IACR 07

CANCER REGISTRY
OF SLOVENIA

29TH ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION OF CANCER REGISTRIES

17–20 September 2007, Ljubljana, Slovenia

PROGRAMME AND BOOK OF ABSTRACTS

At the Crossroad of Tradition and new Technologies in Cancer Registration

The Role of Cancer Registries in Cancer Control

INSTITUTE
OF ONCOLOGY
LJUBLJANA

International Association
of Cancer Registries

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29TH ANNUAL MEETING
OF THE
INTERNATIONAL ASSOCIATION OF CANCER REGISTRIES

LJUBLJANA, SLOVENIA, 17–20 SEPTEMBER 2007

PROGRAMME AND BOOK OF ABSTRACTS

AT THE CROSSROAD OF TRADITION AND NEW TECHNOLOGIES IN CANCER REGISTRATION

THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL

29th Annual Meeting
of the
International Association of Cancer Registries
Ljubljana, Slovenia, 17–20 September 2007

Organised by:
Institute of Oncology Ljubljana with Cancer Registry of Slovenia,
International Association of Cancer Registries (IACR), and
Cankarjev dom, Cultural and Congress Centre, Ljubljana, Slovenia

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At the Crossroad of Tradition and New Technologies in Cancer Registration
The Role of Cancer Registries in Cancer Control

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Welcome to the 29th Annual Meeting of the IACR

Dear colleagues and friends,

We, the staff of the Cancer Registry of Slovenia and of the Institute of Oncology Ljubljana, together with all our scientific community interested in cancer epidemiology, are honoured with the opportunity to host the 29th Meeting of International Association of Cancer Registries and welcome you in Slovenian capital Ljubljana.

The topics of this meeting are not only a challenge for our future work, but also the opportunity to exchange experiences and to raise awareness of the importance and usefulness of data from cancer registries for planning and evaluating national cancer control programmes, as well as to promote cancer epidemiology and its role in public health policy among doctors, health administrators and the general public.

We have had a perfect reply to our invitation for participation. We are proud that 11 invited speakers, all eminent experts in their field, will introduce the topics of this meeting, from possibilities of automated cancer registration to all key elements of cancer control, dealt with also by the 46 oral presentations. The time limit of the meeting did not allow us to accept all abstracts for oral presentations, so 52 presentations were arranged in six groups for short presentation in poster sessions. Additional 81 posters on display bring interesting research results and reports on cancer burden in different regions of the world.

We hope that Ljubljana with its historical background and interesting architecture together with the technical facilities of the venue will provide an inspiring surrounding for a fruitful discussion on numerous interesting topics, thus assuring a successful meeting. Though there will not be a lot of free time, we hope that you will enjoy our country and that you will find the opportunity to meet and chat with your friends, if not but on social gatherings.

We have tried to do our best to make the 29th IACR Meeting a memorable professional and social event.

Maja Primic-Žakelj

Head of Epidemiology and Cancer Registry
on behalf of the Local Organising Committee

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PROGRAMME AT A GLANCE

Monday, 17 September 2007

09:00–18:00	Pre-congress course on Cancer mapping and spatial statistics in cancer epidemiology Venue: Institute of Oncology Ljubljana, Building C
09:00–18:00	IACR Executive Board Meeting Venue: Institute of Oncology Ljubljana, Building B
17:30–20:00	Registration in Cankarjev dom
20:00–22:00	Opening ceremony, introductory lecture by Peter Boyle (Director, IARC), and welcome reception in Cankarjev dom, Linhart Hall

Tuesday, 18 September 2007 – Venue: Cankarjev dom, Linhart Hall

08:00–09:00	Registration and setting-up posters
09:00–11:00	AT THE CROSSROAD OF TRADITION AND NEW TECHNOLOGIES IN CANCER REGISTRATION: The use of computerised sources of information in the registries – Part 1 *Chairpersons:* Holly Howe, Renee Otter
11:00–11:30	Coffee break – Poster viewing
11:30–13:00	AT THE CROSSROAD OF TRADITION AND NEW TECHNOLOGIES IN CANCER REGISTRATION: The use of computerised sources of information in the registries – Part 2
	Round table discussion on computerised sources of information in cancer registration *Moderators*: Hans H. Storm, Anna Gavin, Lorenzo Simonato
13:00–14:00	Lunch break
14:00–16:45	THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL Session 1: Cancer registries in the evaluation of impact of primary prevention measures *Chairpersons*: Joe Harford, Surapon Wiangnon
16:15–16:45	Coffee break – Poster viewing
16:45–18:00	THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL Session 2: Methodological aspects of cancer registration *Chairpersons*: Timo Hakulinen, Freddie Bray
19:30	Transfer to Kratochwill Tavern – bus leaves from Kongresni trg
20:00	Slovenian evening at Kratochwill Tavern

Wednesday, 19 September 2007 – Venue: Cankarjev dom, Linhart Hall

08:00–09:00	Poster viewing

09:00–10:30	THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL Session 3: Cancer registries in the evaluation of screening and early detection *Chairpersons:* Heather Bryant, Maja Primic-Žakelj
10:30–11:00	Coffee break – Poster viewing
11:00–13:00	THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL Session 3 (contd.): Cancer registries in the evaluation of screening and early detection *Chairpersons*: Lawrence von Karsa, Paola Pisani
13:00–14:00	Lunch break
14:00–17:30	THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL Session 4: Cancer registries in the evaluation of cancer care and survival *Chairpersons*: Brenda Edwards, Branko Zakotnik
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17:30–18:30	Poster sessions
20:00	Congress dinner at Grand Hotel Union

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11:00–11:45	STRATEGIES OF CANCER CONTROL *Chairpersons*: D. Max Parkin, David Forman
11:45–12:00	Posters evaluation and awards
12:00–13:30	IACR business meeting & Presentation of the 2008 conference organiser
13:30–14:00	Closing of the meeting

Friday, 21 September 2007 – Venue: Cankarjev dom, Štih Hall

08:00–16:00	Sattelite Meeting **EUROPEAN NETWORK OF CANCER REGISTRIES (ENCR) GENERAL MEETING** The current state of cancer registration in Europe and future directions

DETAILED PROGRAMME

Monday, 17 September 2007

09:00–18:00	**Pre-congress course on** **Cancer mapping and spatial statistics in cancer epidemiology** **Venue: Institute of Oncology Ljubljana, Building C**
09:00–18:00	IACR Executive Board Meeting Venue: Institute of Oncology Ljubljana, Building B
17:30–20:00	**Registration in Cankarjev dom**
20:00–22:00	**Opening ceremony, introductory lecture by Peter Boyle (Director, IARC), and welcome reception in Cankarjev dom, Linhart Hall**

Tuesday, 18 September 2007 – Venue: Cankarjev dom, Linhart Hall

08:00–09:00	**Registration and setting-up posters**	
09:00–11:00	**AT THE CROSSROAD OF TRADITION AND NEW TECHNOLOGIES IN CANCER REGISTRATION:** **The use of computerised sources of information in the registries – Part 1** *Chairpersons:* Holly Howe, Renee Otter	Page 33
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20:00	**Slovenian evening at Kratochwill Tavern**	

Wednesday, 19 September 2007 – Venue: Cankarjev dom, Linhart Hall

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09:00–10:30	**THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL** **Session 3: Cancer registries in the evaluation of screening and early detection** *Chairpersons:* Heather Bryant, Maja Primic-Žakelj	Page 63

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Wednesday, 19 September 2007

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Poster session 2: SURVIVAL AND CARE OF CANCER PATIENTS – 1

Moderator: Timo Hakulinen

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Poster session 3: SURVIVAL AND CARE OF CANCER PATIENTS – 2

Moderator: Franco Berrino

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Moderator: Eva Steliarova-Foucher

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LIST OF OTHER POSTERS

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SOCIAL PROGRAMME

Monday, 17 September 2007

Opening Ceremony with welcome reception

Time: 20:00–22:00
Location: Cankarjev dom, Linhart Hall and Foyer 2
Street: Prešernova 10
Dress: Informal
Price: Included in the registration fee for participants and accompanying persons

Tuesday, 18 September 2007

Slovenian Evening

Time: 20.00–23.00
Location: Kratochwill Tavern, BTC Ljubljana
Street: Šmartinska 152
Meeting point: Prešernova street, Cankarjev dom
Bus transfer will be organised from Cankarjev dom at 19:30
as well as back to the Congress Square (Kongresni trg) at 23:00
Dress: Informal
Price: Included in the registration fee for participants and accompanying persons

Entertaining presentations of Slovenian dances and folk-customs. Folklore dance group will entertain you as the evening continues: you will see some of the Slovenian national dances with live music, and you will be invited to participate and become a part of the show.

Friday, 19 September 2007

Congress Dinner

Time: 20:00 – 24:00
Location: Grand Hotel Union
Street: Miklošičeva 3, Ljubljana
Dress: Smart
Price: Included in the registration fee for participants and accompanying persons.

