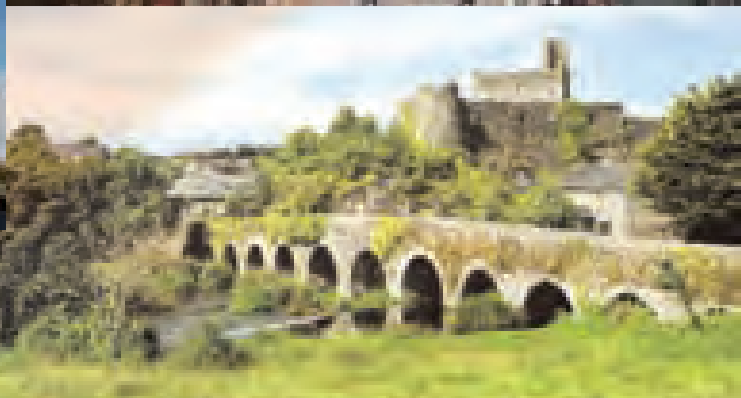
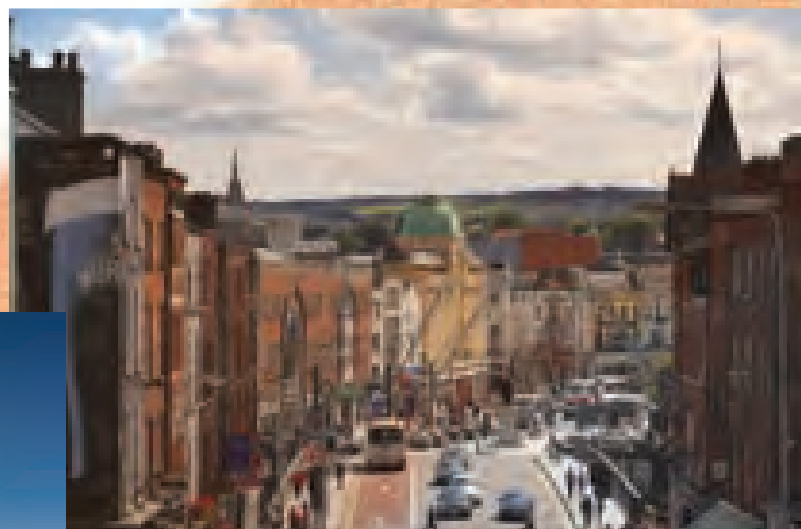
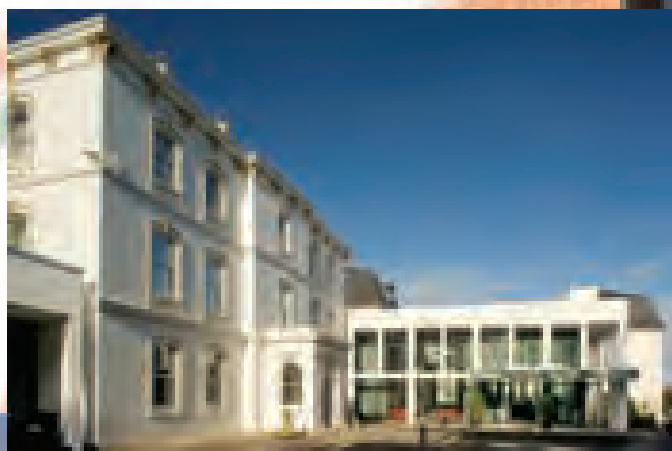


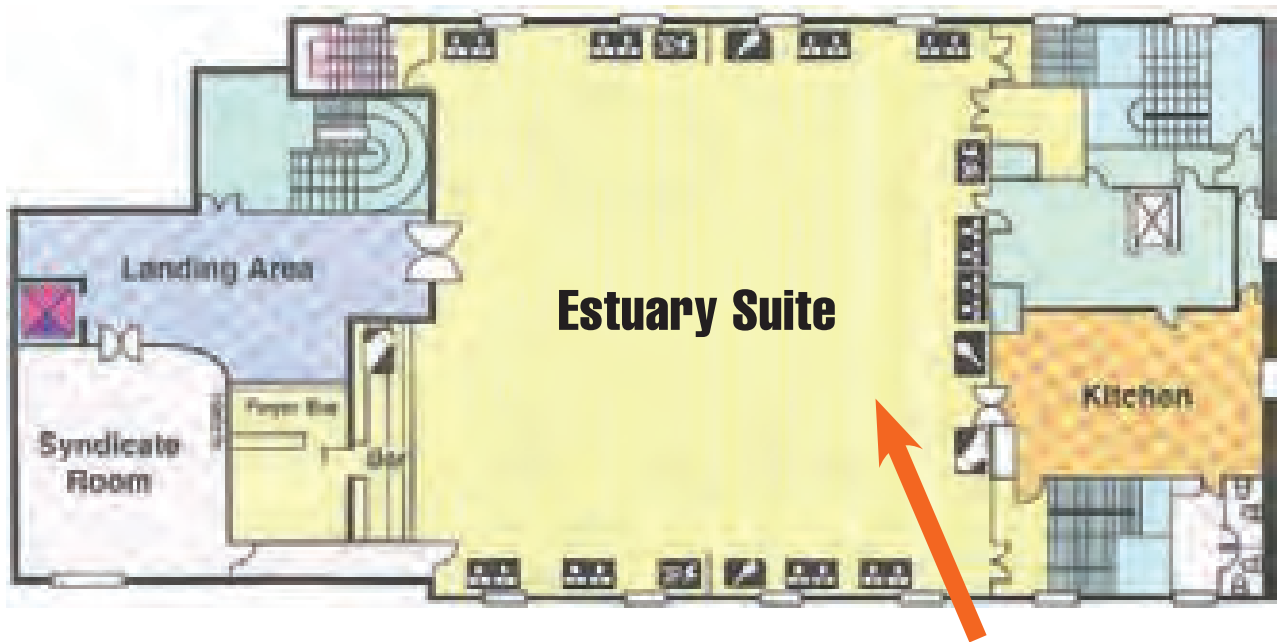
# **34th** **International Association of Cancer Registries Conference**

**17–19 September 2012**  
**Cork, Ireland**



IACR  2012

## **PROGRAMME & ABSTRACTS**



**Oral session and poster area**



**Registration area**

**Poster, coffee break  
and lunch area**

**Session and poster presentation areas  
Rochestown Park Hotel**



# **Conference Programme and Abstracts**

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## Welcome

The National Cancer Registry is honoured to be the host of the 2012 annual meeting of the International Association of Cancer Registries. We have chosen this year's conference theme as "Better cancer control through better information". The World Health Organisation describes "well organized population-based cancer registries that provide data on incidence and survival" as an optimal resource for cancer control, and emphasises the central role of cancer registration in protecting the health of the population and promoting the welfare of cancer patients. Cancer control programmes are making increasing use of evidence from registries to inform their decisions on the provision of services across the entire spectrum of cancer care from prevention programmes to support services for cancer survivors. We have chosen this year's presentations to reflect the wide range of areas of research and analysis now engaged in by registries. In addition to sessions on registration methods and quality, the scientific programme covers the full patient pathway—from aetiology, through screening, diagnosis and treatment, to end-of-life care. Two of our keynote speakers—Dr Joe Selby and Professor Lonneke van de Poll-Franse—will introduce the developing area of patient-reported outcomes, an unexplored research topic for many cancer registries.

"Networking" is always described as an essential part of any conference. In addition to the scientific programme, we have provided what we believe will be an entertaining social programme, giving you the opportunity to meet old acquaintances and make new ones; in particular, we encourage you to take the time during breaks to meet the many poster presenters.

Cork, although not Ireland's capital, is a lively and friendly city, set in attractive countryside and close to a beautiful coastline. A number of local tours have been arranged to follow the conference, but we also hope that you can stay for a little longer to sample the many attractions of Ireland's southwest—or perhaps come back to visit us in the future.

I would like to thank the Organising and Scientific Committees for the many hours they have devoted to preparing for this conference and, on their behalf, I would like to welcome you to Cork and wish you a productive and enjoyable time here.

Dr Harry Comber

## **Welcome from Dr James Reilly, TD** **Minister for Health**

I would like to welcome speakers and delegates to this 34th annual meeting of the International Association of Cancer Registries, which is a leading world conference on cancer epidemiology. It is also the first time that this meeting is being held in Ireland.

It is a wonderful opportunity for experts from around the world, representing a range of population-based cancer research centres, including cancer registries, universities, research institutes and hospitals to share their knowledge and expertise.

Conferences such as this one, which allow for that sharing of information, are an important part of transposing best practice and excellence across different health systems.

I note that there are interesting sessions covering all aspects of cancer control, from prevention through treatment to aftercare and survivorship, on the Scientific Programme. With the challenges facing those working in cancer control there is much to be learned on best practice relating to data quality, quality assurance and quality of care.

The use of accurate, timely information and the ability to effectively measure outcomes are vital components of an effective cancer control programme. The data collected and collated by Cancer Registries are essential in providing information to service planners and providers and are also key tools in the delivery of best possible outcomes for patients.

Cancer Registries play a vital role in ensuring that optimum services are directed towards areas of greatest need.

Here in Ireland there has been a strong focus in recent years on improving the quality of cancer services, through reorganisation of services under the HSE's National Cancer Control Programme. Cancer Registry data are essential elements in assessing population service needs and the configuration of any National Programme. Survival rates and comparative analysis are also strong tools in the assessment of the success of cancer programmes.

Finally, I would like to thank Dr Harry Comber and his team in the National Cancer Registry of Ireland and the members of the Committees for organising the meeting. May I wish you every success with the event.



A handwritten signature in dark ink, appearing to read 'James Reilly', written over a light blue horizontal line.

Dr James Reilly, TD  
Minister for Health

# Sponsors

The International Association of Cancer Registries would like to thank our sponsors for their generous support of this meeting.

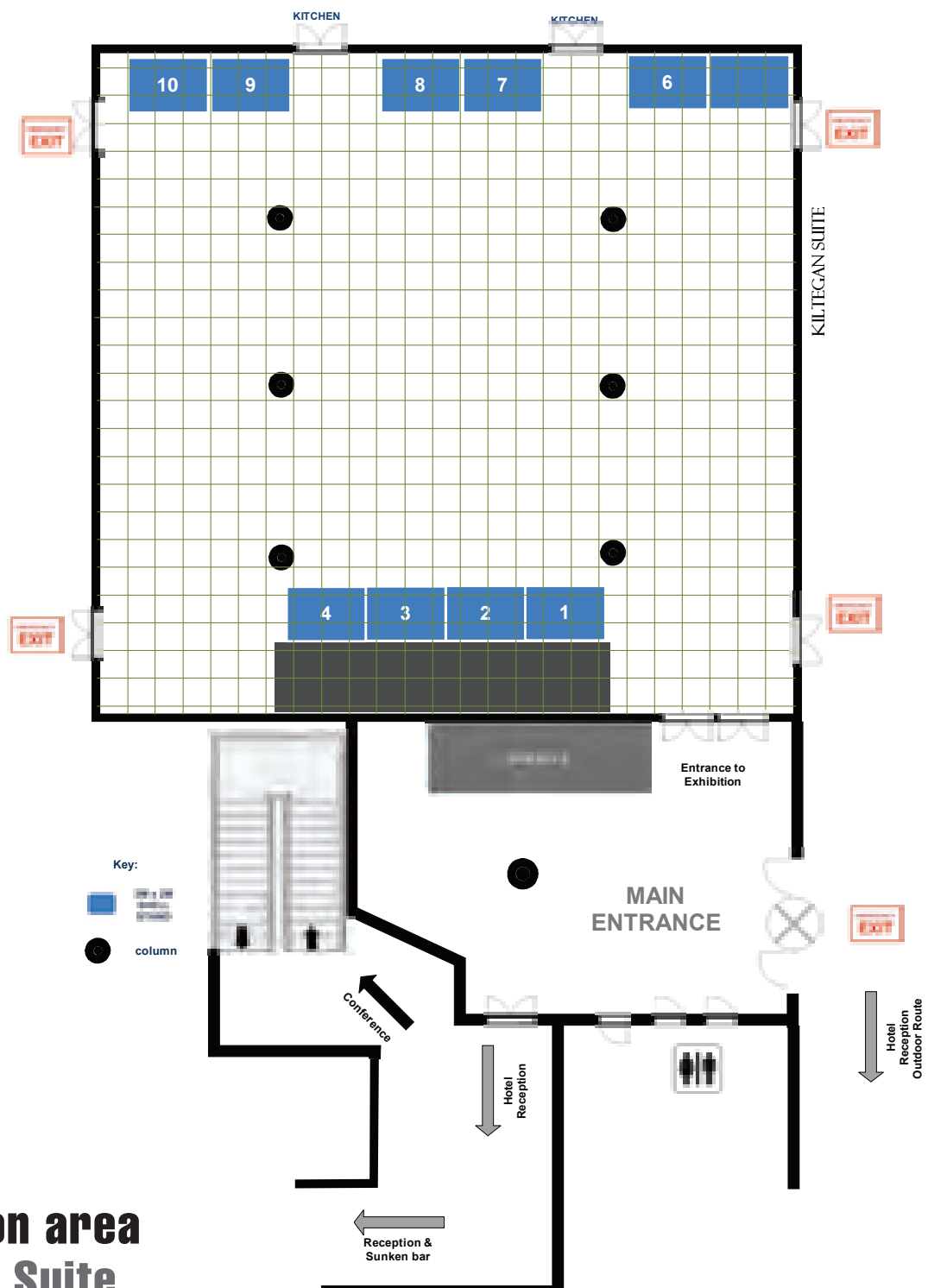


International Agency for Research on Cancer



 International Association of Cancer Registries





## **Exhibition area Kiltegan Suite**

1	Elekta
2	Novartis
3	Geowise
4	Takeda

6	Bristol-Myers
7	Janssen
8	Irish Cancer Society
9	Sanofi
10	National Cancer Registry, Ireland

## History and Aims of the International Association of Cancer Registries

The International Association of Cancer Registries (IACR) was founded in 1966, as a professional society dedicated to fostering the aims and activities of cancer registries worldwide. It is primarily for population-based registries, which collect information on the occurrence and outcome of cancer in defined population groups (usually the inhabitants of a city, region, or country). For each new cancer case, registries record details of the individual affected, the nature of the cancer, information on treatment, and on follow-up especially with respect to survival from the disease.

Registries play an important role in research into the causes of cancer, both by providing data on patterns and trends, and in different types of epidemiological study (in particular, in their ability to follow up groups of persons exposed to potential hazards). They comprise an essential element in the planning and monitoring of cancer control strategies, and for identifying priorities in public health.

To ensure that cases are properly recorded, and that the statistical data gathered is complete and can be used to make valid comparisons, cancer registries must conform to accepted working practices and standards. The Association was created to foster the exchange of information between cancer registries internationally, so improving quality of data and comparability between registries.

The Association is a non-governmental organization which has been in official relations with the World Health Organization since January 1979.

## The National Cancer Registry

The National Cancer Registry is honoured to host this year's meeting of the International Association of Cancer Registries. The Registry was established as a statutory agency by the Minister for Health in 1991 and has been collecting population-based incidence data for Ireland since January 1, 1994. Its functions are:

- (a) to identify, collect, classify, record, store and analyse information relating to the incidence and prevalence of cancer and related tumours in Ireland;
- (b) to collect, classify, record and store information in relation to each newly diagnosed individual cancer patient and in relation to each tumour which occurs;
- (c) to promote and facilitate the use of the data thus collected in approved research projects and in the planning and management of services;
- (d) to publish an annual report based on the activities of the Registry;
- (e) to furnish advice, information and assistance in relation to any aspect of such service to the Minister.

The Registry covers a population of about 4.5 million, with over 30,000 new incident cases each year. We register extensive information on patient, cancer, treatment and outcome and publish a wide range of reports, now mainly electronic, and also have an active programme of research, from aetiological studies of pancreatic and oesophageal cancer to studies of quality of life and the economic welfare of cancer survivors. We have a close collaborative relationship with the Northern Ireland Cancer Registry, which registers cancers in the other part of the island of Ireland.



## **Committees**

### **Scientific Committee**

**Dr Brenda Edwards**

Surveillance Research Programme  
National Cancer Institute  
Suite 504, MSC 8315  
6116 Executive Blvd  
Bethesda, MD 20892-8315  
USA

**Dr David Forman**

International Agency for Research on Cancer  
150 cours Albert-Thomas  
69372 Lyon Cedex 08  
France

**Dr Anna Gavin**

N. Ireland Cancer Registry  
Centre for Public Health, School of Medicine,  
Dentistry & Biomedical Sciences  
Queen's University Belfast  
Mulhouse Building  
Grosvenor Road  
Belfast BT12 6DP  
Northern Ireland

**Dr Linda Sharp**

National Cancer Registry  
Building 6800  
Cork Airport Business Park  
Cork, Ireland

**Dr Sabine Siesling**

Netherlands Comprehensive  
Cancer Centre (IKNL)  
Location Groningen/Enschede  
Post Box 330  
9700 AH Groningen  
The Netherlands

**Dr Harry Comber**

National Cancer Registry  
Building 6800  
Cork Airport Business Park  
Cork, Ireland

### **Local Organising Committee**

**Dr Harry Comber, Ms Geraldine Finn**

National Cancer Registry  
Building 6800  
Cork Airport Business Park  
Cork, Ireland

**Ms Vania Power, Ms Patricia McColgan**

Abbey Conference and Corporate  
City Gate, 22 Bridge Street Lower  
Dublin 8, Ireland

### **IACR Board Members**

**President:**

Roberto Zanetti (Turin, Italy)

**Past President**

Brenda K Edwards (NIH/NCI, USA)

**General Secretary**

Sabine Siesling (Utrecht, The Netherlands)

**Executive Secretary**

David Forman (International Agency for  
Research on Cancer, France)

**Treasurer**

Lynn Ann Gloecker Ries (Rockville, USA)

### **Regional Representatives**

**Africa**

Anne Korir (Nairobi, Kenya)

**Asia**

Rajamaran Swaminathan (Chennai, India)  
Hideo Tanaka (Aichi, Japan)

**Europe**

Andrea Bordoni (Locarno, Switzerland)  
Eero Pukkala (Helsinki, Finland)

**North America**

Maria Schymura (Albany, USA)  
Tom Tucker (Lexington, USA)

**Central & South America**

Patricia Cueva (Quito, Ecuador)

**Oceania**

Helen Farrugia (Victoria, Australia)

# Programme at a glance

Sunday 16th September	Monday 17th September	Tuesday 18th September	Wednesday 19th September	Thursday 20th September	Friday 21st September
	9.00-9.15 Formal Opening	9.00-9.30 Keynote: The Registry and Clinical Data	8.30-9.30 Session 9: Survival methods	9.00-13.00 ENCR Meeting	9.00-13.00 CONCORD Meeting
	9.15-9.45 Keynote: Cancer Incidence in Five Continents	9.30-11.00 Session 5: Evaluation of clinical care	9.30-10.00 Keynote: UICC efforts in cancer control		
	9.45-10.00 Presentation CI5		10.00-10.30 Break/ Poster Viewing		
10.00-17.00  Workshop 1: Trends and projections: Age-Period- Cohort Modelling using splines  Workshop 2: Geographical methods in cancer epidemiology  Workshop 3: ICDO3 and TNM coding	10.00-11.15 Session 1: Registration Methods		10.30-11.30 Session 10: Linkage to other data sources		
	11.15-11.45 Break/ Poster Viewing	11.00-11.30 Break/ Poster Viewing	11.30-13.00 IACR General Meeting Poster Prizes Enrico Anglesio Prize		
	11.45-13.00 Session 2: Data quality	11.30-13.00 Session 6: Cancer control			
	13.00-14.15 Lunch/ Poster Viewing	13.00-14.15 Lunch/ Poster Viewing	13.00-14.00 Lunch		
	14.15-14.45 Keynote: Johannes Clemmesen Lecture	14.15-14.45 Keynote: From cancer registry to cancer patient registry	14.00-18.30 ENCR Meeting	14.00-18.00 CONCORD Meeting	
	14.45-16.00 Session 3: Burden of disease	14.45-15.30 Session 7: Survivorship			
		15.30-15.45 Award Honorary Members			
	16.00-16.30 Break/ Poster Viewing	15.45-16.15 Break/ Poster Viewing			
		16.15-17.15 Session 8: Determinants of patient outcome			
	16.30-17.30 Session 4: Cancer risk factors				
18.30-20:30 Welcome Reception	18.30-19.30 Walking Tours				
	19.30-23.30 Social Evening	20.00-23.00 Gala Dinner			

# Workshops

## Workshop 1

### **Trends and projections: Age-Period-Cohort Modelling using splines**

**with FREDDIE BRAY, PAUL LAMBERT and MARK RUTHERFORD**

The course will centre on analysing and interpreting time trends of registry data according to the effects of age, calendar period and birth cohort, and using such models in the provision of estimates of the future cancer burden. The emphasis will be on practical applications to real cancer incidence data, and the use of the *apcfit* package to fit age, period and cohort effects via restricted cubic spline models in Stata. A prerequisite for participants' inclusion on the course would be a statistical or a computational background. No specific knowledge of APC models is assumed.

## Workshop 1 Programme

**10:00-10:15** Welcome to the course, introductions, etc.

**10:15-11:00** General overview of cancer trends (FREDDIE BRAY)

- Uses of time trends
- Components of time: age, period and cohort
- Graphical analysis of rates
- Understanding and interpreting trends

**11:00-11:20** Coffee

**11:20-12:00** Age-period and Age-cohort factor models (PAUL LAMBERT)

- Using Poisson models for rates
- (Re)-introducing the concept of drift
- Age-period models
- Age-cohort models

**12:00-12:45** Practical (interpreting trends and AP/AC models) (PAUL LAMBERT)

**12:45-13:45** Lunch

**13:45-14:15** Introduction to APC models (MARK RUTHERFORD)

- Identifiability issue
- Modelling A, P, C simultaneously: what extra constraints to make?
- Sensible choice of constraint?
- Graphical presentation of results

**14:15-14:45** Splines and continuous time APC models (MARK RUTHERFORD)

- What are splines?
- Why finer intervals?
- Fitting APC models
- Graphical presentation of results
- Software

**14:45-15:30** Practical (APC models) (MARK RUTHERFORD)

**15:30-15:50** Coffee

# Workshops

## Workshop 1 Programme (cont.)

**15:50-16:30** Introduction to Projections (FREDDIE BRAY)

- Aims of cancer predictions
- Demographic effects
- Brief overview of past approaches

**16:30-17:00** Projections implementation and discussion (MARK RUTHERFORD)

- Comparison of various assumptions
- Extensions to software
- Understanding the uncertainty

## Workshop 1 Faculty



### Freddie Bray

Freddie completed a PhD in Epidemiology at the London School of Hygiene and Tropical Medicine in 2005, having previously studied statistics as undergraduate level (Aberdeen - 1993) and a Masters in Medical Statistics (Leicester, 1994). His research specialty includes descriptive epidemiology of cancer, time trends and predictions. He has worked for the Cancer Registry of Norway and is currently Deputy Head of the Cancer Information Section at the International Agency for Research on Cancer, in Lyon.

### Paul Lambert

Paul Lambert is a Reader in Medical Statistics in the Department of Health Sciences at the University of Leicester. Paul currently is seconded (30% FTE) to the Department of Medical Epidemiology and Biostatistics at Karolinska Institutet. Paul's main research interest has been in developing methods for modelling relative survival. In particular modelling time-dependent covariate effects, incorporating period analysis in statistical models, and the estimation and modelling of 'cure' in population-based cancer studies. He is particularly keen on the use of flexible parametric survival models for both standard and relative survival. These offer a number of advantages in terms of communication of results, for example quantifying absolute levels of risk as well as relative risk. He has developed software in Stata to fit cure models for relative survival (strsmix and strsnmix) and also flexible parametric models (stpm2). Paul is co-author of the book "Flexible Parametric Survival Analysis Using Stata: Beyond the Cox Model".

### Mark Rutherford

Mark Rutherford is a Research Associate in the Department of Health Sciences at the University of Leicester. Mark's research spans methods for population-based cancer data including modelling of relative survival and modelling of cancer incidence using age-period-cohort models. Mark has written software for Stata (apcfit) to carry out age-period-cohort analyses using restricted cubic splines to estimate smooth functions for the effects. He has also written an article detailing methods for obtaining future projections of cancer incidence using recently developed approaches.

## **Workshop 2**

### **Geographical methods in cancer epidemiology**

with **EERO PUKKALA** and **ANTHONY STAINES**

#### **Workshop 2 Programme**

1. Approaches to mapping cancer
2. Issues in mapping disease in small areas, what is the problem?
3. Empirical Bayes solutions
4. MCMC and BUGS/JAGS, a diversion
5. Fully Bayes solutions

A close-up photograph of two hands in white lab coats clapping, set against a blurred background.

**Open**



# Workshops

## Workshop 2 Faculty

### Anthony Staines

Anthony Staines was appointed as the first Professor of Health Systems in the School of Nursing and Human Sciences in DCU in August 2007. Prior to this he spent a decade in UCD in the School of Public Health. He is also the chair of the Irish Blood Transfusion Service, and a member of the board of the Higher Education Authority.

His research interests cover many aspects of public health, often with a focus on policy relevant research, with particular skills in study design, epidemiology, and policy analysis. He studies the uses of information in many different settings, including health service funding, health service planning, environmental health policy, and disease epidemiology and has often used a combination of qualitative and quantitative methods to develop policy relevant information.

Current and recent projects are RICHe, on child health research policy; TACTICS, a project on childhood injury prevention; RN4CAST, on forecasting the nursing workforce, both in terms of quantity and of skill, and EUROHEIS2, on health and environment information systems, in all three of which he is a partner. He was the Irish lead for the Epilymph project, a member of the Interlymph consortium, and one of the founders of the International Multiple Myeloma Consortium. Other recent work includes the ongoing Health Atlas Ireland, a new web based health information, analysis and planning tool for HSE; a developing program of work on autism; a health technology assessment for colorectal cancer screening; the allocation of resources within the Irish health system; blood transfusion in Ireland.



### Eero Pukkala

Eero Pukkala (on the right of the picture) is Director of Statistics (since 2002) and epidemiologist at the Finnish Cancer Registry, Institute for Statistical and Epidemiological Cancer Research, Helsinki and Professor of Public Health and Epidemiology at the School of Health Sciences, University of Tampere.

He is author of about 600 peer-reviewed epidemiological publications, including studies on cancer and other health outcomes related to physical and social environments, occupational hazards, and life habits; biological risk factors of cancer; familial clustering of cancer; evaluations of the effects of screenings and other interventions; survival studies; cancer predictions; cancer map presentations for numerous countries; methodological publications on registry and bio bank data quality, data protection, privacy issues etc.

He is Team leader of the Familial Cancer Epidemiology Group of the Finnish Centre of Excellence in Cancer Genetics Research (CoECG), leader in the Nordic study networks "Nordic Occupational Cancer (NOCCA)" and "North-European Studies on Cancer among Airline Personnel (NoESCAPE)", Chairman of the Expert Working Group for Cancer of the National Institute for Health and Welfare, Health 2000 and 2011 Survey (since 2012), Coordinator and method developer in projects on mapping of cancer-related phenomena in Finland, other North-European countries and selected other regions in Europe, America and Asia and national principal investigator in several international research projects.



## **Workshop 3**

### **ICD-O Coding and TNM Staging**

with **APRIL FRITZ**

### **Workshop 3 Programme**

#### **Morning Session: ICD-O-3 Coding**

*NOTE: Registrants MUST bring their own ICD-O-3 manual*

**9:30** Registration

**10:00** Introduction to ICD-O-3

Differences between ICD-O and ICD-x

**10:45** Review of ICD-O-3 Coding Rules

10 international coding rules for primary site and morphology with examples

**11:30** Break

**11:50** Coding Practicum

Coding exercises of graduated difficulty

**13:00** Lunch

#### **Afternoon session: Principles of TNM staging**

*NOTE: Registrants MUST bring either UICC or AJCC edition of TNM Manual, 7th Edition*

**14:00** Introduction to TNM Staging

Basics of staging, differences between UICC and AJCC editions, format of staging manual, general TNM rules

**14:30** Principles of Basic T, N, and M Classification

What is important for assigning T, N, and M for various major sites with practicum

**15:10** Break

**15:30** Idiosyncratic TNM Staging Systems

Special issues, such as tumor markers, grade, and specific histology, as factors in determining TNM and Stage Group for certain sites, with practicum

**17:00** Adjourn



# Workshops



## Workshop 3 Faculty

### April Fritz

April Fritz, RHIT, CTR, has been a teacher and trainer of cancer registry professionals for more than thirty years. Until the spring of 2006, she was the Manager of Data Quality for the Surveillance, Epidemiology and End Results (SEER) Program of the National Cancer Institute in Rockville, Maryland. Prior to her federal service, she was employed by several hospitals and a cancer registry software vendor. April developed the Principles of Oncology for Cancer Registry Professionals training program in 1992. She has made presentations to dozens of cancer registry organizations and has been a consultant to many cancer organizations, including the Commission on Cancer, the American Joint Committee on Cancer, SNOMED International, International Agency for Research on Cancer, and the American Veterinary Medical Association.

April combines her registry technical knowledge with skill and experience as a writer. She has served on the editorial committees of numerous international standard registry references, including the International Classification of Diseases for Oncology, third edition, AJCC Cancer Staging Manual, seventh edition, AJCC Cancer Staging Atlas (published 2006), Collaborative Staging and Coding Manual, SEER Summary Staging Manual 2000, Cancer Registry Management: Principles and Practice, first edition (NCRA textbook), Workbook for Staging of Cancer (NCRA), Notes on Anatomy and Oncology.

A former president of the National Cancer Registrars Association (NCRA), April is active in state and national professional organizations. Professional honors include the Distinguished Member and Education awards from the National Cancer Registrars Association, the Distinguished Service Award from the North American Association of Central Cancer Registries, and service awards from the National Cancer Institute.

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IACR 2012

# Conference Programme

**September 16-21**

**Conference theme**  
**Better cancer control**  
**through better information**

## Sunday, September 16

Meeting of IACR Executive Board

**Workshop 1: Trends and projections:  
Age-Period-Cohort Modelling using splines**

10:00-17:00

Faculty:

Freddie Bray, International Agency for Research on Cancer

Mark Rutherford, University of Leicester

Paul Lambert, University of Leicester

**Workshop 2: Geographical methods in cancer epidemiology**

10:00-17:00

Faculty:

Eero Pukkala, Finnish Cancer Registry

Anthony Staines, Dublin City University

**Workshop 3: ICDO3 and TNM coding**

10:00-17:00

Faculty:

April Fritz, April Fritz and Associates

18:30-20:30

**Welcome Ceremony**

# Detailed conference programme

Monday, September 17	
09:00-13:00	<b>REGISTRATION METHODS AND DATA QUALITY</b>
9:00-9:15	<b>Formal opening of the conference</b> Dr Roberto Zanetti, President IACR Executive Board <b>Welcome address</b> Dr James Reilly, Minister for Health, Ireland
9:15-9:45	<b>Keynote address: Cancer Incidence in Five Continents, Volume X: entering the second half-century</b> Dr. David Forman, International Agency for Research on Cancer, France <i>Chairs: Dr Brenda Edwards, National Cancer Institute</i> <i>Dr Harry Comber, National Cancer Registry, Ireland</i>
9:45-10:00	Presentation to countries contributing to all 10 volumes of Cancer Incidence in Five Continents
10:00-11:15	<b>Session 1. REGISTRATION METHODS</b> <b>Helen Farrugia:</b> Bridging the void – capturing timely population-based data on cancer stage and recurrence <b>Klaus Kraywinkel:</b> New methods for estimating national cancer incidence in Germany <b>Roberto Zanetti:</b> Economic evaluation of cancer registration in Europe <b>Maria Stella de Sabata:</b> Global initiative for cancer registry development in low- and middle-income countries (GICR): data for action <b>Anne Korir:</b> Enhancing cancer registration in sub-Saharan Africa: the African Cancer Registry Network
11:15-11:45	Break and poster viewing
11:45-13:00	<b>Session 2. DATA QUALITY</b> <i>Chairs: Ms Anne Korir, Kenya Cancer Registry</i> <i>Dr Anna Gavin, Northern Ireland Cancer Registry</i> <b>Marianna De Camargo Cancela:</b> Biomarkers and their implementation in cancer registration: the example of HER2 testing in Ireland <b>Isabel Izarzugaza:</b> REDEPICAN: guidelines for external evaluation of population-based cancer registries <b>Raziye Özdemir:</b> The evaluation of a new death registration system in Izmir city in Turkey <b>Marceli De Oliveira Santos:</b> Completeness of cancer registration in Brazilian PBCR using the flow method <b>Masoud Babaei:</b> Quality of data in Ardabil cancer registry, a successful experience of population based cancer registration in Iran
13:00-14:15	Lunch and poster viewing

**Monday, September 17 (cont.)**

**14:15-17:30 BURDEN OF DISEASE AND AETIOLOGY**

**Johannes Clemmesen Lecture: Evolution of cancer registration and cancer epidemiology from geographical pathology to cancer control**

14:15-14:45 Dr Hans H Storm, Danish Cancer Society

*Chairs: Dr Roberto Zanetti, Piedmont Cancer Registry, Italy*

*Dr Deirdre Murray, National Cancer Control Programme, Ireland*

**Session 3. BURDEN OF DISEASE**

**Sultan Eser:** Recent trends in colorectal cancer incidence and mortality in south-eastern Europe for 1999-2008 period

14:45-16:00 **Joannie Lortet-Tieulent:** International trends in the incidence of cutaneous malignant melanoma 1953-2008

**Donna Turner:** Cancer in Manitoba's First Nations: Evidence of a Gathering Storm

**Atul Shrivastava:** Time Trends in Cancer in Bhopal (1988-2005)

**Tomohiro Matsuda:** Visualization of patients developing cancer at a young age in Japan

16:00-16:30 Break and poster viewing

*Chairs: Dr Hideo Tanaka, Aichi Cancer Center, Japan*

*Dr John Fitzpatrick, Irish Cancer Society*

**Session 4. CANCER RISK FACTORS**

16:30-17:30 **Caroline Weibull:** Reproductive history and the risk of bladder cancer: a population-based cohort study in ParCa 2

**Linda Sharp:** Associations between population density and cancer risk

**Tina Zagar:** Slovenian maps of local standardized incidence ratio

**Nicola Bowtell:** An exploratory study: indoor and outdoor work, socio-economic status and skin cancer

18:30-19:30 Walking tour of Cork city

19:30-23:30 Social evening, Boardwalk Restaurant, Cork

# Detailed conference programme

Tuesday, September 18	
9:00-13:00	<b>QUALITY OF CARE AND CANCER CONTROL</b>
	<b>Keynote address: Registries and Clinical Data Networks – Support Patient Centered Outcomes Research</b>
9:00-9:30	Dr. Joe Selby, Patient Centred Outcomes Research Institute (PCORI), USA <i>Chairs: Dr Sabine Siesling, Comprehensive Cancer Centre the Netherlands (IKNL) Dr Cathy Kelly, Mater Misericordiae University Hospital, Dublin</i>
	<b>Session 5: EVALUATION OF CLINICAL CARE</b>
	<b>Yvette Van Gestel:</b> Distant recurrences of colorectal cancer: a population-based study
	<b>Sharma P Riaz:</b> Recent trends in resection rates among non-small cell lung cancer patients in England
9:30-11:00	<b>Marjolein Zanders:</b> Increased adherence to treatment guidelines for colorectal cancer patients with diabetes: a population-based study
	<b>Harry Comber:</b> Quality of rectal cancer surgery and its relationship to surgeon and hospital caseload: a population-based study
	<b>Ambakumar Nandakumar:</b> Patterns of care and survival in breast cancer, India
	<b>Isabelle Soerjomataram:</b> Disability-adjusted life years: country-specific estimates for 27 cancers in 12 world regions
11:00-11:30	Break and poster viewing
	<b>Session 6. CANCER CONTROL</b>
	<i>Chairs: Ms Helen Farrugia, Cancer Epidemiology Centre, Victoria, Australia Dr Susan O'Reilly, National Cancer Control Programme, Ireland</i>
	<b>Conan Donnelly:</b> Saviour symptoms: The potential for earlier clinical diagnosis in three cancer sites
	<b>Katie O'Brien:</b> Association between screening status and tumour subtypes in breast cancers diagnosed in women in the screening age-range
11:30-13:00	<b>Hans W. Hense:</b> First evaluation of interval cancer rate in the German mammography screening program—results from the Epidemiological Cancer Registry North Rhine-Westphalia
	<b>Antonella Zucchetto:</b> Screening history of women with cervical cancer in Italy
	<b>Hiroaki Katayama:</b> Use of socio-economic indexes and GIS for targeting the areas for medical colon cancer screening
	<b>Ruth Jack:</b> The varying influence of socio-economic deprivation on breast cancer screening uptake in London
13:00-14:15	Lunch and poster viewing

**Tuesday, September 18 (cont.)**

**14:15-17:30     PATIENT OUTCOMES**

**14:15-14:45**     **Keynote address: From cancer registry to cancer patient registry: population-based quality of life research using the cancer Registry**  
 Professor Lonneke van de Poll-Franse, Eindhoven Cancer Registry, The Netherlands

**Session 7. SURVIVORSHIP**

*Chairs: Dr Andrea Bordoni, Ticino Cancer Registry, Switzerland  
 Dr Linda Sharp, National Cancer Registry, Ireland*

**14:45-15:30**     **Christian Herrmann:** Rapid increase in the number of cancer survivors in Eastern Switzerland  
**Paul Hanly:** Lost productivity due to colorectal cancer: patterns and costs for Ireland  
**Paolo Baili:** Cancer rehabilitation indicators for Europe

**15:30-15:45**     Award of Honorary Membership of IACR (part 1)

**15:45-16:15**     Break and poster viewing

**Session 8. DETERMINANTS OF PATIENT OUTCOME**

*Chairs: Dr Thomas T Tucker, UK Cancer Control Program, Kentucky, USA  
 Mr John McCormack, Irish Cancer Society*

**16:15-17:15**     **Annemiek Kwast:** Prognostic factors for survival after breast cancer metastasis  
**Xue Qin Yu:** Conditional survival of cancer patients: an Australian perspective  
**Claudia Allemani:** Colorectal cancer survival in the US and Europe: a CONCORD high-resolution study  
**Mieke Aarts:** The impact of socioeconomic status on prostate cancer treatment and survival in the southern Netherlands

**20:00-23:00**     Gala Dinner, Rochestown Park Hotel

# Detailed conference programme

Wednesday, September 19	
8:30-11:30	<b>METHODS IN SURVIVAL AND LINKAGE</b>
8:30-9:30	<b>Session 9. SURVIVAL METHODS</b> <i>Chairs: Dr David Forman, International Agency for Research on Cancer Dr Paul Walsh, National Cancer Registry, Ireland</i> <b>Bernd Holleczeck:</b> Reduction of population-based cancer survival estimates by trace back of death certificate notifications: an empirical illustration <b>Mark Rutherford:</b> Comprehensive assessment of the impact of errors in the cancer registration process on cancer survival <b>Hannah Weir:</b> The impact of SEER vs IACR multiple primary rules on population-based cancer survival rates <b>Paul Lambert:</b> Estimating the loss in expectation of life due to cancer using flexible parametric survival models
	<b>Keynote address: UICC efforts in cancer control</b> Professor Mary Gospodarowicz, Union International Contre le Cancer (UICC)
	Break and poster viewing
	<b>Session 10: LINKAGE TO OTHER DATA SOURCES</b> <i>Chairs: Dr Rajaraman Swaminathan, Cancer Institute, Chennai, India Dr Kathleen Bennett, St James's Hospital, Ireland</i> <b>Susan Spillane:</b> Use of the antidiabetic drug metformin and disease spread at diagnosis in colorectal cancer <b>David Brewster:</b> Can linkage to routinely collected health records substitute for active follow-up of clinical trial participants? <b>Francesco Giusti:</b> Belgian Cancer Registry linked to administrative databases: a way to monitor clinical practice in anal cancer <b>Anna Johansson:</b> Swedish Quality Registers on Cancer: an underutilized resource in cancer epidemiology
	IACR General Meeting Presentation of poster prizes Presentation of Enrico Anglesio prize Conference end
13:00-14:00	Lunch

## Information for authors and chairpersons

### Speakers

1. For each speaker, the allocated time to speak is 10 minutes, followed by a 5 minute discussion.
2. All speakers are asked to keep to the allocated time.
3. Only computer presentations will be available in the oral sessions.
4. Please bring your presentation in English, saved on either CD-R or USB memory device to the AV Technician in the Estuary Suite. If you have any difficulties, please contact the registration staff at the registration area and they will assist you.
5. You will need to submit your presentation in advance and carry out a test to check whether all the slides appear properly.
6. Speakers are requested to present their materials at least one hour prior to their presentation.

### Poster presentations

1. Poster areas are located in the Kiltegan and the Estuary Suites. Posters in themes A, B, C and D are located in the Estuary Suite. Posters in themes E, F, G, H, I and J are located in the Kiltegan Suite.
2. Posters in themes E, F, G, H, I and J located in the Kiltegan Suite should be put on display on Sunday 16th September between 4.30 and 6.30pm or Monday 17th September morning between 8 and 9am. Posters in themes A, B, C and D located in the Estuary Suite should be put on display on Monday 17th September morning between 8 and 9am. Posters may remain on display until 1pm on Wednesday 19th, when they must be removed.
3. Poster viewing sessions are planned for Monday 17th (11:15-11:45 am, 16:00-16:30 pm) Tuesday 18th (11:00-11:30 am; 15:45-16:15) and Wednesday 19th (10:30-11:00) and you should be available for discussion at your poster at the designated times.
4. Posters should be no more than 1.5m high and 1m wide. Posters which do not fit on the poster boards will be removed.
5. All posters remaining on panels after the removal time will be discarded by the secretariat.

## Other meetings

### Wednesday, September 19

14:00-18:30      ENCR general meeting

### Thursday, September 20

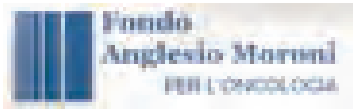
09:00-13:00      ENCR general meeting

14:00-18:00      CONCORD meeting

### Friday, September 21

09:00-13:00      CONCORD meeting





## The Enrico Anglesio Prize

The Fondo Anglesio Moroni, Torino, Italy, awards each year at the IACR meeting a prize aimed at recognising original scientific research work on Cancer Epidemiology conducted by a young researcher working with a Cancer Registry or another centre of epidemiology. The prize is awarded on a yearly basis during the GRELL Meeting (GRELL Round), and during the IACR Meeting (IACR Round).

During the previous two IACR meetings the Prize was awarded to:

- Yuri Ito from Japan for *Trends in cure fraction for colorectal cancer in Osaka, Japan, between 1975 and 2000* in year 2010; and
- Mugi Wahidin from Indonesia for *Methods of population-based cancer registry in Indonesia* in year 2011.

This award will be made again this year during the 34th annual meeting of the International Association of Cancer Registries.

To be eligible, the work presented must be original, not previously presented elsewhere and included in the scientific programme as an oral presentation. The Jury, appointed by the Fondo, will evaluate the candidates and their work on the following criteria:

1. Clarity and impact of the oral presentation.
2. Originality and relevance of the scientific work.
3. Compilation of the abstract.
4. Curriculum of the candidate.

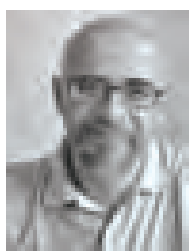
The Fondo awards a Prize of €500; doubled to €1000 if the work is published within one year in a Journal with impact factor between 2.00 and 4.00 and €1500 Euro if the journal has an impact factor over 4.00. The Enrico Anglesio Prize must be mentioned in the acknowledgments of the publication.

A number of applications have been received for the 2012 Cork award of the Prize, and are currently (end of August 2012) being processed. The final list of applicants will be available at the beginning of the Conference.



## **Jurors of the Enrico Anglesio Prize in past IACR rounds**

Previous juries have included the following, who have contributed greatly to the success of the Prize:



Stefano Rosso  
(Italy)



Sabine Siesling  
(The Netherlands)



Hans H. Storm  
(Denmark)



Hideo Tanaka  
(Japan)



Hideaki Tsukuma  
(Japan)



Tomohiro Matsuda  
(Japan)



Shyam Manraj  
(Mauritius)



Andrea Bordoni  
(Switzerland)



### **IACR Poster Award**

Evaluation sessions will be taking place at allocated times during the conference. Scientific content as well as communication skills will be judged by the IACR board members. A prize will be given to the authors of the best three posters at the closing ceremony.

## Conference venue

### Rochestown Park Hotel

The Rochestown Park luxury hotel in Cork city has long been recognised as one of Cork's premier hotels. Located near Cork Airport, Rochestown Park Hotel combines a wide range of luxury facilities for corporate and leisure guests alike. Key features include 4 star luxury hotel accommodation in Cork City and an award winning Leisure Centre, Thalassotherapy & Beauty Centre. In addition, it provides free parking and free Wi-Fi to all conference guests. The perfect venue, in the perfect location... the perfect experience!

### Cork

Steeped in history, Cork City is fast gaining a reputation as one of Europe's hippest cities. The city centre is built on an island in the River Lee, just upstream of Cork Harbour. The two channels of the River Lee which embrace the city centre are spanned by many bridges, and this gives the city a distinctive continental air.

Exploring Cork is an enjoyable, multi-day pursuit. Ring the Shandon Bells in the 300-year-old tower of St. Anne's Church, and marvel at the French Gothic spires of St. Finbarre's Cathedral.

You will discover unique shopping and dining options, including the English Market, with its stalls selling foods from all over the world, and numerous pedestrian walkways and sidewalks flanked by smart boutiques and major department stores.

At every corner you'll come across another panoramic view, another interesting architectural feature and some of the best art galleries, theatres and museums in Ireland.

### Getting around

Cork City is easy to get around on foot, by bus or by short and not too expensive taxi ride.

Rochestown Park Hotel is located in Douglas Village, 5 km from the city centre. Public buses to the city centre pass the hotel approximately every half hour. The conference will also provide coaches from Cork City Centre to Rochestown Park Hotel every morning, and from Rochestown Park to Cork City Centre every evening after the last session. Coaches will also be provided for evening functions. For more information, please contact the registration staff.

### Social programme during the conference

<b>Sunday 16th September</b> <b>18.30 - Welcome Reception</b>	The Welcome Reception will be held in the Atrium of the Rochestown Park Hotel.
<b>Monday 17th September</b> <b>18.30-19.30 – Walking Tours</b>	Cork City Centre is compact and accessible and so to give you a taste of this welcoming city, we have arranged guided walking tours on Monday evening – your guides will be local, very knowledgeable and will welcome your questions! If you wish to take one of these tours you can advise the registration staff. Limited availability.
<b>19:30-23.30 – Social Evening, Boardwalk Restaurant</b>	The Boardwalk is one of Cork trendiest bars. All delegates are welcome to enjoy an evening full of fun, entertainment, and traditional Irish music.
<b>Tuesday 18th September</b> <b>20.00 – Gala Dinner</b>	The Gala Dinner will take place in the Estuary Suite overlooking the Mahon Estuary. With good food and a very special entertainment feature, this evening promises to be a night to remember.

*All participants are welcome to attend these events, however please note pre-booking is required.*

## **Excursion options** for the afternoon of Wednesday, 19th September

Two excursions are proposed to the participants. Please note however that these tours will depend on final numbers confirmed. Final itinerary will be announced at the conference.

### **Option 1: Midleton and Cobh**

Participants will go directly to the historic town of *Midleton*. The famous Old Midleton Jameson Distillery & Heritage Centre represents the modern face of the town, where you can see the history of the making of Irish whiskey. Set on 15 acres and beautifully restored, this is where the true heart of Irish whiskey is born, the old distillery is a unique experience with some of the buildings dating back to 1795.

On the way back to Cork, participants will stop in *Cobh*, and visit the Heritage Centre. Cobh is situated on the southern shore of the Great Island in one of the world's great natural harbours. The town dates from 1750 when a tiny fishing village was established on the site of the present town. As the country's premier port of call for transatlantic liners, it was for many years the point of departure for thousands of emigrants who were heading for the New World in search of a better life. The "Queenstown Experience", located at the Heritage Centre, has exhibitions of Irish history. It provides information on life in Ireland through the 18th and 19th centuries, the mass emigration, the Great Famine, and on how criminals were transported to Australia for petty crimes. It also has an exhibition on the history of the RMS Titanic, whose last port of call before it sank was Cobh (then named Queenstown).



### **Option 2: Blarney Castle Tour & Cork City Gaol**

*Blarney Castle* was built nearly six hundred years ago by one of Ireland's greatest chieftains, Cormac MacCarthy, and has been attracting attention beyond Munster ever since. Over the last few hundred years, millions have flocked to Blarney, making it a world landmark and one of Ireland's greatest treasures.

Now that might have something to do with the Blarney Stone, the legendary Stone of Eloquence, found at the top of our Tower. Kiss it and you'll never again be lost for words.

En route to the castle, you will stop to visit the **Cork City Gaol**. The *Cork City Gaol* in Sunday's Well, was designed to

replace the old Gaol at the Northgate Bridge in the heart of the city. The old gaol was nearly 100 yrs. old, on a confined site, overcrowded & unhygienic. In 1806 an Act of Parliament was passed and monies levied locally to allow the building of a new City Gaol. This Cork heritage centre is renowned for its wax figures. Step back in time to see what 19th / early 20th Century life was like in Cork - inside and outside the prison walls. Amazingly lifelike wax figures, furnished cells, sound effects and fascinating exhibitions.

### **Other tours**

A Cork Tourism representative will be available at the Conference on Monday 17<sup>th</sup> September. Please visit the Tourist Information desk at the Registration area, if you require more information on additional tours, activities and other Cork attractions.

# Keynote speakers

## Dr David Forman PhD

Dr Forman is Head of the Cancer Information Section at the International Agency for Research on Cancer (IARC) based in Lyon, France. This Section of IARC is responsible for the provision of information concerning worldwide cancer vital statistics and produces the definitive reference source *Cancer Incidence in Five Continents (CIS)*, published in nine successive volumes over the last 45 years. Part of this responsibility includes the provision of support to cancer registries worldwide especially in low and medium resource countries. The Section also maintains an active research program in the descriptive epidemiology of cancer.

Prior to taking up his appointment at IARC in April 2010, Dr Forman was, from 1994, Professor of Cancer Epidemiology at the University of Leeds, UK and Director of the Northern and Yorkshire Cancer Registry. He was also Head of Analysis and Information for the UK National Cancer Intelligence Network. From 1982 to 1994, he was a Staff Scientist with the Imperial Cancer Research Fund Epidemiology Unit in Oxford, UK working initially with Sir Richard Doll. Dr Forman's PhD and postdoctoral research was in cancer biology.

Dr Forman's research profile includes studies in the epidemiology of cancer and he has also been involved in health services research in cancer and, in association with the Cochrane Collaboration, systematic reviews and meta-analysis in upper gastrointestinal disease. Much of his research has been focused on cancers of the gastrointestinal tract and he has been particularly identified with studies examining the association between stomach cancer and *Helicobacter pylori* infection. He has over 200 publications in peer reviewed journals.



## Dr Lonneke van de Poll-Franse

Dr van De Poll-Franse is professor of cancer epidemiology and survivorship, at the Center for Research on Psychology in Somatic Diseases, Tilburg University, The Netherlands. She was formerly Head of the Research Department at the Comprehensive Cancer Centre South/Eindhoven Cancer Registry and Associate Professor, Center of Research on Psychology in Somatic Diseases, Tilburg University. She has also worked at the Jonsson Comprehensive Cancer Center, University of California, Los Angeles, Comprehensive Cancer Centre South/Eindhoven Cancer Registry, Sticht Center on Aging, Wake Forest University, Winston-Salem, North Carolina, USA Department of Preventive Medicine, University of Tennessee, Memphis, TN, USA.

In 2004 she was appointed at the Comprehensive Cancer Centre South (CCCS), to write the Dutch Cancer Society report: "Cancer in the Netherlands. Trends, predictions and implications for health care use". This report, in which she described quality of life of cancer survivors, greatly influenced her research career afterwards. Together with psychologists from Tilburg University (TiU) and medical specialists in the Southeast Netherlands she started using the Eindhoven Cancer Registry as a sampling frame to study the late effects of cancer treatment and quality of life among the growing group of survivors. The increasing research collaboration between CCCS and TiU resulted in her appointment as associate professor in 2008. An NWO-investment grant for the development of the online PROFILES (Patient Reported Outcomes Following Initial treatment and Long-term Evaluation of Survivorship) application and the Dutch Cancer Society Award she received, greatly enhanced their research activities in this field. Today, she and her collaborators have included over 15,000 cancer survivors in past and ongoing studies. Most studies derived from questions raised by clinicians or psychologists and have contributed to discussions about the effectiveness of current therapies or psychosocial support. However, research activities about the impact of information provision on quality of life derived from many comments received from patients participating in the studies. She would now like to evaluate whether cancer care can be improved by intervening in information provision such as survivorship care plans.

## Dr. Hans Henrik Storm

Hans Henrik Storm, MD is Director, Cancer Prevention and Documentation; Danish Cancer Society and was Director of the Danish Cancer Registry 1985-1997.

Hans graduated in medicine 1976 from University of Copenhagen and was trained in surgery, internal medicine and haematology. He was affiliated as medical supervisor and coder at the Danish cancer registry 1977 until he was appointed full time researcher at the cancer registry 1981. From 1988 to 1991 he was appointed head of Cancer Registration and from 1991 to 1996 Acting Director for the Division for Cancer Epidemiology. Since 1997 H.H. Storm has been director of Department for Cancer Prevention and Documentation at the Danish Cancer Society. He has served as secretary and board member of the ENCR in more periods and was chairman of the IARC working group on Confidentiality Guidelines for Cancer Registries, and the ENCR/EUROCOURSE revision in 2012. He was regional representative for Europe of the International Association of Cancer Registries, General Secretary (1996-2000) and President 2000-2004. He is a co-author of European Cancer Code, and for a decade appointed as WHO cancer expert. He has served on the Danish Data Protection Council since 2000. Since 1985 he has been a board member of the Association of Nordic Cancer Registries (president 1994-5 and 1999-2000). H.H. Storm has been the course director of the Nordic Summer School in Cancer Epidemiology from 1993 up to the present, and initiated the NORDCAN collaboration and software. H.H. Storm has published more than 300 publications (102 as 1st author) in cancer epidemiology, descriptive and analytical since 1980 including routine monitoring of cancer incidence, mapping, survival, and data linkage. Main areas for analytical studies are radiation, cytotoxic agents, immunosuppression, multiple primary cancers, and evaluation of cancer control.



