.19). Also a pronounced decrease tendency in crude rate with significant annual percent change (APC) of -2.64 from 2009 was observed. This decrease was observed in all regions. In situ tumours showed a high increase until 2012 with a significant annual percent change (APC) of 10.44 and a stable increase from then on (APC of 1.05). These results may be explained by 2009 screening program implementation with complete performance after 2017.

Overall survival at 20 years was 65.90% (5 y: 81.19%; 10 y: 76.64%; 15 y: 71.71% and 24 y: 60.09%). Survival showed an increase over time with 64.85% at 5 years in 1998, 82.37% in 2008 and 83.67% in 2018. Differences between regions were also found with higher survival in Lisboa (82.50% at 5 y and 67.31% after 20 years) when compared to Alentejo and Algarve, which presented similar results (Alentejo: 72.44% at 5 y and 58.93% after 20 y; Algarve: 71.57% at 5 y and 54.92% after 20 y). Survival at 20 years by stage at diagnosis is according to expected prognostic factors, In Situ: 88.94%; stage I: 70.26%; stage II: 34.99%; 20.75% stage III cases and stage IV with 5.91%.

## Discussion and conclusions

The burden of cervix uteri cancer decreased, possibly related to implemented screening and vaccination programs. Survival shows several improvements. Nevertheless, differences between regions remain, suggesting different access to health care, including cancer screening.

Keywords: Cervix uteri cancer, screening, APC, Survival

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## SESSION II : DATA LINKAGE WITH OTHER DATA SOURCES (GEONOMICS, BIOBANKS, SOCIOECONOMIC)

### **Inequalities in cancer: linking population-based cancer registry data to individual-level socio- economic and -demographic parameters in Belgium**

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## Background

The Belgian Cancer Registry collects patient and tumour characteristics for all new cancer diagnoses in Belgium since 2004, and is routinely linked with population-based

administrative datasets providing information on vital status, reimbursed medical procedures and medication, hospital discharge data, and causes of death.

### Aim

The objective was to study inequalities in cancer incidence and survival via linkage of the extended cancer registry dataset with individual-level socio-economic and -demographic (SE/SD) parameters.

### Methods

To study the association between SE/SD parameters and cancer risk and stage, data on education level, household composition and housing conditions for all adults participating in the nationwide 2001 Census was linked with the cancer registry (incidences 2004-2013). Secondly, to study inequalities in cancer survival, data of a cohort of cancer patients diagnosed between 2006 and 2013 was linked with individual-level SE/SD parameters (i.e., household income, employment status and marital status), retrieved from administrative datasets.

### Results

In the study cohort of almost 7 million individuals, deprived groups showed higher risks for lung and head and neck cancers, whereas an inverse relation was observed for female breast cancer and melanoma. Lower socio-economic position was associated with reduced chances of being diagnosed with a known or early stage at diagnosis.

Lower income, unemployment, and living alone were all associated with worse cancer survival, and associations were most pronounced for certain lifestyle-related cancers (e.g., head and neck cancers) and those with good to moderate prognosis (e.g., colorectal and female breast cancer).

### Conclusion and discussion

Linkage of individual-level SE/SD determinants with cancer registry data is feasible in Belgium. This allows an in depth evaluation of drivers of inequity in cancer, contributing to informed proportionalism of policy measures in cancer prevention and care.

Keywords: Cancer; inequalities; data linkage; survival; incidence

## **Return to work after breast cancer: the RELIANCE-Breast Cancer study**

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## Background

In women with breast cancer is the most common cancer in terms of incidence and mortality. Luxembourg's National Cancer Registry (RNC) collects all new cancer cases diagnosed and/or treated on the territory of Luxembourg. The RELIANCE (“REaL-life cANCER epidemiology to identify risk factors for cancer with a particular focus on prevention and care”) Breast Cancer study, aims to evaluate cancer epidemiology for the first time in Luxembourg. The study involves a retrospective analysis of the RNC breast cancer cohort 2013-2018 including waiting times for breast cancer treatment and a cross-sectional prospective study being linked to RNC data.

## Aim

To evaluate associated risk factors for breast cancer and the barriers and facilitators to return to work after diagnosis.

## Methods

An online self-administrated questionnaire collected data from breast cancer survivors (who visited the Service de Santé au Travail Multisectoriel (STM)). If consent is provided, collected data is linked to STM breast cancer patient data and an RNC dataset of the 2013-2018 cohort. Additionally, a scoping review is conducted to identify return work interventions and gaps according to breast cancer survivors and employers perception.

## Results

Articles were systematically searched using two databases (Pubmed and EMBASE). The scoping review includes 608 peer-reviewed articles before screening. A framework of interventions will be presented, as well as their gaps according to survivors and employers perception. Thanks to the questionnaire (response rate of 38%) and data linkage, age at diagnosis for breast cancer survivors having returned to works was assessed at a mean 44.8 [27.0; 63.0]. The workability index by clinical, sociodemographic, employment and behavioral characteristics, as well as long-term side effects will be presented.

## Discussion

This study enabled to highlight the importance of data linkage between cancer registry data and secondary data sources to support return to work and breast cancer management in Luxembourg, as well as to compare patient pathway depending on clinical and socioeconomic factors.

Keywords: return-to-work, data-linkage, breast cancer, scoping review

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# Is hospital discharge database appropriated for collecting treatment information in a cancer registry? Exploratory study on childhood malignant astrocytomas

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## Background

The treatment data provided by the population-based cancer registries (PBCR) is crucial for treatment pattern monitoring, treatment evaluation and identification of treatment access inequalities.

## Aim

The objectives are to explore the first course of treatment data provided by the Hospital Discharge Database (HDD) for malignant astrocytomas (MA) diagnosed in children (0-19 age group) during the period 2007-2020 and residents in the Valencian Region (VR), as well as to validate this information using clinical records as the gold standard.

## Methods

Tumours with behaviour 3 included in the IIIb group of the International Classification of Childhood Cancer, 3rd edition, update 2017 were obtained from the Childhood Tumours population-based Registry (CTPBR) of the VR. Pilocytic astrocytomas were excluded. Hospital discharges including, at least one central nervous system tumour code in the primary or secondary diagnoses (ICD-9 codes: 191-192, 194.3-194.4, 225, 227.3-227.4, 237.0-237.1, 237.5-235.6, 237.9 and ICD-10 codes: C70-C72, C75.1, C75.3, D32, D33, D35.2, D35.4, D42-D43, D44.3, D44.5) were obtained from the HDD of VR with admission dates between 2006 and 2021.

Diagnoses and procedures codes of the HDD related to first course of anticancer treatment were classified into 3 groups: surgery, radiotherapy and chemotherapy.

Outpatient and inpatient clinical information was used for HDD validation.

## Results

A total of 82 MA were obtained from the CTPBR. HDD was linked with 72 (88%) of those cases. No HDD information was registered in 3 cases and 7 cases had data non-MA related. Surgery was performed in 54 MA and 96% of them were found in the HDD. The admission date was closed to the surgery date. Chemotherapy was given to 31 patients and 52% of them were registered in HDD and the proportion is higher in patients alive at the end of the study (82%). Only 1 radiotherapy treatment of 12 (8%) was found in HDD.



## Conclusions

HDD could be a complementary source for the CTPBR to collect MA first course of treatment. Other sources could be needed to improve the data provided by the HDD for chemotherapy and radiotherapy treatments. Next step is to explore other childhood tumours, evaluating other possible information sources. An European working group sharing experiences in this topic would improve the data comparability among PBCR.

Keywords: Astrocytoma, treatment data, hospital discharge database

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## SESSION 1 : SURVIVAL

### **16.01.01 – ID 64970 - Estimating net survival and cure of patients with increased risk of death from other causes using EUROCORE-6 data**

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#### Background

To estimate net survival (NS) and cancer cure fraction (CF), i.e. the proportion of patients no longer at risk of dying from cancer progression/relapse, a clear distinction needs to be made between mortality from cancer and from other causes.

#### Aim

Conventionally, CF is estimated assuming no excess mortality compared to the general population. To estimate both indicators, a new modelling approach that corrects for the cancers' patient extra risk of dying (RR) from causes other than cancer compared to the general population was considered.

#### Methods

We considered EUROCORE-6 data on head and neck (H&N), colorectal, and breast cancer in patients aged 40-79, diagnosed from 1998 to 2002 and followed-up to 31/12/2014, provided by 65 European cancer registries. Both the conventional and the corrected mixture cure models were applied to aggregated life table data of the European pool of registries stratified by cancer, age class, and sex. In addition, cause of death data (CoD) on patients diagnosed in 1998-2013 were analyzed in a subset of registries with 90% of these data available.

## Results

The RR for H&N cancer decreased with age from 4.0 to 1.6 in males and from 4.5 to 1.8 in females; CF ranged from 46% to 56% in males and 49-54% in females, depending on age group. For colorectal cancer, CF ranged from 47% to 55%, with RR ranging from 1 to 1.2. CF of female breast cancer ranged from 73% to 79%, with RR between 1.2 and 1.4. Using CoD, we found no substantial RR for colorectal and breast cancer, but  $RR > 2$  for H&N cancer.

## Conclusion & Discussion

If the relative risk of other causes is higher than one, relative survival with the general population as the reference underestimates net survival and Cancer cure fraction is underestimated as well.

Overestimating the cancer mortality risk may cause an undue additional burden on the quality of life of cancer survivors and greater difficulty in planning their life and return to normal existence and potentially to block access to insurance.

Keywords: cure model; net survival; cure fraction

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## **Contribution of tumor stage at diagnosis to international variation in population-level overall survival: First results of the Benchista project**

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<sup>1</sup>University College London (UCL); <sup>2</sup>Fondazione IRCCS “Istituto Nazionale dei Tumori di Milano” (INT).

## Background

Differences in stage at diagnosis may explain international variations in childhood cancer survival. The BENCHISTA Project aims to understand these variations and stimulate population-based cancer registries (CRs) to apply the internationally recognised Toronto Guidelines (TG) and collect non-stage prognostic factors for six solid paediatric cancers.

## Methods

67 CRs from 27 countries within and outside Europe collected TG at diagnosis for 6 childhood tumours (osteosarcoma, Ewing sarcoma, rhabdomyosarcoma 0-19yrs; Wilms tumour, neuroblastoma, medulloblastoma 0-14yrs) diagnosed between 2014-2017. European countries were grouped by regions defined in previous EURO CARE studies. Three-year overall survival (OS) by tumour type and stage was analysed using standard Kaplan-Meier methods. Adjusted Cox model and logistic regression were used for multivariate analysis.

## Results

10,939 cases in total were submitted by participating CRs. Overall completeness of stage at diagnosis was 93,2%. The proportions with metastases at diagnosis ranged from 18% for Wilms tumour to ~50% (40%M+10%MS) for neuroblastoma. After adjusting for age and stage, the Odds Ratio (OR) for diagnosis at a metastatic stage were significantly higher in the UK/Ireland for neuroblastoma (OR= 1.66, 95%CI=1.28-2.17) and medulloblastoma (OR=1.45, 95%CI=1.03-2.04). Conversely, this probability was significantly lower in Eastern and Southern Europe for neuroblastoma (OR=0.61, 95%CI=0.47-0.79 and OR=0.77, 95%CI=0.16-0.97 respectively) when compared to Central Europe. Three-year OS was Wilms tumour 95%; neuroblastoma 83%; medulloblastoma 79%; osteosarcoma 74%; Ewing sarcoma 76%; and rhabdomyosarcoma 75%. Multivariate analysis highlighted stage as an important contributor to survival variation for neuroblastoma in the UK/Ireland (Hazard ratio[HR] of death reduced from 1.4[p=0.01] to 1.2[p=0.3]) and for rhabdomyosarcoma in Eastern Europe (HR from 1.5[p=0.04] to 1.3[p=0.2]) compared with Central Europe.

## Conclusions

Differences in stage distribution at diagnosis partially explain overall survival variation by region and only for some tumour types. BENCHISTA has achieved a successful collaboration to interpret geographic variation, allowing the estimation of OS by stage at a population level for the first time.

Keywords: childhood cancer, survival, Toronto guidelines, epidemiology

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## **Social inequalities, geographical accessibility and excess mortality for patients with haematological malignancies in France results from French Cancer Registries**

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## Background

Outside clinical prognosis factors, non-clinical determinants of survival were identified for numerous cancer sites. Concerning haematological ones, little is known for such determinants.

## Aim

The objective of this study was to investigate the influence of socioeconomic environment and access to care on mortality in excess for patients with haematological malignancies for French mainland territory.

## Methods

This population-based study included 12 French cancer registries. The selected cases are Hodgkin's lymphomas, myeloid haemopathies, chronic lymphatic leukaemia, diffuse large B-cell lymphoma and follicular lymphoma diagnosed between 2013 and 2015 in France (N=15,995). The effect of socioeconomic environment was measured using the European Deprivation Index (EDI). The access of secondary care was measured by travel time between patient's residence to nearest reference care center, and access to primary care was estimated using two indexes: SCALE index, a new multiscale index available for all residential areas of France (approximately 2.8 millions) and APL index, potential accessibility localised well-known index developed by IRDES and available for all communes.

The effects of these indicators on mortality in excess were investigated using additive excess hazard models with multidimensional penalised splines.

## Results

For myeloid haemopathies, only the social environment had a significant effect on mortality in excess. For diffuse large B-cell lymphoma, the travel time to nearest reference care center had an impact on mortality in excess. Finally, for follicular lymphoma, an increase of APL index (explaining a better accessibility to primary care) was associated with a decrease of mortality. No effect was found for chronic lymphatic leukaemia and Hodgkin's lymphoma.

## Conclusion

Our study showed that the social environment and the geographical accessibility to primary or secondary care were prognostic factors for survival in certain haematological malignancies.

Keyword: registries, survival, social environment, geographical access

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## **Global surveillance of cancer survival trends (CONCORD-4): future perspectives**

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<sup>1</sup>London School of Hygiene & Tropical Medicine, on behalf of the CONCORD Working Group

### Background

CONCORD is an ambitious global public health programme for the long-term surveillance of cancer survival. In 2015, the second cycle (CONCORD-2) established world-wide surveillance of trends in cancer survival over 1995-2009. In 2018, CONCORD-3 updated the global surveillance of survival trends to include 37.5 million patients diagnosed up to 2014. The programme was extended in calendar time (2000-2014), geography (322 registries in 71 countries and territories; 47 with national coverage) and the number of cancers (18 cancers in adults and 3 in children). The CONCORD programme now involves 600 investigators.

### Aim

To showcase CONCORD-4, now in progress, and some broader activities designed to improve world-wide strategies for cancer control.

### Methods

We are collecting data for adults diagnosed with one of 22 cancers during 2000-2019, or later years. Older registries are also invited to submit data from 1990. We will examine trends in age-standardised net survival for patients diagnosed during the 32 years 1990-2021. In collaboration with St. Jude Children's Research Hospital (Memphis, TN), we will also examine survival trends for all cancers in children, to monitor progress towards the target in WHO's Global Initiative for Childhood Cancer, to increase five-year survival for all children with cancer to 60% by 2030.

### Results

By March 2024, we had received over 68 million records for adults and 450,189 for children, from 266 cancer registries in 56 countries (76 registries in 13 GRELL countries). We will present the state of the art for CONCORD-4 in May 2024: data collection, quality control, life tables and preliminary results.

### Conclusion and Discussion

Survival estimates from the CONCORD programme have become the *de facto* standard for international survival comparisons, and as a metric of health systems performance, cancer policy and improvement in outcomes. The Organisation for Economic Co-operation and Development, in partnership with the CONCORD programme, has

included survival estimates for 48 countries in its regular *Health at a Glance* publications since 2017.

The GRELL meeting will offer a great opportunity to announce a wider initiative in cancer control triggered by the CONCORD programme.

Keywords: cancer control, population-based cancer registries, survival

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## SESSION 2 : SURVIVAL

### **Determinants of breast cancer survival at the Instituto Cancerológico de Nariño-Colombia, 2016-2020**

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<sup>1</sup>Registro Institucional de Cáncer del Instituto Cancerológico de Nariño-Colombia.

#### Background

Breast cancer is one of the main causes of morbidity and mortality due to cancer in the female population of Colombia. However, studies related to the determinants of survival are limited, preventing the evaluation and planning of actions to reduce the impact on the population.

#### Aim

To identify determinants associated with breast cancer survival at the Nariño Cancer Institute (ICN), a leading institution for cancer treatment in southern Colombia.

#### Methods

A follow-up study of up to 5 years was carried out on a cohort of women diagnosed with breast cancer (N=762) during 2016-2020 and treated at the INC. The overall observed survival (St) was estimated and its relationship with demographic (age), socioeconomic (area of residence, health insurance, socioeconomic stratum) and clinical conditions (TNM stage) was explored, using the Kaplan-Meier method and Cox models. Information was processed by the Institutional Cancer Registry (RIC) of the ICN following standardized IARC methodologies and articulated with the Cancer Registry of Pasto-Colombia. Follow-up data were obtained from the official death certificate database.

#### Results

Women were mainly: aged 27-59 years (N=467; 61.3%), with a “subsidized” health insurance (N=433; 56.8%), residents of urban areas (N =548; 71.9%), socioeconomic stratum I (N=720; 94.5%), with basic educational level (N=350; 45.9%) and with tumors

TNM II (N=220; 28.9%). There were 159 deaths (20.8%) and an overall observed 5-year survival rate of 76.9% (95%CI 74.3%-79.5%).

Survival is significantly higher in women with contributory and special health insurance (St=80.5%; 95%CI 76.6%-84.3%) and with tumors TNM I (St=93.2%; 95%CI 85.9%-100%) and II (St=87.1%; 95%CI 82.5%-91.7%).

Cox models identified that the risk of death is significantly higher in women with a subsidized health insurance (Hazard Ratio HR= 1.4; 95%CI 1.07-1.95) and with tumors in TNM III (HR=6.5; 95%CI 2.07-21.3) and TNM IV (HR=12.01; 95%CI 3.49-41.24) compared to women with contributory and special health insurance and with TNM I tumors, respectively.

### Discussion and Conclusion

The overall observed survival is higher than the reported for Pasto and other similar populations. However, it is necessary, to improve access to early diagnosis and timely treatment in women with a subsidized health insurance.

Keywords: Breast cancer, survival, Institutional Cancer Registry

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## **Five-year net survival of myeloid neoplasms: A population-based study in Spain (2002-2016)**

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### Background

The Spanish Network of Cancer Registries (REDECAN) estimates that in 2024 hematological neoplasms will be the fourth most common cancer, of which myeloid neoplasms (MNs) will account for 30%. Currently, there is a lack of updated survival information on these neoplasms at the population level in Spain.

### Aim

The aim of this study is to calculate the overall survival of MNs and its trends in Spain during 2002-2016.

## Methods

All primary MNs tumor cases from the REDECAN database diagnosed during 2002-2016 with a follow-up of at least 5 years were included covering ~26% of the Spanish population. All tumors were coded according to the International Classification of Diseases for Oncology and classified by the 2016 WHO tumor classification.

Five-year net survival (5-y NS) was estimated for all MNs and by sex, age group, and MN subtype using the Pohar-Perme estimator. Trends were assessed by calculating the 5-y NS by period of diagnosis (2002-2006, 2007-2011, and 2012-2016).

## Results

A total of 21,513 MNs cases were included in the survival analysis with a median [Q1-Q3] age of 74 [61-81] years and a male predominance of 11,816 [55.0%] cases. Myeloproliferative neoplasms (MPNs), myelodysplastic syndromes, and acute myeloid leukemias were the three most common MN subtypes.

An overall 5-y NS of 48.9% [95%CI: 48.1-49.7] was reported for all MNs, with women having a better prognosis with a 5-y NS of 55.1% [95%CI: 53.9-56.4] than men with a 43.8% [95%CI: 42.7-44.9]. MN subtype differences were observed with MPN and mastocytosis showing 5-y NS above 80%, while the remaining subtypes showed values below 38%. The acute leukemia of ambiguous lineage subtype showed the worst prognosis with a 9.7% [95%CI: 7.1-13.2]. The 5-y NS by period of diagnosis was 48.3% [95%CI: 46.8-49.9], 50.9% [95%CI: 49.6-52.3] and 46.9% [95%CI: 45.5-48.4] for 2002-2006, 2007-2011 and 2012-2016, respectively. In addition, MN subtype trends also showed a stabilization during the period of the study.

## Conclusions and discussion

This study provides real-world data on the prognosis of MNs at the population level. Diagnosis of these cancers mainly in older people and the increasing aging of the population in Spain highlights the importance of monitoring the survival estimates of these types of neoplasms to help clinicians and health authorities.

Keywords: survival, myeloid neoplasms

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## **Survival and recurrences of colon cancer in a population-based cohort study: role of sidedness of the primary tumor. Geneva, Switzerland**

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## Background

Disparities in survival and disease progression of colon cancer (CC) have been reported according to primary tumor location (left versus right-sided cancer). We sought to study the potential role of sidedness in a population-based cohort of colorectal cancer patients established using the Geneva Cancer Registry.

## Methods

Patients diagnosed between 1985 and 2013 with primary invasive CC were included. Right-sided CC included ICD-O codes C18.0, C18.2-18.4 and left-sided CC included ICD-O codes C18.5-18.7, 19.9. We studied the cumulative incidence of recurrences (locoregional recurrences and metastases) and the overall and net survival according to sidedness of the primary tumor (left versus right) and other patient and tumor related characteristics (sex, age, period of diagnosis, stage, grade, abdominal emergency at diagnosis and treatment).

## Results

Among the 3503 patients with CC, 1870 patients had a left-sided CC (53%) and 1633 a right-sided CC (47%). Patients with a right-sided CC were older and more often women. Tumors were less frequently of stage I, well differentiated or diagnosed during an abdominal emergency, and less often treated with a combination of surgery and chemotherapy. Among patients with stage I – III CC, the cumulative incidence of recurrences at 5 years was 11% (IC95%, 10%-13%) and decreased with more recent period of diagnosis and lower stages. However, sidedness was not associated with cumulative incidence. Five-year overall survival was 56% (95%CI 54-59%) for left-sided CC and 47% (95%CI 45-50%) for right-sided CC ( $p<0.001$ ). Five-year net survival was 66% (95% CI 63%–68%) for left-sided CC and 59% (95% CI 56%–62%) for right-sided CC ( $p<0.001$ ). In a multivariate model, patients with a left-sided tumor had a 25% reduction in 5-year mortality in comparison with the right-sided tumors with an excess hazard ratio (eHR) of 0.75 (95CI% 0.63-0.89). This association remained significant only among stage IV cancers (eHR 0.73; 95%CI 0.59 – 0.91,  $p=0.005$ ) and not for stage I-III cancers (eHR 0.80; 95%CI 0.61 – 1.05,  $p=0.37$ ).

## Conclusion

Survival of right-sided CC was lower than left-sided CC, particularly among stage IV tumors, indicating the importance of sidedness for prognosis and treatment considerations.

Keywords: colon cancer, survival

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## **Dynamic of death hazard of breast cancer according to stage at diagnosis**

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### Background and aim

In France, only few studies have investigated the survival of women diagnosed with breast cancer according to stage at diagnosis. The objective of this study was to estimate the dynamics of net survival and excess mortality from breast cancer according to stage and age at diagnosis and according to the presence or absence of surgery or neoadjuvant treatment.

### Method

Using data from the French cancer registries, we identified a sample of women diagnosed with invasive breast cancer between 2009 and 2015. Stage at diagnosis was used, based on the TNM classification, in four groups: stage I, II, III and IV. We estimated excess mortality hazard and net survival for each stage according to age and follow-up time, using flexible penalized model.

### Results

Of the 9,628 women identified, 47% had stage I and 7% had stage IV. For stage IV, the excess mortality hazard was higher than for the other stages, regardless of age and time of follow-up. Survival was lower for women who did not undergo surgery and in older women regardless of the stage. The dynamics of the excess mortality were different according to the stage.

### Conclusion

This study based on French data provides new information on survival and its dynamic according to stage and to the type of first treatment for women diagnosed with breast cancer.

Keywords: breast cancer, excess mortality, survival, stage

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## SESSION 3 : SOCIAL INEQUALITIES AND CANCER

### **Describe the relationship between the Gender Inequality Index and the male/female incidence rate ratio from international cancer registries data.**

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#### Background

Tumors represent the second leading cause of death worldwide, with about 70% of deaths occurring in low- and middle-income countries. Incidence and mortality rates vary considerably among countries and may be influenced by socioeconomic inequalities, particularly gender disparities (Siegel et al. 2017, Arnold et al. 2017, Vaccarella et al. 2022).

#### Aim

To understand the relationship between gender inequalities and cancer incidence in each country. To do so, we used the 2021 Gender Inequality Index (GII) in conjunction with data from the Cancer Incidence in Five Continents Volume XI (CI5), published by the International Agency for Research on Cancer from international cancer registries data.

#### Methods

We have focused so far on the most common gender-neutral cancers worldwide: lung, colon, liver, stomach, and rectum, as well as on the age categories: 40-44 years, 55-59 years, and 70-74 years. From the registries, we have constructed average male-to-female incidence ratio rates to report them by country. To analyze the relationship between these average rates and the GII, we have conducted a simple linear regression for each age category and country.

#### Results

Our preliminary descriptive findings indicate a relationship between the level of GII and the average male-to-female incidence rate ratio. Additionally, we observe significant variations across cancer sites and age groups. For lung and colon cancers, age influences the association between GII and sex ratio, suggesting a higher incidence among males as GII increases in younger individuals. This trend reverses as individuals age, where an increase in GII is associated with a decrease in the male-to-female incidence rate ratio. In contrast, for liver, stomach, and rectum cancers, the correlation between the indicators is consistently negative across all age groups, with the regression slope becoming increasingly negative as age increases.

## Conclusion

These preliminary results highlight the relationship between the GII and the male-to-female incidence rate ratio. Major methodological issues arise from this work, which will be highlighted and discussed. We will continue our analyses to understand the mechanisms influencing this relationship and to explore other cancer site.

Keywords: cancers, gender, social inequalities

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## **Health-Related Quality of life in long-term survivors of Non-Hodgkin Lymphoma: A French population-based study**

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## Background

Non-Hodgkin lymphoma (NHL) represents 63% of haematological malignancies in France. Diffuse large B-cell lymphoma (DLBCL) and follicular lymphoma (FL) constitute the majority of NHL, accounting for 18% and 11% respectively. The issue of health-related quality of life (HRQoL) is becoming increasingly crucial, given the rise in survival rates following the diagnosis of FL and DLBCL.

## Aim

To compare HRQoL of NHL survivors with that of the general French population and to identify factors associated with HRQoL in NHL survivors.

## Methods

A population-based study was conducted across three cancer registries specializing in haematological malignancies (Covering 5 administrative departments with 3,693,712 residents in 2023). After updating vital status and addresses, patients diagnosed between 2010 and 2018 were administered the SF-12 and other questionnaires in September 2023. A reminder was sent two months later. The ICD-O-3 classification was used to define the diagnosis of DLBCL and FL. Mixed models were used in the multivariate analysis to account for the random effect of place of residence.