INFORMATION FOR PRESENTING AUTHORS

Oral Presentations

Technical equipment available:

- DATA projectors (DATASCOPE) for computer presentation (resolution up to 1024 x 768 pixels).
- Video projections for system VHS (PAL, NTSC), SVHS, DV (mini DV).
- Notebook or PC with Windows XP operating system and Microsoft Office 2003 (including PowerPoint).
- Speakers Corner

Please note: Slide and overhead projector *will not be* available.

The technical organiser will give you additional instructions concerning your session and the presentation of your paper in the Speakers Corner located in the Foyer 2, Congress Centre. Please make sure that your computer presentation is fully operational before your talk.
Only Power Point presentations on CD-ROM, ZIP disk and USB Memory cards will be accepted. Version MS PowerPoint 2003 is recommended.
It is the responsibility of the presenting author to test and install computer presentation at least 2 hours before the talk.

The Speaker Corner will have the same opening hours as the registration desk.

Poster Preparation

Posters must be brought to the Meeting by the presenting author and should not be mailed in advance. The dimensions should not exceed 95 cm (width) and 180 cm (height).

At the top of poster the title of the paper should be provided together with names of the authors and their affiliations, all in bold lettering of about 2.5 to 3 cm size. Artwork and lettering should be large and clear.

Participants are expected to exhibit their poster just upon arrival and place it on the board, having the same number as they had received in the confirmation letter. More detailed instructions will be displayed on the spot.

Poster Session on Wednesday, 19 September 2007

Presentations will be organised in 6 groups in Foyer 2 just before the entrance into the Linhart Hall.

Participants will present their work in front of their poster that will be arranged in designated group. There will be a moderator for each group to facilitate the discussion.

GENERAL INFORMATION

Official language

The official language of the Meeting is English. No simultaneous translation is provided.

Venue

The Meeting will be held in the Cankarjev dom, Cultural and Congress Centre, located in the very centre of Ljubljana, opposite the Slovenian Parliament, within walking distance of all major hotels, shops, restaurants and main sights of the city.

Registration and fees

Registration is required for all Meeting participants and accompanying persons. Registration for participants and accompanying persons include:

	Full fee	*Accompanying persons fee*
Meeting material	*	
Admission to all Meeting scientific sessions	*	
Coffee breaks	*	
Working lunches	*	
Welcome reception	*	*
Congress dinner	*	*
Slovenian evening	*	*

Registration and information desk

Registration and information desk, located in Foyer 2, Congress Centre Cankarjev dom, will be opened:

Monday, 17 September 2007	17:30–20:00
Tuesday, 18 September 2007	08:00–18:00
Wednesday, 19 September 19, 2007	08:00–18:00
Thursday, 20 September 2007	08:00–15:00

All information on hotel accommodation, social and tourist programme as well as general information will be available at the Registration and information desk.

Meeting identification badge

Upon registration, each participant will receive a badge. There will be no admittance to scientific sessions without the symposium badge. Invitations for social events will be collected on entry. The meeting identification badges will be also most helpful in contacts with other participants.

Refreshments

During session breaks, refreshments and lunch will be served free of charge to participants wearing registered identification badges in the 2nd Foyer, Cankarjev dom.

Meeting point/Message desk

A meeting point is located with the message board near the Registration desk.

Internet access

Internet access will be available in the 2nd Foyer.

No-smoking policy

According to the Act Amending the Restriction of the Use of Tobacco Products, which was implemented on 5th August 2007, smoking is prohibited in all closed public areas and work places.

Insurance

All participants are reminded that neither the Organising Committee nor the technical organiser Cankarjev dom, Cultural and Congress Centre, are liable for any losses, accidents, or damage to persons or private property. Participants and accompanying persons are requested to make their own arrangements in respect of health and travel insurance.

Money Exchange

From 1 January 2007 the Slovenian legal tender is Euro (€). Foreign currency may be exchanged at banks, exchange offices, travel agencies, hotels, airports and railway stations. There is a bank in the immediate vicinity of the Congress Centre.

Automatic Cash Dispensers

Automatic cash dispensers accepting Visa, Eurocard/Mastercard, American Express credit cards and Maestro Cirrus are situated at all main banks in Ljubljana and also at Ljubljana Airport.

Credit Cards

All major credit cards, such as American Express, Visa, Eurocard/Mastercard, Diners, are widely accepted in hotels, restaurants and shops.

Electricity

Electricity in Slovenia is 220V, 50Hz. Continental Europe (Schuko) plugs are used.

Important Phone Numbers

Police: 113
Fire: 112
Emergency first aid: 112
AMZS – Automobile Association of Slovenia: 1987

Public Phones

Public telephones operate on magnetic cards. Magnetic cards are sold at post offices; at newspaper kiosks and tobacco shops.

Mobile Phones

In Slovenia there are two mobile phone operators (UMTS & GSM 900/1800). More information (including the prices) can be obtained on their web sites: http://www.mobitel.si/eng/ and http://www.simobil.si/eng/.

Wi-Fi coverage

NeoWLAN is Slovenian public wireless network, compliant to IEEE 802.11b standard, also known as Wi-Fi (SSID = neo). It enables very fast and simple internet or e-mail access for Laptop and PDA users. When started, the internet browser automatically redirects to NeoWLAN entering page.

Autentification system assures a simple registration:

Mobitel GSM/UMTS and Pree-paid users can also enter their GSM number to receive SMS with a one-time password.

With NeoWLAN prepaid card, which can be bought in every Mobitel Center across Slovenia (Important: If you log in to NeoWLAN network using a 2-hour prepaid card at 12.00 a.m. for the first time, your prepaid card will expire at 2.00 p.m., irrespective of how much time you actually spent logged in to the network).

Time

European summer time, one hour ahead of Greenwich Mean Time (GMT).

Weather

The weather in Ljubljana in September is generally fair with morning temperatures around 10 degrees and afternoon high between 18 and 23 degrees. Afternoon showers or thunderstorms are not unusual but prolonged rain or cold is unlikely, though this year the beginning of September is unusually cold with maximum day temperatures about 10 to 15 degrees.

Public Transportation

Ljubljana has a good bus transportation system payable with tokens (available at a reduced price in post offices and at the Conference Registration Desk) or cash. A flat rate fare applies, regardless of the distance travelled. Also available are daily and weekly passes.

Taxis

Taxi service is available day and night. To order, dial +386 1 520 9700, +386 1 520 9701, +386 1 9702, +386 1, 0801190 or 0801117. The cost for 1 km should not exceed 1.20 EURO, the lowest being 0.80 EURO in Ljubljana city.

Shopping

Many antique shops, sales galleries, arcades, and the open-air market create the spirit of the Old Town. Normal shopping hours during the week are 9.00 to 19.00, Saturdays 9.00 to 13.00. On Sundays, there is a flea market in center city at the banks of the Ljubljanica river.

Ljubljana Tourist Information Centre – TIC

Address: Adamič-Lundrovo nabrežje 2, 1000 Ljubljana
Phone: +386 1 306 12 15
E-mail: tic@ljubljana-tourism.si
Internet: http://www.ljubljana-tourism.si

ORGANISED TRIPS

Organised trips for participants and accompanying persons

A special selection of trips has been prepared in advance for the participants and accompanying persons by the Gaia plus Travel Agency.

Advance booking has been closed on 10 September 2007. On Monday, 17 September 2007 there will be a representative from Gaia plus Travel Agency and the Registration and Information desk from 17:30 till 19:30 to accept some additional registrations for one day trips.

Pre- and post-congress trips

Postojna and Bled in one day: 17 September 2007

Eastern Slovenia in one day: 21 September 2007

Half day trips for accompanying persons:

Škofja Loka: 18 September 2007

Cerknica and Idrija: 19 September 2007

Ljubljana with National Galery: 20 September 2007

Booking and information

Gaia plus, Travel Agency
Gasilska cesta 3, 1000 LJUBLJANA, Slovenia
Phone +386-31-566-567, fax +386-1-515-28-82
URL: http://www.gaia-plus.si/en/iacr2007-leisure-activities
e-mail: gaiaplus@siol.net

Ljubljana in few words

Ljubljana, the capital of Slovenia, lies where the East and the West meet; at the foothills of the Alps, only a stone's throw from the Adriatic coast, and at the outermost edges of the Pannonian Plain. Ljubljana is big enough for one to get lost within its metropolitan pulse yet has preserved its small-town friendliness. With 300,000 inhabitants it is a medium-sized European city, but offers all the wealth of a capital. Ljubljana is the political heart of Slovenia that in 2004 became member of the European Union. It is an important European commercial, business, fair and convention centre as well as the transport, science and education centre of Slovenia.