## Joe V. Selby, M.D., M.P.H.

Joe V. Selby, M.D., M.P.H. is the first Executive Director of the Patient-Centered Outcomes Research Institute (PCORI). A family physician, clinical epidemiologist and health services researcher, he has more than 35 years of experience in patient care, research and administration. He is responsible for identifying strategic issues and opportunities for PCORI and implementing and administering programs authorized by the PCORI Board of Governors.

Dr. Selby joined PCORI from Kaiser Permanente, Northern California, where he was Director of the Division of Research for 13 years and oversaw a department of more than 50 investigators and 500 research staff working on more than 250 ongoing studies. He was with Kaiser Permanente for 27 years. An accomplished researcher, Dr. Selby was elected to membership in the Institute of Medicine in 2009 and was a member of the Agency for Healthcare Research and Quality study section for Health Care Quality and Effectiveness from 1999-2003. A native of Fulton, Missouri, Dr. Selby received his medical degree from Northwestern University and his master's in public health from the University of California, Berkeley. He was a commissioned officer in the Public Health Service from 1976-1983 and received the Commissioned Officer's Award in 1981.

He serves as Lecturer in the Department of Epidemiology and Biostatistics, University of California, San Francisco School of Medicine, and as a Consulting Professor, Health Research and Policy, Stanford University School of Medicine. Dr. Selby was appointed PCORI executive director on May 16, 2011.

## Professor Mary Gospodarowicz

Mary Gospodarowicz is Medical Director of the Princess Margaret Cancer Centre at the University Health Network and Regional Vice President of Cancer Care Ontario. After completing her medical degree at the University of Toronto and obtaining specialty certifications in internal medicine, radiation oncology, and medical oncology, she joined the Department of Radiation Oncology at Princess Margaret Hospital (now Princess Margaret Cancer Centre) and the University of Toronto where she recently completed a 10-year term as Chief of Radiation Medicine Program at Princess Margaret and Chair of Radiation Oncology at the University. As a radiation oncologist at Princess Margaret who treats malignant lymphomas and genitourinary cancers, she is involved in research and clinical trials evaluating radiation therapy in cancer treatment, cancer staging and prognosis, image-guided precision radiotherapy and survivorship programs and has authored more than 250 peer-reviewed articles and book chapters to date.

She has been an active member of various provincial, national and international committees. She is currently Chair of the UICC TNM Cancer Staging Project. She is a member of the NCIC CTG Clinical Trials Committee, the Lymphoma Foundation of Canada, and the Canadian Association of Radiation Oncologists (CARO) of which she was President from 2001 to 2003. She is presently a member of the Board of Directors of the International Extranodal Lymphoma Site Group. In August 2012, she assumed the position of President of UICC, an international NGO dedicated to the global control of cancer.

Professor Gospodarowicz is a Fellow of the American Society of Radiology and Oncology (ASTRO), Honorary Member of the European Society of Therapeutic Radiology and Oncology (ESTRO) and Honorary Fellow of the Royal College of Radiologists, United Kingdom.





## Keynote abstracts

### **Cancer Incidence in Five Continents: Volume X—entering the second half-century**

**Dr. David Forman**

**International Agency for Research on Cancer, France**

The nine volumes of Cancer Incidence in Five Continents (CI5C), published approximately every five years since 1966, represent flagships for the world's population-based cancer registries and for IACR. The serial publication has now become internationally regarded as providing the highest quality comparable data on global patterns of cancer incidence and is widely recognised as the definitive source for such information for use in both cancer research and cancer control planning. The data available provide a geographic and temporal picture of cancer worldwide for the second half of the 20th century. CI5C has grown from providing information from 32 registries in 29 countries in volume I to 225 registries in 60 countries in volume IX – all volumes providing some data from each of the major continental regions. With the current interest, especially within the WHO and UN in non-communicable diseases (NCD), it is apparent that the standards set by CI5C in cancer surveillance are now providing a benchmark for other NCD entities such as diabetes and cardiovascular disease.

This lecture will provide an overview of the current status of volume X of CI5C and will survey the data submitted and plans for their publication. These data will primarily cover incidence for the period 2003-07 and will bring CI5C fully into its second 50-year period. As the work of the CI5C Editorial Board in reviewing the quality standards of these data is not complete, it will not be possible to provide detailed results from volume X. However, comparative analysis of trends over time will be provided using results from the 17 registries\* that have been published in all volumes of CI5C. This will be followed by a short ceremony to make a presentation to the registries concerned.

*\* South America: Cali (Colombia); North America: Alberta, Manitoba, Newfoundland, Saskatchewan (Canada); Connecticut (USA); Asia: Israel, Miyagi (Japan); Europe: Denmark, Finland, Norway, Slovenia, Sweden, Mersey, West Midlands (England); Oceania: New Zealand, Hawaii (USA).*

### **From Cancer Registry to Cancer Patient Registry: Population-based quality of life research using the Cancer Registry**

**Professor Lonneke van de Poll-Franse**

**Eindhoven Cancer Registry, The Netherlands**

With increasing cancer survival, studies into the (late) effects of cancer and its treatment on patients' quality of life is of growing importance. Patient-reported outcomes (PROs) are now recognized as indicators of treatment efficacy as many new treatments offer only marginal improvements in survival. Population-based cancer registries, which collect data on incident cases, have been used successfully to identify and recruit participants for such studies.

Advantages of using national or regional registry data include their wide reach and large numbers, and wealth of information on patients' socio-demographic and clinical characteristics, thus providing an excellent sampling frame for recruitment for survival studies. Being population-based, data from cancer registries are more generalizable and less likely to have problems with referral biases associated with institutional registries, especially those coming from traditional cancer centers.

Nevertheless, a review of the current literature shows that cancer registries are an under-used resource for cancer survivorship studies especially for less common cancers or populations such as the elderly which are understudied in clinical studies.

The Eindhoven Cancer Registry (ECR) and Tilburg University together developed PROFILES ('Patient Reported Outcomes Following Initial treatment and Long term Evaluation of Survivorship) registry for the study of the physical and psychosocial impact of cancer and its treatment. PROFILES contains a large web-based component and is linked directly to clinical data from the ECR. Data from the PROFILES registry are available for noncommercial scientific research, subject to study question, privacy and confidentiality restrictions, and registration ([www.profilesregistry.nl](http://www.profilesregistry.nl)).

## **JOHANNES CLEMMESSEN LECTURE**

### **Evolution of cancer registration and cancer epidemiology from geographical pathology to cancer control**

**Dr Hans H Storm**  
**Danish Cancer Society**

The history of cancer observation and control is long, beginning with occupational cancers such as *mala metal-lorum* (Georgius Agricola 1556), Ramazzini (1700), and the risk of scrotal cancer in chimney sweeps (Percival Pott, 1775) and the first studies implicating tobacco exposure—snuff and nose cancer—as shown by John Hill (1700). Epidemiology was born with infectious diseases; John Snow with the cholera epidemic demonstrated how observation could lead to prevention and control. Clemmesen's interest was sparked by Kennaway's work in 1937 on cancer statistics. This fueled his interest in cancer registration and on May 5th 1942 the first national cancer registry was begun in Denmark. Cancer statistics in those days, even though based on punched cards, knitting needles and typewritten information on cards, led to valuable studies of cancer incidence, mortality, risk factors, survival and prevalence. At the Oxford symposium in 1950 what originally was proposed as "endemiology" for the study of the aetiology of malign neoplasms became cancer epidemiology. A classic analytical study from that era is Sir Richard Doll's study on lung cancer and smoking from the early 1950s.

The proven usefulness of cancer registries for research, follow-up and planning purposes has led to widespread cancer registration, predominantly in the more developed parts of the world. Computerization, the increased scope of registration data and the development of registries for other conditions, when added to our ability to link huge datasets, today bring to light what previously took years to discover. Building upon the ideas of our predecessors and through improving our methods and data comparability, cancer registries today can, and should, have a central role in any effective cancer control activity. A new buzz word, "translational" research, has recently appeared and has proven useful when applying for basic science funding. "Translational" cancer epidemiology, as an expression for research into cancer prevention and public health studies (including cancer registration) could perhaps assist in funding these important databases—but maybe a symposium is needed to lead to acceptance of this term.

## **Johannes Clemmesen**

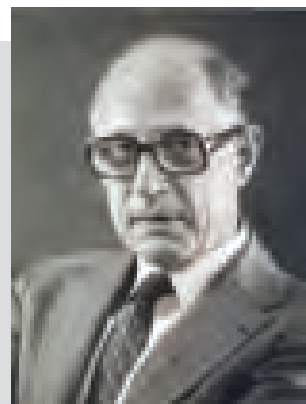
### **1908-2010**

Johannes Clemmesen, born 1908, was a Danish Physician and Pathologist. His thesis from 1938 was on transplantation of cancer from one animal species to another after X-ray exposure. Dr. Clemmesen was head of pathology at the Finsen Institute 1955–78, and became specialist in internal medicine in 1943 and in pathology in 1946. He founded and led the Danish Cancer Registry under the auspices of the Danish Cancer Society in 1942 giving Denmark a unique position in understanding cancer causes, development and incidence. He led the Danish Cancer Registry until 1980. During his leadership he authored a constant and high profile scientific production—especially the link between bladder cancer and tobacco consumption, the high incidence of testicular cancer and, not least, the shape of the age incidence curve of breast cancer with "Clemmesen's hook" at the menopause indicating two types of breast cancer—one among younger women and another among the older. His publication series in 5 volumes "Statistical studies in malignant neoplasms" still stands as a milestone in cancer epidemiology with observations and analysis and literature review up to 1977.

On the basis of his work and ideas the cancer epidemiology of the Danish Cancer Society was developed and many younger researchers can thank Clemmesen for developing the possibilities upon which they base their research in cancer. He was due his importance for establishing cancer registries internationally one of the fathers of the International Association of Cancer Registries and also the longest living honorary member. His life time achievement in research and the creation of the Danish Cancer Registry led to a doctor *honoris causa* at Århus University in 1978.

He was acknowledged in 2003, at the age of 94 with the Danish Cancer Society Senior Research Prize, which he instantly supplemented by his own funds to form Johannes Clemmesens Cancer Research Fund focused on the causes of cancer, in particular testis cancer with a very high incidence in Denmark shown by his cancer registry – his life achievement.

Clemmesen had a good and active life even beyond age 94. He lived to see his life achievement be pulled apart by authorities separating cancer registration from research of which he expressed his deep concern. He did not live his active life long enough to see the modernized cancer registration blossom. His latest years were devoted to coping with old age and domestic matters.



## Keynote abstracts

### Registries and Clinical Data Networks: Support Patient-Centered Outcomes Research

**Dr. Joe Selby**

**Patient-Centered Outcomes Research Institute (PCORI), USA**

The Patient-Centered Outcomes Research Institute (PCORI) is an independent, nonprofit organization authorized in 2010 as part of the Affordable Care Act to fund research that offers patients, caregivers, clinicians and policymakers the information they need to make important healthcare decisions. PCORI focuses on comparative clinical effectiveness research studies for preventing and diagnosing disease, and for providing treatment and care. Improving healthcare delivery systems and development of the science and methods of patient-centered outcomes research are also among PCORI's five national research priorities. PCORI's first funding announcements require innovative and non-traditional responses that involve the patient and caregiver in all phases of the research from determining the question to dissemination of results. How these goals will be implemented in actual studies poses numerous scientific and practical challenges. For example, cancer survivors may be appropriate contributors to decision support interventions for patients deciding on treatment options but may not be relevant collaborators when studying interventions that assist healthy individuals with decisions about undergoing screening tests. Other approaches may rely on analysis and modelling studies of time series or observational data from high-quality disease registries or clinical research networks. PCORI's health research agenda is guided by measures of disease burden (incidence and prevalence, especially of chronic conditions) but also by the likely impact of the research on practice and patient outcomes. Some important outcomes research issues in cancer detection and treatment will be presented.



Since the introduction of the NCCP in 2007 there has been a significant and sustained improvement in cancer services in Ireland.

Ireland has progressed from a situation whereby, prior to the establishment of the NCCP, cancer services were delivered in 32 hospitals many of which had low volumes, poor outcomes and incomplete multidisciplinary teams. The reputation of cancer service had been undermined following a series of breast and colon cancer scandals as well as delayed diagnostics and treatment. There were no national policies, treatment guidelines, quality indicators or assurance process in place and for several years there had been no co-ordinated national plan for screening, surgery, radiation or medical oncology services.

The National Cancer Control Programme (NCCP) introduced a programmatic approach to cancer services as laid out in the 2006 Strategy for Cancer Control in Ireland. Its aim is to improve cancer prevention, detection, treatment, increase survival rates and improve quality of life. This is currently being achieved through the development of a comprehensive national service, based on evidence and best practice.

Cancer services are now centralised around eight Designated Cancer Centres established in four networks (two cancer hospitals are in each of the four HSE Areas).

The NCCP is working to ensure that designated cancer centres for individual tumour types have adequate case volumes, expertise and a concentration of multi-disciplinary specialist skills.

Ireland has to maintain its commitment to highly organised cancer control service and adapt a highly effective new treatments ensure that the progress to date can be sustained even in a very constrained financial environment.

Ensuring that services are consistent with national standards and provided in high volume multidisciplinary environment offers the best outcome for patients and the best value for money in the country.



## UICC efforts in cancer control

### Professor Mary Gospodarowicz, Union International Contre le Cancer (UICC)

Over 75 years ago, cancer researchers created the Union for International Cancer Control (UICC) to bring together cancer professionals and volunteers in a unified mission to eliminate cancer as a life-threatening disease for future generations. The UICC ([www.uicc.org](http://www.uicc.org)) members include 500 organizations from over 120 countries united to raise awareness about cancer, education, standard setting, in support of the world cancer declaration.

One of the oldest programs of the UICC is its TNM Project that defines cancer staging classification. Cancer stage reflects disease extent and is one of the fundamental determinants of outcome. The other long-standing is the fellowship program that has been running successfully since 1962 and will be celebrating its 50 years at the 2012 World Cancer Congress. UICC programs address the most urgent and most achievable issues in cancer control in the world. These include programs in childhood cancer, cervical cancer, and pain relief. A founding member of NCD Alliance ([www.ncdalliance.org](http://www.ncdalliance.org)), UICC lobbies to place cancer control on the global agenda. The 2011 United Nations High Level Meeting on Prevention and Control of NCDs provided a unique opportunity to put cancer on the global agenda. UICC activities include annual World Cancer Day on February 4<sup>th</sup>; the Annual World Cancer Leaders Summit that brings together key decision makers to debate emerging issues in cancer. The UICC World Cancer Congress brings together participants from across the world every two years.

UICC with its broad membership has a unique opportunity to speak for cancer control.



Jevtana® (cabazitaxel)  
Prescribing Information

**Presentation:** Vial containing 60mg cabazitaxel, with an accompanying vial of solvent. After dilution with the solvent, 1ml of solution contains 10mg cabazitaxel. **Indications:** Treatment, in combination with prednisone or prednisolone, of hormone refractory metastatic prostate cancer previously treated with a docetaxel-containing regimen. **Dosage and Administration:** Use of Jevtana should be confined to units specialising in the administration of cytotoxics and supervised by experienced anticancer chemotherapy specialists. Jevtana is administered as a 1 hour intravenous infusion every 3 weeks in combination with oral prednisone or prednisolone 10 mg administered daily throughout treatment. The recommended dose of Jevtana is 25 mg/m<sup>2</sup>. Premedication with the following intravenous medicinal products: antihistamine (dexamethasone 8 mg or equivalent), corticosteroid

(dexamethasone 8 mg or equivalent), and H2 antagonist (ranitidine or equivalent) should be given at least 30 minutes prior to each administration of Jevtana. Antiemetic prophylaxis is recommended and can be given orally or intravenously as needed. **Elderly:** No specific dose adjustment for the use of cabazitaxel in elderly patients is recommended. **Children:** Not recommended. **Hepatic impairment:** see contraindications. **Contraindications:** Hypersensitivity to the active substance or excipients, baseline neutrophil count of <1,500 cells/mm<sup>3</sup>, liver impairment (bilirubin ≥ ULN, or AST and/or ALT ≥ 1.5 × ULN), concomitant vaccination with yellow fever vaccine. **Precautions and Warnings:** Patients should be observed closely for hypersensitivity reactions. Complete blood counts must be monitored on a weekly basis during cycle 1 and before each cycle thereafter. Reduce dosage with: febrile neutropenia or neutropenic infection, Grade ≥ 3 neutropenia for more than one week (despite G-CSF use), Grade ≥ 2 peripheral neuropathy, Grade ≥ 3 diarrhoea or persisting diarrhoea. Ensure adequate hydration throughout treatment to prevent complications such as renal failure. Discontinue treatment in cases

of renal failure ≥ Grade 3 (CTCAE 4.0). Caution recommended in patients with haemoglobin <10 g/dl and appropriate measures taken as clinically indicated. Solvent contains 96% (15% v/v) ethanol which should be taken into account in high-risk groups such as patients with liver disease, or epilepsy. **Interactions:** Avoid coadministration with strong CYP3A4 inhibitors as they may increase the plasma concentrations of cabazitaxel. Avoid coadministration with strong CYP3A4 inducers as they may lead to decreased plasma concentrations of cabazitaxel. Vaccination with a live attenuated vaccine should be avoided in patients receiving cabazitaxel. Response to killed or inactivated vaccines may be diminished. **Pregnancy and Lactation:** Cabazitaxel is not recommended during pregnancy and in women of childbearing potential not using contraception. Cabazitaxel should not be used during breastfeeding. For full information on Adverse Events please consult the Jevtana Summary of Product Characteristics. **Adverse Reactions:** Infections and infestations Septic shock, sepsis, cellulitis, urinary tract infection, cystitis, upper respiratory tract infection, herpes zoster, candidiasis. **Blood and the lymphatic system** Neutropenia, anaemia, infections (including sepsis and pneumonia), febrile neutropenia, thrombocytopenia, neutropenic sepsis. **Skin and subcutaneous tissue** Alopecia, erythema, dry skin.

SANOFI ONCOLOGY



Gastrointestinal Diarrhoea, nausea, vomiting, constipation, abdominal pain, abdominal pain upper, abdominal distension, dyspepsia, gastroesophageal reflux disease, dry mouth, haemorrhoids, rectal haemorrhage. **Nervous system** Peripheral sensory or motor neuropathy, paraesthesia, hypoaesthesia, dysgeusia, dizziness, headache, lethargy, sciatica. **Cardiac, vascular** Atrial fibrillation, tachycardia, hypotension (including orthostatic), deep vein thrombosis, flushing, hot flushes. **Metabolism and nutrition** Anorexia, dehydration, hyperglycaemia, hypokalaemia. **Eye** Lacrimation increased, conjunctivitis. **Ear and labyrinth** Tinnitus, vertigo. **Psychiatric** Anxiety, confusional state. **Musculoskeletal, connective tissue and bone** Myalgia, arthralgia, pain in extremities, back pain, flank pain, musculoskeletal chest pain, muscle spasms. **Respiratory, thoracic and mediastinal** Dyspnoea, cough, pneumonia, oropharyngeal pain. **Renal and urinary disorders** Renal failure (including acute), dysuria, renal colic, haematuria, pollakiuria, hydronephrosis, urinary retention, urinary incontinence, ureteric obstruction. **Reproductive system and breast** Pelvic pain. **General disorders and administration site reactions** Asthenia, fatigue, pyrexia, peripheral oedema, mucosal inflammation, pain, chest pain, oedema, chills, malaise. **Immune system disorders and injury** Hypersensitivity reactions. **Investigations** Weight decreased, elevated AST and transaminases. **Marketing Authorisation Number:** EU/1/11/676/001 **Marketing Authorisation Holder:** Aventis Pharma S.A., 20 avenue Raymond Aron, 92165 Antony Cedex, France. **Further information is available from:** Sanofi 18 Riverwalk, Citywest Business Campus, Dublin 24 or contact [Irmedinfo@sanofi.com](mailto:Irmedinfo@sanofi.com) Tel.: (01) 4035600.

Please refer to the Summary of Product Characteristics which can be found on IPHA @ <http://www.medicines.ie/> before prescribing. Information about adverse event reporting can be found at [www.imb.ie](http://www.imb.ie). Adverse events should be reported to the Sanofi Drug Safety Department on +353(0)14035600



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ARE  
AFFECTED  
BY CANCER.

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We are funding cancer research to help find a cure.

We are making sure people get diagnosed earlier.

We are supporting people through their treatment.

We're making sure people who do get cancer, get the best treatment.

We can't provide our vital services without the people who support us. We thank you!

For advice, support and information about cancer, talk to a specialist cancer nurse in confidence on **1800 200 700** or to offer your support, please contact us at **1850 60 60 60** or visit [www.cancer.ie](http://www.cancer.ie)



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Even a small amount of  
**Androgen**  
can fuel tumour growth.<sup>1-5</sup>

That's why the goal is to reduce  
testosterone to **undetectable** levels.

**References:** 1. Gregory CW et al. Androgen receptor stabilization in recurrent prostate cancer is associated with hypersensitivity to low androgen. *Cancer Res* 2001; 61: p2892-2898. 2. Holzbeierlein J et al. Gene expression analysis of human prostate carcinoma during hormonal therapy identifies androgen-responsive genes and mechanisms of therapy resistance. *Am J Path* 2004; 164 (1): p217-227. 3. Yu S-Q et al. The diverse and contrasting effects of using human prostate cancer cell lines to study androgen receptor roles in prostate cancer. *Asian J Androl* 2009; 11 (1): p39-48. 4. Corey E et al. LuCaP 35: a new model of prostate cancer progression to androgen independence. *Prostate* 2003; 55 (4): p239-246. 5. Loberg RD et al. Development of VCaP androgen-independent model of prostate cancer. *Urol Oncol* 2006; 24 (2): p161-168.



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## **Bridging the void: Capturing timely population-based data on cancer stage and recurrence**

**1.1**

**Helen Farrugia<sup>1</sup> Georgina Marr<sup>1</sup> Graham Giles<sup>2</sup>**

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### **Background**

Australian cancer registries collect a range of data from hospitals and pathology laboratories but information on staging and recurrence remains an acknowledged void in population-based data for cancer control. Diagnostic imaging reports provide a rich source of information pertaining to stage and recurrence. Natural Language Processing (NLP) has potential to capture these data from imaging report electronic repositories. The aim was to develop NLP algorithms for cancer registries to capture and extract information on stage and recurrence in real time from diagnostic imaging report repositories.

### **Methods**

1. Develop and trial NLP algorithms to capture stage and recurrence from imaging reports.
2. Compare NLP data capture with that of clinical coders.
3. Incorporate NLP derived information with existing registry data to evaluate the capacity of the product to deliver staging and recurrence at the population level.

### **Results**

Our NLP trials have achieved 100% sensitivity and 97% specificity for identifying reports relevant to cancer. Stage was successfully extracted from 88% of lung cancer related reports.

### **Conclusions**

Use of NLP technology by registries to interrogate diagnostic imaging databases can significantly contribute to bridging the void in population-based data on cancer stage and recurrence with minimal burden on health services and in a timely fashion.

## **New methods for estimating national cancer incidence in Germany**

**1.2**

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German Centre for Cancer Registry Data

### **Background**

Population-based cancer registries established full coverage of all German federal states by the end of the last decade. While several registries can boast long histories with high levels of data quality, differences between registries regarding starting dates, legislative frameworks and financial support still lead to substantial variation in completeness of incidence data, thus requiring the estimation of nationwide statistics.

### **Methods**

The Centre for Cancer Registry Data at the Robert Koch Institute, founded in 2009, has developed new methods for estimating nationwide cancer incidence in Germany. The methods use reported data for those regions where registration is estimated to be complete, while for incomplete regions incidence is estimated based on the mortality to incidence ratio, using five well established registries as a reference.

### **Results**

For the year 2008, a total of 470,000 new cancer cases were estimated, based on 390,000 reported cases. Newly established screening programs have led to a sharp increase in breast cancer and melanoma incidence. Additionally, an increase in thyroid cancer incidence has been noted, as has also been observed in other European countries.

### **Conclusions**

The new approach to incidence estimation allows for a smooth transition between estimating and counting nationwide cancer incidence, reflecting the continuously improving database in Germany.

## **The economic evaluation of cancer registration in Europe**

**1.3**

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Turin, Italy

### **Background**

Little has been reported on the costs of cancer registration and standard indicators have not been developed yet. This article investigated costs and outcomes of a sample of 18 European registries, covering a population of 58.8 million inhabitants.



## Methods

In the framework of the EUROCOURSE Project, a questionnaire asked the Registries for data on real costs, concerning personnel, IT, infrastructure and materials. Human costs were divided by professional position and by activity performed. As outcomes we considered publications in peer-reviewed journals (number of articles and Impact Factor), and some characteristics of the Registries' websites.

## Results

In our sample, the average cost per inhabitant covered was €0.27 (range €0.03–€0.93), while the mean cost per case registered was €50.63 (range €6–€205). Human work took on average the 79% of total resources. Resources spent in routine activities predominated over those allocated with research, with few exceptions. In terms of outcomes, the last five-years impact factor appeared related to the fraction of the budget allocated to research.

## Conclusions

Different costs of cancer registration across Europe can be attributed to the combination of three principal factors: size of population covered, national economical profile and length of activity.

## Global initiative for cancer registry development in low- and middle-income countries (GICR): Data for action

1.4

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International Agency for Research on Cancer

## Background

By 2030 over 60% of the global cancer burden is estimated to occur in the developing world, which is the least equipped to cope with this situation and where high-quality population-based cancer registration (PBCR) is lacking. GICR, an IARC-led initiative backed by several national, regional and international organisations, aims to develop the capacity to produce reliable, high-quality information on the burden of cancer in low- and middle-income countries (LMIC) so that effective cancer control policies may be developed, implemented and evaluated.

## Methods

A regional implementation approach sees regional registry resource centres ("Hubs") providing support, advocacy, consultancy and training for those working in the field of PBCR within designated regions in LMIC. Longer-term, the Hubs will be the focal point for support for registration through continued expansion of activities and responsibilities, serving as IARC "Centres of Expertise".

## Results

Since November 2011, three pilot Regional Hubs were selected and became operational, covering Eastern, South Central and South Eastern Asia; sub-Saharan Africa; Northern Africa and Western Asia. A Regional Hub for

Latin America is planned in 2013. Advocacy resources with a regional focus were released; a webinar series on CanReg was launched; twinning schemes are being developed, as well as training activities.

## Conclusions

GICR is expected to result in an increase in the number and quality of PBCR in LMIC, and ultimately in national cancer control interventions guided by reliable data. Hubs will improve the timeliness and local relevance of support to cancer registries. <http://gicr.iarc.fr>

## Enhancing cancer registration in sub-Saharan Africa: The African Cancer Registry Network

1.5

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<sup>5</sup> Blantyre Cancer Registry, Malawi

## Background

In 2011 INCTR sponsored the development of an East African Registry Network, with members in 7 countries. The success of this model has allowed expansion, to become the African Network of Cancer Registries (AFCRN). The first aim of AFCRN is to provide a 'Regional Hub' for countries of sub-Saharan Africa, with activities to:

- provide technical and scientific support to registries;
- deliver tailored training in cancer registration methods;
- advocate the cause of registration and improve networking among registries;
- coordinate international research projects and disseminate results of such activities.

## Methods

The programme of consultancy and training is described on the website ([www.afcrn.org](http://www.afcrn.org)). Collaborative studies include standardizing stage at diagnosis, cancer survival, costing of registry activities and methods for estimation of completeness.

## Results

Cumulative incidence of cancer (excl. KS & NMSC) in women, 0-64 years of age, (East Africa: 2003-7)

Kampala (Uganda)	15.1%	
Harare (Zimbabwe)	17.8%	
Blantyre (Malawi)	16.6%	
Nairobi (Kenya)	14.7%	
UK*	14.7%	
USA*	15.2%	
France*	15.7%	(* from GLOBOCAN 2008)

## Conclusions

Cancer is not a rare disease in Africa hence the need for systematic cancer control programmes maximising scarce resources. AFCRN aims to extend and improve cancer registration in the continent.

## Biomarkers and their implementation in cancer registration: the example of HER2 testing in Ireland 2.1

Marianna De Camargo Cancela, Linda Sharp,  
Mary Chambers, Harry Comber  
National Cancer Registry Ireland

### Background

Tumours markers help determine treatment and prognosis. Over time, markers and assays evolve and levels of utilization change. Since 2002 the National Cancer Registry Ireland has recorded information on human epidermal growth factor receptor 2 (HER2) in breast cancer. We investigated quality of HER2 data, including how recording of test results varied over time and by other factors.

### Methods

Breast cancers (ICD10 C50) incident 2002-2008 were identified and HER2 results recorded by the Registry classified as positive, negative, or equivocal. Additional information on second tests conducted in equivocal cases (Allred score 2+) was sought from pathology reports. Factors associated with having a HER2 result recorded were determined by logistic regression for cases diagnosed 2006-2008.

### Results

11,673 of 16,551 (70%) breast cancer cases had a HER2 test result recorded; this percentage increased over time (2002: 42%; 2008: 87%). The availability of two assays (FISH and IHC), with different positivity thresholds, made classification of results difficult. 870 cases had an equivocal result initially (7%); results of second tests were found for 410 (47%). Married women were significantly more likely to have a HER2 result; area of residence at diagnosis also predicted test receipt.

### Conclusions

The percentage of cases with a HER2 result recorded increased over time. Socio-demographic factors predicted whether a result was available. After additional data collection, a proportion of cases could not be assigned a definitive result. Recording of biomarker test results presents several challenges to cancer registries.

## REDEPICAN: guidelines for external evaluation of population-based cancer registries 2.2

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<sup>6</sup> Registro Argentino de Melanoma Cutáneo

<sup>7</sup> Registro Nacional de Tumores, Ecuador

<sup>8</sup> Ministerio de Salud y Ambiente de la Nación, Argentina

### Background

REDEPICAN is a network of 10 groups working in Epidemiology and Cancer Information Systems in Latin America and Spain. One objective was to establish a procedure and a structured protocol for evaluation of population-based cancer registries (PBCRs). The objective was to elaborate REDEPICAN guidelines for evaluation of PBCRs and test them.

### Methods

Experts on cancer registration and medical audit produced an evaluation guideline. Seven domains were established. For each domain several criteria with their corresponding standard were established. Compliance with the standard was scored in three levels. Two courses for training reviewers were organized. Guidelines were tested in Spain and Latin America by external review teams.

### Results

REDEPICAN Guidelines contain 68 criteria. According to the score a registry is qualified as fair (41-199), good (200-299) or excellent (300-350). The domain on registration practices represents 25% of the score, followed by completeness and validity (19%), dissemination (19%), structure (13%), confidentiality (11%), comparability (9%) and procedure manual (3%).

### Conclusions

Piloting was particularly useful to 1) refine criteria and standards, 2) incorporate the needs of clients and 3) stress the domain on dissemination. REDEPICAN Guidelines were feasible to administer as well as useful particularly in Latin America. Guidelines are finalized and ready to use in other countries and registries.

## The evaluation of a new death registration system in the city of Izmir, Turkey

2.3

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### Background

In this study, the new death registration system which has been put into practice in Turkey since 2009 was evaluated in terms of completeness and accuracy in the case of Izmir city.

### Methods

Completeness was assessed by a two-step process. First, population counts from the 2000 and 2010 Census rounds were adjusted for completeness using the Generalized Growth Balance method. These adjusted population data and annual intercensal deaths were analyzed using the Extinct Generation Method to arrive at an overall estimate of the completeness of death registration for five-years old and over for the intercensal period. For accuracy, the proportion of ill-defined underlying cause of death in 2010 was established. The proportion of ICD-10 codes for symptoms; deaths from injuries where the intent is not determined; cardiovascular disease categories lacking diagnostic meaning; cancer deaths coded to categories for secondary or unspecified sites were determined.

### Results

It was found out that the completeness of death registration in the urban parts of Izmir were 91.8% for males and 87.1% for females. Ill-defined underlying cause of death was 29.7% of all causes.

### Conclusions

The new death registration system was found insufficient in terms of completeness and accuracy in Turkey.

## Completeness of cancer registration in Brazilian PBCR using the Flow Method

2.4

Marceli de Oliveira Santos<sup>1</sup> Rejane de Souza Reis<sup>1</sup>  
Julio Fernando Pinto Oliveira<sup>1</sup> Juliana Moreira de Oliveira  
Ferreira<sup>1</sup> Luis Ivan Ortiz Valencia<sup>2</sup>

<sup>1</sup> Instituto Nacional de Cancer Jose Alencar Gomes da Silva

<sup>2</sup> Universidade Federal do Rio de Janeiro

### Background

Population-based cancer registries are essential to public health and research. The cancer registries provide information on the surveillance of cancer incidence and survival. A high-quality cancer registration is fundamental to monitoring cancer burden and identifies patterns and trends in various population groups, in different geographic areas, and over time. Cancer registries try to achieve maximum completeness in case-finding procedures in order to ensure that comparative studies are not distorted by variations on efficacy of registry procedures.

### Methods

Implementation of the flow method using the R statistical program for five PBCR, to estimate completeness by sex, age and selected tumors, in which the proportions of unregistered patients are derived from the time distributions of the probabilities.

### Results

The overall completeness was above 80%. There was no difference by gender. The worst completeness was observed in teenagers and young adults. Lethal cancers had more completeness at the first years. At the end of 5 years, all cancers were similar (around 80%).

### Conclusions

The Flow Method claims to be adaptable to cancer registries in countries with low to middle income profiles. This method could be applied to Brazilian cancer registries and allows cancer registries to provide routine surveillance of completeness.

## Quality of data in Ardabil cancer registry: a successful experience of population based cancer registration in Iran

2.5

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### Background

It is very important for any active population cancer registry to exhibit the quality indexes of its data. Ardabil cancer registry (ACR) is the first population based cancer registry in Iran and we aimed to provide some details about its data quality here.

### Methods

The ACR is a multiple source registry and provides consistent reports of cancer incidence and mortality among the approximately 1.2 million inhabitants of Ardabil province. Our analysis has been performed on all registered cancer data from 2004 to 2008 and we calculated the completeness of each type of cancer based on the Ajiki formula. We also examined validity and comparability of all cancer data in the ACR.

### Results

During five years 7460 cases were registered in the ACR and the proportion of notifications per case was 1.55. The age standardised rate for all cases was 166.2 for male and 131.2 for female. The age specific crude rate curve of all cases revealed a slightly under registration in elderly female cases. In terms of basis of diagnosis DCO (death certificate only) percentage has declined from 22.5% to 15% in five years. Total completeness of cancer cases was 79.9% and the most complete cases were Liver (95%), Small intestine (91%) and Lung (88.4%).



The most valid cases were Stomach, Esophagus and Lung respectively.

### Conclusions

There is an obvious progress in quality of data in the ACR within its first five years of activity; this reveals a successful experience of population based cancer registration in Iran.

## Recent trends in colorectal cancer incidence and mortality in south-eastern Europe 1999-2008

3.1

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### Background

The aim of this study is to present recent trends for colorectal cancer (CRC) incidence and mortality in Southeastern (SE) European countries for 1999-2008.

### Methods

Data from cancer registries in Slovenia, Croatia, Serbia (Central), Romania (Cluj County), Bulgaria, Turkey (Izmir and Antalya), Cyprus and Malta were analyzed. Age standardized incidence and mortality rates (ASIRs, ASMRs, World population, per 100,000) were calculated by the direct standardization method. Average Annual Percent of Change (AAPC) were calculated by JoinPoint Program.

### Results

ASIR varied from 48.3 (Slovenia) to 18.3 (Antalya) in males and from 27.4 (Slovenia) to 9.4 (Antalya) in females in 2008. In males, incidence has been increasing throughout the region (AAPCs 1.0-4.4%) and mortality has increased in all registry (AAPCs 1.5-2%) regions except Slovenia and Malta in which the trends seem stable. In females increasing trends are on the agenda also in most of the registry regions with the mortality increasing in Bulgaria and Serbia (AAPCs 1.0-2.2).

### Conclusions

Despite the decreasing pattern of CRC mortality rates in the rest of Europe, it still shows an increasing trend in some SE countries, mainly in those where primary and secondary preventive measures for colorectal cancers are not available.

## International trends in the incidence of cutaneous malignant melanoma 1953-2008

3.2

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### Background

We studied global patterns and time trends of malignant melanoma, rates of which have increased over the past 50 years in fair-skinned populations.

### Methods

We calculated the cumulative risk and age-standardised incidence rates, by period and birth cohort, annual percentage changes and incidence rate ratios in 39 countries.

### Results

The highest rates of melanoma are in New Zealand, Australia and the U.S. In Europe, rates are elevated in Northern Europe, Switzerland and Czech Republic, and continue to rise in all ages in most countries. Trends in Australia, New Zealand, Canada, the U.S., Israel, and Norway indicate a stabilisation in incidence, mostly in younger people. Uniform increases in rates are seen in successive birth cohorts up to the late-1940s, followed by a stabilisation or decline for more recently-born cohorts in Australia, New Zealand, the U.S., Canada and Norway.

### Conclusions

The recent time trends appear more related to birth cohort than period, whereas the time lag between changing UV exposure and the resulting stabilisation in incidence might be too short to be the direct result of skin cancer prevention activities. Reduction in rates observed in people aged 25-44 highlight the importance of UV radiation awareness campaigns that target older people.

## Cancer in Manitoba's First Nations: Evidence of a Gathering Storm

3.3

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### Background

Until recently, cancer has been thought to be less common in Canada's First Nations (FNs) than in non-FNs for all cancers combined and many specific sites. However, there are indications that this is changing, with cancer rates in FNs increasing rapidly. Confirming this hypothesis is problematic given the lack of a FNs identifier in most Canadian cancer data sources. In Manitoba, FNs provincial and tribal organizations and government agencies collaborated to identify FNs in the Manitoba Cancer Registry and other health databases. Objective: Identify FNs in Manitoba's cancer registry, and describe incidence and mortality trends in FNs and non-FNs from 1984-2008.

### Methods

Linkage of the federal Indian Registry System database with the Manitoba Population Health Registry was successful for over 93% of records, a 50% increase in our ability to distinguish FNs for health research. A de-identified file was produced for FNs and linked to the cancer registry at CancerCare Manitoba.

### Results

Cancer incidence over 25 years has remained relatively stable for the non-FNs population in Manitoba. For the FNs population, rates increased and now approximate the rates found in the non-FNs population. A similar trend was apparent for cancer mortality (all sites and specific sites).

### Conclusions

Cancer is increasing for FNs in Manitoba. These initial analyses provide the basis for further efforts, including early detection and prevention.

## Time Trends in Cancer in Bhopal, India (1988-2005)

3.4

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### Background

The present study examines the pattern of cancers and their trends in the population of Bhopal.

### Methods

Evaluation of trends in Age-Adjusted Rate (AAR) was done using the Joinpoint method on incidence data collected over the years 1988-2005 by Population Based Cancer Registry Bhopal.

### Results

The leading sites of cancer among males during the year 1988 were lung (11.0%), tongue (10.5%), mouth (8.8%), hypopharynx (6.4%) and prostate (3.0%). Among females cancer of the cervix (24.6%) followed by breast (21.2%), mouth (5.3%), oesophagus (5.9%), ovary (5.3%) and gall bladder (4.0%). Between the years 1988 and 2005 significant ( $P < 0.05$ ) rising trends were observed in cancers of the mouth, larynx and prostate among males and among females breast, ovary, and gallbladder. Significant decreasing trends were observed in cancers of hypopharynx among males and cancer of the cervix and oesophagus among females.

### Conclusions

These trends have resulted in a significant change in the pattern and load of cancer in the population of Bhopal. The changes in the trend and pattern of cancer will help the health care system in reformulating the cancer care and cancer control activities in the region.

## Visualization of patients developing cancer at a young age in Japan

3.5

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### Background

The aging society in Japan has led to a rapidly increasing number of cancer cases. On the contrary, cancer onset at a young age is mentioned frequently. The study aimed to analyze and visualize this tendency statistically.

### Methods

National estimated cancer incidence during the period 1975-2007 was used to calculate age-specific incidence rates by sex, 4 time periods, 20 primary sites and 18 age groups. The tendency of "developing cancer at a young age" was confirmed, by applying Joinpoint analysis and other statistical tests, in terms

of 3 criteria related to cancer control; increasing proportion of young patients (cancer care), increase in incidence rate in young age groups (prevention program), change in peak incidence age and age of initial rise in incidence (etiology research).

### Results

Increasing incidence rates of young patients in lung cancer and gynecological cancer, thyroid cancer, and malignant lymphoma were observed. The proportion of patients in younger age groups decreased due to the aging of society for most sites, except for cervix and prostate cancer. There was a change in the peak age for cervix, ovary and female thyroid cancer. Cervix cancer matched all 3 criteria for “developing cancer at a young age”.

### Conclusions

These results confirm that patients with some cancer types are getting younger. We should pay attention to changes in youth lifestyle, promote screening programs, and allocate medical resources appropriately to them.

## Reproductive history and the risk of bladder cancer; a population based cohort study in ParCa 2 4.1

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### Background

The incidence of bladder cancer is substantially lower in women compared to men, a difference that cannot be fully explained by established risk factors such as smoking and occupational hazards. Our aim was to investigate if reproductive history influences the risk of bladder cancer in women.

### Methods

Utilizing the ParCa 2 database, encompassing two million Swedish women born between 1932 and 1969, we performed a population-based cohort study. Main exposures of interest were maternal parity and age at first birth. The relative risks of bladder cancer were estimated using Cox proportional hazards regression models.

### Results

By means of record linkage, 2,860 cases of bladder cancer were identified in the National Cancer Register. Compared to nulliparous women, the risk of bladder cancer was lower in parous women (HR = 0.80, 95% CI: 0.72-0.89). Further, among parous women, the risk decreased with increasing age at first birth.

### Conclusions

Taken together, our results support the notion that reproductive history is associated with subsequent risk of bladder cancer.

## An exploratory study: indoor and outdoor work, socio-economic status and skin cancer 4.2

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### Background

UK studies exploring the risk of skin cancer in occupational settings are limited.

### Methods

Data on persons (3,096), in the South West, where skin cancer (C43 and C44) was recorded as an underlying or contributory cause of death on the Death Certificate (2001-2010) were extracted. Occupation was classified in terms of exposure using an occupational health model (outdoor, intermittent, and indoor), and socio-economic status (NS-SEC).

### Results

Outdoor workers were more likely to die older and with a non melanoma, and indoor workers die younger with a melanoma ( $p < 0.001$ ). No significant difference was observed for intermittent workers. Two outdoor professions (agriculture and unskilled outside) appear to have a significant association with non melanoma skin cancers, whereas two indoor groups (medical and allied professions and managerial) appear to be associated with melanoma ( $p = 0.001$ ). No association was shown for clerical workers and outdoor professionals.

### Conclusions

There appears to be different induction mechanisms for melanoma and non melanoma, with outdoor workers more likely to die with a non melanoma and indoor workers (especially those from higher socio economic groups) to die with a melanoma.

## Associations between population density and cancer risk 4.3

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### Background

Some studies suggest urban/rural variations in cancer incidence; whether these simply reflect urban/rural socio-economic variation is unclear. We investigated associations between population density and cancer risk, adjusting for socio-economic indicators.

## Methods

Invasive cancers diagnosed 1995-2007 were extracted from the National Cancer Registry Ireland and the Northern Ireland Cancer Registry and allocated to small geographical areas. Areas were grouped into approximate population tertiles based on population density (<1 person/hectare; 1-15 p/h; >15 p/h). Relative risks were computed, by negative binomial regression, adjusting for age, country and area-based socio-economic indicators (unemployment, educational attainment, elderly living alone).

## Results

Risks of non-melanoma skin, colorectal, lung, stomach, bladder, head & neck, and oesophageal cancers were significantly higher in males and females resident in the most, compared to the least, densely populated areas. Risks of breast, cervical, kidney and brain cancer were higher in females resident in more densely populated areas. Associations were strongest for lung (males: RR>15 vs <1 p/h=1.54, 95%CI 1.47-1.61; females: RR=1.74, 1.65-1.84), head & neck (males: RR=1.53, 1.42-1.64; females: RR=1.29, 1.15-1.45), bladder (males: RR=1.30, 1.21-1.39; females: RR=1.31, 1.17-1.46) and cervical cancer (RR=1.48, 1.35-1.62). Only prostate cancer showed the opposite trend. Non-Hodgkin's lymphoma, leukaemia, melanoma, and pancreatic, ovarian and uterine cancers varied little by population density.

## Conclusions

Several cancers are positively associated with population density after adjusting for socio-economic markers. Some associations may be due, in part, to geographic variations in health services and service utilization; others are possibly due to geographical variations in smoking.

## Slovenian maps of local standardized incidence ratio

4.4

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## Background

Cancer maps are important tools in public health research. However, small area mapping has always been a challenge. In Slovenia the geographic coordinates for cancer cases as well as for population are available, so a statistical method to estimate the standardized incidence ratio (SIR) locally was developed, based on the georeferenced data. We call this approach the "local estimation of SIR".

## Methods

The cancer data were provided by the Cancer Registry of Republic of Slovenia (CRS) and population data by the Central Population Register. The SIR was calculated for each grid point covering the study area producing a smooth cancer incidence map.

## Results

Compared to smoothed SIR maps based on aggregated data, the map of local SIR estimates emphasizes extremes. But unlike the maps, based on the observed SIR, these estimates are more stable, since they are based on (approximately) the same population size.

## Conclusions

The drawback of the local SIR estimation is that the geocoded data are not always available. The benefits are that the arbitrary administrative areas are ignored and, above all, such high resolution maps can reveal more local risk patterns helping to identify those where further investigation of an increased cancer burden is needed.

## Distant recurrences of colorectal cancer: a population-based study

5.1

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## Background

Data on distant recurrences are generally not registered by cancer registries. The aim of this study was to provide population-based data on the incidence of distant recurrences of colorectal cancer origin related to relevant patient, tumour, and hospital characteristics at time of diagnosis.

## Methods

All patients diagnosed with colorectal cancer M0 between 2003 and 2008 in the Dutch Eindhoven Cancer Registry were included (n=6044). By means of active follow-up by the Cancer Registry staff within the 10 hospitals, data on development of distant recurrences were collected for all patients. Median follow-up was 44 months.

## Results

1052 (17%) patients were diagnosed with distant recurrent disease (15% at 3 years follow-up). Most common sites of recurrence were liver (60%), lung (39%), extra-regional lymph nodes (22%) and peritoneum (19%) (multiple sites possible, most often liver and lung (14%)). Patients with distant recurrence were younger at time of initial cancer diagnosis (67.7 vs. 69.4 years). Of all patients with pT1 tumour stage 4% developed a recurrence, 10% of pT2, 21% of pT3, 34% of pT4 and 11.0% of pTx. Of patients with positive lymph nodes, 33% developed recurrent disease and 25% of patients with poorly/undifferentiated differentiation grade. There were no significant differences in recurrence rates between the hospitals (15%-20%, p=0.33).



## Conclusions

Seventeen percent of colorectal cancer patients (M0) developed a distant recurrence, being strongly related to patient and tumour characteristics but not hospital of diagnosis. This study shows that routine collection of recurrences by cancer registries is feasible.

## Recent trends in resection rates among non-small cell lung cancer patients in England

5.2

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## Background

Lung cancer resection rates are low in England, compared with some other countries. We analysed the recent trends in surgical resection by age, sex, socioeconomic deprivation and type of surgical procedure in England.

## Methods

Data on 286,217 lung cancer patients excluding small cell lung cancer diagnosed between 1998 and 2008 were extracted from the English Cancer Registries and information on surgery was retrieved from linked hospital episode statistics records. We calculated the odds ratio of undergoing surgery per one year increment by age, sex, socioeconomic deprivation and surgical procedure.

## Results

The proportion of patients undergoing surgery increased from 8.8% in 1998 to 10.6% in 2008. The increase was similar in levels of socioeconomic deprivation (most affluent: OR=1.017 per one year calendar increment, 95%CI [1.006-1.028] and most deprived: OR=1.015, 95%CI [1.007-1.023]), slightly more pronounced among females (OR=1.023, 95%CI [1.016-1.029]) than males (OR=1.010, 95%CI [1.005-1.015]) and most prominent with increasing age (80-84 age group: OR=1.102, 95% CI [1.080-1.124] and 85+ age group: OR=1.130, 95% CI [1.069-1.193]). The proportion of patients undergoing pneumonectomy decreased in favour of an increase in lobectomies and sub-lobar resections.

## Conclusions

Resection rates have increased in England in recent years and increases have been most marked in older age groups.

## Increased adherence to treatment guidelines for colorectal cancer patients with diabetes: a population-based study

5.3

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## Background

We described changes in patient, tumour, and treatment parameters in colorectal cancer (CRC) patients with and without diabetes (DM).

## Methods

All 17,330 cases of primary CRC diagnosed between 1995 and 2009 in the Southeastern Netherlands were included. The Cochrane-Armitage test and logistic regression analysis were used.

## Results

12,059 patients were diagnosed with colon cancer and 5,271 with rectal cancer, of whom 1,512 (13%) and 532 (10%), respectively had DM. CRC patients with DM were 5 years older than those without DM and more often diagnosed with proximal colon tumours (60% vs. 54%). Resection rates decreased in stage IV CRC patients. Chemotherapy administration increased in stage III colon cancer patients with and without DM from 17% in 1995-1998 to 52% in 2007-2009 and from 36% to 64%, respectively. However, stage III colon cancer patients with DM less frequently received adjuvant chemotherapy (OR: 0.8 (95% CI 0.6-1.0) p=0.04). A similar proportion of stage II/III rectal cancer patients with and without DM received radiotherapy in recent years (91%-87%).

## Conclusions

CRC patients with DM less frequently receive chemotherapy. However, differences in treatment between those with and without DM are diminishing, probably due to better adherence to treatment guidelines for CRC patients with DM.

## Quality of rectal cancer surgery and its relationship to surgeon and hospital caseload: a population-based study

5.4

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### Background

Better outcomes for rectal cancer have been associated with increasing surgeon and hospital caseload, but there is less evidence of how caseload relates to quality of care. Our aim was to examine how measures of quality in rectal cancer surgery related to surgeon and hospital workload, and to outcomes.

### Methods

All colorectal surgeons in Ireland participated in an audit of rectal cancer based on an evidence-based instrument. Data was extracted from medical records by trained coders.

### Results

581 (95%) of the 614 rectal cancers diagnosed in Ireland in 2007 were audited; 49 hospitals and 86 surgeons participated. Ten hospitals (28%) treated fewer than five cases; seven treated less than three cases. Generalised linear mixed models were used to determine the relationship between surgeon or hospital caseload and measures of quality of care. A positive relationship between caseload and quality was seen for a few measures, more frequently for hospital than surgeon caseload. The relationship between caseload and quality of care was inconsistent, suggesting these measures do not represent a single dimension of quality. Survival was negatively associated with hospital caseload. There was no statistically significant relationship between survival and measures of quality of care.

### Conclusions

Quality of care was inconsistently influenced by surgeon and hospital caseload. Caseload may affect only one aspect of surgical management, such as the quality of pre-operative workup, and is not necessarily related to the quality of other hospital care. Simple measures of outcome, such as survival, cannot represent the complexity of this relationship.

## Patterns of care and survival in breast cancer, India

5.5

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### Background

To better assess patient care by Hospital Cancer Registries, a study of patterns of care according to clinical stage and treatment for cancers of breast, cervix and head & neck was undertaken.

### Method

A twelve page standardized patient information form specifically for each site was used for data capture through the internet. Software programmes were developed in house for data capture, checking, generation of tables including survival tables, graphs and analysis. Information forms from 17 institutions across India were received.

### Results

The number of cases accrued since 2006 is as follows: breast: 16,435; cervix: 11,280 head & neck: 24,381. For breast cancer, a total of 9,270 cases which were treated at the reporting institution were analysed. Stage 1 constituted 5.1% of all breast cancers, waiting time between date of diagnosis and date of cancer directed treatment was less than 1 month in 66% of cases. Various combinations of broad types and specific types of treatment by clinical stage has been looked into and survival thereof.

### Conclusions

Since the proportion of patients with breast conservative surgery was only 39% the need to consider more patients for conservative breast surgery should be looked into.

## Disability-adjusted life years: country-specific estimates for 27 cancers in 12 world regions

5.6

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### Background

Country comparisons that consider both the impact of fatal and non-fatal disease outcomes are valuable summary measures to aid health care planning.

### Method

We calculated years of life lost (YLLs) and years-lived with disability (YLDs) to derive disability-adjusted life years (DALYs) for 27 cancer sites worldwide.

### Results

An estimated 168.1 million years of healthy life were lost due to cancer worldwide in 2008. Colorectal, lung, breast and prostate cancers were the main contributors to the total DALYs in most world regions, and explained 22%-49% of the total burden from cancer. In Sub-Saharan Africa and Eastern Asia, an additional large burden from infection-related cancers (liver, stomach and cervix) was estimated (30% and 27% respectively). We observed marked global differences in the cancer profile of DALYs by country and region, however in all countries and for all cancers, years of life lost (YLL) are



the most important component in DALYs and contributed to over than 90% of the total burden. Nonetheless, we consistently observed higher YLLs (as a proportion of the total DALYs) in low resource settings.

### **Conclusions**

Irrespective of world region, age-adjusted DALYs lost from cancer are substantial. The consistently larger proportions of YLL in lower HDI countries imply that there are marked inequalities in prognosis after cancer diagnosis, highlighting the need for radically improved cancer care in low resource countries.