## Results

Questionnaires were sent to 1,381 patients, of whom 489 responded (35% response rate). NHL survivors exhibited lower HRQoL compared to the general French population ( $p < 0.001$ ), particularly in terms of physical role scores (62 vs. 73), emotional role scores (66 vs. 76), vitality (49 vs. 56), and social functioning (70 vs. 79). A one-year increase in age was associated with a decrease in general health ( $\beta = -0.2$ ,  $p = 0.007$ ), role emotional scores ( $\beta = -0.3$ ,  $p = 0.0001$ ) and vitality ( $\beta = -0.4$ ,  $p = 0.0039$ ). Ann Arbor stages III and IV were associated with poorer general health ( $\beta = -5.9$ ,  $p = 0.02$ ). Decreased libido was associated with lower physical role scores ( $\beta = -0.1$ ,  $p = 0.03$ ). The presence of comorbidity, socioeconomic deprivation, anxiety, and depression were associated with poorer HRQoL.

## Conclusion

The main factors associated with poor HRQoL in NHL survivors 6-11 years post-diagnosis were age, Ann Arbor stage, decreased libido and the presence of comorbidities, socioeconomic issues, anxiety, and depression. This study provides reference HRQoL values for comparison in the REALYSA study (National real-life study of lymphomas) and offers indicators to physicians to improve follow-up and care.

Keywords: Non-Hodgkin Lymphoma; Patient-reported outcomes; QoL; Income

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## **Socioeconomic deprivation and invasive breast cancer incidence by stage at diagnosis: a possible explanation to the breast cancer social paradox.**

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## Background

Compared to socioeconomically affluent areas, lower breast cancer incidence and similar or higher mortality have been reported in deprived areas.

## Aim

We provide a possible explanation to this paradox, by assessing the influence of area-based socioeconomic deprivation on the incidence of invasive breast cancer (BC) in France, according to stage at diagnosis.

## Methods

All women from six mainland French departments, aged  $\geq 15$  years, and diagnosed with a primary invasive breast carcinoma between 2008 and 2015 were included (n=33,298). Area-based socioeconomic deprivation was determined using the French version of the European Deprivation Index. Age-standardised incidence rates (ASIR) by socioeconomic deprivation and stage at diagnosis were compared estimating incidence rate ratios (IRR) adjusted for age at diagnosis and rurality of residence.

## Results

Compared to the most affluent areas, significantly lower IRR were found in the most deprived areas for all-stages (0.85, 95% CI 0.81-0.89), stage I (0.77, 95% CI 0.72-0.82), and stage II (0.84, 95% CI 0.78-0.90). On the contrary, for stages III-IV, significant higher IRR (1.18, 95% CI 1.08-1.29) were found in the most deprived areas.

## Conclusion & discussion

These findings provide a possible explanation to similar or higher mortality rates, despite overall lower incidence rates, observed in deprived women when compared to their affluent counterparts. Socioeconomic inequalities in access to healthcare services, including screening, could be plausible explanations to this phenomenon, underlying the need for further research.

Keywords: breast cancer, incidence, socioeconomic deprivation, rurality

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## **Socio-Economic Inequalities in Adherence to Clinical Practice Guidelines and Breast Cancer Survival in Spain**

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## Background

Women with lower socio-economic status (SES) have lower breast cancer survival. It is not clear to what extent differences in the care received contribute to these disparities.

## Aim

To investigate socio-economic inequalities in adherence to clinical practice guidelines (CPG) for the diagnosis and treatment of breast cancer and their implications for survival.

## Methods

We included all new invasive breast cancer cases in women diagnosed 2010-2014 in six Spanish provinces (N=3,253). Clinical data were extracted in the framework of the European High-resolution Studies and vital status follow-up covered a minimum of 5 years. SES was measured with the Deprivation Index established by the Spanish Society of Epidemiology, referred to 2011 and divided in quintiles from highest (Q1) to lowest (Q5). Adherence to CPG was measured with 15 indicators based on European and Spanish guidelines. Relative survival was modeled using flexible parametric models.

## Results

There were no differences in the type of treatment received but women living in the lowest SES areas were less likely to undergo a sentinel node biopsy (OR=0.60, [0.46, 0.80]), surgery within 30 days after pathological diagnosis (OR=0.53, [0.39, 0.73]), and adjuvant treatment within six weeks after surgery (OR=0.61, [0.44, 0.85]). In a model adjusted for age and clinical variables, women residing in the lowest SES areas had higher risk of death, HR=1.74 [95% CI 1.05, 2.87]. This difference seemed to be attributed to higher stage at diagnosis and lower adherence to CPG. The effect of SES was eliminated after adjusting for these variables.

## Conclusion & Discussion

Despite the overall coverage of the Spanish health system, women living in more deprived areas were less likely to receive care in line with CPG and had shorter survival. The evidence supports the “inverse equity hypothesis” that new interventions initially reach mostly those of high SES.

Funding: HiReSIC PROYE20023SÁNC (AECC), Subprogram VICA CIBERESP

Keywords: breast cancer; socio-economic inequalities; deprivation;

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## SESSION 4 : EPIDEMIOLOGICAL USE OF REGISTRY DATA

### **Validation of Rectosigmoid junction tumors site registration in Tarragona Cancer Registry**

**Marià Carulla**<sup>1</sup>, Ricard Sales<sup>2</sup>, Alberto Ameijide<sup>1</sup>, Laia Llauredó<sup>1</sup>, Aina Ratés<sup>1</sup>, Sandra Mateu<sup>1</sup>, Cristina Miracle<sup>1</sup>, Jaume Galceran<sup>1</sup>.

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## Background

Rectosigmoid tumors site registration may be a challenge for surgeons, pathologist, and cancer registry staff due to the several definitions of their location (e.g. anatomic landmark or endoscopic distance)

## Aim

To validate rectosigmoid tumor site of cases from a Cancer Registry according to the individual review of each case supported by the most suitable location method

## Methods

Observational retrospective study with a selection of rectosigmoid tumors, sigmoid colon and rectum of the 2014-2015 period from Tarragona Cancer Registry (TCR). An expert surgeon reviewed sigmoid and rectum tumor cases to exclude low rectal and proximal sigmoid tumors. In the selected tumors, surgeon reviewed all available explorations (rectoscopy/colonoscopy, magnetic resonance imaging, computer tomography, pathology record and intraoperative surgical record) to determine the tumor site

## Results

235 tumors included. 83 (35.3%) distal sigmoid colon, 77 (32.8%) rectosigmoid and 75 (31.9%) high rectal tumors according to TCR. In 60.9% of cases, intraoperative surgical records +/- other explorations, allowed to obtain the tumor's site. 41.0% of distal sigmoid cases, 54.5% of rectosigmoid and 54.7% of higher rectum tumors were classified correctly by TCR. 42.2% of distal sigmoid cases corresponded to rectosigmoid site. 16.9% of rectosigmoid tumors corresponded to high rectal site and 22.7% of high rectal tumors corresponded to rectosigmoid site.

## Conclusion & Discussion

Most of the distal sigmoid tumors and about 35% of rectosigmoid and high rectal tumors were misclassified by our registry. The lack of a well-established definition of rectosigmoid site is a key factor with important implications for patient management. Waiting for results in other registries, a clear definition of rectosigmoid tumors site seems necessary for all professionals.

Keywords: rectosigmoid junction tumors, cancer registration, missclassification

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# Cancer incidence trends in young adults of the province of Granada, 1985-2018

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## Background

Cancer incidence in young adults (20-49 years old) represents 15.4% of the overall incidence worldwide. An increase of cancer incidence has been reported for several types of cancer in multiple countries.

## Aim

To investigate cancer incidence trends in young adults in the province of Granada (Spain).

## Methods

We included all new invasive cancer cases diagnosed during the period 1985-2018 in the province of Granada in young adults (20-49 years old, N=17,902, 58% in women), using data from the Granada Cancer Registry. We computed annual age-adjusted incidence rates using the 2013 European standard population and used Joinpoint regression to estimate the annual percent change (APC) and 95% confidence interval for each combination of anatomical site and sex, analysing the main types of cancer.

## Results

Overall cancer incidence in young adults of Granada is rising for both men (APC=+0.8%) and women (APC=+2.5%). The most common cancers in women were breast (N=3,262 cases), non-melanoma skin cancer (N=1,980), thyroid (N=659), and skin melanoma (N=545). In men, non-melanoma skin cancer (N=1,727), lung (N=513), colorectal (N=486), and testicular (N=464) were the most frequent cancers. The biggest increases in men were found for thyroid (APC=+10.2%) and testicular cancer (APC=+7.8%); and in women for lung (APC=+5.1%) and thyroid cancer (APC=+3.7%). For lung cancer in men we found a two-phase trend, with an increase from 1985 to 1993 (APC=+6.2%) and a decrease from 1993 to 2018 (APC=-4.1%).

## Conclusion & Discussion

In concordance with international data, the province of Granada is experiencing a sharp increase in the incidence of cancer in young adults. The underlying causes could be related to exposure to risk factors and increased cancer detection. Cancer control

measures, such as obesity control and appropriate screening, may contribute to reducing the increasing cancer burden among young adults.

### Funding

Subprogram VICA CIBERESP.

Keywords: incidence; trends; young adults

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## **The risk of second primary cancer after a first primary cancer: a population-based study in Switzerland**

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### Background

With the improving cancer survival in Switzerland, concerns arise regarding the late effects and especially the risk of developing a second primary cancer (SPC) following a first primary cancer (FPC) diagnosis. This study aims to investigate the SPC risk among individuals diagnosed with a FPC in Switzerland.

### Methods

We included children and adolescents (age 0-19 years) and adults (age > 19 years) registered in the national childhood cancer registry and the cantonal cancer registries with FPC diagnosis between 1990-2019 and a minimum follow-up of 4 months. SPC were defined following the International Rules for Multiple Primary Cancers (ICD-O third edition). We included malignant SPC occurring at least 4 months after the FPC diagnosis and until December 31, 2019. We calculated standardized incidence ratios (SIR) by sex, age, FPC group and FPC/SPC group combinations.

### Results

Among our study population of 551'891 individuals with FPC, 46'348 were diagnosed with SPC during a total of 3'318'762 person-years. Overall, SPC risk was 13% higher in our study population compared to the risk of FPC in the Swiss population (SIR = 1.13; 95% Confidence Interval (CI) = [1.12, 1.14]). Relative risks were slightly higher in females (1.16 [1.14, 1.18]) compared to males (1.12 [1.10, 1.13]). The relative risk of SPC was higher after a FPC in childhood (age 0-14 years) (6.34 [5.13, 7.75]). The highest overall SPC

relative risks were observed after FPC of the lip, oral cavity and pharynx (3.03 [2.92, 3.14]), FPC of the larynx (2.59 [2.43, 2.75]), and FPC of the oesophagus (1.90 [1.71, 2.09]). The relative risk for SPC of the lip, oral cavity, and pharynx was 24 times higher after FPC of the same group (SIR = 23.78 [21.91, 25.76]).

### Conclusions

The findings underline an increased risk of subsequent primary cancers among cancer survivors in Switzerland especially after FPCs in childhood. Individuals with FPC related to smoking and alcohol consumption are especially vulnerable to SPC development. Patient counselling, healthcare professional awareness, and risk-adapted surveillance are crucial.

Keywords: Second Primary Cancers, Late-Effects, Risk-adapted surveillance

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## **A Martinique-Cuba pilot comparative study in the projections and indicators for cancers in The Caribbean**

**Remi Houpert<sup>1</sup>, Yaima Galan<sup>2</sup>, Jacqueline Veronique-Baudin<sup>1</sup>, Leticia Fernandez<sup>2</sup>, Clarisse Joachim<sup>1</sup>.**

<sup>1</sup>Cancer Research Unit UF3596, Oncology Hematology Urology Department, CHU Martinique; <sup>2</sup>National Cancer Registry of Cuba, La Havana, Cuba.

### Background

Prostate cancer is the most frequent cancer in men in the Caribbean. Since 2023, an observational epidemiological study has been implemented in Martinique focusing on risk profiles among the most frequent cancer localizations and their associations with potential environmental exposure. Cuba and Martinique have been selected as pilot sites, as they are comparable in terms of quality population-based registry data.

### Aim

The aim of this study is to duplicate the study started in Martinique and to compare the trends in incidence, mortality, and survival of prostate cancer with Cuba.

### Methods

We included socio-demographic data and clinical variables from all patients diagnosed with Prostate cancer (ICD10 : C61) between 2010 and 2019. Clinical stage at diagnosis was classified into localized (T1N0M0 - T2N0M0 and T3aN0M0) versus locally advanced (T3b/T4N0M0) and regional/metastatic group (N+/M+) based on the TNM classification.

### Results

Between 2010 and 2019, a total of 5,872 and 39,361 new cases of prostate cancer were diagnosed in Martinique and Cuba respectively. Age at diagnosis was 68 years for both

countries. Incidence and mortality were significantly higher in Martinique. In Cuba, both incidence and mortality are rising. The 5-year net survival rate for prostate cancer is higher in Martinique than in Cuba, with a very favorable prognosis (95% vs. 56.1%). Interactive online reports and dynamic dashboards will present the range of geographical disparities and will be presented according to clinical stage, taking into account environmental exposure in Martinique.

### Conclusion & Discussion

The results will be used to share epidemiological findings and innovative work in the field of oncology in the overseas regions, through the development of observation systems and knowledge of population health in the Caribbean. The findings will be integrated into a cancer surveillance platform: the Martinique Cancer Data Hub (MCDH). This project represents a powerful hub for the development of programs to support emergent professional communities of practice, and to strengthen health monitoring systems for cancer in the Caribbean.

Keywords: Prostate cancer, Caribbean, Public Health, Data-Hub

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## SESSION 5 : EPIDEMIOLOGICAL USE OF REGISTRY DATA

### **16.05.01 – ID 65003 - Stage-specific incidence and survival trends in non-small cell lung cancer over 2008-2020: a large French population-based study**

**Nolwenn LE STANG**<sup>1,2</sup>, Alexandre QUILLET<sup>1,3</sup>, Thomas SYSTCHENKO<sup>1</sup>, Nicolas MERIAU<sup>1</sup>, Nicolas ISAMBERT<sup>4</sup>, Gautier DEFOSSEZ<sup>1,2</sup>.

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#### Background and aim

Lung cancer is the leading cause of cancer-related deaths worldwide. Over the last decades, new strategies to cancer diagnosis and therapy has dramatically improved in lung cancer, depending on the pathways and characteristics of different tumor entities. The aim of this study was to identify stage-specific incidence and survival trends in non-small cell lung cancer (NSCLC) over 2008-2020 in South-Western France.

#### Methods

All NSCLC diagnosed between 2008 and 2020 identified from the Poitou-Charentes Cancer Registry were included. Stage at diagnosis was categorised as local (I-IIA), locally advanced (IIB-IIIA), regional (IIIB-C) or advanced stage (IV) according to the 8<sup>th</sup> TNM edition to ensure consistent level of prognosis over time. Trends over 2008-2020 were

summarized by the average annual percent changes (AAPCs) defining by the slope of time-dependent regression line from age-standardized incidence rates and from 3-year net survival rates. Data focused on the two main histological subtypes, adenocarcinomas and squamous cell carcinomas (SCC).

## Results

Among the 12,943 included NSCLC, overall adenocarcinomas incidence increased steadily from 2008 to 2020 (AAPC = +2.4%), while incidence decreased in SCC (AAPC = -2.7%). Stage-specific trend analyses suggest an increasing incidence of adenocarcinomas at all stages, and only at local and locally advanced stages for SCC. Net survival rates improved for adenocarcinomas for every stage (AAPC = +1.4% for all-stages combined), particularly for regional stages (AAPC = +1.4%, from 25% to 43%) and advanced stages (AAPC = +1.1%, from 6% to 19%). For SCC, net survival increased slightly (AAPC = +0.7% for all stages combined) and even a decrease for local and locally advanced stages (AAPC = -0.2% and -0.4% respectively).

## Conclusion

Lung cancers remains mostly diagnosed at advanced stages. The increased incidence of adenocarcinomas lung cancer coincided with an improved prognosis, suggesting actual benefits of early detection (low-dose computed tomography screening) and management of lung cancer (breakthroughs in targeted therapies and immunotherapy).

Keywords: lung cancer, incidence, survival, stage

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## **Epidemiological Trends Over The Main Hematologic Malignancies In An Insular Region Of Portugal – 25 Years Of Observation On Madeira Islands**

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## Background

Hematologic malignancies (HM) are among the most relevant tumors worldwide. Non-Hodgkin lymphomas were the 10<sup>th</sup> most common cancer and leukemias, the 10<sup>th</sup> leading cause of cancer mortality worldwide (GLOBOCAN 2022).

## Aim

Present an epidemiological approach of the main HM types obtained for 25 years of cancer registry on Autonomous Region of Madeira (Madeira; 2 inhabited islands on North Atlantic, population 250744; area 801km<sup>2</sup>).

## Methods

Data collected from Madeira residents (1998-2022) with HM, registered on the platform National Cancer Registry database (RON). Mortality data obtained from the National Statistics Institute. Epidemiological variables including, sex, age, cumulative risks, incidence (IR) and mortality rates (MR; /100,000), including annual percentage change (APC) and average APC (AAPC), and overall survival (OS) with Kaplan-Meier method and log-rank test for groups comparison were analyzed. It was used Joinpoint 5.0.2 and IBM SPSS Statistics 22.

## Results

A total of 2342 cases were obtained (49.8% males), with a median age of 67yrs (IQR=23). They were the 4<sup>th</sup> most frequent, and non-Hodgkin lymphoma, the most frequent HM and the 6<sup>th</sup> globally (world age standardized rate; ASR=5.2-14.3) with an increasing incidence among younger groups (<65yrs; AAPC=4.7%; 95%CI=3.3;6.0; p<.001), with a stable MR (APC and AAPC with p>.05). Myelodysplastic syndromes had the most pronounced IR AAPC with 7.8% (95%CI=2.5;13.5; p=.004). MR was most pronounced among older groups with multiple myeloma (AAPC=13.6%; 95%CI=1.5;27; p=.026). Leukemias were the 2<sup>nd</sup> most frequent (26.9%) with no significative (p>.05) MR APC or AAPC and a mean cumulative risk (0-74yrs) of 0.59%. Acute myeloid leukemia was the deadliest HM with 15.3% 5-yrs OS. No differences were observed among chronic myeloid and chronic lymphocytic leukemias (mean survival of 3.5-4.0yrs; p=.213).

## Conclusion & Discussion

IR increased among most types and MR remained relatively stable among these 25yrs. In the almost absence of direct risk factors, more and better diagnosis accuracy were made through these years reflecting better health services such as therapies on our population.

Keywords: hematologic malignancies; epidemiology; incidence; mortality; survival

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## **The impact of lung cancer in Brazil**

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<sup>1</sup>Fundação do Câncer, Brazil.

## Background and Aim

Lung cancer is one of the main causes of morbidity and mortality worldwide, representing a serious public health problem.

In Brazil, there is a high incidence and mortality associated with the disease. The occurrence of more than 32 thousand new cases of lung cancer was estimated in 2024, 18 thousand in men and 14 thousand in women. There is a clear difference between the regions of the country. More than 29 thousand deaths from the disease were recorded in Brazil in 2022.

## Methods

This study presents information on the incidence, mortality and hospital morbidity of lung cancer (C33-34) in Brazil, stratified by sex, age group and geographic regions. Information on hospital morbidity was taken from Brazilian cancer registries database, from 2016 to 2020. The variables race/skin color, education, time between diagnosis and treatment, clinical staging and smoking were analyzed.

## Results

A total of 45,811 patients were analyzed, 25,568 men and 20,243 women.

During the period from 2020 to 2021, there was a decrease in the proportion of deaths due to lung cancer, with a corresponding shift in this percentage to deaths that had COVID-19 infection as the underlying cause.

The study showed the highest occurrence of lung cancer in the population with low education. The majority of lung cancer patients reach stage four, both in the male (63.1%) and female (63.9%) population, a pattern that is repeated in all Brazilian regions.

Among patients with lung cancer, the majority were smokers or ex-smokers (86% - male and 72% - female). This percentage ranged from 79.5% in the Northeast to 87.5% in the South, in the male population, and from 67.0% in the Northeast to 76.4% in the South, in the female population.

## Conclusion and Discussion

Primary prevention plays a crucial role in reducing the incidence of lung cancer and, consequently, its mortality. This includes a set of educational, legislative, regulatory and economic actions aimed at reducing smoking initiation and/or encouraging smoking cessation.

Keywords: Lung Cancer, Incidence, Brazil, Mortality, Morbidity

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## **Health care costs of cancer patients at the end of life: Estimated from the Epicost-2 study**

**Silvia Francisci**<sup>1</sup>, Alessandra Andreotti , Alberto Gagliani , Silvia Gori , Stefano Guzzinati<sup>2</sup>, Sandra Mallone<sup>1</sup>, Daniela Pierannunzio<sup>1</sup>, Andrea Tavilla<sup>1</sup>.

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### Background and aim

Cancer treatment represents a significant burden on societies and healthcare systems. Costs of cancer care are particularly concentrated immediately after diagnosis and before death due to cancer for worst prognosis patients. The objective here is to estimate the cost profiles relating to healthcare services provided to cancer patients diagnosed in the Veneto region in their last year of life.

### Methods

The study cohort is cross-sectional, identified retrospectively on the basis of the site of the primary tumor and includes adult patients, resident in the Veneto Region, alive on 1.1.2018 who were diagnosed with cancer at the age of 15 years or older in a period ranging from 1990 to 2017, and died within 12 months from the prevalence date. The tumor sites considered are colon, rectum, cutaneous melanoma, female breast and thyroid. Data are collected within the framework of the Epicost-2 study.

### Results

The prevalence cohort includes 3,249 subjects. Of these, more than 70% have breast or colon cancer (41.7% and 30.8% respectively). The majority are women (67% versus 33%) and are over 70 years old (69.9%). With reference to the average cost per patient, it is higher in younger patients and decreases with age. Overall, the total estimated cost at the end of life in the Veneto Region, for the five types of cancer analyzed, is approximately 54 million euros.

### Conclusions

The cost of cancer patients, especially at the end of life represents a relevant share of the health care budget and this share is increasing over time. Therefore, there is a lively debate about the sustainability of the health care systems in most Western European countries, including Italy.

The Epicost-2 study provides evidence to policy makers in order to better allocate financial resources to the health care system and to properly address health care needs of cancer patients.

Keywords: cancer, costs, phase-of-care, end-of-life, prevalence



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## SESSION 6 : OTHER POPULATION-BASED STUDIES

### **Enhancing quality of information for Italian Childhood Cancer data: the BENCHISTA-AIRC Project.**

**Didonè Fabio**<sup>1</sup>, Laura Botta<sup>1</sup>, Andrea Tittarelli<sup>1</sup>, Claudio Tresoldi<sup>1</sup>, Martina Fragola<sup>2</sup>, Riccardo Haupt<sup>2</sup>, Gemma Gatta<sup>1</sup>, and the BENCHISTA PMT<sup>3</sup>.

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#### Background

Survival data for childhood cancers highlighted inequalities across countries/regions. The tumour stage is an important prognostic factor, thus differences in stage distribution should be considered.

#### Aim

The BENCHISTA-AIRC (National Benchmarking of Childhood Cancer Survival by Stage at diagnosis) project aims to: 1) encourage the application of the Toronto staging guidelines (TG) by the Italian population-based cancer registries (PBCRs); 2) understand whether geographical differences are explained by a different distribution of stage at diagnosis, and 3) link PBCRs data and national clinical registries, to mutually enrich both databases.

#### Methods

Cases of 9 solid pediatric cancers, diagnosed between 2013-2017 and with at least 3 years of follow-up, were included. Information on demographics, clinical information (e.g. primary treatment, recurrence/progression, hospitals of diagnosis/treatment) and other prognostic factors were collected. Subsequently, a similarity function was used to link probabilistically patients in PBCRs data with those in the national clinical registries. The variables used for the linkage were: sex, year of birth, residence, year of diagnosis, age in months and hospital of diagnosis.

#### Results

25 PBCRs have provided data for a total of 1724 cases. The completeness of stage at diagnosis shows values above 90% for the majority of the tumours. The linkage with the Italian Neuroblastoma Registry showed a performance of 93% and improved the completeness of important clinical information and prognostic factors (e.g., from 81% to 99% for stage tier 2 and from 49% to 86% for genetic mutation). The stage distribution is not severely affected by the linkage, but the stage assigned by PBCRs and clinical registry differs in 33% of the matched cases.

## Conclusion

The national BENCHISTA project demonstrated the feasibility of collecting TG stage at diagnosis by the Italian PBCRs. The results of this project will contribute in better understanding geographical disparities in childhood cancer survival, to plan appropriate solutions. Finally, the results obtained by the linkage between PBCRs and clinical registries data reinforce the relevance of the strong collaboration between the latter, also encouraging the establishment of a national pediatric cancer registry.

Keywords: Linkage; Stage; Toronto Guidelines; Cancer Registries;

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## **Progression of bladder cancer: a population-based study in Tarragona, Spain**

**Laia Llauredó**<sup>1</sup>, Marià Carulla<sup>1</sup>, Araceli Jiménez<sup>1</sup>, Sheila García<sup>1</sup>, Lydia Díaz<sup>1</sup>, Jàmnica Bigorra<sup>1</sup>, Xavier Collado<sup>1</sup>, Jaume Galceran<sup>1</sup>.

<sup>1</sup>Tarragona cancer registry. Hospital Sant Joan de Reus. Spain

### Background

Bladder cancer is characterized by episodes of recurrence and progression. Classification of non-invasive and in situ urothelial carcinomas determines the risk of stage progression in urinary bladder cancer.

### Aim

The aim of the study is to describe the progression of non-invasive urothelial bladder cancer cases from the Tarragona population-based Cancer Registry (TCR) in Catalonia (Spain) diagnosed in the period 2010-2014 with a follow-up until 2018.

### Materials and Methods

Bladder cancer cases included in the study were those diagnosed by biopsy confirmation, non-invasive low grade (pTa LG), non-invasive high grade (pTa HG) and in situ (pTis) with specific histologies classified using the ICD-O-3. The cases were followed up to 5 years and progressions to higher grade or in situ or invasive tumors were registered. The recurrence cases were not evaluated.

### Results

584 incident bladder cancer cases (without progressions and invasive cancers in the mentioned period) from TCR, diagnosed during 2010-2014, were included. Ratio men/women 6.3, mean age at diagnosis 69.1±11.9. pTa LG 75.0% (438 cases). pTa HG 20.9% (122) and pTis 4.1% (24). The progression proportion was 9.4% for pTa LG (41 cases), 15.6% for pTa HG (19) and 4.2% for pTis (1) (p=0.08). A total of 7.1% of pTa LG cases become invasives, whereas 14.8% of pTa HG cases and 4,2% of pTis cases showed this

progression ( $p=0.022$ ). The mean time to first progression in the pTa LG cases was 71.3 days, in pTa HG cases it was 425,2 days and in the pTis cases it was 259 days ( $p<0.001$ ).

### Discussion and Conclusions

Our study shows that pTa HG cases are more likely to progress to invasive tumor than pTa LG or pTis cases. The majority cases of non-invasive bladder cancer cases are pTa LG and these cases are the ones that progress fastest. Taking this into consideration, clinical care should monitor cases of pTa LG more closely.

Keywords: Urinary bladder cancer, progression, cancer registration

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## **Geographical survival comparison and estimated long term survival outcomes of pediatric CNS tumors from 31 european countries – results from the Eurocare project**

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### Background

Survival outcomes of pediatric CNS tumors have been reported to vary largely across European countries. Additionally, up-to-date long-term survival outcomes have not been reported for clinically relevant groups of pediatric CNS tumors.

### Aim

This study aims to understand the geographical variations and long-term survival outcomes of pediatric CNS tumors in Europe.