In Ljubljana the old meets the new; and it seems that history has spent all of the settlement's five millennia preparing it to become the nation's capital. It has managed to retain traces from all periods of its rich history; from the legacy of Roman Emona; through to the Renaissance, Baroque and Art Nouveau periods characterised in the house fronts and ornate doorways of the city centre, the romantic bridges adorning the Ljubljanica river, the lopsided rooftops and a park reaching deep into the city centre. Here eastern and western cultures met; and the Italian concept of art combined with the sculptural aesthetics of Central European cathedrals.

The city owes its present appearance partly to Italian baroque and partly to Art Nouveau, which is the style of the numerous buildings erected immediately after the earthquake of 1895. In the first half of the 20th century, modern Ljubljana was shaped by the strong personal style of Joze Plecnik, a great

European architect and a local of Ljubljana. The cityscape was complemented by his modernist followers as well as by creations of the "New Wave" of acknowledged young architects. All the different facets of Ljubljana blend harmoniously into a single image.

Visitors are particularly charmed by the castle, perched on the top of a hill above Ljubljana and overlooking the picturesque old houses squeezed against the slope beneath it and facing the newer buildings on the other side of the river. The numerous bridges, amongst which the triplet Tromostovje (The Three Bridges) is particularly notable, will soon tempt you to ramble around the old streets with their small shops and inns where, in summer, you can enjoy dining in the open-air. You will be able to appreciate the pulse of the Old Town, the popular meeting place and promenade, which becomes especially lively in the evening. You might be absorbed by its flow - the citizens of Ljubljana are known for their hospitality!

To get more information about Ljubljana, visit or contact:

TIC Ljubljana Tourist Information Centre
Stritarjeva ulica, SI-1000 Ljubljana, Slovenia
Phone: +386 1 - 306 1215
Fax: +386 1 - 306 1204
E-mail: pcl.tic@ljubljana.si

ABSTRACTS

AT THE CROSSROAD OF TRADITION AND NEW TECHNOLOGIES IN CANCER REGISTRATION

The use of computerised sources of information in the registries

Invited Lecture – IL01

AUTOMATING CANCER REGISTRATION – CHALLENGES AND OPPORTUNITIES

Penberthy L

Department of Internal Medicine, Massey Cancer Center, Richmond, Virginia, USA

Cancer registration faces new challenges related to the complexity of cancer care, the limitations in personnel and financial support for registries, and in maintaining clinical utility in the current health care environment. Traditional methods of cancer surveillance and registration are based on in-hospital cancer registries using manual abstraction of paper-based records or electronic data that do not permit easy integration into the cancer registry. These methods can no longer achieve the timeliness, completeness and level of detail that are required for the cancer registry community to provide meaningful information for public health and clinical purposes. Many cancer patients are receiving their care from multiple health care settings including physician offices and stand alone facilities, which frequently are not well integrated into the manual cancer reporting network. In order to remain a viable component of the clinical care setting and provide essential information to the public health community, cancer registries must modify data collection methods and expand the scope and level of detail of the data they collect. Examples of such essential data include details on chemotherapy use, information on recurrent disease and its treatment, as well as complications of treatment. Additional data on comorbid conditions are also essential to understand the context for the delivery of cancer treatment and outcomes. The challenge is that registries must do this with ongoing budgetary and personnel constraints. One mechanism through which some of these challenges can be met is through capitalizing on the growing infrastructure for electronically communicating health care information within and across health care provider entities. There now exist a broad range of electronic data sources that provide opportunities to capture and in some instances, automate the extraction of data for cancer registration. Many of these data sources utilize standard coding systems, such as ICD-9 (10), Current Procedural Technology (CPT) codes or SNOMED Codes, which can provide detailed data to support cancer registration. These electronic data sources are commonly available in standardized formats which provide an opportunity for automated integration into the cancer abstract. Understanding the content of these electronic sources, their level of validity and availability within the health care system, and taking advantage of the most useful elements can enhance registry efficiency, timeliness and completeness without increasing the workload of registry staff or compromising the validity and integrity of the registry. One example of such a standardized electronic data source is billing information. These data are typically submitted in a standardized format, such as the UB92 (or 837 Inpatient), and include standard nomenclature such as ICD-9 or CPT codes. While designed for reimbursement of providers, there are financial penalties for incorrect coding of specific fields on which reimbursement is based. There are external audits to assure the codes are valid – such as those for chemotherapy administration – that make the data useful as a potential supplement to cancer registration. Thus, understanding when and how these data are validated can provide the registry community opportunities to utilize electronic data designed for purposes other than for cancer registration. It is essential for the cancer registry community to understand the electronic data sources available to them to enhance our ability to provide useful, timely and valid information both to the public health community, but also to the clinical community from which registries derive their data. Examples of the benefits and potential barriers to leveraging available electronic data are provided in the discussion and the presentations for this session.

Oral Presentation – OP01

AUTOMATED CANCER REGISTRATION IN NORTHERN IRELAND

Fox CR, Middleton RJ, Gavin AT

Northern Ireland Cancer Registry, Queen's University of Belfast, Belfast, Northern Ireland

Background. The Northern Ireland Cancer Registry (NICR) has been in existence since 1959. However, until 1993, the process of cancer registration relied heavily on clinicians submitting new cases of cancer via registration cards to the Department of Health. This method produced only 5000 cancer registrations annually (mainly from death certificate data) and was considered only about 70% complete. Consequently in 1994 a new cancer registry was formed, its mission to capture all cases of cancer in the N Ireland population. Coinciding with this development, new computerised information systems providing data such as hospital episode records and pathology reports were installed in all health trusts throughout N Ireland. These became the main data sources, heralding a new age of automated cancer registration in N Ireland.

Methods. To make good use of such data sources the Registry required a sophisticated computer system to amalgamate the various electronic records received for a patient into a single consolidated tumour registration. Eventually one was found which was highly flexible and customisable to suit the NICR operation. However, in order to implement a suitable solution a number of aspects needed attention. Hence much effort was expended in setting up data translation and standardisation routines, simple and cross-field validations, record linkage algorithms, data survivorship rules and quality assurance procedures in order to obtain the solution. For example, new techniques using probabilistic matching were employed to link patient records from different data sources, while automatic translations between coding schemes had to be incorporated into the system. Mechanisms to ensure data quality were also developed.

Discussion and Results. The NICR automatically processes over 120,000 notifications each year, producing around 9000 consolidated cancer registrations in a population of 1.7 million. The data sources which give rise to these registrations will be presented along with their uses. In addition, the NICR cancer registration system and process will be described along with various issues involved in the implementation of the system. Our extensive Quality Assurance programme has minimised any errors associated with the automated process to provide accurate, consistent data. The discussion will include areas such as data validation, record linkage and data survivorship. For example, in the area of record linkage, up to 90% of the notifications can be processed without human intervention and this is likely to increase as new initiatives are introduced. Such new initiatives and future plans for improvement of the registration system are outlined.

Key words: Automated cancer registration; Computerised data sources; Data validation; Data survivorship; Data quality

OP02

THE CONCEPT OF THE POLISH NATIONAL HEALTH CARE SYSTEM OSOZ

Kamiński Z[1], Mródź G[1], Zorzycki M[1], Góźdź S[2], Mężyk R[2]

[1]KAMSOFT SA, Katowice, Poland
[2]Holycross Cancer Centre, Kielce, Poland

Introduction. The Polish National Health Care System OSOZ is a comprehensive information and computer system intended to support health care management at all levels of the health care market. Health care management is supported by the achievements of medical, technical and economical cybernetics.

Aim of the study. The best possible improvement in patients' and society's health with limited financial resources for health care.

Methods. Project of Central Health Databases and applied new technology of informatics and telecommunication.

Results. Support for the development of health care methods which replace traditional remedial medicine – "in-patient treatment" whit modern and more effective preventative medicine – "out-patient treatment". The health care market in the OSOZ system is divided into 9 layers of management, grouped into 3 classes: natural, immunity, remedial medicine ("in-patient treatment") and preventative medicine ("out-patient treatment"). The National Health Model, consisting of over 200;000 mathematical equations, is the basis of management in the OSOZ system. In the OSOZ system, the Patient's State of Health is the measure of patient's health quality. The National State of Health is the measure of society's health quality. The Patient's State of Health is a multidimensional function defined in Life Space, which presents life quality numerically represented and allows the determination of the deviation of the Patient's State of Health from the National State of Health. In the OSOZ system, each Patient has an individual Health Account. The Patient's State of Health is determined on the basis of the treatment history accumulated on the Individual Health Account. The Patient's Individual Health Account may be accessed trough the health portal "demo.osoz.pl". The current monitoring and analysis of the dynamics of disease incident development are presented as National Health Map. These Maps illustrate the current dynamics of disease incident development in terms of time, age and territory.

Conclusions. Central Health Base of the OSOZ system including disease entities, health parameters of the patient, applied treatment, including medical procedures and medicines can become an effective tool serving to control and manage the medical market in Poland. Gathered health data can be made available for scientific research both on the national level, and the level of the European Union.