## **Saviour symptoms: The potential for earlier clinical diagnosis in three cancer sites**

**6.1**

**Conan Donnelly, Deirdre Fitzpatrick,  
Finian Bannon, Anna Gavin**  
Northern Ireland Cancer Registry

### **Background**

Efforts to increase cancer survival are increasingly focused on early diagnosis through clinical detection with much interest in earlier patient presentation through symptom awareness interventions. To ensure interventions are effective, evidence on symptom incidence, duration and their relationship with disease stage is required. This work was undertaken at a population level for lung, breast and colorectal cancer in Northern Ireland.

### **Methods**

Retrospective secondary care note review was completed for all lung, breast and colorectal cancer patients diagnosed 1996, 2001 and 2006. Symptom incidence and duration was documented and their relationship with stage was investigated using multivariate methods.

### **Results**

8,151 patients were included. The most common symptoms in each site were coughing in lung cancer (64%), breast lump in breast cancer (66%) and abdominal pain in colorectal cancer (53%). Symptoms varied little across the three years, however, increasingly patients presented asymptotically for breast cancer and fewer lung cancer patients presented with unresolved pneumonia. There was evidence of earlier breast/axillary lump presentation and later presentation of persistent coughing in 2006. Multivariate analysis will be presented.

### **Conclusions**

This research can inform guidelines and interventions promoting earlier diagnosis to improve survival.

## **Association between screening status and tumour subtypes in breast cancers diagnosed in women in the screening age-range**

**6.2**

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National Cancer Registry, Ireland

### **Background**

Screening for breast cancer via mammography has been implemented in many countries. We compared subtypes and other characteristics of tumours detected: detected through BreastCheck, the Irish breast cancer screening programme; in the interval between mammographies in screened women; and in women who did not participate in BreastCheck.

### **Methods**

We linked cancer registrations and BreastCheck records to identify women aged 50–66 years diagnosed with invasive breast cancer during 2006–2008 with known receptor subtype. Multinomial regression was used to test associations between screening status and subtypes (luminal A, luminal B, triple negative and Her2) adjusted for grade, size and nodal involvement.

### **Results**

2,832 women had known receptor subtype; 34% screen-detected, 13% intervals and 53% non-participants. Grade, size and nodal involvement of screen-detected, interval and non-participant's cancers differed significantly. Adjusting for these factors, interval cancers were 4.0 (95%CI 2.5, 6.5) times as likely as to be triple negative compared to screen-detected cancers, while non-participant's cancers were 2.3 (95%CI 1.5, 3.4) times as likely to be triple negative. Non-participant's cancers were 1.4 (95%CI 1.0, 1.9) times more likely to be luminal B than screen-detected cancers.

### **Conclusions**

The distribution of tumour subtype varied by screening status. Interval cancers and BreastCheck non-participants have worse tumour characteristics than screen-detected cancers.

## First Evaluation of Interval cancer rate in the German mammography screening program – results from the Epidemiological Cancer Registry, North Rhine-Westphalia 6.3

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### Background

Many individuals have to be examined in a cancer screening program to detect the few cases that actually have cancer, and the evaluation of the quality of these screening programs is of utmost importance. The rate of interval cancers – occurring in screen-negative participants in the interval between invitations – is one relevant indicator of program quality with potential implications for program effectiveness.

### Methods

Data from the German Mammography Screening Program (MSP; eligibility criteria: all women aged 50 – 69 years) were linked with data from the Epidemiological Cancer Registry (EKR) of the state of North Rhine-Westphalia (NRW). Interval cancers (IC), that is, in-situ and invasive breast cancers, occurring in all screen-negative women (examined for the first time in the MSP in NRW between 2005 and 2008) within 24 months after screen visit were identified. Data linkage was performed semi-automatically with pseudonymised procedures.

### Results

Among 878,764 screen-negative women we identified 2,036 IC (23.1 per 10,000 and 24 months); the IC rate was 7.4 in the first year, and 15.7 per 10,000 in the second year. The respective proportionate IC rates were 27% and 58%. 44% of all IC were of size T2-4.

### Conclusions

Evaluation of MSP quality parameters through a pseudonymised record linkage with EKR data is feasible. The IC rates results from the implementation phase of the MSP in the largest German federal state indicate a quality that is comparable to established European programs.

## Screening history of women with cervical cancer in Italy 6.4

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### Background

Organized cervical screening programs (CSPs) have been widely introduced in Italy. We aimed at retrieved screening history within CSPs of women with invasive cervical cancer (ICC) in areas covered by Cancer Registries.

### Methods

Screen-Detected (SD) women were those with a positive Pap-smear within a CSP, otherwise they were considered Non-Screen-Detected (NSD). Odds ratios (ORs) were calculated by logistic regression models adjusted for age.

### Results

Among 3473 women, aged 25-74 years and belonging to CSPs target population in the period 1995-2008, 32.3% were SD and 67.7% were NSD. Among 2350 NSD women, 27.7% were never invited by CSP, 55.2% were never compliant with CSP, and 17.1% had a last negative Pap-smear within a CSP (53.5% <3.5 years before diagnosis). Compared to SD, NSD women were more frequently resident in the Center or South/ Islands (ORs 1.4 and 7.8 vs. North, respectively) and born abroad (OR=1.6 vs. Italy); NSD had also more frequently non-squamous cells ICC histology (OR=1.5 vs. squamous) and higher ICC stages (OR=8.7 for FIGO III-IV vs. IA-IA1).

### Conclusions

In Italy, 68% of women with ICC were diagnosed outside CSPs, mainly because of non compliance with CSP invitation. These women had more advanced tumor stages, with negative prognostic effects.

## Use of Socio-economic Indexes and GIS for targeting areas for medical colon cancer screening

6.5

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### Background

The purpose of our study is to establish measures for the narrowing of areas for targeting colon cancer screenings by using accumulated cancer data and socio-economic indexes.

### Methods

The study group consisted of 547 colon cancer patients in Hirakata City, Osaka Prefecture, Japan, from 2004 to 2006. Their geographic information was obtained by GIS. Based on this information, colon cancer patients were mapped onto the detailed map of Hirakata City. Thus, the number of patients per administrative district was obtained, and 338 out of 397 administrative districts were selected for analysis. The expected prevalence per administrative district was calculated, using the age adjusted prevalence in Osaka Prefecture from 2004 and 2006, and the difference between the expected and actual prevalence per district was calculated. Multiple regression analysis was applied for the statistical analysis, which designated the difference between the expected and actual prevalence as criterion variable and socio-economic indexes as explanatory variable. The statistically significant criterion was 5%, and the statistical software, SAS 9.2 and JMP 9 were used.

### Results

Some social factors were suggested which were significantly related to the differences between the expected and actual prevalence of colon cancer rates ( $p < 0.05$ ): occupation, sex, age, and household conditions.

### Conclusions

This method was shown to be effective for narrowing down the target areas. The application of this method to other prefectures may clearly prove to be effective.

## The varying influence of socio-economic deprivation on breast cancer screening uptake in London, UK

6.6

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### Background

Breast cancer screening uptake has been shown to be associated with socioeconomic deprivation. This study aimed to assess this for women invited to their first routine screening appointment in London.

### Methods

Data on women aged 50–52 who had an invitation between 31/03/2006 and 31/12/2009 were obtained from the London Quality Assurance Reference Centre. Women were assigned to a deprivation quintile based on postcode of residence. Logistic regression was used to examine screening uptake in socioeconomic groups overall, within screening areas and ethnic groups.

### Results

Breast cancer screening uptake decreased with increasing deprivation (adjusted odds ratio (OR)=0.97,  $p < 0.001$ ). This pattern was also found in White British (OR=0.94,  $p < 0.001$ ), Black African (OR=0.89,  $p = 0.046$ ) and White Irish (OR=0.89,  $p = 0.055$ ) ethnic groups, and in South East London (OR=0.90,  $p < 0.001$ ) and South West London (OR=0.94,  $p < 0.001$ ) screening areas. In the West of London screening area uptake increased with increasing deprivation (OR=1.05,  $p = 0.002$ ).

### Conclusions

While overall there is lower uptake of breast screening in more deprived areas, this does not apply to all screening areas or ethnic groups. Private screening may influence uptake in some areas, while the low proportions of some ethnic groups living in more affluent areas may explain the lack of association between uptake and deprivation.

## The rapid increase in the number of cancer survivors in Eastern Switzerland

7.1

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### Background

Cancer survivors are a heterogeneous group with complex demands on the health system. Data concerning its total number and growing dynamics are scarce.

### Methods

Population and mortality data were retrieved from the Swiss Federal Statistical Office (FSO) and incidence data from the SGA cancer registry for 1980–2010; relative survival was calculated applying the Ederer II method. Complete prevalence for 1990–2010 was estimated using the PIAMOD program and the Jointpoint program was used to quantify the annual percent increase in the estimates.

### Results

In the period studied the number of cancer survivors approximately doubled with an exponential increase of 3.7% annually, from an estimated 9,207 in 1990 (1.87% of the population) to 18,263 persons in 2010 (3.35%). The increase is mainly due

to a high proportion of cancers with favorable prognosis such as breast cancer, prostate cancer and melanoma, but improved survival of almost all cancer types is contributing as well. We observed gender differences with higher increases in the male population (4.7% annually vs. 2.9% increase in women,  $p < 0.01$ ).

## Conclusions

Recent advances in early diagnosis and treatment have led to a continuing, rapid increase of cancer survivors in Eastern Switzerland, challenging the health system.

## Lost productivity due to colorectal cancer: patterns and costs for Ireland

7.2

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## Background

It is increasingly recognised that cancer can impact adversely on people's working lives. This has implications for employers and society in the form of lost productivity. We investigated patterns and costs of lost productivity due to colorectal cancer (CRC) in Ireland.

## Methods

Data from a survey of CRC survivors who had been working at diagnosis ( $n=159$ ) was combined with population-level survival estimates and national wage data to calculate costs of: temporary disability (cancer-related work absence); permanent disability (workforce departure, reduced working hours); and premature mortality. Costs were estimated for 2008 using the human capital approach.

## Results

Almost 40% of survey respondents left the workforce permanently after diagnosis. Similar proportions of males and females (89% v 93%) took temporary time off work following diagnosis; the average absence was similar (26.4 vs 24.7 weeks). One-fifth returned to work with reduced hours; the reduction was higher in males than females (21 vs 13 hours). Total costs of lost productivity per person were €223,324 for males and €177,789 for females. Male productivity costs were higher across all cost subcomponents. Premature mortality and permanent workforce departure were key drivers of costs.

## Conclusions

The costs of lost productivity due to CRC are substantial.

## Cancer rehabilitation indicators for Europe

7.3

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## Background

Little is known on cancer patients' rehabilitation needs at population level.

## Methods

EUROCHIP-3 invited a group of experts to propose a list of population-based indicators to describe cancer patients' rehabilitation in Europe.

## Results

Agreement was reached on two types of indicators. First, cancer prevalence indicators to describe the burden of rehabilitation needs according to time since diagnosis (total prevalence and by time) and patient health status (cured and qualified prevalence). These can be estimated through models of cancer registry (CR) data or collecting clinical follow-up data of CR patients. Second, indicators measuring rehabilitation success were suggested: rate of return to work, quality of life and specific rehabilitation need satisfaction. To have comparable data across Europe, patient samples extracted from CRs will be asked to complete relevant questionnaires. Three aspects must be considered: patients may not be aware that they have cancer; non-participation of patients in the surveys could bias the population coverage; some CRs cannot be authorized to approach patients due to national confidentiality laws.

## Conclusions

EUROCHIP is aware that such studies are expensive and can meet various problems, but the dramatic increase of cancer prevalence obliges researchers to start to map cancer patients needs to give fundamental information for policy-makers.

## Prognostic factors for survival after breast cancer metastasis

8.1

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## Background

Little is known about the influence the treatment of metastasis has on prognosis after the development of metastases. The aim of this nationwide population-based study was to define prognostic factors for survival of breast cancer patients with distant metastasis (DM).



## Methods

All Dutch women diagnosed with breast cancer in the period 2003–2005 and treated with curative intent who developed a DM during 5 year follow-up were selected from the nationwide cancer registry (N=2665). Prognostic factors for overall survival were determined by univariable and multivariable survival analyses.

## Results

Multivariable analyses showed that grade, tumour size, lymph node status and hormone receptor status of the primary tumor and age at diagnosis of DM, site and treatment of DM are independent prognostic factors for survival after distant metastasis. Patients older than 70 years at metastasis diagnosis were significantly less often treated with chemotherapy and more often with endocrine therapy. In univariable analysis surgical treatment of solitary metastasis (liver, bones, skin or central nervous system (CNS)) was associated with a better survival. Patients with metastasis to the CNS had a better survival after radiotherapy. Chemotherapy was associated with a better survival for patients with liver metastasis or multiple metastasis excluding bones. Endocrine therapy was associated with a better survival for patients with digestive, liver, lung or bone metastasis or multiple metastasis with or without bony metastases.

## Conclusions

These results may assist physicians in clinical decisions after diagnosis of distant metastasis.

## Conditional survival of cancer patients: an Australian perspective

8.2

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## Background

Estimated conditional survival for cancer patients diagnosed at different ages and disease stage provides important information for cancer patients and clinicians in planning follow-up, surveillance and ongoing management.

## Methods

Using population-based cancer registry data for New South Wales Australia, we estimated conditional 5-year relative survival for 11 major cancers diagnosed 1972–2006 by time since diagnosis and age and spread of disease at diagnosis.

## Results

A total of 193,182 cases were included, with the most common cancers being prostate (39,851), female breast (36,585) and colorectal (35,455). Five-year relative survival tended to increase with increasing years already survived and improvement was greatest for cancers with poor prognosis at diagnosis

(lung or pancreas) and for those with advanced stage or older age at diagnosis. After surviving 10 years, conditional 5-year survival was over 95% for 6 localised, 6 regional, 3 distant and 3 unknown stage cancers. For the remaining patient groups, conditional 5-year survival ranged from 74% (for distant stage bladder cancer) to 94% (for 4 cancers at different stages), indicating that they continue to have excess mortality 10–15 years after diagnosis.

## Conclusion

Conditional survival changes dramatically as survival time increases, especially for cancer patients with an initial poor prognosis providing hope for these patients.

## Colorectal cancer survival in the US and Europe: a CONCORD high-resolution study

8.3

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<sup>2</sup> (Full authorship will be presented)

## Background

We seek to explain the wide international differences in survival found in the first CONCORD study.

## Methods

21 population-based registries in 7 US states and 9 European countries (Estonia, Finland, France, Italy, Netherlands, Poland, Slovakia, Slovenia, Spain) collected data on Dukes stage, diagnostic procedures, treatment and follow-up under a single protocol for representative samples totalling 12,523 adults (15–99 years) diagnosed with colorectal cancer during 1996–98. Age-standardised five-year net survival by age and stage was estimated with flexible parametric excess hazard models.

## Results

The proportion of Dukes A and B tumours was similar in the US and Europe, while Dukes C was more frequent in the US (38% vs. 21%) and Dukes D more frequent in Europe (22% vs. 10%). Net survival was similar in Northern and Western Europe (55–56%) and the US (58%), lower in Southern Europe (50%), and lowest in Eastern Europe (43%). Survival was higher for women than men. Survival was lowest in Eastern Europe in each stage category, higher in the US for Dukes A and B and in Northern Europe for Dukes C and D.

## Conclusions

US-Europe differences in colorectal cancer survival in the late 1990s were persistent. Further analyses to elucidate the role of stage at diagnosis are ongoing.

## The impact of socioeconomic status on prostate cancer treatment and survival in southern Netherlands

8.4

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### Background

To investigate if socioeconomic status (SES) played a role in the selection of prostate cancer treatment and overall survival.

### Methods

Treatment and survival by SES of all newly diagnosed prostate cancer patients (1998-2008) from the population-based Eindhoven Cancer Registry (n=11,086) were studied.

### Results

Younger patients (<75) with early stage disease, including PSA-detected stage cT1c, with low SES underwent prostatectomy and brachytherapy less often (differences: 10-16% and 0-7%) compared to those with high SES, but underwent more external beam radiotherapy, hormonal therapy and watchful waiting policy (6-9%, 5-7% and 3-7%). This was partially related to the prevalence of comorbidity. Ten-year survival for localised and advanced disease was superior in high SES patients (67% vs 44% and 29% vs 20%), both related to treatment and comorbidity. Multivariable adjusted death rates remained significantly elevated for patients with low SES, especially cT1c, age<60 (HR<sub>low\_vs\_high\_SES</sub>: 4.2 (1.3-13.7)).

### Conclusions

SES affected treatment selection and overall survival for patients with prostate cancer in the Southern-Netherlands, where treatment guidelines exist and health care is fully covered. Presence of comorbidities only partly contributed to these differences. The relation with other SES-associated factors, e.g. ability to understand medical information or to cope with health problems, remains to be explored.

## Reduction of population-based cancer survival estimates by traceback of death certificate notifications: an empirical illustration

9.1

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### Background

Population-based survival studies allow assessment of effectiveness of cancer care on a population level. Population-based cancer registries differ in the proportion of death certificate notified (DCN) cancers, as well as in the efforts to trace back such cases. We aimed to assess the impact of such trace back activities on survival estimation.

### Methods

Using data from the population-based Saarland Cancer Registry (Germany) we investigated survival experience of successfully traced back DCN cases from 1994-2003. Five-year relative survival (RS) of patients with DCN cancers and the effect of trace back were analyzed.

### Results

Overall, 12% of included cancers were DCN. Trace back reduced the proportions of death certificate only notified cancers by about 50%. Cumulative 5-year RS of DCN cancers with follow back was 2%. The inclusion of DCN cancers with additional registrations in survival estimation reduced overall 5-year RS by 4% units to 55%. Effects of trace back on survival estimates were highest for cancers of liver and gallbladder and leukaemia and a particularly strong decrease of survival estimates was observed among elderly patients.

### Conclusions

Trace back results in increased inclusion of patients with poor prognosis. Varying extent of trace back across registries may compromise comparability of cancer survival estimates. Therefore the effect of trace back on survival estimates should be taken into account in comparative survival studies.

## Comprehensive assessment of the impact of errors in the cancer registration process on cancer survival

9.2

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### Background

International comparisons of cancer survival have become increasingly common. When making these comparisons and drawing conclusions that effect health policies, it is essential reported differences are real effects and not an artifact of potential errors in cancer registration.



## Methods

Simulation methods are used to assess the impact of various cancer registration errors on commonly reported outcomes of cancer survival (1-, and 5-year relative survival estimates). We draw two samples of patients diagnosed with cancer from the same population. We then introduce potential registration errors in one of the sample populations under various assumptions. The quantities that are varied are; 1) percentage of patients missed at diagnosis, 2) proportion of those patients with a delayed date of diagnosis, 3) the proportion of DCI cases with the correct date of diagnosis. We investigate the effect of each registration error individually as well as the composite effect when combined with other registration errors.

## Results

The results of the simulation indicate that high levels of cancer registration errors are necessary to make a noticeable effect on commonly reported metrics of cancer survival. Differences of up to 3 percentage units in the 5-year relative survival proportion are seen under realistic scenarios.

## Conclusions

Starting from simulated data allows a true assessment of the impact of the various registration errors and ensures that there is an appropriate comparison to the “perfect” cancer registry. Simulations using this structure can be used as a tool to assess how registration errors impact on real analyses.

## The impact of SEER vs. IACR multiple primary rules on population-based cancer survival rates 9.3

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## Background

The objective was to evaluate the impact of SEER and IACR multiple primary (MP) rules on population-based cancer survival estimates.

## Methods

Survival data from five state and six metropolitan-area cancer registries were used to estimate sex-specific, age-standardized relative survival for the top 25 cancer site recodes in men and women according to SEER and IACR MP rules.

## Results

From 1995 to 2008, the percentage of multiple cancers (all sites combined) increased 25.5% using SEER rules (14.6% to 18.4%) and 19.5% using IACR rules (13.3% to 18.4%). SEER rules resulted in the registration of more MP cancers than IACR rules (15.8% vs. 14.4% in males; 17.2% vs. 14.5% in females). The three sites with the largest differences were melanoma (5.8%), urinary bladder (3.5%) and kidney and renal pelvis (2.9%) in males, and breast (5.9%), melanoma (3.9%) and urinary bladder (3.4%) in females. Five-year survival estimates using first primary cancers-only were higher than esti-

mates including SEER or IACR rules for all sites combined, and for 10 of 21 sites in males and 11 of 23 sites in females. Estimates were lower using SEER rules compared to IACR rules for urinary bladder (79.1% vs. 79.8%) in males and breast (88.50% vs. 88.87%) in females.

## Conclusion

First cancers-only survival estimates exclude a large and increasing number of cancers. US registries should include all primary cancers when producing survival estimates according to IACR rules to allow for comparisons over time within a cancer registry and between cancer registries either domestically or internationally.

## Estimating the loss in expectation of life due to cancer using flexible parametric survival models 9.4

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## Background

A useful summary measure for cancer survival data is the expectation of life, which is estimated by obtaining the area under a survival curve. The loss in expectation of life is the difference between the expectation of life in the general population and the expectation of life in a diseased population. It is used little in practice since estimation requires extrapolation of both the expected (general-population) survival and observed survival of the cancer patients.

## Methods

Extrapolation of expected survival is fairly straightforward, but stronger assumptions are required for the observed survival. We have found extrapolations based on relative survival are more stable and reliable than just using all-cause survival. For example, we can assume that the excess mortality has reached zero (statistical cure) or has stabilized to a constant. We build on previous work using lifetables by using a flexible parametric approach for estimating the excess mortality to estimate loss in expectation of life at the individual level.

## Results

We have evaluated our extrapolation approach using Swedish data and results agree well with observed data. Results will be presented for a variety of cancer sites. We have developed user friendly software to enable estimation of the loss in expectation of life.

## Conclusions

This measure is useful for measuring cancer control progress and resource allocation in cancer prevention and control. It is easily-interpretable, but is rarely reported. We believe this measure should be routinely reported and with the availability of our software, we hope it will be.

## Use of the antidiabetic drug metformin and disease spread at diagnosis in colorectal cancer 10.1

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### Background

Laboratory studies suggest metformin, an antidiabetic drug (ADD), inhibits tumour spread. We examined associations between metformin exposure in the year before colorectal cancer (CRC) diagnosis and likelihood of presenting with no nodal/metastatic tumour involvement (node-met).

### Methods

National Cancer Registry Ireland records linked to prescription claims data were used to identify TI-TIII CRC patients diagnosed 2001-2006. Patients were divided into four exposure groups: received metformin only (MET), received ADDs other than metformin (OTHER), received both (BOTH), and nondiabetics. The metformin-receiving groups were also subdivided into high/low metformin exposure by median proportion of days exposed. Logistic regression was used to estimate odds ratios (OR) for node-met negative status at diagnosis, adjusted for age, tumour size, grade, site and aspirin exposure.

### Results

3,534 TI-TIII CRC patients were identified. MET (high-exposure), relative to OTHER, was associated with a significantly increased likelihood of node-met negative disease at diagnosis (OR 2.15, 95%CI 1.02-4.56). This association was stronger in analyses stratified by concurrent exposure to aspirin (OR 3.44, 95%CI 1.24-9.49), which also approached significance relative to the nondiabetic group (contrast MET vs nondiabetic OR 2.30, 95%CI 0.97-5.47).

### Conclusions

High exposure to metformin was associated with reduced disease spread at diagnosis. Aspirin exposure may modify these associations.

## Can linkage to routinely collected health records substitute for active follow-up of clinical trial participants? 10.2

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### Background

Randomised clinical trials are extremely costly to run, particularly in relation to long-term follow-up. It has been suggested that follow-up events could be detected by record linkage of trial participants to routinely collected health data.

### Methods

We assessed the completeness and accuracy of follow-up events detected by data from cancer registry, hospital discharge, and death records against the information gathered by active follow-up of Scottish participants in the TACT (Taxotere as Adjuvant Therapy) breast cancer trial.

### Results

Trial follow-up data from all 475 Scottish participants in the TACT trial linked to cancer registry information. Overall, apart from death, the correlation between information from active trial follow-up and routinely collected data was poor.

### Conclusions

Routinely collected patient data in Scotland are not currently comprehensive and accurate enough to substitute for active trial follow-up. Two major limitations of routinely collected data are: (1) the lack of specific ICD-10 diagnostic codes to signify local or regional recurrence of cancer; and (2) limitations of routinely collected outpatient records (failure to record all repeat attendances, and failure (usually) to record diagnosis), given that some follow-up events may be diagnosed and dealt with solely in an outpatient setting.

## Linking the Belgian Cancer Registry administrative databases: monitoring clinical practice in anal cancer

10.3

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### Background

The majority of anal cancers are squamous cell carcinomas (SCC). Chemoradiotherapy is the standard treatment for this rare cancer (except for T1N0 tumours), with salvage surgery in case of treatment failure. This study aims to describe clinical practice and outcome for anal SCC in Belgium.

### Methods

Data on tumour and patient characteristics were retrieved from the Belgian Cancer Registry (BCR) for 2004–2007. Treatment data were available from the health insurance database. Relative survival (RS) rates were estimated (Ederer II method).

### Results

349 cases (96%) could be linked with health insurance data. The European age standardised incidence rates were 0.8/100,000 person-years in females and 0.5 in males. 183 out of 349 cases received chemoradiotherapy (52%) and 50 cases (14%) radiotherapy alone. Salvage surgery was performed in 13% of irradiated cases (30/233). The other 116 patients (33%) received various other treatment regimens. RS was lower in patients >65 years (58% vs 78%), for tumours >5 cm (57% vs 72%) and in cases with lymph node metastasis (42% vs 83%). In addition to these preliminary results, more detailed analyses on the treatment strategies and outcome will be performed.

### Conclusions

The linkage between BCR and health insurance data allows to evaluate the adherence to treatment guidelines and outcome results at a population level.

## Swedish Quality Registers on Cancer: an underutilized resource in cancer epidemiology

10.4

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### Background

Compared to the National Cancer Register, data available in Swedish Cancer Quality Registers are more detailed since they include information on management and tumour characteristics. While the primary aim of the currently 25 Cancer Quality Registers in operation is to monitor the quality of care and benchmarking, the use for research purposes has been limited.

### Methods

By means of record linkage to other registers, such as the Multigeneration Register, the National Cancer Register, the Cause of Death Register, the National Patient Register and the Prescribed Drug Register, the research value of the quality registers can be further increased. Linkage is made possible through the unique national registration number assigned to all Swedish residents.

### Results

To date, several quality registers have been enriched by information from other sources. Two examples are ParCa2, a project on reproductive history and breast cancer risk and survival, and PCBase Sweden, a research initiative based on the National Prostate Cancer Register. We will present some examples of how these research databases are being used in cancer epidemiology.

### Conclusions

The Cancer Quality Registers in combination with other health registers provide a unique resource in cancer epidemiology.



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# Poster Presentations

## Theme A: Registration methods

### Impact of various follow-up and trace-back routines on population-based cancer survival rates in Germany **A1**

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#### Background

Comparisons of population-based cancer survival should indicate differences in oncological care which could be changed. In Germany cancer registration is organized at the level of federal states and has developed heterogeneously concerning onset, legislation and structure. The now possible comparison of cancer survival by region shows considerable differences which raise the question of data comparability.

#### Methods

The quality of routine mortality follow-up was examined in seven German cancer registries by cross-checking recorded vital status data of defined cohorts with residential registration

offices. The proportions of missed deaths (error rates) were used to calculate corrected five-year survival. In addition trace-back activities concerning death certificate initiated cases are described and their impact on regional cancer survival statements is demonstrated.

#### Results

Vital status data of 5,530 cancer patients supposedly alive five years after diagnosis were checked. The range of error rates was 0–15%, reducing five-year survival by two percentage points on average. Trace-back as performed by the cancer registries of Hamburg, Saarland, Bremen and Münster results in decreased five-year relative survival by up to 17% according to site and registry.

#### Conclusions

Faced with substantial effects of various follow-up and trace-back procedures on population-based cancer survival figures, the need for transparency concerning data quality is obvious so as to assess outcome quality in oncological care adequately.

### A virtual forum for cancer registration: the GICR "Community of Practice" **A2**

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#### Background

The Global Initiative for Cancer Registry Development in Low- and Middle-Income Countries (GICR), an IARC-led initiative, aims to develop the capacity to produce reliable, high-quality information on the burden of cancer so that effective cancer control policies may be developed, implemented and evaluated. The Union for International Cancer Control (UICC) and the International Association of Cancer Registries (IACR) are partners of GICR.

### Methods

Surveys among the cancer registration community were disseminated via IACR and UICC membership networks, with the objective of achieving prioritisation of GICR supporting activities. A strong expression of interest in a virtual discussion forum to facilitate international exchange and networking was recorded (94% of 197 respondents from 83 countries).

### Results

In response to this demand, a Community of Practice (CoP) for cancer registration professionals has been developed on a platform provided by UICC, which hosts similar discussion forums in other areas of cancer control. Discussion moderators are expert cancer registration professionals from the world over. The scope of the CoP will be presented highlighting different streams of discussion e.g. topic; language; geographic area; as well as early results of the user-driven topics.

### Conclusions

GICR and UICC have put at the disposal of the cancer registration community a freely accessible virtual venue to share best practice and discuss topical issues and innovations common to their profession. It is expected that enhanced communication, active participation and knowledge sharing will foster the creation of a truly global cancer registration community.

<http://www.uicc.org/community>

## Significance of cancer registry application

A3

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### Background

The world is facing a serious threat from the cancer burden. The world population is increasing with increasing cancer incidence and mortality despite attempts to control this. Cancer is a significant problem, and every year over 12 million people are diagnosed and 7.6 million die of it. The cancer registry is essential for all cancer issues for without it all matters involving cancer would not be possible to understand. Data from the cancer registry reflects ideas for application. The purpose of this study is to evaluate if the cancer registry application is significant.

### Methods

A sample size of 100 people was selected among hospital staff. Information was obtained by the administration of a questionnaire. The statistical tool employed was the chi-square method.

### Results

**Test of Hypothesis:** Hypothesis tested (test of significance),  
H0: Application of Cancer Registry is not significant.

H1: Application of Cancer Registry is significant.

Chi-square value (X<sup>2</sup>) of 6.25 was obtained from the tabulated responses. A level of significance of 0.05 and P-value from the chi-square distribution table is 0.012. Since (0.012 < 0.05), H0 is therefore rejected.

### Conclusions

The cancer registry application is significant. Application is seen in research, control, prevention, conferences and workshops, screening, burden awareness, health education and teaching, policy making, media publication and cancer treatment management planning.

## Completeness of Austrian cancer incidence data using hospital discharge data: The challenge of record linkage

A4

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### Background

The international comparability of data from population-based cancer registries depends strongly on the completeness of case ascertainment. Observed incidence rates suggest that the completeness differs between Austrian federal states.

### Methods

Austrian hospital discharge data were used to estimate completeness. Record linkage of Austrian hospital discharge data with Austrian National Cancer Registry data was developed and a hospital-discharge-only (HDO) index was calculated.

### Results

After 2006 the number of HDO-cases rose noticeably. The HDO indices for the federal states running a regional cancer registry are generally lower than for the other federal states, but results are not consistent. As unique personal identifiers are not available, the approach did not lead to valid numerical estimations.

### Conclusions

The decreasing Austrian cancer incidence rate in the last three published years and regional differences in cancer incidence rates are probably a result of lacking completeness of case ascertainment. A regional cancer registry is beneficial for high completeness but is no guarantee and is not indispensable. The approach should be pursued and based on a non-controversial record linkage using a unique identifier. Completeness estimations would add a great value to the Austrian National Cancer Registry and improve the international comparability of cancer incidence, prevalence and survival data.

## Current population-based cancer registration in the Philippines

A5

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### Background

There was no organized national population-based cancer registration system in the Philippines until late 2011 when the Department of Health requested the assistance of the Philippine Cancer Society.

### Methods

An organizational/Training Workshop was held in Manila on December 2011 and consensus was reached between 5 registries to adopt common methods of active registration that conform to IARC/IACR recommendations.

### Results

The following are the 5 Registries with their founding date, catchment area and population covered (2007 Census). Philippine Cancer Society-Manila Cancer Registry (1983; cities of Manila, Quezon, Pasay, Caloocan; 6,124,838). Department of Health-Rizal Cancer Registry (1974; the rest of Metro Manila and Rizal Province; 7,152,884). Eduardo Aboitiz Foundation-Metro Cebu Cancer Registry (1988; cities of Cebu, Mandaue, Lapulapu, Talisay and Naga plus 5 municipalities; 2,156,848). Department of Health-CHD Davao Cancer Registry (2002; Davao City; 1,366,153). Andres Soriano Foundation-Bacolod Cancer Registry (2000; Bacolod City; 499,497).

### Conclusions

All 5 Registries will limit the items of information to be obtained to those that are essential for calculating incidence, for the period 2003–2011.

## New software to improve cancer patients data in Bahia Blanca, Argentina

A6

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### Background

Cancer data collection is very difficult and time consuming in Argentina because the Health System is heterogeneous.

### Method

Our Multidisciplinary Group faced a problem in creating new software in order that all sources in the Registry area can have a uniform way of keeping cancer data.

A CANREG-compatible software system has been proposed and developed. It is expected that the new system, named CDC (Cancer Data Collector), works as a fast and intuitive interface placed into different cancer data sources. It has been developed in JAVA language and designed with the objective of maintaining a strong compatibility with the different components of CANREG. This compatibility is aimed to allow an easy and effective management, at the time of the collection of cancer cases from different sources. The CDC will enable us to import and export data in a safe way, becoming into a helpful intermediate step and connecting the route of data from the sources to the Cancer Registry.

### Results

The new software has been proved successfully and it will be soon presented to all Hospitals and Clinics Directors and Heads of Pathology Labs, Radiotherapy Centers, Haematologists and Clinical Oncologists in order to try to convince them about the advantages of its use.

### Conclusion

To have a uniform way of keeping cancer data will be an important achievement. The success of the initiative will depend on the general acceptance of the software by all the sources.

## **Software modules for cancer registries in developing countries**

**A7**

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### **Background**

The National Centre for Disease Informatics through its National Cancer Registry Programme has undertaken over the past few years software development as a major activity in order to improve data quality at the time of capture so as to correct the errors early. Software for Hospital Based Cancer Registries (HBCR) evolving into Patterns of Care and Survival Studies (POCSS) has also been developed.

### **Method**

The software is targeted at cancer hospitals with the scope to setup a HBCR with linkages to the Population-Based Cancer Registry (PBCR) and the POCSS application programmes. Testing and retesting at every stage at both the NCRP coordinating unit and the institutions that use the software is a major exercise.

### **Results**

The places/centres where the software is being used include 27 PBCRs, 30 HBCRs, 17 POCSS centres and over 70 cancer atlas centres. The software module is an evolving product. Features of the software include off-line and on-line versions, all cancer registry checks at data entry and subsequently, a de-duplication module including use for matching, and several outputs that include waiting times, histopathological classifications according to WHO etc.

### **Conclusion**

Software data capture with integration of data across disciplines holds the key to future translational research.

## **Integration of a notification algorithm of incident cancer cases within a multisource cancer registry**

**A8**

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### **Background**

A contextual selection algorithm of relevant records for the notification of incident cases of cancer has been developed within a multisource cancer registry. It aims at optimizing data preparation for manual cancer registration. An evaluation was made on a full year registration.

### **Methods**

The algorithm selects the best information at the patient level according to its contextual relevance for tumoral topography (tracer procedures like surgical procedures, lymph node dissections and biopsy) and tumoral morphology (pathology data) independently. Composite records are grouped according to IARC notification rules for multiple primary cancers. The evaluation is performed by calculating recall (sensitivity) and precision (positive predictive value) from the comparison of notified tumors and tumors validated by the registry.

### **Results**

Among the 12 346 target tumors, 72% were correctly notified: recall and precision of 0.729 and 0.721 (0.925 and 0.921 for topography, 0.805 and 0.804 for morphology). Imprecise morphology explains 49% (1 720) of the errors due to non-coded records or irregularity codes provided by pathology data.

### **Conclusions**

This approach reduces false positive cases and the number of alterations required during validation, while allowing the operator to access to all the non-selected information. Subsequent work will focus on semantic integration and the use of non-structured information.

## **The NICR Staging tool. A rule-based cancer staging application, freely available to cancer registries**

**A9**

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### **Background**

Correct, consistent staging is important for population-based cancer research but also for measuring treatment effectiveness and outcomes for cancer patients. TNM and other staging classification systems can be complex and encourage practitioners to use simplified versions. Our objectives are to enhance their adoption and standardisation in cancer registries.

### **Methods**

We developed a staging tool software free to use by many registries in the world. We liaised with Springer Healthcare, to purchase licensing permissions, and with the Global Initiative for Cancer Registry Development in low- and mid-income countries. The AJCC rules, v.7, and staging tables provided by Springer were encoded in the software.

### **Results**

The MS Access tool calculates TNM and other site-specific cancer staging classifications from the basic features of the disease (e.g. tumour size or number of positive nodes), manually entered in a controlled fashion. It can be used to stage 16 cancer sites/types: Breast, Bladder, Lung, Lymphoma, Prostate, Skin (melanoma), Ovary, Uterus, Cervix, Vulva, Pancreas, Stomach, Small intestine, Oesophagus, Colorectal, Bile ducts.



## Conclusions

The Tool is available from [www.qub.ac.uk/nicr](http://www.qub.ac.uk/nicr), free of charge to any ENCR registry who purchased three Cancer Staging Manuals from Springer, and to any registry based in a low- to mid-income country who purchased one manual. In the future we are planning to convert the tool into a web based application service, allow batch calculations, extend to other sites (e.g. Head and Neck) and enhance collaboration with the GICR for distribution and training.

## An Ontology-based system for Information extraction, reasoning and cancer registration from pathology reports

A10

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## Background

Surgical pathology reports are considered the most accurate source of information on a patient's cancer. Their narrative or almost-narrative form makes them difficult to read by machines and requires visual inspection in almost all scenarios of information extraction. Our objective was to enhance these scenarios, by means of an ontology-based approach, and to enhance and extend the approach further, in an attempt to design a complete document-to-registration system.

## Methods

An OWL2 ontology, the GATE framework and machine learning techniques were integrated to design a prototype system capable of extracting information from surgical pathology reports, using the extracted information to infer staging classification, where possible, and finally presenting the extracted and inferred information in a standard format ready for input into cancer registration systems.

## Results

The individual modules and subsystems have been developed and tested. We are now in the process of formally evaluating the whole system on a set of breast cancer pathology reports produced in Northern Ireland in 2006. Quality will be assessed in terms of sensitivity/specificity and precision/recall while performance will be evaluated in terms of human time saved.

## Conclusions

The integration of diverse approaches, such as semantic techniques, machine learning and natural language processing, are likely to prove more and more beneficial to the cancer registration of the future. The integration will provide increasing support to the automation of cancer registries, liberating staff's valuable time for other tasks.

## Reasoning on cancer: Automatic staging using Ontology-based knowledge representation

A11

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## Background

Biomedical ontologies, complex structures for the natural classification of biomedical concepts, are becoming more and more ubiquitous. This is also due to their capacity to be used as a basis for inferring information not explicitly mentioned in documents and databases. Very few experiments have been made to explore the use of ontologies for cancer staging and this work shows a successful example of automatic T classification of breast cancer.

## Methods

An OWL2 ontology was designed in Protégé 4 to represent essential knowledge for TNM classification of breast cancer. Logical axioms were used to express the necessary and sufficient conditions for a tumour to be classified in the range T1-T4. Sample assertions were created to simulate the existence of patients affected by tumours with variable characteristics.

## Results

The reasoners available in Protégé 4 were able to classify the tumours in all cases simulated. The cases were presented as patients having a tumour characterised by up to three linear dimensions. By varying these dimensions to include all possible scenarios, the ontology representation proved to be correct.

## Conclusions

It is possible to use the OWL2 language to represent and use knowledge about staging classification to actually stage individual tumours. The Open World Assumption of the language, which causes missing information to be assumed possible, was addressed by a workaround. This solution was suitable in this case but more studies are needed to confirm other classification items can be successfully represented in OWL2.



## **The Genesis of Cancer Surveillance in Belize, Central America** **A12**

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### **Background**

The National Cancer Registry of Belize, Central America began data collection in 2009. The Belize Ministry of Health, Belize Cancer Society and the Belize Cancer Center of Dangriga has partnered with the University of Southern California (USC) Los Angeles Cancer Surveillance Program since 2012 to examine the data. Belize is a multi-ethnic population (Mayan, Creole, Mestizo, Garifuna) of 312,000 living in a geographical area of 8,867 square miles.

### **Methods**

De-identified cancer surveillance data from 2009–2011 was abstracted from the confidential Registry Form and submitted to USC in Microsoft Excel format. Data was assessed and analyzed in Belize and at USC by a cancer researcher.

### **Results**

Of the 295 case records, 223 (76%) contained the Necessary Data Items (NDI) to classify them as an incidence case. The crude cancer incidence rate from 2009–2011 was 9.5 per 100,000. Notably, lung cancer incidence was extremely low (<1%). Crude breast and cervical cancer incidences were 5.4 and 2.2 per 100,000 respectively. Furthermore, female all cancer site incidence rates were twice that of men. Prostate cancer incidence rate was less than 1%.

### **Conclusions**

Belize is committed to improving its population-based cancer registry. Factors such as undiagnosed cases, out-of-country diagnoses, and unreported in-country diagnoses limit current completeness and quality. Mandated reporting laws, central registry management, registrar training and the CanReg5 data system are being pursued to provide quality data that informs national cancer prevention and control programs. Preventative outreach will assist our low-and middle resource country from escalating to Westernized cancer incidence rates.

## **ITACAN: a new web-site for the Italian cancer registries data** **A13**

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### **Background**

AIRTUM, the Italian Network of Cancer Registries, collects data from 37 regional cancer registries which cover more than 20,000,000 persons (40% of the Italian population). AIRTUM ([www.registri-tumori.it](http://www.registri-tumori.it)) has developed a new web-site called ITACAN (<http://www.iatcan.it>) which provides easy access to providing statistics.

### **Methods**

ITACAN was developed in collaboration with the Section of Cancer Information at IARC and the Nordcan project group (<http://www-dep.iarc.fr/nordcan.htm>). ITACAN derives from the NORDCAN application (<http://www-dep.iarc.fr/nordcan.htm>), and it uses the same user interface. Incidence, mortality, survival and prevalence data are available and can be presented as tables or graphs. It is available in Italian and English languages.

### **Results**

ITACAN is a web based application that provides all the main epidemiological indicators by major cancer sites. Tables and graphs are presented following the user's selections: age-groups, year or period, sex, cancer site, registry/area. Data can be displayed by geographic area (North-East, North-West, Centre, South) or by single registry. Two million cases contributed to create ITACAN, although individual records are not present in the underlying database. Pooled incidence and mortality trends are available from 1992 to 2008 for more than 40 cancer sites. Prevalence and survival are based on most recent AIRTUM publications.

### **Conclusions**

The ITACAN website has a user-friendly interface which makes it easy to access data from all Italian Cancer Registries.

## Workload and Staffing Guidelines in Central Cancer Registries

A14

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### Background

Cancer registry data inform cancer treatment and contribute to cancer research. Little is known about the workload of cancer registrars and staffing in cancer registries. The goal of the 2011 National Survey of Central Cancer Registries was to better understand the relationship between workload and staffing within the registry.

### Methods

On-line survey with 39 multi-item questions was emailed to 50 state registries and D.C.; 24 (47%) responded. Registrars were asked to use a journal to document 20 weekly, monthly, and yearly work activities.

### Results

1. Number of source records and total number of cases are important indicators of workload. On average, registries reported about 34,000 reportable cases in 2008 and about 2 source records per case.
2. Four core activities account for approximately half of all workload at Central Cancer Registries: Abstracting at registry, Visual Editing, Case Consolidation, Resolving EDIT reports
3. Estimated FTE based on the workload activities: 12.4 FTE required to perform Central Cancer Registration activities. Estimates vary depending upon the size of the registry and the type of activities most frequently performed.

### Conclusions

These findings represent a benchmark which registries can compare to their own workload and staffing and begin to build the evidence for the staffing needed to meet the cancer data reporting objectives and requirements.

## A 10-year overview of information requests received by the National Cancer Registry, Ireland

A15

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National Cancer Registry, Ireland

### Background

Since the National Cancer Registry started to collect information on cancer incidence, treatment, survival and mortality in Ireland in 1994, there has been a growing demand for data from a wide range of individuals and organizations, and requests for information have increased in both number and complexity over time. A brief overview is provided on the sources of queries (which include government, health agencies, hospitals, clinicians, researchers, charities, media, commercial companies and the general public) as well as the nature of the information requested. Some examples are given of the type of information provided to requesters.

### Methods

The National Cancer Registry collects details of all requests for information. These were analysed by type of request. This poster describes how queries received through direct contact have changed over the 10-year period.

### Results

In the 10-year period between 2002 and 2011, there has been a 20% increase in the number of queries received by direct contact with the Registry (via telephone and email). However, the Registry's online query system, set up in 2004, has provided easy access to incidence data, in particular, and has reduced the proportion of queries received by direct contact. Since 2006, there has been an increase of 145% in the number of visits to the Registry website generally ([www.ncri.ie](http://www.ncri.ie)) and an increase of over 200% in the number of pages viewed per visit.

### Conclusions

The provision of data online can reduce the workload of registry staff in responding to queries, but this number continues to increase.

## Extending the analytical capabilities of CanReg5

A16

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### Background

CanReg5 is an open source software package for population-based cancer registries to enter, quality control, and store data, based on international standards. In order to facilitate cancer control activities and comparative studies, integration of an analytical tool in such software is essential.

### Methods

There are three types of analytical options in CanReg5: a tool to produce frequencies by year – stratified by any sets of variables, a set of ready to print tables of rates, pyramids etc., and export facilities to prepare the data for further analysis in other tools (Standard spread sheets, statistical software, and more specific tools, like SEER\*stat.)

### Results

A central part of analysis in CanReg5 is the integration with other free software. R is leveraged in a transparent way within CanReg5, so that the end user does not require any knowledge of that language. More advanced users, however, can send any data stored in CanReg5 to any R program to automate their own analysis. These scripts can then again be shared among CanReg5 users and potentially be distributed with the software.

### Conclusions

In the future, available analytical outputs will be improved by adding more advanced analysis, new tables and potentially templates for cancer registry reports.

## **A Pilot Study of the Collaborative Stage Data Collection System in Korea**

**A17**

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### **Background**

The Korea Central Cancer Registry (KCCR) executed a pilot project for the introduction of a Collaborative Stage data collection system (CS) in 2011. The purpose of this study is to demonstrate the results and propose the application of this new system in cancer registration in Korea.

### **Methods**

Eleven regional cancer centers participated in this trial to collect data using the CSv2, developed by an American Joint Committee on Cancer (AJCC). Cases diagnosed with stomach, lung, liver, colorectum and breast carcinoma in 2010 were selected randomly. Kappa statistics were calculated to measure of agreement between SEER Stage (SS) of the existing data and the CS derived SEER stage (CS-SS).

### **Results**

A total of 1,197 cases were evaluated for analysis. Tumor size was unknown for 23% of lung cancers; tumor extension was not recorded in about 8% of lung and liver cases. The information extracted from breast was specific enough to compare with other cancers. The concordance rate in registered SS and CS-SS of all cancer combined showed kappa statistics 0.72 ( $p < .0001$ ). The level of agreement for stomach, colorectum and breast carcinomas were 0.78, 0.74, 0.74 respectively.

### **Conclusions**

Our study results suggest that acceptable completeness level of data is expected for three carcinomas (stomach, colorectum and breast) in which the missing or unknown information is low and the concordance rate with the SS is high. The practical implications of our findings with respect to adopting of CSv2 and future planning need to be continued.

## **Implementation of a modern cancer registry in Georgia**

**A18**

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### **Background**

The Georgian Population-based Cancer Registry was set up in 2000. In 2009 most medical facilities in Georgia became private. Currently private clinics are not instructed by law to submit data to the central registry and nearly 30% of data are lost from the population registry.

The aim of the project was to:

1. Implement a modern cancer registration system in Georgia.
2. Ensure compliance with reporting standards.
3. Create a registry that will meet international data standards.

### **Methods**

In 2011 as a result of active work with the Ministry of Health Care (MOH)

- Cancer Registry program was included in NCCP
- Government has funded a "State Program of Modern Cancer Registry Implementation"
- By the end of the project the Cancer Registry will be linked to EMR notification system that itself will be linked to public and death registry and data on every cancer patient will automatically appear in the cancer registry database

### **Results**

According to the schedule, stage I of the program has been completed successfully.

- New model of cancer registry has been developed
- ICD-O third edition has been translated
- Committee of Healthcare at Parliament of Georgia prepared legislation proposal for consideration. By the end of 2012 development of software, training of registrars and piloting of cancer reporting is planned.

### **Conclusion**

The developed model of Cancer Registry will serve as a basis for clinical, epidemiologic, and health care services research and for the assessment of their efficacy in Georgia.

## **Implementation of JamKesMas in Cancer Registration in Indonesia**

**A19**

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### **Background**

Achieving universal health coverage, in 2004, Indonesia introduced the mandatory public health insurance scheme Askeskin, which evolved into Jaminan Kesehatan Masyarakat (JamKesMas) in 2008. The Ministry of Health hosts this program which now covers over 76.4 million low-income people in Indonesia. Most members of JamKesMas will use their membership to get medication at a Primary Health Care facility in their district. The Cancer patients can be referred from Primary Health Care (PHC) to Municipal or Central hospitals which have facilities for diagnoses and treatment.

### **Methods**

Data mining from INA-CBG (Software of JamKesMas) into CanReg5.

### Results

Coverage is one indicator of quality control in cancer registration. The contribution of cancer cases from PHC in the Jakarta population-based cancer registry in 2005-2007 was only 12 cases of 12,993 (0.09%). Using JamKesMas, the coverage of cancer patients in primary health care is expected to increase. Many district governments have followed the lead of JamKesMas. The result of cancer patients using JamKesMas in Jakarta who got treatment in Dharmas National Cancer Hospital in 2009 is the registration of 236 cancer cases (11.4 %) out of 2077 cancer cases.

### Conclusions

Using JamKesMas data, the coverage of PBCR from PHC is increased.

## Difficulties and constraints in cancer registration: how to remedy?

A20

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### Background

Prospective registration of incident tumors in the Sidi Bel Abbes region took place from 1997 after feasibility studies for the creation of a general cancer registry.

### Results

The registry started providing incidence data describing the disease profile since this date and up to the middle of 2000. Some factors have constrained its development since 2002. These constraints were linked to recording difficulties, and retaining of certain data, particularly cytologic data, as well as their validity. Coverage, which indicates quality and performance of a registry, was not complete and this situation did not permit more complete and valid data.

### Methods

Thus, a sensitizing and training effort has been undertaken by the registry team with different information sources; this permitted the registry to function in normal conditions. Currently, all incident cases are recorded.

### Conclusions

The registry's interest, regarding cancer control, is to propose measures in the context of a specific cancer control program based on prevention; however, only the existence of reliable data will permit a needs assessment in diagnostic and therapeutic sight.

## Collecting population-based cancer stage data in a cancer registry to support cancer control activities

A21

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### Background

The stage of a patient at diagnosis is essential to predict prognosis and plan treatment. If stage data is collected on a population basis by the regional registry additional analyses can produce a wealth of information that can aid cancer control activities.

### Methods

Since 2008 stage data was collected on all Ontario patients with breast, colorectal, lung and prostate cancer. This data was then linked to survival and treatment data.

### Results

Data is now available for over 90% of Ontario patients diagnosed in 2008 with four common cancers. 20% of colorectal cancers presented with stage IV disease, demonstrating the need for screening. In one region, 18% of breast cancer patients presented with advanced stages, but in another it was 24%, for stage I lung cancer in one region, 54% of patients had surgery, in another 78%, showing variation in extent of disease and treatment across the region. Compliance with treatment practice guidelines and survival can also be measured by stage and region and examples will be shown.

### Conclusions

Access to incidence and mortality data is important but its value is greatly enhanced if stage is collected by the cancer registry. Analysis of such data assesses the value of screening programs, informs resource allocation, evaluates compliance with treatment guidelines, and compares survival trends.



## **Importance of Cancer Registration: Jordan's Cancer Registry Role 1996–2010**

**A22**

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### **Background**

A national population-based cancer registry systematically collects the occurrence and characteristics of reportable cancer data of both Jordanian and non-Jordanians to monitor changes in the trends of all cancer incidences and differences. It was initiated in 1996 with emphasis on epidemiological research, and evaluation of health services for prevention, diagnosis and treatment of the disease.

### **Method**

Cancer data is collected from all medical facilities, public and private, all over the kingdom by a combination of Passive and Active methods of data collection and case finding, as well as through the death registration system. Data is filtered and coded using ICD-O3, and CanReg-4 software is used for data processing. Data is then statistically and epidemiologically analyzed and standard rate calculations used to facilitate comparison. Quality controls are applied.

### **Result**

The total registered number of cases was 71,188, of which 56,132 were Jordanians (78.9%). There were 27,811 males (49.5%) and 28,231 females (50.5%). The most common cancer in adult males was lung (11.5%) followed by colorectal (11.1%) and leukemia (8.9%), while in females the commonest cancers were breast (33.9%), colorectal (9.3%) and leukemia (6.2%). Childhood cancers made up about 6.1% of the total—57.4% in males and 42.6% in females. Leukemia (32.5%) ranked first in children followed by cancers of brain & CNS (16.7%) and lymphoma (13.4%).

### **Conclusion**

Projections of cancer burden are based on cancer registry data. It provides the baseline and plays a major role in justifying the establishment, implementation and monitoring of national cancer control programmes and prevention strategies. An inadequate assessment of the cancer burden can have long-term negative implications and effects on the health resources of a country; therefore, cancer registration is of fundamental importance.

## **The Role of Hospital-based Cancer Registries in Low and Middle Income countries: The Nigerian Case Study**

**A23**

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### **Background**

Cancer incidence in many sub-Saharan African countries is on the rise, and urgent steps are needed to guide appropriate policy, health sector investment and resource allocation. Hospital-based cancer registries (HBCR) are useful sources of information on the frequent cancer sites in limited resource regions where population level data is often unavailable.

### **Methods**

Nineteen of twenty-one cancer registries in Nigeria met the definition of HBCR, and from these registries, we requested data on cancer cases recorded from January 2009 to December 2010. 16 of the 19 registries (84%) responded. Analysis of relative frequency of cancers, basis of diagnosis recorded and total number of cases recorded by gender was carried out on 11 HBCR with good quality data.