### Methods

Survival of 14,689 children (<15 years) diagnosed with a CNS tumor between 2008 and 2013 from 31 European countries was compared using cox regression models. A multivariate model, including the proportion of non-malignant CNS tumors, and age at diagnosis was used to compare adjusted risks of dying using Germany as reference. Additionally, we analyzed data on 15,242 children (<15 years) diagnosed with a CNS tumor between 1998-2013 from 31 European countries with follow-up until 31/12/2014 to estimate up-to-date 15-year observed survival (OS).

## Results

Large variation in survival was seen for high-grade gliomas (HGGs); 0%-70%. When analyzing HGGs, six countries had a significantly higher risk of dying with HRs ranging from 1.2 to 4.2. When excluding malignant gliomas, NOS (ICD-O-M9380/3) from the HGGs the risk of dying became comparable for two out of the six countries. For HGGs, only one country had a significant lower risk of dying. For Medulloblastomas, 5-year OS within the majority of countries ranged between 40-70% but with some countries having no patients surviving their disease. Seven countries had significantly worse survival outcomes with HRs ranging from 1.7-3.2. As a result of the high long-term mortality rate of 16 per 1000 surviving patients per year, ependymomas had an estimated 15-year OS of 62%. Long-term mortality for surviving glioblastoma patients was null resulting in a projected 15-year OS of 20%. For medulloblastomas 15-year OS is estimated at 56%. AT/RTs including PNETs and HGGs had an estimated 15-year OS of 28% and 19% respectively.

## Conclusion

Despite corrections, survival gaps persist for all CNS tumor types across European countries. This study is the first to assess long-term survival in clinically significant pediatric CNS tumor groups. These results will enhance patient-centered care, and contribute to the overall improvement of healthcare systems.

Keywords: CNS tumors, pediatric, EUROCARE, survival

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## **Monitoring survival in Belgium following COVID-19: first observations 3 years later**

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<sup>1</sup>Belgian Cancer Registry, Brussels, Belgium.

### Background

Since the start of the COVID-19 pandemic, timely monitoring of changes in both cancer incidence and survival data has emerged for many cancer registries worldwide. In the database of the Belgian Cancer Registry, data on vital status is quickly available (+- 1 month delay according to a combined passive and active method).

### Aim

In this study, the main objective was to explore changes in the 1-, 2- and 3-year relative survival (RS) in Belgium of patients diagnosed during the COVID-19 pandemic in 2020.

## Methods

The 1-, 2- and 3-yr RS (Ederer II; follow-up until 31<sup>st</sup> December 2023) was calculated for all invasive tumours diagnosed between 2017-2021 and compared with two-sided z-tests. Patient populations were divided as follows: distant metastasis at diagnosis (yes/no), pre-COVID-19 RS probabilities as measure for aggressive cancers (cancer types with 3-yr RS<35%; 10-yr RS<50% or 10-yr RS>50%) and age group (<50; 50-64; 65-79; 80+). An explorative analysis on cancer type level (21 subtypes) was performed to detect consistent RS differences.

## Results

While the 1- and 2-yr RS for 2020 (81.9% and 75.4%) were lower than the RS for 2019 (82.5% and 76.0%) and 2021 (83.1% and 77.1%), the 3-yr RS for 2020 (72.1%) aligned again with the RS for 2019 (72.2%) and was higher than the 3-yr RS of 2018 (71.5%). The 1- and 2-yr RS for 2021 seemed to follow the increasing trend observed in the years before the pandemic. No coherent trend was detected at cancer type level. In 2020, small shifts were observed towards proportionally more patients with unfavourable characteristics such as distant metastases and aggressive cancers compared to previous years. The number of new diagnoses by age group reflected the expected trends of the ageing population in Belgium except for the age group 80+ marked by a proportional decrease in 2020, which continued in 2021.

## Conclusion and Discussion

These explorative results on the 3-yr RS of 2020 and the 2-yr RS of 2021 are hopeful, but at the same time cancer registries should be careful with drawing strong causal conclusions. Most probably, a complex interaction of multiple elements plays a role in the RS trends, even on cancer type level, with potential changes in both diagnostic and treatment trajectories (i.e. delayed diagnoses, concomitant COVID-19 infections, changes in stage and age distribution, etc.).

Keywords: COVID-19; 3-year relative survival; monitoring

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## **The impact of the COVID-19 pandemic on cancer incidence in Switzerland - a study with population-based national cancer registry data**

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## Background and Aim

Responses to the COVID-19 pandemic, including lockdowns and behavioural and health system measures during 2020 influenced cancer detection and treatment worldwide. Limited evidence is available from Switzerland. The aim of this study was to investigate the impact of the COVID-19 pandemic on cancer incidence in 2020 in Switzerland.

## Methods

We used population-based Swiss national cancer registry data and included all primary cancers in patients aged  $\geq 20$  years and diagnosed between 2017 and 2020. We compared crude and directly age-standardised annual and monthly incidence rates for 2020 to the respective incidence rates for 2017-2019. The analyses were conducted for all cancers (ICD-10 C00 to C97, excluding C44), breast (BC, C50), and colorectal cancer (CRC, C18-C20), stratified by age group.

## Results

Age-standardised annual incidence rates decreased in 2020 compared to 2017-2019 for all cancers (530.4 [522.4-538.5] in 2020 vs 543.1 [538.4-547.8] in 2017-2019), BC (156.1 [150.3-162.1] vs 162.6 [159.1-166.1]) and CRC (48.5 [46.1-51.0] vs 51.1 [49.6-52.5]). A decline in monthly age-standardised incidence rates was observed during the lockdown period from March to May 2020 compared to the same period in 2017-2019 for all cancers, BC, and CRC. A potential rebound effect with higher incidence rates from July to September 2020 was observed, while incidence rates in October and November were again lower compared to 2017-2019. Stratified by age group, the decrease in incidence rates for all cancers during March-May 2020 compared to 2017-2019 was primarily observed in individuals aged  $\geq 50$  years. The rebound effect was smallest and the decrease in incidence at the end of 2020 was most pronounced in the age group  $\geq 80$  years.

## Conclusion and Discussion

The COVID-19 pandemic affected cancer incidence in Switzerland with a decrease during the lockdown period in spring 2020. The overall lower incidence in 2020 compared to 2017-2019 suggests that a full rebound through delayed diagnoses has not taken place. This may be attributed to certain age groups or cancers for which organised screening programs (BC, CRC) exist being particularly affected by the pandemic.

Keywords: cancer registry data, incidence, COVID-19

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## SESSION 7 : CANCER ETIOLOGY

### **Residential radon exposure and skin cancer in Switzerland - highlights from the PaRTERRE project**

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#### Background

Radon is a radioactive gas naturally found in the earth crust, that can accumulate in buildings and emit alpha particles potentially irradiating tissues including the skin.

#### Aim

We aimed to evaluate the association between residential radon exposure and skin cancer incidence and mortality, considering ambient solar ultraviolet radiation (UVR) exposure.

#### methods

Incidence analyses included all residents in the cantons of Vaud, Neuchâtel, Valais, Geneva, Fribourg, and Ticino (1.3 mil adults; followed 8 to 11 years) with cases of primary skin tumours (melanoma and squamous cell carcinoma (SCC)) identified from cantonal cancer registries. Mortality analyses were conducted using the census-based Swiss National Cohort (4.9 mil adults; followed 15 years). Exposure to long-term residential radon was modelled for all dwellings, ambient UVR exposure was modelled at 1x1 km. Both were linked to participant's residence. Hazard ratios (HR) were calculated using Cox proportional hazard models with age as time scale, adjusted for basic personal characteristics, socioeconomic position, and outdoor occupation (as proxy for additional UVR exposure).

#### Results

For incidence, 4937 melanoma and 10,269 SCC cases were accrued. For mortality, 3979 melanoma deaths were accrued. We found no association between residential radon and skin cancer incidence in all ages combined. In subset analyses, an association was observed for melanoma incidence in 20-29 year olds (1.68 [95% CI: 1.29, 2.19] per 100 Bq/m<sup>3</sup> radon), strongest in women and those of low socio-economic position. Residential

radon exposure was borderline associated with melanoma mortality (1.10 [95% CI: 0.99, 1.23] per 100 Bq/m<sup>3</sup> radon at age 60).

In addition to the known relationship between radon and lung cancer, our results suggest radon exposure is also a relevant risk factor for melanoma. Since accumulation of radon in homes is preventable, to communicate the risks to the public and inform about measures to reduce exposure is important.

Keywords: radon, melanoma, squamous cell carcinoma, cohort

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## **Cancer incidence in the vicinity of open landfills in Guadeloupe, French West Indies**

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### Background

People living in the vicinity of a landfill may be exposed to a wide range of pollutants, with possible subsequent health effects, including increased risks of cancer. The aim of the present study was to assess in Guadeloupe, the association between cancer incidence and proximity to the main open landfills.

### Methods

We used data from the Guadeloupe cancer registry over the period 2008-2017. We conducted analyses for the 18 most frequent cancer sites. We used the Besag York and Mollié model to study the association between cancer incidence and distance from a landfill, with adjustment for social deprivation.

### Results

People who lived less than 2 km from a landfill had increased risks of ovarian and head and neck cancer. Elevated risks of pancreatic, prostate, lung cancer and melanoma in men, as well colon cancer and hormone receptor negative breast cancer in women were also observed.

### Conclusion

A link between exposure to pollutants generated by a landfill and the risk of developing certain cancers was suggested but should be confirmed by additional studies involving a better characterization of exposure and control of potential confounders.

Keywords: environmental pollution; Caribbean; landfill; spatial analysis



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## **Etiology of liver cancer in the United States: patterns of HCV-, HBV-, Alcohol-, NAFLD- hepatocellular carcinoma, and cholangiocarcinoma.**

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### Background:

Liver cancer is prominent in the United States with ample variation in patterns of the two main types: hepatocellular carcinoma (HCC) and intra-hepatic cholangiocarcinoma (ICC) by etiology.

### Aim:

Assess liver cancer incidence rates and trends by etiology.

### Methods:

All Florida Cancer Registry data for 2010–2018, including 14420 HCC, 2930 ICC, and 2166 cases of extra-hepatic cholangiocarcinoma (ECC) were linked with population-based, statewide discharge data and department of health viral hepatitis data with 88.2% of cases successfully matched for major specific etiologies of HCC: chronic viral hepatitis C (HCV) and B (HBV) infections, alcohol, and non-alcoholic fatty liver disease (NAFLD). We analyzed incidence, survival, and trends (joinpoint regression) for HCV-, HBV-, alcohol- and NAFLD-related HCC, as well as ICC and ECC.

### Results:

HCV accounted for most cases of HCC (47%), followed by NAFLD (27%) and alcohol (13%) for 2010-2018, but since 2017, NAFLD is the number one cause of HCC in women. HCV-HCC age-adjusted incidence rates were high among US-born Black and Latino males. Overall trends are increasing significantly for NAFLD-HCC (+4.3% annually), alcohol-HCC (+6.0%), and ICC (+7.0%); stable ( $p < 0.05$ ) for ECC and HBV-HCC; while the number one cause, HCV-HCC, started to decrease significantly (-9.6% annually) in 2015, after the introduction of Direct-Acting Antivirals. Five-year age-adjusted all-cause survival remains poor for all types: HCC 18.5% (95%CI: 17.7-19.3), ICC 11.0% (9.2-12.8), and ECC 12.9% (10.5-15.3). By etiology, survival for the HCV-alcohol combined variant of HCC was the lowest at 11.4% (9.6-13.1).

### Discussion:

Population patterns of liver cancer are considerably heterogeneous by etiology. Characterization and prevention of liver cancer are limited by its consideration as a single disease. Prognosis remains uniformly poor. Priorities should include screening for risk factors and HCC and developing a better understanding of cholangiocarcinoma.

Keywords: liver cancer; etiology; epidemiology; NAFLD; Alcohol

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## **Breast cancer and pregnancy in the east coast of Spain**

**Clara Cervero-Carbonell**<sup>1-2</sup>, Laia Barrachina-Bonet<sup>1-2</sup>, Laura García-Villodre<sup>1-2</sup>, Lucía Páramo-Rodríguez<sup>1-2</sup>, Berta Arribas-Díaz<sup>1-2</sup>, Anna Torró-Gómez<sup>1-2</sup>, Ana Vizcaíno Batllés<sup>3</sup>, Carmen Martos-Jiménez<sup>1-2</sup>.

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### Background

Pregnancy-associated breast cancer (PABC) is defined as breast cancer (BC) diagnosed during pregnancy or in the first postpartum year.

### Aim

To analyze the risk of PABC and to identify differences in the pregnancy outcomes depending on BC diagnosis or not in the Valencian Region (VR), Spain.

### Methods

Women between 15-54 years old with at least one pregnancy between 2009-2018 were obtained from the population-based birth registry. To identify women diagnosed with BC between 2004-2019, they were linked with the population-based registry of tumors of Castellon (RTC), and with the Oncology Information System (SIO) if their province of residence was Valencia or Alicante.

The BC risk was analyzed according to the time of diagnosis, classifying women into 3 groups: before pregnancy, during pregnancy -PABC-(from the date of conception to 12 months after the delivery) and after pregnancy. For multiparous, the first pregnancy was classified. The Standardized Incidence Ratio (SIR) and their 95% Confidence Interval (95%CI) were calculated considering the RTC and SIO rates as standard.

### Results

1847 women were identified with BC of the 316865 with at least one pregnancy.

Between women with vs. without BC, statistically significant differences were identified in: proportion of women who only had one pregnancy (68.5% vs. 59.2%), mean age at delivery (35.3 vs. 31.8 years) and vaginal delivery or caesarean section (more caesarean sections in women with BC,  $\chi^2=38.3$  and  $p<0.05$ ).

In PABC group, the risk of BC was lower in relation to the population for VR (SIR: 0.7 (95%CI 0.6-0.8)) and no statistically significant differences were found for the residents at Castellon (SIR: 0.8 (95%CI 0.5-1.2)).

### Conclusion & Discussion

Despite BC is the most frequent during pregnancy, no increased risk of PABC was identified in the VR nor in Castellon. Women with BC are more likely to have just one pregnancy, in an older age, and a caesarean section.

Keywords: Pregnancy; Breast Cancer; Population-based Registry; Risk

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## SESSION 8 : CARE AND CURE

### **Synchronous and second primary cancers in newly diagnosed multiple myeloma non-transplant-eligible treated with lenalidomide**

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#### Background

Multiple primary cancers are two (or more) cancers in the same patient that are independent of each other. Additional cancer is synchronous (SyC) or metachronous (second primary cancers, SPC). An increased risk of developing SPC was reported with lenalidomide (Len) that has greatly participated to improving the treatment of newly diagnosed multiple myeloma (NDMM) non-transplant-eligible (NTE). There are limitations to these studies, especially co-exposition of alkylating-agents and not excluding SyC.

#### Aims

We aimed to evaluate the SPC risk in NDMM-NTE patients treated in front-line with lenalidomide and the incidence rate of SyC on the assessment of SPC risk.

#### Methods

We conducted a high-resolution population-based study using data from the Poitou-Charentes General Cancer Registry (Western France, 1.8 million inhabitants) with systematically review of medical source files. Additional cancer diagnosed within 4 months after MM was considered as a SyC and after 4 months as a SPC. The person-year approach was used with an indirect standardization. Patients were treated with Len as front-line setting for  $\geq 2$  cycles/months, alone or in combination with proteasome inhibitors and/or anti-CD38 monoclonal antibodies. Patients were excluded if they had

exposure to chemotherapy and/or were <70 years old because high-dose therapy with autologous stem cell transplantation is the recommended treatment for these patients.

## Results

Between 2018 and 2020, 360 patients were NDMM, including 173 treated with Len. 16 of 360 patients (4.4%) had a SyC of which 8 haematological malignancies and 10 (63%) incidental tumors. Standardized incidence ratio (SIR) of SyC was 8.20 [95% CI 4.68-13.31]. With a median follow-up of 36 months (range 6-32), 12 (6.9%) of the 173 NDMM-NTE treated with Len had a SPC. SIR of SPC was 1.30 [95% CI 0.67-2.27]. Cumulative incidence of SPC was 3.6% at 3 years [95% CI 1.6-8.0%]. SIR of additional malignancies (SyC + SPC) was 2.17 [95% CI 1.51-3.02]. Sixty-six patients (38%) died, including 61 without SPC and 5 with SPC.

## Conclusion

Incidence of SyC is particularly high in NDMM-NTE, therefore they should be excluded from the SPC risk assessment. NDMM-NTE treated with lenalidomide alone or in combination (without chemotherapy) did not have an increased SPC risk compared with general population.

Keywords: multiple primary cancers, myeloma, lenalidomide

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## **Adherence to clinical guidelines and time to treatment for women diagnosed with breast cancer during 2015-2018 in GRELL countries: the VENUSCANCER project**

**Di Carlo Veronica**<sup>1</sup>, Minicozzi Pamela<sup>1</sup>, Allemani Claudia<sup>1</sup>, on behalf of the VENUSCANCER Working Group.

<sup>1</sup>Cancer Survival Group, London School of Hygiene and Tropical Medicine.

## Background

The CONCORD programme has documented wide global differences in survival trends for women diagnosed with breast cancer (66% in India; 90% in the US in 2010-2014).

The VENUSCANCER project, embedded in the CONCORD programme, examines whether global differences in survival are attributable to differences in disease biology between populations, or to differences in patterns of care, or to socio-economic status.

## Aim

To examine adherence to clinical guidelines and time to treatment among the GRELL countries.

## Methods

Cancer registries were invited to submit data for a single year of incidence during 2015-2018, for which the availability and the completeness of *high-resolution variables* (e.g., stage, staging procedures, biomarkers, treatment) were highest.

We examined the distribution of the main prognostic factors and key indicators of adherence to international clinical guidelines, by country. We also estimated the median time to treatment, by age, stage and tumour sub-type. We will estimate the odds of receiving guideline-compliant treatment, by age and, where possible, socio-economic status.

## Results

We obtained individual tumour records for 35,709 women diagnosed with breast cancer from 43 registries in 12 GRELL countries.

Early-stage tumours (T1N0M0) ranged from 12% in Romania to 45% in Italy. Breast-conserving surgery (BCS) plus radiotherapy was offered to 77% of women with an early breast cancer in Belgium, but less than 40% in Ecuador and Romania. Median time to BCS ranged from 21 days in Italy and Switzerland to 103 days in Colombia.

Node-positive tumours (N+) ranged from 24% in Switzerland to 34% in Ecuador. Chemotherapy was offered to 42% of women with N+ tumours in Switzerland, ranging up to 85% in Ecuador. Median time to chemotherapy ranged from 31 days in Cuba to 119 days in Colombia. We observed wide variation in the median time to chemotherapy between younger (15-49 years) and older (70-99 years) women in Brazil and Martinique.

## Conclusion and discussion

A less favourable stage distribution for women with breast cancer in low- and middle-income GRELL countries, together with a lower proportion of tumours treated according to clinical guidelines, and a longer time to treatment can help to explain differences in survival world-wide.

Keywords: guideline-compliant treatment, surgery, breast cancer

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## **Centralization Of Rectal Cancer Care (CENTRUM study): How Do Patients Survive In Reality and In Centralized Care Scenarios? Analysis of FRANCIM Registries Data**

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## Background

In 2018, 13,744 new cases of rectal cancer (RC) were diagnosed in France. For localized invasive RC, resection of the mesorectum is the gold standard treatment. The surgical activity level of the center consulted seems to be correlated to the quality of this surgery and the reduction in the risk of relapse for patients. In France since 2022, a threshold of 5 annual interventions on rectum (C20 code, ICD-10) per center has been set to be authorized to surgically treat RC.

## Aim

To study the impact of RC surgical treatments centralization according to different activity volume threshold scenarios on survival and patients travel distance between 2010 and 2015.

## Methods

CENTRUM studies non-metastatic invasive RC who received a curative surgical treatment collected by the French registries. Subjects and their surgery centers were geolocated and three center closure scenarios were defined on rectal surgery activity thresholds: < 5, < 10, < 20 annual procedures. Patients did not change treatment location if their observed care center was still open, and otherwise went to the nearest open center. Five-year survival probability was estimated and then predicted in each of the different scenarios according to the activity volume of the center consulted.

## Results

The study population is 3221 subjects. Scenarios 5, 10 and 20 lead respectively to the shutdown of 32%, 51% and 75% of surgical centers, and to the relocation of 98, 348 and 906 patients. Subjects relocated in scenario 5 had their average travel distance increased from 22.4 to 25.6 km, while their 5-year survival was improved by almost 8% (observed: 0.65 IC<sub>95%</sub> (0.60; 0.71); Scenario 5: 0.70 IC<sub>95%</sub> (0.66; 0.73)). More disadvantaged subjects (EDI 4 or 5) increased their 5-year survival by 15%. Scenarios 10 and 20 respectively improved patients' survival by 4% and 10%, but the cost is a greater distance to travel.

## Conclusions & Discussion

Centralization improves 5-year survival. This improvement is greater for the most disadvantaged subjects, but they have to move further away from home. These results show that a change in the organization of care must be assessed for its impact on different categories of the population.

Keywords: Rectal cancer, social inequalities in health



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## TOPIC 1 : OVERVIEW OF CANCER

### **Info.oncollect: a publication with reach for different audiences**

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#### Background and Aim

The Cancer Foundation raises funds and invests in prevention, early diagnosis, assistance, programs and projects related to cancer control, with one of its missions being the dissemination of knowledge in a simple yet technical way to the entire population. Based on this, we have been publishing, since December 2022, a newsletter called 'info.oncollect', about cancer and its risk and protective factors based on secondary databases, mainly those related to registries of cancer.

#### Methods

Databases related to cancer: incidence, hospital morbidity and mortality and databases related to risk and protective factors: vaccination, tracking and health promotion actions.

After capturing the databases, descriptive and analytical analyzes of the information are constructed.

The release frequency of each bulletin is quarterly.

#### Results

Has already released four newsletters, all of them related to the impact of HPV on the development of cancer, especially cervical cancer. The first showed the Impact of Cervical Cancer in Brazil. The second, entitled 'An overview of HPV vaccination in Brazil' brought an important reflection on how much still needs to be done to raise awareness of the benefits of the vaccine. The third volume addressed the topic of cervical cancer screening. In the last volume of the series, the Foundation showed the impact that HPV infection has on other types of cancer, including in the male population. The 5th volume is under construction, which will profile lung cancer in Brazil, thus launching a new editorial for the year 2024, with the theme of tobacco.

#### Conclusion & Discussion

We hope that info.oncollect can bring knowledge about the disease to as many people as possible, from healthcare professionals, managers and the general population. Furthermore, it can be used to build policies that strengthen primary and secondary cancer prevention actions, with the aim of identifying barriers and gaps regarding the disease in Brazil.

Keywords : Cancer, Brazil, Cancer registries



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## TOPIC 2 : CANCER ETIOLOGY

### **Incidence rates and trends of large B-cell lymphoma in Spain (2002-2016): a population-based study**

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#### Background

Large B-cell lymphoma (LBCL) is one of the most frequent non-Hodgkin's lymphomas. Its incidence increases with age, thus being considered a disease of older adults. Recent studies have reported increased incidences of LBCL, hypothesizing that the aging population may be responsible for those.

#### Aim

To describe the incidence rates and trends of LBCL in Spain (2002-2016) by age groups, using data from the Spanish Network of Cancer Registries (REDECAN).

#### Methods

All primary cases of LBCL collected during 2002-2016 from the REDECAN database were included. Cases were coded using the third edition of the International Classification of Diseases for Oncology and classified according to the WHO 2016 Tumor Classification. Crude (CRs) and age-standardized rates (using the 2013 European Standard Population) (ASRe), incidence trends and annual percent change (APCs) were analyzed.

#### Results

8,339 cases (46.7% women, median age at diagnosis 68 years) were registered. The most frequent subtype was 'diffuse large B-cell lymphoma, not otherwise specified' (97.5%), followed by 'primary mediastinal diffuse large B-cell lymphoma' (1.5%). The most common tumor location were lymph nodes (52.1%) and, among the extra-nodal locations, the gastrointestinal tract (13.4%).

CRs and ASRe were higher in men and older age groups. Incidence rates increased over the period of diagnosis for both sexes and the age groups over 50 years. Statistically

significant increases in incidence trends were found for age groups 50-59, 60-69, 70-79 and 80+ years, with APCs [95% confidence interval (CI)] of 1.79 [0.41;3.18], 3.11 [1.96;4.26], 1.89 [0.91;2.88], 2.74 [1.54;3.95]; respectively.

### Conclusions and discussion

This study presents real-world data that contributes to the understanding of the epidemiology of LBCL. Considering that LBCL diagnoses are mainly in older individuals and that the Spanish population is aging, their monitoring is crucial to aid public health authorities and clinicians.

Keywords: B-cell lymphoma, incidence trends, aging population

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## TOPIC 3 : SOCIAL INEQUALITIES AND CANCER

### **Improved care-pathway can increase the overall survival among acute myeloid leukemia patients: A population-based study using doubly robust causal inference methods**

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### Background

Approximately 10% of patients with acute myeloid leukaemia (AML) not admitted to a Specialized Haematology Unit (SHU) experience a significant loss of therapeutic opportunity.

### Aim

This study aims to demonstrate and quantify the causal relationship between access to a SHU and the overall 1-year survival in AML patients.

### Methods

All AML incident cases diagnosed between 2012 and 2016 in the three French departments covered by a specialized haematological malignancy registry were included

(N=1033). We employed the double robust TMLE (Targeted Maximum Likelihood Estimation) framework that integrates ensemble learning, statistical theory and statistical inference to determine the average treatment effect (ATE) of access to SHU on AML-patients overall survival. Mortality rates at 1,3, 6, 9 and 12 months were determined using the Kaplan-Meier method. For each time point, we determined the mortality rate of the counterfactual situations: a) all patients were admitted to SHU vs. b) none admitted to SHU. The ATE was calculated as the marginal difference between the mortality rates of the two counterfactual scenarios. The number of avoidable deaths in patients not admitted to SHU was estimated as the difference between the number of deaths observed and the number of deaths that would have occurred if the patients had been admitted to SHU. All TMLE models have been specified using 'SuperLearner' ensemble learning algorithms, to reduce the risk of model misspecification.

## Results

Observed mortality rates at 1, 3, 6, 9 and 12 months were 15.5%, 29.8%, 39.6%, 47.1% and 53.5%. The corresponding counterfactual mortality rates if a) all patients had been admitted to SHU were: 10.7%, 24.4%, 35.0%, 43.2% and 51.3% *versus* b) 31.6%, 53.1%, 61.3%, 68.4%, 73.1% if none were admitted to SHU. The corresponding ATE at each time point varied between 20.9% (at 1 month) and 28.8% (at 3 months). Among the 326 patients not admitted to SHU, we predicted that 100 deaths would be avoided at 1 year if all patients had access to SHU.

Admitting AML patients to SHU at the onset of their diagnosis during their care pathway would mitigate the loss of therapeutic opportunities observed among non-SHU patients. This, in turn, could help reduce the 100 avoidable deaths attributable to the care pathway.

Keywords: Epidemiology, Acute myeloid leukaemia, Causal inference

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## **The MapInMed platform for studying and reducing social and territorial inequalities in cancerology**

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## Background

Socio-territorial inequalities influence's on health indicators (screening, treatment, survival of patient diagnosed with cancer..) has been well established.