Key words: National health care system; Technology of informatics

OP03

HOW USE OF INFORMATION TECHNOLOGY AND ELECTRONIC DATA TRANSFER HAS LEAD TO EARLY FINALIZATION OF ANNUAL REPORT OF NATIONAL CANCER REGISTRY PROGRAMME IN INDIA

Shrivastava A[1], Nandakumar A[2], Kapoor N[1], Shrivastava S[1], Takiar R[2]

[1]*Population Based Cancer Registry, Gandhi Medical College, Bhopal, India*
[2]*Coordinating Unit National Cancer Registry Programme, Indian Council of Medical Research, Bangalore, India*

Background. Cancer registries in India have existed for last four decades. In 1982 Indian Council of Medical Research started a network of cancer registries under National Cancer Registration Programme (NCRP). There are twenty population based cancer registries under NCRP. Cancer registration in India was done through active follow-up method. Visits to the sources of registration were done to collect information in prescribed format from the medical records and by interviewing the patients/relatives. This information was scrutinized to ascertain the patient's residential status, diagnosis, date of diagnosis and completeness of data. Due to inadequate death registration system in India, information on cancer deaths was collected through house visits and regular scrutiny of the death records. This information was checked manually for various range, consistency and duplication. The data was entered on computers and sent to the coordinating unit of NCRP. At the coordinating unit the data was checked again and list of errors was sent back to the registries. Errors were rectified at the registry and sent to the coordinating unit again. Every registry used its own software for data entry resulting in different formats of data. Thus the data of all the registries was converted into a common format and was then analyzed for generation of annual reports.

Observations. Due to increasing number of cancer cases and lack of software which could perform data validation at the registries itself there was a considerable delay in submission of data. Lot of time was also lost at the coordinating unit in converting the data of various registries into a common format. Almost 36 months of time was taken for submission and correction of data and finalization of NCRP reports.

Efforts. In the year 2003 efforts were made to reduce this delay. Common software for all the registries was developed by NCRP. Thus, the software enabled a common format for all the registries and facilitated online data entry and submission of data on the website of NCRP. The software also performed consistency, range and duplication checks during the data entry. Thus the data submitted to the NCRP by all the registries was in a common format and absolutely free from errors. This enabled faster processing of data and an early finalization of the report.

Results. Use of the software and submission of data through website has reduced the time for finalization of NCRP report considerably from 36 to 18 months.

Key words: NCRP – National cancer registry programme, Information technology

OP04

"COMPUTERISED SOURCES OF REGISTRATION": A NEED FOR CANCER REGISTRATION IN INDIA

Shrivastava S[1], Shrivastava A[1], Kapoor N[1], Takiar R[2]

[1] *Population Based Cancer Registry, Gandhi Medical College, Bhopal, India*
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Cancer registries in India date back to 1963. A network of cancer registries was started under National Cancer Registration Programme (NCRP) by Indian Council of Medical Research in 1982. Today there are twenty population based cancer registries in operation under the NCRP network. As cancer is not a notifiable disease in India, cancer registration is done through active follow-up method. Regular visits are made to the sources of registration for collection of information in a prescribed form. The information is collected from the medical records and by interviewing the patients/relatives. The information collected is then scrutinized to ascertain the patient's residential status, diagnosis, date of diagnosis and completeness of data. Due to inadequate death registration system in India the information on cancer deaths has to be collected through house visits and regular scrutiny of the records of crematoriums and burial grounds. The scrutinized data is entered on the computers using software developed by NCRP. The software performs various range and consistency checks during the data entry. Finally, the data is sent to the coordinating unit of National Cancer Registration Programme. Bhopal cancer registry collects cancer information from sixty three sources. With growing population it became very difficult to visit every source regularly resulting in lack of quality mortality data and timely submission of data. The average time taken for submission of the data is 36 months. Computerised data of major cancer hospitals, burial grounds and crematoriums was used to overcome the delay in data submission. A total of fourteen major sources had their records computerised. Training on importance of cancer registration and use of computers was imparted to the staff of these sources. A modified methodology was adopted to cover these sources; the details of the patients as required by registry were entered on computers by the staff of these sources; this data was then transferred to the registry. The required information was abstracted from the transferred data. Data entry was done using the NCRP software. Monthly visits were made to these sources to rectify the errors and incomplete data. The number of visits to the individual sources reduced considerably. The time taken for data processing and submission reduced from 3 years to 2 years along with a significant improvement in mortality registration. Computerised sources of registration can bring a substantial improvement in the cancer registration system.

Key words: NCRP – National cancer registry programme; Computerised sources

OP05

ON-LINE CONNECTION BETWEEN CENTRAL REGISTER OF POPULATION AND INSTITUTE OF ONCOLOGY LJUBLJANA

Tršinar I

Citizens Registration and Public Documents Section, Ministry of the Interior, Government of the Republic of Slovenia, Slovenia

In Slovenia, the Central Register of Population (CRP) operates since 1980 with the intention to provide basic personal information to all legitimate users from one common central point, at the same time and of the same contents. Preconditions for such a goal are: personal identification number (PIN) assigned to every individual in Slovenia; its inclusion in all data collections; quality primary sources of data; well organised data flow; consensus in the society for exchange of personal information among government and public institutions. New technologies (1990, 2000) enabled the development of register orientation in Slovenia and e-government movement. Nowadays, CRP is the central point for information on physical persons either by means of classical media or electronic services. The data process is determined by acts at all levels. CRP users are responsible bodies competent for operating data bases with personal information. They can receive up-to-date basic data from the CRP: PIN, name and surrname, place of living, citizenship, vital status, family relations, etc. Apart from the big national data bases, small, individual users that operate data bases with specific cohorts are also common. Institute of Oncology Ljubljana is responsible for Cancer Registry of Slovenia (CRS) and population based cervical cancer screening programme called ZORA. Population based breast cancer screening programme (DORA) is also planned. ZORA is nationwide programme that needs accurate date of birth, current residence and vital status for all Slovenian female population in order to efficiently operate and send invitation letters. The data needs to be as up-to-date as possible. For the time being the CRP transfers information to Institute of Oncology Ljubljana separately for two registers: to ZORA monthly changes for female population on CD (all demographic events and corrections) and to CRS quarterly information for registered cancer patients four times a year. Thus, invitations, follow-up and survival analyses are enabled. In 2007, a project for modernizing exchange of data between the CRP and Institute of Oncology Ljubljana is going on. Official personal information for CRS and ZORA will be provided by daily online synchronization and computer-to-computer communication via CRP security scheme (register of users that enables safe and reliable transfer of data within anticipated services, only for legitimate purposes and registered users, and with possibility of auditing).

Key words: Central register of population; Up-to-date data; On-line exchange of information; Register orientation

OP06

CURRENT SYSTEM OF CHILDHOOD CANCER REGISTRATION IN BELARUS

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The adult cancer-registry collected information about childhood cancer cases in Belarus had definite limitations in case verification and registration according to the modern classifications and standards used in childhood oncology. That is why the Childhood Cancer Subregistry was organised by the Ministry of Health in 1999 based at the department for clinical and epidemiological study of the Belarusian (National) Research Center for Pediatric Oncology and Hematology (Minsk, Belarus). This Center (BRCPOH) is responsible for diagnosis and treatment of all types of malignant neoplasm except thyroid cancer, in the children and adolescents of Belarus (all mentioned categories of patients from the whole republic must be diagnosed there and most of them are treated at that Center). This fact makes for easier collection and verification of cases for the Childhood Cancer Subregistry. As a first step, the data base for all cancer cases in children 0–14 had been collected with the help of the Belarusian State Cancer Registry back to 1989, and verified by re-examination of slides, disease histories, death certificates etc. with participation of oncologists, haematologists and cytomorphologists from BRCPOH and the Research Institute for Oncology and Medical Radiology (Minsk, Belarus). In 2001 the official name 'Childhood Cancer Subregistry of Belarus' designated and confirmed by certificate was received (certificate #0170100025 in the state register of information resources of Belarus, in force from 12. 12. 2001). At present, the data base is being extended with leukaemia cases of children and adolescents back to 1986, with collaboration of the Research Institute of Haematology and Blood Transfusion and the Belarusian State Cancer Registry. Every cancer case is entered into the cancer registry immediately after establishment of diagnosis and coded automatically according to ICCC-3, ICD-O-3, ICD-O-2 and ICD-10. Annual verification of the database with the Belarusian State Cancer Registry is performed using codes ICD-O-2 and ICD-10 and requiring agreement between registries. The population-based Childhood Cancer Subregistry is standardized according to IARC recommendations, computerised, performs active data collection, verification and continues follow-up.