### **Results**

The total number of cancers registered was 6484. The number of new cancer cases recorded annually in these HBCR on average was 117 and 177 in males and females respectively. Breast and cervical cancer were the most common cancers seen in women and prostate cancer was the commonest among men.

### **Conclusions**

Information provided by HBCR is beneficial and useful for the improvement of cancer care delivery systems in low and middle income countries where there are no population-based cancer registries.

## **Analysis of the cancer registry in the Republic of Macedonia**

**A24**

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### **Background**

To indicate the management of the cancer registry in the Republic of Macedonia, opportunities and challenges.

### **Methods**

Publications with statistical data from the Institute of Public Health, State Institute of Statistics and World Health Organization have been used. An epidemiological descriptive-analytical method of operation has been applied.



## Results

The Cancer Registry in the Republic of Macedonia was established in 1969 at the Institute for Public Health in Skopje. It was initially managed as a hospital registry, and in 1986 introduced a report on malignant neoplasms (list No. 3-35-86) in accordance with the law for evidence in health. Sources of data in the population register are: registration for malignant neoplasm, laboratory findings of histopathological and cytological laboratory and confirmation of death. Computer data processing is carried since in 1995. Reports are published annually, using the incidence of malignant neoplasms by sex, age, nationality, residence (urban and rural), workplace occupation and primary localization.

## Conclusions

To strengthen the Cancer Registry in Macedonia in order to obtain prevalence and survival, which are not available, there must be enough professionally-trained staff to improve the methods of recording, collecting, updating and processing of data by the introduction of international rules and standards.

## Lung cancer in Thailand, 1988–2003

A25

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## Background

In Thailand, lung cancer is the second most common cancer in men and is the fourth most common in women. Our study aims to describe the incidence and histological type of lung cancer in Thailand during 1988–2003.

## Methods

Data were extracted from Cancer in Thailand volume I-V, 1988–2003.

## Results

The national estimate of lung cancer incidence was 24.9 in men and 9.7 in women in 2002. There is some regional variation with rather higher rates in the Northern part of the country. The highest incidence rate in men (ASR=51.2) and women (ASR=27.5) were observed in Lampang cancer registry. The lowest incidence was found in Nakhon Phanom with the ASR of 17.3 in men and 5.6 in women. Men were affected more than women in all registries with the sex ratio varying between 1.4 in Chiang Mai and 3 in Nakhon Phanom. Overall, the incidence of lung cancer in both sexes seems to have been stable during 1988–2003. The most common histological type is adenocarcinoma particularly in women. Squamous cell carcinoma was slightly more frequent in men in Lampang and Songkla in 1991, however, since 1999 the incidence of adenocarcinoma has been increasing gradually in all registries.

## Conclusions

Lung cancer has remained the most common cancer in Thailand. Rates of adenocarcinoma have increased steadily over time. This finding may be useful for control and prevention programs of lung cancer in Thailand.

## Cancer Diseases Hospital Statistical Bulletin

A26

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## Background

Cancer Diseases Hospital (CDH) is a modern specialized hospital offering comprehensive cancer treatment. It is situated in Lusaka City, Zambia. It is meant to cover 9 provinces of Zambia with a population of 13 million.

## Methods

The institution uses database software to manage all cancer data.

## Results

Generally, cancer is on the increase. By 31st December 2011, the number of new patients had increased from 35 in 2006 when the hospital started to 1302 in 2011. The ratio of male patients to female patients is 1 to 2. The number of females is on the increase because of cervical cancer which represents 35% of cases and affects the largest number of women. The mean age for cancer patients is 44 years. Most patients present at stage 2b and above. This stage requires treatment with radiotherapy and it is late for surgical intervention. Late presentation affects survival. The highest number of patients comes from Lusaka, which contributed 38% of new patients, followed by the copper belt with 21% between 2006 and 2011. Luapula, western and northwestern have the lowest numbers (3%), the reasons being poverty among the people, distance to be covered to Lusaka and lack of diagnostic facilities for cancer in some rural health centers.

## Conclusions

From commencement of clinical operations to date, challenges have been identified such as inadequate human resources and lack of patient accommodation. Future development plans include opening of a radiation therapy technologist (RTT) school in June 2012 to address the shortage of human resources in radiation technology. In phase II for CDH, patients and staff accommodation will be addressed.

## **Central database: challenges of new cancer registration system in Poland**

**A27**

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### **Background**

Cancer registration in Poland is based on 16 regional registries and a National Cancer Registry. Regional registries gain data from physicians, hospitals, screening programs and cancer-specific registries, e.g. bone cancer registry or hematological registry. Due to the fact that each registry has its own database and specific system, cooperation between them is limited.

### **Methods**

The National Cancer Registry has launched a project of building a central database for cancer registration in Poland, financed by the EU funds. A central database will automatically integrate data for the country, from regional and cancer-specific registries.

### **Results**

Integration of cancer registries and links to other databases will result in better data quality. A central database will bring such advantages as: automatic data consolidation, current data verification, faster access to the publications, metadata compatibility, possibility of generating reports based on current data, complex source of information for citizens and physicians.

### **Conclusions**

A central database brings new opportunities for the Polish registry. Regional offices will verify data quickly, easily and safely and organ registries will be given a tool to create their own unique form for clinical research. These changes will lead to data quality improvement, further access to scientific researchers and active cooperation with international organizations.

## **Zambia National Cancer Registry: Information Flow**

**A28**

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Zambia National Cancer Registry

### **Background**

The National Cancer Registry in Zambia was established in 1982 at the country's biggest referral hospital, the University Teaching Hospital. Later on, the country established provincial and district cancer hospitals throughout the country.

### **Methods**

The flow of information is that, when there is a confirmed case of cancer at the district level, it is reported to the provincial registry in turn notifies the national cancer registry office in Lusaka. The cancer registry at the University Teaching Hospital (National Cancer Registry) is responsible for notifying the Ministry of Health. This is done through submitting quarterly and annual reports to the Ministry of Health. Besides that, the National Cancer Registry works in collaborations with other health service providers outside the government structure, and these include the mining companies, parastatal organizations, Faith Based Organizations such as the Churches Health Association of Zambia, Private clinics and traditional leaders. All these organizations notify the national registry of any cancer cases. The National Cancer Registry also conducts research on cancer countrywide.

### **Conclusions**

However, there are both opportunities and challenges that the National Cancer Registry faces in its quest to improve on the notification of cancer in the Zambia.

## Theme B: Data Quality

### Estimating completeness of case ascertainment in cancer registration: comparison of different approaches

B1

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#### Background

We compared estimates of completeness obtained from the flow method, a death certificate notified (DCN) method using the Lincoln-Petersen (conventional-LP) estimator and a modification of this (modified-LP).

#### Methods

Registration completeness at the National Cancer Registry, Ireland was estimated for each year during 1995–2006, with extraction date 31/12/2010. Software for the flow method, provided by Bullard et. al. was used to calculate completeness at fixed time points. LP was calculated using Stata 11.

#### Results

5-year completeness for all malignant neoplasms, excluding non-melanoma skin cancer, estimated by the flow method ranged from 96.4% – 97.6% (standard deviation (sd) 0.003). LP (conventional) estimates were in the range 94.1%–97.4% (sd 0.01), with the modified-LP providing higher estimates in the years 2003–2006. Similar patterns emerged when site-specific completeness was considered.

#### Conclusions

Estimates provided by the flow method are fairly stable over time. The conventional-LP estimator gives reasonably good bounds for older data, and the modified-LP estimator provides higher estimates for more recent data. In order for cancer registries to compare levels of completeness, the conventional-LP/modified-LP estimators should be used in the first instance. It would be helpful to have a maintained website for the flow method software to improve access to this more complex method.

### Data quality of rare cancers: an issue for cancer registries?

B2

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#### Background

Rare cancers are the 22% of all incidence tumours in Europe however, the quality of data for rare cancers is not good as that for common tumours. The project surveillance of rare cancers in Europe (RARECARE) assessed rare cancers data quality in cancer registries (CRs).

#### Methods

Revision of morphology and topography codes and of the follow-up of fatal rare tumours on the basis of the pathological reports filed at CRs offices. 8 rare tumours were considered: mesothelioma, liver angiosarcoma, sarcomas, tumours of oral cavity, CNS tumours, germ cell tumours, leukaemia, malignant digestive endocrine tumours (MDET). The impact of the revision on incidence and survival was estimated. 43 CRs contributed from 13 EU countries.

#### Results

The revision confirmed a relative high proportion (11%) of mesothelioma long survivors. Few cases of liver angiosarcoma were retrieved. The revision of the Non Otherwise Specified (NOS) morphology confirmed the majority of cases as NOS. The majority of carcinoids of the appendix changed behaviour from malignant to border line.

#### Discussion/conclusions

The revision allowed to provide more precise estimates of incidence and survival for mesothelioma and chronic myeloid leukaemia. The proportion of unspecified morphology remained high most likely because of the difficulties in reaching a diagnosis. At CRs level, data quality of rare cancers can improve undertaking periodically revision of rare cancers. The awareness of the importance of data quality for rare cancers should increase among registrars, pathologists and clinicians. RARECARE is promoting training course in this regard.

## **Recollecting stage information for gastric cancer in a population-based cancer registry: a health indicator of survival**

**B3**

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### **Background**

Clinical stage (TNM) is a prognostic indicator of cancer care. To better understand the value of abstracting clinical TNM stage data, we selected gastric cancer, a common malignant neoplasia in Brazil, for analysis.

### **Methods**

Variables analyzed included basic and the recommended information clinical stage. All variables were analyzed for gender and age and in 5-year period analysis using chi-squared test. Survival comparison involving staged and unstaged cases was also performed using Kaplan-Meier method. The study was approved by two ethics committees in Goiás.

### **Results**

2275 gastric cancer patients were registered from 1988 to 2007, with 61.4% of men and 38.6% of women. Data quality was excellent for sociodemographic information and low for topography and stage. Proportion of initially staged cases was very low (5.3%) increasing to 16.5% after recollection. Older patients tended to be less staged. Estimated 5-year survival rate was approximately 21% for the unstaged patients and varied from 40% to 58% for the staged patients.

### **Conclusions**

Basic information was collected with high quality by the PBCR of Goiânia while topography and clinical staging data were infrequently recorded. Although completeness of clinical TNM stage information for gastric cancer was low, it was shown that it is possible to recollect clinical staging information and thereby improve the completeness, quality, and reliability of information in a PBCR. Clinical staging of cases is directly correlated with better survival rates.

## **Comparing data across cancer registries**

**B4**

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### **Background**

When aggregating and comparing population-based cancer registry data for publication in monographs or peer reviewed journals, it is important to assess data from the contributing registries to assure that the data are of similar and acceptable quality. This is essential for understanding the burden of disease in different areas and for valid comparisons between populations of interest.

### **Methods**

We will present several methods used in North America to assess the quality of data from various registries. Quantitative measures have been applied to measure compliance with minimum data quality standards. Additional measures are used to scan data for outlying rate values, and identify registries with consistently high or low cancer rates. Methods used to calculate outlying values will be discussed. Methods used to display comparative data will be demonstrated. Assessment of registry specific data is also important (percent microscopically confirmed, percent death certificate only, observed to expected ratios, incidence to mortality ratios). Methods for comparing these statistics both within the registry and across other registries will be demonstrated.

### **Results**

Core data quality measures were calculated for all data submissions. Tools were developed to visualize outlying quality indicators and unusual rate patterns. Evaluative cut points were set to identify data submissions that needed more in-depth qualitative review.

### **Conclusions**

Computer-assisted review of data quality indicators can facilitate the review process by systematically applying criteria which will identify data submissions requiring more extensive review.

## **Completeness of ascertainment of chronic lymphocytic leukaemia in the Girona Cancer Registry, Spain**

**B5**

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### **Introduction**

Chronic lymphocytic leukaemia/small lymphocytic lymphoma (CLL/SLL) diagnoses are more often occurring in an outpatient setting, which makes these cancers to be underreported to cancer registries. The objective was to evaluate the completeness of ascertainment of CLL/SLL in the Girona cancer registry.

### **Methods**

A quantitative evaluation of the degree of completeness of CLL/SLL registration was conducted. We surveyed haematologists from the hospitals situated in the area covered by the GCR in order to rescreening the information sources about patients diagnosed by CLL/SLL. We compared the number of cases collected by the routine with the cases proportionated by the haematologist in order to quantify the completeness of CLL/SLL. Incidence rates were calculated per 100,000 person-years and age-adjusted using the European standard population (ASRe).



### Results

From 2001 to 2008, 243 patients were diagnosed with a CLL/SLL with an ASRe of 3.5 cases per 100,000 person-year (4.8 for men and 2.4 for women). After including the new cases, the number of CLL/SLL increased until 294 (ASRe of 4.3 cases; 5.7 for men and 3.1 for women). We found that 243/294 (82%) of the patients diagnosed with CLL/SLL were subsequently reported to registry by the routine reporting and approximately 18% of cases are underreported, increasing over the time.

### Conclusions

Our data confirm that Girona Cancer Registry missed a substantial number of incident cases of CLL/SLL. This significant under-ascertainment of CLL/SLL is probably attributable to increasing over time the outpatient diagnosis.

## Can we detect a change in incidence? A power analysis for establishing Cancer Registry size

B6

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### Background

With the aim of an optimal allocation of limited resources there is the need to have information about the sample size (or population coverage) that allows to evaluate the precision of occurrence measures provided by registries. In this analysis, we focused on the possibility to detect temporal trends in incidence.

### Materials and methods

We simulated incidence data with varying rates and population sizes, according to different scenarios. For each simulation, we calculated main statistics, based on the Joinpoint analysis of Poisson distributed counts [Kim et al 2000]. The power of the statistics was then directly calculated from the  $1-\beta$  portion of the simulated series distribution.

### Results

For each scenario, we presented results according to series length, incidence rate, population, effect size and power. For example, for UK population observed along 28 years, and incidence rate of 10/100000 person-years, the Annual Percent Change (APC) detectable with a power of 80% and  $\alpha=0.05$  is 0.49%. The APC decreases to 0.16%, if the incidence rises to 100/100000 person-years.

### Conclusions

To detect significant incidence changes in time an opportune balance between population and effect size, and length of observation is needed: at equal length, more recent, and therefore interesting, changes require additional power.

## Practical means of checking consistency and legitimacy of cancer data collected by four hospitals

B7

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### Background

Population-based cancer registries are essential for assessing the extent of cancer burden in a specified geographic area. Since incidence data collected is reported by more than one source, information sometimes is bound to have variations. As such, quality assurance is always emphasized. Quality is described by four attributes. These include ascertainment or accuracy, completeness, timeliness and validity. The aim of the study was to assess the reliability and validity of information reported by four sources of information.

### Method

Data were extracted from patients notification forms sent by four hospitals for the year 2010. Variables selected include patient information including address, cancer site, date of diagnosis, basis of diagnosis and vital status. Total number of cases reported per source was verified. Records from the four sources were matched with those collected by the registry personnel to compare information recorded. Because same data sources were used to collect information; 100% comparability was expected in both completeness and accuracy.

### Results

Variations were observed. When comparing the total number of cases reported; only one source obtained 100% whereas two sources had 90% and one 88%. Completeness of information recorded was between 92% and 100%.

### Conclusion

These results emphasize close monitoring and training of data collectors can improve their performance.

## Comparison of data quality from 16 regional registries in Poland: new registration system in Poland

B8

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### Background

In January 2011 the project of building a new system of cancer registration in Poland started. Its aim is to create an integrated database of cancer cases available on-line for the 16 regional cancer registries. Migration of data from local databases into a central database must be preceded by a multi-stage process of assessment, verification and completion of data. The project is co-financed by the European Union Funds.



### Methods

Data for the period 1999–2009 were extracted from 16 local registries. The selected methods recommended by Bray and Parkin were applied to assess validity and completeness of data.

### Results

Polish local registries follow the international guidelines for comparability. Limited access of particular registries to different data sources affects the differences in quality of regional data. Significant differences are observed between the registers in the completeness of the data, the proportion of histological confirmation, and cases registered based on death certificate.

### Conclusions

A new system of cancer registration in Poland will improve quality of data for the whole country and allow the participation of Polish data in international research projects.

## On death certificate only (DCO) proportions in the initial years of newly established cancer registries **B9**

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### Background

The proportion of cases notified by death certificate only (DCO) is a commonly used criterion to judge completeness of cancer registration even though it is affected by additional factors. In the initial years of registration of newly established registries, DCO cases may reflect deaths of patients diagnosed prior to the registration period in addition to patients diagnosed during the registration period but not registered at lifetime.

### Methods

We provide model calculations to demonstrate the magnitude and time course of the impact of both mechanisms on DCO proportions based on data from the United States Surveillance, Epidemiology, and End Results (SEER) Program.

### Results

DCO proportions of up to  $\geq 30\%$  can be expected from deaths of previously diagnosed patients during the first year of registration. Although this proportion is expected to gradually diminish over subsequent years, DCO proportions may be dominated by this source for several years, especially for cancers with relatively large proportions of late deaths. Otherwise, however, increasing incompleteness is expected to become the predominant source of DCO proportions in the long run.

### Conclusion

Results from this first systematic quantitative investigation of the expected development of DCO proportions may guide interpretation of DCO proportions of relatively young cancer registries.

## Data quality at the Bulgarian National Cancer Registry: An overview of comparability, completeness and validity **B10**

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### Background

The Bulgarian National Cancer Registry (BNCR) was established in 1952. Reporting of neoplasms has been compulsory following a directive from the Ministry of Health in 1951. The quality of data has been estimated rather infrequently in past years. Aim: To provide a comprehensive evaluation of the BNCR data quality.

### Methods

Quantitative and semi-quantitative methods, including historic data methods, mortality:incidence ratios (M:I), capture-recapture method, proportions of histologically verified (HV%) and death-certificate only (DCO%) cases, and missing information (primary site unknown – PSU, stage unknown – SU), were applied for cases diagnosed in 1993 – 2010 (C00–C96, ICD10).

### Results

The BNCR coding and classification systems follow international standards. The overall completeness was estimated at 94.7% for the period 2001–2005, with variations between cancer sites (95.2% – 98.1%) and age groups (93.0% – 96.0%). For the period 1993 – 2010, M:I was 0.54, 75.9% were HV (87.4% in 2010), DCO% – 9.5 (4.8% in 2010). The overall proportion of cases registered with PSU was 3.7% and with SU – 18.8%.

### Conclusions

The present review showed that BNCR yields comparable data that are reasonably accurate and close-to-complete, especially in recent years. This is a prerequisite for BNCR to expand its role to more areas of cancer control.

## Follow up registration and completeness in Switzerland **B11**

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### Background

Cancer registration in Switzerland is organised at the cantonal level with varying legal bases and financial resources. As this is likely to affect data quality and completeness a questionnaire survey was conducted, focusing on the process of active follow up (FU).

## Methods

Up to now prevalence and survival is not part of Swiss national cancer monitoring on a regular base. Therefore, main quality and completeness checks focused on incidence information only up to 2010. In 2009 15 out of 26 cantons were covered by cancer registration.

## Results

A preliminary investigation uncovered variations in the frequency of active FU on cantonal level. In most cantons, active FU is done at least once a year, some cantons investigate the status of FU only every 5th year and one canton is doing active FU only within the framework of specific studies. In most cantons, FU information is compiled for all malignant cancers and carcinoma in situ whereas in other cantons only specific malignant cancers are considered. In half of the cantons written requests have to be sent to cantonal and/or community inhabitant control offices, the remaining ones have electronic connections. Documentation of FU status for the national level is mandatory in 12 cantons for breast cancer and colorectal cancer only (at least once every 5th or 6th year for each case).

## Conclusions

Federal structures without national framework legislation can lead to a high variation concerning procedures, data quality and completeness of FU registration.

## Standardising a method for producing an analytical version for the English National Cancer Dataset Repository

**B12**

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## Introduction

The registries need a consistent and reproducible analytical version of the English National Cancer Dataset Repository (NCDR). The 2007 NCDR covered for the diagnosis years 1990–2007 and included a derived field using a version of the IARC duplicate rules for the international benchmarking project which indicated if the case should be included. This field did not account for other exclusion reasons.

## Methods

All cases were extracted from the 2007 NCDR with the fields needed to assign exclusion criteria (5,744,814 cases). A series of exclusion flags were then assigned. The exclusion criteria were run against the 2008 and 2009 NCDRs using the same years of diagnosis.

## Results

Consistency between the two exclusion methods was extremely high, 98.61%. 71,939 (1.25%) cases included in the benchmarking project were excluded by the new method. However, 49,689 of these cases are excluded on area of residence and

other data related reasons while 22,250 are excluded due to IARC duplicates rules. The method was consistent across the 2008 and 2009 NCDRs.

## Conclusions

This method of assigning exclusion flags to the NCDR is consistent across different versions of the NCDR. Major differences occurred as more cases were excluded as registries stated they were extra-regional.

## Feasibility study of determining clinical tumour stage information in the Chennai registry in India

**B13**

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## Background

An attempt to get information on tumour stage, based on standard criteria for common cancers from a population-based registry is made for the first time from India.

## Methods

Incident cancers of female breast (756), cervix (380) and oral cavity (429) registered in 2009 in Chennai registry formed the basis. Data on tumour stage and basis for staging were abstracted from medical record using special questionnaire, explicitly stating TNM (breast and oral) and FIGO (cervix) components as data items.

## Results

Data on tumour stage was available in 48% of breast, 68% of cervix and 52% of oral cancers: maximum from regional cancer centre and government hospitals with cancer treatment facilities (66–80%) and least from private hospitals (22–31%). For breast cancer, stage III (43%) and II (40%) were predominant; tumour status revealed T2 (34%), T3 (33%) and T4 (24%) in order; 70% were clinically node-positive and 14% presented with distant metastasis. For cervix, stage II (46%) and III (28%) were top ranking. For oral cancer, stage IV (52%) formed the majority with T4 (43%); 67% were clinically node-positive and <1% presented with distant metastasis. Clearly, 70–80% of cases presented in locally advanced stages. Minimum required investigations for staging breast, cervix and oral cancers were done in 54%, 72% and 69% respectively.

## Conclusions

Information on tumour stage from routine registration was variable depending on cancer site and sources. Concerted efforts would enhance data availability, facilitating scientific evaluation of cancer control measures and meaningful correlation of disease characteristics with cancer survival.

## **Data Quality Assurance by Reabstracting in North-Western Regional Cancer Registry**

**B14**

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### **Background**

Cancer registration is compulsory in Romania and since 2008, Prof. Dr. Ion Chiricuta Oncological Institute runs one of the regional cancer registries in Romania – The North-Western Regional Cancer Registry. The computer system for collecting data combines the passive method of data collection with some automatic procedures.

### **Methods**

For 2008, 773 cases (8.6%) were reabstracted using the same information used in the first abstracting and 149 (1.7%) were reabstracted using the original clinical files.

### **Results**

The differences between first and second codification were measured for the following variables: incidence date (the difference being – 2.5%), topography (3.2%), morphology (27%), basis of diagnosis (1.5%) and laterality (1.2%).

### **Conclusions**

Reabstracting is a powerful tool which should be used for quality control in the cancer registry.

## **Completeness and Consistency of Data of Hospital Based Cancer Registry in Brazil**

**B15**

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### **Background**

Information from Hospital-Based Cancer Registry (HBCR) are critical in hospital cancer surveillance. Quality assurance and reliability of information systems are fundamental to the health surveillance. The aim of this study was to offer the analysis of HBCR quality information consolidated in IntegradorRHC web system.

### **Methods**

We analyzed 254,819 cases from 2000 to 2006, 99 of HBCR who sent their informations to the IntegradorRHC, web system that consolidates data from HBCR in Brazil. The quality of information was assessed on the completeness and consistency by mandatory variables of Cancer Registry Form. Cutoff: excellent (<5%), good (5% to 10%), fair (10% to 20%), poor (20% to 50%) and very poor (<50%).

### **Results**

There is good consistency and completeness of the information in the databases forwarded to the IntegradorRHC. However, the variables TNM staging, disease status at the end of the first treatment, and education level showed a not good completeness.

### **Conclusions**

For ensuring the quality of cancer information from HBCR are essential: progressive improvement in medical records, higher participation and training of the professionals involved in the cancer information process, large information using, high level of analysis and critical data.

## **Population survey for estimating completeness of cancer registration in rural Dindigul district in south India**

**B16**

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### **Background**

Cancer incidence in rural Dindigul district is lesser by half than in metropolitan Chennai, in the same state of Tamil Nadu, prompting a population survey to elicit the completeness of cancer registration.

### **Methods**

A total of 19,333 households were visited by trained volunteers recruited locally in 2011 enlisting 97,632 individuals from 41 villages/localities randomly chosen using stratified sampling. A questionnaire was administered to collect history of cancer among family members. Reported cancers were reconfirmed by registry staff for registration criteria.

### **Results**

Out of 308 cases reported as cancers from the survey, 166 (54%) fulfilled the criteria for registration in Dindigul registry during 2003–2009. The excluded cases (n=142) were either confirmed as not having cancer (40%) or suspected cancer (13%) or cases registered prior to 2003 (40%) or non-residents (7%). Out of 166 eligible cases, 111 (67%) were matched with cases in registry database. Among 55 (33%) cancers newly identified from the survey, 24 (14%) had visited new sources not yet covered by the registry both inside and outside registry area; 15 (9%) were registered in hospitals covered by registry but had given a different residence address lying outside registry area; 16 (10%) were missed on routine registration from existing government/private data sources inside/outside the registry area.



### Conclusions

Existing registration practices should necessarily be supplemented by appointing volunteers for routinely reporting cancers occurring in their locality and by expanding the coverage of sources to cover general medical practitioners to minimize missing of cancers in rural registries in future.

## What is the reliable incidence of childhood cancer in Japan?

**B17**

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### Background

In Japan, childhood cancer is registered both by Japanese Society of Pediatric Oncology (JSPO) and regional population-based cancer registries (PBCRs) independently. The purpose of this study is to assess the completeness of both registries.

### Methods

We compared incidence rate in 2007 collected from 21 PBCRs which covered approximately 40% of the total population in Japan and had comparatively high-quality, with that in 2008 and 2009 collected by JSPO. We evaluated those incidence rates by tumor and age groups. We also estimated incidence rate of all Japan using data from 21 PBCRs.

### Results

Concerning all tumor types, the incidence rate for people aged 0–14 years for PBCRs and JSPO was 100.3 per million and 93.0 per million, respectively. The estimated incidence rate calculated from PBCRs was 99.5 per million. Regarding people aged 0–19 years, the incidence rate for PBCR was 105.9 per million and that for JSPO was 73.0 per million. The estimated incidence rate for the age group was 105.9 per million.

### Conclusions

The results showed the possibility of under-enumeration of the JSPO registration, especially for people aged 15–19 years. Comparison of data registered independently could reveal problems of data quality.

## Selecting a potential pool of cause of death registry sites to establish a population-based cancer registry in Indonesia

**B18**

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### Background

Cause of death registry is a pre-requisite for population-based cancer registry in developing countries. Nonetheless Indonesia was 1 out of 75 countries without cause specific mortality data from vital registration system based on a WHO-UQ study. Accordingly none of cancer registries have been implemented in cause of death registry sites. In line with Law No 23 Year 2006 on Vital Registration, a number of cause of death registry projects applying mortality rules of ICD-10 and MMDS (Medical Mortality Data System Decision Tables) have been developed successively throughout the country. Medical Certificate of Causes of Deaths are sent to local health office for analysis from hospitals and health centers based on Medical Records and Verbal Autopsy. Morphology codes are already included on the recent certificate.

### Methods

Each site of cause of death registry was evaluated inter alia according to accuracy, coverage, completeness, local political commitment to continue funding after the project finished, then related to cancer registry, the availability of cancer diagnostic and therapeutic facilities.

### Results

The potential sites identified are 2 out of 16 sites of IMRSSP 2006–2009, and 5 out of 15 sites of SRS 2001–2001 with a total number of population captured around 4 million, all are located in 3 out of 5 big islands in the country.

### Conclusion

Pooling the sites of cause of death registries is required to reach the minimum number of population for robust estimates with tolerable margin of errors in cancer registry.

## Improving Cancer Registry Data Quality in the United Kingdom

**B19**

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### Background

The UKACR Data Quality Assurance & Registration Group has the responsibility to make recommendations to the UKACR Executive to improve data quality assurance, quality control, performance and management of cancer registration data.

### Methods

Each year all UK cancer registries submit performance indicators on the quality of their registration data for the previous year. The data items included in the report are the CI5 measures of % DCO rate, % Microscopic Verification and Mortality: Incidence ratio. Information on incidence stability, completeness, treatment, staging, screening histories and other variables are also compared. The results are published annually and available on the UKACR website.

### Results

Considerable improvement in registration data quality has been achieved over the 13 years that the group has been operating. The overall % DCO rate for the UK has dropped from 4.5% to 1.3%. % Microscopic verification has improved from 76.9% to 83.5%, and Timeliness has also improved, with data available 12 months after the end of a collection year.

### Conclusions

Marked improvements in data quality and timeliness were achieved through co-operation, training and good practice sharing. There are still improvements in several areas including staging, but it is hoped that developments in data flow from suppliers will help this.

## Trends in incidence of primary liver cancer subtypes before and after the introduction of ICD-10 **B20**

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### Background

This study aimed to examine the incidence of primary liver cancer (PLC) subtypes around the introduction of a revised disease classification in 1995.

### Methods

37,512 patients with PLC in England between 1990 and 2008 were identified from the National Cancer Data Repository. Annual age-standardised incidence rates per 100,000 European standard population and average annual percentage changes (APC) for years before and after the introduction of ICD-10 (1990-1994 and 1995-2008) were calculated.

### Results

Hepatocellular carcinoma incidence increased in men from 0.89 per 100,000 in 1990 to 3.38 in 2008. The APCs were 6.9% during 1990-1994 and 5.8% during 1995-2008. In women the incidence was stable at around 0.25 per 100,000 in 1990-1994 and increased to around 0.76 (APC 3.5%) in 1995-2008. Intrahepatic bile duct carcinoma incidence increased throughout the whole study period from 0.58 per 100,000 in 1990 to 1.83 in 2008 in men and 0.42 to 1.45 in women, respectively. The APCs were similar in men and women, approximately 9% during 1990-1994 and 5% during 1995-2008.

### Conclusions

Hepatocellular carcinoma and intrahepatic bile duct carcinoma incidence increased in this period and these appear to be a true increase in spite of the revision in disease classification.

## Death from Non-Reportable Tumors: The Ovarian Conundrum **B21**

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### Background

With the implementation of ICD-O-3, fourteen ovarian tumor morphology terms (or five codes) were reclassified as borderline and became non-reportable, and a new borderline code was added. The New York State Cancer Registry (NYSCR) is among the few registries that have continued to collect borderline ovarian tumors. Our objective was to determine whether to continue doing so.

### Methods

All microscopically confirmed ovarian tumors, diagnosed between 1996 and 2009, with behavior codes 1 and 3 were included. Demographic and tumor characteristics were compared by behavior. Relative survival and cause of death were evaluated for women with only one primary. Gynecologic-oncologists were consulted regarding whether to keep collecting borderline ovarian tumors.

### Results

While the incidence of ovarian cancer is decreasing, the incidence of borderline ovarian tumors appears to be increasing. The mean age at diagnosis for borderline tumors was significantly younger than for invasive tumors (49 vs. 61). Tumor behavior was not associated with race. Five-year relative survival varied by behavior and stage; it was 98.3% for borderline tumors and 90.6% for invasive tumors diagnosed at localized stage. Among women with only one borderline ovarian tumor, 25.1% of deaths were attributed to ovarian cancer, while 44.7% of deaths were attributed to any cancer. Since the underlying cause of death is frequently misclassified, it is likely that most of the cancer deaths were due to ovarian cancer.

### Conclusions

Based on our findings and the input of our consultants, we will continue to collect these tumors.



## Incidence and survival of colorectal carcinoma before and after screening: analysis by stage and gender

B22

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### Background

In Umbria (central Italy) organized CRC screening (age 50-74) started in 2006. We describe incidence and survival trends of CRC (C18-C20) by gender, stage, pre and post screening period and mode detection (screen-detected, non screen-detected).

### Methods

Cases from 1994 to 2008 are from the Regional Registry. A stratification of cases (over 1580 severe dysplasia and 6000 cancer) according to stage has been performed for the period 2002–2008. Standardized rates are calculated using European population. Relative survival is calculated using the Ederer 2 method.

### Results

Standardized rates increased from 61.1 to 77.5 in males and from 40.6 to 45.2 in females. Age-specific 50-74 years rates peaked in 2007 both in males (253) and females (132) but the increase was higher for males (30%) than females (10%) with respect to the pre-screening period.

4-year relative survival (RS) among cases 50-74 years old increased from 65% in the pre-screening period to 75% after screening start in males, but remained unchanged in females (from 68% to 69%). Performing the analysis without stage IV cases led to a similar increase in survival for both sexes. 4-year survival for NSD (65%) and SD (85%) cases was the same in males and females.

### Conclusions

First screening round led to the detection of pre-invasive and early stage cancers. The effect of screening on incidence and survival was less pronounced among females than in males despite similar participation. Unchanged survival in females is explained by worsening survival for stage IV in the screening period.

## Comparison of cancer registry data and clinical data on volume of cystectomies for bladder cancer

B23

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### Background

Radical cystectomy for bladder cancer is a high-risk and low-volume procedure. The Dutch Association of Urology has set an annual minimal volume of 10 cystectomies per hospital. We investigated whether data of the Eindhoven cancer registry (ECR) could be used to determine the annual volume of cystectomies of hospitals.

### Methods

Urologists were requested to send in data on all cystectomies performed in 2008 and 2009. These data were compared with the data of the ECR. Discrepancies between the data sources were checked out with aid of the hospital medical files. The mean annual number of cystectomies was calculated for each hospital.

### Results

Of the total of 237 cystectomies 68% was registered by the ECR and send in by the urologists, 7% was only registered by the ECR and 25% was only send in by the urologists. Of this latter group most of the cystectomies were performed for a recurrence, progression or another type of primary cancer. Six of the nine hospitals performed  $\geq 10$  cystectomies annually.

### Conclusions

In order to be able to adequately monitor the annual volume of cystectomies, registration criteria of the ECR have been adapted to also include cystectomies performed for recurrences or progression of bladder cancer.

## Validation of the AJCC cancer staging 7th edition for prostate cancer: a registry database review

B24

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### Background

The AJCC cancer staging 7th edition for prostate cancer revised the T category criteria and incorporated in Gleason score/pre-operative prostate-specific antigen (PSA), achieving a better distribution of prostate cancer patients with similar prognostic survivals. To date, there is limited survival data to suggest if the 7th edition is applicable to an Asian population. We report disease free survival trends of prostate cancer patients with radical prostatectomy (RP) performed at our department over ten years, evaluating the predictive ability of the 7th edition compared to the 6th edition using our prostate cancer registry database.

### Methods

We retrospectively reviewed all 562 RP cases from 2000 to 2009 in the database with a list of patients operated from the hospital Operating Theatre Management system to ensure all prostate cancer patients who received RP at our hospital were included.

### Results

5-year disease-free survivals were 89.3%, 78.1%, 88.0%, 61.1%, 37.5% stage I, IIA, IIB, III and IV by the 7th edition ( $p < 0.001$ ) compared with 87.1%, 61.1%, 37.52% stage II, III and IV by the 6th edition ( $p < 0.001$ ) respectively. Concordance Indexes for 7th and 6th staging groups were 0.668 (95%CI: 0.610 – 0.727,  $p < 0.001$ ) and 0.660 (95%CI: 0.600 – 0.720,  $p < 0.001$ ).

### Conclusions

Changes to the 7th edition have made no significant improvement in predictive ability in our Asian population.

## An analysis of Cancer Incidence from 2003 to 2007 in Cixian county Hebei Province

B25

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### Background

The objective was to understand cancer incidence and prevalence in Cixian.

### Methods

According to the cancer registration specification, collection, evaluation incidence of malignant tumors, statistical and analysis cancer, the incidence of cases, crude incidence rates, standardized rate and the world standardized rates and other indicators.

### Results

In 2003 to 2007 the crude incidence rate was 281.19/100000, standardized rate 262.12/100000 and the world standardized rate 351.04/100000. The male crude incidence rate was 328.66/100000, the standardized rate 334.58 /100000 and the world standardized rate 446.93/100000. The female crude incidence rate was 231.67/100000, standardized rate 198.91/100000 and world standardized rate 266.98/100000.

The five commonest tumors in men were esophagus, stomach, bronchus and lung, liver and colorectal cancer and in women esophagus, stomach, bronchus and lung, liver and breast cancer.

The incidence based on land type was as follows—

areas on the plain, crude incidence rate was 309.67/100000, standardized rate 288.54/100000 and world standardized rate 387.82/100000.

hilly areas, crude incidence rate was 239.16/100000, the standardized rate 223.21/100000 and the world standardized rate 296.57/100000.

mountain areas, crude incidence rate was 284.96/100000, the standardized rate 265.47/100000 and the world standardized rate 356.45/100000.

### Conclusions

The county historical data show an increase in cancer incidence. Esophageal cancer has decreased, but still is the most common incident tumor in the county. Gastric cancer incidence rate increased significantly. Considering the three types of landforms, cancer incidence in the plain was higher than in the mountains and hills, and higher in the mountains than the hills. Active early cancer detection and treatment is very important to strengthen cancer research areas.

## The National Cancer Intelligence Network (NCIN)

B26

Anna Gavin, Chris Carrigan, Di Riley,  
Michael D Peake, Michael Chapman

The National Cancer Intelligence Network (NCIN)

### Background

The NCIN is a collaborative United Kingdom network which brings together cancer registries, clinical champions, health service researchers and a range of other interested parties under the umbrella of the National Cancer Research Institute (NCRI).

### Methods

Alongside each of 12 Site Specific Clinical Reference Groups (SSCRGs), English cancer registries have taken on the role of “lead registry” to develop and deliver site-specific national work programmes, funded by the NCIN, to be taken forward over the next months and years.

The NCIN led on the creation of the National Cancer Data Repository (NCDR) which contains merged data on all cancer patients from the English cancer registries (and from UK registries in an anonymised fashion) including the registry record, hospital admission records, and national clinical audit data. Cancer waiting times and general practice data is available for linking at patient level and the forthcoming radio- and chemo- therapy datasets will also be included within the NCDR.

### Conclusions

The NCIN therefore combines both data and the expertise to use it which will enable the creation of an excellent, world standard cancer intelligence system.

The many outputs are available to view and download from [www.ncin.org.uk](http://www.ncin.org.uk)

## Patterns of prostate cancer incidence, survival and mortality in European countries **B27**

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### Background

PSA testing has been widely used for early detection of prostate cancer, though the effectiveness of screening remains under discussion. The objective was to describe prostate cancer incidence, survival and mortality trends in European countries and to discuss the observed patterns according to the use of PSA testing.

### Methods

Ten countries with national incidence (CI5), and mortality (WHO) data, and survival estimates (EUROCORE) were selected. Joinpoint regression was used to identify significant changes in age-standardized incidence and mortality (45-85+ years) trends and to estimate the annual percent changes.

### Results

Czech Republic, Finland, Norway, Scotland and Sweden showed increases in incidence and survival, compatible with PSA screening, and decreasing mortality trends. Denmark and Slovenia showed the same incidence and survival pattern, but no significant variation in mortality, suggesting that early detection may not suffice to reduce the mortality burden. Slovakia was the only with no significant variation in incidence and survival from pre- to post-PSA era. Estonia and Iceland presented increasing survival trends, while no changes were detected for incidence and mortality.

### Conclusion

Although these results are compatible with the effectiveness of PSA testing, they do not allow disentangling the contribution of screening and appropriate management of patients to the mortality reduction.

## Four years' hospital based cancer incidence from seven major health institutions in Nepal (2003–2006) **B28**

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### Background

This is the first study of this type in Nepal and includes a total of 16,757 cancer cases from 7 major hospitals across the country where cancer was diagnosed and treated.

### Methods

This was a descriptive study, based on secondary data collection, from the medical record section of seven collaborative institution. Refresher training was provided to the medical record staff of collaborating institution for data abstraction.

### Results

A total of 16,757 cancer cases, collected from seven major hospitals across the country between 2003 and 2006, were included across the country. Female cases (52.9%) were diagnosed more frequently than males (47.1%). Overall, the most common cancer sites found in males were lung, stomach and leukemia and in females cervix uteri, breast and lung.

### Conclusions

The cancer data in this study may not represent the whole country. A population-based cancer registry program is not yet established so it is difficult to reflect the burden of cancer in the country.

## Theme C: Burden of Disease

### Study of esophageal and gastric cancer incidence trends in Ci-County, China 1988–2007

C1

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#### Background

Incidence trends of esophageal and gastric cancer during 1988–2007 were analysed by the tumor registry data in Ci-County, which is a high-risk area for esophageal cancer in northern China.

#### Methods

The incidence of the cancers with ICD codes C15.0-C15.9 and C16.0-C16.9 was selected and fitted to a linear model to calculate the annual percent change (APC).

#### Results

The overall incidence of esophageal cancer was downwards. The APC of total incidence for men and women combined was -1.15%,  $P = 0.0015$ ; female APC was -1.47%,  $P = 0.0008$ , but male APC was -0.94%,  $P = 0.1186$ . Trends in the incidence of gastric cancer increased for both sexes. Overall gastric cancer APC was 1.3%, 1.5% for men, and all were statistically significant. Female APC was 1.3%,  $p = 0.0830$ . Of the sub-sites, cancer of gastric cardia showed the most significant increase and accounted for 40.0% for all gastric cancer. The APC of total incidence for males and females was 8.07%, 6.51% for women, 8.07% for men. All trends were statistically significant,  $P = 0.000$ . In conditions that anatomic site was associated with esophageal and cardiac cancer. Incidence has shown a downward trend, but  $P > 0.05$ .

#### Conclusions

In Ci-County in China the incidence of gastric cardia cancer has grown fastest in the last 20 years, while there has been a decline in the incidence of esophageal cancer. The increased incidence of gastric cancer is closely related with the ICD coding rules.

### Epidemiological measures of cancer in Kuwaiti population from 2000–2009

C2

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#### Background

Cancer is the second cause of death in Kuwaiti people after cardiovascular diseases. This study is the first in Kuwait to describe the cancer epidemiological measures in this population.

#### Methods

Data obtained from Kuwait cancer registry included all Kuwaiti patients between years 2000–2009. Analysis conducted using age-specific rates, age-standardization-direct method, 95% confidence Interval (95% CI), cumulative risk by the age of 74 years, limited-duration prevalence, mortality and forecasting to year 2029.

#### Results

We found that the commonest cancer sites were colorectal ASIR = 16.1/100,000 in males and breast 49.4/100,000 in females. The trend of cancer incidence (1974–2009) showed no statistical significance. First causes of death due to cancer were female breast 8(6.4-9.6)/100,000 and lung (males) 8.1(6.6-10.0)/100,000. The risk of developing cancer by the age of 74 was 13.4 (1/8) and 14.3% (1/7) in males and females respectively. The risk of dying from cancer in the same age group was 1/17 and 1/23 in males and females respectively. By the end of 2009, prevalent cases represented 0.52% of the Kuwaiti population. In the year 2029, the total number of cancer cases expected to reach 1200 cases compared to 889 cases in 2009.

#### Conclusion

Common cancers in Kuwait (Breast, colorectal and lung) are largely preventable.

### Prostate cancer incidence in metropolitan and suburban areas of Izmir, Turkey in 1995, 2000 and 2005

C3

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#### Background

As an introduction to Geographic Information System (GIS) studies, we conducted a pilot study for mapping and identifying the geographic characteristics of prostate cancer (PC) in Izmir in 1995, 2000 and 2005 using GIS.

#### Methods

PC cases diagnosed in 1995, 2000 and 2005 were included in the study. Existing database structure is modified to meet the aim of this study and correlated with digital maps through geocoding of cases. GIS based geostatistical analyses were applied to the cases, and GIS-based kernel methods were used for testing.

#### Results

PC incidence has been strikingly increasing and age of patients has dropped over time in Izmir. Besides higher incidence rates in metropolitan areas generally, the slope of the increase is bigger than in suburban districts also. The median age (group) of having PC diagnosis in metropolitan districts was 65-69, whereas it was 70-75 in suburban.



## Conclusions

The increase of PC incidence and decrease of age for having diagnosis is highly correlated with the rising of awareness and the opportunistic PSA screening in Izmir. In the metropolitan districts, PSA screening has been more widely applied due to more rapid improvement in the awareness and better accessibility to the health care services.

## Gynecological Cancers in Izmir, Turkey from 1993–2007

C4

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## Background

Aim of this study was to examine incidence trends of gynaecological cancers (ovarian, cervical, cervix in situ and endometrial cancers) in Izmir for 1993–2007.

## Methods

Age Standardized Incidence Rates (AAIRs per 100,000) were calculated for 5263 gynaecological cancers from Izmir Cancer Registry for 1993–2007. Annual Percent of Change (APCs) of rates were analyzed by JoinPoint Program.

## Results

AAIRs were 55.7 in 1993–1997 and 5.6 in 2003–2007 for cervical cancer; 6.4 and 9.9 for endometrial cancer; 5.7 and 5.8 for ovary cancer respectively. The incidence rates of endometrial cancers were increased significantly during 1998–2007 period (APC 7.7, 95% CI= 6.2, 9.2), in while it did not show a significant change in 1993–1997. The incidence rates of cervical and ovary cancers stayed stable, with the APC of 0.4% for cervix, APC of 0.6% for ovary.

## Conclusions

Results of this study showed the increasing incidence of endometrial cancer in Izmir. This pattern might be explained with the decreasing of fertility, increasing of obesity and hormone replacement therapy. Although only opportunistic screening has been applied in Izmir, the burden of cervical cancer hasn't shown an increasing trend. It might be related with the primary prevention of HPV infection depending on the cultural aspects mainly.

## Epidemiology of Cancer in Aden Cancer Registry, Yemen: A 13-year period

C5

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## Background

This paper describes the epidemiology of cancer incidence over 13 years period (1997–2009).

## Methods

Data from the Aden Cancer Center (ACC) was used to estimate the cancer incidence of population under the catchment area of the registry. The data was analyzed using the CanReg4 program and the incidence rate was calculated based on mid-time total population in each period.

## Results

From the total of 2826 cancer cases 1285 (45.5%) were male and 1541 (54.5%) were female. Age standardized rate (ASR) per 100,000 inhabitants was 64.4 and 67.1 for males and for females, respectively. The five most common cancer in males were non Hodgkin lymphomas (4.3), leukemia (9.4%), Hodgkin disease (8%), colorectal cancer (7.8%) and liver (4.7%). Breast (36.1%), Leukemia (10.1%), non-Hodgkin lymphomas (5.3%), colorectal (4.5%) and thyroid cancer (4.4%) were among the top cancer in women. The highest ASR for breast cancer was observed in the age group 40–49 years (74/100,000 population).

## Conclusion

Although this findings of reported cancer from ACC has indicated similar pattern to the cancer registries in the adjacent countries, our registry is an example of those registries facing important challenges in country with poor resources and political instability

## The patterns of cancer incidence in Chile

C6

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## Background

Chile has three population-based cancer registries (PBCRs) with data for the period 2003–2007. The objective was to analyse and to compare the patterns of cancer incidence of three areas of Chile with PBCRs.

## Methods

Data on cancer incidence for the period 2003–2007 were provided by the three cancer registries: Antofagasta, Biobio and Los Ríos.



### Results

In Antofagasta, the most incident types of cancers in men were: lung (ASIR: 54.9), skin non-melanoma (48.6), prostate (39.7). In women: skin non-melanoma (41.0), breast (35.7) and lung (19.1). In Los Ríos and Biobio, the two most common types of cancer were Prostate (65.5 and 53.4, respectively) and Stomach (35.1 and 41.5) for men, and Breast (34.1 and 31.9) and Gallbladder (25.1 and 24.7) for women. The third cause in men was non-melanoma skin (16.8) in Los Ríos and Gallbladder (11.4) in Biobio and in women non-melanoma skin (18.5) in Los Ríos and Stomach (16.7) in Biobio.

### Conclusions

The patterns of cancer incidence in the different areas are quite distinct. In Antofagasta lung cancer, non-melanoma skin cancer and urinary bladder cancer show rates much higher than in Biobio and Los Ríos in both men and women. These three cancers are causally related to arsenic exposure. Stomach and gallbladder cancers are less frequent in Antofagasta than in the other two areas in both men and women. The development of some new registries will give a more detailed view of the magnitude of cancer and its characteristics in Chile.

## Cancer incidence in Nigeria: a report from population-based cancer registries

C7

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### Introduction

Cancer poses a threat to public health in sub-Saharan Africa (SSA). However, few countries in this region have data on cancer incidence. Data on cancer incidence in Nigeria from 2 population-based cancer registries (PBCR) that are part of the Nigerian National System of Cancer Registries (NSCR) are presented.

### Materials and methods

We analyzed data from 2 population-based cancer registries in Nigeria, the Ibadan population-based cancer registry (IBCR) and the Abuja population-based cancer registry (ABCR) covering a 2-year period 2009–2010.

### Results

The age standardized incidence rate (ASR) for all invasive cancers was 62.4 and 131.1 per 100,000 in men and women respectively. Mean age of diagnosis of all cancers in Ibadan and Abuja were 51.1 and 49.9 years in men and 49.1 and 45.4 in women. Breast and cervical cancer were the commonest cancers among women and prostate cancer the most common among men. Breast cancer and cervical cancer ASR were 54.3 and 34.3 per 100,000 respectively. The observed differences in incidence rates of breast, cervical and prostate cancer between Ibadan and Abuja, were not statistically significant.

### Conclusions

This paper highlights the need for high quality regional cancer registries in Nigeria and other SSA countries to provide useful information on cancer incidence.

## Cancer Trends in Bahía Blanca, Argentina, between 1989–2007

C8

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### Background

The problem of cancer has motivated difficult discussions among Bahía Blanca inhabitants due to the vicinity of the petrochemical industry. The cancer registry is therefore frequently consulted and, at present, its importance is better understood. We have already studied and reported the trends of the main sites. We present now the trends for less frequent sites.

### Methods

Joint Point Program was used, with a log linear model that allows the calculation of annual percentage change.

### Results

We found in Hodgkin lymphoma among men an annual decrease of 1.72 and of 0.12 among women. In leukemias in women an increase of 0.65, and among men a decrease of 1.85; in larynx a decrease of 2.03 among men; in esophagus a decrease of 2.13 among men and of 3.05 among women. None of these differences were significant.

### Conclusions

Taking in consideration these results with the previous ones in 1989–2002 period—a significant decrease in lung and gastric cancer among men, a significant increase in prostate cancer and a stable incidence of breast and colon cancer; the fears referred to are not confirmed.

## Rare Cancers: a common challenge. A national population-based epidemiological study in the Netherlands

C9

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### Introduction

Previously, the only existing definition for rare disease was based on prevalence. Within the European RARECARE project an incidence based definition, deemed more appropriate, was developed for rare cancers, defining rare cancers as rare in case the crude incidence rate equals <6 per 100,000 per year. We applied this definition to The Netherlands, classifying tumours as rare or not.

### Methods

All patients with cancer in the period 2004 to 2008 were selected from the Netherlands Cancer Registry (NCR) and classified according to the RARECARE grouping of topography and morphology combinations. Crude and European standardized incidence rates were calculated.

### Results

Out of the 260 defined cancer types from the RARECARE list, 223 (86%, N=14,000) were considered rare according to the definition, which accounted for 17% of all malignancies in the Netherlands. Our findings were similar to the European findings by RARECARE, but some gender-specific tumours were considered rare by RARECARE. We observed considerable fluctuations in crude rates over the years, classifying oesophageal adenocarcinoma as rare in 2004 only.

### Conclusions

Rare tumours account for a small number of tumours per entity, but combined they still affect a large group of people as 1 in 6 cancer patients in The Netherlands is affected by a rare cancer. The cut-off for the definition of rare cancer should be further specified by taking an average annual rate of <6 per 100,000 over 5 years. Also, the use of gender-specific incidence rates for gender-specific cancers is required.

## Challenges in projecting prevalence for prostate cancer: issues and options

C10

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### Background

Forecasting prevalence of cancer is difficult but important for health service planning. It is more difficult to predict the prevalence of prostate cancer due to the introduction of prostate specific antigen (PSA) testing in the early 1990s and subsequent changes in clinical practice. The current work presents options to overcome these issues.

### Methods

Using data from an Australian population-based cancer registry for prostate cancer diagnosed in 1972–2007, we developed piece-wise projection models fitting the data separately for three periods (1972–1989, 1990–1997, 1998–2007). Population, mortality, incidence and survival data were inputs to the PIAMOD software to predict cancer prevalence. Incidence was projected using age-period-cohort models. Survival was estimated using mixture cure models. Prevalence was then projected based on the modelled incidence and survival estimates.

### Results

The estimates from the piece-wise method were in good agreement with the directly observed measures for 1998–2007 and provided a better fit to the data than other standard projection models. Using data for 1990–2007, the number of prostate cancer survivors aged 40–84 years was estimated to increase from 2.5% of the population in 2007 to 5.8% in 2017.

### Conclusions

Based on current clinical practice, the piece-wise method appears to be reasonable for obtaining reliable projections for the prevalence of prostate cancer as we allowed for the post PSA testing effect on incidence. However, as with all projections of incidence and prevalence, there are considerable uncertainties as these estimates are based on several assumptions related to the expected patterns in future incidence and survival.

## **Incidence of invasive cervical cancer in four Brazilian cities: evidence of records of population-based cancer, 1990–2004**

C11

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### **Background**

Population-Based Cancer Registries (RCBP) systematically collect data on cancer diagnosis, treatment and incidence. In Brazil, there are 28 RCBP. Our aim is to analyze trends in incidence rates of cervix cancer based on these data.

### **Methods**

We accessed the data at the National Cancer Institute website for PBCR of Fortaleza, Porto Alegre, Recife and Sao Paulo to obtain cervix carcinoma in situ, invasive cervix carcinoma and unspecified uterus part carcinoma cases. The population denominators were informed by the Ministry of Health. The age-specific rates were obtained for groups stratified as 25–34, 35–49 and 50–59 years. A linear trend was analyzed by linear regression.