## Aim

Conducting such studies requires relevant tools able to evaluate social and territorial environment at an accurate scale. This is the aim of the MapInMed platform, created in 2012 and recently accredited by IBISA, which proposes to researcher, territorial collectivity, political, an expertise and a methodological help to conduct research on social health inequalities and access to care and also a database of tools to evaluate it.

## Methods

Regarding social environment, The European Deprivation index (EDI) has a methodology based on relative deprivation defined par Peter Townsend in 1979. It is calculated using an European survey (EUSILC) and the census data. EDI is a sum of weighted variables that best define deprivation in the country for which it is calculated. French EDI exists in five version (1999, 2007, 2011, 2015 and 2017) at IRIS and municipality level. It is also available for Spain, Italy, Portugal, Slovenia, Lithuania, for UK, Nothern Ireland and the Republic of Ireland. The EDI is available in cancer registries' database due to the geolocation of all addresses registered since 2016 by MapInMed. Regarding access to care, the travel time to reference care center can be calculated. More recently, the health accessibility index (SCALE) has been constructed to evaluate it more accurately taking into account both proximity of the resource and its availability. It is a multiscalar index computed at a very high geographical scale calculated with census data 2010 and the Base Permanente des Equipements 2013. Its update is in progress.

## Results

Social and territorial inequalities are only part of environmental factors to which individuals are exposed. It is necessary to have more extensive measurement tools in the field of expology. To this end, platform should propose 3 new tools within the next 3 years to assess the food environment, pedestrian and cycling facilities, and the availability of green spaces and physical activity infrastructures. Furthermore, the methodology applied to compute the SCALE index should be applied to law, education...

Keywords: deprivation, health accessibility, index, multiscalar

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## **Rural-urban differences in breast cancer stage at diagnosis and time to treatment in the province of Tarragona (Spain)**

**Clàudia Pla<sup>1</sup>**, Marià Carulla<sup>1</sup>, Araceli Jiménez<sup>1</sup>, Laura García<sup>1</sup>, Xavier Collado<sup>1</sup>, Jordi Civit<sup>1</sup>, Francina Saladié<sup>1</sup>, Jaume Galceran<sup>1</sup>.

<sup>1</sup>Tarragona cancer registry. Hospital Sant Joan de Reus. Spain.

## Background

Population-based cancer registries are a very useful tool for analyzing access to healthcare system and to detect inequalities. Some studies have detected inequalities in

access depending on patient's residence (urban or rural), although there is still scant literature.

### Aim

The aim of the study was to assess stage at diagnosis and time to treatment of breast cancer (outside the screening program) between rural and urban municipalities of two counties of the province of Tarragona, in the period 2012-2018.

### Methods

Incident breast cancer cases from Baix Camp (BC) and Baix Ebre (BE) counties, out of the screening program, stage and dates of diagnosis and first treatment (neoadjuvant chemotherapy (NC) or surgery) were obtained from the Tarragona Cancer Registry (TCR). The stratification of municipalities by urban-rural was performed using Eurostat classification: cities, towns and semi-urban areas and rural areas. BC and BE municipalities were also distributed in 4 groups of distance to the reference hospital: (1) 0-5 km, (2) 6-15 km, (3) 16-30 km and (4) +30 km.

### Results

864 (BC 614 and BE 250) cases were included. Mean age  $60.8 \pm 16.4$  and  $63.7 \pm 17.4$ . In both counties most of the cases were diagnosed with stage II (42.0% in BC and 38.0% in BE). No significant differences were found when comparing stage at diagnosis by urban-rural municipalities of BC ( $p=0.638$ ) and BE ( $p=0.127$ ). No significant differences were found either when comparing stage at diagnosis between distance groups of BC ( $p=0.746$ ) and BE ( $p=0.751$ ). In BC, median time to NC was 30 days and 59.5 days to surgery, and in BE the median was 41 days to NC and 44 days to surgery. A trend towards a longer time to NC in the more distant municipalities compared to nearest ones were observed in both counties (30.0 days vs 37.0 median days in BC and 41.0 vs 50.0 median days in BE) but it was not statistically significant ( $p=0.820$  and  $p=0.278$ ).

### Conclusion & Discussion

Although no significant differences were detected between the different population groups according to urban-rural level or distance to the reference hospital, some trends were observed that should be further studied by adding other socioeconomic variables.

Keywords: breast cancer, urban-rural, inequalities, cancer registration

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## **Spatial analysis of cancer incidence according to social inequality indicators in Martinique**

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## Background

Cancer is the second leading cause of death after cardiovascular disease in Martinique. When individual data are not available, the socio-economic level of the area of residence is often used to describe social inequalities in health. A pilot study demonstrated the feasibility of studying social inequalities in incidence, using data from cancer registries and the socio-economic level of the area of residence.

## Aim

The aim is to analyze the correlation between a social deprivation index and the geolocation of cancer cases in Martinique.

## Methods

Smoothed standardized incidence ratios were calculated at the IRIS scale using Besag, York and Mollié modeling for the 18 main cancer sites and all cancers combined between 2006-2019. An ascending hierarchical classification of these smoothed SIRs was used to describe the relationship between the different cancer locations and to identify geographical aggregates. A correlation was sought between cancer incidence and the inequality indicator according to gender and tumor location.

## Results

Between 2006 and 2019, more than 23,000 cases of cancer were diagnosed in Martinique. The link between social disadvantage and cancer risk was more marked in men than in women. Several results emerge from this study: (i) there is no link between social disadvantage and cancer risk, in either men or women, for the following localizations: Esophagus, Liver, Pancreas, Lung, Kidney and Brain, and (ii) no excess risk was found for gynecological sites in women, nor for the prostate in men. On the other hand, significant associations are observed for other sites (thyroid melanoma and myeloma, in both sexes and rectum, colon in men).

## Conclusion & Discussion

Our results point out, for the first time in Martinique, the need to target prevention and health promotion efforts at the male population identified as most at risk. This is a concern for reducing social inequalities in health in a Caribbean Island department. The social determination of particular risk factors could explain some of the inequalities observed. This initiative could make it possible to better assess the proportion of cancers attributable to social disadvantage. These new practices may enable many cancers to be avoided, and could lead to improved mortality rates for certain sites, improving overall survival.

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## TOPIC 4 : SCREENING

### **Using Cancer Registry Data to Assess the Quality of a Mammography Screening Program in Eastern Switzerland**

**Marcel Blum**<sup>1,2</sup>, Jonas Subelack<sup>3</sup>, David Kuklinski<sup>3</sup>, Alexander Geissler<sup>3</sup>, Alena Eichenberger<sup>2</sup>, Rudolf Morant<sup>1,2</sup>.

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#### Background

Mammography screening programs (MSP) are an important contributor to an ever-decreasing mortality of breast cancer (BC) by detecting a tumor at an earlier stage and thus allowing less invasive treatments. However, relevant outcomes of the MSP can only be evaluated using data from a population-based cancer registry (CR). Therefore, a linkage of MSP and CR data is essential for quality assurance and improvement.

#### Aim

We aim to analyze all BC cases, as well as to evaluate relevant outcomes of the MSP. Additionally, we aim to win insights to improve the quality for participating women in the future.

#### Methods

Data from the "donna" MSP, which invites all women between 50 and 69 years of age in the cantons of St.Gallen and Grisons for a biennial screening, were merged with the data from the CR of Eastern Switzerland and Grisons-Glarus. BC cases (ICD-10: C50 and D05) between 2010 and 2019 were classified as screen-detected (SBC), interval breast carcinoma (IBC) within 24 months after a mammography assessed as normal or as outside the MSP diagnosed. We analyzed tumor characteristics, treatment and survival rates. Further, radiologists and an AI-software re-assessed all IBC mammographies.

#### Results

The BC cases were classified as 33% SBC, 9% IBC and 58% outside the MSP diagnosed. The share of IBC of all BC diagnosed in program participants was 22%. SBC had a preferable stage distribution and other tumor characteristics. MSP participants underwent fewer chemotherapies and mastectomies, and had a significantly higher overall survival rate, independent of tumor stage. Preliminary results from radiologists and AI indicate some IBC could have been avoided.

## Conclusion & Discussion

The use of CR data is essential for effective quality assurance and improvement of MSPs and may help the participating women to get a more personalized screening. Higher survival of participating women may motivate more women to attend the MSP. Use of AI might contribute by reducing the number of IBC.

Keywords: Breast Cancer, Mammography Screening, Evaluation, AI

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## **Are prognostic factors more favourable in screen-detected than in non-screen-detected breast cancer? Results of a population-based study in Southern Switzerland 2016-2022**

**Alessandra Spitale<sup>1</sup>, Laura Ortelli<sup>1</sup>, Nadia Riso<sup>1</sup>, Simona Peverelli<sup>1</sup>, Paola Mazzola<sup>1</sup>, Andrea Bordoni<sup>1</sup>.**

<sup>1</sup>Ticino Cancer Registry, Ticino Screening Programme Centre.

### Background

According to the European Guidelines (EU-GL) for quality assurance in breast cancer (BC) screening and diagnosis, BC screening programmes should guarantee acceptable and desirable levels of quality and performance indicators.

### Aim

Aim of the study is to assess if there is a difference of outcomes between screen-detected BC and non-screen-detected BC in the target population compared with the EU-GL recommended standards.

### Methods

Data are extracted from the Ticino Cancer Registry database and the Ticino Screening Programme Centre database. We consider all women aged between 50 and 69 years living in the Canton of Ticino (Southern Switzerland) with a BC (invasive and in-situ) diagnosed during the years 2016-2022. Exclusion criteria are the following: death certificate only cases, lymphoma and sarcoma. Synchronous events, such as a multiple BC diagnosis were counted as one event per woman's screening round. In case of multiple BC, the tumour of highest stage was considered. The quality indicators are computed in terms of percentage and are compared between screen-detected BC and non-screen-detected BC.

### Results

In the period 2016-2022, 1226 BC are diagnosed in the Canton of Ticino: 565 screen-detected BC vs 661 non-screen detected BC. There is a statistically significant difference in the performance indicators between the two groups: screen-detected BC show a



higher percentage of: invasive node-negative BC (73% vs 50%,  $p < 0.0001$ ; EU-GL: >70%), invasive BC with a diameter  $\leq 10$ mm (38% vs 25%,  $p < 0.0001$ ; EU-GL:  $\geq 25\%$ ) and invasive BC with a diameter <15mm (60% vs 39%,  $p < 0.0001$ ; EU-GL:  $\geq 50\%$ ), together with a lower percentage of advanced stage BC (stage II+) (19% vs 32%,  $p < 0.0001$ ; EU-GL: <30%).

### Conclusion & Discussion

Our study finds the expected differences in prognostic factors and performance indicators between screen-detected BC and non-screen-detected BC. Results confirm that the organized screening programme has a deep impact in the characteristics of BC which meet the desirable level recommended by the EU-GL.

Keywords: breast cancer screening, cancer registry, quality-indicators

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## **Prognostic factors and 5-years recurrence of breast cancer in women attending versus not attending the screening: a population-based study in Southern Switzerland 2015-2022**

**Laura Ortelli<sup>1</sup>, Alessandra Spitale<sup>1</sup>, Nadia Riso<sup>1</sup>, Simona Peverelli<sup>1</sup>, Paola Mazzola<sup>1</sup>, Andrea Bordoni<sup>1</sup>.**

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### Background

Interval breast cancer (BC) are considered an adverse outcome of screening and they are known to have less favourable prognostic factors than screen-detected BC. However, studies comparing BC in women attending the screening (screen-detected and interval BC) with BC in women not attending the screening are lacking in the literature.

### Aim

Aim of the study is to compare prognostic factors, biological characteristics and 5-years recurrence rate of BC in attenders vs non-attenders women.

### Methods

Data are extracted from the Ticino Cancer Registry and the Ticino Screening Programme Centre database. We consider all women aged between 50 and 69 years living in Canton Ticino (Southern Switzerland) with an invasive BC diagnosed during the years 2015-2022. Lymphomas, sarcomas and death certificate only cases are excluded from the analysis. Synchronous BC are counted only once per woman's screening round. In case of multiple BC, the tumour of highest stage is considered. We consider the following prognostic factors: stage, biological characteristics (Luminal A, Luminal B, HER2 positive, triple negative), progesterone and oestrogen receptor status, Ki-67, HER2 status, grade and morphology. We exclude women not receiving surgical treatment or with metastatic BC from the recurrence analysis. Prognostic factors and 5-yr recurrence rates are compared

among the following groups: attenders (screen-detected and interval BC) vs non-attenders. The follow-up is at 31.12.2023.

## Results

The analysis includes 1205 BC: 623 (485 screen-detected BC and 138 interval BC) in attenders (52%) and 582 in non-attenders (48%). BC are more likely to have lower stage at diagnosis and more favourable biological characteristics in attenders. Median time from surgery to recurrence is 31.5 and 25.5 months for attenders and non-attenders, respectively. The 5-yr recurrence rate is 5% for attenders and 10% for non-attenders ( $p=0.0006$ ).

## Conclusion & Discussion

This study shows a positive effect of screening in reducing BC stage at diagnosis and probability of BC recurrence in attenders, also including interval BC. This could be also related to an increased attention to their own health by screened women and a different medical approach in the period within the two screening mammograms rounds.

Keywords: screening, cancer registry, interval cancer, recurrence

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## **Analysis of the 2,114 breast cancers diagnosed by the Breast Cancer Screening Program of Barcelona during the period 1995-2023**

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## Background

Evaluating screening programs is essential for assessing their effectiveness. Cancer registries play a crucial role in this evaluation. Our study focuses on malignant breast tumors diagnosed through Barcelona's Breast Cancer Screening Program.

## Aim

To assess the program's effectiveness in early breast cancer detection and treatment by analyzing detection rates and long-term survival rates, stratified by age at diagnosis, period, district and clinical stage; and by describing the characteristics of interval cancers.

## Methods

A retrospective analysis (1995-2023) of breast cancer cases diagnosed through the screening program in 4 districts of Barcelona has been conducted. This program follows the directives of the European Guidelines on Breast Cancer Screening and Diagnosis. Data were obtained from the Cancer Registry of Hospital del Mar, where the screening program is managed. Observed and relative survival rates at 5 and 10 years were calculated, using Kaplan-Meier curves for survival analysis, stratified by sociodemographic and tumor characteristics. Relative survival was calculated based on the observed cohort survival and expected survival from Catalonia mortality reference. Furthermore, detection rates were calculated, categorizing by age at initial screening and regularity (adherence to previous rounds) in subsequent screenings.

## Results

Over the 28 years of the program, 2,114 breast cancers have been detected, but the annual number of detected tumors varied significantly. Across screening rounds, the detection rate was 5.3 per 1000 mammograms for initial screenings and 4.6 per thousand for subsequent screenings. Stratifying by screening regularity, rates of 4.4 and 5.3 per 1000 mammograms were observed for regular and irregular screenings, respectively. After transitioning from analog to digital mammography in 2004, detection rates increased from 4.3 to 5.0 per 1000 mammograms. Early-stage diagnosis was noted in 87.9% of cases. Survival rates at 5 and 10 years were 95.7% (95%CI: 94.4-96.5) and 88.7% (95%CI: 87.0-90.5), respectively.

## Conclusions

The findings underscore the effectiveness of Barcelona's Breast Cancer Screening Program, its adherence to EU Guidelines' standards, and highlight the lasting impact of sustained screening efforts.

Keywords: screening programs, breast cancer, survival rates

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## **Population-level impact of the BMJ Rapid Recommendation for colorectal cancer screening: a microsimulation analysis**

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## Background and Aim

In 2019, a BMJ Rapid Recommendation advised against colorectal cancer (CRC) screening for adults with a predicted 15-year CRC risk below 3%. Our study estimated the population-level impact of this recommendation for Switzerland using Swiss cancer registry data combined with modelling.

## Methods

We predicted the CRC risk of all individuals in the population-based Swiss Health Survey using the recommended QCancer risk calculator. Then, we derived the distribution of risk-based screening start age, assuming predicted risk was calculated every 5 years between ages 25-70 and screening started when this risk exceeded 3%. Next, the MISCAN-Colon microsimulation model was calibrated to CRC incidence, stage and survival data from Swiss cancer registries to replicate the Swiss population. It evaluated biennial Fecal Immunochemical Test (FIT) screening with the risk-based start age. We also simulated screening initiation based on age and sex only, and risk-based screening initiation using a hypothetical, better risk prediction tool with an Area Under the Curve (AUC) of 0.84.

## Results

Starting screening in Switzerland only when predicted risk exceeded 3% meant 82% of females and 90% of males would not start screening before age 65 and 60, respectively. This would require 42-57% fewer FITs, prevent 8-15% fewer CRC deaths, and yield 19-32% fewer lifeyears gained (LYG) compared to screening from age 50. Screening females from age 65 and males from age 60 yielded similar outcomes. Using a hypothetical, better risk prediction tool, a 3% threshold would still decrease mortality reduction and LYG with 17-34%, although reducing the number of FITs by 78-87% compared to current screening from age 50.

## Conclusion

With the recommended QCancer risk calculator, the impact of the BMJ Rapid Recommendation would be similar to screening initiation based on age and sex only. Although halving screening burdens, LYG by screening would be reduced substantially compared to screening from age 50, even with a hypothetical risk prediction tool with increased AUC. This suggests that the 3% risk threshold to start CRC screening might be too high. We believe these findings to be generalizable to other Western countries. Cancer registry data are crucial to inform models that evaluate the long-term effects of such recommendations.

Keywords: QCancer, risk-based screening, colorectal cancer, Switzerland

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# Colonoscopy or FIT for colorectal cancer screening: a risk-based recommendation

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## Background

Most Swiss colorectal cancer (CRC) screening programs offer participants a choice between colonoscopy and Fecal Immunochemical Test (FIT). Colonoscopy resources may however be better allocated by providing a risk-based recommendation for FIT or colonoscopy.

## Aim

By combining Swiss cancer registry data with modeling, we investigated the impact of such recommendations.

## Methods

We used CRC incidence, stage distribution and survival data from Swiss cancer registries to adapt the MISCAN-Colon microsimulation to the Swiss population, and simulated CRC screening from age 50 to 74. We evaluated two risk stratification strategies: risk assessed at 1) age 50 only; 2) ages 50, 60 and 70. For both strategies, 10-yearly colonoscopy was recommended if individual risk was in the highest risk quantile of all assessed individuals, biennial FIT was recommended otherwise. Thus, under the second strategy, some individuals would switch from FIT to colonoscopy at age 60 or 70. We used two risk assessment tools: QCancer (AUC 0.66-0.70) and a hypothetical tool (AUC 0.84). We compared the risk-based strategies to current practice (50% colonoscopy / 50% FIT), and an age-based strategy (colonoscopy for 70+ only), assuming full adherence to recommendations.

## Results

Current screening practice yielded 167 extra QALYs at 1819 colonoscopies (COLs) per 1000 individuals compared to no screening. A QCancer risk assessment at age 50 yielded fewer QALYs (160) but required one third fewer COLs (1310). Although 10-yearly risk assessment yielded more QALYs (169) at equal COLs (1318), it was as effective as the age-based strategy (170 QALYs at 1311 COLs). Strategies with the hypothetical risk prediction tool outperformed all other strategies (174 and 177 QALYs at 1271 and 1264 COLs for once-only and 10-yearly assessment, respectively).

## Conclusion

Up-to-date cancer registry data are crucial to maintain models to evaluate future, risk-based screening strategies. Although modeling shows that risk-based recommendations using Qcancer outperforms current Swiss screening practice, they could simply be replaced by age-based recommendations. Instead, improved risk prediction tools, for example through incorporating prior fecal hemoglobin values, have the potential to outperform age-based recommendations.

Keywords: risk-based screening, colorectal cancer, Switzerland, modelling

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## **Breast cancer in women residents of Basque country: Trends in incidence and mortality, effects of socioeconomic status, stage of tumor detected in screening programme**

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## Background

Trends from 2001 to 2018 in breast cancer (BC) incidence in women residents in Basque Country show significant increases in cancer rates.

## Aim

Analyse trends in incidence and mortality by age groups (AG) (15-44, 45-49, 50-69 and over70 years). Their differences in incidence by deprivation index. Moreover, differences are evaluated according to the stage at diagnosis of those tumours detected in screening programme.

## Methods

25,078 cases of BC were extracted from the Basque population-based Cancer Registry and Mortality Registry. Incidence (2001-2018) and mortality (2001-2022) trends of Age-standardized rates (ASRs) were evaluated by Join point regression analysis. Population was that of the Basque Country census. For each small area SES (socioeconomic status) was estimated using the local MEDEA deprivation index in 2011, ranged from 1 (most affluent) to 5 (most deprived). In addition, proportions of tumors detected by the screening program (2010-2018) were evaluated according to the stage in diagnosis (TNM 7<sup>a</sup>).

## Results

During the studied period, BC rates increased significantly 1,6 % annually. However, mortality rates decreased, and this reduction was significant from 2012 to 2022 (2,1% per year). The incidence decreased significantly with increasing SES index, showing a rate ratio of 0.85 in the most disadvantaged vs the most affluent. According to age group, incidence trends increased significantly in groups over 45 years old: 1.2% in 45-49 AG; 2.7% in 50-69 AG; 0.6% in over 70. On the other hand, in youngest women (under 45) no significant increase was observed.

In addition, almost 50% of the stage I tumours (2010-2018) were diagnosed by screening vs only 5.8 % of those in stage IV. Considering the target AG of the screening program (50-69 years), 72% of stage I cases were diagnosed by screening.

## Conclusions & discussion

In the period from 2001 to 2018, in Basque Country, the incidence of BC in women over 45 years old has increased while mortality has decreased. No significant increase has been observed in women under 45. According to these results, it will be interesting to consider the inclusion of 45-49 AG in the screening program, further supported by the fact that most of the tumours detected by screening are diagnosed in stage I, the stage with the best prognosis.

Keywords: Trends, SES , screening-stage, Breast cancer

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## **Trends in PSA levels in prostate cancer cases diagnosed in France between 2008 and 2019**

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## Background

In 2018, 59,885 new cases of prostate cancer (PC) were diagnosed in France. The PC incidence rose from 1990 until 2005, then fell but since 2015 it has been rising again. Changes in incidence of PC are closely linked to the use of PSA as a screening test. There was a very sharp increase in net survival between 1990 and 2010, corresponding to the rise in the incidence of less advanced PC diagnosed thanks to screening. The use of the PSA for mass screening has been challenged by many health agencies because of the risk of over-treatment. If the impact of screening is to be assessed, the decline in this practice must also be considered. Several publications, mainly in the US, show that this decline in PSA testing is associated with a small but proven increase in poor prognosis PC.

## Aim

The aim was to provide a description of changes in the severity of prostate cancers diagnosed in France between 2008 and 2019.

## Methods

We study representative samples collected by 15 cancer registries. As a severity indicator we have chosen to use the PSA level measured at the time of diagnosis (before any treatment). Incidence rates by year according to PSA level were calculated for the zone studied using adjusted numbers calculated by taking into account the weight of each sample (register \* year) and the population of this zone (svyset Stata). We also have information on PSA use in France over a short period from 2009 to 2015.

## Results

During the study period, a decline in the incidence of this cancer and in the prescription of PSA tests was observed until 2014. Logically, a drop in screening leads to a drop in incidence, and also to an increase in the proportion of severe cases, that's why we need to study the incidence of severe cases. Whatever the age group studied, we do not observe in our data between 2008 and 2019 an increase in the incidence of cases with a PSA level > 20ng/ml. However, trends are not linear. Among the oldest men (aged 85 and over), there is a slight increase in 2014, with rates higher than any observed between 2008 and 2019. 2014 was the year with the lowest frequency of PSA use.

## Discussion & conclusion

In the current context of complex trends in the incidence of prostate cancer, we need to continue monitoring the severity of cases, to confirm or refute any increase in serious cases. This should be complemented by monitoring of PSA use in the population by age.

Keywords: Prostate cancer, screening, prognosis

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## TOPIC 5 : DATA LINKAGE

### **Diagnostic management, therapeutic care and follow-up imaging for glioma patients in Belgium between 2016 and 2019**

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## Background

Process indicators are important tools to study the care trajectory of oncological patients, but their use in neuro-oncology is scarce

## Aim

This study aims to investigate key elements of diagnostic management, therapeutic care and follow-up imaging for glioma patients in Belgian hospitals by calculating process indicators using coupled data.

## Methods

3.067 patients diagnosed with a glioma in 2016-2019 were identified in the Belgian Cancer Registry (BCR) database. Via the National Social Security Number, these data were deterministically linked with claims data of the health insurance organizations and vital status of the Crossroads Bank for Social Security. Indicators assessing diagnostics (n=3), therapeutic care (n=8) and follow-up imaging (n=4) were calculated.

## Results

**Diagnostics:** 89.5% of glioma patients received a diagnostic MRI which aligns with the target of 90%. WHO-performance status registration and performance of full spine MRI in ependymoma patients were suboptimal (resp. 89.3% vs target 100% and 43.6% vs target 90%).

**Therapeutics:** The target was met for most treatment indicators, e.g. concomitant chemoradiotherapy was started in 93.1% of surgically treated and 88.9% of biopsied glioblastoma patients (target 90%). However, timely initiation of chemoradiotherapy in high grade glioma patients was suboptimal (79.8% vs. target 95%).

**Follow-up:** The performance of postoperative MRI in high grade glioma patients was suboptimal (48.5% vs. target 90%), but the performance of long-term follow-up imaging aligns with the target of 90% (93.9% in low grade glioma patients and 90.0% in high grade glioma patients).

## Conclusion & discussion

This study is a crucial starting point for assessing quality of care in neuro-oncology, creating opportunities to optimize care. Regular monitoring of indicators at national and hospital level, based on retrospective analyses on population-based databases, should be part of each quality improvement cycle.

**Keywords:** glioma – process indicators – diagnostics – therapeutics – follow-up

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# Improving completeness in mapping population-based cancer registry data to OMOP CDM by using alternative source fields

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## Background

Interoperability among different data sources greatly benefits medical research. One way to achieve this is to use a common data model such as OMOP common data model (CDM). However, cancer registry data differs from clinical data, OMOP concepts for oncology are still under development, and mappings do not exist for all source codes. Ignoring cases without mapping reduces completeness of OMOP database and may bias research. Especially, old versions of vocabularies often have no OMOP mappings. This study aimed at improving mapping completeness for cancer by integrating alternative source fields.

## Methods

We developed a method to map cancer registry data to the OMOP CDM. The mapping is based on the oncology extension of CDM and the OMOP Cancer Modifiers vocabulary was mainly used. Special attention was paid to completeness of mapped data. ICD-10 codes were used when ICD-O codes had no corresponding OMOP concept. For non-mapped TNM versions, we used general OMOP TNM staging codes. Old ICD-8 death cause codes were first mapped to ICD-9 codes. The OMOP database was first validated by using OHDSI data quality tools and then by comparing the mapped CDM data to a manually extracted source data.

## Results

The OHDSI data quality tools indicated that mapping to OMOP CDM was technically 100% correct. The comparison against the manual extraction indicated very high correspondence (>99%) between the source data and the CDM data. Using ICD-10 codes reduced unmapped cases from 1.46% to 0.08% of total cases. Using general OMOP TNM codes for the TNM version 5 did not increase the number of unmapped TNM values. About 73% of ICD-8 death causes were mapped (vs 96% ICD-9 and ICD-10).