Key words: Children; Cancer registry

AT THE CROSSROAD OF TRADITION AND NEW TECHNOLOGIES IN CANCER REGISTRATION

Round table discussion on computerised sources of information in cancer registration

Invited Lecture – IL02

INTRODUCTION TO ROUND TABLE DISCUSSION ON AUTOMATED CANCER REGISTRATION

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The value of cancer registries for research purposes is obvious. The dedication and care by which data is collected, and the well developed and described quality control for cancer registries, relieve the burden of many researchers to check if the cancer data they use are unbiased and of sufficient quality to draw conclusion. Cancer registries however should also be used in relation to clinical care and for planning purposes. Whereas it may not be critical for many research projects to have timely data, it is more so needed if registries are to play a role in clinical cancer care, outcome research and planning. If cancer registries are going to play an important role in the future, combining its knowledge on population based research on risk factors, incidence and trends, predictions, prevalence and survival they need to be timely, and based on already computerised data integrated into the health care system and clinical care of the cancer patient. Increasing costs for public health will increase the demand for efficient management and rationalization, without duplication of efforts. Hence computerised systems have been set up including both the clinical data as well as the diagnostic. Cancer registries are in most places not in charge of the development of new information systems for health but a user. The question is how can we keep the definitions cancer registries have worked with for decades, and continue to have comparable datasets? And how do we quality control the computerised data and how extensive and often should it be?

In 1998 IACR hosted a series of seminars on automated data collection in Cancer Registration, and with the IARC a technical report was issued. A number of recommendations were issued. Since those days several registries have implemented less and more extensive use of computerised data sources, and thus the experience is growing, and numbers of solutions are growing.

The round table will discuss the current status and each presenter will give examples on where registries must be careful when moving towards automated electronic data capture and automation. Each presenter will give his/her view on the need for and possibility for education at the data entry site, and for joint recommendations for data entry. The 10 recommendations from the IARC technical report no 32 will be reviewed with a view to how they can be followed in a real world where the registry is not a priority for the collected data.

RECOMMENDATIONS[1]

1 Make use of the system designs, software and experience of other registries. It should not be necessary to 'reinvent the wheel'.

2 Automated registration *must* be augmented with active manual validation of data collected and summarized electronically. This should apply *at least* to possible cases with incomplete or inconsistent information from routine data sources (which is likely to exceed 30%, depending on the quality of source records and the accuracy required of the final registration data). These issues should be considered when estimating the human resources required for a new system.

3 To ensure completeness, at least three independent data sources should be used, one of which should be death certificate records and another should include the microscopic diagnoses (usually from pathology systems). A third source is usually provided by hospital discharge records.

4 Each data source should be audited before designing the automated cancer registration system, in order to attach appropriate weights to records according to the validity of each source used in the summarization procedure.

5 Linking of records pertaining to the same individual can be achieved with unique identification numbers only if these are accurate, with complete population coverage and are always present in the records to be linked. Otherwise, computerised probabilistic record linkage with at least full name, sex and date of birth is required.

6 Ensure that the registration process ends with records which comply with international standards for cancer registries, such as the *ICD-O-2* classification system. If necessary, include code conversion programmes as part of routine data processing.

7 Registries using automated methods must establish confidentiality and data security standards which are at least as effective as those in the manual systems they replace.

8 The key quality control activity of automated registries should be continuous sampling from *all* registrations (including cases which may already have been registered using traditional manual methods). Registries should also undertake separate monitoring of components of the registration system, such as the record linkage and summarization software.

9 Provide feedback to the providers of the original data used in automated registration. This improves working relationships and may allow the registry to improve the quality of the original data and influence future developments.

10 It should be recognized that the long-term development of cancer registration will probably involve a move from retrospective linkage of independent data sets towards systems which integrate clinical, health services management and epidemiological functions.

Reference

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Oral Presentation – OP07

FIRST STEPS IN THE AUTOMATION OF CANCER REGISTRATION IN THE REGION OF MURCIA – SPAIN

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Introduction. Validity of diagnostic codes of pathological reports and hospital discharge has been analyzed to know the feasibility to implement automatic process in cancer registries. More advanced steps are need to implement automate process in registries. The main issue is that the automatic process does not have to decrease the quality of data, quite the opposite, it will have to improve.

Objective. To evaluate the agreement in CIEO-2 topography codes in real cases of a population-based cancer registry coded manually and automatically.

Method. The cases have been selected from the Murcia Cancer Registry (MCR), incident period 2002–2003. The registry is implementing an automatic process to code topography and morphology of malignant tumours. In the incident period 2002–2003 cases are being coded manually (staff) and automatically (developed software). These two processes are totally independent. The main sources of information are available in electronic support. Hospital discharge are coded in ICD-9 including thirteen codes, pathological reports that are increasing their codification in SNOMED, and death certificates with mention of cancer are available in ICD-10. Haematological tumours have been excluded. Case candidate to be code automatically require at least one pathological report and codes from different sources have to be in agreement.

Results. Firstly, a select sample of 222 random cases has been code manually and automatically; 79% of cases have been correctly coded at three digits level, 10% of tumours have been coded in adjacent sites, mainly in female genital organs and colorectal cancer. Primary unknown site has been assigned manually to the 2% of cases, that automatically has been coded in different sites (lung, stomach, colon). All cases of prostate and breast have been correctly coded. Causes of disagreement are mainly due to a lack of codes accuracy in sources of information and also problems with the conversion between classifications. Any errors are due to the algorithms implemented in the software that are being reviewed.

Conclusion. A good overall agreement is observed. More effort has to be done in both cases, to add and improve rules in the algorithms and to increase the quality in diagnostic codes in hospital discharge, pathological reports and death certificates. The more accuracy sources of information, the more quality in automatic process. In the future, we expect to obtain a reduction in time to complete cancer cases with the automation of cancer registration.

Key words: Cancer; Automation; Codification; Classification

OP08

IMPROVING AUTOMATED CANCER REGISTRATION: AN EXPLORATORY USE OF PROBABILISTIC CLASSIFIERS

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Introduction. Most systems for automated registration of cancer cases allow to automatically register no more than 60% of cases. To increase this proportion, a data-mining approach has been explored, using two kind of probabilistic classifiers: random forests and multinomial logit models, both applied to cases already registered and manually checked for possible second cancers, representing 22% of subjects manually processed in the Venetian Tumour Registry (RTV).

Objectives. To test the performance of probabilistic classifiers in improving automated registration, focusing on three issues: the increase of the share of automatically defined cases, the error rate implied, the importance and role of predictive variables used.

Methods. The analysis was carried out on 5608 subjects, randomly assigned to the training set (75%) and to the test set (25%), registered as cancer cases in the period 1987–96 and manually verified because discordant diagnoses followed in 1997–1999 period. The outcome of manual checking represents the response variable, modelled in four categories: prevalent case (PREV, 54.4%); second cancer registered, corresponding to the discordant diagnosis with highest evidence (NEW1, 34%) or to another discordant diagnosis (NEW2, 4.8%); deletion or modification of previously registered cancer (MOD, 6.9%). Sixty-three predictive variables were derived from the diagnostic sources. Classifiers were fitted on the training set and the estimated probabilities of outcomes PREV and NEW1 determined for subjects in the test set: these are classified as PREV or NEW1 when the corresponding probability is no lower than a given value, to which an error rate and a percentage of subjects classified is associated. Varying the acceptance value, a series of trade-off curves were obtained, matching the error rate to the corresponding proportion of subjects classified. Predictive variables were ranked by the Wald 2 statistics, as to multilogit models, and by the mean decrease in accuracy as to random forests.

Results. Using the multinomial logit model, 5% of subjects are classified with a minimum classification error of 3.5% and 15% with a 4.5% error rate: the share of classified subjects may increase only accepting an error rate greater than 5%. Random forest classifies 13% of subjects with a minimum error rate of 2.8%, the proportion may increase to 40% with an error rate lower than 5%.

Conclusions. The random forest performance is appealing, indicating a potential drop of manual checked cases, in the category analyzed, from 1750 to 1050 per incidence year against an error rate lower than 5%.

Key words: Automated cancer registration, Probabilistic classifiers, Random forests

OP09

HOSPITAL DISCHARGE RECORDS REGISTRY AS A TOOL TO IDENTIFY CANCER INCIDENT CASES IN THE BASQUE COUNTRY

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Introduction. The Hospital Discharge Records Registry (HDRR) constitutes a source of information for the Cancer Registry. A cross sectional study has been designed to evaluate its validity for identifying incident female breast, colorectal and prostate cancer cases in the Basque Country within a Spanish collaborative study.

Methods. Case definition is the first hospital discharge record occurring in any public hospital in the Basque Country during the year 2000 coded as female breast, colorectal or prostate cancer (ICD-9 CM: 1740-9, 1530-9, 1540, 1541, 185) among area residents. Cases were identified from HDRRs. Four algorithms were developed to select cases: a) one of these codes as first diagnosis (D1), b) one of these in any of the first five diagnoses (D1-D5), c) first diagnosis and first procedure related to one of these (D1-P1) and d) any of these in any of the first five diagnoses and procedures (D1-D5P1-P5). Only one episode per patient was included and those with previous hospitalisation during 1998–1999 were excluded. Cases obtained from HDRR were compared with a probabilistic linkage with the population-based Cancer Registry of the Basque Country as a "gold standard". Sensitivity and positive predictive value have been calculated for each algorithm and cancer site.