### **Results**

Registries periods of 1990 to 2004 ranges 7 to 13 years. There was less regularity to Recife. The incidence trend for invasive cervix cancer declined among women 35 to 59 years in Fortaleza and São Paulo. There was trend for decrease on cervical cancer unspecified part incidence among women 35 to 59 years in Porto Alegre. The trend analysis of cervix carcinoma in situ has been increasing in all cities and age groups studied, with the exception of Recife.

### **Conclusions**

The frequency and coverage of the PBCR can interfere with the quality of the estimates of incidence. Even with these limitations, the information generated may be relevant to the monitoring of cancer. The observed decrease invasive cancer and carcinoma in situ growth may indicate positive results of the actions of screening for cancer of the cervix in these cities.

## **Incidence of thyroid cancer in Italy between 1986 and 2005**

C12

AIRTUM Working Group

Coordinator: Luigino Dal Maso, CRO Aviano, Banca dati AIRTUM, Florence, Italy

### **Background**

Some of the worldwide highest thyroid cancer (TC) incidence rates have been reported in Italy.

### **Methods**

TC cases diagnosed in areas covered by Italian cancer registries (CR) during 1991–2005 were used to estimate age-standardized IRs and age-period-cohort effects.

### **Results**

IRs of TC were twofold higher in 2001–2005 than in 1991–1995 (18 and 8 per 100 000 women, 6 and 3 per 100 000 men, respectively). Increases were similar in the two sexes and nearly exclusively due to papillary TC. A strong period effect emerged in both sexes, though IRs peaked at younger ages in women (45–49 years) compared to men (65–69 years). IRs significantly higher than the pooled estimates emerged for the latest period in the majority of CRs located in the Po River plain and in Latina province.

### **Conclusion**

The importance of period effect, and earlier onset in women compared to men, points to local variations in medical surveillance as an explanation of upward TC trends. Cohort effects are not compatible with a role of environmental radiation exposure. The consequences of the current intense search for TC and overtreatment should be carefully evaluated

## **Recent trends in cancer incidence: a comparison of two urban European areas**

C13

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### **Introduction**

Cancer incidence variations within and across countries are influenced by many different factors, socio-economic status (SES) being one of them. The purpose of this study was to examine the recent trends in cancer incidence in two urban European areas with different levels of SES.

### **Methods**

Age-standardised incidence rates (world standard – ASRW) for cases diagnosed in 2000–2009 for Sofia (Bulgaria) and the canton of Zurich (Switzerland) were calculated using the data from the corresponding cancer registries. Average annual percent of change (AAPC) were estimated with Joinpoint regression analysis.

### **Results**

ASRWs for all sites combined were higher in the canton of Zurich, both for males (311 vs. 262 per 100,000) and females (241 vs. 231 per 100,000). Colorectal (both sexes), lung (males), cervical and corpus uteri cancers had higher incidence in Sofia. Prostate, female breast and lung (females) cancers were more often diagnosed in Zurich. Significant increase of incidence was observed in both areas for female lung cancer (3–4% annually). Overall incidence was decreasing in Zurich, while it was not significantly changing in Sofia.

### **Conclusions**

Cancer incidence rates differ between Sofia and Zurich. Differences concerning SES, use of screening, but also data quality (data not shown) may influence these results.



## Assessment of the Burden of Primary Brain and CNS Tumor Incidence in the USA

C14

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### Background

Since 1995, the Central Brain Tumor Registry of the United States (CBTRUS) has been providing Statistical Reports driven by clinical relevance on primary brain tumors irrespective of behavior in the USA. Whereas the collection of non-malignant brain tumors, those coded as 0 (benign) and 1 (uncertain) by ICD-O behavior codes, was collected voluntarily before 2004, their collection is now mandatory in the USA and is guided by uniform data standards.

### Methods

Each report is a compilation of data on all primary malignant and non-malignant tumors of the brain, central nervous system, pituitary, pineal gland, and olfactory tumors of the nasal cavity and brain lymphoma and leukemia. Information on tumors diagnosed during 2005–2009 were collected at state central cancer registries and provided to the CDC National Program of Cancer Registries and the NCI Surveillance, Epidemiology, and End Results program. These data serve as the foundation of the most recent CBTRUS report.

### Results

Incidence rates for more than 300,000 brain and CNS tumors will be presented by histology groupings, age, gender, and race.

### Conclusions

The CBTRUS Statistical Reports provide comprehensive, up-to-date population-based statistics and represent a mean to assess the burden of primary brain and CNS tumors in the United States.

## Burden of cancer among Indigenous peoples globally

C15

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International Agency for Research on Cancer

### Background

Cancer burden in indigenous populations globally has largely been overlooked, despite evidence that indigenous people in some jurisdictions have significantly worse cancer outcomes than other populations. An understanding of the similarities and differences in the cancer profiles among indigenous populations around the world is of major public health importance, particularly in setting appropriate cancer control strategies.

### Methods

We conducted searches for relevant peer-reviewed articles (1990–2012) in PUBMED, CINHALL, EMBASE, Scielo, LILACs and Google Scholar, and searched grey literature including country and regional cancer reports and non-peer-reviewed literature, for information relating to cancer among Indigenous peoples. The searches focussed on three regions: Latin America and the Caribbean (LAC), the Circumpolar region and Oceania, including New Zealand and Australia.

### Results

No cancer registries in LAC reported cancer rates for indigenous people, and Indigenous status is generally not recorded therein. A search of the peer reviewed literature revealed 27 articles detailing screening, service and risk factor assessments in LAC, while only in two reports were rates of selected cancers documented. Neither of these reports was based on data from population-based cancer registries.

### Conclusions

There is a dearth of literature relating to the burden of cancer among indigenous people in LAC. This might be addressed by international recommendations for the inclusion of indigenous status in datasets in relevant populations, following a global survey as to the feasibility of its collection.

## Epidemiology of Thyroid Cancer in Jordan from 1996–2008

C16

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### Introduction

Thyroid cancer incidence rate varies from very low 2 in Europe to highest 21 in the Hawaiian Chinese populations per 100,000. Figures from the Middle East Cancer Consortium (MECC) from 1996–2001 stated an age standardized incidence rates (ASRs) ranging from 2 in Egypt to 7.5 per 100,000 for Israeli Jews. In Jordan, ASR was 3 per 100,000 in that period. The most common type (Papillary Carcinoma) shows good prognosis. This study aims to define the incidence of thyroid cancer in Jordan, and to explore the epidemiological characteristics of patient and tumor.

### Methods

A descriptive epidemiological study utilized data reported to Jordan Cancer Registry (JCR) from 1996–2008.

### Results

Thyroid Cancer Incidence Rate varied during the study period, but recorded 2.6/100,000 in 1996 and 2008. Incidence Rate in Jordanian females increased from 3.4 to 3.9/100,000. ASR was highest (4.7/100,000) in the age group 45–49 years. The most common morphological type was papillary thyroid carcinoma (76%) patients. Average annual incidence of thyroid cancer during the study period was highest in Amman governorate (3.3/100,000).

### Conclusions

The study results showed consistency with international studies. Thyroid cancer Incidence in Jordan is not high compared to other countries in the world.

## **Incidence and survival of carcinoma of unknown primary: A population-based study**

C17

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### Background

Carcinoma of unknown primary (CUP) is the most commonly diagnosed malignant disease after breast, colorectal, lung, prostate, skin, and bladder cancer. Clinical research has however neglected CUP. This study describes the trends in incidence and survival of CUP.

### Methods

All patients diagnosed with CUP between 1970 and 2009 in the area of the Eindhoven cancer registry were included. Age-standardized incidence rates were calculated. Survival was analyzed according to period of diagnosis, histology and location of metastases.

### Results

A total of 9,643 patients with CUP were included. The age-standardized incidence rate is decreasing for both males and females since 1998. The incidence of CUP as percentage of all malignancies was decreasing from around 5% in 1990 to about 2% in 2009. The prognosis of patients with CUP did not change over time and remained poor with 1-year survival rates of only 15%. Patients with metastasis to the liver or peritoneum had the worst survival (median survival: 40-46 days).

### Conclusions

Despite its decreasing incidence thanks to higher diagnostic accuracy, CUP remains a frequently diagnosed disease. In view of the dismal prognosis which shows no sign of improvement, more efforts should be undertaken in order to explore potentially effective treatment strategies.

## **Increasing risk of invasive adenocarcinoma of the uterine cervix in Cali, Colombia**

C18

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### Background

Cervical cancer remains in Colombia the first cause of cancer mortality and the second cause of cancer incidence among women. Little is known on time trends of this cancer in Latin America.

### Methods

Data from the population-based Cancer Registry of Cali, were used to estimate mortality and incidence rates for cervical carcinoma diagnosed during 1962–2007 by histologic subtype: squamous cell carcinoma (SCC) and adenocarcinoma (AC). Age-specific incidence rates per 100,000 for two age groups: 25–49 and 50–74 years were estimated. Annual percent change (APC) was estimated to assess trends.

### Results

The age-adjusted incidence rate (per 100,000) of cervical cancer has decreased from 75.1 in 1962 to 20.1 in 2007. The overall incidence of invasive SCC declined over time for both age groups, APC: -3.2 [CI95%: -3.6; -2.8] and APC=-3.4 [-3.8; -3.1]. Significantly increasing incidence trends were observed for AC for women younger than 50 years. Annual incidence increase was 1.6% [95%CI: 0.5, 2.7], no change was observed in older women. Overall death rates have continued to decrease since the early 1980s. The APC was -4.4 [95%CI: -4.9, -3.8].

### Conclusions

A significant increase in the incidence of cervical adenocarcinomas in women younger than 50 years was observed. Further investigation is needed to understand the cause of this remarkable phenomenon.

## **Changing Patterns of Gastric Cancer in Cali, Colombia**

C19

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### Background

The population-based Cancer Registry of Cali, Colombia has been in continuous operation since 1962. The RPCC have contributed data to be published in all nine volumes of Cancer Incidence in Five Continents. The objective was to describe time trends in gastric cancer incidence in Cali, and to investigate time period and birth cohort as determinants of such trends.



## Methods

Incidence data for the period 1962–2007 were obtained from the RPCC database. The analysis was based on 11518 cases of invasive cancer, 91.3% were stomach and remaining in the esophagus. Trends of rates were evaluated by the annual percentage change (APC), using the weighted least squares method. Age, period and cohort curvature trends for stomach cancer incidence were estimated through the Poisson Regression model proposed by Holford.

## Results

The overall gastric incidence rate fell in males and females through 1926–2007, with corresponding APCs of  $-1.7$  [CI95%:  $-1.9$ ;  $-1.5$ ] and  $-1.6$  [CI95%:  $-1.9$ ;  $-1.4$ ]. There was an increase from 0.2 to 1.3/100 000 of tumours of the cardias and 0.2 to 0.4 for tumours of the esophagus (distal). The incidence rates were stables in esophagus (proximal). Stomach (non-cardias) cancer incidence significantly decreased for males and females, with corresponding APCs of  $-1.8$  [CI95%:  $-2.0$ ;  $-1.6$ ] and  $1.6$  [CI95%:  $-1.8$ ;  $-1.3$ ]. The risk of developing stomach cancer declined in generations born between 1890 and 1960 and rose in subsequent birth cohorts in both sexes.

## Conclusions

Trends in stomach cancer rates seem to be mainly linked to birth cohort effect. The causes of this apparently new incipient epidemic are unknown.

## Burden of Bronchopulmonary cancer in West Romania, 2008–2010 C20

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## Background

The Timisoara Regional Cancer Registry (EUROMTIM) is one of eight population-based Romanian cancer registries and a GRELL/ENCR/IACR member. The purpose of this study is to emphasize the critical high incidence of the bronchopulmonary (BP) cancer, per counties, in the western region of Romania.

## Methods

The information used for BP cancer cases, was provided by EUROTIMS 2008–2010 database. Population denominators come from the Romanian National Institute of Statistics.

## Results

Burden of disease in our region is dominated by bronchopulmonary (BP), colorectal, breast, stomach, cervical and prostate cancers, which represents more than 53% of all incident cases. The annual incidence of this particular cancer is higher in man than in woman, representing 15.5% of all new cancer cases; the critical age group is 65+, with 4.4% curable stages. BP cancer is the most common cause of death in men, five-fold higher than in women, representing 17.9% of all cancer deaths.

## Conclusions

BP cancer data analysis revealed major gender differences in incidence and mortality and low differences between counties and areas. Smoking prevention is the key to reducing the burden of disease and death. We have to implement and develop more efficient Cancer Prevention and Information strategies.

## Main Gynecological Cancers: Incidence trends in South-Eastern European countries, 1999–2008 C21

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## Background

Gynecological cancers are the second most frequent female cancers in Europe, mainly due to the cervical cancer burden in South-Eastern European (SEE) countries with low investment in prevention activities. The aim of this abstract is to present recent trends of incidence for main gynecological cancers in SEE.

## Methods

On behalf of the EUROCOURSE project, we analyzed data from Bulgaria, Bosnia-Herzegovina, Croatia, Slovenia, Serbia and Romania (Cluj County), for cervical, corpus uteri and ovarian cancers. Joinpoint regression analysis of the age-standardized (world standard – ASRW) rates was used to estimate the average annual percent change (AAPC), for the period 1999 – 2008.

## Results

For 2008, gynecological cancers comprised between 13.6% and 23.1% of all incident female cancers. ASRWs varied from 8.8 to 27.6/100,000 for cervical cancer, with high rates ( $> 20/100,000$ ) for all countries, except Slovenia and Croatia and a significantly decreasing tendency in Slovenia and Serbia (AAPC  $-5$  to  $-2.5\%$ ); corpus uteri cancer from 8.3 to 16.7/100,000, with increasing tendency (1-2%); ovarian cancer from 6.8 to 13/100,000 women, decreasing only in Croatia with 3%.

## Conclusions

The patterns of gynecological cancers in SEE countries reflect lifestyle changes, diminishing fertility rate, burdened by the lag in introducing population-based cervical cancer screening, which only Slovenia started since 2003 (program ZORA).

## **Prediction of cancer incidence and mortality in Poland**

C22

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### **Background**

An estimation of frequency of cancer occurrence in a given population in the future is interesting not only from an administrative, but also from a scientific point of view.

### **Methods**

The basis for creation of incidence and deaths forecast was the data on cancer incidence and mortality in Poland and the population forecast for Poland. The forecasts of incidence cases, deaths and the rates for years 2010 and 2015 were based on the method proposed by Dyba. The calculations were done using the program Stata macros for short-time prediction.

### **Results**

The number of new cases and deaths caused by malignant neoplasms will steadily increase in the coming years, especially in the female population. Starting in 2010, the number of new cases in females will exceed that seen in males. This change is probably due to the clear lowering of the incidence rate of lung cancer in males along with the increasing incidence of both breast and lung cancer in females. The mortality rate will increase significantly slower.

### **Conclusions**

The forecasted increase of the number of cancer deaths is mainly caused by the demographic changes in the Polish population. A general conclusion, which can be made drawn from the presented prognoses, is the necessity to prepare educationally, diagnostically, medically, economically and logistically to a rapidly growing number of patients suffering from cancer disease. The scale of this phenomenon requires state health care participation.

## **Good and bad trends for cancers associated with tobacco use in South-Eastern Europe since 1999**

C23

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### **Background**

Tobacco smoking is a leading contributor to the cancer burden in South-Eastern Europe (SEE) where the tobacco industry is economically and politically influential. The SEE Ministers of Health highlighted tobacco control as a priority for the region since 2001. We present recent trends in incidence and mortality of some cancers associated with tobacco use.

### **Methods**

In the scope of the EUROCOURSE project, we analysed data from cancer registries in five SEE countries for lung and larynx cancers. Joinpoint regression analysis of the age standardized (world standard – ASRW) rates was used to estimate the average annual percent change (AAPC) for the period 1999 – 2008.

### **Results**

Lung cancer incidence and mortality in SEE men were generally high (ASRW 50-60/100 000), still increasing in Bulgaria. In women, lung cancer incidence and mortality were low (ASRW 8-15/100 000), but increasing with 2% and up to 4% annually, respectively. Laryngeal cancer incidence and mortality were markedly decreasing in males (AAPC –3 to –4%), except for Bulgaria, and non-significantly increasing in women.

### **Conclusions**

Analysis of recent trends of tobacco-related cancers in SEE shows still high, but decreasing rates in men, and modest increase in women. Continuous monitoring by the population-based cancer registries should be established throughout the region.

## **Estimation of cancer incidence in Chile, 2003–2007**

C24

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### **Background**

Until now, estimations of cancer incidence for Chile were those of Globocan based on data of a single registry and mortality data of the entire country. The objective was to estimate cancer incidence for the period 2003–2007, globally and for each tumour type and for Chile and its regions.

### **Methods**

The 2003–2007 incidence data derived from population-based cancer registries of Antofagasta, Los Ríos and BioBio; and mortality and population data from the National Statistics Institute. For each tumour type, estimates of Incidence/Mortality ratio were obtained from generalized linear models assuming Poisson distribution and effect of age has been smoothed by splines. National incidence was obtained by applying these fitted ratios to the corresponding national mortality.

### **Results**

In Chile as a whole, the average number of incident cases of cancer for all tumours except non-melanoma skin for the period 2003–2007 was 15,879 for men and 15,945 for women. In men, the age-standardized incidence rates (ASIR) for invasive cancers were 194.9, prostate (50.6), stomach (29.4), lung (17.1) and colon (9.1). In women, the global

ASIR was 158.4, breast (ASIR: 39.1), gallbladder and biliary tract (15.2), cervix uteri (13.0) and stomach (10.9). By regions, Antofagasta, Los Ríos and Magallanes showed the most elevated incidence rates.

### Conclusions

For the first time, national Chilean cancer incidence has been calculated using data from several cancer registries. Differences in estimated cancer incidence rates are observed among the regions. In the near future, new national estimations will be calculated using data from even more registries.

## Trends in female breast cancer mortality in urban centers and rural regions of Brazil

C25

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### Background

To provide a comprehensive picture of trends in mortality from female breast cancer in urban centers and rural regions of Brazilian states.

### Methods

This was an ecological study on a temporal series, using death information registered in the national mortality information system and the demographic database. Mortality trend analyses were performed using Poisson regression.

### Results

A declining trend was observed for mortality due to breast cancer in some urban centers: Porto Alegre (-1.6%); Rio de Janeiro (-0.9%); Sao Paulo (-1.7%); Belo Horizonte (-1.2%) and Recife (-0.9%). However, there were increases in other urban centers: Fortaleza (0.5%), Belem (0.8%), Joao Pessoa (1.6%), Teresina (4.6%) and Porto Velho (9.0%). In rural areas, there was a reduction in Sao Paulo (-2.8%) and increases most other rural areas in different Brazilian states, which were worst in Maranhao (17.6%), Paraiba (14.5%), Piaui (10.0%) and Alagoas (10.8%).

### Conclusions

It was observed that there were reductions in female breast cancer mortality in five urban centers in Brazil, while there were increases in most rural areas, with the exception of some areas in southern. One of the reasons for this disparity may be the lower access to treatment among patients living in rural areas.

## Trend in colorectal cancer incidence in Daejeon and Chungnam cancer registries, South Korea

C26

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### Background

Colorectal cancer is one of the major cancers in South Korea. We described the time trends in colorectal cancer incidence and its histologic types in Daejeon metropolitan city and Chungnam province (2000–2009), South Korea.

### Methods

Using the database from the Daejeon Cancer Registry (DCR) and the Chungnam Cancer Registry (CCR), we calculated the age-standardized (to world standard population) incidence rate (ASR) per 100,000 person years. Annual percent change (APC) was assessed as a trend indicator.

### Results

Incidence of colorectal cancer showed increasing trend in both sexes. Over the years 2000–2009, ASR among men was increased significantly from 35.6 to 51.9/100,000 (APC, 5.6%) in DCR and from 29.1 to 45.2 (APC, 6.2%) in CCR. For women, ASR was also increased significantly from 16.4 to 28.8 (APC, 5.5%) in DCR and from 15.3 to 24.1 (APC, 4.7%) in CCR.

### Conclusions

South Korean people in the study areas have an increasing trend in incidence of colorectal cancer. Our finding suggests the need of more active control program on the risk factors in the communities.

## Age-period-cohort analysis of thyroid cancer incidence in Korea

C27

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### Background

Korea has the highest incidence rate of thyroid cancer in the world and the incidence rate is increasing very rapidly. The rapid increase of thyroid cancer in Korea was known due to early detection. Recently, it was suggested that rapid increase rate of thyroid cancer was not due to early detection, but due to rising occurrence of thyroid cancer. But direct causes are not yet clear which are responsible.



### Methods

We investigated increasing rates of thyroid cancer according to the histologic type of thyroid cancer using annual percent change (APC) from Korean National Cancer registry database during 1993–2010. And we analyzed age-period-cohort model to distinguish effects on thyroid cancer incidence using log-linear poisson regression.

### Results

Both men and women, thyroid cancer was increasing after 1999. According to the types of thyroid cancer, papillary thyroid cancer was increasing very rapidly and anaplastic type of cancer didn't significantly increase. Not only age effect, but also cohort effects had an important effect on the rising incidence rates of thyroid cancer. Period effect didn't have a significant effect on thyroid cancer incidence as contrasted with age effect and cohort effect.

### Conclusions

Papillary thyroid cancer was increasing very rapidly. Not only age effects, also cohort effect involved in the sharp increase of the thyroid cancer. These results may imply that rapid growth of thyroid cancer was attributable to the environmental factors, like increase of BMI, exposure to radiation, associated with papillary cancer, not to early detection.

## Estimate 2012 – Brazilian cancer incidence

C28

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### Background

Since 1995, the Brazilian National Cancer Institute José Alencar Gomes da Silva (INCA) estimates and publishes information on cancer incidence. Estimates of cancer incidence for 2012 analyze the risk of cancer in different geographical Brazilian regions.

### Methods

The methodology proposed by Black et al (1997) was applied. This method allows estimates of national or regional incidence rates by multiplying the mortality rate recorded in the region by the ratio of incidence to mortality (I/M) in the cancer registry area.

### Results

Estimates for the year 2012 indicate that 518,510 new cases of cancer will occur. Non-melanoma cancer of the skin is expected to be the most common cancer in the Brazilian population followed by prostate cancer, female breast cancer and colorectal cancer.

### Conclusions

The cancer estimate of primary sites showed different incidence profiles by region. Cancer estimates enable us to calculate the dimensions and impact of cancer in Brazil and to provide healthcare managers and planners with up-to-date information on the expected number of new cases of cancer to establish a countrywide policy for the control of cancer in Brazil.

## Incidence trends and multiple cutaneous malignant neoplasms in patients under 40 years old in Goiânia, Brazil

C29

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### Background

Skin cancer is the most frequent malignant neoplasm in the world. It mainly occurs after 40 years in Caucasian body sun-exposed areas. There have been few studies about the occurrence of these malignancies in young individuals. The objective of this study was to analyze the profile of patients with skin cancer in population of Brazil.

### Methods

Incident cases of malignant skin tumours from the population-based cancer registry of Goiânia in individuals under 40 years, for the period 1988 to 2008.

### Results

We identified 2040 cases with an annual average of 43 cases in men and 59 women. The incidence rate in the period was 4,97/100.000 in males and 6,03/ 100.000 in women. There was an increase of Incidence trends for both genders ( $p < 0,001$ ). The presence of a single lesion appears in 82.1% of the cases, being 33.8% in men and women 48.3%. About 17.8% of the incident cases have multiple lesions, being 9.4% in women and 8.4% in men.

### Conclusions

The trend of incidence on skin cancer shows an increase for both genders in young in the period. The presence of multiples lesions are high. The reason for these increases needs further investigation.

## Trends in the incidence of basal cell carcinoma in patients under 40 years

C30

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### Background

Skin cancer is the most common malignancy in the world. The most frequent histological type is basal cell carcinoma (BCC). Little has been studied about the occurrence in young people. The objective of this study was to analyze trends in the incidence of BCC in the population of Brazil.

## Methods

Incident cases of basal carcinoma from the population-based cancer registry of Goiânia in individuals under 40 years, for the period 1988 to 2008.

## Results

There were 1509 incident cases of BCC with an annual average of 31 in men and 43 women. The ratio of male/female cases was 0.72. We observed an increase in the incidence trend for both sexes, in men APC = 3.2 (p 0.02) and women APC = 4.2 (p 0.003), 66.7% in the head and neck, 17.2% trunk and 9% limbs. There was an increase in the incidence trend in all segments; in limbs APC 17% men (p 0.001), women APC 16 % (p 0.006); trunk APC 6,9 % (p 0,1) men and women; in head and neck APC 2,2 % (p 0,09) for men and women.

## Conclusions

There is an increased of incidence of BCC in patients below forty years. There is evidence for recommendations to change habits to prevent this neoplasm.

## Cancer risk among Chernobyl cleanup workers from the Baltic countries 1986–2007

C31

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## Background

The Baltic cohort of Chernobyl cleanup workers includes 17,613 men from Estonia, Latvia, and Lithuania who participated in the environmental cleanup after the accident and received mean radiation doses of approximately 100 mSv. Aim of the study was to assess site-specific cancer risk in the cohort at 22 years of follow-up.

## Methods

Cancer cases diagnosed in the cohort and in the male population were obtained from the national cancer registries. In the situation of unavailable person-time at risk, proportional incidence ratio (PIR) was calculated to quantify the cancer risk.

## Results

Overall, 847 cancer cases were diagnosed in the cohort during 1986–2007. Elevated risk was found for cancer of thyroid gland (PIR=2.71; 95% confidence interval (CI) 1.60–4.28; 18 cases), and esophagus (PIR=1.43; 95% CI 0.99–1.99; 34 cases). No excess number of leukemia cases was observed (PIR=1.03; 95% CI 0.67–1.51; 26 cases). To the increased risk of prostate cancer (PIR=1.38; 95% CI 1.12–1.69; 95 cases) contributed high proportion of cases among the Latvian cleanup workers.

## Conclusions

Clear evidence of an increase in the radiation-related cancer risk was not observed with the exception of thyroid cancer, which is likely attributable to a screening effect.

## The Role of Population-Based Cancer Registries in the prevention of cervical cancer in Brazil

C32

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## Background

The control of cancer in Brazil had its beginning around the 1940s. Surveillance is a strategic component for the effective planning and efficient cancer control programs. Monitoring the occurrence of cancer in population is the main goals of Population-Based Cancer Registries (PBCR). The PBCR produce information that allows to describe and to monitor the profile of the cancer incidence, it becomes an essential source for clinical and epidemiological research development, as also, to plan cancer-control programs and to monitor and evaluate their performance.

## Method

Incidence of cervical cancer was obtained from 18 Brazilian PBCR. All incidence rates were age-adjusted to the World Standard Population and the age-specific rates were calculated by age-groups. Trends were constructed from the logarithm of the adjusted rates.

## Results

The Brazilian PBCR, has the average incidence rates of invasive cervical cancer ranged from 9 to 45 per 100,000 women. For carcinomas in situ rates ranged from 3 to 43 per 100,000 women. In five cities the in situ carcinoma already exceeded the invasive.

## Conclusions

Incidence information produced by PBCR is indispensable to monitor magnitude of cancer burden and its trends especially for cervical cancer, as also, evaluate the cancer-control programs.



## Cancer incidence estimates and projections for Andalusia (Spain) during 1981–2013 **C33**

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### Background

Cancer incidence is an indicator of cancer burden, useful for cancer surveillance. Incidence estimates in 2007 and projections to 2013 for Andalusia (Spanish region; population over 8 million) are presented for total cancer, except non-melanoma skin cancer, and major cancer sites.

### Sources

1) Spanish National Institute of Statistics: Population data by sex, age and calendar year (1981–2007); mortality data for total cancer, except non-melanoma skin cancer, and cancer sites (stomach, colon-rectum, lung, breast, prostate).

2) EURO CARE: Relative survival data. The Mortality-Incidence-Analysis-MODEL (MIAMOD) was used to calculate incidence rates from mortality and survival data.

### Results

The overall number of incident cases was estimated to be 30,072 in 2007. Estimated crude incidence rates were lower in women (340 per 100,000) than in men (420 per 100,000). Major cancer sites were prostate cancer in men (26%) and breast cancer in women (37%). The projected number of incident cases in 2013 increased to 32,723 (52% men).

### Conclusions

The proportion of incident cases in Andalusia is predicted to rise between 2007 and 2013. Estimates are similar to those of Spain and are the most updated available.

## The relationship between metabolic syndrome, its components, and cancer incidence in Korea **C34**

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### Background

The prevalences of both metabolic syndrome (MS) and cancer mortality are steadily increasing worldwide. However, little is known about the association between MS and cancers. The purpose of this study is to assess the relationship between MS, its components, and cancers in Korean.

### Methods

The author enrolled 15,516 (13,176 males and 2,340 females) Koreans who were undergoing a health check-up in the Ulsan University Hospital from January 1998 to December 2001. The incidence of cancer was confirmed by comparing the name and the resident registration number in the cohort with those in the database from the Korea Central Cancer Registry Center and the Ulsan Cancer Registry Center between 1998 and 2008.

### Results

The odds ratio for the risk of cancer incidence was significantly increased for subjects with the presence of one or more MS components compared with subjects with no component in men but not in women. In a Cox proportional hazard regression model using the individual components of MS by the retrospective cohort, the cancer incidence was not associated with any of the MS components.

### Conclusions

Our data support that MS is associated with cancer incidence in Korean males. Further study should be conducted to quantitatively analyze this issue.

## Clinical analysis of multiple primary cancers in Cluj County, Romania **C35**

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### Background

In Romania, the registration of multiple primary cancers (MPC) was reglemented by the Ministry of Health in 2008, according to IACR/ENCR standards. The aim of this study was to determine the frequency and clinical characteristics of MPC in non-selected patients in Cluj County.

### Methods

Between January 2006–December 2008, all patients with pathologically proven MPC were selected from the Cluj County Regional Cancer Registry and reviewed retrospectively.

### Results

Records of 171 patients with two and 7 with three primary cancers, representing 2% of all malignancies were evaluated. The sex ratio was 1.28 (male 100/female 78). The median age at first cancer diagnosis was 65 years in males, 60 in females. 34 cases (19%) appeared synchronously and 144 (81%) metachronously. In females, most frequent associations were breast cancer with new primaries synchronously developed in the opposite breast (4/78-5%), breast with corpus uteri (4/78-5%), breast with colorectal cancer (3/78-3.85%); corpus uteri with lung (4/78-5%) and colorectal with ovary (4/78-5%). The main cancer association in males were lung with smoking-related cancers, namely mouth, larynx, bladder (5/100-5%), bladder cancer with prostate (5/100-5%) and colorectal cancer with prostate (2/100-2%).

## Conclusions

Adequate surveillance after initial diagnosis should be performed for earlier detection of second primary cancers.

## Trends in the incidence (1977–2008) and mortality of cancer in Cuba (1977–2010)

C36

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## Background

Cancer is a health problem in Cuba for its discharge rates of incidence and mortality.

## Methods

With the objective of describing in time the behavior of these, we carried out a descriptive study of the rates of incidence for the main localizations of incidence (years 1977 at the 2008) and mortality (years 1977 – 2010) for cancer: breast, uterus neck, lung, prostate and colon. Age-specific rates of incidence and mortality were calculated for the age groups: 15-24, 25-44, 45-54, 55-64, 65 and over. The rates were adjusted to the world standard population and predicted for the year 2025. The analysis of the tendency used a model of simple linear regression.

## Results

There was reported to the national registration of Cuba an average of 26 thousand new cases for year and 14mil deaths to the National Address of Statistic of the Ministry of Health. There was a bigger increment of risk in women than in men, the rates of incidence and mortality were increased for those over 65 years in both sexes.

## Conclusions

In the female sex there was an increasing trend in the incidence for the cancers of breast, lung and colon. While the mortality was stable for breast, it increased in prostate and colon in men, but in lung it increased less than in women. It is predicted that by 2025 these trends will increase, which will allow planning of actions appropriately for cancer control.

## Cancer Incidence in Adolescents and Young Adults in Korea, 1999–2009

C37

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## Background

In Korea, cancer ranks third as cause of mortality in adolescents and young adults (AYA). However, comprehensive information relating to AYA (15-29 years) cancer has never been studied. The purpose of this study is to describe cancer incidence rates and trends among AYA in Korea.

## Methods

Data from the Korea National Cancer Incidence database were used to analyze cancer incidence among 15-29 years diagnosed during 1999–2009. The International Classification of Diseases for Oncology (ICD-O-3) was used for definitions of primary sites and histology. Data have been grouped according to the International Classification of Childhood Cancer (ICCC). Age-standardize incidence rates and estimated annual percentage change were computed by gender for age groups.

## Results

A total of 35,138 malignant neoplasm cases were included for calculating incidence rates. For all cancers combined, the incidence rate was 191.8 for males and 350.5 for females (M/F: 0.55). Among male, the three most common cancers were thyroid carcinoma (21.9), non-Hodgkin lymphomas (16.3) and stomach cancer (13.2). Among female, the major cancers were thyroid carcinoma (139.6), breast (27.3) and stomach cancer (20.1). The age-standardized incidence rates increased from 208.3 in 1999 to 367.3 in 2009 and the annual percentage change was 6.1% ( $p < 0.0001$ ). Significant increases were seen in chronic myeloproliferative diseases (7.5%), Non-Hodgkin lymphomas (7.7%) and carcinoma of the thyroid (18.0%).

## Conclusions

This study is the first to demonstrate specific results in the incidence of AYA cancer in Korea. Our research findings will provide valuable information for planning of cancer control strategy.

## Age-period-cohort analysis and prediction of liver cancer mortality in China

C38

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## Background

To analyze the trends of liver cancer mortality in China, we reported the liver cancer mortality rates from 1989–2008 and predicted the future mortality rates up to 2013.

## Methods

Liver cancer mortality data were retrieved from national cancer registration database of China from 1989 to 2008. Annual population projection was obtained from the National Statistics Bureau. Crude mortality rate and age-standardized rates by World Segi's population were calculated. We fitted Bayesian age-period-cohort models on the age, period and cohort effects, and used projections of this effect to predict future mortality of liver cancer up to 2013.

## Results

The age standardized mortality rates of liver cancer decreased from 18.67 per 100,000 in 1989 to 13.77 per 100,000 in 2008. Age effects showed a steadily increasing slope up to the age of 80. The small decrease of age standardized mortality rates can be attributed to the cohort effects. In the next five years,

the age standardized mortality rates of liver cancer would decrease, especially in males of rural areas of China.

### Conclusions

The age standardized mortality rate of liver cancer in China has declined in the past twenty years and the decrease will probably continue in the next five years.

## Cancer incidence rates in the Republic of Belarus: 42-year experience of Belarusian Cancer Registry **C39**

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### Background

Cancer registration in Belarus began in the 1953 and contains information on each case on more than 60 points. We have analyzed cancer incidence since 1970 to 2011 years.

### Methods

Data on cancer incidence of Belarusian Cancer Registry were used. Time-related trends for Age Standardized Incidence Rates were analyzed.

### Results

Five main types of time-related ASR trends were distinguished. No considerable changes in ASR were detected for liver, pancreas, esophagus, larynx, lung and bladder female cancers. A gradual increase in ASR was noted for colon cancer and melanoma of skin in both males and females and for breast, corpus uteri and renal female cancers. Considerable decrease was shown in ASR of males and females stomach cancer and in lip cancer in males. ASR for female and male recto-sigmoidal cancer and male cancers of oesophagus, larynx, lung and bladder increased till the middle of the 90s and then remained fixed at a certain level.

### Conclusions

The ASR trends may be indicative of the impact of some environmental factors at certain periods of time. Together with the atlas of distribution of SIR in time by 117 geographical regions of Belarus this may provide a basis for further analytical epidemiological studies.

## Gastric cancer incidence trends in Latin America **C40**

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### Background

Epidemiological studies have demonstrated decreasing gastric cancer incidence rates worldwide, however there is a lack of recent data on cancer incidence and trends in Latin America. This study assessed incidence and trends based on data from five population-based cancer registries (PBCRs) in Latin America.

### Methods

Countries involved were Brazil (Goiânia and São Paulo), Colombia (Cali), Costa Rica (national PBCR), and Ecuador (Quito). Crude and standardized rates were calculated. Significant changes in incidences trends were analyzed using a regression Poisson model. The study was assessed and approved by two ethics committees in Goiás.

### Results

40 829 gastric cancer cases were identified from the five PBCRs. Brazil (Goiânia) had the lowest incidence rates for both genders, with 14.09 per 100 000 for males in 1998 and 6.02 per 100 000 in 1996. In four of the five PBCR analyzed, a significant decrease was observed for males, with a downward trend curve. For females, a non-uniform pattern was observed. Major decrease in incidence trends for both genders were observed in São Paulo, with 6.4% (CI 95% 11.5 to 0.9) and 4.4% (95% CI 8.4 to 0.2) for males and females respectively.

### Conclusions

An incidence decline in Latin American males was observed during past decades. This decrease was not observed within females. Possible explanations could be the ascending trend in tobacco consumption in young females observed in past decades, as *Helicobacter pylori* infection prevalence and dietary aspects were not different when analyzed by gender.



## Increasing incidence of invasive cutaneous melanoma in central-West Brazil

C41

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### Objectives

To analyze the incidence of cutaneous malignant melanoma in a capital of central-west of Brazil in the period from 1988 to 2008.

### Methods

We analyzed the incident cases of cutaneous melanoma in Goiânia from 1988 to 2008. Data were stratified by gender and year of incidence. We calculated the standardized incidence by age, and groups were divided into <30, 30-39, 40-49, 50-59, 60-69 and ≥70 years. The trend analysis was done using the Poisson regression model, using the software Join point.

### Results

The total number of cases recorded in the period was 871, being 445 females and 426 males. We identified 51 (11.46%) melanomas in situ in females and 31 (7.27%) in males. However for invasive tumours there is not difference between males and females. It was observed an increase of incident rates in both sexes after 50 years age for the invasive tumours, with rate from 1.12 / 100 000 in 1988 to 6.28 / 100,000 in 2008 in females. The same occurred in men, with rates from 0.17 / 100,000 in 1988 to 6.72 / 100,000 in 2008. Trend of incidence showed a statistically significant increase in both, men (APC = 9.7%) and women (APC = 7.9%).

### Conclusions

The incidence rates of melanoma increased in both sexes in Goiânia especially after age 50. Our data show an increased incidence of malignant melanoma of skin in this city, with incidence rates above those estimated by GLOBOCAN 2008 for the Brazilian population.

## Increasing incidence of non-melanoma skin cancer in central West Brazil

C42

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### Background

Nonmelanoma skin cancer is most common in white populations worldwide. The Population-Based Cancer Registries (PBCRs) do not adopt as a routine collection of nonmela-

noma cancers. The PBCR of Goiânia has collected this information systematically. In central-west Brazil, the state of Goiás has a population phenotypically protected against skin cancer. Objectives: To analyze the incidence of nonmelanoma skin cancers in a capital of central-west of Brazil.

### Methods

We analyzed the incident cases of nonmelanoma skin cancer in Goiânia from 1988 to 2008. Data were stratified by gender and year of incidence. We calculated the standardized incidence by age, and groups were divided into <30, 30-39, 40-49, 50-59, 60-69 and >70 years. The trend analysis was done using the Poisson regression model, using the software Joinpoint.

### Results

The total number of cases was 26,117, being 14,218 females and 11,899 males. We identified 19,961 basal cell carcinomas and 6,156 squamous cell carcinomas, 591 of these cases were in situ and 25,526 invasive. There was an increased incidence in both sexes, especially the elderly. In the females standardized rates incidence ranging from 59.14/100,000 in 1988 to 154.02/100,000 in 2008. The same occurred in males, with rates of 50.79/100,000 in 1988 and 178.88/100,000 in 2008. Trend of incidence showed a statistically significant increase in both men (APC=6.4%) and women (APC=6.0%).

### Conclusions

These data demonstrate the impact of the incidence of non-melanoma skin cancer in Goiânia. The rates showed a steady increase in the incidence rates for both genders and all age groups.

## Trends in Ovarian Cancer and its Treatment in N. Ireland 1996–2010

C43

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### Background

Cancer Services were reorganised in N. Ireland starting in 1996.

### Methods

Goals of service centralisation, rapid investigation, treatment by specialised teams and improved communication were measured for malignant ovarian cancers by review of clinical records.

### Results

195 patients diagnosed in 2010 were compared with 121 (1996) and 122 (2001). In 2010, 10% presented as emergencies with 73% via own doctor (GP) WITH 29% urgent referrals, 10% incidental, 54% presented with pain, 54% presented with abdominal distension, symptom duration was poorly recorded, 47% presented to gynae, 27% to general surgery. Waiting times to 1st diagnosis and treatment increased. Staging

improved to 64%, histological grade recording improved to 74%. Communication to patients and conclusions of patients at multidisciplinary teams improved. Fewer patients had surgery but there were 12 single operators, a reduction from previous years. Survival improved.

### Conclusions

After 15 years there have been service improvements but there is still some to go to the goals of the 1996 services reorganisation.

## Epidemiology of cancers in Niger, 1992–2009

C44

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### Background

Cancer remains a real problem of public health in Niger. Our study aims to determine the various epidemiological characteristics of cancers in Niger from 1992 to 2009.

### Methods

This is a retrospective and descriptive study based on the data of the National Cancer Register of Niger. During that period, 7031 cases of cancer were collected.

### Results

The number of registered patients suffering from cancers significantly increased, from 186 cases in 1992 to 646 cases in 2009. The majority were female, with a sex ratio of 1.40. The average age was of 43 years. The majority of the patients (70.2 %) lived in the Niamey area.

Breast cancer (27.36%) was the most frequent female cancer, followed by cervical cancer (13.41%) and ovary cancer (8.83 %). The main sites in men were liver (19 %), skin (8.04 %) and bladder (4.92%). Approximately 7 % of the registered cases were childhood cancers.

Carcinomas constituted (27.03 %) the most frequent histological type. Burkitt lymphoma (15.1 %) was the most frequent histological entity in children. The incidence rate was 0.0225 % in 1992 and 0.0440% in 2009.

### Conclusions

In the absence of adequate and adapted health policies for their early diagnosis, the incidence of cancer increased.

## Histological analysis of gynecological cancer incidence in Japan (2003–2007)

C45

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### Background

Increasing incidence of gynecologic cancer in young patients is reported in Japan. The purpose of this study was to analyze histological pattern of gynecological cancer incidence according to age of patients.

### Methods

We used the incidence data during the period 2003–2007 from 12 population-based cancer registries meeting the quality criteria; ovarian (C56: n=8395), cervical (C53: n=8442) and uterine (C54: n=8191) cancers. Incidences were analyzed by 10-year age groups and histological groups for each topography.

### Results

Age-adjusted incidence rates was 7.4, 8.5, and 7.1 for ovarian, cervical and uterine cancer, respectively. The highest incidence rate was observed in the group aged 50–59 years for ovarian and uterine cancer, and in the group aged 40–49 years for cervix cancer. In ovarian cancer, serous carcinoma was the most common (30.6%). The most frequent histology in young patients (<30yrs) was mucinous carcinoma. In cervical cancer, squamous cell carcinoma was most commonly observed (74.7%), especially among young patients. In uterine cancer, adenocarcinoma was the predominant histological types (95.8%), and no clear histological diversity was found according to age.

### Conclusions

This study revealed the characteristics of gynecologic cancers according to age, and suggested importance of research on specific etiology in young generation.

## Leukemia Incidence among children and adults in Nagasaki prefecture, Japan, 1985–2008

C46

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### Background

Few studies have assessed the population-based estimate of leukemia incidence by subtype in Japan.



## Methods

Leukemia was extracted according with ICD-O3 codes from data of the Nagasaki Prefectural Cancer Registry covering approximately 1.5 million people. We categorized them into Group A: de novo leukemia (excluding adult T-cell leukemia), Group B: leukemia arising from de novo myelodysplastic syndromes (MDS) or myeloproliferative neoplasms (MPN), and Group C: therapy-related leukemia, and calculated age-adjusted (to the Japanese standard population) incidence rate (IR) per 100,000 person years by sex and 5year age groups.

## Results

During 1985–2008, there were 2,538 individuals with leukemia. Among those, 2,138 were

Group A (sex-specific age-adjusted IR; 5.94 in men and 3.84 in women), 302 were

Group B (0.86 in men and 0.28 in women), and 98 were

Group C (0.27 in men and 0.14 in women). Age-specific IR of each group increased with age, especially in those over 50 years old, except for the decrease with age in aged 0-25 in Group A. The joinpoint analysis showed a statistically significant increase in IR of Group B.

## Conclusions

The etiology of most leukemia remains unknown. Descriptive epidemiologic studies may provide critical clues for future etiologic investigations. IRs of other leukemia-related diseases are under way.

## Pediatric CNS tumors: population-based study in Moscow Region **C47**

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## Background

Based on official statistical reports age-standardized incidence (ASR) of CNS tumors in Russian Federation is 2,0-2,1 (Davydov M.I., 2009) reflecting the significant underreporting of cases. The aim of the study was to assess the incidence of CNS tumors in children 0-14 years old in Moscow Region (MR) during the period 2000–2009.

## Methods

The data on patients were retrieved from the database of Childhood Population-based Cancer Registry of MR. Patients with CNS tumors irrespective of behavior (diagnostic group III according to ICCC-3) diagnosed during the period 2000–2009 were included. ASR was calculated using World Standard Population as a standard. Incidence was calculated per 100,000.

## Results

270 cases of CNS tumors were revealed, which comprises 22.9 % of all cancer types in children. Male-to-female ratio was 0.97. Median age at diagnosis was 7.8 years. Crude incidence of CNS tumors was 3.08, ASR was 3.16. ASR increased from 2.62 in 2000–2004 to 3.67 in 2005–2009. Astrocytoma was the most common subgroup – 119 cases (44.0%), followed by embryonal tumors – 54 cases (20.0%). ASR by subgroups of CNS tumors was 0.36 for ependymoma (IIIa), 1.37 for astrocytoma (IIIb), 0.68 for embryonal tumors (IIIc), 0.12 for other gliomas (IIId), 0.24 for other specified tumors (IIIe) and 0.29 for unspecified tumors (IIIf).

## Conclusions

Pattern of incidence of CNS tumors in MR was compatible to European countries. Close cooperation between cancer registries and neurosurgeons is needed for complete ascertainment of CNS tumors in pediatric population.

## Colon cancer profile in patients attending Brazilian public hospitals **C48**

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## Background

IntegradorRHC was developed as an unique National System to consolidate the Hospital-Based Cancer Registry databases. This study was carried out aiming to analyse the profile of colon cancer from 118 Brazilian public hospitals.

## Methods

From the National Database were selected 27,177 cases of colon cancer (ICD/3: C18-C20) diagnosed between 2000 to 2008. Based on descriptive analysis were obtained the percentage distribution of cases for selected variables in relation to demographic, diagnosis and treatment informations.

## Results

The age pattern are similar for both sex and most of cases are between 50 to 74 years (62,2% for males and 60,1% for females). Females represent 53.7%. In advanced disease stage were 60%. For the basis of diagnosis, 92,8% were based on histological diagnosis: Adenocarcinoma were 86,4% (colon/rectosigmoid junction corresponding to 92,6%) and Carcinoma were 79,9% (the main primary sites were anus/anal canal).

## Conclusions

Malignant neoplasm of colon was the fifth greatest frequency among all cancer cases in this study, corresponding to 5.76%. It was observed that the majority patients with colon cancer had arrived at Brazilian public hospitals in advanced disease stage. This progression status of the disease results in a large number of deaths at the end of the first treatment.

## Infant cancer incidence and mortality trends in Belarus for the 25-year period 1986–2010

C49

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### Background

Infant cancer incidence and mortality trends is still a subject of epidemiological analysis.

### Methods

Joinpoint regression model analysis was used.

### Results

An active data collection revealed that during 1986–2010 years the diagnosis of cancer has been established in 446 children aged under 1 year old. The crude incidence rate of all infant cancers combined was 155 per million infants. Joinpoint analysis revealed significant increases in all infant malignancies (APC 2,6;  $p < 0,05$ ) mainly due to neuroblastoma (APC 7,9;  $p < 0,05$ ), CNS tumors (APC 5,2;  $p < 0,05$ ) and retinoblastoma (APC 10,4;  $p < 0,05$ ) incidence. At the same time period, infant leukemia incidence rate decreased (APC -3,26;  $p < 0,05$ ); the peak of infant leukemia was registered in 1986–1987 (IR – 78 per million). In 1986–2010 125 children under 1 year of age died due to malignancies. The crude mortality rate of all infant cancers combined was 43,4 per million infants. The joinpoint analysis of the mortality trends revealed that mortality rate decreased (APC -2,4; n.s.) mainly due to leukemias (APC -6,35;  $p < 0,05$ ).

### Conclusions

The revealed significant increase in infant cancer incidence rate in Belarus may be due to improvement in diagnostic modalities.

## Population-based incidence and survival of myeloid malignancies in Girona, 1994–2008

C50

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### Introduction

Epidemiological data on myeloid malignancies are very rare. The lack of registration by cancer registries can be due to changes in classification. Objectives To estimate the incidence and survival rates of myeloid malignancies in the Girona province according to the WHO classification (2008).

### Material and Methods

1302 cases (708 men and 594 women) of myeloid malignancies were diagnosed from 1994 to 2008. Clinical, pathology, haematology, molecular and cytogenetic information from these patients were revised. Age standardized incidence rates were calculated per 100,000 person-year using the European standard population (ASRE). Follow-up time until 31/12/2011 was performed using a record-linkage with the Catalan Mortality Registry and the National Death Index. Hakulinen, Kaplan-Meier and Fleming-Harrington methods were used to compute relative and observed survival.

### Results

ASRE was 10.9 per 100,000 person-year (12.9 for men and 9.3 for women). Within myeloid malignancies the distribution was as follow: Myeloproliferative neoplasms (MPN): 36.1% (470/1302); Myelodysplastic syndromes (MDS): 34.2% (445/1302); Acute myeloid leukaemia (AML): 24.1% (314/1302); Myelodysplastic/Myeloproliferative neoplasms (MDS/MPN): 4.9% (64/1302) and histiocytic and dendritic cell neoplasms: 0.7% (9/1302). The best survival was found in MPN and the worst in AML. Survival rates according to myeloid malignancies will be presented. Discussion and

### Conclusions

Myeloproliferative neoplasms were the most frequent diseases within myeloid malignancies in Girona. Although these patients had the best survival, we found differences in survival rates between myeloid entities.

## Disability-adjusted life years in patients with colon cancer in the Netherlands between 1989 and 2008

C51

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### Background

Over the past two decades, survival in patients with colon cancer has improved in the Netherlands. However as the incidence of this neoplasm is still on the rise, more people are likely to be subject to disability during the course of the disease.

### Methods

We compared disability-adjusted life years (DALYs) between patients diagnosed with colon cancer in 1989 and those in 2008 in the Netherlands. Years of life lost (YLL) and years of life lived with disability (YLD) were calculated to derive the DALYs.

## Results

DALY rates due to colon cancer have decreased by 12% (341 to 302/100,000), as a result of declining rates of premature mortality from colon cancer, with the largest reduction seen among patients younger than 60 years of age. On the other hand, YLD has increased by 22% from 55 to 67 per 100,000. This increase over time is greatest (44%) in terms of disability spent during the terminal phase of the disease, although the largest contributor to the total YLD (e.g. 76% in 2008) involved the period of disability experienced during active follow-up.

## Conclusion

The observed decrease in the overall DALY from colon cancer, was counteracted by an increasing number of years lived with disability. As such, early detection programs to reduce the burden are needed in the Netherlands, alongside increased patients support to reduce disability, especially during the follow-up and end-of-life phase.

## Cancer among women in Guyana

C52

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## Background

Guyana's population is 751,223, of which 375,189 (49.9%) are women. There were 4028 cancers diagnosed for the period 2005–2010, 61% (N=2475) were women, 42% (n=1,029) have died. Cancer statistics in the Caribbean are often underestimated because of a limited number of population-based cancer registries. In Guyana, there have been no published reports of the cancer burden in the Guyanese population.

## Methods

We performed secondary data analysis on cancer registry data and the Ministry of Health statistical department. Data are actively collected from all medical institutions in the country. Summary statistics were performed to compare the incident rate and distribution of cancers among Guyanese women. Kaplan Meier Plots were generated to compare survival rates for women for all cancers represented in the registry's data base.

## Results

The majority of cases were diagnosed at stages 1 and 2. Among all other cancers diagnosed in women in Guyana, HPV related cancers and cancers of the GI tract had the lowest 2 year survival rate of 37% and 11%, compared to the other cancers in this study. Age range is evenly distributed with the majority of the population falling between the 35 – 54 categories. Marital status is largely unknown with blacks and East Indians forming the larger groups for ethnicity in all areas

## Conclusions

More work needs to be done to address screening and early detection, based on the results of the data presented.

## Cancer treatment in the elderly: could more be done?

C53

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## Background

In developed countries cancer burden in older people is rising. However, in many countries treatment rates are lower in older, compared to younger, cancer patients. To better understand reasons underlying this, we investigated factors affecting cancer treatment decision making (TDM) in Ireland.

## Methods

In-depth interviews were performed with 44 healthcare professionals (HCP) and 35 women with breast, colon or ovarian cancer. Content analysis was used to identify themes

## Results

All HCPs emphasised that patient's functional status rather than chronological age influences TDM. However, assessment of functional status and definitions of "old age" varied. Many factors were identified as affecting cancer TDM in older patients including: clinical, patient-related, social/family-related, health service-related, and clinician-related factors. HCP reported multidisciplinary teams had improved TDM. HCPs considered that awareness of cancer symptoms and health literacy were lower among patients without private health insurance and older patients. Older women tended to take a more passive role in TDM and were more "easy to manage" than younger women. Older patients who live alone and/or have little social/family support appeared particularly vulnerable to suboptimal treatment.

## Conclusions

Age influences cancer TDM in many and complex ways. Strategies to tackle these disparities, including improving advocacy for vulnerable groups, need to be addressed.