## Discussion and Conclusions

The main cancer coding systems (ICD-O, TNM) are straightforward to map for cancer registries but grading and cancer specific measurements (PSA, FIGO, etc.) are more complex because of multiple alternative concepts in OMOP. Our study showed that using alternative source codes and non-version specific OMOP target concepts could substantially improve completeness of OMOP CDM database with little additional efforts.

Keywords: interoperability, OMOP-OHDSI, improving completeness

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## TOPIC 6 : NEW METHODS AND REGISTRIES

### **Progress of FOCO, a Continuous Education Plan for Cancer Registries**

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#### Background

FOCO, new integrated education plan and training resources for the National Cancer Registry in collaboration with MediCuba Suiza and MediCuba Europa.

#### Aim

The general objective is to develop capacities on the design, operation, and analysis of population and hospital cancer registries data, to achieve all the expectations and knowledge needs of technicians and professionals related to RNC.

#### Methods

High-tech educational package, with Medical University academic link including training, course, seminar and workshops, based on the use of principles of modern pedagogy and original instruction methodology for cancer registries. FOCO is a continuous education project with three levels of teaching: Level 1 (course for registrars), Level 2 (course for physicians) and Level 3 (Diploma for Public Health Professionals). The strategy "Trainer of trainers," provides sustainability to FOCO. This Plan include theoretical materials that facilitate the teaching-learning process for students and teachers, scientifically enriched with the evaluation of target populations of students.

#### Results

The design of FOCO is finished: Fifteen chapters, two modules, learning objectives on each education level. The 10 first chapters were written by our professors and revised by a group of five reviewers. The National Codification Training (NCT Part I), with the participation of 38 registrars from all provinces of the country was developed on 2023, Part II will be done this year as well as the Module I for registrar and doctors. A travel across the country and seminars with directors of main hospitals is being done. We show the education program, and evaluations activities and questionnaires submitted to all students proving the improvement of technical skills.

## Discussion and Conclusion

The main motivation is guaranteeing the National Cancer Registry with an Education Plan used to maintain the interest on cancer registration and the use the information on cancer control as well as improve quality of data of the RNC.

Keywords: population and hospital cancer registries; Training

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## **Biological receptor prediction from breast pathology reports using Text Mining and Machine Learning methodologies**

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### Background

In pathology reports, information on biological markers is often contained in a free text field related to the pathological diagnosis of cancer.

### Aim

To train models capable of extracting and predicting the values of biological markers of female breast cancer contained in pathology reports, through the application of *Text Mining* (TM) and *Machine Learning* (ML) methodologies.

### Methods

We first implemented a TM algorithm for the text extraction from the diagnosis field; we subsequently implemented the supervised Support Vector Machine ML algorithm for predicting the values of the following biological markers: estrogen receptor (ER), progesterin receptor (PR), human epidermal growth factor receptor 2 (HER2) and marker of proliferation (Ki-67).

### Results

The data used to train the models were extracted from the Veneto Cancer Registry (VCR) and refer to 9,807 anonymized pathology reports relating to 4,029 patients with breast cancer diagnosed between 2017 and 2020, including Gold Standard (GS - data recorded manually by VCR registrars). These data refer to 7 Pathological Anatomy services of the Veneto Region. The weighted F1 score related to the exact biomarkers values varies between 87.1% of Ki-67 to 91.6% of HER2. Conversely, the score related to the thresholds defined by the Italian Oncology Association to identify the cancer phenotypes varies between 95.4% of HER2 to 99.6% of ER.

## Conclusion & Discussion

The prediction accuracy (F1 score) of the ML models is very good. Of significant importance will be the application of our models to the pathology reports of patients affected by breast cancer in 2021, and the comparison of the models' predictions with the corresponding GSs. Furthermore, these models will be applied to the reports of the other 15 Pathology Services of the Veneto Region and subsequently verified on a sampling basis by the VCR registrars.

Keywords: Breast cancer, Biological markers, TM, ML

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## **Cancer treatments and cardiovascular risk: the role of causal inference in understanding effects and interactions**

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### Background

When dealing with real-world epidemiological data, such as population-based Cancer Registries' (CRs) data, it is important to unravel real causal effects from spurious associations. This is crucial especially in the oncological field, where the complexity of the disease requires multimodal combined treatments which individual effects are difficult to be disentangled.

### Aim

To estimate the direct causal impact of each oncological treatment on 5-year cardiovascular diseases (CVDs) risk in patients diagnosed with breast cancer (BC) between 15 to 39 years of age (i.e., Adolescents and Young adults, AYAs).

### Methods

We took advantage of a causal bayesian network model we built piercing data coming from a population-based cohort (identified by italian CRs) and a single-insitution clinical cohort of AYA 1-year BC survivors, together with domain expert knowledge. Using the backdoor criterion, a causal inference method, we were able to identify the minimal conditioning set of variables to be used to block spurious paths and estimate direct causal effects. Adjusted relative risks (RRs) were calculated as the ratio between the risk of patients who received a given treatment compared with that of those who did not.

## Results

Neo-adjuvant (i.e., pre-surgery) treatments resulted to have the highest cardiotoxic impact: target therapies RR=33.3 [14.7; 62.0], radiotherapy RR=17.7 [3.1; 32.2] and chemotherapy RR=10.7 [-3.3; 24.7]. No significant impact is observed for the same treatments when administered as adjuvant therapies (i.e., post-surgery). In contrast, neo-adjuvant hormone therapy resulted to have a protective role with respect to the risk of ischemic heart diseases (RR=0.7 [0.6; 0.8]). Finally, no causal impact of treatments is observed on the risk of developing hypertension or dyslipidemia within 5-years from diagnosis.

## Conclusion & Discussion

Causal inference tools such as probabilistic graphical models and graphs can be extremely effective in handling selection and confounding bias in CRs' data, providing clinically interpretable estimates as well. The estimates obtained by this analysis will be read and interpreted in the light of the scientific literature. Moreover, the adjusted estimates will be compared with unadjusted estimates, to discuss the role and impact of bias in the data.

Keywords: Long-term outcomes; cardio-oncology; causal inference; survivorship

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## **Automatic (near-) duplicate content document detection in a cancer registry**

**Tapio Niemi**<sup>1</sup>, Jean-Pierre Ghobril<sup>1</sup>, Patrick Arveux<sup>1</sup>, Simon Germann<sup>1</sup>, Eloïse Martin<sup>1</sup>, Jean-Luc Bulliard<sup>1</sup>.

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## Background

(Near-) duplicate medical documents are problematic in document management, clinical use, and medical research. In this study, we focus on multisourced medical documents in the context of a population-based cancer registry in Switzerland. Identifying near-duplicates is particularly challenging because the large number of documents makes pairwise comparison non-feasible.

## Methods

We implemented a method based on a normal hash function, Simhash (Locality Sensitive Hashing), and Smith-Waterman (S-W) text alignment similarity. Full duplicates can be detected by using the normal hash, Simhash offers good approximation for near-duplicates, and finally the S-W algorithm conforms the results by calculating a precise similarity metric. Extracted differences can be illustrated by highlighting differences in original PDF documents.

We validated the method using 3042 manually verified document pairs containing 1252 full-duplicate and 398 near-duplicate pairs. The AUC was 0.96, sensitivity 0.92, specificity 1.00, PPV 1.00, and NPV 0.91. For the same size simulated data, corresponding values were 0.86, 0.72, 1.00, 1.00, and 0.77, respectively.

## Results

We applied the method against 224 398 medical documents in the cancer registry. We found 5.5% of full duplicates, and 0.17-0.24% near-duplicates depending on the used parameters and threshold values. Most near-duplicates related to the same patient and originated from the same transmitter. Manual evaluation showed that only 2% of differences were in medical contents and 83% in administrative data (21% in patient, 11% in doctor, and 51% in other administrative data).

## Discussion and Conclusions

We demonstrated that our method can efficiently find all full-duplicates and most near-duplicates in a large set of multisourced medical documents. Many near-duplicates looked strikingly similar from a human perspective. The method has been successfully integrated in our data management flow and spared several thousand documents annually from manual processing.

Keywords: (near-)duplicate documents, locality-sensitive hashing, cancer registry

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## **Automatic pre-coding of squamous cell carcinoma of the skin from medical reports using neural networks**

**Tapio Niemi<sup>1</sup>**, Eloïse Martin<sup>1</sup>, Patrick Arveux<sup>1</sup>, Simon Germann<sup>1</sup>, Jean-Luc Bulliard<sup>1</sup>.  
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### Background

Healthcare providers deliver medical data to cancer registries in multiple formats, including unstructured PDFs. To alleviate effort and time required for manual coding of unstructured data for frequent cancers, we developed an automatic method for detecting skin cancer reports and pre-coding them using neural networks.

### Methods

We applied convolutional neural networks (CNN) for identifying cancer types and pre-coding site, morphology, behaviour, and laterality of skin cancer cases in the Vaud Cancer Registry. Since our training data was labelled on tumour level, we combined all reports of the same tumour as one input. Standard natural language processing methods were applied. Because of heterogenous training data, a customised robust loss function was used. The five-step method included: 1) Extracting text from PDF documents, 2) mapping

the source text to numeric vectors using an embedded model, 3) training CNN using coded cases from earlier years, 4) detecting the cancer type and pre-coding squamous cell carcinomas (SCC) cases by using CNN, 5) using a Python/SQL script to upload the pre-coded cases into the registry database for verification.

## Results

The detection of SCC had 98% accuracy, 95% sensitivity, 99% specificity and 95% PPV. The ICD-O site detection had 92% accuracy, behaviour 98%, laterality 90%, 3-digit morphology 96%, and full ICD-O morphology 72%. All four items were correct in 79% accuracy (3-digit morphology code). The average computing time required to code one case including all five steps was less than one second when using a standard desktop PC (i9-9900, 3.1GHz, 64 GB).

## Discussion and Conclusions

Our real-word use case faced challenges such as patient's reports containing partially contractionary data (multiple cancer diagnoses, synchronous SCC at multiple sites, history of prior SCC). Our automatic pre-coding method is being refined and plan to be extended to other cancer sites.

Keywords: cancer coding, neural networks, text mining

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## **European clinical and population-based data to the OMOP Common Data Model: the retroperitoneal sarcoma use case**

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## Background

OHDSI (Observational Health Data Sciences and Informatics) is a collaborative initiative aimed to enable large scale studies with observational health data. The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) is a data standard for Real World Data, designed to standardize structure and content of observational data. This standardisation allows the harmonization of heterogeneous data sources, like clinical and population-based registries, useful in the context of rare-ultrarare cancers. The European Reference Network for rare adult solid cancers is therefore establishing a registry that is scalable and interoperable with other data sources.



## Aim

We aimed at demonstrating the potential of a harmonized registry based on the OMOP-CDM to identify prognostic factors for retroperitoneal sarcoma (RPS) as first use case.

## Methods

Data came from 3 different data partners: one population-based registry (Netherlands Cancer Registry NCR, IKNL) and two clinical registries (Fondazione IRCCS Istituto Nazionale dei Tumori, INT and University Hospital Graz, Graz). We used the standardized ATLAS tool of OHDSI to characterize the cohort of RPS patients with the following selection criteria: adult patients ( $\geq 18$  years old) with a primary localized, non-metastatic RPS with a surgery between 01/01/2010 and 31/12/2017. We excluded patients with other previous malignancies. We assessed differences and similarities across data partners, comparing patient, tumour and treatment characteristics. Analyzes are underway to identify prognostic factors.

## Results

We identified 1164 patients (502 NCR, 616 INT and 46 Graz) with a RPS. The distribution by sex and age at diagnosis is similar across data partners. In clinical registries we observed a higher proportion of high grade tumor (II-III) compared to population-based data (70% vs 40%). The most frequent histologies were well-differentiated and dedifferentiated liposarcoma in all databases.

## Conclusion & Discussion

Centre Léon Bérard and Norwegian Cancer Registry databases will be soon mapped according to the OMOP-CDM and further analyses on data from all data partners will be performed using a federated approach. Hospital volume definition is under discussion with clinicians and analyses will be conducted to confirm its prognostic role.

Keywords: sarcomas, prognostic factors, common data model

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## **Setting up the Luxembourg National Cancer Registry Data Flow - Lessons Learned**

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## Background

Cancer registration is a complex, continuous process, involving numerous data sources and people. For the Luxembourg National Cancer Registry (French: *Registre National du Cancer*, RNC), the main sources are the hospitals and the national radiotherapy centre, each operating independently in silos. In this set up, the RNC faces delays in data collection, preparation, and dissemination.

## Aim

This work aims to streamline the RNC data flow, to increase quality and timeliness. In a first step, this study focuses on data collection within hospitals. We map the current flow, identify bottlenecks and pain points, and co-design solutions with our main stakeholders (RNC team, data operators, and hospitals).

## Methods

The main challenges include the time-intensive data consolidation from the hospital data silos, lack of structured electronic hospital records, and missing national pseudonymisation service. To overcome some of these issues, a collaborative tool, replacing the current siloed system, has been suggested. To implement this collaborative approach, new features have been added in the data collection software.

In the following months, the impact on the workload of the hospital data operators will be assessed. In addition, more discussions are required with our partner hospitals, to identify opportunities and incentives to improve data timeliness and quality. International data standards such as openEHR for data definition and modelling (<https://openehr.org/>) or Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) (<https://ohdsi.github.io/CommonDataModel/>) for federated research could be explored to further support the implementation of the cancer registry.

Keywords: dataflow, collection, data modelling, quality

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## TOPIC 7 : CARE AND CURE

### **Exploring clinical and socio-economic factors associated with breast cancer treatment waiting times in Luxembourg: the RELIANCE-BC study**

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## Background

In Luxembourg, cancer is the second leading cause of death in women with breast cancer the most common in terms of incidence and mortality. Luxembourg's National Cancer Registry is a Population Based Cancer Registry (PBCR) collecting all new cancer cases diagnosed and/or treated on the territory of Luxembourg. The RELIANCE (“REaL-life cANCER epidemiology to identify risk factors for cancer with a particular focus on prevention and care”) Breast Cancer study, aims to evaluate cancer epidemiology for the first time in Luxembourg using longitudinal population data from the RNC. The study involves a retrospective analysis of the RNC breast cancer cohort 2013-2018 including waiting times for breast cancer treatment.

## Aim

To explore the clinical and socio-economic factors associated with breast cancer treatment waiting times in Luxembourg.

## Methods

The analysis included 1,871 female patients with breast cancer resident in Luxembourg. We measured waiting time for first treatment as the number of days between incidence and first treatment. We used a multi-level model to investigate the relationship between waiting times and 1) individual-level clinical factors and 2) a socio-economic index of individuals' area of residence.

## Results

The median waiting time between incidence and first treatment was 27 days. Stage (2, 3 or 4 compared to 1), Behavior (Invasive compared to in-situ) and Grade (moderately, poorly or undifferentiated compared to well differentiated) were associated with shorter waiting times. Diagnostic tests (mammogram, ultrasound or MRI) were associated with longer waiting times.

## Perspective

This study will enable to support breast cancer management in Luxembourg and to compare patient pathway depending of clinical and socioeconomic factors.

Keywords: Breast cancer, registry, treatment, waiting times

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## TOPIC 8 : SURVIVAL

### **Net Survival for Cancer of the Cervix by Histological Group in Northeast Brazil (1996-2017)**

Silva Brenda Evelin Barreto<sup>2</sup>, Ssenyonga Naomi<sup>4</sup>, Minicozzi Pamela<sup>4</sup>, Di Carlo Veronica<sup>4</sup>, Matz Melissa<sup>4</sup>, Allemani Claudia<sup>4</sup>, Coleman Michel P<sup>4</sup>, **Lima Carlos Anselmo**<sup>1-3</sup>.

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#### Background

Trends in cervical cancer burden have been influenced by preventive measures, early detection, healthcare access, and effective treatment.

#### Aim

Population-based survival is crucial for assessing health system effectiveness in cancer care. Our goal was to analyse cervical cancer survival trends in Sergipe, Brazil, by histological group.

#### Methods

We examined data from the Aracaju Cancer Registry on women (15-99 years) diagnosed with invasive primary cervical cancer in Sergipe from 1996 to 2017, with follow-up to 2022. Of 10,482 registrations, 3,977 (90.7%) of 4,387 invasive malignancies were eligible for survival analyses. One- and five-year net survival rates were calculated using the Pohar-Perme estimator, age-standardized with the International Cancer Survival Standard weights. Background mortality was adjusted using complete life tables for women in Sergipe from 1996 to 2022

#### Results

One-year net survival decreased from 84.6% (1996-1999) to 73.4% (2015-2017), while five-year survival declined from 60.8% to 49.3%. Squamous cell carcinomas accounted for 85.1% of cases. Age-standardized survival rates were similar for squamous cell carcinomas and adenocarcinomas (approximately 80% at one year and 55-58% at five years). Other specified morphologies had age-standardized survival rates of 70.8% at one year and 46.1% at five years. Net survival for squamous cell carcinoma decreased from 85.7% to 74.5% at one year and from 62.5% to 51.4% at five years between 1996-1999 and 2015-2017.

## Conclusion & Discussion

Survival showed a modest decline over time, potentially indicating improvements in screening programs. Detecting and treating in situ tumours during screenings can reduce invasive cancer incidence. However, aggressive tumours, which are harder to detect due to faster growth, pose challenges in treatment, potentially reducing survival rates. Additionally, survival did not differ between squamous cell carcinoma and adenocarcinoma.

Keywords: Survival; Cervix Uteri; Cancer of Cervix

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## **Ovarian Cancer Net Survival by Histological Group in Northeast Brazil (1996-2017)**

Silva Brenda Evelin Barreto<sup>2</sup>, Ssenyonga Naomi<sup>4</sup>, Minicozzi Pamela<sup>4</sup>, Di Carlo Veronica<sup>4</sup>, Matz Melissa<sup>4</sup>, Allemani Claudia<sup>4</sup>, Coleman Michel P<sup>4</sup>, **Lima Carlos Anselmo**<sup>1-3</sup>.  
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## Background

Ovarian cancer survival tends to be lower in low- and middle-income countries compared to high-income countries, influenced by access to healthcare and socioeconomic factors.

## Aim

Our aim was to describe ovarian cancer trends in Sergipe, Brazil, by histological group.

## Methods

We analysed individual data from the Aracaju Cancer Registry on women aged 15 to 99 years diagnosed with ovarian, fallopian tube, uterine ligaments and adnexa, peritoneum or retroperitoneum, and other specific and unspecified female genital organs cancer in Sergipe, Brazil, over five periods (1996-1999, 2000-2004, 2005-2009, 2010-2014, 2015-2017), with follow-up to 31 December 2022. After applying the quality control procedures developed for the VENUSCANCER project, of 1,131 registrations, 948 eligible patients were included in survival analyses. One- and five-year net survival rates were estimated using the Pohar-Perme estimator, age-standardized with the International Cancer Survival Standard weights and stratified by histological group. Complete life tables for all-cause mortality rates among women in Sergipe from 1996 to 2022 were constructed to adjust for background mortality.

## Results

One-year net survival ranged from approximately 60-70% during 1996-2017, while five-year survival varied from 31-47%. Type I epithelial tumours accounted for 24.9% of cases, while type II accounted for 56.1%. One-year survival for type I and type II was similar, around 67-68.5% from 1996-2017. However, five-year net survival for type II tumours was 32.5%, lower than the 52% for type I. Over time, survival for type II tumours increased from 55.4% (2000-2004) to 69% (2015-2017) at one year, and from 22.3% (2000-2004) to 37.4% (2015-2017) at five years.

## Conclusion & Discussion

Ovarian cancer survival trends remained stable over time. Type II epithelial tumours, comprising over half of the cases, had lower five-year survival compared to type I tumours. Disparities in healthcare infrastructure and resources in regions with a medium Human Development Index could impact ovarian cancer survival outcomes.

Keywords: Survival; Ovary; Ovarian Cancer

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## **Impact of Prognostic Factors in Lung Cancer Survival: A Time-Varying Population-Based Study in Girona, Spain, 2010-2019.**

Teixidor-Vilà Eduard<sup>1</sup>, Trallero Jan<sup>2</sup>, Sanvisens Arantza<sup>2</sup>, Vidal-Vila Anna<sup>2</sup>, Puigdemont Montse<sup>2</sup>, Menendez Javier A. <sup>3</sup>, Bosch-Barrera Joaquim<sup>1</sup>, **Marcos-Gragera Rafael<sup>2</sup>**.

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## Background

Survival from lung cancer (LC) remains low and is an unmet challenge. Enhancing LC survival requires comprehension of prognostic factors.

## Aim

To analyze the impact of prognostic factors in LC patients over a 10-year population-based cohort in the province of Girona, Spain.

## Methods

LC patients diagnosed in the province of Girona, between 2010 and 2019. Follow-up was until December 31, 2021. Date of diagnosis, sex, age, stage, and histology were recorded. Histology was categorized into 6 groups: small cell carcinoma [SC], non-small cell adenocarcinoma [NSC-AC], large cell carcinoma [NSC-LCC], squamous cell carcinoma

[NSC-SCC], other non-small cell carcinoma [NSC-NOS], and LC not otherwise specified [LC-NOS]). Multivariate flexible parametric models were used to analyze net survival with age as time-varying covariate.

## Results

A total of 4,112 LC cases were registered in the period study of which 3,642 (88.5%) had stage at diagnosis and were included in the analysis. The median age was 69 years (interquartile range: 61-77) and 79.3% were male. The proportion of stages varied by histologic group with 69.1% metastatic cases in SC and 36.6% in NSC-SCC. At the end of follow-up, 12.3% of cases were alive. In the multivariate model adjusted for age as a time-varying effect, men had a worse prognosis than women, with a hazard ratio (HR) of 1.30 (95%CI: 1.25;1.35). NSC-AC and NSC-SCC showed a lower risk of LC death compared to NOS histology group (HR: 0.52, 95%CI: 0.49;0.55 and HR: 0.62, 95%CI: 0.58;0.67, respectively). And increasing tumor stage had a dose-response effect on the risk of LC death with 1.8-, 4.0-, and 10.1-fold greater odds for stage II, III, and IV, respectively, compared to stage I.

## Conclusions & Discussion

LC survival is influenced by sex, age, and clinical characteristics of the tumor. Stage had the greatest impact highlighting the importance of collecting this data in the population cancer registries to provide more reliable data on survival.

Keywords: Lung Cancer; histologic groups; prognosis; survival

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## **Survival Trends in Lung Cancer: A 26-year Longitudinal Population-Based Study in Girona, Spain.**

Teixidor Vilà Eduard<sup>1</sup>, Trallero Jan<sup>2</sup>, Sanvisens Arantza<sup>2</sup>, Vidal-Vila Anna<sup>2</sup>, Puigdemont Montse<sup>2</sup>, Menendez Javier A.<sup>3</sup>, Bosch-Barrera Joaquim<sup>1</sup>, **Marcos-Gragera Rafael<sup>2</sup>**.

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## Background

Lung cancer (LC) is the leading cause of cancer-related mortality in Spain. Analysis of survival trends is essential to evaluate the efforts made to address this unmet challenge.

## Aim

To analyze net survival (NS) trends by histology group in LC patients over a 26-year cohort in the province of Girona, Spain.

## Methods

Population-based study of all LC cases collected between 1994 and 2019, with follow-up until December 31, 2021. Variables included date of diagnosis, sex, age, and tumor histology. The latter were grouped into 6 histologic categories (small cell carcinoma [SC], adenocarcinoma [NSC-AC], large cell carcinoma [NSC-LCC], squamous cell carcinoma [NSC-SCC], other non-small cell carcinoma [NSC-NOS], and LC not otherwise specified [LC-NOS]). Date of diagnosis was divided into 3 periods (1994-2002, 2003-2011, and 2012-2019). Multivariate flexible parametric model estimated trends of survival including age as a covariate with a time-varying non-linear effect. Annual absolute change in survival (AAC\_S) was calculated using the 3-year NS.

## Results

A total of 9,117 cases of LC were identified. Men accounted for 84.0% of cases, and the median age was 69 years (interquartile range: 61-77). At the end of follow-up, 7.4% were alive. The most common histologic groups were NSC-AC and NSC-SCC, accounting for 27.8% and 27.4% of cases, respectively. Median NS shows a significant increase between the first and last period (7.1 months (95%CI: 6.5;7.6) vs. 8.5 months (95%CI: 7.9;9.1)). The global AAC\_S was 0.33% (95%CI: 0.21;0.44). By histology, the largest improvement was observed in NSC-SCC with an AAC\_S of 0.32% (95%CI: 0.21;0.43). On the other hand, the survival of NSC-NOS worsened with an AAC\_S of -0.19% (95%CI: -0.26; -0.12) per year.

## Conclusions & Discussion

LC survival in the province of Girona improved over time, with disparities between different histology groups. NSC-SCC has shown the greatest enhancement, likely due to improved management strategies.

Keywords: Lung Cancer; Survival trends; Population-based; Histology.

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## **Age-related prognoses in a Luxembourg breast cancer cohort: The RELIANCE Study**

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## Background

The correlation between age and breast cancer risk is well-established, yet the influence of age at diagnosis on survival outcomes remains inconsistent.



## Aim

This study aimed to evaluate the prognostic consequences of age at diagnosis in breast cancer.

## Methods

This retrospective cohort study is part of the RELIANCE study (REaL-life cANCER epidemiology aims to identify risk factors for **Breast Cancer** with particular focus on prevention and care) and utilized high resolution data from the National Cancer Registry of Luxembourg, including female primary breast cancer cases diagnosed from 2013 to 2018. Stratification was performed across six age-based groups (<40, 40-49, 50-59, 60-69, 70-90, ≥80). Survival analysis was conducted employing Kaplan-Meier estimations and Cox proportional hazards modeling. Comparative survival assessments were performed among three distinct age categories (<50, 50-69 and ≥70). Multivariate analysis based on various clinical factors, , and therapeutic interventions.

## Results

The study included 3,012 female patients, with 6.2% diagnosed prior to age 40. An analysis of tumor grades and subtypes revealed that younger patients (<40 years) were significantly more likely to present with poorly differentiated or undifferentiated grades and triple-negative tumors than older patients ( $p<0.001$ ). The 5-year survival rates were as follows: <40 years (91.0%), 40–49 years (95.3%), 50–59 years (93.7%), 60-69 years (90.6%), 70-79 years (75.4%), and >80 years (47.1%). Notably, the age group of 50-69 years demonstrated a statistically significant superior overall survival in comparison to the other age groups (<50 and ≥70,  $p<0.001$ ). Additionally, multivariate analysis showed 50-69 and ≥70 age groups were significantly associated with better survivals than <50 patients.

## Conclusion & Discussion

The findings of the study indicate that younger (<40 years) breast cancer patients tend to present with more aggressive disease profiles when compared with older age groups. Diagnoses occurring between the ages of 50-69 are associated with more favorable survival rates, compared to those under 50 or over 70, even after adjustments for confounding variables.

Keywords: survival, breast cancer, age

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## **Factors associated with relapse-free and overall survival among French AML-patients: a population-based study**

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## Background

The post-therapeutic relapse of acute myeloid leukaemia (AML) is a common issue after patient's treatment.

## Aim

To estimate the effect of the main prognosis factors, as well as those involved in the therapeutic relapse among AML patients.

## Methods

In this study, we included all AML incident cases diagnosed between 2012 - 2019 and treated with intensive chemotherapy. Patient data were obtained from eight French departments covered by cancer registries (Basse-Normandie, Côte-d'Or, Gironde, Isère, Haut-Rhin, Haute-Vienne, Somme, Tarn), equivalent to more than 7 million inhabitants. A Cox proportional hazards model was used to determine the impact of factors on overall survival using relapse as a time-dependent variable. In the framework of competitive events, we used the Fine and Gray model to estimate the sub-distribution hazard ratio of factors associated with relapse as a primary outcome and death as concurrent events.