Results. A total of 1073, 1356 and 1150 incident cases were identified in the Cancer Registry for female breast, colorectal and prostate cancer respectively in the year 2000. Algorithm (D1) identified in CMBD 782, 1144 and 372 cases, algorithm (D1-D5) 848, 1267 and 632 cases, algorithm (D1-P1) identified 679, 896 and 245 cases and algorithm (D1-D5P1-P5) 683, 913 and 250 cases. The highest proportion of prevalent cases was found in algorithm D1-D5 in each site. Best sensitivity was obtained with algorithm D1-D5 in colorectal cancer (74%) followed by female breast (59.8%) and prostate (25.7%) while the highest percentage of cases confirmed as true positives was obtained again in colorectal cancer (88.8%), when introducing procedures in the algorithm (D1P1-P5) followed by female breast (86.2%) and prostate (65.3%).

Conclusions. HDRR may identify up to 80% of cases in the Basque Country Cancer Registry mainly of colorectal and female breast cancer but not prostate cancer. Similar results obtained in some other Spanish areas may indicate the consistency of the algorithms used in this study.

Key words: Hospital discharge records registry; Validity; Sensitivity; Predictive value; Cancer registry; Female breast, colorectal, prostate cancer

OP10

EFFECTIVE USE OF ACCESS TO EXTERNAL DATA STORAGE SYSTEMS IN THE CANCER REGISTRY OF NORTH RHINE WESTPHALIA (GERMANY)

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Introduction. The Epidemiological Cancer Registry of North Rhine Westphalia (EKR NRW) started in July 2005 registration on a new legal basis. The registry covers the whole population of approximately 18 million with up to 90,000 incident cancer cases expected per year. Notifications are mandatory and have to be submitted electronically. To implement this legal specification a novel system of notification is being established to achieve completeness in an acceptable time range and with reasonable efforts. Fundamental components of this system are the existing clinical registries within the Oncological Quality Assurance (OQA) and the pathology departments which supply separate but comprehensive data bases. Currently the OQA operates only in one of two regions of NRW (Westphalia, 8.5 Mio. inhabitants).

Method. Hospitals which take part in the OQA store full documentation of their cancer cases in a central database. Out of this database relevant data on incident cases is automatically submitted to the EKR. Pathologists submit full reports as plain text out of their electronic storage system directly to the EKR. No additional documentation by pathologists is needed except for the place of residence. In the EKR, the diagnosis is extracted from each report and then coded by trained personnel. Data transfer is effected via VPN with restricted access only to physicians. As the person identifying data is encrypted twice, a probabilistic record linkage procedure is applied to update the registry's database.

Results. All 164 hospitals in the region of Westphalia are part of the OQA and submit notifications to the registry. About 70% of all pathology and dermato-pathology departments in NRW are reporting actively to the EKR. Since start of the registry in 2005, 247,347 notifications have been received, 94% from OQA and pathology department data systems and 6% from private praxis regular data systems entering individual datasets. For the year of diagnosis 2006, already 52,264 tumours have been registered up to the end of May 2007. 20.1% (n = 10.529) of the tumours were notified both by OQA and pathologists while 52.5% (n = 27,435) originated only from pathologists and 27.4% (14,300) only from OQA.

Discussion. The electronic collection of data from external storage sources is an important feature of the registration process in the EKR NRW. It ensures timeliness of registration. Staff resources are mainly required for record linkage and coding. It is expected that clinical registries within Oncological Quality Assurance will also be established soon in the other part of the state.

Key words: Data storage systems; Clinical registries; Pathology departments; Quality assurance

THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL

Session 1:

Cancer registries in the evaluation of impact of primary prevention measures

Invited Lecture – IL03

ROLE OF CANCER REGISTRIES IN EVALUATION OF POPULATION-FOCUSSED PREVENTION PROGRAMMES

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Registries play a role the evaluation of primary, secondary and tertiary prevention programs delivered at a population level. Australian examples will be used to show how a cancer registry enabled research on programs that enhanced the clinical care of patients with a variety of cancers; improved mass screening for breast cancer; and underpinned campaigns to reduce sun exposure and obesity. Principles of for designing, implementing and evaluating mass reach programs on these risk factors will be explained. The principles will be exemplified from The Cancer Council Victoria's experience with the now 'mature' SunSmart campaign and a more recent campaign to reduce overweight/obesity. The presentation will include screening of television advertisements that formed part of these campaigns.

Oral Presentation – OP11

INTERNATIONAL VARIATIONS IN AGE-INCIDENCE CURVES OF NASOPHARYNGEAL CARCINOMA: THE "FRAILTY" EFFECT AND IMPLICATIONS ON AETIOLOGY

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There are marked international differences in the risk of nasopharyngeal carcinoma, with at least a fifty-fold variation in age-adjusted incidence rates. There are a few groups with notably high-rates (age-standardised (World) rates > 5 per 100,000), among them the Cantonese-speaking populations in Southern China and Hong Kong, and the Chinese populations in Singapore and the US. Rates tend to be uniformly low (rates < 1) elsewhere, particularly among predominantly Caucasian populations. The aetiology of NPC is considered multifactorial, with known risk factors such as elevated antibody titres against Epstein-Barr virus and the consumption of salt-preserved fish likely to explain part of the variability. Migrant studies demonstrate, however, that genetic characteristics of inhabitants as well as their environment are important. Hildesheim and Levine have noted a paucity of studies examining low-risk and young populations to better understand the disease. One interesting aspect is the atypical age-incidence curve that includes a minor peak in young adults, as reported for several high-risk, but rarely in lower-risk populations. Using the available incidence data from high-quality population-based cancer registries in 19 countries, this presentation critically examines the age-incidence curves of NPC by sex, place and time, hypothesising that there exists a high degree of uniformity in the basic shape on classifying NPC risk into these two broad risk categories, and that the early peak is evident in low-risk populations. Cubic spines are applied to smooth the age-incidence curves. Frailty modelling is then used to draw the proportion of individuals susceptible from those considered "immune", and to estimate the number of genetic events necessary for NPC development at a given age. On comparing the curves and frailty proportions by sex, place and period of diagnosis, we speculate on the biological and epidemiological explanations for the findings.

Key words: Nasopharyngeal carcinoma; Susceptibility; Frailty; Aetiology; Genetics; Diet; EBV; Geographical pathology

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OP12

COFFEE AND TEA CONSUMPTION AND RISK OF HEPATOCELLULAR CARCINOMA IN ITALY

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The role of coffee in the aetiology of hepatocellular carcinoma has raised great interest. In Italy, coffee consumption is high, thus allowing the investigation of the topic over a broad range of consumption. A hospital-based case-control study was conducted in Italy in 1999–2002, including 185 incidents, histologically confirmed cases of hepatocellular carcinoma aged 43–84 years. Controls were 412 subjects admitted to the same hospitals' networks for acute, non-neoplastic diseases unrelated to diet. Coffee and tea consumption were assessed using a validated food-frequency questionnaire. Odds ratios (ORs) and corresponding the 95% confidence intervals (CI) were computed using unconditional multiple logistic regression, adjusting for hepatitis viruses seropositivity, alcohol intake, smoking habits and other potential confounding factors. Compared to people who drunk < 14 cups/week of coffee, the risk of hepatocellular carcinoma decreased for increasing levels of consumption ($OR = 0.4$, 95% $CI = 0.2–1.1$ for > 28 cups/week, p for trend $= 0.02$). In the present study, inverse relations were observed across strata of hepatitis C and B virus infections and alcohol drinking. No significant association emerged with consumption of decaffeinated coffee ($OR = 0.7$, 95% $CI = 0.2–2.5$) or tea ($OR = 1.4$, 95% $CI = 0.8–2.7$). The present study supports the hypothesis of a favourable effect of coffee, though not decaffeinated coffee and tea, on the risk on hepatocellular carcinoma.

Key words: Coffee; Tea; Hepatocellular carcinoma; Case-control study

OP13

TRENDS IN PLEURAL AND PERITONEUM MESOTHELIOMA BETWEEN MALES AND FEMALES: A DIFFERENT AETIOLOGY?

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Objective. Trends in mesothelioma have been attributed to occupational exposure to asbestos resulting in a higher incidence in pleural mesothelioma in males than in females. Peritoneal mesothelioma occurs primarily among workers with high cumulative exposure. Women rarely work in the industrial workforce such as shipyards and miners, so it is expected that the incidence of peritoneal mesothelioma would differ from the incidence in men at least to the same extent as for pleural mesothelioma. Surprisingly, in several countries the incidence of peritoneal mesotheliomas among women closely mirrors the pattern among men. The aim of this paper is to analyze trends in peritoneal mesothelioma in two countries and compare them to the trends in pleural mesotheliomas and peritoneal tumours with other histology in order to reveal whether peritoneal mesotheliomas in females is the same disease as peritoneal mesotheliomas among males.