## **Establishing hospital based Cancer Registry in Ekurhuleni district: a study of cancer referral, treatment and survival**

**C54**

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### **Introduction**

South African cancer information has been limited because the National Cancer Registry (NCR) a pathology based database lacks sufficient information on demographic and lifestyle factors. In addition, not all cancers are collected especially those not diagnosed using histology. Current legislation makes cancer a reportable condition in South Africa. The newly legislated reporting form provides detailed demographic and risk factor information including HIV status. Legislation recommends the establishment of a population-based cancer registry.

### **Methods**

Ekurhuleni District is one of 5 health districts in Johannesburg with 3 mln inhabitants. We have initiated a pilot hospital based cancer registry in the Ekurhuleni which has six public hospitals and 21 private health care clinics. This project aims to collect information on new cancers in Ekurhuleni and follow them up referral treatment centers (Donald Gordon Hospital and Charlotte Maxeke Hospital and to other private health care providers). This project will provide estimates for cancer incidence for all ethnic groups. We will be able to compare referrals, treatment and survival of cancer patients for the most common cancers. The project will be the first complete epidemiological study to assess survival of common cancers in South Africa, and will determine treatment delays due to health system inefficiencies. Information regarding the cost and requirements for implementation of hospital based cancer registries in other areas will be established.

The new cancer registry will provide more complete information on newly diagnosed cancer cases especially on haematopoietic and blood forming organs. Valuable information will emerge for the National Department of health and the newly established National health Insurance to plan and improve cancer services in the country.

## **Temporal trends and regional variation in clinical stage distribution of non-small cell lung cancer in the Netherlands**

**C55**

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### **Background**

New imaging techniques aim for earlier detection and/or higher accurateness in detecting lymph node or distant metastases, this will influence stage distribution. We will provide an overview of clinical stage distribution of non-small cell lung cancer (NSCLC) in the Netherlands over time and relate this to the introduction of the PET scan, which has been used increasingly since the 1990s.

### **Methods**

All NSCLC patients diagnosed between 1989 and 2007 were selected from the Netherlands Cancer Registry (n=126,962). Maps of smoothed percentage distribution of clinical stage NSCLC were conducted by period of diagnosis. Joint point regression analyses were performed to detect trends over time and annual percentage change was calculated for regions with and without a PET scan between 1996 and 2001.

### **Results**

The percentage of clinical stage I and stage unknown decreased with 7.4% and 13.3% between 1989 and 2007, while the percentage of stage IV increased with 23.4%. The most rapid changes in stage I and stage IV were observed between 1997 and 2003. In regions with a PET the proportion of stage IV increased annually with 8.2 and 9.1% compared to 7.2 and 7.6% in regions without a PET.

### **Conclusions**

A shift in stage distribution towards higher clinical stages has been observed was observed between 1989 and 2007. The most rapid shift corresponds with the introduction of PET. In regions with a PET the proportion of stage IV increased at a slightly higher rate than in regions without a PET.

## Theme D: Cancer Risk Factors

### Methodological and practical challenges in cancer mapping: examples from the all-Ireland Cancer Atlas **D1**

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#### Background

Mapping cancer incidence can provide aetiological clues. We describe data-management, analysis and presentation issues in developing the All-Ireland Cancer Atlas.

#### Methods

Invasive cancers diagnosed 1995–2007 were extracted from cancer registries in Republic of Ireland (RoI) and Northern Ireland (NI) and allocated to small geographical units (RoI: enumeration districts; NI: wards). We aimed to create maps in which spatial variation would be unlikely to be artefactual. This entailed deciding: (1) the optimal statistical model; (2) how to deal with missing data; and (3) map colour schemes and grids. Alternative models (+/-covariates for population density/country), were compared by simulation. 4.4% of RoI cases had been assigned to multiple EDs. Simple random allocation and imputation were compared for allocating these cases to a single ED. Colour-ramp and grid options were compared.

#### Results

Small-area smoothed relative risks (RR) were produced using conditional autoregression. The basic model (no covariates) was selected; results were easier to interpret. Multiple ED cases were assigned by simple random allocation; there was little difference between the approaches. Guidelines by Brewer et al informed selection of the blue-green colour-ramp. To facilitate comparisons, each map/cancer had the same ramp. The grid assumed normality of estimated RRs from 0.50–1.00; the grid from 1.00–2.00 was the reciprocal. Some maps show unexplained gradients in incidence across the island; further analyses are investigating whether these could be artefactual.

#### Conclusions

Practical and methodological challenges need to be explored when embarking on cancer mapping, particularly when combining data from multiple registries.

### Cancer risk by education in Lithuania: a census-based cohort study **D2**

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#### Background

The aim of this study was to investigate the relationship between education level and cancer risk in Lithuania.

#### Methods

The data used for this study is based on the linkage of the 2001 census data and Cancer registry records for 2001–2009. Cancer risk was analyzed in three education categories: high (at least 14 years of schooling), medium (10–13 years) and low education (up to 9 years or unknown). Standardized incidence ratios (SIR) and their confidence intervals (CI) were calculated separately for women and men.

#### Results

We found that higher educational level was associated with an increased risk of prostate cancer (SIR=1.27; 95% CI 1.23–1.31) and melanoma (SIR=1.82; 95% CI 1.57–2.11) among men and of breast cancer (SIR=1.25; 95% CI 1.20–1.30) and melanoma (SIR=1.60; 95% CI 1.43–1.80) among women. The risk of lung cancer and of other smoking related cancers for men in lowest education group was about 40% higher than expected. For women, in the lowest education group we observed increased risk of cervical cancer (SIR=1.18; 95% CI 1.11–1.26).

#### Conclusion

The study suggests that the patterns of educational differentials in cancer incidence in Lithuania are similar to those observed in other countries.

### The Burden of Cancer due to Alcohol in Ireland **D3**

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#### Background

Alcohol is a class 1 carcinogen, causing oral cavity, pharynx, larynx, oesophagus, liver, colorectum and female breast cancers<sup>1</sup>. Proportions of new cancers caused by alcohol (alcohol attributable fractions – AAFs) can be calculated using:

- the relative risk due to alcohol consumption
- prevalence of alcohol consumption in a population
- cancer incidence data.



### Methods

The European Prospective Study on Nutrition and Cancer (EPIC) computed AAFs for cancer incidence in eight European countries.<sup>2</sup> Ireland was not included. Our study used EPIC calculations to estimate what proportion of Ireland's cancer incidence is attributable to alcohol consumption. National Cancer Registry data for 2007–2009 were used.

### Results

Up to 1,200 cancers diagnosed annually were due to alcohol – 926 male and 248 female. The highest AAF related to upper aero-digestive tract cancers. The largest population burden related to breast and colorectal cancers because these are common cancers. The EPIC study determined that 57–87% male and 48–98% female alcohol related cancers were caused by drinking over the recommended level (two drinks/day for men; one drink/day for women).

### Conclusions

In Ireland large numbers of cancers could be prevented by drinking within recommended limits set out by the Department of Health.

## Colorectal cancer risk in patients undergoing colonoscopic polypectomy: a large population-based study

D4

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### Background

Colorectal cancer is the third most commonly diagnosed cancer in the UK and typically originates from precancerous lesions known as colorectal polyps (CRP). The aim of this investigation was to quantify colorectal cancer risk following polypectomy outside of bowel cancer screening programmes in a large population-based study.

### Methods

Individuals diagnosed with CRP between 2000 and 2005 in Northern Ireland (NI) were identified via electronic pathology reports received to the NI Cancer Registry (NICR). Incident CRP patients prior to matching to the NICR and NI General Registrar's Office to detect colorectal cancer cases and deaths, respectively, by 31st December 2010. Standardised incidence rates (SIRs) were calculated to determine cancer risk.

### Results

Between 2000 and 2005, 11,167 adults received a CRP diagnosis, comprising 7,481 individuals detected with an adenoma and 3,615 individuals detected with hyperplastic polyps without a concurrent adenoma. During 74,351 person-years of follow-up, 238 colorectal cancer cases were diagnosed  $\geq 6$

months after their incident CRP. Colorectal cancer risk was significantly elevated in both adenomatous polyp (SIR 268; 95% CI: 245–305) and hyperplastic polyp (SIR 165; 95% CI: 135–215) patients compared with the general population.

### Conclusions

Colorectal cancer risk remains elevated in individuals who have undergone a polypectomy for either adenomatous and hyperplastic polyps.

## Patterns of cancer in rural and urban areas: evidence from Ahmedabad cancer registries, India D5

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### Background

Population-based Ahmedabad rural and urban registries were established in 2004 and 2007 respectively under the network of National Cancer Registry Programme to obtain incidence and mortality rates on cancer in Ahmedabad rural and urban areas of India and to understand differences in pattern of cancer in rural and urban India.

### Methods

Like other PBCR in India the data collection method and registration process is active for Ahmedabad rural and urban cancer registries.

### Result

In 2007–09 the incidence rates observed in Ahmedabad rural were 72.2 and 50.8 while for urban area the rates were 111.5 and 86.9 per 100,000 persons respectively for males and females. The patterns of cancer also seem to be different in both areas. Tongue in rural and mouth in urban area were the leading site of cancer among males. High rates of breast cancer were found in urban compared to rural and almost similar rates were observed for cancer cervix in both areas. Tobacco related cancers were found more in urban area.

### Conclusions

As compared to rural area, incidence of cancer is over 1.5 times more and that of breast cancer is double in urban area. Thus even a slight change in lifestyle may significantly alter the cancer risk.

## Cancer Assessments in Hinkley: Are we learning what we need and using what we know?

D6

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### Background

Hinkley, California is a desert community known for the Erin Brockovich film that alleged a cancer excess from chromium 6 [Cr(VI)] contaminated groundwater. Inhaled Cr(VI) powder causes nasopharyngeal carcinoma, while an etiologic role for aqueous CR[VI] has been challenged.

### Methods

We assessed observed and expected counts of new cancers in Hinkley (1996–2008). Indirect standardization adjusted effects of age, sex, race/ethnicity, population size, and out-migration. Observed divided by adjusted expected counts defined standardized incidence ratios (SIR) with 95% confidence intervals (CI).

### Results

Counts for all cancers (SIR; 95% CI=0.91; 0.78, 1.04) and 15 types did not differ significantly from expected. No nasopharyngeal carcinomas were identified. Markedly more cervix cancer than expected was found (SIR; 95% CI=2.83; 1.82, 5.86), while counts of digestive (SIR; 95% CI=0.72; 0.48, 1.03), prostate (SIR; 95% CI=0.65; 0.40, 0.98), and pancreatic cancers were markedly below expected.

### Conclusions

Findings do not support claims of an etiologic cancer excess in Hinkley. Cervix and prostate cancer findings and advanced-stage colorectal cancer suggest inadequate screening that may exist in other poor and remote desert communities. Findings are consistent with previous assessments that found no cancer excess. Societies challenge to “win the war on cancer” demands evidence-based findings, rather than legal settlement and movie claims.

## The status of tobacco related cancers in India

D7

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### Background

In India, the Tobacco Related Cancers (TRCs) constitutes around 40% of the total cancers in males and around 15% in females. In the present communication an attempt is made to assess the status of Tobacco Related Cancers in India.

### Methods

The data of 20 PBCRs (NCRP–2010) was utilized for assessing the current status of TRC in India. For both males and females, based on the Age Adjusted Rate (AAR) of TRC, the registries are categorized as Low, Medium and High. Then means for AAR of TRC and mean % contribution of TRC to total cases were compared between the categories by Wilcoxon test. For assessing the time trend in AAR of individual TRC sites (IARC-1987) the data of five urban registries from 1982/88 to 2005 was considered.

### Results

The High TRC group is characterized by the presence of relatively higher mean of AAR of tongue, oesophagus, hypopharynx, pharynx and other oropharynx. In both Chennai and Delhi registries the lung, tongue, other oropharynx and bladder showed an increasing trend. For females, the lung cancer showed an increasing trend in the registries of Bangalore, Chennai and Delhi. Among the younger age group (below 45 years), an increasing trend in tongue and mouth cancer was observed.

## Small area variation in skin cancer risk in Ireland

D8

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### Background

We have examined geographical patterns of skin cancer across the island of Ireland from 1995 to 2007 inclusive.

### Methods

This analysis combines cancer incidence data for 1995 to 2007 at the smallest geographical level available for Northern Ireland and the Republic of Ireland. This data has been analysed

- by negative binomial regression of the incidence rates, using socio-demographic variables at ward/ED level, to examine the relationship between these variables and cancer risk;
- by mapping the smoothed incidence data across the whole island

### Results

104,928 cases of non-melanoma skin cancer (NMSC) and 9,169 of melanoma were analysed. The risk of both was higher in the Republic of Ireland (RoI). NMSC risk was highest in densely populated areas and in coastal areas of the south-west and east. The risk was higher in more affluent areas and those with high levels of elderly living alone. Melanoma risk was highest in a band along the south coast and in the coastal area round Dublin. It was not associated with population density but was higher for both males in females in areas of low unemployment and high educational attainment.

### Conclusions

NMSC and melanoma in light-skinned people is mainly due to UV exposure, recreational or from outdoor occupations. The distribution of risk was not similar for the two cancers, nor did it follow the distribution of outdoor working. Sunlight is higher on average along the south coast but while this may explain some of the melanoma distribution, NMSC distribution is different.

## Risk Factors of Oral Cancer in Jordan, Retrospective Study from Jordan Cancer Registry

D9

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### Background

Oral cancer linked to life-style risk factors, such as tobacco and alcohol consumption. This study aims at determining the prevalence of such risk factors and its influence among oral cancer patients in Jordan.

### Methods

Data related to cases with biopsy-proven squamous cell carcinoma of the lip, oral cavity and oro-pharynx between 1996 and 2008 were extracted from the Jordan Cancer Registry. Patients with valid contact details were telephone interviewed regarding life-style risk factors. Analysis performed using Independent t-test and chi-square test. Significance level was set at  $\alpha=0.05$  (two-sided).

### Results

Three hundred ninety-nine patients were registered with oral cancer at the Registry (JCR), of whom hundred sixty-seven were contactable. The average age at diagnosis was 58.6 (SD: 9.4), and male to female ratio was 2:1; most cancers were oral (66%), then oro-pharyngeal or labial (22% each). Cigarette smoking was practiced by 70% of the patients, Nargile by 34% and alcohol by 21%. Nargile smokers were significantly younger than non-smokers were at the time of cancer diagnosis (mean age: 47.6 vs. 65.3, respectively;  $p<0.05$ ). Cigarette smokers and alcohol drinkers were significantly more likely to be diagnosed at a higher stages ( $p=0.032$  and  $p=0.089$  respectively).

### Conclusion

Our results show relationship to commonly practiced risk factors, which seem to influence the tumor stage and grade.

## Associations between trace elements and risk of pancreatic cancer: results from the all-Ireland PanCAM case-control study

D10

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### Background

Other than smoking, little is known about pancreatic cancer risk factors. We investigated associations between concentrations of trace elements in toenails and pancreatic cancer risk.

### Methods

Cases were incident pancreatic cancers, diagnosed October 2007-February 2010. Controls, frequency matched to cases by age and sex, were recruited through general practices. Subjects underwent a structured face-to-face interview and provided toenail clippings. Levels of twelve trace elements were determined in toenail samples by inductively coupled plasma-mass spectrometry. Odds ratios (OR) and 95% confidence intervals (CI), adjusted for confounders, were calculated using logistic regression.

### Results

167 cases and 290 controls participated; toenail clippings were available for 108 and 269 respectively. Risk was significantly increased in subjects in the lowest, compared to highest, tertiles of concentrations of chromium (OR=2.96, 95%CI 1.47-5.97,  $p(\text{trend})=0.002$ ), iron (OR=2.38, 95%CI 1.26-4.51,  $p(\text{trend})=0.008$ ), manganese (OR=8.53, 95%CI 3.57-20.38,  $p(\text{trend})<0.001$ ), nickel (OR=2.98, 95%CI 1.57-5.67,  $p(\text{trend})=0.005$ ), and vanadium (OR=5.15, 95%CI 2.34-11.34,  $p(\text{trend})<0.001$ ). Low concentrations of cadmium were associated with reduced risk (OR=0.59, 95%CI 0.37-0.92,  $p(\text{trend})=0.002$ ). Aluminium, copper, selenium and zinc were unrelated to pancreatic cancer risk.

### Conclusions

These results, together with other recent findings, suggest an important role for trace elements in pancreatic carcinogenesis.

## Tobacco-related Cancers and Tobacco Use in Bhopal, India

D11

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### Background

Population-Based Cancer Registry has consistently recorded a high incidence of tobacco related cancer as compared to other registries of India. The study was undertaken to explain the high incidence of tobacco related cancers on the basis of prevalent tobacco habits.

### Method

A tobacco random sample survey was carried out among 6522 adults males. Site specific incidence rate for Bhopal and other registries were obtained from published reports in the National Cancer Registry Programme. Published report of prevalence of tobacco habits in various areas were used for comparison.

### Results

The tobacco survey showed that the prevalence of tobacco chewing was very high as compared to other registry areas while the proportion of smokers in Bhopal was less than the other registries. The incidence rates for cancer of hypopharynx and oral cavity which are largely chewing dependent were significantly ( $P < 0.05$ ) higher than the other registries. While smoking dependent cancers of oropharynx, larynx and lung were significantly low ( $P < 0.05$ ) as compared to other registries.

### Conclusions

The high incidence of chewing dependent cancers in males can be explained by the high prevalence of chewing habit. On the contrary low rates of smoking related cancers can be explained by the low smoking rates in Bhopal.

## Assessment of risk factors of breast cancer in 5 provinces in Indonesia

D12

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### Background

Breast cancer is the most common cancer in Indonesia. The Ministry of Health, through the Sub Directorate of Cancer Control, will develop a program of prevention and control of breast cancer. For this it needs assessment of risk factors that contribute on the disease in the population.

### Method

The design of the assessment was a case control study. The population of the study was women aged 17+ years in 5 provinces—Jakarta, West Java, Central Java, Jogjakarta, and East Java. A sample was taken from 6 cancer referral hospitals in these 5 provinces, totalling 1584 (790 cases and 794 control). Data was collected by filling a questionnaire in 4 months of 2006. Data processing and analyses was done using SPSS 13.0. Bivariate and multivariate analysis used chi square analysis and logistic regression.

### Results

Factors that statistically affected the risk of developing breast cancer (bivariate analyses) were age, level of education, BMI, family income, genetic, stress, smoking exposure, pesticide exposure, lack of vegetable consumption, consumption of re-used vegetable oil, consumption of preserved food, physical inactivity, having a history of benign breast tumor, not breastfeeding and type and length of contraception. The most important factors that statistically effected the development of breast cancer (multivariate analyses) were history of benign breast tumor (OR 10.1), oral contraception (OR 6.8), level of education less than 6 years (OR 3.2), and overweight/BMI >25 (OR 2.5).

### Conclusions

The study provided information on factors that effect on breast cancer. These results are a source of information for the developing program of promotion and early detection of breast cancer in Indonesia.

## The Geographic Prevalence of Gastric Cancer along the Chinese Silk Road

D13

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### Background

An epidemiological survey in the 1970s found that gastric cancer was prevalent in the northwest of China—Shaanxi, Gansu, Qinghai and Xinjiang—the main route of the traditional Silk Road.

### Methods

The PUBMED and China CNKI databases were checked for to research on gastric cancer characteristics of the Silk Road regional population.

### Results

People in this region who develop gastric cancer have three notable features. Firstly, the number of people with cancer of the gastric cardia was 30% – 47% of all those with stomach cancer and the percentage is still growing. Secondly, more people from the countryside than from cities developed cancer of the gastric cardia. Thirdly, the risk of gastric cancer is clearly higher for close relatives of local families, suggesting a hereditary disease phenomenon. Deaths from gastric cancer do not follow the Poisson distribution,  $P > 0.05$ . By analyzing the rela-



tionship between *Helicobacter pylori* (HP) and gastric cancer it can be seen that there is no difference among different nationalities, immigrants and local people who are affected by HP. Studies suggest that the two virulence genes, CagA and VacA HP, may be related to geography, but have nothing to do with nationality.

### Conclusions

The main reason for the increasing of cardiac cancer cases is due to the rapid elevation in the popularity of endoscopic and ICD coding standards.

## Geographical Variation of Cancer in Ireland 1995–2007 D14

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### Background

The 5 million population of the island of Ireland have two different health services, but similar urban/rural and socio-economic distribution. Cooperation between the two cancer registries on the island has produced all-Ireland maps of cancer risk and identified areas for research and service change.

### Methods

Age-standardised incidence ratios for 18 cancer sites and for each small area (3947 in total) were calculated and smoothed, using Bayesian conditional autoregressive models, to provide relative risks for 1995–2007.

### Results

There was a marked geographical variation in the incidence of some common cancers (non-melanoma skin, lung and stomach) – but very little for others (breast, colorectal, non-Hodgkin's lymphoma). There was notable spatial variation in incidence of cancers of the prostate and cervix, although the areas of highest relative risk differed. Three cancers (pancreas, brain/central nervous system and leukaemia) had an increasing gradient of incidence from north-east to south-west.

### Conclusions

There was some correlation between smoking prevalence and tobacco-related cancers. The other patterns of incidence shown may reflect socio-economic deprivation, lifestyle or service organisation, but much of the variation is unexplained by known risk factors.

## Risk of lymphoma in undiagnosed coeliac disease: results from a population with different coeliac disease prevalence D15

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### Background

Coeliac disease is often undiagnosed, early diagnosis and treatment could be relevant to avoid serious complications such as intestinal lymphoma. Our aim is to estimate the risk of intestinal lymphoma in undiagnosed coeliac patients, evaluating the real incidences and applying different theoretical settings of coeliac prevalence.

### Methods

We collected cases of intestinal lymphomas from the Lombardy Cancer Registry and coeliac patients through computerized search of all Pathology Departments; duodenal pathological reports compatible with a Marsh 3 grade were included. The lymphoproliferative risk was calculated for theoretical different settings of coeliac prevalence (from 1:50 to 1:200), relative risks for intestinal lymphomas and compared to the real incidence of the lymphomas in this population.

### Results

The population consisted of 815,362 inhabitants; during the investigated period, 237 intestinal lymphomas and 326 coeliac patients were diagnosed. None of the coeliac patients had lymphoma. In the different scenarios calculated and compared with the real lymphoma incidence the relative risks of undiagnosed coeliac disease for gastrointestinal B- and T- cell lymphomas ranges from 1.0 to 2.0 for 1:100 coeliac disease prevalence.

### Conclusions

Undiagnosed coeliac patients have no increased risk of developing intestinal lymphoma; population screening programmes, aimed at early diagnosis of lymphoma may not be useful in this setting.

## A comprehensive review on risk for second primary cancers (SPCs) among cancer survivors in the Netherlands (1989–2008)

D16

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### Background

Cancer survivors are at higher risk for SPCs compared to the general population. Shared environmental risk factors, treatment of the initial cancer, genetic predisposition, and post-diagnosis surveillance explain the elevated risk.

### Methods

We analyzed risk for 20 common SPCs following 10 selected first cancers from Netherlands Cancer Registry (1989–2008). The 20-year Cumulative incidence (CI), Standardized Incidence Ratio (SIR), and Absolute Excess Risk (AER) for metachronous SPCs were estimated according to sex, follow-up periods (2–5, 6–10, >10 years), age (</>=65 years), as well as possible etiological factors (infection, smoking, genetic predisposition, and radiotherapy). For synchronous SPCs, 1-year period prevalence was estimated.

### Results

Among 1 155 830 cancer survivors ~10% (123 751) had an SPC. The 20-year CI for SPCs varied between 3% and 19% after 10 selected first cancers. Synchronous cancers—often diagnosed close to the anatomical site of the first cancer—compromised 1/3 of total SPCs. Metachronous SPCs were commonly diagnosed in breast (12 053), lung (11 046), skin (squamous cell carcinoma) (10 731), and colon & rectum (10 136). Risk (i.e. SIR and AER) for SPCs remained elevated after 5 years of follow-up in these common sites as well as in cancers which shared same risk factor with the index cancer. Substantially elevated absolute risk (AER) for SPCs was mainly pronounced among patients older than 65 years.

### Conclusions

Considering the high and long-lasting risk for a SPC as well as the old age of this population, setting up an appropriate (long-term) surveillance strategy is crucial however, remains challenging.

## Second cancer risk after a first primary breast cancer: Systematic review and meta-analysis

D17

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### Background

The risk of developing second cancers after a first primary female breast cancer (FBC) has been examined in several population-based studies, but very different risk estimates have been reported. The aim was to conduct a systematic review and meta-analysis on second cancer risk after FBC.

### Methods

The scientific literature was searched in MEDLINE by use of explicit search and inclusion criteria: published between 1989 and 2011 (December), using population-based data and ENCR/IARC codification rules for multiple primary cancers, reporting standardised incidence ratios (SIR). The methodological quality of the studies was evaluated and a meta-analysis of published SIR estimates on second cancers has been carried out.

### Results

The systematic literature search retrieved 593 studies (without duplicates). 26 studies fulfilled the inclusion criteria and reported SIRs for second cancers after FBC varying from 1.0 to 1.8. Of these, only 13 studies reported SIRs for all cancers combined (pooled SIR:1.22; 95% CI:1.19–1.25). Studies also reported SIRs by cancer sites but only few, gynaecological cancers and others, showed elevated risks.

### Conclusions

Population-based studies on second cancer risk after FBC show an overall increased risk of subsequent cancers among women. This might be related to treatment-related factors or common etiologic factors, either environmental or genetic.

## **Geographic Information System Methodology for Cancer Risk Estimation**

**D18**

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### **Background**

It is very important for cancer monitoring to realize investigations in different relatively small geographic areas.

### **Methods**

We applied geographic information system methodology to analyse the data of the Belorussian/Belarusian Cancer Registry. Standardised incidence ratios (SIR) standardized by age, time, sex and residential status (SIR) for 12 major cancer localizations were calculated for 2006–2010 in 117 administrative regions of Belarus.

### **Results**

An atlas of SIR and their 95% Poisson confidence intervals distributions was produced. There were some clusters of regions with significantly high or low SIRs. For example, we have found significantly high risks of skin cancer in the Polotsk region where oil-refining industry and polymer glass fiber production are situated. In the Soligorsk area (potash salts mines area) we have estimated a significantly low risk of thyroid cancer. Krichev (asbestos production) region has a high risk of Hodgkin lymphoma in males. Shklov, Mogilev and Homel regions have high risks of thyroid cancer. It was also shown that some closely situated areas may differ very much in SIRs.

### **Conclusions**

Regions with significantly high SIR could have some occupational or environmental risk factors which need to be investigated. Some regions recently have had PSA screening programs and thus the high risk of prostate cancer could be a result of over-diagnosis. We also need especially to note some areas with a significantly low risk of cancer. These regions may have some factors for risk reduction. This work may provide a basis for further analytical epidemiological studies on cancer prevention and monitoring.

## **Endogenous estradiol, estrogen and progesterone receptors increase cancer risk among non-familial postmenopausal females**

**D19**

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### **Background**

Hormones and genetics play a critical role in breast cancer development, determining the association between plasma hormones and breast cancer risk may provide insight into the etiology of breast cancer.

### **Methods**

One hundred and forty postmenopausal females during the period between June 2007 and May 2011 were enrolled in this study, eighty three were breast cancer patients and fifty seven were benign patients. Plasma estradiol, progesterone and prolactin levels were estimated among familial and non-familial breast cancer females.

### **Results**

About twenty percent of non-familial breast cancer and sixteen percent of benign females have abnormal prolactin. About four percent of non-familial breast cancer and about twelve percent of benign females have abnormal progesterone. On the other hand, about fifty seven percent of non-familial breast cancer females and about forty four percent of non-familial benign females have abnormal serum estradiol.

### **Conclusions**

Abnormal plasma estradiol and positive estrogen and progesterone receptors associated with increased risk among postmenopausal both among non familial benign and breast cancer females. These findings suggest that estradiol, prolactin and estrogen evaluation might be useful to better identify females with non-familial hormone-dependent disease that should be considered in breast cancer pathogenesis as well as in the treatments.

## **Urban and rural cancer incidence in Kerala**

**D20**

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### **Background**

Cancer Incidence and pattern are reported to be different in urban and rural populations.

### **Methods**

Cancer incidence & pattern in Trivandrum Taluk (67% Urban) and in Kollam District (18% Urban) in Kerala are compared. Kerala lies on the south west coast of India. Both registries form part of National Cancer Registry Programme.

### **Results**

All cancer AAR of Trivandrum and Kollam were: male 121.7 & 113.6 and females 108.3 & 89.7. Stomach cancer rates in Trivandrum were male 5.0, female 1.2 and in Kollam these were male – 6.3, female 1.4. Lung cancer rates were M: 14.8 and F: 3.6 in Trivandrum and in Kollam M: 18.1 and F: 3.1. Breast cancer AAR was 33.0 in Trivandrum, but only 23.2 in Kollam. Cervix rates were almost equal in both areas. Prostate rate was 7.2 and 4.1. Female thyroid rates were 6.9 in Trivandrum and 5.8 in Kollam. Age specific rates are compared. Embedded in Kollam is an ongoing registry studying the effect of exposure to natural radiation present in Karunagappally area. Natural radiation exposure did not alter cancer risk.

### **Conclusions**

In Kerala, there was only minimal difference in urban and rural cancer rates, perhaps a reflection of life style.

## Distribution of childhood cancer in Sub Saharan Africa

D21

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### Background

Childhood cancer is relatively rare on the African continent. Aim The aim of the study was to analyze the distribution of childhood cancer in Sub Saharan Africa.

### Methods

Childhood cancers were defined as those below the age of 15 and were classified according to the International Classification of Childhood Cancer. Data obtained were analyzed using EpiInfo and Statistica 10 software.

### Results

There were 21 centers included in the study from 19 Sub Saharan African countries. The data analyzed differed from center to centre and included cases from 1985–2011. The proportion of childhood cancer out of all cancers ranged between 1.4% in Ghana to 10.0% in Rwanda. In Southern Africa, Kaposi sarcoma was the most common malignancy in children in Mozambique (15.8% of all cases) and the second most common in Zambia (15.6%) and in Malawi (12.4%). In Eastern Africa, Uganda recorded Kaposi sarcoma as the most common tumor in children (22.0%) while 2 Kenyan centers reported mainly Burkitt lymphoma (25.1% and 37.1% respectively). In Western Africa, Non Hodgkin lymphoma was the most common in Ghana (53.6%), in Ivory Coast (73.6%) and in Mali (32.7%). Nephroblastoma remains of the most common solid tumors in Africa exceeding 10 % of total pediatric cancers in many countries (Rwanda 26.0%, Ivory Coast 14.5%, Mali 17.6%, Congo 15.5% etc).

### Conclusions

Unlike developed countries, lymphomas, nephroblastoma and Kaposi sarcoma were the most common pediatric tumors in Africa.

## Evaluation of clinical-epidemiological profile of patients with cancer of mouth and oropharynx in the state of Goiás

D22

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### Background

The oral cavity cancer is a malignancy whose late diagnosis and treatment can lead to significant changes in vital functions of patients, those related to food, communication and social interaction, may cause an impact on quality of life. To analyze the profile of patients with mouth and oropharynx cancer in the State of Goiás in the period 1998 to 2003.

### Methods

The cases were defined as patients with a histological diagnosis of squamous cell carcinoma of the mouth and oropharynx treated at the Head and Neck Surgery, Araújo Jorge Hospital, residents in the State of Goiás.

### Results

We collected 200 cases, 78.5% males and 21.5% females. 130 patients (65%) were of rural area and 70 (35%) from urban, 109 patients (54.5%) had 0-4 years of education, 63 (31.5%) patients were illiterate and 1% of patients had college degrees. 60% were married, 189 (94.5%) patients were older than 40 years. The most affected site was the base of the tongue with 21%, followed by the floor of the mouth (19.5%) and tongue (18.5%). 143 (71.5%) patients were active smokers, 23.5% had quit smoking more than two years before the interview, 5% were non smokers. 109 (54.5%) were alcoholics, 35.5% were former drinkers and 10% never drinkers. In relation to the treatment 115 (57.5%) patients had surgery plus radiotherapy; 42.5% received palliative treatment.

### Discussion and Conclusions

It seems that oropharyngeal cancer is predominantly in rural patients and with low level of education in the State of Goiás.



## **Childhood Cancer and Spatial Distribution in a Brazilian City**

**D23**

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### **Background**

In Brazil, 2% of cancers affect young people under 19 years of age. The city studied was Campinas – Brazil, with a Reference Service of childhood cancer treatment and a PBCR. Population of approximately 1,000,000 inhabitants. Our aim is to define a spatial distribution of childhood cancer from Campinas with diagnose in one of Childhood cancer treatment Reference Service.

### **Methods**

Period from 1996 until 2005. The inclusion from ICCC Groups I, II, III and IX, below nineteen years old. The data collection instrument was containing identification, demographics and tumors variables. The case were identified according to the place of residence and later added to the Global Information System and analyses according to Campinas Health District. Used to Kernel estimation for concentration events.

### **Results**

Our results include 180 cases identified. In spatial data analysis, South Health District, Southwest Health District and the Northwest Health District had the higher clustering of cases.

### **Conclusions**

Although we do not have the information of all childhood cancer cases in Campinas, with the data from the Reference Service of childhood cancer treatment it was possible to get the spatial analysis of the neoplasm and local residency of persons. This will assisting in the planning of health services in this city.

## **Family History of Breast Cancer: Referral Patterns in Ireland**

**D24**

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### **Background**

The National Cancer Control Programme in Ireland carried out a review of referral patterns to Symptomatic Breast Units to determine the reasons for a 60% increase in referrals. Hospital consultants reported an increase in referrals for review of breast cancer family history but this had not previously been quantified nationally.

### **Methods**

In-depth semi-structured interviews were conducted with the lead consultant in each of the nine breast care centres in Ireland to explore the factors influencing breast referral patterns from primary to secondary care. This was followed by a retrospective chart review of one months GP referrals (n=2,649) to the breast clinics, to further investigate the factors identified.

### **Results**

The chart review found that 9.3% of GP referrals were for family history of breast cancer, ranging from 4% to 14% between hospitals, with a distinct geographical variation. Consultants reported that many of these referrals had a nebulous family history of breast cancer and were not at increased risk of hereditary breast cancer.

### **Conclusions**

Approximately 3,500 patients were referred to Symptomatic Breast Clinics in 2011 for assessment of Breast Cancer Family History. Clear information is required for GPs and for patients on referral criteria and referral pathways for these patients.

## Long-term health-related quality-of-life in men with prostate cancer: a population-based study **D25**

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### Background

Rising incidence and survival mean that more men are living longer with prostate cancer. This growing burden makes it important to better understand how cancer and its treatment impacts on survivor's health-related quality-of-life (HRQoL) longer-term. In a population-based study, we investigated temporal trends in HRQoL, and factors associated with low HRQoL, among prostate cancer survivors.

### Methods

Men with prostate cancer (ICD10 C61) diagnosed 18 months-15 years previously were identified through cancer registries in Northern Ireland (NI) and the Republic of Ireland (RoI). A questionnaire (including the EORTC QLQ30 and QLQ25 and EQ5D-5L) was administered by post April-May 2012. Multivariate regression will be used to identify predictors of low HRQoL.

### Results

More than 1700 completed questionnaires have been received so far. Results will be reported on: HRQoL by time since diagnosis, age and treatment received; and patient- and treatment-related factors, symptoms and functional limitations associated with low HRQoL.

### Conclusions

This study provides important information on the extent to which prostate cancer and its treatment impacts long-term on men's HRQoL and which men are at risk of poorer outcomes. This type of evidence is required to underpin the development of support services for the ever increasing number of cancer survivors.

## Tumour size and nodal disease in screen-eligible breast cancer patients in Northern Ireland (NI) **D26**

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Northern Ireland Cancer Registry

### Background

Mortality rates from breast cancer have declined even prior to screening (1993) in NI. We investigate tumour size and nodal disease in screen-eligible cancer patients for insights into stage shift, and over-diagnosis.

### Methods

Breast tumours of women diagnosed 1993–2007, aged 50–64, were included (n=4658). Tumour size, nodes, screening and stage were assessed.

### Results

From 1993 to 2007, the proportion of screen-detected tumours in women increased from 38.4% to 45.0% (odds ratio [OR] 1.02, P<0.01). Overall tumour size remained constant over the period at 21.7mm; screen-detected tumours were smaller (17mm vs 26mm P<0.001) than unscreened. For tumours sized 0–20 mm, the probability of detecting a positive node and the number of nodes sampled (mean=14) was positively associated (OR 1.02, P<0.01); screen-detected tumours were less likely to have a positive node (OR 0.74, P<0.01). The number of nodes sampled increased up to 2004 (P<0.001). Over time, the proportion of patients diagnosed at Stage II declined accompanied with an increase in Stage III (P<0.05).

### Conclusions

Stage shift occurred due to increased nodal sampling. Screened-tumours are less likely to spread to nodes. Changes in these factors could influence survival improvements.

## Theme E: Evaluation of cancer care

### Management of Wilms' tumor at the Children's Hospital of Skopje, FYROM **E1**

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#### Background

To indicate the management of Wilms tumor and to display the situation in a ten year period in the Republic of Macedonia, opportunities and challenges.

#### Methods

Epidemiological retrospective -analytical method were used in the study

#### Results

Series 1: From 1997 to 2001, 14 children from 9 months to 7 years were hospitalized. The ratio between males and females was 9:5, and between right and left kidney 7:6. One case was bilateral in 1997, two cases in 1998-1, 1999-3, 2000-2, 2003-3, stage 1-1, 2-9, 3-3, 5-1.

Series 2: From 1994 to 2003, 28 children aged from 12 months to 10 years were diagnosed. The proportion living / dead was 3/1, 1995 is 4, 1996 6/3, 1997 3/1, 1998 3/1, 2000 2/1, 2001 0, 2002 2, 2003 3/1. The proportion male/female is 10:19, compared to left / right kidney = 15:12, bilateral two. 17 children were diagnosed before 4 years, 3 children had metastases after surgical intervention of which 2 had metastases in the lungs and central nervous system and one in the lungs and lymph glands. 9 children are dead, 18 children are alive and for two children we have no data. The 5-year survival is 62%, or 12 children from the total number of 14 children. Specific treatment recommendations are based on the current National Wilms' Tumor Study IV schema.

#### Conclusions

This result suggests that further intensification of the treatment regimen for children and early detection may result in an additional improvement in the prognosis.

### A profile of ovarian cancer incidence and treatment in Ireland, 1994–2010 **E2**

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#### Background

Ovarian cancer is the 4th most common cancer diagnosed in women in Ireland, with an average of 376 cases diagnosed annually. This study describes trends in its incidence and treatment in Ireland from 1994 to 2010.

#### Methods

Data on all ovarian cancer patients diagnosed in Ireland from 1994 to 2010 was extracted from the National Cancer Registry database.

#### Results

A pronounced geographical pattern in incidence was observed with higher incidence rates in the south and west of the country and lower incidence in the north-east. Although no clear pattern of variation in incidence with deprivation status was observed, incidence was 12% higher in urban compared to rural areas; a trend observed across all deprivation levels. Variation in cancer subtype, stage and treatment with age was observed, with younger women more likely to be diagnosed with borderline tumours, have early stage disease and have unilateral surgery compared to older women. Borderline tumours represented 32% of all cancers in <50 year-olds compared to <5% in 75+ year-old women. Of staged tumours, 50% were Stage I in <50years olds compared to 9% in 75+ year-olds. Bilateral oophorectomy with hysterectomy was the most common procedure overall, representing 77% of all surgical operations. However, young women (<30 years) were more likely to have unilateral surgery without hysterectomy – 80% of all surgical procedures in this age group, compared to just 9% in women aged 50+ years.

#### Conclusions

Results of this analysis indicate that further research into the epidemiology of ovarian cancer in Ireland is warranted. The geographic variation in incidence may indicate differences in risk factors while variation in stage and treatment appears to be strongly influenced by patient age.

## Examining prostate cancer treatment patterns, costs and the determinants of treatment uptake in Ireland

E3

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### Background

There is high uptake and significant income-related inequalities in prostate specific antigen (PSA) testing in Ireland; private medical insurance has a role in explaining these. We examined variation in prostate cancer treatment, controlling for confounding variables related to the provision of care in a private versus publicly-funded environment.

### Methods

Prostate cancers diagnosed 1998–2009 were extracted from the National Cancer Registry, Ireland (N=21,556). Univariate probit models were employed for these six binary responses: radical prostatectomy (RP), transurethral resection of the prostate (TURPS), external beam radiation therapy (EBRT), brachytherapy, hormone therapy (ADT) and surveillance only.

### Results

Patients, aged 55–69, whose care was provided in part or wholly in a private setting were significantly more likely to have RP and less likely to undergo TURPS or surveillance only. Patients, aged  $\geq 70$ , whose care was provided in part or wholly in a private setting were significantly more likely to receive EBRT and less likely to receive ADT. Marital status and geographical location also significantly impacted on treatment receipt.

### Conclusions

Consistent with analyses of PSA testing, patterns of utilisation differ in public versus private settings. This, and observed variations by socio-demographic factors, suggest significant disparities in prostate cancer treatment. This warrants further investigation.

## Factors predicting hospital length-of-stay after radical prostatectomy: a population-based study

E4

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### Background

Radical prostatectomy (RP) is a leading treatment option for younger men with localized prostate cancer. Hospital in-patient stays account for much of the costs of prostate cancer treatment. We investigated factors predicting prolonged hospital LOS in men who had RP following prostate cancer.

### Methods

Incident prostate cancers (ICD-O2: C61), diagnosed January 2002–December 2008 in men  $< 70$ , were identified from the National Cancer Registry, Ireland, and linked to hospital episodes. For those who had RP the associated episode was identified and LOS calculated as days from admission to discharge. Patient, tumour, and health service related factors predicting longer LOS (upper quartile,  $> 9$  days) were investigated using logistic regression.

### Results

9096 prostate cancers were included; 27% had RP. Median LOS was 8 days (inter-quartile range = 7–9). In adjusted analyses, risk of prolonged LOS was significantly raised in men who were not married (OR=1.71, 95% CI 1.25–2.34) or had co-morbidities (OR=1.64, 95% CI 1.25–2.16). Men treated in higher-volume hospitals (annual median  $> 49$  RPs) or by higher-volume surgeons (annual median  $> 17$  RPs) were significantly less likely to have prolonged LOS (OR=0.34, 95% CI 0.26–0.45; OR=0.55, 95% CI 0.42–0.71, respectively).

### Conclusions

The strong inverse relationship between hospital and surgeon volume and LOS supports the argument for increased centralization of RP surgery.

## Adherence to national guidelines for gastric cancer in the Netherlands: a retrospective population-based audit

E5

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### Background

In May 2009, a new clinical practice guideline for gastric cancer was released in the Netherlands. To determine the impact of this guideline, we evaluated trends in patterns of care, thereby focusing on the use of perioperative chemotherapy, the adequacy of lymphadenectomy and the proportion of non-curative resections. In addition, the current resection rate and 30-day postoperative mortality were examined.

### Methods

For our evaluation, we retrospectively collected information from the Netherlands Cancer Registry on 2,511 patients diagnosed with primary adenocarcinoma of the stomach during the period July 2008–June 2010, excluding tumours of the cardia. Clinical management for patients diagnosed from July 2008 to June 2009 was compared with that for patients diagnosed from July 2009 to June 2010.

### Results

Indicators for guideline adherence did not show major change, except for the proportion of patients that received an adequate lymphadenectomy (examination of  $\geq 10$  lymph nodes), which increased from 49% to 58% ( $p=0.005$ ), this increase being more pronounced for high-volume hospitals ( $p=0.006$ ).



Preoperative chemotherapy was given in 45% of patients and 25% of resections was non-curative. For the total study population, the resection rate was 41% and 30-day mortality was 5.7%. Postoperative mortality increased with age and was high for patients with stage IV disease (8.9%).

### Conclusions

After the introduction of the new national guideline, a higher proportion of patients underwent adequate lymph node staging. Other recommendations were already implemented before the guideline was actually released. Future implementation plans should focus on decreasing the rates of non-curative surgery.

## Insight in the Quality of breast cancer care in the Netherlands: the NABON Breast Cancer Audit

E6

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### Background

The NABON (National Breast Cancer Network) developed a multidisciplinary set of 24 indicators to gain insight into the quality of care of breast cancer patients. Data on the surgical indicators is now available for 2011.

### Methods

Data was gathered by the Netherlands Cancer Registry (NCR) and the surgeons themselves in the Dutch Breast Cancer Audit (DBCA). All hospitals participated in at least one registration system. For the analysis of the period 01-01-2011 to 30-09-2011 surgeons were asked to participate and to define which dataset they wanted to be included in the analysis.

### Results

Patients with primary invasive breast cancer or DCIS from 68 hospitals (73% of all hospitals in the Netherlands; NCR 39 hospitals, DBCA 29 hospitals) were selected (n=6967). In total, 10% of the patients were not discussed in the multidisciplinary team (MDT) before surgery, and eight hospitals (12%) did not reach the norm of having at least 90% of their patients discussed preoperatively. Postoperatively 6% were not discussed in the MDT, of which six hospitals had < 90% of their patients discussed postoperatively. Time until surgery varied between the hospitals, of which nine hospitals had < 90% of the patients operated within 35 days. The percentage irradical resections after first breast conserving surgery was 5,6% for invasive carcinoma and 23% for DCIS, which is below the norms.

### Conclusions

This first results on the surgical indicators reveal in general a good quality of care in the Netherlands. However, improvement can be gained in several hospitals.

## PSA testing: how it is impacting on prostate cancer treatment

E7

Marianna De Camargo Cancela, Linda Sharp, Harry Comber  
 National Cancer Registry, Ireland

### Background

Ireland has the highest prostate cancer (PC) incidence in Europe, in large part due to very high levels of prostate specific antigen (PSA) testing. We conducted a population-based study investigating time trends in PC age at diagnosis, disease extent and treatment.

### Methods

All PCs (ICD10 C61) diagnosed 1998–2008 were included, and classified by TNM stage, Gleason score and treatment received (radical prostatectomy (RP); radiotherapy (RT); androgen deprivation therapy (ADT)). Time trends were analysed by joinpoint regression, overall and by age-group (40-69, ≥ 70).

### Results

23,810 cases were included (40-69: 10,830; ≥ 70: 10,666). Mean age at diagnosis fell over time (1998: 72; 2008: 68). Incidence of early-stage tumours rose significantly over time, in younger and older men (40-69: T1, +24% per annum (pa) during 2001–2008; ≥ 70: T1, +19% pa during 2000–2008). The most common treatments were: in younger men, RT (26%) and RP (20%); in older men, ADT alone (25%) and 10% had ADT+RT. RT alone increased more than other treatments, to a greater extent in older (+34% pa during 1998–2004) than younger men (+23% pa during 1998–2004). RP use in younger men remained stable (+0.7% pa during 2000–2008).

### Conclusions

PSA testing has changed the profile of PC over time. This, in turn, is likely to be driving increased use of radiotherapy as a primary treatment.

## Disparities in breast cancer surgery in Ireland: the role of deprivation status

E8

Marianna De Camargo Cancela, Harry Comber, Linda Sharp  
 National Cancer Registry, Ireland

### Background

Surgery is the cornerstone of breast cancer (BC) care. Depending on the tumour features, breast conserving surgery (BCS) or mastectomy are indicated. It is well known that breast cancer incidence and mortality vary by socio-economic status, but whether socio-economic status influences treatment is less clear. We investigated whether socio-economic status (measured by area-level deprivation) impacts on receipt of cancer-directed surgery and/or procedure type.

### Methods

From the National Cancer Registry, Ireland, we selected BC cases diagnosed 2006–2008 among women aged <70. Logistic regression was used to investigate associations between deprivation and receipt of (i) cancer-directed surgery (any type) and (ii) mastectomy or BCS. Models were adjusted for significant clinical and socio-economic confounders.

### Results

5647 BCs were analysed. 10% of women from most deprived areas did not undergo cancer-directed surgery compared to 6% of those in the least deprived (adjusted OR=1.47; 95%CI: 1.02–2.11). Of women who had surgery, those from the most deprived areas were 20% more likely to have mastectomy than BCS (OR=1.20; 95%CI: 1.03–1.41).

### Conclusions

This study suggests socio-economic inequalities in BC surgery in Ireland. Possible explanations include variations in: women's treatment preferences, clinicians' treatment recommendations, or treatment policies/practices in public and private hospitals. In the interests of equity, the reasons for the observed disparities require further investigation.

## Factors associated with re-resection after breast conserving surgery: a population-based study in Ireland **E9**

Marianna De Camargo Cancela, Harry Comber, Linda Sharp  
National Cancer Registry, Ireland

### Background

Breast conserving surgery (BCS) is increasingly used for breast cancer (BC) treatment. The re-resection rate following BCS is as a treatment quality indicator. In women who underwent BCS initially, we aimed to quantify re-resection rates and identify factors associated with re-resection.

### Methods

From the National Cancer Registry, Ireland, we identified BCs, diagnosed 2002–2008, for which the first surgical procedure was BCS. Logistic regression was used to identify clinical and socio-demographic factors significantly associated with re-resection by (i) BCS or (ii) mastectomy.

### Results

8309 BCs underwent initial BCS; 7% had re-resection by BCS and 12% by mastectomy. 64% of re-resections occurred within a month of the initial BCS; 29% within 1–6 months; and 7% after 6 months. Risk of re-resection by BCS varied significantly by area of residence. Risk of re-resection by mastectomy was significantly increased in T2/3/4 cancers, with nodal involvement, and HER2 over-expressing subtype. After adjusting for these clinical factors, risk was also significantly raised in women who were married, aged <50 and lived in the most deprived areas. Whether cancers were screen-detected was unrelated to re-resection risk.

### Conclusions

Almost one in five women underwent re-resection. The timing suggests most were for positive margins. Geographical and socio-economic variation in re-resections should be further investigated.

## Factors influencing time from diagnosis to surgical treatment in breast cancer: a population-based study **E10**

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### Background

To provide insight into factors influencing time from pathological diagnosis to first surgical treatment for breast cancer patients in the Netherlands.

### Methods

The Netherlands Cancer Registry provided information on 99,561 female breast cancer patients diagnosed between 2000 and 2010 with primary breast cancer (excl LCIS, distant metastases and neo adjuvant treatment), treated with breast conserving surgery or amputation. Time to treatment was dichotomized according to the current guideline of 35 days (NABON norm). Logistic regression was used to analyse influencing factors.

### Results

Median time to treatment was 21 days, 85% of the patients were operated within 35 days. Multivariable analysis shows that patients with age >75 years (OR=1.51), carcinoma in situ (OR=1.76), positive lymph nodes (OR=1.07), multifocal (OR=1.23) or lobular (OR=1.13) tumours, referred for surgery (OR=4.01), receiving preoperative sentinel node procedure (OR=5.85), who underwent an amputation (OR=1.71), and operated in teaching (OR=1.30) or academic (OR=6.15) hospitals were more likely to receive treatment more than 35 days after diagnosis ( $p<0.05$ ).

### Conclusions

Time to treatment depends on patient and tumour characteristics and factors related to treatment. These results indicate extended diagnostic workup for specific patients, increasing time to treatment. Further research should include more detailed analysis of preoperative workup, especially the use of MRI.

## Cost of hospital care for cancer patients in the last year of life E11

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### Background

The duration and number of admissions, length of stay and costs of hospital inpatient care in the last year of life vary between cancer types due to the nature of complications and progression of disease.

### Method

We examined Hospital Episode Statistics (HES) data for patients who died of cancer in 2006–2008. Costs, length of stay and type of admission were calculated for three groups of admissions: last year of life, last 30 days of life and last 30 days of life where death was in hospital.

### Results

There is clear variation in hospital utilisation and cost between cancer types. The highest cost per person for care in the last year of life was for testicular cancer at £13,300, with the lowest cost £5,950 for lung cancer (although more of these patients will be diagnosed and die within a year). The highest average number of admissions was for bladder and ovarian cancers (3.1 per person), but the longest average length of stay was for prostate cancer at 12 days. The final admission was nearly one-fifth more expensive than the average during the last year of life.

### Conclusions

Costs and inpatient activity are highest for the group of cancers which affect the pelvic area, probably because of the side-effects they can have on urinary and bowel function. A focus on the specialist care available for these cancers may help reduce admissions and length of stay near the end of life.

## Improving breast cancer treatment and outcome of old women in Geneva: yes we can E12

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### Background

No information is available on changes in medical practice following reports about sub-optimal treatment of elderly breast cancer patients. Aim of this study was to evaluate if, in Geneva, Switzerland, there were changes in breast cancer treatment and outcome among women aged ≥80 years.

### Methods

We identified 680 patients with first, primary invasive breast cancer between 1989–2008, using data from the population-based Geneva Cancer Registry. We compared patient and treatment characteristics, five-year overall (OS) and breast cancer specific survival (BCSS) between patients diagnosed in 1989–2003 (n=500) vs. 2004–2008 (n=180).

### Results

Around 50% of women received surgery in both periods (52% vs 55%, respectively), with breast conserving surgery increasing in 2004–2008 (17% vs. 28%) over mastectomy (29% vs. 22%). The proportion of women with hormone therapy only did not change (34% vs. 35%), while that of women with no treatment slightly decreased (13% vs. 8%). This proportion halved in the public sector (from 12% to 6%) and did not change in the private sector (from 14% to 12%). The OS improved significantly in 2004–2008 as compared to 1989–2003 (43% [95%CI:39-47] vs. 56%, [95%CI:48-64]). In contrast, BCSS did not differ between the two periods (75% [95%CI:71-79] vs. 82% [95%CI:76-88]). However, for women treated in the public sector both OS and BCSS improved significantly, with no modifications in the private sector.

### Conclusions

We demonstrated not only a change in medical practices towards elderly patients with breast cancer, but also that this change resulted in an improvement of patients' health status.

## Influence of Comorbidity and Age on 1-, 2-, and 3-Month Postoperative Mortality Rates in Gastrointestinal Cancer Patients E13

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### Background

Studies on the impact of comorbidity and age on postoperative outcome after gastrointestinal tumour resection are scarce. We investigated the impact of comorbidity and age on 30-, 60-, and 90-day mortality after resection of oesophageal, gastric, periampullary, colon, and rectal cancer.