## Results

The median age of the 1,073 patients included in this study was 62 years, IQR [49;70]. Median survival for all patients was 3.05 years IQR [2.4;3.8], and 1.8 years IQR [1.6-2.0] for the 365 patients (n=34%) who experienced post-therapeutic relapse during the follow-up. The risk of death of patients who relapsed was HR= 3.60 95% CI [3.06; 4.23] times higher compared to those who did not. Compared to patient with a favourable ELN prognosis, the risk of relapse was SHR=1.41 CI [1.06; 1.89] and SHR=1.49 CI [1.12; 1.99] higher for patients in the intermediate and adverse ELN prognosis group, respectively. However, patient diagnosed with promyelocytic AML, SHR=0.15, 95% CI [0.05; 0.42] have a lower risk of relapse, as do patients with t-MDS, SHR=0.36, 95% CI [0.13; 1.00] (borderline significant). Age and comorbidity have no impact on AML-patient relapse free survival.

## Conclusion

Therapeutic relapses increase the probability of death among AML cases. The factors associated with relapse are related to the disease subtype, and the ELN risk group. These findings highlight the importance of targeting cytogenetic factors that are most predictive of therapeutic prognosis.

Keywords: Acute myeloblastic leukaemia, relapse, population-based, survival

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## TOPIC 9 : BIG DATA

### **Estimation of general and under five population exposure to magnetic fields from high voltage power lines in France using geographic information system and extrapolated data**

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#### Background

The long-term health effects of extremely low-frequency magnetic fields, particularly concerning childhood leukaemia, remain uncertain. The International Agency for Research on Cancer classifies exposure to magnetic fields  $>0.4 \mu\text{T}$  as 'possibly carcinogenic to humans (group 2 B)' for childhood leukaemia. However, the number of exposed individuals, particularly children, remains poorly documented in the international literature. This study aimed to estimate the number of individuals residing near high or very high voltage lines ( $\geq 63 \text{ kV}$ ) in France, among the general population and children under the age of five years.

#### Aim

Estimation of the general population and children under five years of age in France exposed to magnetic field from high or very high voltage power line using geographic information system and extrapolated field data.

#### Methods

Various exposure scenarios were considered based on the line voltage, housing proximity, and line configuration (overhead or underground). Estimates were obtained using a multilevel linear model constructed from a measurement database published by "*Réseau de transport d'électricité*," the operator of the French electricity transmission network.

#### Results

Between 0.11% ( $n = 67,893$ ) and 1.01% ( $n = 647,569$ ) of the French population and between 0.10% ( $n = 4,712$ ) and 1.03% ( $n = 46,950$ ) of children under five years old were estimated to reside in areas potentially exposed to magnetic fields ( $>0.4 \mu\text{T}$  and  $>0.1 \mu\text{T}$ , respectively).

## Conclusions

Our methodology facilitates the estimation of residents, schools, and health institutions near high-voltage power lines. This approach helps identify potential co-exposure situations near such lines, aiding in resolving discrepancies in epidemiological studies.

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Keywords: exposure; magnetic fields; GIS; power lines

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## TOPIC 10 : EPIDEMIOLOGICAL USE OF REGISTRY DATA

### **Thyroid metastasis : data from the French Marne-Ardenne registry from 1975 to 2021.**

**DEBREUVE-THERESETTE Adeline<sup>1</sup>**, ZALZALI Mohamad<sup>2</sup>, MGABAR Camil<sup>1</sup>, MARTIN Pierre<sup>3</sup>.

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#### Background

Thyroid is an uncommon metastatic site. The aim of our study was to describe the frequency and characteristics of thyroid metastasis.

#### Methods

Retrospective study using data from the French Marne-Ardenne thyroid cancer registry, from 1975 to 2021.

#### Results

29 metastases were included during the study period : 13 women, 16 men. The mean age at the diagnosis of thyroid metastasis was 61.7 [38-84]. Metastases were mainly diagnosed from an isolated nodule (14) or multinodular goiter (9). Primitive cancers were mainly kidney (7), head and neck (6), lung (5), digestive tract (5), hemopathy (3), sarcoma (1), breast (1) and womb (1). 12 metastases were already present when the cancer was diagnosed ; 14 were diagnosed within the following years (mean = 5.9 years). Time between the diagnosis of the primitive tumor and the appearance of thyroid metastasis was shorter in lung cancers, and longer in kidney and digestive cancers. Most of thyroid metastasis underwent surgical treatment. Surgical complication rates were similar to that of primitive thyroid tumors surgeries.

## Conclusion

Most of thyroid metastasis come from kidney cancer, due to cell affinity. Prognosis is related to primitive tumor extension and general condition of the patient.

Keywords: thyroid metastasis

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## **Epidemiology and characteristics of thyroid cancer larger than 4 cm between 1975 and 2020 based on Marne-Ardennes registry data**

**DEBREUVE-THERESETTE Adeline**<sup>1</sup>, **DILMI Chouaib**<sup>2</sup>, **GITTON Anne**<sup>2</sup>, **ZALZALI Mohamad**<sup>2</sup>.  
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## Background

Thyroid cancer (TC) is the most common endocrine cancer. Its incidence is increasing and mainly concerns small cancers less than 1 cm. Epidemiological data on TC larger than 4cm are more heterogeneous. The main objective of our study is to study the epidemiological data of TC larger than 4 cm, estimate their incidences, characteristics, as well as an analysis of their evolution and survival.

## Methods

This is an epidemiological, longitudinal, retrospective study, using data from the Marne-Ardennes registry from 1975 to 2020.

## Results

The standardized incidence of TC larger than 4 cm shows an increasing trend. It goes from 0.7 per 100,000 person-years (P.A) in 1975 to 1.7 per 100,000 P.A in 2020. It is explained mostly by the increase of papillary thyroid cancer (PTC) representing 46% of all TC >4cm, which cumulative incidence increases from 2.14 P.A between (1975-1979) to 7.41 P.A in (2015-2020). Follicular TC represent 35.5%, anaplastic cancer (AC) 14% and medullary cancer 4.5%. TC>4 cm are more common in older population (55 and over : 58.3%), with an average age at diagnosis estimated at 57.2 years. This difference in distribution is more marked for AC, with 91% of cases over 55 yo. Sex ratio is 0.58. Total thyroidectomy was the standard treatment (77.4%), associated in 49% with lymph node dissection. Immediate postoperative hypocalcemia was the most frequent complication (49.9%). Additional treatment with radioactive iodine was carried out for 80.8% of cases of CPT and vesicular thyroid cancer (CVT). Complete remission was achieved in 44.6% of patients. Furthermore, 69.2% of patients experienced a recurrence of the disease. The disease was refractory for 25.5% of the study population. Overall survival is 70.3% at 5 years and 63.7% at 10 years. It is relatively similar for CPT and CVT (around 80% at 5 years), and significantly lower for AC (14.3% at 5 years), with a median survival of 5 months and a worse prognosis.

## Conclusion

Our retrospective study demonstrates an increase in the incidence of TC larger than 4cm over recent decades, explained by the increase in PTC. Prognosis depends on the histological type.

Keywords: thyroid cancer

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## **Incidence and Survival of Cancer of Unknown Primary in The Canton of Bern, Switzerland (2014-2021)**

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## Background

Cancer of unknown primary (CUP) is a heterogeneous group of aggressive tumours with unknown primary origin mostly diagnosed following metastasis. Evidence on epidemiological characteristics of CUP is limited. We aimed to i) describe the incidence and survival of CUP in the canton of Bern, Switzerland and ii) determine factors associated with survival.

## Methods

We used data from the population-based Cancer Registry of Bern. We included incident CUP cases (ICD-10 code C80) from 2014 to 2021 in our study. Follow-up was until December 31, 2023. We calculated age-standardized incidence rates (ASR) per 100'000 persons from 2014 to 2021. Kaplan-Meier survival curves were estimated stratified by sex, age at diagnosis, histological group, and diagnostic method. We used Cox proportional hazards models adjusted for sex and age at diagnosis to investigate factors associated with risk of dying.

## Results

Our study included 442 CUP cases (53% male) with a median age at diagnosis of 80.7 years (interquartile range [IQR]: 72.6-87.4). CUP accounted for 0.6% of the total number of cancer diagnoses registered between 2014 and 2021. ASR of CUP was 6.1/100'000 in 2014 and 4.8/100'000 in 2021. ASR were higher for male than female individuals from 2014 to 2021. Most patients died during follow-up (n=415, 95%). Median survival time after CUP diagnosis was 1.8 months (IQR: 0.7-6.2). Compared to CUP patients with an adenocarcinoma, mortality was lower among those with a squamous cell carcinoma (hazard ratio [HR]=0.6, 95%-CI: 0.4-0.9) and higher among CUP patients with unclassified tumours (HR=1.7, 95%-CI: 1.3-2.3). A microscopically verified diagnosis was associated with a lower risk of dying (HR=0.5, 95%-CI: 0.4-0.6). Mortality increased with older age at diagnosis (>80 years vs <60 years; HR=2.1, 95%-CI: 1.4-3.1).

## Conclusion

Incidence of CUP in the canton of Bern was low, however, mortality after diagnosis was high. Advancements in diagnostics and development of novel targeted treatment options may contribute to improved outcomes among CUP patients in the future.

Keywords: Cancer; unknown primary; incidence; survival

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## **Predicting the burden of cancer in Switzerland up to 2025**

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<sup>1</sup>Unisanté.

## Background

Predicting the short-term evolution of the number of cancers is essential for allocating health resources.

## Aim

The objective of this study was to predict the numbers of cancer cases and of the 12 most frequent cancer sites, and their age-standardized incidence rates for the years 2019–2025 in Switzerland, using an AutoRegressive Integrated Moving Average (ARIMA) model, identified through recent comparison as the most accurate prediction method.

## Methods

Projections of the number of malignant cancer cases were obtained by combining data from two sources: forecasts of national age-standardized cancer incidence rates and population projections from the Swiss Federal Statistical Office. Age-standardized cancer incidence rates, approximating the individual cancer risk, were predicted by a low-order ARIMA model. The contributions of changes in cancer risk (epidemiological component) and population aging and growth (demographic components) to the projected number of new cancer cases were each quantified.

## Results

Between 2018 and 2025, age-standardized cancer incidence rates are predicted to stabilize for men and women at around 426 and 328/100,000, respectively (<1% change). These projected trends are expected for most cancer sites. The annual number of cancers is expected to increase from 45,676 to 52,552 (+15%), more so for men (+18%) than for women (+11%). These increases are almost entirely due to projected changes in population age structure (+12% for men and +6% for women) and population growth (+6% for both sexes). The rise in numbers of expected cancers for each site is forecast to range from 4.15% (thyroid in men) to 26% (bladder in men). While ranking of the three most frequent cancers will remain unchanged for men (1<sup>st</sup> prostate, 2<sup>nd</sup> lung, 3<sup>rd</sup> colon-rectum),

colorectal cancer will overtake by 2025 lung cancer as the second most common female cancer in Switzerland, behind breast cancer.

### Conclusion & Discussion

Effective and sustained prevention measures, as well as infrastructural interventions, are required to counter the increase in cancer cases and prevent any potential shortage of professionals in cancer care delivery.

Keywords: prediction arima method age-standardized-rates

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## **Impact of Locking down Public Life on Swiss Cantonal Registry Data during the COVID-19 Pandemic**

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### Background

In 2019, the virus SARS-CoV-2 was discovered and started to spread globally. The virus has severe effects on human health, resulting in a lockdown of public life in many countries. This measure helped to lower the number of SARS-CoV-2 patients, but diagnosis and treatment of other severe diseases, such as cancer, may have been neglected.

### Aim

We investigated differences in cancer diagnosis and stage distribution among the pre-SARS-CoV-2 years (2018/2019) and the during the first SARS-CoV-2 year (2020) in two Swiss cantons.

### Methods

Data of the Cancer Registry of the cantons of ZH and ZG were used. Age-standardized monthly incidence rates per year were determined using the direct method. Quasipoisson regression models adjusted for sex, canton, and incidence year and month were fitted to determine Incidence Rate Ratios (IRR) with 95% confidence intervals (95% CI). Differences in cancer stage distribution were investigated descriptively.

### Results

Lower Incidence Rates (IR) were observed in 2020 compared to 2018/2019 for all-cancer (IRR<sub>2020 vs. 2018</sub> = 0.95 [95% CI: 0.95-0.96]; IRR<sub>2020 vs. 2019</sub> 0.96 [0.96-0.96]), female breast cancer (IRR<sub>2020 vs. 2018</sub> = 0.93 [95% CI: 0.91-0.95]; IRR<sub>2020 vs. 2019</sub> 0.91 [0.90-0.93]), colorectal



cancer ( $IRR_{2020 \text{ vs. } 2018} = 0.90 [0.88-0.92]$ ), lung cancer ( $IRR_{2020 \text{ vs. } 2019} = 0.94 [0.92-0.97]$ ), and melanoma ( $IRR_{2020 \text{ vs. } 2018} = 0.96 [0.94-0.99]$ ;  $IRR_{2020 \text{ vs. } 2019} = 0.96 [0.93-0.99]$ ). A shift towards more severe cancer stages was partly observed in our study (mainly decrease in cancer cases of 'unknown stage' and slight increase in cancer cases of stage II, III, and IV).

### Discussion/Conclusion

We observed lower cancer incidence rates in 2020 compared with previous years. Other European studies reported disrupted cancer screening programs, leading to a decrease in cancer diagnosis. The observed shift in cancer stage distribution in our analysis, in particular lower unknown stage cancers might be caused by the new Swiss laws on systematic cancer case registration in 2020. To the best of our knowledge, this is the first Swiss study using population-based cantonal cancer registry data to examine the impact of locking down public life during the pandemic on cancer diagnosis and stage distribution.

Keywords: Cancer Registry, Switzerland, COVID-19, lockdown

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## **Spectroblastome: Incidence and Characteristics of Patients Afflicted with Glioblastomas**

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### Background

Glioblastoma (GBM), the predominant glial brain tumor in adults, is associated with a limited life expectancy ranging between 12 and 18 months. A retrospective observational study from 2003 to 2013 indicated the Somme revealed a slight increase in the occurrence of GBM.

### Aim

The primary aim of this study was to assess the incidence of GBM between 2014 and 2020 in the Somme and subsequently describe its characteristics. Some secondary objectives were to describe the magnetic resonance spectroscopy (MRS) and survival data.

### Methods

This retrospective population-based study identified 137 histologically confirmed cases of GBM cases between 2014 and 2020 in the Somme. Parameters investigated included cohort characteristics (age, sex, rural or urban residence, surgical excision, treatment, and biomarkers), incidence analyzed by place of residence and sex (crude and world-standardized incidence rates (WSIR) per 100,000 person-years), and age  $\geq 65$  years or not

(crude only). Additionally, the study involved MRS data and explored survival outcomes, stratified by sex, place of residence, age  $\geq 65$  years or not, and the surgical excision.

## Results

The WSIR of GBM diagnosed in the Somme department between 2014 and 2020 was 2.1 [1.7-2.4] per 100,000 person-years, showing a minimal increase, non-significant compared to the 2003-2013 period (WSIR: 1.6 [1.4-1.9]). No significant differences were observed based on sex or place of residence. Initial MRS data following the Stupp protocol (n = 79) revealed distinctive features (proliferation, infiltration, necrosis, and the existence of necrotic phospholipids) and elevated spectroscopic ratios linked to GBM. The prognosis was unfavorable, with over 90 % succumbing within eight years. Notable differences were observed only in the context of surgical excision.

## Conclusion and Discussion

Despite lacking statistical significance, an upward trend in GBM incidence of in the Somme (2014-2020) was noted. Place of residence did not impact GBM incidence or prognosis, but surgical excision influenced long-term prognosis, favoring complete excision.

Keywords: Glioblastoma, Incidence, Population Characteristics, Spectrum Analysis,

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## **Management of non metastatic prostate cancer in old patients ( $\geq 75$ years old) in a French Department (Hérault)**

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## Background

Due to the accelerated aging of the population, prostate cancers in the elderly are constantly on the rise, and their management remains a difficult problem, particularly for localized cancers which may be under or overtreated, and curative treatments are rarely achieved.

## Aim

The aim of this study was to analyze the management of non metastatic prostate cancer (T1-4, N0-X, M0) with a diagnostic on prostate biopsies in subjects aged 75 and over in a French department (Hérault).

## Methods

We used a population-based study data from a French registry specialized in oncology (RHESOU: Registre Hérault Spécialisé en Onco Urologie) in patients aged 75 and over at diagnosis with a non metastatic prostate cancer between 01/01/2017 and 31/12/2020. Patients were divided into 2 groups according to age at diagnosis: group 1 (patients aged from 75 to 79 years) and group 2 (patients aged 80 years and over). Inclusion included all non metastatic prostate cancer with a diagnosis on prostate biopsies (PB). For the survival study, the endpoint date was 16/05/2023.

Statistical analysis: Univariate analysis of the treatments for the two age groups was performed by using a Chi-2 test. Survival according to treatments was modeled using a Kaplan-Meier model.

## Results

Eight hundred and seven patients were included in the study, 482 in group 1 and 325 in group 2. Local curative treatment was performed in 72.6% of patients in group 1 and 34.5% in group 2 ( $p < 0.0001$ ). Patients aged 80 and over were mostly treated with an isolated hormone therapy (48.9%) whereas their survival is similar than patients not treated (watchful waiting).

## Conclusions

Patients aged 80 and over had higher-risk of non metastatic prostate cancer. They received few local curative treatment, and hormone therapy was overused, contrary to the recommendations of learned societies and according to the results of the present survival study. Treatment decisions for these patients should not be based on chronological age, but on cancer prognosis and life expectancy.

Keywords: prostate cancer, management, elderly patients

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## **Childhood and adolescents cancer incidence in Cuba 2010-2019: a population-based study**

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## Background

In Cuba, childhood cancer incidence data has been systematically gathered and processed by the National Cancer Registry (NCR) since 1964. Cancer incidence in childhood and adolescent according to the pediatric diagnostic groups was described for 2010-2019.

## Methods

Data from all diagnosed cancer cases among ages 0-19 years from 2010 to 2019 was obtained from the Cuban NCR. Cases were grouped according to the International Classification of Childhood Cancer, 3rd edition. Annual age-specific (SIR) and age-standardized incidence rates (ASIR), per million, were calculated by the direct method using the world standard population. Temporal trends were examined by annual percent changes (APCs) using Joinpoint regression.

## Results

A total of 3716 new cancer cases recorded with an age-specific rate (SIR) of 128.5 and ASIR of 126.4 per million. Age distribution was: 0-4 years, 903 (27.1%); 5-9 years, 586 (17.6%); 10-14 years, 666 (20%) and 15-19 years, 1173 (35.3%). The overall ASIR in age 0–14 years was 145.4 and 164.7 in age group 15–19 years, per million. Leukemias were the most common group, with an SIR and an ASIR of 35.2 and 36.7 per million, respectively. The SIR and ASIR<sub>s</sub> of lymphomas were 22.3 and 20.9 per million, respectively. The overall ASIRs increase from 139.8 per million in 2010 to 146.8 per million in 2019 with an APC of 0.6 (95%CI: 0.4; 1.6).

## Conclusion

This study shows valuable insights into the incidence of childhood and adolescents cancer in Cuba, useful for surveillance and planning purposes for diagnosis and treatment. Further analysis is being done to justify new diagnosis and treatment protocols.

Keywords: childhood cancer ; adolescent cancer ; incidence ;

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## **The Impact of HPV on different types of cancer in Brazil**

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The Human Papillomavirus (HPV) is a sexually transmitted virus and is linked to the development not only of cervical cancer, but also types of cancer of oropharynx, anus, vulva, vagina and penis, affecting the male population also.

Cancers of oropharynx, anus and penis together correspond to approximately 2% of cancers in men and cancers of oropharynx, anus, vulva and vagina correspond to approximately 1% of tumors in women.

Information was analyzed on five types of cancer related to HPV, in men and women (oropharynx (C09-10), anus and anal canal (C21), vulva (C51), vagina (C52) and penis (C60)). Information was used by population-based and hospital-based cancer registries in Brazil.

In Brazil, in 2021, we had a total of 4,500 deaths from the types of HPV-related cancers presented in this study. Considering that they are responsible for around 6 thousand new cases per year, a mortality rate of almost 75% is significant and needs to be taken into consideration. The information analyzed brings important reflections regarding the arrival of patients at health units, which directly impacts the reduction of preventable deaths from the disease. Oropharyngeal tumors are those with the highest percentage of patients arriving at hospitals with stage III and IV (more than 80%), for both sexes. Cancers of the anus, penis, vulva and vagina have these values varying between 40% and 50%. The profile of the patients analyzed showed that, among men and women, the majority were over 50 years of age (78% in both), had low education (64% in both) and were black (56% and 53%, respectively) .

The HPV vaccine is distributed free of charge in Brazil, but there is still difficulty in achieving adequate vaccination coverage.

The information from this study highlights the importance of looking at HPV prevention beyond cervical cancer and the female population, as this is an impacting factor in the burden of the disease as a public health problem for the entire population, men and women.

Keywords: Cancer, HPV, Incidence, Mortality, Morbidity

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## **Shift in Gleason Score**

**Grosclaude Pascale**<sup>1-2</sup>, Lamy Sebastien<sup>1-2</sup>, Daubisse-Marliac Laetitia <sup>1-2</sup>.

<sup>1</sup>Tarn cancer registry; <sup>2</sup>CERPOP : Equity team, Inserm. Toulouse III University.

### Background and aim

The Gleason score created in 1966 was revised several times until 2005. A new revision took place in 2014. Continuous adaptation to the reality of management is a necessity for a prognostic indicator for clinical use, but it generally makes this indicator unsuitable for monitoring the evolution of tumors over time. The distribution of groups is no longer comparable, and neither is the prognosis for each group. A shift in classification leading to what is commonly known as the Will Rogers phenomenon was clearly demonstrated in 2005 for the Gleason score. We want to know if this shift is still going on.

## Methods

We used data of prostatic cancers from the Tarn cancer registry from 2008 to 2021; 5087 cases for which we have the clinical stage, PSA level and Gleason score at the time of diagnosis. We observed the change in the Gleason score and its components at constant clinical stage by studying their distributions and the trend of components  $\geq 4$ .

## Results

Over the period, there was a decrease in scores  $\leq 6$  and an increase in scores  $\geq 7$  for the stages of localised tumors. For the predominant cellular pattern we see no change (OR / for 2 years= 0.97) ; for the second pattern the increase in the frequency of components  $\geq 4$  increases significantly (OR / for 2 years= 1.10  $p < 0,0001$ ). The same analysis carried out on PSA values shows only slight variations at constant stage.

## Conclusion

Between 2008 and 2021, there has been a shift in the classification of the Gleason score. This shift is due to the second cell pattern. It is therefore partially neutralized by the inclusion of the percentage of cellular pattern (score 7-/ 7+) in the overall score. However, this shift makes the use of the Gleason inadequate for studying trends.

Keywords: Prostate cancer, prognostic indicator

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## **Multiple Myeloma On Autonomous Region Of Madeira, Portugal – Incidence, Mortality, And Survival (1998-2022)**

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## Background

Hematologic malignancies (HM) are among the most relevant tumors worldwide. Multiple myeloma (MM) is a monoclonal plasma cell malignancy that represents about 10% of all (HM) and is the 3<sup>rd</sup> most incident and the 3<sup>rd</sup> most lethal HM worldwide (GLOBOCAN 2022).

## Aim

Present the main MM epidemiological variables obtained for the last 25 years of cancer registry on Autonomous Region of Madeira (Madeira; 2 inhabited islands on North Atlantic, population 250744; area 801km<sup>2</sup>).

## Methods

Data collected from Madeira residents between 1998 and 2022 with MM (ICD-O-3: M9732/3), registered on the platform National Cancer Registry database (RON). Mortality official data obtained from the National Statistics Institute. Epidemiological variables including, sex, age, risk, incidence (IR) and mortality rates (MR; /100,000). Joinpoint 5.0.2 used for annual percentage change (APC) and average APC (AAPC) trends and IBM SPSS Statistics 22 for overall survival (OS) with Kaplan-Meier method and log-rank test for groups comparison.

## Results

A total of 309 (13.2% HM; 42.4% males) cases were obtained, with a median age of 71yrs (IQR=77-64). They were the 3<sup>th</sup> most frequent HM and the 17<sup>th</sup> globally (world age standardized rate – ASR=0.7-4.0) with an increasing IR (overall AAPC=3.8%; 95%CI=1.1;6.6; p=.006) among both younger (<65yrs; AAPC=2.9%; 95%CI=0.2;5.7; p=.038) and older groups (≥65yrs; AAPC=6.1%; 95%CI=1.9;10.4; p=.004). MR increased overall (AAPC=2.8%; 95%CI=0.3;5.3; p=.029) essentially on the older group (>65yrs; AAPC=13.6%; 95%CI=1.5;27; p=.026). It was obtained a cumulative risk (0-74yrs) between 0.1% (2000) and 0.52% (2022) and a cumulative risk of dying until 74yrs varied from 0.1% (2002) and 0.35% (2020). 5-year OS was of 35.7% with a mean of 2.9±0.1 (95%CI=2.7;3.1) yrs. Although IR and MR increased, survival also increased by year of diagnosis (mean: AAPC=9.5%; 95%CI=1.1;18.5; p=.025; median: AAPC=20.3%; 95%CI=9.6;32.1; p<.001).

## Conclusion & Discussion

Incidence rates increased 3.8% over these 25 years, mortality rates also increased at a lower value (2.8%). In contrast, survival rates increased with a mean of 9.5% per year, reflecting the improved patient survival by means of better strategies such as target therapies and better diagnosis at early stages.

Keywords: multiple myeloma; epidemiology; incidence; mortality; survival

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## **Impact of pharmaceuticals on the costs of cancer patients: a focus of EPICOST study**

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## Background

In Italy, current spending on healthcare amounts to 115 billion euros in 2019 and represents 6% of the GDP. Purchase of drugs represents 16% of current spending and the

most prescribed medicines are oncology drugs (17%), followed by antihypertensives (9%).

### Aim

To describe frequency and cost of drug substances used in the 3 phases of the disease (initial, continuous and final) during the diagnostic and therapeutic pathway of cancer patients resident in the Veneto Region, according the drugs distribution setting (hospital or territorial pharmacy).

### Methods

The EPICOST-2 study cohort is cross-sectional and includes adult patients alive on 1.1.2018, who have been diagnosed with a cancer of colon, breast or cutaneous melanoma in the period 1990-2017 and followed up until 31.12.2018. The data were linked with all health services databases including the two: hospital drugs (HD) and territorial drugs (TD).

### Results

The impact of pharmaceuticals costs varies across different phases of care in the three cancer sites, being lower in the initial phase, except for breast cancer. In melanoma, pharmaceutical costs account for more than half of the total spending (13% for colon and 24% for breast). Antineoplastic drugs are infrequently prescribed in territorial settings, with the exception of breast cancer. In melanoma, HD costs are almost exclusively associated with the final phase, despite the low prevalence of patients in this phase.