Methods. All tumours located on the pleura (mesothelioma) or peritoneum were selected from the Swedish and Netherlands Cancer Registers for the period 1989–2003. Cases were classified into pleural mesothelioma, peritoneal mesothelioma, peritoneal adenocarcinomas and other peritoneal tumours. Trends in incidence rates were analysed in both countries, stratified by sex.

Results. Among females in both countries there was a sharp increase in peritoneal tumours caused by an increase in adenocarcinomas starting in The Netherlands around 1990 and 10 years later in Sweden. The proportion of mesotheliomas in all peritoneal cancers dropped to about 8% in the past few years. Over the 15 period the annual number of peritoneal mesotheliomas consistently remained very low in both countries with incidence rates below 1 per 100,000 persons. This increase in incidence peritoneal tumours was not observed among men where mesotheliomas each year constituted 68–84% of all peritoneal tumours.

Conclusion. The absence of a time trend in peritoneal mesotheliomas in females suggests a limited role of occupational exposure to asbestos as important aetiological factor. Morphological verification of the diagnosis of peritoneal mesothelioma with immunohistochemical markers could play a key role. The consequences of asbestos exposure among men and women can better be observed by incidence patterns of pleural mesothelioma than by patterns of peritoneal mesothelioma. Recognition of peritoneal mesothelioma as a compensable occupational disease due to asbestos exposure should take into account differences in causality between males and females.

Key words: Mesothelioma – aetiology, occupation, asbestos

OP14

IS THE AETIOLOGY OF SYNCHRONOUS AND METACHRONOUS BREAST CANCERS DIFFERENT?

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Introduction. Survival of cancer patients is increasing, hence an increased risk for a second cancer. Risk *of breast cancer in the population as well as in certain type of cancer patients is well defined. However,* breast cancers risk across age and period among female cancer patients has been scarcely studied.

Method. We retrieved data of all female cancer patients diagnosed between 1970 and 2004 in the area of the Eindhoven cancer registry. Using this database, we calculated the incidence rate of metachronous (diagnosed at least 6 months after first cancer, MBC) and synchronous (diagnosed within 6 months, SBC) breast cancer. The incidence rate of MBC was calculated by dividing the number of incident cases by the number of person-years at risk. The rate of SBC was calculated by use of the Eindhoven population at risk. Incidence rates were also computed according to age, period and treatment of the first cancer.

Results. During the study period, 437 (0.7%) and 1310 (2%) women among 64,661 patients with a previous primary cancer were diagnosed with a SBC and MBC, respectively. Incidence of SBC increased steeply until the age of 50 and slowed down before it continued rising. Increased rate of SBC over time was only observed for women older than 50 years. Incidence of MBC peaked among women aged 40–54 years (8/1,000), afterwards decreasing and stabilizing at 6/1000 person years. Over time, we observed an increasing incidence at all ages of MBC, especially for the younger age groups. Age standardization only slightly reduced the observed rising trend in incidence of MBC. Cancer patients who received radiotherapy exhibited the greatest risk of MBC, being largest among women aged 40–50 at first cancer diagnosis (10/1000). As compared to those who received systemic treatment a relative risk ranging from 1.6 to 2.6 was observed for radiation.

Discussion and Conclusion: SBC and MBC may have different aetiology. Age pattern in incidence of SBC is similar to that of the general population, hence it appears to share common risk factors with primary breast cancer. As for the age pattern of MBC, it shows similarity with genetic-related cancer, implying the importance of genetic components. In addition, risk of MBC among younger cancer patients seems to be magnified by radiotherapy received for the first cancer treatment. Finally, increases in incidence of SBC and MBC preceded the screening era, suggesting the role of other risk factors.

Key words: Cancer survivors; Breast cancer – risk, treatment, population-based registry

OP15

CLEAR CELL ADENOCARCINOMA OF VAGINA AND CERVIX UTERI: ARE THE CONSEQUENCES OF DIETHYLSTILBESTROL STILL EVIDENT?

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Background. In the 1980s, the Central Netherlands Registry of clear cell adenocarcinoma of vagina and cervix uteri (CNR) was started to gain insight into the risks of diethylstilbestrol (DES). Results up to 2005 are presented.

Methods. In the past, the nationwide network and registry of histo- and cytopathology in the Netherlands (PALGA) notified patients. More recently, notification was obtained from the 9 regional cancer registries in The Netherlands. Patients diagnosed with clear cell adenocarcinoma of the cervix or vagina (CCAC) and born after 1946 were included. Data on intrauterine exposure to DES were gathered from the medical files and through questionnaires. The histological slides of tumours have been reviewed.

Results. Up to 2005, 148 patients were registered. Age at diagnosis varied from 8–53 years (modus: 25 years, n = 11). The number of new diagnoses rose until 1989, remained fairly stable in the 1990s and seemed to decline thereafter. The incidence of CCAC up to age 55 years was 1.4 per million women from 1980–1989 and 0.6 per million from 2000–2005. Of the patients with known history of intrauterine exposure to DES, 60% had been exposed (75/125). The mean age at diagnosis of exposed patients was 7 younger than that of non-exposed patients.

Conclusion. Since 2000, the incidence of CCAC of the vagina and cervix is lower than in the 1980s, but it has to be awaited if the epidemic due to DES is over. Also, the possible consequences of DES after the menopause have to be awaited.

Key words: Vaginal cancer; Cervical cancer; Diethylstilbestrol

OP16

SMOKING CESSATION SUPPORT: SHOULD IT BE TARGETED TO SPECIFIC GROUPS?

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Background. In England there is a life expectancy (< 75 years) gap of 7.4 years (males) and 5.7 (females) between socio-economic groups I–V, up to 10 years locally Major contributors are cardiovascular disease and cancer. National targets aim to reduce premature mortality from cancer (< 75 years) by 2010 by at least 20% and by at least 6% between the poorest fifth of local areas and the population as a whole. The most important avoidable risk factor is smoking. The evidence base for smoking cessation interventions is strong and cheap compared to many other interventions. To focus attention on prevention of avoidable mortality, The Department (Ministry) of Health introduced targets to reduce smoking prevalence to 21% by 2010 and in manual workers, from 32% (1998) to 26%.

Aim. To raise awareness of underinvestment and critical decisions in deployment of resources for smoking cessation.

Methods. The South West Public Health Observatory used socio-economic differentials in smoking prevalence, quit rates, smoking related cancer incidence rates, trends and economic data to inform an ethical debate on how best to invest resources in smoking cessation services. Ethicists, epidemiologists, front line staff and policy makers are involved.

Results. The gap between rich and poor in all cause and cancer mortality (< 75 years) is widening in the South West Region. Smoking and lung cancer is declining in men but not in women. Smoking prevalence has a socio-economic gradient: manual workers (29%) professional (17%) masking higher rates in subgroups e.g. single, unemployed mothers or prisoners (80%). Quit rates at four weeks are higher for advantaged groups (60%) than less advantaged (43%). Ethical issues considered in targeting smoking cessation intervention to more deprived areas/ special groups include: Why is so little invested in smoking cessation compared to management of disease. Individual autonomy – are the 'poor' targeted to give up? Fair reciprocity – should smokers contribute to their health care? Should society reduce access to the affluent to prioritise those less well equipped to help themselves because good for society or to compensate for previous injustice? Does this violate the principle of equal consideration preventing one person's interests being given greater priority than others? Conclusion Differences in smoking prevalence trends partly explain the widening under 75 years mortality rates. Targets focussing on numbers of quitters favours investment where success is highest i.e. the affluent. This will widen inequalities in life expectancy. The epidemiological/economic/ethical debate has produced guiding principles for those planning prevention services.

Key words: Smoking; Premature mortality; Inequalities; Economics; Ethics; Prevention services

OP17

CANCER PATTERN ASSOCIATED TO GROUND CONCENTRATION OF ARSENIC IN NAPLES PROVINCE, ITALY, 1999–2002

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Aim. In the province of Naples, South-Italy, excesses of cancer mortality and incidence are located in specific areas distributed heterogeneously. The aim of the present study was to explore at municipality level the association between mortality from selected cancers and the arsenic (As) concentration in ground.

Materials and Methods. Number of events disentangled by age, gender, residence, and disease (cancers of the lung, kidney, and bladder) and corresponding resident population were obtained from Italian National Institute of Statistics. The ground concentration of *As* was derived from the geochemical Atlas of grounds of the province of Naples. Spatial variation was examined across the smallest available administrative areas (91 municipalities, excluding the city of Naples). Based on small number of events at municipality level, a fully Bayesian modelling approach and a Markov Chain Monte Carlo method were used to stabilize and compute Relative Risks (RR) estimates.

Results. Median concentration of *As* was 12 mg/kg (range 5–36). Three municipalities displayed values higher than 20 mg/kg, which is the 2006 Italian safety threshold. A statistically significant association was observed between *As* concentration and cancers of the lung (RR = 1.10; 95% CI: 1.04–1.16) and kidney (RR = 1.39; 95% CI: 1.07–1.81). An association with bladder cancer (RR = 1.08; 95% CI: 0.95–1.23) was also observed.