### Methods

The study included 8583 patients recorded in the population-based Netherlands Cancer Registry, regions Eindhoven (Eindhoven Cancer Registry) and Mid and South Limburg, who underwent resection for cancer stage I-III. Patients were diagnosed in 2005–2010. Age was categorized as <65, 65–74, and ≥75 years.



## Results

Comorbidity was present in more than two-thirds ( $n=5910$ ) of patients. Thirty-day mortality rates ranged from 0.5% for rectal cancer patients  $<65$  years to 12.8% for gastric cancer patients  $\geq 75$  years. Patients with comorbidity who underwent oesophageal tumour resection had the highest mortality rates, ranging from 8.4% for 30-day to 12.0% for 90-day mortality, while rectal cancer patients had the lowest rates, i.e. 4.3–6.4%, respectively. In multivariable analyses, cardiac disease ( $OR=1.74$ , 95%  $CI=1.32$ – $2.30$ ), vascular disease ( $OR=1.41$ , 95%  $CI=1.02$ – $1.95$ ) and previous malignancies ( $OR=1.38$ , 95%  $CI=1.02$ – $1.86$ ) in colon cancer, and cardiac disease ( $OR=1.81$ , 95%  $CI=1.10$ – $2.98$ ) and vascular disease ( $OR=1.95$ , 95%  $CI=1.11$ – $3.42$ ) in rectal cancer were associated with the highest 30-day mortality.

## Conclusions

Postoperative mortality extends beyond 30 days. Comorbidity and older age are associated with early postoperative mortality after gastrointestinal cancer resection. Underlying comorbidity should be identified preoperatively with attention to patients' specific needs to optimally attenuate risk prior to surgery. A less aggressive treatment approach may well be considered in these groups.

## QC3: Quality of Comprehensive Cancer Care in Southern Switzerland

**E14**

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## Background

Quality of Cancer Care (QoCC) studies have shown an improvement in oncologic care. QoCC can vary depending on the particular medical condition, with deficits in the adherence to recommended processes for basic care being frequently observed.

## Methods

The QC3 is a prospective (01.01.2011–31.12.2013) population-based study, which analyses the QoCC of colorectal, prostate, ovarian, endometrial and lung tumours in Southern Switzerland. Patients  $>18$  years, with incident tumours as listed above, treated both in the public and private hospitals and clinics, are enrolled. Together with dedicated working groups (WG), we identified a list of quality indicators (QI), then selected by a two-round modified Delphi process and validated by an international Advisory Board (AB).

## Results

In 2011 we have defined the QI specific for all the above cited tumours. The initial colorectal cancer (CRC) IQ ( $n=149$ ) underwent to the WG's revision and the selection ( $n=149$ ) underwent Delphi process, which selected 89 QI, finally validated by the international AB ( $n=74$ ). Here we present the preliminary results of the CRC incident in 2011 ( $n=252$ ).

## Conclusions

This study aims to produce evidence-based QI, whom application could allow an immediate change in the diagnostic-treatment process, that could be translated in a short-term benefit for patients.

## Use of the hospital's cancer registry to evaluate breast cancer treatment in elderly patients

**E15**

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<sup>3</sup> Geriatrics UZ Brussels

## Background

Breast cancer patients (BCP) aged  $>60$  are less likely to receive standard treatment. To evaluate parameters that might affect clinical care we linked the hospital cancer registry to the hospital medical database.

## Methods

Retrospective analysis of newly diagnosed female BCP aged  $>60$  ( $n=347$ ) in the UZ Brussels between 2004 and 2007. Patients aged 60–69 were compared to patients  $\geq 70$ . Diagnostic and treatment procedures, comorbidity and treatment waiting times were documented and their effect on therapeutic management was examined.

## Results

Higher age was significantly related to less favourable stage at diagnosis. Age was unrelated to differences in diagnostic procedures or treatment waiting time. With increasing age patients were less likely to undergo breast conservative surgery, sentinel procedure, to receive chemotherapy or radiotherapy. There were no age related differences in axillary lymph node dissections. Comorbidity had a significant effect on receiving chemotherapy but not on radiotherapy. Patients over 80 were less treated according to surgery and radiotherapy guidelines.

## Conclusions

Patients over 60 form a very heterogeneous group where age and comorbidity have an effect on treatment. The cancer registry forms a useful detection tool. Multidisciplinary assessment and individual discussion on implementation of guidelines is recommended for elderly cancer patients.



## **Factors predicting hospital length-of-stay after colorectal resection: a population-based study** **E16**

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### **Background**

The impact of developments in colorectal cancer surgery on length-of-stay (LOS) have not been well described. In a population-based analysis, we investigated predictors of LOS.

### **Methods**

Incident colorectal cancers (ICD-O2: C18-C20), diagnosed 2002–2008, were identified from the National Cancer Registry, Ireland, and linked to hospital in-patient episodes. For those who underwent colorectal resection, the associated hospital episode was identified. Factors predicting longer LOS (upper-quartile, >24 days) for elective and emergency admissions separately were investigated using logistic regression.

### **Results**

8197 patients underwent resection, 63% (n=5133) elective and 37% (n=3063) emergency admissions. Median LOS was 14 days (inter-quartile range (IQR) =11–20) for elective and 21 (15–33) for emergency admissions. For both emergency and elective admissions, likelihood of longer LOS was significantly higher in patients who were older, had co-morbidities and were unmarried; it was reduced for private patients. For emergency patients only the likelihood of longer LOS was lower for patients admitted to higher-volume hospitals.

### **Conclusions**

One quarter of patients stay in hospital for at least 25 days following colorectal resection. Over one third of resected patients are emergency admissions and these have a significantly longer median LOS. Patient- and health service-related factors were associated with prolonged LOS. The cost implications of these findings are significant.

## **Assessing the epidemiology and pattern of care of colorectal cancer in Valais, Switzerland** **E17**

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### **Background**

Assessing adequately the epidemiology as well as the pattern of care of cancer requires the collaboration between cancer registries and clinicians.

### **Methods**

We evaluated characteristics, treatment type, and survival rate of colorectal cancer cases recorded in Valais cancer registry between 2006 and 2009.

### **Results**

774 cases were recorded (Men: 59%; median age: 70). The main localization was colon (71%). The stages were 0 for 20% of cases, I or II for 36%, III for 18% and IV for 22%, respectively. The most frequent mode of detection was a consultation for non emergency symptoms (75%). 90% of the patients were treated by surgery, alone or with combined treatments. 82% of patients were treated within 30 days from diagnosis. Survival rate was 95% at 30 days and 79% at one year.

### **Conclusions**

The characteristics of patients and tumors and the one year survival were similar to those observed in Switzerland and some European countries. Patterns of care were close to those recommended in guidelines. Routine data recorded in a cancer registry can be used, not only to provide general statistics, but also to help clinicians assess local practices.

## **Patient management and survival in breast cancer in a tertiary care setting in Lahore, Pakistan** **E18**

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### **Background**

At Shaukat Khanum Memorial Cancer Hospital and Research Center, from Dec. 1994-Dec. 2010, breast cancer ranked 1st (9,789 cases) accounting for 21% of all malignancies.

### **Methods**

Retrospective review-795 breast cancer patients registered at the Hospital in 2007; studied 122/795 females who had neo-adjuvant chemotherapy and surgery. Overall Survival (OS) between the dates of diagnosis and death/last contact and Disease Free Survival (DFS), start of treatment and relapse. File review ended in Dec. 2011.

### **Results**

Mean presenting age: 44 years (122 females). Clinical stage: I-1 (0.8%), II-57 (46.7%), III-60 (49.2%), and IV-4 (3.3%). HER-2: positive 36 (29.5%), negative 61 (50%). Status after neo-adjuvant: Partial response 98 (80.3%), complete response 19 (15.6%), and stable disease 5 (4.1%). Final response: remission 68 (55.7%), relapse 33 (27%), and progression 21 (17.2%). Patients (n=53) who had neo-adjuvant, surgery, radio-, and hormonal- therapy-count and mean DFS (months) with range: remission 35/53- 36.4 (10.8-43.5) (stage-II (22/35) – 36.7 (30.5-43.5) and III (13/35) 36 (10.8-42.3)); relapse 11/53-26.9 (9.6-48.96); and progression 7/53. Patient status and mean OS (months): died 19 (15.6%), 25.7; alive 80 (65.6%), 49.0; and lost to follow-up 23 (18.9%), 18.5.

### **Conclusions**

Approximately 50% presented in stage III-IV. Education of the community is needed to enable significant reduction in morbidity.

## Results of treating gastric cancer in Gunma Prefecture, Japan **E19**

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### Background

Gastric cancer accounts for 15% of all malignancies, so it is important to investigate therapeutic results.

### Methods

We analyzed 354 cases with gastric cancer diagnosed in 2003 and 962 cases diagnosed in 2007 from the Gunma Prefecture Cancer Registry. Cases were classified according to year of diagnosis, tumor stage, chemotherapy, and treatment at specialist hospitals. The 3-year survival rate was estimated by the Kaplan-Meier method and compared with the log-rank test.

### Results

The overall 3-year survival rate was 60.2% in 2003 and 60.7% in 2007. Among cases with regional lymph node metastasis (R-ly), there was a difference between 2003 and 2007 (60.0% vs. 71.0%,  $p=0.049$ ). Among cases receiving chemotherapy, the survival rate of those with R-ly was 43.3% vs. 67.3% ( $p=0.036$ ). Among cases without chemotherapy, there was no difference at any stage. When survival at specialist hospitals vs. other hospitals was compared in 2007, there was a difference for R-ly cases (79.3% vs. 61.5%  $p=0.078$ ).

### Conclusions

Survival of gastric cancer cases in Gunma has improved over four years, especially for R-ly cases receiving chemotherapy. However, there may be a difference between specialist hospitals and other hospitals.

## Theme F: Cancer Control

### Development of National Electronic Cancer Referral in Ireland: The story five years on

F1

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<sup>5</sup> The Irish College of General Practitioners (ICGP)

#### Background

The National Cancer Strategy 2006<sup>1</sup> recognised the importance of information systems in managing cancer services. The National Healthlink Project, ICT Department HSE, ICGP, and GPIT Group collaborated with the NCCP on this project.

#### Methods

Phase one involved developing site-specific cancer referral forms in Healthlink. Referral guidelines and paper referral forms (breast, prostate and lung) were developed by the NCCP. These referral forms were adapted for online use by Healthlink. Phase two was the development of breast, prostate and lung cancer electronic cancer referral via the four ICGP accredited GP practice management software systems below: 1. Complete GP 2. Helix Practice Manager 3. Health One 4. Socrates

#### Results

10% or of all cancer referrals were sent electronically in 2011 and we expect an increase to 20% in 2012.

#### Conclusions

The NCCP electronic cancer referral project provides useful lessons for the general electronic referral project. The recent HIQA report 2 suggests electronic referrals will improve patient referral in Ireland. References: 1. A Strategy for Cancer Control 2006, National Cancer Forum, DOH. 2. Report and Recommendations on Patient Referrals from General Practice to Outpatient and Radiology Services, including the National Standard for Patient Referral Information, HIQA 2011.

### Impact of skin cancer screening on stage-specific melanoma incidence using multiple imputation

F2

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#### Background

In Schleswig-Holstein, Germany, a pilot project for population-based skin cancer screening (SCREEN project) was conducted in 2003/2004. An effective screening should result in an increase in early stage melanoma incidence and a consecutive decrease in late stage incidence, indicating a future reduction of melanoma mortality. Adequate treatment of missing stage information is crucial.

#### Methods

We used cancer registry data of 9,774 melanoma patients in Schleswig-Holstein for calculating stage-specific age-standardised (Europe) incidence rates for 1999–2000 and 2006–2007. In order to include the 40% of patients with missing T-category adequately, four missing data treatments were compared in a simulation study.

#### Results

Multiple imputation by polytomous regression using demographic, clinical and therapeutic data yielded good results and was used for the present analysis. Incidence of in situ melanomas increased by 70%. Invasive melanoma incidence decreased by 17% (women) and 11% (men), with a statistically significant decrease in T2 (-52% women, -54% men) and T3 (-45% men) and a statistically significant increase in T1 (+16% men).

#### Conclusions

The observed incidence pattern is in agreement with the expected effects of an effective screening. However, interpretation of the data is hampered by a change in TNM-classification and changing numbers of patients notified to the registry by death certificate only.

### Are Electronic Cancer Referrals Better? – A Users Perspective

F3

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#### Background

The National Cancer Control Programme introduced GP referral guidelines for suspected cancers in Ireland in 2009. Referrals can be made electronically via Healthlink, the national electronic messaging system since 2010 and were incorporated into GP software systems in 2012.

### **Methods**

Semi-structured interviews were conducted with the lead consultant in each of the nine Symptomatic Breast Centres in 2011 and with a random sample of 24 General Practitioners (GPs) in 2012, to explore the factors influencing GP referrals to cancer centres. One aspect of this study included exploration of Consultant and GP use and experience of electronic referral. Analysis was conducted using NVivo according to attributes.

### **Results**

The hospital consultants identified the benefits of electronic referral as: clearer more complete information received from GPs, efficiency of the triage process and ability to track referrals securely. The GPs found the electronic referrals quick, innovative and easy to use, with instant acknowledgements and rapid appointments for urgent patients. The early adopters of electronic referral were predominantly young urban GPs in computerised group practices.

### **Conclusions**

The benefits of electronic cancer referral can clearly be demonstrated for the cancer centres in the hospitals, the referring GPs and the patients with suspected cancers.

## **Women's views about HPV vaccination: findings from a national survey**

**F4**

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### **Background**

A school-based HPV vaccination programme for 12-13 year-old girls was introduced in Ireland in 2010. To maximise vaccine uptake, it is important to understand views women have about vaccination. We investigated knowledge of, and attitudes towards, HPV vaccination among women in Ireland.

### **Methods**

A questionnaire was mailed, in 2010, to a random sample of 5,553 women aged 20-64 years, selected through primary care. 3,470 women responded (response rate=62%). Analyses focus on (a) all women and (b) mothers with daughters  $\leq 13$ .

### **Results**

56% of women had heard of HPV vaccination before survey completion; this was lower in younger women (<35 years; 47%) and those without tertiary education (46%). 92% were in favour of vaccination of young girls because HPV infection is very common. While attitudes towards the programme were positive, there were concerns about safety (26%), side-effects (25%) and vaccination encouraging unprotected sex (13%). 92% of mothers of girls  $\leq 13$  indicated that they would probably have their daughter vaccinated, but half had safety concerns.

### **Conclusions**

Although women were generally positive about HPV vaccination, knowledge levels were low and some more negative views could challenge the success of the programme. The concerns of women need to be addressed to ensure uptake in schools remains high.

## **Factors associated with never having had a cervical smear: findings from a national population survey**

**F5**

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### **Background**

Cervical screening uptake has fallen in several developed countries in recent years. We investigated characteristics, health behaviours and beliefs of women who had ever, and never, had a cervical smear test.

### **Methods**

A questionnaire was mailed to a random sample of 5,553 women aged 20-64 years selected through primary care. Respondents were classified by whether or not they had ever had a smear. Factors associated with never having had a smear were identified by multiple logistic regression.

### **Results**

3,470 questionnaires were completed (62%). 237 women (7%) had never had a smear. Women who were single, nulliparous, and without private health insurance were less likely to have ever had a smear. Likelihood of having a smear was lower in smokers and those who had never had a breast exam/mammography. After adjusting for socio-demographics and health behaviours, likelihood of having a smear was lower in women who believed they lacked knowledge or would be embarrassed or anxious; it was higher in women who believed it was easy, and people important to them wanted them to have smear tests.

### **Conclusions**

Other health behaviours and perceptions about smears influence attendance. Screening programmes should consider designing targeted information materials addressing specific perceived beliefs/barriers.



## **Primary health care patients' attitudes towards population-based colorectal cancer screening**

**F6**

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### **Background**

Colorectal cancer screening is effective in reducing colorectal cancer incidence and mortality. In Spain, participation rates in population-based colorectal cancer screening programmes are low, not higher than 60%. The objective was to explore social and cultural elements which determine the intention of primary health care patient to participate in a population-based colorectal cancer screening programme, taking into account gender differences.

### **Methods**

Ethnographic qualitative research based on gender perspective. The technique used was group interview. Participants were men and women aged between 50 and 70 years in Barcelona and Mallorca.

### **Results**

The key element was diagnosis on time. The general perception around cancer has changed from that of a non curable disease. Cancer is perceived currently as a serious problem that can be cured if diagnosed on time. A feeling of personal responsibility regarding health was observed, especially in men, who have incorporated self-care. Participants request more information about what cancer is. People interviewed feel vulnerable to cancer, especially men. Women and men face symptoms in a different way. Attitudes to screening tests are, in general, positive, even for invasive tests such as colonoscopy, especially in men. Diagnosis on time is a helping element for performing tests in absence of symptoms.

### **Conclusions**

Attitudes toward colorectal screening are positive. Gender differences have been observed, which should be taken into account in the design of population-based colorectal cancer programmes.

## **In situ and invasive cancer incidence during implementation of screening programs in Germany**

**F7**

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### **Background**

Since 2002 three new population-based cancer screening programs were implemented as service of the statutory health care system in Germany. Nation-wide colonoscopy screening started in 2002, mammography screening in 2007 and skin cancer screening in 2008. Assuming these programs are feasible and population-based participation is relevant, rapid effects on incidence rates (in situ and invasive cancer) should be observable.

### **Methods**

We used data on colorectal cancer, breast cancer and melanoma from seven selected federal states of Germany covering a population up to 25 million inhabitants. Age-standardized incidence rates of in situ and invasive cancers in the pre-screening period were compared with those in the prevalence period of the screening.

### **Results**

For all three cancer sites a strong increase of in situ carcinomas could be observed (colorectal cancer +74%, breast cancer +31% and melanoma +25%) after the start of the screening program. Incidence rates of invasive cancer increased by 16% for colorectal cancer, 10% for breast cancer and 13% for melanoma.

### **Conclusions**

The German cancer screening programs seem to be feasible at least in terms of detecting early stage (in situ) cancers. This is a first necessary, but not a sufficient condition for positive effects on incidence and/or mortality in the future.

## Interval breast cancers in the Breast Cancer Screening Programme (PDPCM) of the Girona Health Region

F8

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### Background

Mammography screening programs for breast cancer have the ability to reduce mortality from this neoplasm. However, mammography screening has certain adverse effects (false positive and interval cancer) that need to be further studied in order to minimize them. The main objective of this study is to estimate the IC rate in PDPCM Girona Health Region, and compare their characteristics with the cancers detected in the program screening.

### Methods

Retrospective cohort study included all women participating in the PDPCM between 2000 and 2006. We have analyzed the IC detected between the first and second round of the program and the second and third, calculating the incidence rate, the proportional incidence, the sensitivity and some radiological characteristics stratified by group of age (50-59 and 60-69), type of screening (initial and successive) and time elapsed between the last mammography screening and diagnosis (less than 12 months, 12 months or more).

### Results

43 IC were detected and 20 were classify into real intervals (60%), false negatives (15%), occult tumors (10%) and minimal signs(15%). The overall incidence rate is 0.70 cancers per 1000 women screened. The proportional incidence is in the limits recommended in European Guidelines. In the case of IC it has been detected more invasive cancers, with more advanced stage and with a higher histological grade than cancer screening and a different molecular pattern with a higher proportion of triple negative was found too.

### Conclusions

Significant differences were observed among the tumor characteristics which provide prognosis information useful to PDPCM.

## Public Attitudes and Cancer Beliefs in Northern Ireland: an International Cancer Benchmarking Partnership Study

F9

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### Background

Cancer survival in Northern Ireland (NI) is lower than other European countries for many cancers with late diagnosis a factor. This reports population awareness and beliefs about cancer in the NI population and identifies possible interventions.

### Methods

Data were collected under the International Cancer Benchmarking Partnership (ICBP) protocol using telephone interview of people aged >50 in private households 2,307 people participated.

### Results

Awareness of cancer symptoms was good from 61% unexplained tiredness to 96% for lump. Awareness was higher in women, in higher socioeconomic groups and in younger people. Regarding barriers, 18% indicated difficult seeing a doctor, 21% embarrassment and 35% concern about wasting doctor's time, 21% too busy, while 32% would worry about a diagnosis. 19% of people would not want to know a cancer diagnosis. Over half thought treatment worse than the disease, while one third believed cancer a death sentence. However 85% believed cancer patients can continue with daily activities, while 87% believed cancer can often be cured. In general, knowledge of cancer survival rates was poor, This provided evidence of barriers to cancer presentation.

### Conclusions

Recommendations include messages that early diagnosis depends upon you, that acting quickly improves survival and that modern treatments control, symptoms and improving cure rates.

## **Social inequalities observed in the national screening program for cervix cancer in Uruguay**

**F10**

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### **Background**

Uruguay has a national screening program for prevention of cancer of cervix since 2005; Since there is important economic heterogeneity between Montevideo and the rest of the country, it's worth to estimate whether or not the objectives of efficiency has been reached in the same way wherever in the country.

### **Methods**

The 19 regions of Uruguay were grouped into 5 categories of deprivation areas. Individual data from Cervical Cancer Prevention Program were cross-matched between the registry and the screened population. Attendance rates, sensitivity and specificity of the test, incidence rates and in situ/malignant ratio were observed over time, comparing the pre-screening period 1999–2001 and post-screening period 2007–2009.

### **Results**

Overall, incidence of invasive cancer decreased regularly, incidence of in situ increased by four fold between the two periods (APC=20.9,  $p<0.01$ ) and in situ/invasive ratio shifted from 0.37 to 1.81. However, this benefit is not equally observed all over the country: in situ/invasive ratio shifted from 0.4 to 2.7 in Montevideo city, but did not change in the most deprived area (0.5 to 0.6). In addition, differences in attendance rates exist between public and private sector, especially in less deprived areas where private sector is more frequent. Issues of quality of the test processing, sector of care, attendance rates and deprivation are discussed

### **Conclusions**

National cervix cancer screening in Uruguay is efficient. However, social inequalities are still important and probably due to lower participation in the most deprived areas.

## **Demographic Predictors of Delayed Stage Cervical Cancer in California**

**F11**

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### **Background**

Hispanic women experience the highest risk of cervical cancer (CACX) in California, followed by non-Hispanic black (NHB), Asian/Pacific Islander (API), and Non-Hispanic white (NHW). Half of CACX cases in California are delayed-stage (II-IV), with stage I (early-stage) detection attributed to screening.

### **Methods**

Age, race/ethnicity, socioeconomic status (SES), and marital status (MS) categories for all 8,045 staged CACXs in the California Cancer Registry (2004–2009) were contrast as independent odds ratios (OR) for delayed- versus early-stage.

### **Results**

ORs with 95% confidence intervals (CI) contrasting delayed- versus early-stage CACX for age-categories were: OR:<30/50-69=0.30, 0.24-0.37; OR:30-49/50-69=0.48, 0.44-0.54; and OR:70+/50-69=1.37, 1.17-1.61. Contrasting race/ethnicity with NHWs showed: OR:API/NHW=1.23, 1.07-1.42; OR:NHB/NHW=1.13, 0.92-1.38; OR:Hispanic/NHW=1.07, 0.96-1.20; and OR:NH-Other/NHW=0.62, 0.40-0.96. Contrasting lower SES-categories with highest showed: OR:SES1/5=1.45, 1.23-1.70; OR:SES2/5=1.53, 1.31-1.80; OR:SES3/5=1.23, 1.05-1.45; and OR:SES4/5=1.21, 1.03-1.43 (Trend  $p$ -value=0.0001). Contrasts of single (S) and divorced, widowed, or separated (DWS) versus married (M) were: OR:S/M=1.41, 1.26-1.57; OR:DWS/M=1.62, 1.44-1.83.

### **Conclusions**

Lower delayed- to early-stage during reproductive years, with increased odds for age 70+ are consistent with Pap-screening. Higher delayed- to early-stage among APIs versus NHWs revealed inadequate screening. Inverse dose-response discloses lower SES as a more robust predictor of delayed-stage CACX than race/ethnicity. Single and divorced, widowed or separated women experienced higher odds of delayed stage CACX than married.

## **Cervical and Breast Cancer Screening Program in Indonesia, 2007–2011**

**F12**

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### **Background**

Cervical and breast cancer are the leading cancers in Indonesia. In order to control these cancers, the Ministry of Health (Directorate of Non Communicable Disease Control, Sub Directorate of cancer control) in collaboration with other related stakeholders developed a program of early detection. This program was launched as national program by the Indonesian First Lady on 21 April 2008.

### **Method**

The method used in screening for cervical cancer is Visual Inspection with Acetic Acid (VIA) and cryotherapy for VIA positive (single visit approach). The method of breast cancer screening is Clinical Breast Examination (CBE) with a system of referral. The target of the program is 80% of women aged 30–50 years of age in 5 years in each district/municipality.

### **Result**

By 2011, in collaboration with local government and private sectors, the program has been running in 17 provinces of 33 provinces at 84 districts/municipalities. The program was developed by the Ministry of Health and local government, and the Female Cancer Program (FcP), is a project involving several Faculties of Medicine. The result of cervical and breast cancer screening since 2007 till 2010 shows that 291,473 women aged 30–50 have been screened, VIA positive 12,648 women (4.34%) suspect of cervical cancer 338 (2.7 per 1000), lump/tumor in the breast 592 women (4.7 per 1000).

### **Conclusions**

A program of early detection for cervical and breast cancer using VIA and CBE has been successfully developed in Indonesia. The program will be strengthened and expanded to all provinces in Indonesia with good quality control.

## **Cancer control planning to reduce cancer mortality by 30% in the next 10 years in Osaka, Japan**

**F13**

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### **Background**

Osaka has been one of the prefectures with the highest mortality from cancer since 1985. We propose cancer control planning in Osaka, Japan, based on existing statistics and evidence to reduce cancer mortality by 30% in the next 10 years. Elevated mortality from cancer in Osaka has been related to higher incidences of lung and HCV-related liver cancers, more advanced stages of cancer diagnosis, and poorer stage-specific

survival of some cancer sites. Nevertheless, the age-standardized cancer mortality in Osaka has decreased annually by 2% since 1995, mainly due to the consistent decrease in stomach cancer incidence, and the turning to a downward trend in liver cancer incidence since mid-1990s.

### **Methods**

We plan to reduce cancer mortality by an additional 10% in the next 10 years through some efficient cancer control: smoking prevalence reduction among adults by half, organized HCV screening and treatments, targeted cancer screening, and centralization of treatments to the designated cancer care hospitals. These 4 strategies are expected to achieve decrease in all cancer mortality by additional 1.7%, 0.9%, 4.1%, and 2.1%, respectively. The impact on each cancer site is estimated as follows; decreased smoking prevalence would reduce the lung cancer mortality by 4.1%; early detection would reduce 8.0% of stomach, 12.8% of large bowel, and 24.4% cervical cancer mortality.

### **Conclusions**

Cancer control planning in Osaka, and Japan, should be remade based on the existing statistics and evidence to reduce cancer mortality.

## **Early effects of mammography screening on age and stage specific breast cancer incidence in Germany**

**F14**

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German Centre for Cancer Registry Data

### **Background**

A population-based mammography screening program for women between 50 and 69 years of age has been established in all federal states of Germany between 2005 and 2008, with participation rates reported to be slightly above 50%.

### **Methods**

We estimated age and stage specific breast cancer incidence in Germany for the years 1999 to 2009 using national incidence estimates and information on tumor size and early metastasis from German cancer registries with sufficient completeness of incidence data and staging information.

### **Results**

A sharp increase of breast cancer incidence was found from the years 2005 to 2008 for the screening age group, especially for women aged from 60 to 69 years. After stratifying for tumor size, the increase could only be observed for T1-tumors, while the T4-incidence steadily declined from the beginning of the study period. In contrast, the incidence of M1 tumors seemed to remain fairly constant over time.

### **Conclusions**

As expected, the implementation of mammography screening in Germany resulted in a sharp increase of the incidence of early stage breast cancer in the screening population. So far, no clear reduction of advanced stages can be observed on the national level, probably due to the still early phase of the program, its stepwise implementation and the moderate participation rates.



## **Colorectal cancer screening among immigrants in Emilia-Romagna region**

**F15**

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<sup>1</sup> Romagna Cancer Registry

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### **Background**

In Italy, little is known about participation to colorectal cancer screening among immigrants of different ethnic groups. This study examined the association between ethnicity and the probability of responding to invitation to a population-based screening programme in the Emilia-Romagna Region.

### **Methods**

Ethnicity was defined and grouped according to the Italian National Institute of Statistics (ISTAT). The cumulative probability of responding to invitation over time was estimated with the Kaplan-Meier method. Adjusted Hazard-Ratios (AHRs) and 95% Confidence Intervals (95% CI) were estimated for females and males using Cox regression.

### **Results**

Between 2009 and 2011, 950,000 people were invited. Fifty-seven percent Italian women were screened within 12 months of invitation versus 37% immigrant women. Among men, the proportion was 53% versus 29%. Compared with native-born Italian women, the probability of responding to invitation was particularly lower for women from Africa (AHR = 0.41 [95% CI = 0.39-0.43]) and Asia (AHR = 0.38 [0.35-0.40]). Compared with Italian men, the probability was lower for immigrants of all ethnic groups, particularly for those from European Union (AHR = 0.41 [0.38-0.45]), Other European Countries (AHR = 0.44 [0.42-0.47]) and Asia (AHR = 0.42 [0.40-0.45]).

### **Conclusions**

Certain ethnic groups of immigrants may require targeted interventions to improve their uptake of cancer screening.

## **Colorectal cancer incidence in Germany: stage-shift 6 years after implementation of colonoscopy screening programme**

**F16**

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### **Background**

In 2002, colonoscopy has been introduced as a tool of colorectal cancer screening in Germany. One objective is to reduce the incidence in colorectal cancer (CRC) by detection and removal of advanced adenomas. Until now, the effect of colonoscopy screening on population-based incidence in Germany is unknown.

### **Methods**

We provide data on trends of stage-specific, age-standardized incidence rates of three federal states in Germany within six years after colonoscopy implementation. Annual percent changes and 95% confidence interval were calculated using joinpoint analysis.

### **Results**

Between 2002 and 2008 a statistically significant decrease in invasive CRC incidence could be observed (annually 3.0% (95% confidence interval (CI): [-3.8; -2.2])). The decline was apparent in all advanced tumor categories (T2, T3, and T4), whereas the incidence of in situ carcinomas (Tis) increased annually by 51.6% (95% CI: [28.0; 79.4]) until 2004 and remained stable until 2008. These trends were seen in men as well as in women with a generally higher incidence in men.

### **Conclusions**

Due to the limitations of observational studies, the observed changes cannot be attributed definitively to the screening activities, but the presented data support a possible causal association.

## **Using routine data to assess comorbidities: the example of prostate cancer in Ireland**

**F17**

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National Cancer Registry, Ireland

### **Background**

Comorbidities impact on cancer treatment and prognosis, but are not recorded by most cancer registries. We describe challenges experienced using other routinely-collected data to assess comorbidity in prostate cancer (PC).

## Methods

PC registrations diagnosed 2002–2008, with hospital in-patient episode(s) within one year post-diagnosis were included ( $n=10,015$ ). Comorbidity (assessed by Charlson and Elixhauser indices) was determined from hospital episodes. Multinomial logistic regression was used to investigate associations between comorbidities and treatment receipt; relative risk ratios (RRR) were adjusted for confounders. A survey of urologists and radiotherapists was conducted.

## Results

Prevalence of any comorbidity varied by index: Charlson=17%; Elixhauser=27%. Using Charlson, men with a single comorbidity were not more likely to undergo radical prostatectomy than radiotherapy (RRR=1.31; 95%CI 0.93-1.84) than men with no comorbidities; a significant association was observed using Elixhauser (RRR=2.73; 95%CI 2.15-3.48). Conditions reported by clinicians as influencing treatment were mostly rare.

## Conclusions

Several challenges were identified. Findings varied by index used. Some conditions included in indices may be diagnosed because of cancer and treatment, rather than representing “true” comorbidities. Conditions included in indices may not be those considered clinically-important in determining treatment. Clinically-important conditions may be uncommon. Using routine data to assess comorbidity in cancer patients is not straightforward.

## Childhood Cancer Incidence and Circumstances regarding Diagnosis and Treatment in Hiroshima Prefecture, 2004–2008

**F18**

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## Background

The aim of this study is to evaluate childhood cancer incidence and the circumstances regarding diagnosis and treatment in Hiroshima prefecture.

## Methods

Subjects were childhood cancer patients aged 19 years or younger at diagnosis based on the Hiroshima Prefecture Cancer Registry between 2004 and 2008. The number of incident cases and the incidence rates were calculated on the basis of the diagnostic groupings of the ICCC III. We then evaluated relationship between the secondary medical-care district of each patient's residence, hospital of diagnosis, and hospital of treatment.

## Results

The total number of incident cases was 274, and age-standardized incidence rate was 105.8 per million for boys and 97.5 for girls. The most common cancers were leukemia ( $n=72$ , 26.3%), germ cell tumors, trophoblastic tumors, and gonadal neoplasms ( $n=40$ , 14.6%), as well as tumors of the brain and central nervous system ( $n=37$ , 13.5%). Five main cancer-care hospitals in the Hiroshima district covered 72.3% of childhood cancer patients in terms of their diagnosis and 83.2% with respect to their treatment.

## Conclusions

These main cancer-care hospitals played important roles in the provision of medical care for the childhood cancer patients. While the patients who lived in the aforementioned Hiroshima district were diagnosed and treated in the same district, most of the patients living outside of the district had to travel to visit hospitals in the Hiroshima district. It is therefore considered necessary to construct a general support structure that not only provides medical care but also relieves the attendant burdens of the families.

## Transfer of follow up breast cancer care to the community – informing and implementing policy

**F19**

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National Cancer Control Programme, Dublin, Ireland

## Background

Provision of routine follow up care of breast cancer survivors by general practitioners has been shown to be equivalent to follow up by specialist clinics, in terms of clinical outcomes and quality of life. The National Cancer Control Programme proposed that care of these women in Ireland be transferred to the community.

## Methods

Recommendations of the steering group were informed by a review of the literature, focus group research with patients and data collected on current attendances at breast surgical OPD for routine follow up.

## Results

Routine follow up appointments accounted for 15.4% (95%CI: 13.8-17.0%) of appointments, ranging from 5.2% to 27.3% across different hospitals. A third of such patients were at least five years post-operative. Women highlighted issues such as attachment to specialist services, importance of communication and need for clarity as to where responsibility of care lies. Reassurance, confidence in the primary care practitioner, and coordination of multiple appointments were also identified as important issues.

## Conclusions

The proposed policy of transfer of care at five years post-operatively would free up 5% of breast clinic appointments. Steps underway to ensure safe implementation include the development of information materials for patients and a robust system for scheduling annual mammography.

## **Explaining international cancer survival differences: The International Cancer benchmarking Partnership**

**F20**

Conan Donnelly, Anna Gavin  
Northern Ireland Cancer Registry

### **Background**

Cancer Survival varies in Europe and internationally. To investigate this, the International Cancer Benchmarking Partnership (ICBP) was established to investigate these observed survival differences. The ICBP involves 3 continents and 12 jurisdictions in 6 six countries (UK, Canada, Australia, Sweden, Norway & Denmark) and focuses on 4 cancers: breast, colorectal, lung and ovary where survival differences are greatest.

### **Methods**

Work is divided into 5 studies. Module 1 is an Epidemiological study of cancer registry data. Other modules include investigation into population awareness and beliefs (Module 2), primary care attitudes and beliefs (Module 3), diagnostic / treatment delays (Module 4) and an audit of investigation, treatment and co-morbidities (Module 5).

### **Results**

Results from the Epidemiological study (Coleman et al, 2011) showed survival improved from 1995–2007 in all countries. However, survival for all four cancers was higher in Australia, Canada and Sweden than Denmark, England, Wales and Northern Ireland. The cancer awareness and beliefs study is completed, international comparisons will soon be published.

### **Conclusions**

Data has been collected and analysed in a comparable manner across six countries providing a firm foundation for future work.

## **Prognostic Factors in Cancer Patients Using Classification**

**F21**

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Osaka University Graduate School of Medicine

### **Background**

Most cancer patients need to keep getting medical care for dealing with the side effects of chemotherapy/radiation therapy or detecting cancer recurrence, over long periods. Therefore, it is important whether there are reliable medical facilities in the neighborhood. In this study, we investigated the effect of the patients' characteristics including their area of residence on their prognosis.

### **Method**

We analyzed 15,344 patients diagnosed with cancer from 1994 to 1998, and registered in the Nagasaki cancer registry. To develop the prediction models, a classification tree method was applied. The characteristics investigated in the prediction of survival time were age at diagnosis, sex, year of registration, tumor morphology, address of the patient and address of the medical facility of initial treatment.

### **Results**

The proportion of patients who got treatments in their residential area differed considerably according to the area, from the lowest, under 30%, to the highest, over 90%. However their survival times were similar among areas of residence.

### **Conclusions**

The classification tree analysis suggested that the effect of the address of the medical facility was greater than that of the patients' address. The reason for this is that patients consult medical facilities according to cancer type, rather than by their area of residence.

## Theme G: Survivorship

### Exploring the subjective burden of caring for colorectal cancer survivors: evidence from Ireland

G1

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#### Background

Colorectal cancer (CRC) survivors often require ongoing support and care post-treatment. Caring activities are frequently performed by family members. We quantified the perceived burden on informal carers of CRC survivors and investigated factors influencing this.

#### Methods

Carers were identified via a survey of CRC survivors and invited to complete a questionnaire which included the Caregiver Reaction Assessment, 12-item Short Form Health Survey, and questions on time dedicated to caring activities. Total caregiver perceived burden (range 5-25) and mean scores for 4 negative subscales and 1 positive subscale (range 1-5) were calculated. Multiple linear regression was used to identify predictors of caregiver burden.

#### Results

154 of 228 carers participated (response rate=68%). 82% were female. The mean total burden score was 11.48 (sd=2.80). The highest ranking negative subscale was impact on schedule (mean=3.04; sd=0.97), followed by the impact on finances (mean=2.41; sd=0.87), health (mean=2.33; sd=0.73) and family support (mean=1.98; sd=0.79). Multiple regression analysis showed that patient quality-of-life ( $p=0.000$ ), carer general health ( $p=0.000$ ), time dedicated to caring activities ( $p=0.003$ ) and the number of children living with the carer ( $p=0.001$ ) were all significant predictors of higher carer burden.

#### Conclusions

Findings such as these could help identify groups of carers who may themselves require specific support and services.

### Post-treatment supportive care needs of head and neck cancer survivors: unmet needs, gaps in services and barriers to access

G2

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#### Background

Although many cancer survivors eventually adjust well, some experience significant morbidity and ongoing needs for supportive care. We explored post-treatment support needs of head and neck cancer (HNC) survivors in Ireland.

#### Methods

In-depth interviews were conducted with 31 health professionals involved in HNC care and 17 HNC survivors. Health professionals were asked about: survivors' support needs post-treatment; if needs were being met; barriers to meeting needs; and additional supports/services needed. Survivors were asked about: experiences post-treatment; support offered and provided; and additional supports/services needed. Interviews were analysed by content analysis.

#### Results

Similar themes emerged from the two interview sets. Support needs were identified in several areas: information, emotional/psychological, medical, financial and social. Support needs can arise across the full survivorship trajectory, long after initial treatment ends. Unmet need and gaps in existing post-treatment services were identified, explicitly by health professionals and implicitly from survivors' experiences. Issues which influence survivors' willingness to use services included: lack of "formal" referral; voluntary nature of some services; perceived ineligibility; and service location.

#### Conclusions

HNC survivors' supportive needs often go unmet, in part due to gaps in services. The identified barriers to service utilization suggest developing services/supports which adequately meet survivor's needs will be challenging.



### Incontinence and impotence in selected prostate cancer patients in Tyrol: results from a patient questionnaire **G3**

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#### Background

In Tyrol/Austria, PSA testing was introduced already in the early 1990s and offered free of charge to all men aged 45 to 75. Several analyses showed that after five to seven years after PSA testing, prostate cancer mortality decreased about 25%. Up to now, only few results on harms caused by PSA screening are known. Therefore we aimed at getting information on incontinence and impotence from a patient questionnaire.

#### Methods

Selected patients with prostate cancer treated with prostatectomy in Tyrol were applied standardized questionnaires on incontinence (ICIQ – Urinary incontinence form, short version) and impotence (IIEF – International Index of Erectile Function), both before and one and/or two years after treatment.

#### Results

We analyzed a total of 550 questionnaires from 370 patients, 63% before and 37% after treatment. The incontinence summary score resulted in 78% without problems and 15% with slight problems before treatment opposed to 35% and 37% after treatment respectively. Concerning erectile dysfunction, 56% had no problems and 32% mild to moderate problems before opposed to 20% and 31% after treatment respectively.

#### Conclusions

After treatment, one third of patients had no problems with incontinence and 20% of patients had no problems with impotence. These results need to be confirmed by a larger set of patients.

### The economic burden of colorectal cancer: patient's and caregiver's time, travel and out-of-pocket costs **G4**

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#### Background

Although recognition is growing that cancer may place an economic burden on patients and their families, few studies have quantified this burden. We estimated the economic impact of colorectal cancer on patients and caregivers in Ireland, which has a mixed public-private healthcare system.

#### Methods

Colorectal cancer survivors (ICD10 C18–20) diagnosed 6–30 months previously were identified from the National Cancer Registry and invited to complete a postal questionnaire. Caregivers, identified through patients, also completed questionnaires. We calculated patient's and caregiver's cancer-related out-of-pocket costs (OOPC) and diagnosis and treatment-related time and travel costs (TTC) and caregiver's time costs for home-based caring activities.

#### Results

498 patients and 154 caregivers participated (response rates 39% and 68%). Almost all patients (90%) incurred some cancer-related OOPC (mean across all patients= €1,727). Two-thirds of caregivers reported diagnosis and treatment-related OOPC (mean= €900). The mean patient TTC was €11,055; these costs were greatest for surgery (€7,104), then radiotherapy (€5,301) and chemotherapy (€3,629). The mean caregiver TTC was €5,085 for hospital-related caring activities and €7,895 for home-based activities. Patient costs varied by cancer site; caregiver's costs varied by caregiver's employment status and age, and patient stage.

#### Conclusions

The economic burden that colorectal cancer places on patients and caregivers is significant.

### Family and socio-economic circumstances predict low health-related quality-of-life in colorectal cancer survivors **G5**

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National Cancer Registry, Ireland

#### Background

Evidence is mounting that health-related quality-of-life (HRQoL) may be a prognostic factor in cancer. It is, therefore, important to better understand which survivors are at risk of low HRQoL. We investigated predictors of low HRQoL among colorectal cancer (CRC) survivors.

#### Methods

CRC survivors (ICD10 C18–20) diagnosed 6–30 months previously were identified from the National Cancer Registry, Ireland and invited to complete a postal questionnaire, which collected socio-demographic and treatment information and included the EORTC QLQ30 and CR29. Low HRQoL was defined as an EORTC QLQ30 global health score in the lowest quartile ( $\leq 33$ ). Logistic regression was used to identify predictors of low HRQoL.

#### Results

495 completed questionnaires were received (response rate=39%). Of respondents, 63% were male; 40% were aged  $<65$ ; 61% had colon cancer; and 37% were  $<1$  year post-diagnosis, 47% were 1–1.99 years and 16% were 2+ years. In adjusted models, risk of low HRQoL was significantly higher

in survivors without children (OR=2.27, 95%CI 1.29-4.01), with only primary education (OR=1.91, 95%CI 1.18-3.09) and who currently had a stoma (OR=1.82, 95%CI 1.12-2.94). It was lower in those who had received chemotherapy (OR=0.60, 95%CI 0.36-0.99).

### Conclusions

Family circumstances and markers of socio-economic status predict low HRQoL in CRC survivors.

## Long-term physical and psychological side-effects of prostate cancer treatments: a population-based study

G6

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### Background

In many countries, the number of men diagnosed with prostate cancer is rising. On the island of Ireland, it is now the most common male cancer. Recommendations that men should be involved in treatment decision-making require that men are well informed of possible treatment side-effects. Population-based data on side-effects is limited. This all-Ireland, population-based, study investigated physical and psychological side-effects of prostate cancer treatments up to 15 years post-diagnosis.

### Methods

7,000 men diagnosed with primary, invasive, prostate cancer (C61) 1-15 years ago, identified through cancer registries in Northern Ireland and Republic of Ireland, received a postal questionnaire (encompassing specific questions on treatments received and side-effects experienced including incontinence, impotence, bowel problems, fatigue and depression) during April-May 2012.

### Results

Results will be presented on the prevalence and severity of side-effects soon after treatment and now. Men's experiences of having side-effects will be compared by time since diagnosis, age at diagnosis, between the two jurisdictions and across treatments received.

### Conclusions

This study provides important information on physical and psychological side-effects. Such information will be valuable in guiding the decision-making process for men with prostate cancer in the future, and in informing strategies to identify those likely to require additional support post-treatment.

## From Research to Practice by using Cancer Registry Data

G7

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### Background

In the USA, the cancer registry collects a particular patient's demographic, medical history, diagnostic findings, histology, staging, received treatments, and their annual follow-up. The CS cancer program uses CR data for quality assurance, clinical trials, community outreach activities, planning/improvement of cancer program services and marketing purposes.

### Methods

The purpose of follow-up of cancer patients is to ensure continued medical surveillance, and assess clinical standards, quality of care and patient outcomes. The CS cancer committee decided to look into the experiences of English-speaking women who had survived colorectal cancer (CRC) more than three years after diagnosis. A phenomenological research method was used because only women who lived with the phenomenon are able to share their understanding of the experience (Donalek, 2004). The cancer registry had identified the patients in databases that fell under study eligibility criteria and had sent letters for participation.

### Results

Seventeen subjects participated. Discussions with women were centered on their experience as survivors, including physical, emotional, and daily concerns.

### Conclusions

Seven areas were identified from the result of the study. 1) Listen to Your Body, 2) Support or Lack of Support; 3) No one wants to talk about CRC, 4) CRC Never Goes Away, 5) Moving forward, 6) Life Changing Event, and 7) Survivors. Findings discussed at the meeting resulted in the initiation of a Colorectal Cancer Self Help Group which is open to patients and caregivers. A CRC Educational DVD was made available. A female physician provides screenings and lectures.

## Identifying cancer survivors at increased risk of financial stress and strain as a result of having cancer

G8

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### Background

Accumulating evidence suggests cancer can have significant financial consequences for patients. We investigated factors associated with experiencing financial stress and strain as a result of having cancer.

### Methods

1,373 individuals diagnosed with breast, lung or prostate cancer 3-24 months previously were identified from the National Cancer Registry, Ireland and invited to complete a questionnaire. Main outcomes were self-reported cancer-related financial stress (impact of cancer diagnosis on household ability to make ends meet) and cancer-related financial strain (concerns about household financial situation since cancer diagnosis). Factors associated with increased cancer-related financial stress and strain were identified by logistic regression.

### Results

740 participated (54%). 49% reported increased financial stress, and 32% increased financial strain, due to cancer. Pre-diagnosis employment status predicted subsequent stress and strain (paid employment: stress=63%, strain=43%; retired: stress=22%, strain=13%). Among non-retired people, risk of cancer-related financial stress was significantly increased in those who were younger, and had dependents, mortgage/loans, and increased household bills post-diagnosis; it was lower in those with private health insurance and savings. Among retired people, pre-diagnosis financial status predicted subsequent stress. Findings were similar for financial strain.

### Conclusions

These findings could help develop tools to identify patients most in need of financial advice and support.

## Patterns of workforce participation in cancer survivors 6 and 12-months post-diagnosis

G9

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### Background

Return to work following cancer is important for survivors, their families, employers and society. We are investigating patterns of workforce participation among cancer survivors in Ireland at 6- and 12-months post-diagnosis

### Methods

Potentially eligible cases are identified from the National Cancer Registry, Ireland. We are recruiting a population-based cohort of 750 individuals with incident breast, prostate and colorectal cancer, aged 18-64 and employed or self employed at diagnosis. Structured telephone interviews are conducted at 6 and 12-month post-diagnosis. Preliminary univariate analysis involved Wilcoxon signed-rank test and X<sup>2</sup>.

### Results

To date, 500 subjects have been recruited (breast 53%, prostate 30%, colorectal 17%). At 6 months post-diagnosis, 38% of cancer survivors were working (12% did not stop working; 26% had returned to work). Work at 6 months was associated with diagnosis (breast 22%, prostate 65%, colorectal 40%;  $p=0.00$ ). 52% of male and 23% female of colorectal survivors worked at 6 months. 97% of survivors were employed in the

same job and for 76% their duties had not changed. Results for other employment outcomes and 12-month results will also be presented.

### Conclusions

These results could help health professionals to advise patients appropriately and patients to make treatment decisions and plan for time away from work.

## Cancer survival rate: How long should cancer patients undergo medical follow-up?

G10

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### Background

The number of patients surviving cancer in Japan is increasing, with five-year survival rates exceeding 50%. These statistics are based on patients treated at least five years ago. How many years should medical follow-up continue?

### Methods

Our analysis examined data given by the hospital-based Kanagawa Cancer Center and registered in the population-based Kanagawa Cancer Registry. We measured the observed 13-year survival rate for cancer patients and the expected 13-year survival rate for the general population. The data was analyzed by using the ratio of both rates of change (RCR).

### Results

Once the RCR falls to  $<1$ , it appears that the probability of death from cancer is no different from the general population. In males, an RCR of  $<1$  was observed for cancer of the stomach, large intestine and prostate by the sixth or seventh year. In females, this rate was observed for cancer of the stomach in the eighth year and for the breast, uterus and large intestine in the twelfth year or later.

### Conclusions

The effect of medical treatment on survival was presumed to be about ten years. Our study concludes that maintenance of long-term survival requires medical checks over a period of about ten years.



## Theme H: Determinants of patient outcome

### Cancer prevalence and survival in Austria – Results from the Austrian National Cancer Registry

H1

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#### Background

Information on cancer prevalence and survival is of primary interest for health care planning and resource allocation because it identifies the burden of the disease on the population and health care system.

#### Methods

The Austrian National Cancer Registry contains 925,846 reported tumours in 772,441 persons diagnosed 1983–2009. Cancer prevalence was directly calculated on basis of their vital status follow-up until 2009-31-12. Survival analyses were using life table methods for estimating observed survival and Ederer II for estimating expected survival. Observed and relative survival rates are presented as interval specific survival rates per year of survival.

#### Results

3.4% of all Austrians alive on the reference day have had a prior cancer diagnosis. Women affected by cancer survive past their diagnosis significantly than men, mainly caused by breast cancer. 5 year cumulative relative survival increased from 38% (diagnosed 1985) to 61% (2005) in men, and from 49% to 63% in women. Survival decreases with advancing age at diagnosis. Survival for patients with metastases at diagnosis changed only partially over the years.

#### Conclusions

A notable increase in cancer prevalence is expected given the correlation between demographic ageing, generally increasing life expectancy and improved survival chances of cancer patients in Austria.

### Breast cancer data quality at the population-based cancer registry of Sao Paulo: implications for public health planning

H2

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#### Background

Information based on populational data, such as Cancer Registries, are essential to endorse health planning and provision of cancer care services. This paper aims to present a data quality evaluation of breast cancer incidence data from the Population-Based Cancer Registry of the Municipality of São Paulo, Brazil.

#### Methods

The study included 46,305 new breast cancer cases recorded during a two five-year periods (1997–2001 and 2002–2006). Data analysis was focused on variables such as: date and age at diagnosis, method of diagnosis, clinical stage and topography.

#### Results

The study shows that some variables considered in the literature as essential to the validity and comparability of Registries, such as the diagnosis by histopathology exam and age of the patients, have good information, while that for other relevant variables, such as clinical staging, there are problems of data completeness.

#### Conclusions

Enhancements on data completeness for those variables can amplify the usability of population-based cancer registries.

### Does the incidence and survival from gastric cancer vary between ethnic groups in England?

H3

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#### Background

This study investigated the variation in incidence and survival from gastric cancer between ethnic groups in England.

#### Methods

47,898 gastric cancer patients diagnosed between 2001 and 2007 were extracted from the National Cancer Data Repository. Male and female age-standardised incidence rate ratios (IRR) were calculated for each ethnic group, using White ethnic groups as references. Cox regression analysis was used to assess survival in different ethnic groups, adjusting for age, socioeconomic deprivation and co-morbidity.



### Results

Ethnicity information was available for 81% of patients. Compared with White populations, Black Caribbean men (IRR=1.39 95%CI [1.22-1.60]) and women (IRR=1.57 [1.28-1.92]) had the highest incidence and Indian men (IRR=0.41 [0.37-0.45]) and women (IRR=0.57 [0.48-0.67]) had the lowest incidence of gastric cancer. White men had lower survival compared with men from the other ethnic groups studied. Compared with White women, Black African women had the highest survival (hazard ratio=0.54 [0.36-0.82]).

### Conclusions

Differences in exposure to risk factors are likely to contribute to the variation in incidence between ethnic groups. Public health initiatives to reduce risk factor exposure would reduce the incidence of this cancer, and plausibly reduce the variation between ethnic groups. Reasons for the variation in survival are unclear, and need further investigation.

## An examination of excess cancer mortality among men in Ireland during 1994–2008

H4

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### Background

In developed countries cancer mortality tends to be higher in males than females. We investigated differences in incidence, survival and mortality among males and females in Ireland, 1994–2008.

### Methods

Cases of lung (ICD10 C34), colorectal (C18-C21), bladder (C67) and stomach (C16) cancer, and malignant melanoma (C43) were extracted from the National Cancer Registry, Ireland, and deaths obtained from the WHO Cancer Mortality database. Age-standardised incidence and mortality rates were calculated. Age-adjusted relative survival estimates, up to 5-years post-diagnosis, were calculated for males and females separately using the Hakulinen method. Multivariate Cox proportional-hazard models were run for all cause and cancer-specific mortality; hazard ratios for sex were adjusted for socio-demographics, stage, smoking status, sub-site and histology.