### Conclusion & Discussion

The share of costs represented by drugs varies according to the cancer sites, from 13% for colon to more than a half for melanoma. Applying the calculated annual cost by patient to the complete prevalence by phase of care, allows estimating the total annual expenditure of drugs by cancer type in the whole Veneto Region. Moreover, the molecular categorization of breast cancer allowed verifying the appropriateness of specific drugs prescriptions.

Keywords: Drugs, phase of care, cancer prevalence

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## **Fertility, sexuality and other unmet needs of young breast cancer women during and after care in France: a qualitative study by the French Network of Cancer Registries (FRANCIM)**

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Calmettes; <sup>3</sup>Regional Health Observatory Burgundy Franche-Comté; <sup>4</sup>Burgundy Franche-Comté University.

### Background and aim

Integrating women's needs into medical decisions is becoming increasingly essential for high-quality care. This study aimed to examine the scope and content of information transmitted on fertility and sexuality during breast cancer (BC) management, and identify unmet support needs.

### Methods

This study follows a quantitative study using self-questionnaires, in which patients met the following inclusion criteria (age  $\leq$  40 years at diagnosis, non-metastatic invasive BC diagnosed from 2009 to 2016) and were identified through the FRANCIM Network. A stratified sample (age, department, socio-professional category and socio-economic level) of 29 women was drawn at random among eligible women who completed the self-questionnaires. Individual semi-structured interviews were conducted either by videoconference or face-to-face, from October to December 2022. The interviews were audio-recorded, transcribed verbatim, and analyzed thematically.

### Results

Findings revealed that women would like to be better informed about the post-treatment side effects and better prepared by the physicians, for the feeling of abandonment in the post-cancer due to the lack of medical appointments. More women deplored the lack of coverage and reimbursement of aesthetic and paramedical care essential to women to compensate for the persistent side effects and the repercussions of the disease after cancer. With regard to sexuality and fertility, at diagnosis, it would be suitable to ask women if they would like to be informed in the absence of systematic information. In addition, psychological support for the couple during and after treatment is required to avoid divorce and separation. The introduction of fertility preservation with the possibility to offer it systematically to all young women at diagnosis is important. For women with pregnancy plan at diagnosis, the majority felt a lack of adaptation of care by physicians to their pregnancy plan at diagnosis.

### Conclusions

This study showed that, despite the high quality of care provided in France, young BC survivors felt they had unmet needs in terms of sexuality, fertility and access to paramedical care (psychological, aesthetic ...) after treatment. These results could help public authorities and physicians to improve care and life after cancer for young BC survivors.

Keywords: young women; unmet needs; qualitative study

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# Updating complete cancer prevalence for Switzerland using the completeness index (R-index) method.

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## Background

The complete prevalence (CP) gives the number and proportion of cancer patients alive at a certain date, irrespective of the time of diagnosis. The latest CP figures for Switzerland were estimated in 2013 with date of reference 31.12.2010.

## Aim

To update CP statistics available for Switzerland including diagnoses of the most recent incidence year 2020.

## Methods

A subset of Swiss cancer registries spans 40 years of registration, thus approximating CP with some degree of underestimation. Empirical R-indexes derived from this subset are applied to limited-duration prevalence estimates from a larger and more representative sample of Swiss cancer registries, spanning at least 10 years of registration. Modelled R-indexes are derived with the Complete Prevalence (ComPrev) Program produced by the National Cancer Institute, and based on parametric models for incidence and survival in Switzerland.

## Results

Comparison of empirical R-indexes with modelled R-indexes from the EURO CARE-6 study, and with modelled R-indexes from Swiss data for selected cancers showed that EURO CARE-6 R-indexes often over-estimated the Swiss R-indexes. For all ages and cancers combined, Swiss CP is estimated to about 453'000 persons, or 5.2% of the population in 31.12.2020. Updated Swiss CP estimates surpassed the predictions made in 2013 for many cancer sites.

## Conclusion & Discussion

We show the feasibility of estimating empirical and modelled R-indexes with Swiss data. The suitability of external R-indexes for national monitoring, on the other hand, must be carefully assessed. The updated complete (and limited-duration) prevalence estimates for Switzerland will support policy makers and the health care officials in the planning of health services and particularly survivorship care.

Keywords: Complete prevalence, Switzerland, R-index

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## Cancer incidence trends and estimates for 2023 in Navarra (Spain)

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### Background and aim

Monitoring cancer incidence is essential for evaluating public health programs and planning health care services. We aimed to analyse recent cancer incidence trends and to provide 2023 estimates, overall and for the most frequent cancer types by sex in Navarra.

### Methods

We retrieved the cases of invasive malignant tumours, except non-melanoma skin cancer, from the Navarra Cancer Registry. We estimated the number of cancer cases and incidence rates in 2023 using linear models, based on the trends by sex and age groups observed in the most recent period with available data (2003-2017). We calculated age-standardized rates (ASR) adjusted to the 2013 European standard population to analyse trends.

### Results

The estimated number of new invasive cancer cases in Navarra in 2023 was 4,224, 2,485 in men (59%) and 1,739 (41%) in women. Prostate (21.9%), colorectal (19.4%), lung (14.0%) and urinary bladder (5.1%) were the most common cancer sites diagnosed in men, which accounted for 60% of the total cases. Breast (26.0%), colorectal (14.3%), lung (8.3%) and corpus uteri (6.6%) were the most frequent in women, accounting for 55% of the total. In the last decade, the ASR of cancer decreased by 2.4% in men, from 766 to 748 cases per 100,000 population per year, while it increased by 4.4% in women, from 435 to 454 per 100,000 per year. The incidence of several tobacco-related cancers has increased in women: lung, oral cavity and pharynx, and oesophagus. Although the incidence of tobacco-related cancers continues to be higher in men than in women, the incidence of oral cavity and pharynx, oesophagus, larynx, lung and urinary bladder cancers has decreased in men. In men and women, the incidence of stomach cancer has decreased, and those of colorectal and thyroid cancer maintain an increasing trend.

### Conclusions

Trends in the incidence of tobacco-related cancers reflect historical trends in the prevalence of smoking in the population, which vary between men and women. The results of this study highlight the need for continuing strategies to prevent smoking. Continuing monitoring the cancer trends will be essential to evaluate the impact of public

health programs, such as the recently implemented population-based screening programs for colorectal and cervical cancer.

Keywords: Incidence, trends, cancer estimates, tobacco-related cancers

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## **Occupations of patients diagnosed with pleural mesothelioma in Zurich, Switzerland**

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### Background

Pleural mesothelioma is mainly caused by occupational asbestos exposure. Since 1990 the import and use of asbestos is prohibited in Switzerland, but incidence rates are still on a high level in the canton of Zurich.

### Aim

The aim of the present study was to assess the occupations of patients recorded with malignant pleural mesothelioma in the cancer registry of the canton of Zurich and to evaluate the use of the job descriptions for potential asbestos exposure.

### Methods

Population-based cancer registry data of the canton of Zurich from 1981 to 2019 were used. To our knowledge, there is no specific Swiss Job-Exposure Matrix for mesothelioma. As asbestos sources might differ between countries, we utilized a Swiss list supplied by the largest accident insurance company, Suva. Patients were sorted into the following categories: Suva-listed occupation, multiple Suva-listed occupations, occupation not on Suva-list, occupation with asbestos exposure stated in free text but not on Suva-list, asbestos exposure outside of work, no occupation and no useful job description. Frequencies were calculated for each category, and the most common occupations of the Suva list were determined.

### Results

In total, 906 patients were diagnosed with primary malignant pleural mesothelioma in the canton of Zurich between 1981 and 2019. In approximately one-third of cases, an occupation that was on the Swiss list of occupations associated with asbestos exposure was documented, one-third had an occupation that was not on that list, and almost one-fourth had a job description that was not useful. For 10% of patients, no information on

occupation nor asbestos exposure was available. The most frequent professions that were on the Swiss list of occupations associated with asbestos exposure were electrician (N=69), carpenter (N=42) and locksmith (N=34).

### Conclusion & Discussion

For the majority of patients, information regarding their occupation or asbestos exposure was accessible, but the quality of recorded occupations was often limited. A significant number of patients' occupations that we encountered were not included in the Swiss list of the accident insurance. To enhance research and surveillance of occupation-related cancers, systematic and standardized collection of patients' occupational histories would be needed.

Keywords: Mesothelioma, Cancer registry data, Occupations

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## **Poor-prognosis cancers: Incidence and survival study in the Isère Registry**

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### Background

This study aims to analyze incidence and survival of major cancers with poor prognosis, and assess their temporal variations.

### Methods

Data were collected from the Isère cancer registry. We defined poor prognosis cancers by cancer type and morphologic group. Cancers with 5-year net survival under 33% and upper limit of 95% confidence interval below 50%, using the Pohar-Perme method, were classified as "poor-prognosis". Gender-specific incidence rates were modeled using Poisson regressions with penalized spline for age and year at diagnosis. To estimate the (net) survival rate, (excess) mortality rate was modeled with multidimensional penalized splines for time since diagnoses, year and age at diagnosis.

### Results

Sixty-six morphologic groups from 27 cancer types were identified as having poor prognosis. From 1990 to 2020, the poor-prognosis cancers accounted for 44,123 tumor cases, representing 23.9% of all diagnoses in the Isère registry (29.3% and 17.1% for men and women, respectively). The most common cancers of poor prognosis belonged to morphologic groups in the lung, pancreas, liver, stomach, unknown primary location, brain, esophagus, gallbladder and bile ducts, acute myeloid leukemia, and hypopharynx.

The standardized incidence was decreasing in men but increasing in women, primarily due to lung cancers. For diagnosis between 1990 and 2015, 5-year net survival remained stable for unknown primary location, increased for liver, and slightly increased in lung, pancreas, and stomach poor prognosis cancers.

### Conclusions

The study highlights variations in incidence and survival among cancers with poor prognosis. It emphasizes the need for research and healthcare strategies to address the cancers with the most severe outcomes, especially those with increasing trends such as lung cancer in women and those showing little improvement in survival over time.

Keywords: poor prognosis ; incidence ; survival

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## **Oral cavity cancer among elderly people in France from the healthcare perspective**

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### Background

Oral cavity cancer (OCC) are among the most frequent head and neck cancers. Questions on the evolution of their incidence among elderly people and potential specific risk factors arise in the literature.

### Aims

The objective of the study was to describe the long-term trends in incidence of OCC among elderly people in France, over the 1990-2018 period, and to compare it to those of laryngeal and hypopharyngeal cancers which share the same main risk factors.

### Methods

National incidence rates were modeled from registries data using a 2-dimensional penalized spline of age and year of diagnosis, associated with a district-random effect of the registry. Population was divided into 3 age groups: <70, 70–79 and at least 80 years old. Age-group specific incidence are presented.

## Results

Incidence rate of OCC increased among women aged at least 70 and men aged at least 80. For men aged 70-79, the decline in incidence slowed during the most recent period. Between the periods 1990–1999 and 2010–2018, the number of OCC cases in women aged at least 70 grew from 3093 to 5323 (+72%) while for men, it remained stable, from 6734 to 6851 (+2%). Over the study period, incidence of laryngeal and hypopharyngeal cancers decreased for elderly men while for elderly women incidence of hypopharyngeal cancer also seemed to increase.

## Conclusion and Discussion

With a number of new cases that almost doubled between 1990–1999 and 2010–2018 for people aged at least 80, OCC in the elderly is a rising healthcare burden. The survival improvement in this population will also lead to rising healthcare needs.

Keywords: Elderly people; France; oral cavity cancer

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## **First treatment of cancer in the elderly population: A population base study 2014-2021, in Hérault, France**

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<sup>1</sup>Registre des tumeurs de l'Hérault, Montpellier, France.

## Background

The incidence of cancer increases with age, with almost 40% occurring after age 75 years old. Cancer in the elderly is therefore a public health problem. The main objective is to describe the first treatment of cancer in the elderly population by localization.

## Methods

All the new invasive cancers aged older than 75 years old during 2014-2021 were extracted from the Hérault cancer registry data base. For all cancers, multivariate logistic regression was used to analyze "active" treatment with sex, year, age (75-79; 80-84; 85-89; 90 years and older), stage at diagnosis, type of municipality (rural or urban). For the five more frequent localizations (prostate, breast, colorectum, lung and urinary bladder cancer), logistic regression was used to analyze primary surgery.

## Results

Among the 22,269 new cases diagnosed, 16,441 (74%) received an "active" treatment, 19,531 (88%) have solid tumors, 12% malignant hemopathy, and 19,427 (87%) lived in an urban residence.

For solid tumors, 15,157 (77.6%) received an "active" treatment and 9,304 (47.6%) were operated. Through multivariate analyses, having "active" treatment: decreased

significantly with increasing age ( $p < 0,001$ ); with the worsening of stage ( $p < 0,001$ ) and with increasing years of diagnosis ( $p = 0,023$ ).

Having surgery: decreased significantly with age ( $p < 0,001$ ) and with the worsening of stage for the five localizations; decreased with more recent years for breast cancer; increased with more recent years for urinary bladder cancer; was lower for women for urinary bladder cancer OR 0.25 [0.11–0.52] and for colorectum cancer OR 0.76 [0.60–0.97]. No effect of type of municipality.

For malignant hemopathies, 1,284 (46,9%) received an “active” treatment. Having “active” treatment decreased regularly with age ( $p < 0,001$ ), no effect of sex ( $p = 0,9$ ) or period ( $p = 0,2$ ) or type of municipality.

### Conclusion

This population-based study provides information on the treatments implemented in adults aged 75 years and older in the Hérault district: decrease in risk with increasing age, with worsening stage.

The therapeutic care of the elderly is complex, combining a medical, family, financial and social approach. It is necessary to implement studies taking into account social factors and the autonomy of elderly people.

Keywords: Cancer, treatment, Oldest old,

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## **Development, translation and implementation of CanStaging, the free electronic Staging Tool for Population-Based Cancer Registries.**

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### Background

Cancer stage is a classification of the anatomic extent of cancer at diagnosis and is a key determinant of treatment and prognosis. Internationally agreed systems are used when assigning stage, including the 7<sup>th</sup> and 8<sup>th</sup> edition of the Union for International Cancer Control (UICC) TNM system, UICC Essential TNM, and the Toronto Paediatric Staging Guidelines (TPSG). These systems are implemented by population-based cancer registries (PBCRs) when assigning cancer stage at diagnosis.

### Aim

CanStaging<sup>+</sup> was developed to support improvements in completeness, quality and uniformity of cancer stage data globally.



## Methods

Collaborators from PBCRs across the world have commenced translating the tool to Spanish, Malay, Japanese, Polish, French, Chinese and German. Feedback and learning was sought following recent integration of CanStaging into IT systems of the National Cancer Registry of Ireland and efforts to further integrate CanStaging into more PBCR IT systems are underway. IT and staging experts are working collaboratively to expand the range of tumour sites staged by CanStaging<sup>+</sup>.

## Results

Following successful translation of a range of sites based on Essential TNM, UICC TNM7, UICC TNM8 and TPSG, a Spanish version is now available for use. The CanStaging<sup>+</sup> tool has also been successfully integrated for automated use into the IT system of the National Cancer Registry of Ireland. The tool continues to serve users worldwide, with approximately 300 users using the online version of CanStaging<sup>+</sup> weekly.

## Conclusion/Discussion

The free electronic cancer staging tool for cancer registries, CanStaging<sup>+</sup>, is available as an online and offline resource and is intended to enhance the completeness and comparability of cancer staging data internationally, which would benefit hugely understanding of variations in cancer outcomes. CanStaging<sup>+</sup> is being used more widely and we continue to recommend the incorporation of the tool into IT systems of cancer registries.

Keywords: Electronic CancerStaging, completeness, comparability, translation, implementation

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## **Profile of patients treated at a pediatric reference center in northeastern Brazil, 2000 to 2020**

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## Background and Aim

The Hospital Infantil Albert Sabin (HIAS) is a tertiary hospital, located in the capital city of Fortaleza, state of Ceará, in the Northeast of Brazil. It is recognized as the only reference center, within the scope of the Unified Health System, for the treatment of children and

adolescents with cancer for the entire state and surrounding regions. It provides services to a population with low HDI and large socioeconomic disparities.

### Methods

Information from the Hospital-based cancer registry (HBCR) of HIAS, since its implementation in 2000 until 2020, reveals important characteristics about the profile of patients treated. Over these two decades, 3,347 children diagnosed with cancer were treated. With this information, it is possible to profile these patients in relation to their sociodemographic and tumor characteristics.

### Results

In relation to age group, the hospital cares for newborns up to teenagers under the age of 18, with a higher frequency of cancer cases in the 0-4 age group. Regarding gender, there is a greater predominance of the disease in males (57.1%) than in females (42.8%), as described in the world literature.

With regard to the most common types of cancer, leukemias (40.2%), lymphomas (15%), central nervous system tumors (14%) and bone tumors (9%) stand out. Furthermore, the HBCR shows that the majority of patients reside in the capital city of Fortaleza (35%), although there is a significant representation of patients from other regions of the state.

Regarding treatment results, most patients undergo chemotherapy and surgery. However, there are still persistent challenges such as supportive therapy and access to new therapies.

### Conclusion & Discussion

Information from the Hospital Albert Sabin's HBCR provides a comprehensive view of the profile of patients treated over the last two decades, highlighting not only the diversity of cases treated, but also the challenges and successes in combating childhood cancer in the state of Ceará.

Keywords: cancer, childhood, adolescents, cancer registry, Brazil

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## **Cancer incidence projections for the year 2024 in province of Salamanca (Spain)**

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<sup>1</sup>Castilla y León Population-Based Cancer Registry. Public Health Office, Castilla y León Government, .

## Background

Access to recent cancer data is a priority for registry users, which is not always possible due to various reasons. Furthermore, cancer incidence projections help understand the changing landscape of cancer risk factors and anticipate future burden for healthcare services.

## Aim

The aim of this study is to analyze cancer incidence trends in Salamanca and make projections for 2024, based on data collected from 2011 to 2017.

## Methods

Incidence data were obtained from the Population Cancer Registry of Castilla y León (province of Salamanca) during the period 2011-2017. All incident cases of invasive primary cancer (except non-melanoma skin cancer) by sex, the most common sites for each sex (prostate, colorectal, and lung for men, and breast, colorectal, and corpus uteri in women), and lung in women were included. Poisson regression models were used for trend analysis, evaluating the Annual Percentage Change (APC). For each sex and cancer location considered, the number of new cases, crude incidence rates (CR), and age-standardized rates for the European standard population of 2013 (ASRe) per 100,000 person-years were projected for 2024. The code for this analysis was developed in R version 4.2.2.

## Results

The following statistically significant trends were observed: decreasing trend in men for all cancers (APC: -1.4%) and increasing trends for colorectal cancer in both sexes (APC: +3.0% in men and +3.5% in women) and for corpus uteri cancer (APC: +6.7%) and lung cancer (APC: 10.8%) in women. In 2024, a total of 1,340 new cases of cancer (except non-melanoma skin cancer) are estimated to be diagnosed in men and 1,015 in women. The CR will be 851.5 per 100,000 men and 608.4 per 100,000 women, with expected ASRes for men and women of 662.1 and 446.9, respectively. The most common cancers will be prostate (ASR 151.7), colorectal (ASR 136.2), and lung (ASR 90.3) in men, and breast (ASR 127.2), colorectal (ASR 76.8), lung (ASR 41.9), and corpus uteri (ASR 33.1) in women.

## Conclusion

The projections of overall incidence rates in Salamanca for 2024 are similar to the national estimates made by the Spanish Cancer Registries Network (REDECAN), both in men and women, being slightly higher for colorectal cancer in both sexes and for corpus uteri and lung cancer in women. This approach facilitates informed decision-making in public health.

Keywords: cancer, incidence, epidemiology, projections, trends

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## Prostate cancer stage at diagnosis and net survival in France

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### Background

Prostate cancers have in average a very good prognosis, depending mainly of the stage at diagnosis. In France More than 80% of prostate cancer are diagnosed at an early stage. This may be why real life estimations of survival by stage in prostate cancer are limited.

### Aim

In this study, we estimated population-based net survival by level of PSA at diagnosis

### Methods

The data come from the French registries stage samples. Age-standardized net survival was estimated on 10 783 cases of prostate cancer diagnosed between 2008 and 2015. Tumour stage was approximated by PSA at diagnosis, studied in deciles. We used first non-parametric Pohar-Perme method to estimate Net Survival by age using ICSS weights.

### Results

Results on the whole population show an average age-standardized 5y survival of 94.2 [93.1; 95.1] %. From the results stratified by PSA deciles, two distinct subpopulations seemed to emerge. Before PSA decile 6 the age-standardized 5-year net survival remain greater than 100%. From PSA decile 7, age-standardized 5-year net survival decreases as PSA value increases from 98.2[82.9; 99.8] % in decile 7 to 58.0[53.0; 62.6] % in decile 10.

### Discussion

About 70% of our population presented greater survival than what it is expected in the general population of the same age. An excess in the risk of death in the prostate cancer population only expressed within the highest 30% of the PSA values.

### Conclusion

A high majority of the prostate cancer cases, the 7 out of 10 cases with the lowest PSA values, had very high 5-year survival. This questions the relevance of the using the excess hazard framework on this group and prostate cancer population considered as a whole.

Keywords: prostate cancer; net survival; cancer stage

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# **Times diagnosis-to-first treatment for breast cancer in women: Population-based study, Hérault, 2015-2021 France**

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<sup>1</sup>Registre des tumeurs de l'Hérault, Montpellier, France.

## Background

Treatment time interval for breast cancer in women are a public health issue. Cancer registries can evaluate real initial therapeutic treatments within a well-defined geographic population, without recruitment bias.

## Aim

The main objective of this study is to analyze time intervals from diagnosis to the first treatment of female breast cancer, from 2015 to 2021.

## Methods

The female breast cancer (CIM-10 C50) incidence data from 2015 to 2021 were extracted from the Hérault cancer registry data base. Multivariate linear regression was performed to analyze the time between the date of diagnosis (histological diagnosis) until the first treatment (primary surgery or primary chemotherapy) with year of diagnosis, age and stage at diagnosis, place of first treatment, therapeutic sequencies.

## Results

During 2015-2021, 7,391 new cases were diagnosed, 555 (7,5%) were metastatic stage. 5,548 received primary surgery, 1,131 received primary chemotherapy and 177 (2,4%) have no treatment. After diagnosis, the average time to primary surgery is 38.3 (Standard deviation SD 23) days. In multivariate analysis, it increases significantly age at diagnosis ( $p < 0.001$ ). It decreases significantly for stage III versus I ( $p = 0.013$ ), sequence "surgery+chemotherapy+radiotherapy" versus "surgery alone" ( $p < 0.001$ ) and surgery in privates' hospitals versus university hospitals ( $p < 0.001$ ). No significative effect of the year of diagnosis. After diagnosis, the average time to primary chemotherapy is 40.4 (SD 24.5) days. In multivariate analysis, it increased significantly with age at diagnosis ( $p = 0.02$ ). It decreased significantly for chemotherapy in privates hospitals versus university hospitals ( $p < 0.042$ ). No significative effect of the year of diagnosis, neither the other covariates was found.

## Conclusion

The times diagnosis-to-first treatment (surgery or chemotherapy) were around 5,5 weeks. For surgery and chemotherapy, it increases significantly with age at diagnosis, no period effect. After adjustments, these times increase for treatment initiated in university establishment versus private's establishment.

Keywords: breast, cancer , diagnosis, times, treatment

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## World-wide adherence to clinical guidelines for treatment of cervical cancer during 2015-2018: the VENUSCANCER project

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### Background

In CONCORD-3, we analysed individual records for 660,774 women (15-99 years) diagnosed with cervical cancer during 2000-2014 in 62 countries. During 2010-2014, age-standardised 5-year net survival ranged from 52% in Ecuador to 77% in Korea.

The VENUSCANCER project aims to explain whether these international differences in survival are attributable to differences in disease biology, patterns of care or socio-economic status.

### Aim

To examine adherence to clinical guidelines for women diagnosed with cervical cancer world-wide, with a focus on GRELL countries.

### Methods

Cancer registries were invited to submit data for a single year of complete incidence during 2015-2018 for which availability and completeness of *high-resolution variables* (e.g., stage, staging procedures, treatment) were highest.

Registries in low-income or middle-income countries were financially supported to collect high-resolution data from medical records. Data were analysed for all these registries. Registries in high-income countries were selected for analysis if data on stage and treatment (surgery, radiotherapy or chemotherapy) were available for at least 70% of records.

We examined the proportion of women with an early-stage tumour (T1N0M0) who received a simple or radical hysterectomy, and of women with an advanced-stage tumour (T4anyNM0 or M1) who received radiotherapy or chemotherapy.

The odds of receiving guideline-compliant treatment will be explored by age, race and socio-economic status.

### Results

We received data on stage and treatment for 2,475 women from 30 registries in 9 GRELL countries. Among these women, 31% were diagnosed at an early stage (13% in Brazil - 39% in Italy) and 16% at an advanced stage (4% in Romania - 31% in Ecuador).

Among women diagnosed at early-stage (660), over 80% received simple or radical hysterectomy (85% in Brazil, 95% in Italy and Spain). Among women diagnosed at advanced stage (393), 77% received radiotherapy or chemotherapy (59% in Portugal - 100% in Switzerland).

### Conclusion & Discussion

These results will offer the first global picture of adherence to treatment guidelines for cervical cancer and will help explain the differences in survival between GRELL countries.

Keywords: cervical cancer, stage, treatment, clinical guidelines

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## **Hereditary/familial/syndromic component of multiple tumors in the Marche population: preliminary results**

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### Background and aim

Some types of tumors and hereditary-familial syndromes are correlated with a greater probability of developing multiple tumors that are associated with mutations of several genes such as BRCA1, BRCA2, PALB2, CDKN2A, MEN, RET, MLH1, MSH2, MSH6 and PMS2. The identification of these hereditary tumors is important for genetic counselling.

The objective of this study is to identify multiple tumors that may have hereditary/familial/syndromic or sporadic origin in the residents of the Marche Region.

### Methods

All the cases with two or more malignant tumors diagnosed between 2010 and 2019 were included in the study, excluding non-melanoma skin tumors and non-malignant tumors except urinary bladder cancer. The association breast-ovarian cancer and hereditary diffuse gastric tumors (increased risk for signet ring gastric tumors and lobular breast carcinoma) were investigated among the cases of multiple tumors in Marche Region.

### Results

A total of 5.460 patients were diagnosed with two cancers, 249 with three and 6 with four cancers. The analysis by gender showed a greater number of males than females (66% vs 34%,  $p < 0.05$ ), with the median age of onset of the first cancer of 73 for men and 68 for women. The average latency period was approximately 2 years between the first and the

second cancer, 1 year between the second/third and between third/fourth. The association breast-ovarian cancer was found in 12 women and hereditary diffuse gastric tumors were found in 6 cases.

### Conclusion

These preliminary data provide useful information to highlight and quantify the associations for hereditary tumors and to evaluate whether the risk of developing multiple tumors is different for the individual patient compared to the general population.

Keywords: Multiple tumors, hereditary-familial syndromes,

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## **Cancer incidence in children – results from Luxembourg’s National cancer registry, 2014-2022**

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### Background and aim

To describe for the first time the distribution of new cancer cases by clinical characteristics in children aged between 1 and 14 years at diagnosis and resident in Luxembourg.