### Results

Incidence rate ratios were significantly higher in males for lung (1.64, CI:1.56-1.73), colorectal (1.62, CI:1.54-1.70), bladder (2.98, CI:2.65-3.35) and stomach (1.64, CI:1.48-1.82) cancer; for melanoma the rate ratio was significantly higher in females (.79, CI:0.72-0.87). Mortality rate ratios were significantly higher in males for all five sites. Five-year relative survival was significantly higher for females for lung and colorectal cancer and melanoma; for colorectal and lung cancer this effect was confined to younger patients. Cox proportional hazard models revealed complex associations between sex and mortality; the adjusted hazard ratio for sex varied over time.

### Conclusions

In Ireland, males are at an increased risk of diagnosis and death from cancer, but associations between sex and survival are complex. Cancer prevention strategies should address gender differences in risk.

## Cancer survival in Eastern and Western Germany after the fall of the Iron Curtain

H5

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### Background

Prior to the German reunification, cancer survival was much lower in East than in West Germany. We compare cancer survival between Eastern and Western Germany in the early 21st century, i.e. the second decade after the German reunification.

### Methods

Using data from 11 population-based cancer registries covering a population of 33 million people, five-year age-standardized relative survival for the time period 2002–2006 was estimated for the 25 most common cancers using model-based period analysis.

### Results

In 2002 to 2006, five-year relative survival was very similar for most cancers, with differences below 3 percent units for 20 of 25 cancer sites. Larger, statistically significant survival advantages were seen for oral cavity, oesophagus, and gallbladder cancer and skin melanoma in the West and for leukemia in the East.

### Conclusions

Our study shows that within two decades after the assimilation of political and health care systems, the former major survival gap of cancer patients in Eastern Germany has been essentially overcome. This result is encouraging as it suggests that even though economic conditions have remained difficult in Eastern Germany, comparable health care provision may nevertheless enable comparable levels of cancer survival within a relatively short period of time.

## Is cancer survival affected by smoking status at diagnosis? A population-based study

H6

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### Background

A few small studies suggest that smoking may be associated with poorer outcomes in cancer patients. In a large, population-based study, we investigated whether smoking status at diagnosis affected survival in people diagnosed with: cancers of the breast, prostate, colorectum, lung, stomach, bladder, ovary, and head and neck (H&N), non-Hodgkin lymphoma (NHL) and melanoma.

### Methods

We abstracted cancers diagnosed 1994–2008 from the National Cancer Registry, Ireland. Follow-up was until 31/12/2009. Cox proportional hazards models were used to compare risk of cancer-specific death in current or ex-smokers versus non-smokers, adjusting for other prognostic factors (including age, stage, and deprivation category).

### Results

81,102 cases were included in the analysis. Current smokers were at increased risk of dying from cancer, for all sites, with the exception of stomach and bladder:

(adjusted HR[95%CI] prostate=1.32[1.21,1.43];  
colorectal=1.14[1.08,1.20]; breast=1.13[1.05,1.21];  
lung=1.11[1.04,1.17]; H&N=1.24[1.08,1.42];  
NHL=1.22[1.08,1.37], and melanoma=1.31[1.06,1.61].

### Conclusions

Smoking at diagnosis increased the risk of dying from several cancers. Smoking status misclassification was likely, with some smokers probably recorded as non-smokers; thus the true effects of smoking may have been underestimated. These results could be explained by the effects of smoking on immune competence, inflammatory response, genetic damage, or metabolism of chemotherapy drugs.

## Population-based incidence and survival of gastrointestinal stromal tumours in Girona province, Spain

H7

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### Background

Cancer registries are missing a substantial number of GIST incident cases due to benign tumours are discharged. The objective was to estimate the population-based incidence and survival of GIST.

### Methods

GIST cases diagnosed in the population covered by the Girona Cancer Registry were extracted. Crude rate and age-adjusted incidence using the European standard population (ASRE) were calculated. Follow-up time until 31/12/2010 was performed using a record-linkage with the Catalan Mortality Registry and the National Death Index. Hakulinen method was used to compute relative and observed survival curves.

### Results

During 1994–2005, 88 digestive tract sarcomas were diagnosed, 82 (93.2%) of which were GIST. Crude rate was 1.24 and ASRE was 0.99 per 100,000 person-year. Five-year relative survival decreased with higher risk of recurrence group, as follow: 86% for very low and low risk group, 86% for intermediate group, 65% for high risk group and 18% at three years patients diagnosed with metastatic disease. Survival rates according to risk groups will be presented.

### Conclusions

GIST tumours are very rare neoplasms. During the period studied no increase in incidence was observed. Survival rates is related to the grading of differentiation, and decreased steadily with advancing risk group.

### Modest improvement in 20 years of kidney cancer care in the Netherlands

H8

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#### Background

For an evaluation of the progress achieved in the field of kidney cancer, we described trends in incidence, treatment, mortality and relative survival.

#### Methods

All adult patients newly diagnosed with kidney cancer in 1989–2009 (N=32,545) were selected from the Netherlands Cancer Registry. Age-standardised incidence and mortality rates and annual percentage of change (EAPC) were calculated. Follow-up was completed until January 2010.

#### Results

The incidence of kidney cancer has been stable between 1989 and 2001 with a European Standardized Rate of 11 per 100,000 person years (PY). Since 2001 the incidence increased to 13 per 100,000 PY in 2009. The mortality rate decreased slightly over time, from 6.2 per 100,000 PY in 1989 to 5.6 in 2010. No changes in treatment were observed, except for the introduction of targeted therapies for stage IV disease, since 2005. The 5-year relative survival improved from 51% in 1989–1994 to 58% in 2005–2009.

#### Conclusions

The incidence of kidney cancer has increased slightly, and survival improved modestly, resulting in a decreasing mortality. A positive effect of the introduction of targeted therapies for metastatic kidney cancer was observed in 1-year relative survival. For progress in kidney cancer care, effective prevention strategies and new therapies remain warranted.

### How has survival among older and younger cancer patients developed over the last 20 years?

H9

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#### Background

According to demographic changes cancer among elderly is of high interest from clinical and health care aspects. This study concentrates on development of relative survival among elderly compared to younger cancer patients.

#### Methods

We included all cancer cases of three Federal States in East Germany (Brandenburg, Mecklenburg-Vorpommern and the Free State of Saxony) diagnosed between 1977–1989 and 1997–2009, aged 15–89 years and followed up until 31.12.2009. We excluded DCO cases (n=71,904, 7.2%) and patients older than 99 years at end of follow-up (n=6,671, 0.7%). Hence 996,888 cancer cases were included in the analyses. We computed relative 5-year and 10-year-survival rates for the period 2006–2009 by sex, site and age group (15–64 years, 75 years and older). Expected survival was computed according to Ederer II.

#### Results

Survival among older patients is considerably better than 20 years ago. For all cancers combined relative 5-year-survival for younger male increased from 34% to 62% and for younger female from 56% to 75%. The increase for older patients was 11% to 57% and 16% to 53% (male and female, respectively). Thus, differences in survival between both broad age groups decreased obviously. Already 2 or 3 years after diagnosis there are practically no more differences in further survival experiences between young and old. In the 1980s survival among elderly was considerably worse even 10 years after diagnosis.

#### Conclusions

We present and discuss results for several sites and consider influencing factors such as stage distribution and dco percentage.

### Survival analysis of childhood cancer in the central region of Portugal between 2000 and 2006

H10

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#### Background

In Portugal, oncological diseases represent the second leading cause of death, among children. Therefore we aimed to compute survival of children.

#### Methods

In this study, 377 children aged less than 15 years old, diagnosed with cancer between 2000 and 2006, residents in the area of the Registo Oncológico Regional do Centro and registered in their database, were followed until 31 December 2011. Cancers cases were classified according to the International Classification of Childhood Cancer 3rd Edition (ICCC-3). Observed survival was calculated through the actuarial method. Estimates were presented according to sex, age and place of residence and for the 12 groups and for the 10 most frequent subgroups. Comparisons were performed by the Log-rank test.



## Results

Overall survival was 92.5%, 83.0% and 79.0%, one, three and five years after diagnosis, respectively. No differences were observed in survival according to sex, age and district of residence. Five years after the diagnosis, when considering the ICCC-3 groups, Germ cell tumours, trophoblastic tumours, and neoplasms of gonads and Other and unspecified malignant neoplasms presented the higher survival (So=100.0%) and Hepatic tumours the lower (So=50.0%). When considering the ICCC-3 subgroups, Hodgkin's lymphomas have the higher survival (So=96.2%) and rhabdomyosarcomas the lower (So=50.0%).

## Conclusions

Childhood survival is high, with no differences according to sex, age and district of residence. Hodgkin's lymphomas are the tumours with a higher survival and rhabdomyosarcomas with the lower.

## Social inequalities associated with Gastric Cancer Survival in the city of Goiânia. A population-based study

H11

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## Background

Interest in assessing the association between social inequalities and health has increased during last years as Socioeconomic Status (SES) exerts an important influence on health care. This study assessed survival of gastric cancer patients from the population-based cancer registry (PBCR) of Goiânia according to SES.

## Methods

The study included incident cases from 1988 to 2007. Variables analyzed included gender, age, location of the tumor, staging and the address of the patients (grouped according to the sanitary districts of Goiânia) as a measure of SES. Kaplan-Meier method with Log-rank and Breslow correction was used for survival estimates. The study was approved by two ethics committees in Goiás.

## Results

2275 gastric cancer incident cases were identified from 1988 to 2007 with 61.4% of men and 38.6% of women. For survival study purposes 1844 cases were included. Overall 5-years survival was 21,86 months (95%CI 20,73 – 23,00). Survival was better for females compared to males ( $p=0,01$ ). Survival estimates were worst for patients above 50 years old and patients with proximal and metastatic lesions ( $p<0,001$ ). Survival estimates according to the sanitary districts of Goiânia showed better survivals on central and south districts ( $p=0,04$ ).

## Conclusions

Survival was worst for older patients and for proximal and metastatic tumors. Regarding SES, survival was better on central and south districts of Goiânia. Those are the districts with greater availability of health care facilities. Inequalities on access and utilisation of health care system may be a key factor affecting survival.

## Prognosis value of molecular breast cancer subtypes among Spanish women

H12

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## Background

Gene expression profiling identifies the molecular subtypes associated to different prognosis and aggressiveness. Objectives: To determine whether clinicopathological features and prognosis of breast tumours differed among molecular subtypes in Spanish.

## Methods

Data were obtained from the 10 population-based cancer registries participating in the "High Resolution Spanish Study of Breast Cancer". Invasive female BC, mainly diagnosed in 2005, were retrospectively analyzed. Four molecular subtypes were constructed from immunohistochemical status of hormone receptors and HER2: Luminal A (ER and/or PR + and HER2 -), Luminal B (ER and/or PR + and HER2 +), HER2 (ER and PR - and HER2 +) and Triple Negative (ER, PR and HER2 -). Clinicopathological features were compared among molecular subtypes. Relative survival (RS) was analyzed, according to molecular subtypes, using the Pohar-Perme method. Life tables were calculated using the Elandt-Johnson method. Women were follow-up until 31/12/2010.

## Results

3482 BC were identified and 2763 (79.4%) were classified into molecular subtypes. The proportion of Luminal A, Luminal B, HER2 and Triple negative subtypes were 68.9%, 12.5%, 7.0% and 11.7%; and 5-years RS were 90.9%, 85.8%, 77.3% and 74.2%, respectively ( $p<0.001$ ). The prognostic value of BC molecular pattern remains when adjusting by age and stage.

## Conclusions

Marked differences in clinicopathological features and RS were observed among molecular subtypes in Spanish women. Furthermore, the prognostic value of molecular subtypes remains when adjusting by age and stage.



### Progress in the Survival of Patients diagnosed with cancer in Izmir, Turkey between 1995 and 2003 H13

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#### Background

Trends in population-based survival estimates are useful indicators in evaluating changes in the accessibility and effectiveness of cancer services; trends in cancer survival in Turkey have yet to be assessed.

#### Method

We retrieved data from the Izmir Cancer Registry for 10 cancer sites registered between 1995 and 2003. Patients were followed-up until the end of the study, in 2008, using active means. Cancer-specific 5-year relative survival was calculated according to period of diagnosis (1995-1997, 1998-2000 and 2001-2003) as well as by sex and age group.

#### Results

Five-year relative survival improved for all cancer sites, sexes and age groups. Survival for cancer of the colon, rectum, larynx, breast, cervical, ovary, bladder and Hodgkin and non-Hodgkin lymphoma as well as leukemia ranged between 50-78% and 56-86% for patients diagnosed in 1995-1997 and 2001-2003, respectively. The largest increase was observed for bladder, non-hodgkin lymphoma and cervical cancer (15%, 13%, 12% point percentage increase), with the greatest improvement in patients 60-75 years of age.

#### Conclusions

Survival increased in Turkey for cancers that are amenable to early detection and treatment, suggesting progress in both areas of cancer control in Turkey. The estimates need to be interpreted in the context of possible (non-random) losses to follow-up.

### Impact of metformin on colorectal cancer survival H14

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#### Background

Aim of the present observational population-based study was to assess the therapeutic effect on overall survival of metformin and other diabetes medication used after the diagnosis of colorectal cancer (CRC).

#### Methods

CRC patients from the Southeastern Netherlands diagnosed between 1998 and 2010 were selected from the Eindhoven Cancer Registry (ECR). Patients were linked to the PHARMO Record Linkage system (RLS), including data on drug utilisation and clinical laboratory measurements. Exposure to metformin and other diabetes medication was assessed from 6 months till 24 months after cancer diagnosis. After these 24 months, survival time till death or the end of study was assessed using Cox proportional hazards models.

#### Results

The linkage resulted in an ECR-PHARMO cohort of 4,557 CRC patients of whom 90 patients were exposed to metformin and survived the 24 months after cancer diagnosis. Preliminary analyses showed that the use of metformin during CRC follow-up was not associated with a lower risk of overall mortality. Further analyses that are currently undertaken on the days of exposure and tumor characteristics, will be shown at the conference.

#### Conclusions

Preliminary analyses showed that metformin use after CRC diagnosis was not associated with lower risk of overall mortality.

### Pediatric Cancer Incidence and survival in the Jordanian population, 2000-2009 H15

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#### Background

Marked variations in the incidence and survival of particular types of childhood cancer exist between countries. The aim of this study is to explore epidemiology and trends of pediatric

cancers in Jordan 2000–2009 and to identify the observed survival rate for childhood cancer.

### Methods

A descriptive study was carried out. Cases were identified from the Jordan cancer registry. All Jordanian pediatric cancers which diagnosed between 2000–2009 were included. Data on age, sex, primary site, morphology, vital status (alive, dead) and date of last visit were collected. SPSS software was used for analysis and the Kaplan-Meier method was used to calculate five and ten years survival rate.

### Results

There were 2049 (4.5%) registered malignant tumors during the period 2000–2009. The crude incidence rate for cancers in children was 92.8/million. Cancer was more common in males, M:F ratio 1.4:1. The highest percentage of pediatric cancers was seen in the age group 0–4 years (41%). The most common types of cancers were leukemia (32%), brain and CNS (18%) and lymphoma (15%). The five and ten year survival rates for pediatric cancers were 79.8 % and 76.7% respectively. Survival rate was best in lymphoma patients (90%), and the poorest survival rate was seen in bone cancer (70%).

### Conclusions

The pattern of childhood cancer in Jordan seems to be similar to other countries in our region, where leukemia, lymphoma and brain & CNS were the most common cancers in Jordan and countries in the region, although survival rate is slightly better in Jordan than in other countries in the region.

## Survival analysis of patients with cancer of oropharynx in a Brazilian capital

H16

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### Background

Patients with a history of tobacco use, alcohol and HPV infection have an increased risk of developing oropharyngeal cancer. Prognosis of oropharynx tumors depend on the location of the primary, the clinical stage. We aimed to assess survival in patients with oropharyngeal cancer in Goiânia, Goiás, Brazil.

### Methods

The cases of squamous cell carcinoma (SCC) of oropharynx were identified in the Population-Based Cancer Registry of Goiânia, for the period 1988 to 2005. Age was grouped into <40 and ≥40 years and clinical stage (CS), TNM classification. Survival was analyzed by the Kaplan-Meier with log-rank test with significance of 5% and confidence interval of 95% for comparison of variables. The loss of follow-up was 11.8%.

### Results

We identified 289 cases of SCC of oropharynx, being 81% males and 19% females. Tonsil 103 (35.6%) was the most common site, followed by the base of the tongue 96 (33.2%). Advanced tumors (CS III and IV) were more frequent with 71%. Overall survival was 23% in five years without difference between genders. Five years survival by CS for females for stage I and II was 25%, for stage III and IV was 19%. In males, survival in stage I and II was 44% and in stage III and IV survival was 23% it was statistically significant ( $p=0.014$ ).

### Conclusions

Tonsil tumors were the most common and the majority presented with advanced lesions. Survival rate where higher in males. Stage is a significant predictive factor for better survival.

## Survival of most common cancers of Mongolia

H17

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### Background

In the last 30 years cancer incidence increased in our country and in the future the trend will increase. Therefore there is a need to develop cancer prevention and early detection, diagnosis and treatment. The objective was to measure observed 5 year survival rate and the median of survived time of patients with the most common cancers in Mongolian population.

### Methods

The study design was retrospective. 1714 patients were selected with cancers of esophagus, stomach, liver, lung and breast incident in 2003. The survival time was expressed as a median, observed 1, 3, 5 years survival rate as percentages.

### Results

Median survival of patients with esophagus cancer was 4.3 months; stomach 5.5; liver 3.9; lung 4.1 and breast cancer the highest, 39.6 months. Observed 5 year survival rate of patients with esophagus cancer was 4%; stomach 10%; liver 7%; lung 5% and breast cancer highest at 38%. For patients with esophagus cancer ( $\text{Wald}(2)=26.2$ ,  $P<0.001$ ) and stomach cancer ( $\text{Wald}(2)=49.3$ ,  $P<0.001$ ) survival was correlated with cancer treatment. Survival from lung ( $\text{Wald}(2)=16.1$ ,  $P<0.001$ ), and liver ( $\text{Wald}(2)=23.3$ ,  $P<0.001$ ) cancer was correlated with stage of diagnosis and cancer treatment. Survival of breast cancer patients ( $\text{Wald}(4)=11.1$ ,  $P=0.03$ ) was correlated with age.

### Conclusions

The study design was retrospective and for the first time estimated observed 5 year survival rate. Our results were close to survival rates for other developing countries. In the future we need to study by prospective design and to calculate relative survival rates. The results of this study argue strongly for cancer related medical care and a cancer control program.

### Long lasting excess mortality for indolent and aggressive B-cell non-Hodgkin lymphoma survivors in the Netherlands H18

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#### Background

Survival rates are usually reported as time since diagnosis, which is less relevant for patients who already survived a period of time.

#### Methods

All 54,015 patients diagnosed with indolent and aggressive B-cell non-Hodgkin lymphoma (NHL) in 1989–2008 aged 15–89 years were selected from the Netherlands Cancer Registry. We computed long-term conditional 5-year relative survival rates, according to age, gender, and stage. Follow-up was complete until January 2010.

#### Results

The prognosis for indolent B-cell NHL survivors improved slightly with each additional year survived. For patients with aggressive NHL conditional 5-year survival improved largely in the first 2 year after diagnosis. Afterwards, the improvement in prognosis for aggressive B-cell NHL patients leveled off, but remained larger than for indolent B-cell NHL patients. Initial differences in relative survival at diagnosis between stage groups became smaller with increasing number of years survived. Age remained a prognostic factor, also after prolonged follow-up.

#### Conclusion

Quantitative insight into conditional survival for cancer patients is useful for caregivers to help plan optimal cancer surveillance and inform patients about their prognosis. Long lasting excess mortality for indolent and aggressive B-cell NHL patients indicates the need for additional care long after their diagnosis and a subsequent impact.

### Recent changes in population-based breast cancer survival in Estonia H19

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#### Background

According to international comparisons (EUROCORE, EUNICE Survival), breast cancer (BC) survival in Estonia is still relatively low compared to wealthier countries. This study examined trends in stage distribution and overall and stage-specific survival to identify areas of concern in BC management.

#### Methods

Estonian Cancer Registry data for women diagnosed with invasive BC in 1995–2007 was used to estimate relative survival with period analysis method for periods 2000–2004 and 2005–2009.

#### Results

Among 7424 cases, a shift towards earlier diagnosis was observed, resulting in the following stage distribution among cases diagnosed in 2005–2007: stage I 26% (15% in 1995–1999), stage II 41% (40%), stage III 24% (28%), stage IV 8% (12%), unknown stage 2% (5%). Overall 5-year relative survival increased from 69% for the period 2000–2004 to 76% for 2005–2009; respective stage-specific changes were as follows: stage I from 98% to 100%, stage II from 82% to 87%, stage III from 51% to 54%, stage IV from 7% to 12%.

#### Conclusions

The rise in overall survival mainly results from increased proportion of early BC, as only modest improvement has been achieved for stage II and III BC, suggesting less than optimal management of node-positive and locally advanced cases in Estonia.

### Do women have better cancer survival compared to men? National Registry Data, Korea, 2005–2009 H20

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#### Background

Gender differences have been observed in the prognosis of cancer patients with some cancers. We investigate whether women have better survival than do men for solid cancer sites in Korea.



## Methods

We analyzed data from the Korea National Cancer Incidence Database on 599,288 adult patients diagnosed with solid cancers between 2005 and 2009. Patients were followed up to December 2010, and 5-year relative survival rates were calculated. We applied a relative excess risk (RER) model adjusting for year of follow-up, age at diagnosis, and stage at diagnosis.

## Results

For all solid cancer sites combined, women had a significant 11% lower RER of death than did men (RER 0.89, 95% CI 0.88–0.90) after adjusting year of follow-up, age, stage, and case mix. For the following sites, female patients have a better prognosis: head and neck 0.64, esophagus 0.83, liver 0.95, lung 0.73, melanoma of skin 0.73, brain and CNS 0.79, thyroid 0.54. On the contrary, for colorectal 1.08, larynx 1.03, kidney 1.10, bladder 1.24, female patients have a worse prognosis than male patients. However, RERs for women were increased with increasing age, female patients had a 3% higher RER of death over men among old ages.

## Conclusions

Female cancer patients have a better progress than do men for most solid cancer sites, as well as all solid cancer combined, after adjusting for age and staging. A detailed investigation of gender aspects could lead to improvement in treatment.

## Trends of major cancer relative survival rates by age groups at 1993–2009, in Korea H21

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## Background

In the recent period (2005–2009), most of the major cancer survival rate has improved than earlier period (1993–1995) in Korea. But the 5-year relative survival rates (5-RSR) and their trends are different by age groups and cancer. This study is aimed to compare survival over time by age groups and cancer sites in Korea.

## Methods

Using the Korea National Cancer Database, we analyzed 1,804,388 cancer patients diagnosed from 1993 to 2009. The vital status was followed through 31 December 2010. The 5-RSR was calculated using the Ederer II method, and compared across cancer site, age groups and period of diagnosis.

## Results

The 5-RSR for all sites combined are 77.4% in aged 15–54, 63.7% in aged 55–64, 51.8% in aged 65–74, and 34.4% in 75 years and over among patients who were diagnosed from 2005–2009. When compared with earlier period (1993–1995), the 5-RSR of all sites increased 24.7% in aged 15–54, 26.0% in aged 55–64, 21.7% in aged 65–74, and 9.8% in 75 years and over. The 5-RSR of stomach, colon and rectum, liver, lung, cervix uteri and prostate cancer increased at a lower rate in 75 years and over.

## Conclusions

A significant survival improvement was observed from 1993–1995 to 2005–2009 for all cancer sites combined and most cancer sites. However, survival increased at a lower rate in the elderly (75 years and over), so that the gap among age gaps widened, particularly for liver, and lung cancer.

## Obesity as prognostic factor on survival after breast cancer: results from a population-based study H22

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## Background

Obesity at the time of diagnosis is thought to be a prognostic factor in women with breast cancer in some but not all studies. Proposed mechanisms are more advanced stages at diagnosis due to delayed detection or more aggressive disease or a higher likelihood of treatment failure due to under-treatment or inferior treatment efficiency.

## Methods

Women diagnosed with breast cancer between 2003 and 2005 were drawn at random from two epidemiological cancer registries (Basel, urich) and followed-up to 2008. Additional information on socio-demographic details, tumour characteristics, diagnostic methods and treatment procedures were abstracted. We analysed associations between Body Mass Index and different covariates, calculated relative survival rates and modelled excess mortality for obesity using poisson regression. Biases through missing information were investigated using Multiple Imputation with Chained Equations.

## Results

Obese women compared with non-obese presented tumours with significantly higher stage, expression of progesteron and Her-2 receptors. There was no difference in age, estrogen receptor expression or treatments received. Obesity remained to be a prognostic factor for survival with marginal significance even after adjusting for patient age and tumour stage.

## Conclusions

There is evidence of effect modification via interaction of obesity status with stratification factor stage. This would suggest that obesity also acts as an independent etiological factor.



### 5-year survival by stage report of women with breast cancer of Bucaramanga, Colombia

H23

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#### Background

Although in the metropolitan area of Bucaramanga (AMB) breast cancer is a public health problem, the distribution of clinical stage, survival and its determinants had not been known.

#### Methods

We determined survival rates at 5 years and the association with clinical stage at diagnosis (TNM, AJCC). We studied a retrospective cohort of 719 closed incident cases of the Cancer Registry of the Metropolitan Area of Bucaramanga (RPC-AMB) between 2001 and 2004. We estimated the survival and its association with clinical stage using Cox regression model, adjusting for prognostic factors (clinical, histopathological and therapeutic) and stratified by social security scheme.

#### Results

The case fatality rate was 7.0 / 1,000 person-month follow up (95% CI 6.1 to 7.9). The 5-year cumulative survival estimates were 66.8%, 84.2% early stages, advanced metastatic 64.8% and 17.6%. In the stratified Cox model, we found out significant association with clinical stage (advanced vs HR. Early = 1.93) (95% CI 1.24 to 3.01), (metastatic vs HR. Early = 9.05) 95% (5.65 to 14.49) and time of the initiation of treatment (HR 61-90 days versus 30 days = 0.59) 95% (from 0.40 to 0.87)

#### Conclusions

The survival of breast cancer in AMB is independently associated with clinical stage at diagnosis and time of initiation of therapeutic modalities

### Inequalities in Female Breast Cancer Survival: a study using the Population-Based Cancer Registry of São Paulo, Brazil

H24

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#### Background

The literature shows that cancer survival may be influenced by socioeconomic factors. Some studies suggest that the coverage by private health plans is a mediator in the correlation between socioeconomic status, late diagnosis and survival, and may be a cause of inequalities in incidence, mortality and survival of breast cancer. But the results are controversial and some studies found no differences in survival rates even when the stage is controlled.

#### Methods

This is a retrospective longitudinal study, with analysis of the 5-year survival of women diagnosed with breast cancer, living in São Paulo city, Brazil. The research used vital statistics data from the Mortality Information System (SIM-SP), the Population-Based Cancer Registry of São Paulo (RCBP/FSP/USP) and the administrative data from the National Information System of Private Health Plans (SIB/ANS/MS). Kaplan-Meier method was used for data analysis and the results pointed out significant associations survival rates and socioeconomic factors.

#### Results

The comparison of survival curves between women covered and not covered by private health insurance have shown that patients without insurance coverage presented a survival rate of 89.1% while among patients with health insurance the estimated survival was 80,6%.

#### Conclusions

These findings highlight the need for additional studies to assess new variables in the analyses.

### Survival of lung cancer patients in Nagasaki, Japan: an analysis of population-based cancer registry

H25

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#### Background

Lung cancer is a heterogeneous tumor, leading to the difference in the survival of patients. This study was designed to examine whether the survival may vary with age, sex, and histologic type.

#### Methods

Data of 15,488 patients with lung cancer diagnosed between 1985 and 2005 with follow-up through 2010 were analyzed from the Nagasaki Prefectural Cancer Registry. The 10-year relative survival rate was calculated according to sex, age, and major histologic subtype.

#### Results

The 10-year survival was most favorable in females with adenocarcinoma (31.3%), followed by males with adenocarcinoma (19.8%) and those with squamous cell carcinoma (18.1% for males, 17.5% for females). The age-specific survival of patients with adenocarcinoma was most favorable in patients aged 50-59 years (30.2% for males, 40.0% for females) and decreased with advancing age. In contrast, the survival of younger patients < 50 years old was less favorable (23.3% for males, 28.6% for females), compared with those aged 50-59 years.

## Conclusions

Our findings suggest that survival of lung cancer patients varies with age, sex, and histologic subtype. The survival of younger patients <50 years is less favorable, and novel diagnostic and therapeutic strategies may be needed.

## Oropharyngeal cancer survival: a population-based study of patients diagnosed between 1978 and 2002 in Zaragoza-Spain

H26

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## Background

Oropharyngeal cancer represents approximately 2% of all incident cancer cases worldwide. This article aims at studying oropharyngeal cancer survival from the Population-Based Cancer Registry of Zaragoza, Spain, for the 1978–2002. Cancer survival analysis from population-based data constitutes a valuable tool for the evaluation of welfare services offered and allows for the orientation towards diagnose and treatment strategies.

## Methods

The survival rates were calculated by the Kaplan-Meier method, and the automated calculation method of the Catalan Institute of Oncology was utilized to obtain the relative survival.

## Results

The oropharyngeal cancer survival rate was 61.3% in the first year and 33.9% in the fifth year. One-year relative survival was 62.2% (CI 95%: 57.4–67.4) and five-year relative survival was 36.6% (CI 95%: 31.8–42.1). Comparison of survival rates by sex revealed statistically-significant differences ( $p$  value = 0.017) with better survival in women. There were no differences when comparing the three age groups and the three studied time periods 1978–1986, 1987–1994, and 1995–2002.

## Conclusions

The data presented herein suggest that Zaragoza presents survival rates similar to other Spanish registries already published. Nevertheless, no statistically significant changes have been identified when dividing and comparing the total study period of 25 years in three study periods.

## Characteristics of the prognosis of the patient with multiple primary cancer

H27

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## Background

The number of patients developing multiple primary cancer (MPC) has increased, however, the prognoses of these patients have not been closely discussed. The purpose of this study is to investigate the effect of MPC on the prognosis.

## Methods

Subjects were the patients diagnosed as developing major cancer and registered in Nagasaki Cancer Registry. Single primary cancer (SPC) patient was defined as developing only one cancer, and first primary cancer (FPC) patient was defined as developing second or more cancers between 15 years after the first cancer diagnosis. We investigated the characteristics of these patients with calculating the survival rates.

## Results

For stomach cancer, MPC seemed more likely to affect males (FPC: male 14.6%, female 9.2%;  $P < .001$ ). FPC patients were younger (SPC 65.1, FPC 64.0;  $P < .001$ ) and observed more in local stage (SPC 33.3%, FPC 59.0%;  $P < .001$ ). The 15-year observed survival rate for FPC was higher (SPC 30.3%, FPC 40.0%;  $P < .001$ ). The relative survival for SPC became stable while that for FPC kept decreasing. The similar results were observed in lung, liver and colon.

## Conclusions

The results presented the different prognosis between SPC and FPC. For the further discussion, more detailed information on the patient with MPC would be needed.

### Who dies from melanoma? A population-based study of Irish patients

H28

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#### Background

Incidence of melanoma of the skin tends to be higher among patients from more affluent backgrounds, but survival from melanoma also tends to be higher in that group (and among women). Other demographic or geographic differences might also be expected.

#### Objectives

To assess disparities in cause-specific survival for melanoma patients diagnosed in Ireland during 1994–2008.

#### Methods

Descriptive statistics on incidence, stage and survival are presented, and survival variations are assessed by Cox modelling.

#### Results

Invasive melanoma incidence was c40% lower in the most deprived compared with the least deprived population stratum. In situ melanomas were less frequent proportionately in the most deprived compared to the least deprived group (29% v 32%), likewise stage I melanomas (42% v 47% of invasive cases). Five-year survival from invasive melanoma averaged 81% for the most deprived compared with 86% for the least deprived group overall (age-/sex-adjusted hazard ratio 1.33, 95% CI 1.11–1.58); in men, 71% v 79% (HR 1.47, CI 1.16–1.84); in women, 88% v 90% (HR 1.17, CI 0.89–1.52). Deprivation-related disparities in survival appeared to improve over the study period, and appeared less marked for women. Significant disparities remained for the most deprived group after adjustment for stage, overall (HR 1.22, CI 1.01–1.45) and in men (HR 1.35, 1.06–1.72).

#### Conclusions

Unexplained disparities seen in this analysis suggest the possible involvement of other prognostic, lifestyle or treatment-related factors, not all of which may be available in routine cancer registry data.

### Influence of deprivation on breast cancer survival in Ireland

H29

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#### Background

Socio-economic disparities in survival from invasive breast cancer have been reported widely. Screening and early detection may reduce some of these disparities, but may exacerbate them if screening uptake is variable. Co-morbidities can also impact survival, and are likely to be more prevalent in women from deprived backgrounds. Lifestyle factors are also distributed unequally, and there may also be inequalities in treatment.

#### Methods

The present study is the first to analyse socioeconomic influences on survival from breast cancer in Ireland. For women diagnosed during 1999–2008, cause-specific survival and patient, tumour and treatment factors are compared between five area-based deprivation strata. The influence of these factors on deprivation-related survival is assessed by Cox modelling.

#### Results

Cause-specific survival to five years during averaged 80% (age-standardized) in the least deprived group and 75% in the most deprived group, with similar disparities seen across all age-groups. Patients from the most deprived stratum (5) had an age-adjusted mortality risk (within five years of diagnosis) 35% higher than the least deprived stratum (1), or 22% higher than strata 1–4 combined. Marked deprivation-related patterns were also seen in a range of patient and tumour characteristics and in treatment, but only about half of the excess mortality risk associated with deprivation could be explained from available data on these factors, including co-morbidity.

#### Conclusions

The remainder of the disparity cannot currently be explained, but may relate to aspects of treatment, co-morbidity or other factors not fully captured by the cancer registry and hospital in-patient datasets available for this analysis.

## Theme I: Survival methods

### Lifetable net survival using cohort and period approach

I1

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#### Background

A new method has been proposed by Pohar Perme and coll. for estimating net survival (NS). The first author made available a R function using the survival time on a continuous scale. A lifetable approach computing NS has been developed.

#### Methods

Brain, breast, colorectal, lung, prostate and thyroid cancer cases diagnosed from 1990 to 1992 were selected from the AIRTUM database. NS up to 15 years from diagnosis was estimated with the lifetable approach and the R function (cohort analysis). The lifetable approach was also employed to estimate NS according to the period analysis. Cancer cases diagnosed from 1990 to 2007 were selected. Time at risk was left truncated at the start of the 2005 and right censored at the end of 2007.

#### Results

Time-continuous and lifetable 15years-NS estimates were in good agreement: brain 0.1085, 0.1091; breast 0.6159, 0.6157; colon rectum 0.4105, 0.4101; lung 0.0544, 0.0544; prostate 0.3813, 0.3817; thyroid 0.7205, 0.7207. The corresponding period 15-years NS estimates were: 0.1098, 0.6998, 0.5252, 0.0672, 0.5890 and 0.8962.

#### Conclusions

Lifetable approach produces reliable NS estimates. More up-to-date longterm NS estimates can be obtained through the period analysis by applying the lifetable approach to a more recent time window.

### Comparison of approaches for estimating fraction cured from cancer – practical advice for users

I2

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#### Background

Cure models are survival models which allow for a fraction cured in the study population. In this study, we comprehensively compare four different approaches for estimating the fraction cured and provide practical advice on the use of these approaches.

#### Methods

We compared methods implemented using CANSURV software, and methods described by Verdecchia et al (Int J Cancer 1998), De Angelis et al (Stat Med 1999), Andersson et al (BMC Med Res Methodol 2011). We illustrated these approaches using data for colon, breast and ovarian cancers from SEER cancer registries. Four age-specific estimates of the fraction cured were computed using each of these approaches and compared. The model fit was examined using graphical and statistical methods.

#### Results

For colon and ovarian cancer, age-specific estimates from these approaches were broadly similar, except for those aged 80-84 years, where the results from different approaches were more variable. Comparison to the standard life table estimates indicated that Andersson's approach fit the data for this age group relatively better than the others. Although there was no graphical evidence suggesting cure for breast cancer, all approaches produced an estimate of the fraction cured.

#### Conclusions

There is no gold standard for estimating the fraction cured in the population. We recommend that, no matter which approach is used, the assumption of cure and model fit should always be assessed graphically. In this regard, Andersson's approach seemed to be a better choice as it produced closer estimates to the observed data when the others gave biased estimates.



## Theme J: Linkage to other data sources

### Data exchange between a Cancer Centre and the Belgian Cancer Registry: a single institution experience

J1

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#### Background

The use of complete quality data is essential for hospital and population-based cancer registries. To achieve this goal a cooperation between the Belgian (BCR) and a hospital based cancer registry (HBCR) was set up. A pilot study was conducted to exchange dates of death between the HBCR and the BCR and to analyze the data quality and completeness delivered by the HBCR.

#### Methods

For the exchange of dates of death new head and neck cancer patients (2005–2006) were included. For the analysis of the data quality and completeness all new invasive or in situ cancers of respectively 2006 and 2005 were included.

#### Results

The HBCR could be supplemented with 23 dates of death (42%). We reported no important underregistration of cancer incidences. We found some conflicting (e.g. base of diagnosis and histological diagnosis in 2.8% of cases) and few missing data (e.g. base of diagnosis in 1.7% of cases). The delivering of TNM-data was good except for melanoma (61% missing).

#### Conclusions

Cooperation gives an added value for both registries. The HBCR could be complemented with data from the BCR. Analysis of the data completeness and accuracy can induce an improvement by providing a focus on data quality.

### Challenges and opportunities presented by data linkage, experiences from Ireland

J2

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#### Background

Over the last decade, the National Cancer Registry, Ireland (NCR) has linked cancer registrations data to other large administrative datasets. Based on this experience we discuss challenges and opportunities presented by data linkage.

#### Methods

Using probabilistic matching techniques, we linked three large administrative datasets to registrations: death certificates from the Central Statistics Office (CSO); hospital in-patient episodes (HIPE) provided by the Economic and Social Research Institute (ESRI); and primary care prescriptions provided by the Primary Care Reimbursement System (PCRS).

#### Results

There are considerable data management and methodological challenges in handling and linking these complex datasets, exacerbated by the lack of unique patient identifiers. Linkage to death certificates provides date and cause of death, and helps identify potentially missed registrations. Linkage to hospital episodes can: identify missed registrations; validate registry data; augment registry-collected treatment data; provide measures of patient comorbidity; and enables research on healthcare utilization and long-term treatment complications. Linkage to prescribing data provides detailed information on hormonal therapies and enables research into adherence to these therapies. It also facilitates studies of the role of pharmacological agents in cancer development and progression.

#### Conclusions

While data linkage can enhance cancer registration, and adds significant value in terms of research, it is a complex process with many challenges.

## Identifying cancer cases from an epidemiological cancer registry in a cohort of patients from a disease management programme diabetes type II

J3

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### Background

We report on a study linking data from the disease management program for patients with diabetes mellitus type 2 (DMP-DM2) with the database of the Epidemiological Cancer Registry North Rhine-Westphalia (EKR) to investigate time course of cancer occurrence in this cohort.

### Methods

Personal identifying variables of the DMP records were encrypted in a two-stage process, sent electronically to the EKR and subsequently submitted to a probabilistic record linkage. The study included 51,297 participants, who were between 40 and 79 years of age when enrolled to the DMP-DM2 between June 2003 to July 2008. The median follow-up time was 2.65 years (IQR 1.5–6.8 years). We calculated standardized incidence ratios (SIR) based on the average age-sex-specific cancer incidence rates of the source population in the period 2003–2009.

### Results

The processing time of the semi-automatic record linkage procedure took about 24 hours; approximately two percent of the records had to be reviewed manually. There were 1,411 incident cancer cases among men (18.1 per 1,000 person-years) and 1,103 in women (12.9 per 1,000 py). The SIR for the occurrence of any cancer was 1.12 [99%CI 0.96–1.28] in the first 6 months after DMP enrolment, 1.17 [1.03–1.34] between 6 and 12 months, and 1.10 [1.03–1.17] thereafter.

### Conclusions

The encrypted DMP-DM2 records were linked to cancer registry data with high efficiency. Linked records were instantly usable for epidemiologic analyses. The results are compatible with other reports and will be used for detailed analyses of the potential impact of anti-diabetic medication use on cancer incidence.

## Aspirin use and nodal status in women with a diagnosis of Stage I-III breast cancer (BC)

J4

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### Background

Cyclooxygenase-2 (COX-2) expression is associated with lymph node positivity in breast cancer. This study examines the association between aspirin (a COX-2 inhibitor) exposure prior to BC diagnosis and nodal involvement.

### Methods

Linked National Cancer Registry, Ireland and prescription refill data were used to identify women with incident stage I-III BC (2001–2006). Aspirin use in the 365 days pre-diagnosis was identified and categorized into quartiles by exposure level. Odds ratios (OR) with 95% confidence intervals (CI) for aspirin use and (i) N0 disease; (ii) N1 disease (iii) N1/2/3 disease at diagnosis were estimated adjusted for age, tumor size, grade, ER, PR and HER-2 status.

### Results

4,212 women with stage I-III BC were identified of whom 1,086 (25.8%) used aspirin in the year prior to diagnosis. Aspirin exposure was associated with significantly increased odds of an N0 tumor (OR 1.27 95%CI 1.09, 1.48) and significantly decreased odds of an N1 or N1/2/3 tumor. Women taking aspirin for >95% of the year prior to diagnosis had the highest odds of an N0 tumor (OR 1.50 95%CI 1.14, 1.97). There was no difference in the odds of an N0 tumor for women taking aspirin for <40% of the prior year (OR 1.01 95%CI 0.78, 1.31).

### Conclusions

Aspirin use was associated, in an exposure dependent manner, with node negative status at breast cancer diagnosis.

### Population-Based Cancer Registries and Biobanks: Infrastructures for cancer research

J5

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#### Background

Population-based cancer registries (PBCR) are involved in cancer case ascertainment for descriptive purposes on cancer burden. The collection of clinical data is becoming emergent. The European Biobank Network, i.e. TuBaFrost and BBMRI, is promoting PBCR-biobank linkage.

#### Methods

The current status and future perspectives of PBCRs and biobanks are revised.

#### Results

To achieve a PBCR-biobank linkage several prerequisites have to be accomplished: existence of large-scale biobanks with well-established Good Biobanking practices, quality-assured PBCR in the same geographical area, compliance to linkages, such as personal identifiers linkable between each other, and ethical aspects. Once linked, data quality control will be essential. An example is the IARC Biobank, which contains the largest sample storage collection from research projects, such as the European Prospective Investigation into Cancer and Nutrition (EPIC) study (over 370.000 samples). This data is linked to PBCRs participating in EPIC, and it is now planned to extend this linkage to tumor tissue biobanks.

#### Conclusions

Linking PBCRs to biobanks will support clinical and etiological cancer research, with applications on the identification of molecular and genetic markers associated with cancer risk and treatment. An important task will be to explain why PBCRs-biobanks are needed to the public, politicians and others concerned with cancer research.

### Factors associated with early cancer death: will earlier diagnosis make for a better prognosis?

J6

Conan Donnelly, Finian Bannon, Anna Gavin  
Northern Ireland Cancer Registry

#### Background

Internationally, survival from lung and colorectal cancer in the UK is relatively poor (Coleman et al, 2011) with the greatest excess risk of mortality occurring in the first month for colorectal cancer (Morris et al, 2011) and in the first three months for lung cancer (Holmberg et al 2010). This study investigates factors associated with early death after diagnosis of lung and colorectal cancer to determine the importance of late diagnosis and fitness for surgery.

#### Methods

Data were collected on patient, clinical, service and disease factors through retrospective secondary care note review of patients diagnosed with lung and colorectal cancer in 1996, 2001 and 2006. Univariate and multivariate methods were used to identify factors associated with early death.

#### Results

There were 8,151 patients included in the study. 34% of lung cancer patients and 12% of colorectal cancer patients died within 2 months of their diagnosis. Results of univariate analysis showed that age, marital status, stage, tumour grade and a range of co-morbidities were associated with early death in both sites.

#### Conclusions

This research can inform the policy response to early death in cancer.

*Northern Ireland Cancer Registry is funded by the Public Health Agency*

### Aspirin exposure and prostate cancer outcomes: a population-based study in Irish men

J7

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#### Background

Recent meta-analysis has reported significant associations between prolonged aspirin exposure and reduced cancer mortality. Associations between aspirin exposure and mortality are assessed in this cohort study of men with localised prostate cancer (PC).

#### Methods

Men aged 50-80 years, diagnosed with stage I-III PC from 2001-2006 were identified from National Cancer Registry, Ireland records linked to community prescribing data. Aspirin prescription in the 90 days prior to diagnosis was identified as exposed and categorised (high/low) by the median proportion of days covered. Cox proportional hazards models were used to estimate hazard ratios (HR) for all-cause (ACM) and PC-specific mortality (PCM) adjusting for age, comorbidity, tumour stage, Gleason score, presentation and statin exposure. Effect modification by tumour characteristics associated with elevated COX-2 expression was assessed.

#### Results

2,736 men with stage I-III PC were identified (median follow-up 2.9 years), 976 (35.7%) of whom were exposed to aspirin. Any aspirin exposure was associated with a non-significant reduction in ACM (HR=0.90, 95%CI 0.73-1.10) and PCM (HR=0.74, 95%CI 0.52-1.07). High aspirin exposure was associated with a significantly lower risk of PCM (HR=0.58, 95%CI 0.35-0.96), but not ACM. Effect modification by tumour characteristics was suggested.

## Conclusions

High exposure to aspirin appears to be associated with reduced risk of PC-specific death.

## Aspirin use and mortality in women with stage I-III breast cancer: A population-based study

J8

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## Background

Recent observational studies have associated aspirin use with large reductions in breast cancer (BC) mortality.

## Methods

Linked National Cancer Registry, Ireland and prescription refill data were used to identify women aged 50–80 with incident stage I–III BC (2001–2006). Aspirin use was defined as high or low by the median number of aspirin days' supply in the 90 days pre-diagnosis. Hazard ratios (HR) with 95% confidence intervals (CI) for aspirin use and (i) all-cause and (ii) BC-specific mortality were estimated using Cox proportional hazards models adjusted for age, stage, grade, ER, PR, HER-2 status, comorbidity and other drug exposures. Analyses were stratified by tumor characteristics.

## Results

2714 women with stage I–III BC were identified (median follow-up=3.3 years), of whom 642 (23.7%) used aspirin in the 90 days pre diagnosis. Women with any aspirin use had a non-significant reduction in all-cause (HR=0.85 95%CI 0.68, 1.06) and BC-specific (HR=0.86 95%CI 0.65, 1.15) mortality, compared to aspirin unexposed women. High aspirin exposure was associated with a significant reduction in all-cause (HR=0.70 95%CI 0.51, 0.95) and BC-specific (HR=0.63 95%CI 0.42, 0.96) mortality. No reduction was observed for low aspirin exposure. The benefits of aspirin exposure were greater in early stage, node negative disease.

## Conclusions

Only high aspirin exposure was associated with a significant reduction in all cause and BC-specific mortality.

## Hormonal therapy compliance and early recurrence in women with stage I-III breast cancer: a nested case-control study

J9

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## Background

Little is known about the effects of hormonal therapy compliance on recurrence in women with breast cancer. This study aimed to (i) describe hormonal therapy compliance in women with stage I–III breast cancer; (ii) investigate associations between compliance and risk of recurrence in this population.

## Methods

Women with stage I–III breast cancer at presentation (2002–2006) were identified from the National Cancer Registry, Ireland. Hormonal therapy compliance was measured using linked prescription refill data and categorized into quartiles. Women with a breast cancer recurrence within 3 years of hormonal therapy initiation were matched to controls (1:4) using risk set sampling. Adjusted rate-ratios (RR) with 95% confidence intervals (CI) for compliance and recurrence were estimated by conditional logistic regression.

## Results

A cohort of 1,673 women with stage I–III BC were identified, 75 of whom recurred and were matched to 300 controls. Mean hormonal therapy compliance rates in cases and controls were 82.4% and 88.3% respectively. Compared to the lowest compliance quartile adjusted recurrence rate-ratios were RR=0.53 (95%CI 0.26, 1.07), RR=0.49 (95%CI 0.23, 1.03) and RR=0.39 (95%CI 0.19, 0.82) respectively for increasing quartiles of compliance.

## Conclusions

These results suggest that low hormonal therapy compliance is associated with an increased risk of recurrence in women with breast cancer.



### Suicides among Lithuanian cancer patients 2001–2008

J10

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#### Background

A number of cancer registry-based studies have reported an increased risk of suicide among cancer patients. The objective of this study was to determine the suicide risk among cancer patients in Lithuania.

#### Methods

The risk was examined in a cohort of 116 684 persons diagnosed with cancer in 2001–2008. The mortality codes for suicide were considered (X60–X84). Standardized mortality ratios (SMR) were calculated using the suicide rates of the population of Lithuania as a reference. During follow-up between 2001 and 2008, 191 suicides occurred in the cohort (245615.89 person-years).

#### Results

An increased suicide risk was found for both sexes (SMR=1.68; 95% Confidence Interval (CI) 1.46–1.94). The similar risk of suicide was found for men (SMR=1.60; 95% CI 1.33–1.83) and for women (SMR=1.54; 95% CI 1.10–2.11). The highest risk of suicide was found 3 months following their diagnosis (SMR=4.10; 95% CI 2.97–5.41).

#### Conclusions

This study provides further evidence that cancer is a risk factor for suicide in both sexes, especially shortly after diagnosis.

### Effects of metformin and sulfonylureas on overall and colorectal cancer specific mortality

J11

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#### Background

Preclinical studies suggest a role for metformin in colorectal cancer (CRC) treatment. Associations between metformin exposure and mortality are assessed in this population-based study.

#### Methods

National Cancer Registry, Ireland records linked to prescription claims data were used to identify stage I–IV CRC patients diagnosed 2001–2006. Exposure was classified by receipt of a prescription for metformin +/- a sulfonylurea (MET) or a sulfonylurea alone (SUL) in the 90 days pre-diagnosis. Cox proportional hazards models were used to estimate hazard ratios for mortality in MET vs SUL groups, adjusted for age, sex, stage, grade, site, comorbidities, diagnosis year, and insulin/aspirin/statin exposure.

#### Results

5,617 stage I–IV CRC patients were identified; 369 received metformin and/or sulfonylureas (MET: n=257; SUL: n=112). Metformin was associated with 28% lower all-cause mortality (HR 0.72, 95%CI 0.53–0.98) and a non-significant 24% reduction in CRC-specific mortality (HR 0.76, 95%CI 0.52–1.13). In analyses stratified by tumour site, metformin was associated with 34% lower all-cause mortality for colon cancer (HR 0.66, 95%CI 0.46–0.95). No association was observed for rectal cancer. Associations between metformin and reduced mortality were stronger for early stage (I/II) disease.

#### Conclusions

Metformin exposure was associated with significantly reduced mortality in diabetic patients, particularly in colon/early stage cancer.

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The threat to human and economic development posed by the growing burden of cancer in low- and middle-income countries is widely recognized. Despite this situation, there remains a notable lack of high-quality population-based cancer registries.

The **Global Initiative for Cancer Registry Development in Low- and Middle-Income Countries (GICR)** convened by the International Agency for Research on Cancer and backed by several international organizations aims at developing the capacity to produce reliable, high-quality information on the burden of cancer so that effective policies for cancer control may be developed, implemented and evaluated.

As a cancer registration professional you are ideally placed to strengthen GICR, for example by sharing your expertise with other colleagues (coding, data analysis, reporting, etc) or twinning your registry, and effectively advocating the importance of your profession.

### JOIN GICR!

We look forward to welcoming you to our community supporting cancer registration where it's needed most

\*\*\*\*\*

Il est largement reconnu que le cancer est une menace pour le développement humain et économique des pays à ressources limitées, où cette maladie ne cesse d'augmenter. Malgré cette situation, le nombre et la qualité des registres du cancer dans la population continuent à y faire cruellement défaut.

Organisée par le Centre international de Recherche sur le Cancer (CIRC) et soutenue par plusieurs organisations internationales, l'**Initiative mondiale pour le Développement des Registres du Cancer dans les Pays à Revenus faibles et intermédiaires** (GICR en est le sigle anglais) a pour objectif de renforcer les capacités de produire des informations fiables et de qualité sur le fardeau du cancer, qui seront ensuite utilisées pour élaborer, mettre en œuvre et évaluer des politiques efficaces de lutte contre cette maladie.

En tant que professionnel du domaine de l'enregistrement du cancer, vous pouvez contribuer à cette Initiative, par exemple en partageant votre savoir avec des collègues (codage, analyse des données, élaboration de rapports, etc.) ou en jumelant votre registre, et en sensibilisant les décideurs sur l'importance de votre profession.

### REJOIGNEZ LE GICR!

Faites partie d'une communauté de professionnels qui soutiennent l'enregistrement du cancer là où il le faut

\*\*\*\*\*

Es un hecho ampliamente reconocido que el aumento de la carga del cáncer supone una amenaza al desarrollo humano y económico en países de recursos limitados. A pesar de esta situación, hay una carencia considerable de registros de cáncer de base poblacional de buena calidad.

La **Iniciativa Mundial para el Desarrollo de Registros de Cáncer en Países de Ingresos Bajos y Medios** (GICR, por sus siglas en inglés) convocada por la Agencia Internacional de Investigación sobre el Cáncer y respaldada por varias organizaciones internacionales se propone incrementar la capacidad de producir información fiable y de calidad sobre la magnitud del cáncer: de este modo se podrán desarrollar, poner en práctica y evaluar políticas eficaces para el control de esta enfermedad.

Como especialista en el tema de registros de cáncer, Ud. puede contribuir a esta Iniciativa, por ejemplo compartiendo su saber con otros colegas (codificación, análisis de datos, elaboración de informes, etc.), o hermanando su registro a otro, y sensibilizando a los responsables de tomar decisiones sobre la importancia de su trabajo.

### ¡ÚNASE A LA GICR!

Esperamos forme parte de nuestra comunidad para apoyar a los registros de cáncer donde sea más necesario

\*\*\*\*\*

More information / Plus d'informations / Más información :

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