### Methods

Data from the National Cancer Registry of Luxembourg was used. All children aged below 15 years and all tumours diagnosed, except non-melanoma skin cancer between 2014-2022 were included. Non-invasive tumors of the central nervous system and intracerebral endocrine glands were eligible and grouped with invasive tumors of the same location. Multiple tumors were treated according to established international rules (IARC/IACR, 2004). Only the first invasive tumor per cancer type, per pair of organs or tissue, occurring during the period considered were eligible, when the 2 tumors were from the same morphological group.

### Results

The quality indicators of the data extracted meet the IICC recommended thresholds; in particular, 92.5% of cases have cytological or histological confirmation of the diagnosis and only 2.7% of cases have a morphology not specified. 147 new cases of cancer were: 82 (55.8%) among boys and 65 (44.2%) among girls. Each year, on average, 16 new cases of cancer are diagnosed. The age-standardized annual incidence rate is 164.6 per 1 million children, with a higher rate among boys (179.4 versus 149.1 per 1 million children), which corresponds to a sex ratio M/F of 1.19. Overall, cancers of the most frequently



diagnosed children between 2014 and 2022 are tumors of the central nervous system (31.3%), leukemia (26.5%) followed by lymphoma (10.9%). Hematologic malignancies represent nearly 40% of cancers in children under 15 years of age.

## Conclusion

The main limitation encountered is the size of the analysis population: 147 cancers, which reflects the size relatively small of the population of Luxembourg. The IICC has adopted an arbitrary threshold of 200 cancers of the child under 15 years of age as being necessary and sufficient to produce the incidence of cancers of the child. Groupings were made to prevent the number of cancer cases from being too low to obtain stable estimates, in particular by accumulating data over a period of 9 years. However, the small numbers encountered in certain categories may lead to fluctuation in estimates of impacts, which must be interpreted with caution.

Keywords: Cancer incidence children

## **Childhood tumours and congenital anomalies: proposal of a GRELL collaborative project**

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## Background

Although childhood tumours are rare, they are a major cause of death in the population under 20. Several studies showed an increased risk of tumours in patients with congenital anomalies (CA). A feasibility study on childhood tumours of the central nervous system tumours (CNST) was carried out in Valencian Region (VR). CNST risk was higher among children with nervous system CA compared with the general population and survival was worse. Objectives: 1) to explore and describe the potential association between childhood tumour and major CA in areas covered by the participant cancer registries; 2) to quantify the risk of tumour among children with CA and; 3) to analyse their impact on the survival.

## Methods

A cohort of children born between 2007 and 2021 with a least a major CA as defined by EUROCAT (European network of population-based registries for the epidemiological surveillance of congenital anomalies) diagnosed during the first year of life could be obtained from CA population-based Registry (CAPBR) or from hospital discharges database. In the last option, cases should be validated following the EUROCAT methodology. Tumours among the CA cohort will be identified through the GRELL population-bases cancer registries (PBCR).

Standardized incidence ratio (SIR) and their 95% confidence intervals (95%CI) will be computed to analyse cancer risk among children with CA, considering the PBCR rates as standard. The person-years will be calculated from the date of birth to the tumour diagnosis or date of death or end of study.

Kaplan-Meier analysis will be used to estimate survivor function and Cox regression for investigating the CA hazard ratio (HR) and their 95%CI adjusting by diagnosis period, sex, childhood tumour subgroup, and geographical area.

## Results

A potential association between CA and childhood tumour will be identified and the risk of tumour in a cohort of children with at least a major CA will be quantified.

In addition, 1 and 5 year-survival will be estimated in 3 groups: 1) children with CA and childhood tumour; 2) children with only childhood tumour and; 3) children with only CA.

## Conclusion

Since CA and childhood tumours are rare diseases, a collaborative European project would improve the statistical power of the results.

Keywords: childhood tumours, congenital anomalies, collaborative project

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## **Epidemiology of cervical cancer in a region of southeastern Spain**

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## Background

Cervical cancer (CC) is the 4th cause of cancer in women worldwide and the 4th cause of death from cancer in women, being much less frequent in Spain and the Region of Murcia (RM).

## Aim

To analyze the incidence and characteristics of CC in RM in recent decades

## Methods

Incidence data come from the population-based RM Cancer Registry. Incidence study was carried out from 2016-2020 by five-year age groups and invasive behavior (C. Inv.) and in situ (CIS), obtaining number of cases, and total age-specific rates (TEE), by histological

group [squamous cell carcinomas (SCC), adenocarcinomas (ADC) and others], and by TNM stage. Incidence trend was carried out with joinpoint analysis from 1998-2020, for CIS and C. Inv., total and by age groups (25-64 and  $\geq 65$ ), obtaining the average annual percentage change (AAPC) and the annual percentage change (APC), with 95%CI and trend change points. C. Inv net survival (SN) at 1, 3 and 5 years was obtained. using the Pohar-Perme method. Software used: STATA and Jointpoin regression program v4.6

## Results

In 2016-2020, 2387 CC cases were recorded: 15% C. Inv. and 85% CIS. Half C. Inv. Cases were in 35-54 years old; TEE was  $>10$  per 100,000 in 30-79, 17.98 in 45-49, and 16.73 in 70-79. 60% CIS were diagnosed in  $<40$  and 88% in  $<50$ , TEE was maximum in 30-34 (178.81). C. Inv. histological groups were SCC (65%), ADC (29%) and others (6%). Highest number SCC cases was in 35-54, with maximum incidence rate in 45-49 (12.10). ADCs were distributed more homogeneously by age groups, with predominance in 50-59. CIS were mainly CCE. C. Inv. were distributed in stage I (40%), II (19%), III (24%), IV (13%) and unknown (4%). Stage I were more frequent in the 30-54, II in 55-59, III in 45-59, and IV in 50-54. Joinpoint analysis showed a significant increase in incidence in CIS, for total (AAPC 7.91%, 95% CI 6.65-9.18), and in 25-64 (AAPC 8.10%, 6.72-9.45). 5-year NS increased in 25-64 from 72.08% (1998-2004) to 81.31% (2011-2018), and in  $\geq 65$  from 37.29% to 48.93%.

## Conclusion & discussion

CC Incidence in RM is low, with 6 cases of CIS for each C. Inv., CIS predominating in young women and C. Inv. in mature age. An increase in the incidence of CIS since the late 90s stands out. Most common histological type was SCC. Opportunistic screening has probably contributed to a greater diagnosis of CIS and C. Inv. in early stages, improving its prognosis.

Keywords: cancer cervix incidence trend

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## **PancreOS: A network of registries on Pancreatic Cancer**

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## Background

Pancreatic cancer (PC) is the only cancer with mortality on the rise in both sexes and is currently the 4th largest cause of death by cancer in Europe. Increasing survival rates depend on improving its therapeutic options and on detecting it earlier. Knowing how PC

patients are managed would help to understand the sources of variation in overall survival across the European countries. To this end, PC registries are essential for making progress in PC research and ensuring that Member States fulfill their commitments to effective cancer control.

### Aim

To implement a European network of PC registries under the umbrella of the PancreOS registry project.

### Methods

PancreOS registry builds upon existing population- and hospital-based registries, as well as specific pancreatic cancer registries. In phase I, we collected summarized pathological confirmed PDAC data from each registry by using the REDCap web application.

### Results

Currently, there are 23 registries already involved in the project. Some findings after initial analysis of the first 5 registries: the number of PDAC cases appears to be significantly lower (45% of all PC cases). Additionally, it can be observed that the distribution of the median age is comparable among registries, varying between 65 and 71 years (SD  $\approx$  10).

### Conclusions & Discussion

PancreOS registry initiative is able to provide information on PC diagnosis, treatment, and survival in Europe, identifying the heterogeneity of management and outcomes among countries as well as issues for improvement. This information is very valuable to patients, researchers, healthcare providers, and policymakers. Hence, PancreOS is necessary and beneficial to society and will make a real and fundamental change in what is known so far about PC in Europe.

Keywords: Pancreatic cancer, PDAC, Registry, Patient Management

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## **Forty years of recording of haematological malignancies in a French department: evolutions in incidence and survival**

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## Background and aim

The Haematological Malignancies Registry of Côte d'Or (RHEMCO) began collecting data in 1980, making it one of the oldest registries specializing in haematological malignancies. We aimed at describing here the main haematological malignancies and their evolution in terms of incidence and survival since 1980.

## Methods

All incident cases were included in this analysis. We described each entity (grouping of the French cancer registries network) with sufficient sample size, by age at diagnosis, sex-ratio, standardized incidence, overall and net survival. We used Poisson regression to assess the mean variation of the incidence rate. We used Kaplan Meier method and Cox model to estimate overall survival and the Pohar Perme estimator and flexible parametric model on excess mortality to estimate net survival according to age at diagnosis, gender and 10 years-period of diagnostic, and at different time points (2,5,10,20 years). Cure fractions were also estimated for the same time points.

## Results

The median age at onset varies significantly between entities, from 15 years for Acute Lymphoblastic Leukemia (ALL) to 79 years for myelodysplastic syndromes. Despite the relatively old age at onset, the sex-ratio was superior to 1 for almost all entities. In the whole period, the standardized incidence increased for all entities, except ALL, Acute Myeloid Leukemia (AML), Chronic Lymphocytic Leukemia (CLL) and Waldenström disease. Five-year net survival in the last analyzed period (2010-2019) ranged from 25 % for AML to more than 80% for Hodgkin lymphoma, CLL and myeloproliferative syndromes. Net survival increased in almost all entities during the whole period.

## Conclusions

The use of long-term surveillance data makes it possible not only to assess progress in cancer treatment, but also to identify variations in incidence that may lead to the discovery of new risk factors. As such, registries are a key component of cancer surveillance and cancer research.

Keywords: Haematological malignancies, incidence, net survival

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## **Recent trends of incidence and mortality of pancreatic cancer in Uruguay**

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## Background and aim

This study aimed to analyze the trends in pancreatic cancer mortality and incidence adults in Uruguay using Joinpoint and age-period-cohort analysis.

## Methods

The study analyzed mortality data from 1992-2021 and incidence data from 2002-2021. Age-period-cohort analysis was conducted using 5-year age groups and 5-year periods for individual 40 years and older. For the calculation the age-period-cohort and trends, Joinpoint NCI, web tool from NCI and library Epi of R software was used. The study registered 10712, new pancreatic cancer cases from 2002-2021 and 13746 deaths from the period 1992-2021. Mortality rates showed a monotonic increase among all ages included, (EAPC=1.17% [0.84;1.50] in men an EAPC=1.52% [1.19;1.85] in women). In men the cohort parameters confirmed a uniform increase in risk of death among men born before 1950, with a posterior stable trend for recent cohorts. Attributing all drift to the period effect, show an increase in risk after a stability around 2005. In women the cohort parameters confirmed a uniform increase in risk of death among men born before 1950, with a posterior stable trend. The period effect shows a monotonic rise in rate ratio.

## Results

Incidence rates in men show monotonic increase among all ages included (EAPC=1.27[0.77;1.28]. Rates in women showed an significative rise until 2018 (EAPC=2.99[1.81;4.17]), with a posterior non significant trend (EAPC=-2.77[-10.09;5.16 ]). The cohort parameters in men confirmed a uniform increase in risk and the period effect show an increase in risk after 2010. In women the cohort parameters show a uniform increase in risk among women born before 1960, with a posterior non significant trend for recent cohorts.

## Conclusion

The mortality and incidence show rising trends for all ages. A very recent stop in the trend is showed for incidence rates in women all ages included.

Keywords: pancreatic, cancer,trends, age.periodo-cohort, joinpoint

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## TOPIC 11 : GENDER AND CANCER

### **Sex and gender differences in incidence, mortality and survival for colorectal, lung, melanoma and thyroid cancer: Insights from the Geneva Cancer Registry.**

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#### Background

Sex and gender are distinct concepts, although often used interchangeably. Sex refers to the biological characteristics of a species, while gender relates to the socially constructed roles, behaviors and identities of men and women. Previous research has shown higher cancer incidence and mortality rates among males than females. However, the assessment of the impact of sex and gender on cancer biology and its clinical outcomes remains an under-explored field, failing to address the knowledge gap in the prevention and treatment of different cancers.

#### Aim

The aim of this study is to assess sex and gender differences in incidence, mortality and survival for colorectal, lung, melanoma and thyroid cancer, using data from the Geneva Cancer Registry.

#### Methods

All residents with first diagnosis in the period 2000-2020 were included for the four cancer sites: colorectal, lung, melanoma and thyroid. Age-adjusted incidence, mortality and survival rates with 95% Confidence Intervals (CIs) were calculated. Changes in temporal trends in incidence and mortality were analyzed using the Joinpoint method. Furthermore, survival was analyzed with a Cox regression model, site-specific and adjusted for five-year age groups.

#### Results

During the period 2000-2020, a total of 14,610 Geneva residents received a diagnosis of invasive colorectal, lung, melanoma or thyroid cancer, with a higher overall frequency in men than in women (52% vs. 48%). Significantly higher incidence rates per 100,000 person-years are observed in men than in women for colorectal (44.5 vs 31.5) and lung (57.5 vs 31.3), while for thyroid the incidence is higher in women (5.6 men vs 16.3 women); for melanoma there are no significant differences between the two sexes. Significantly better mortality and survival rates for women are observed for all sites.

## Conclusions

These findings highlight important differences between men and women in cancer incidence, mortality and survival, consistent with risk factors related to differences in biological sex, as in the case of thyroid cancer, gender, as in the case of melanoma, or both, as in the case of lung cancer. Knowledge and understanding of these disparities can help guide cancer prevention and treatment activities. Further analyses on survival are underway and will include stage at diagnosis.

Keywords: Cancer, sex, gender

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## TOPIC 12 : TABACCO AND CANCER

### **Age-Period-Cohort (APC) analysis of Swiss lung cancer mortality trends under constraints on age effects.**

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#### Background

The study of generational factors in cancer epidemiology has fueled the development of APC models, as well as insights into their mathematical limitations (i.e. non-identifiability). For a unique solution, at least one additional linear constraint is required. The selected constraint affects results and is almost always subject to debate.

#### Aim

To analyze age, period and cohort effects in lung cancer mortality trends in Switzerland from 1969 to 2021, using different APC models under hitherto unexplored constraints.

#### Methods

Individual data with causes of death were provided by the Swiss Federal Office of Statistics. Smoking prevalence estimates were from the Swiss Health Surveys (1992-2017), SFA (Schweizerische Fachstelle für Alkoholprobleme) surveys in 1975 and 1981, and the SOMIPOPS (Socio-medical indicators for the population of Switzerland) survey in 1981. Constraints in APC models were defined to set limits for plausible age effects based on the observed lung cancer mortality. We also replaced the cohort terms of APC model with the generation-specific estimates of lifetime smoking prevalence in Switzerland.



## Results

Qualitative analysis of curvature in age-specific lung cancer mortality line graphs, as well as quantitative analysis of the proportion of the variance associated with non-linear effects of cohort and period, showed much stronger cohort than period effects for men and women. The range of cohort effects within the restriction boundaries on the age effect suggest that men born between 1900-1920, and women born 1950-1960, had the highest lung cancer mortality rates in Switzerland. Period effects were largely absent in all APC models. The un-constrained age effect in the AP model with lifetime smoking prevalence as cohort replacement was within the limits for age effects constraints applied to the APC models.

## Conclusion & Discussion

The novel application of constraints on the age effect of APC models for lung cancer mortality reproduced period and cohort trends of previously published studies, based on very different modeling assumptions. We will use our APC results to forecast lung cancer mortality in Switzerland.

Keywords: APC model, Lung cancer, Smoking prevalence

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## TOPIC 13 : OTHER EPIDEMIOLOGICAL STUDIES

### **Incidence trends of head and neck cancers in the north-east of Spain in the period 1994-2018**

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#### Background

Head and neck cancer (HNC) is the seventh most common cancer worldwide. The incidence rates of these tumours vary among countries and can change over time depending on risk factors such as the tobacco and alcohol consumption, and the prevalence of chewing habit or human papillomavirus infection. This makes it necessary to periodically study trends in HNC incidence.

#### Aim

To determine trends in the incidence of head and neck cancer in northeast of Spain.

## Methods

All tumour cases diagnosed in Girona and Tarragona provinces during 1994-2018 with head and neck topographies according to the ICD-O classification were included, with the exception of haematological and sarcoma tumours. Incidence rate trends were modeled using Poisson generalized linear regression models adjusted by age and the annual percentage changes (APC) were calculated. Point changes were tested using segmented models.

## Results

From 1994 to 2018, 7,966 diagnosed cases of HNC were identified. In both sexes as a whole, a significant decrease in incidence, with an APC of -1.83, was observed in overall HNC and in cancers of the lip (APC=-5.34), hypopharynx (APC=-3.15), larynx (APC=-1.97) and salivary glands (APC=-2.22). In men, a significant decline in incidence was observed in overall HNC (APC=-2.63), and in lip, oral cavity, nasopharyngeal, hypopharyngeal, laryngeal and salivary glands cancers. In women, a significant increase was identified in overall HNC (APC=1.77), and in oral cavity, oropharyngeal, hypopharyngeal and laryngeal cancers. No change points were observed.

## Conclusions

Between 1994 and 2018, in the provinces of Girona and Tarragona, a significant decrease in the overall incidence of HNC has been observed, based on the decrease in cancers of the lip, hypopharynx, larynx and salivary glands. This decline is due to the decrease in incidence in all subsites in men in contrast to women, and can be explained, in large part, by changes in smoking habits between sexes.

Keywords: Head & Neck cancers; Incidence; Trends;

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## **Risk of second primary cancer in patients with a hematological cancer in the Manche French department**

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## Background

Patients with hematological cancers have an increased risk of developing a second primary cancer (SPC).

## Aim

In the current study, we aimed to evaluate the trends (by gender, age or period and by hematological cancer type or treatment) of SPC-risk among hematological cancer survivors in patients registered in the Manche department.

## Methods

Standardized incidence ratio (SIR) were assessed in patients diagnosed with first hematological cancer between 1995-2020 from the General Cancer Registry of Manche (RG50) and the Hematological Cancer Registry of Low-Normandy (RRHMBN) databases.

## Results

In the French department of Manche, 10% of cancers are hematological cancers, 77% are invasive solid cancers, 10% are in situ cancers and 3% are benign tumors of central nervous system, or tumors of uncertain malignancy of bladder or ovary. Half of the hematological cancers registered in the Manche department belong to 4 entities: MyeloDysplastic Syndromes (13.1% MDS), Chronic Lymphocytic Leukemia (13% CLL), Multiple Myeloma (12.1% MM), Diffuse large B-cell Lymphoma (11.4% DLBL). 25% of patients with hematological cancers have also a solid cancer (included squamous cell cancers). Nearly half of those patients are first diagnosed with hematological malignancies. Only 8% have both cancers diagnosed within 4 months (synchronous cancers). Considering only metachronous cancers, we identify a majority of skin cancers, notably following non-Hodgkin's malignant lymphoma (NHL), chronic lymphocytic leukemia (CLL) or myelodysplastic syndromes (MDS and MDS). Cancers of prostate, lung and colorectum are also frequent after NHL or CLL, and cancers of breast or kidney after NHL. We observe that second primary cancers appear on average 4 years after MDS or MM, but 10 years after HL or 15 years after ALL. Risk factors are significant for male patients, for chemotherapy and radiation, and for younger age at the time of hematological cancer diagnosis. SIRs also vary according to both hematological entity and second primary cancer sites.

## Conclusion & Discussion

The current study showed that the relative risk of developing SPCs after a hematological cancer is associated with certain clinical and demographic variables and vary according to different cancer types.

Keywords: hematological-cancers, solid second primary cancer

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## **Neuroendocrine tumours in Italy: the experience of the AIRTUM and ITANET working group**

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## Background

Neuroendocrine neoplasms (NENs) are rare neoplasms (incidence <6/100,000). The rapidly evolving classification and rarity of NENs pose challenges in NEN registration including difficulty in distinguishing neuroendocrine carcinoma (NEC) and neuroendocrine tumours (NETs).

## Aim

The Italian Association of Cancer Registries (AIRTUM) has started a working group (WG) with the Italian Association of Neuroendocrine Tumours (ITANET) to improve the quality of NEN registration. A pilot study, initially focused on gastroenteropancreatic (GEP) NEN, was conducted to 1) review GEP NEN, and in particular cases of neuroendocrine carcinoma, NOS (ICD-O3 code 8246), and 2) estimate the incidence of NEN, NET and NEC of the GEP in the pilot project areas.

## Methods

The study examined cases of neuroendocrine carcinomas NOS of the GEP incident in the years 2012-2020. CRs reviewed information included in the pathology report regarding differentiation and tumour cells proliferation (mitotic count and Ki-67). Based on this information and the guidelines defined for the study, they decided whether to confirm the case as neuroendocrine carcinoma NOS or register it as NET or NEC. On the basis of the results, CRs estimated and shared centrally incident rate for NEC, NET-G1, NET-G2, NET-G3 mixed NEN and other functioning and not functioning NEN.

## Results

Eight CRs contributed to the pilot study. After review, in all CRs, only 33% of GEP neuroendocrine carcinomas NOS were confirmed; 28%, 25%, and 14% were defined as NET, NEC, and other histologies, respectively. The incidence rate was 3 x 100,000 and about 4 when adjusted for age. The incidence of NECs was lower than that of NETs (0.7 vs 2.4).

## Conclusion and discussion

Epidemiological data on NEN are limited and difficult to compare due also to the different definitions of NEN, NET and NEC in the literature. After the review, the incidence of GEP NEN in the eight Italian CRs involved was comparable to that reported in other European countries. The heterogeneity of cancer registries in the registration of NEN requires

collaborative work to define and promote a standard definition to be extended to all Italian registries.

Keywords: rare cancers, neuroendocrine neoplasms, data quality

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## **Productivity Loss Due to Hematologic Malignancies-Related Premature Mortality in Brazil between 2001 and 2030**

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### Background

Forty-four percent of cancer deaths in Brazil occur among individuals of working age (between 15 and 65 years old). From an economic perspective, these premature deaths result in a loss of productivity as potential future economic output of the individual is lost and that of the country (Gross Domestic Product) is reduced. Hematologic Malignancies, which predominantly affect younger people, are among those with the highest individual years of potential life lost (YPLL).

### Aim

To estimate productivity loss and years of potential productive life lost (YPPLL) due to premature mortality related to the most incident hematologic malignancies in Brazil.

### Methods

Mortality data from leukemia, multiple myeloma, Hodgkin and Non-Hodgkin lymphomas were obtained from the National Mortality System, from the Ministry of Health. Premature deaths were defined as those occurring before the age of retirement (60 years for women and 65 years for men). Economic data, life tables and population data were extracted from the Brazilian Institute of Geography and Statistics databases. Productivity loss was estimated using the Human Capital Approach method.

### Results

We estimated 195,097 deaths from Hodgkin's lymphoma, non-Hodgkin's lymphoma, multiple myeloma, and leukemia between 2001 and 2030 (63.5% men). Approximately 3.9 million years of productive life are estimated to be lost. Leukemias are estimated to be responsible for 1.2 million (men) and 883,000 years (women) of YPPLL. Individually, the highest YPPLL are estimated for Hodgkin lymphomas, with stability among men (25 to 26 years) and a decrease from 30 to 24 YPPLL among women, between 2001-2005 and 2026-2030. The estimated total economic impact of these malignancies was US\$12.6 billion (PPP).

## Discussion and Conclusions

Premature deaths from hematologic malignancies are estimated to have a high indirect economic impact in Brazil. The high YPPLL per death estimated for Hodgkin's lymphoma and leukemia highlight the burden of these neoplasms on productivity loss, affecting young adults who otherwise would work several years. Strategies to improve the prognosis of those malignancies are needed in order to decrease the number of deaths, YPPLL and consequently productivity loss.

Keywords: productivity loss, premature mortality

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## **Passive indirect residential exposure to agricultural pesticides and hematological malignancies in the general population a population-based cancer registry study (GEO-K-PHYTO)**

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### Background

Incidence rates of most hematological malignancies have been constantly increasing over the past 40 years. In parallel, an expanding use of agricultural pesticides has been observed. Only a limited number of studies investigated the link between (HM) risk and passive environmental residential exposure to agricultural pesticides in the general population. Despite the lack of data on exposure to products used in French agriculture, we propose here an approach based on exposure to crop surfaces.

### Aim

To estimate the impact of indirect residential exposure to vineyards, orchards and arable land on hematological malignancies incidence risk.

### Methods

A geographical ecological study of incident cases of HM diagnosed over the period 2006-2017 by the FRANCIM network in 8 French counties (16, 17, 33, 44, 78, 85, 86, 87). The spatial units used are the administrative scale of the commune and the IRIS. 17 HM subtypes were analyzed. The epidemiological indicator used is the Standardized Incidence Ratio (SIR), which is modelled using a Besag spatial model. When a signal is observed, a complementary case-control study is carried out. The controls were taken from the national FIDELI database. Analyses are classically performed using a conditional logistic regression model.

## Results

More than 40,000 incident HM cases were included in the study. The ecological studies revealed a statistically significant signal for Myelodysplastic Syndrome (MDS) and the residential exposure to vineyards, and with Waldenstrom's Macroglobulinemia for arable land. The signal observed was confirmed by the case-control study for MDS and exposure to vineyards.

## Conclusion

The results can be used to guide local planning policy. Quantifying the risk in terms of distances between houses and farmland, for example, provides precise information for adjusting regulations.

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## **Demographic, Clinical and Pathological Characteristics of Colorectal Cancer. A Population-based Study in Algeria, 2008-2023. Time to Implement Colorectal Cancer Screening**

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## Background and Aim

Colorectal cancer (CRC) incidence has increased dramatically in Algeria over the past two decades, and in some regions, CRC has surpassed breast and lung cancers. The observed trends have been mostly attributed to changes in lifestyle, including eating habits that led to an increase in the prevalence of overweight and obesity in younger Algerian adults. We carried out a retrospective population-based investigation in order to describe demographic and clinicopathological characteristics of CRC in the province of Bejaia, in Northern Algeria, between 2008 and 2023.

## Methods

Medical and pathology records of 1 173 patients with histologically confirmed CRC were reviewed. Demographic, clinical, and pathologic information were abstracted, and changes in demographics and clinicopathological features were described over a four-year period during 2008-2023.

## Results

Between 2008 and 2023, 1 173 (58,7% men and 41,3 women) CRC cases were diagnosed. Male to female sex-ratio was 1.4:1. Mean age at diagnosis was  $61,2 \pm 13,9$  years in men and  $58,7 \pm 14,0$  in women. CRC was diagnosed in patients who sought medical care following rectal bleeding (28%), in patients who experienced acute intestinal obstruction that led to surgery (25%), or chronic stomach pain (20%). The time elapsed between the first symptoms and the first consultation was  $6,1 \pm 5,3$  months (median: 6 months [4 days-24 months]). Well differentiated and moderately differentiated adenocarcinomas were the the most common histopathological subtypes (52,5%, and 19,01% respectively). Metachronous metastases were observed in 28,8% of CCR cases, in the liver (24,4%), and the lung (9,7%). Angioinvasion and perineural neoplastic invasion were observed in 16,5% and 14,7% of CRC cases respectively. CRC were associated with benign tumors of the colorectum in 17,3% cases. The analysis is still underway. Other variables included are personal and familial history of cancer and benign tumors, comorbidities, CRC biomarkers, tobacco smoking and alcohol consumption.

## Conclusion

CRC incidence is expected to further increase, justifying the need for cancer screening programme, but also for more awareness of the positive impact of changing eating habits and physical activity to fight overweight and obesity.

Keywords: Colorectal cancer, demographic, symptoms, histopathology, cancer screening, Algeria

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