Conclusions. In the province of Naples the ground concentration of *As* is significantly associated with cancers of lung and kidney. As was one of the first chemicals to be recognized as a cause of specific cancers, and its margin of safety intake lowered in the last century. The volcanic nature of the ground mainly explains the concentration of *As*, however, human activities such as industrial or agricultural settings (steel or herbicides plants) or consumption of contaminated foods (for instance, shellfish or fish) cannot be excluded as risk factors. From a public health point of view it would be essential to define with greater precision the nature and the characteristics of sources and intakes of *As* in order to assess its role as an environmental indicator of cancer risk. Uncertainties of our study include lack of information on tobacco smoking whose avoidance will reduce alone the incidence of the examined cancers and the sensitivity limitations associated with the ecological nature of our study. Future works including more years of observation and a cross-validation with incidence data will increase precision and weight to the RR estimates.

Key words: Geographical pattern; Lung cancer; Kidney cancer; Arsenic; Naples Italy

THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL

Session 2:

Methodological aspects of cancer registration

Oral Presentation - OP18

DO CANCER PREDICTIONS COME TRUE?

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Predictions of disease incidence, including cancer incidence, play an important role in an epidemiological analysis, both in an administrative and scientific context. The prediction should always be accompanied by a prediction interval, a measure of its precision, in order to be properly utilized in a decision process. In order to check in practice the reliability of a certain group of simple prediction models the study in expost predictions have been conducted using the high quality historical data from the Finnish Cancer Registry. Predictive models assuming directly age-specific Poisson distribution for observed number of cases appeared to have a similar reliability as those making prediction based on the assumption of normality of age-adjusted incidence rates. However the Poisson models produce more precise predictions (shorter prediction intervals), which is crucial in the predictive process especially for scientific predictions. At the same time both classes of models proved to be highly useful in predicting future incidence. The average coverage rate was 84%, compared to the theoretical one of 95%, when the horizon of prediction was 5 years and changed to 73% for the horizon of 10 years for the cancer sites without intervention programmes. The result confirmed in practice the findings from the previous published simulation studies showing practical usefulness of early proposed simple predictive Poisson models.

Key words: Incidence prediction; Prediction interval; Reliability

OP19

HISTOLOGICAL GROUPS FOR COMPARATIVE STUDIES ON CANCER INCIDENCE

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Cancer incidence data are retrieved from cancer registries by means of ICD-O (third edition or ICD-O-3) for sites and histological types of neoplasia. The handling of this information includes several difficulties. Registries may use older code systems such as ICD-O-2 which requires translation to ICD-O-3. The number of different morphology codes used for neoplasms of a single site is usually in the range of 75–50 which hampers a clear display in tables and diagrams. Some codes are obsolete, while others are redundant, i.e. multiple codes are used for the same tumour. The purpose of this work was to obtain instruments for exctraction of manageable incidence data of main histological tumour categories for comparisons between geographic regions and studies of longitudinal changes. A first edition of histological groups was prepared almost 10 years ago. Since then, ICD-O-2 codes have been replaced by ICD-O-3 and some cancer classifications have been revised. For inclusion as a histological group, a cancer type had to be common enough at the site and clinically and epidemiologically relevant. The following 16 sites were included: oesophagus, anus, liver, lung, bone, skin, cervix, corpus uteri, ovary, testis, kidney/renal pelvis, urinary bladder, eye, central nervous system, thyroid and haematological system. Some major cancer sites such as breast and prostate were not included because the vast majority of malignant neoplasms at these sites are adenocarcinomas and the coding of subtypes of these is not consistent. The number of specified categories of neoplasia was 2–10. A major difficulty was the variable coding precision (i.e. specific codes for tumour subtypes vs. comprehensive codes such as adenocarcinoma), which limited the utility of detailed codes. Thus, there is a need of standardisation of coding practices.

Key words: Cancer registration; Morphology; Histopathology; Codes

OP20

GLOBAL CANCER INCIDENCE CORRECTEDFOR UNDER-ASCERTAINMENT IN CANCER CASES IN THE VERY ELDERLY

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Background. Under-ascertainment in the oldest age groups in the cancer registry data is not uncommon especially among less developed countries. Global cancer estimates such as cancer incidence are results of combination of complete and incomplete registry data. Thus global cancer incidence is subject to under-estimation. This article is to calculate corrected global cancer incidence by a novel method to compensate under-ascertainment of cancer cases in the very elderly (aged ≥ 65).

Methods. Corrected age-specific rate for a certain cancer in age group ≥ 65 is calculated by the age-specific rate of that cancer in age group 55–64 multiplied by a corresponding coefficient from a reference cancer registry (sex- and age-specific coefficients from Finnish Cancer Registry, a nation-wide population-based registry with high validity of data). Cancer data was obtained from GLOBOCAN 2002 and Finnish Cancer Registry report for 2001–2005.

Results. Comparing the corrected incidence rates for 2002 with the original ones showed that without correction, crude rates (and consequently number of new cases) for "All sites" were around 9% (men 14.2%; women 2%) under-estimated. This means there were 11,793,000 new cancer cases (6.6 million men; 5.2 million women; about 1 million more than the original estimation for both sexes) in the year 2002. Corrected incidence for the year 2050 was approximately 12% higher (men 18%; women 2.7%) than the original estimate (3.2 million cases more). Depending on cancer site and sex, percentage of under-estimation varied remarkably.

Conclusion. After correction for under-ascertainment in elderly age groups, the global estimates of number of new cases and incidence rates increase substantially especially in men. With respect to preparing future projections of incidence, when the effects of an aging population need to be taken into account, accurate age-specific rates in the upper age groups are important. Without correction, cancer occurrence measures can be remarkably under-estimated which may lead to inadequate resource allocation for control measures.

Key words: Neoplasms; Incidence rate; Bias; Under-ascertainment; Old age; Cancer registry

OP21

A METHOD TO ADJUST FOR ASCERTAINMENT BIAS IN THE EVALUATION OF CANCER REGISTRY DATA

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Using the trend of age-standardized incidence rate of cancers (ASR) is inaccurate for registration with incomplete reporting, especially in developing registries. The relative age-standardized ratio (RASR) is a new measure that takes ascertainment bias of registration into account. RASR is calculated from the ASR for each cancer divided by the ASR for leukaemia. Leukaemia was chosen as the reference because its ASR is rather constant over time in valid registries. The adjusted relative age-standardized rate (ARASR with same unit as ASR) is calculated by multiplying the RASR for a specific cancer in a particular year by the sum of ASRs of that cancer over the years for which a trend is being determined and then dividing result by the sum of RASRs of the cancer for those years. Two likely assumptions are behind use of ARASR, first, constant ASR of leukaemia over time, second, if under/over-registration occurs, it happens for all cancers to the same extent (random under/overreporting). Using the ARASR with empirical data of valid Finnish and SEER cancer registries proved that trend of ASRs for each cancer is almost equal to its ARASR. Using trends of ARASRs instead of ASRs in a registry with incomplete data collection in first years of registration demonstrated more realistic results. In conclusion, the ARASR is more accurate than the ASR for studying cancer incidence trends in registries with incomplete reporting. ARASRs in different countries or different times are comparable since they are age-standardized. Moreover, comparison between trends of ASRs and ARASRs can be used as a test for validity of registration.

Key words: Neoplasms; Incidence; Trends; Bias; Registries

OP22

ALL CANCERS INCIDENCE AND PREVALENCE IN GRANADA (SPAIN): ESTIMATES VERSUS OBSERVED DATA

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Background. Epidemiological indicators of cancer burden provided for population-based cancer registries (CRs) are essential information for cancer surveillance and health planning. Ascertaining quality of this data is a difficult task to pursue. When cancer-specific mortality and survival data for long period of observation (> 10 years) are available from the area covered by a CR, it is possible to estimate through statistical methods incidence and prevalence and to compare them with data provided by the Registry.

Objectives.

1 To estimate cancer incidence in Granada;
2 to compare estimates with incidence observed and provided by the Granada Cancer Registry (GCR) in order to assess the consistency in data and methods;
3 to estimate total cancer prevalence in Granada.

Methods. The GCR is a population-based cancer registry (Spain) with incidence data from 1985 to 2002. Until recently, linkage of GCR database with National Mortality Registry was not allowed, and follow-up was active. So, only some specific sites were selected for survival and for these sites figures were similar to the European mean. MIAMOD (mortality-incidence analysis model) was used to estimate cancer incidence and prevalence using:

4 number of cancer deaths (0–84 years) in Granada, from official statistics 1981–2002;
5 estimated European relative cancer survival, from the Eurocare-3 study for incident cases 1983–1994.

MIAMOD estimates of total cancer (except non-melanoma skin cancer) incidence by sex were compared to observed incidence provided by GCR.

Results. Estimated crude incidence rates for total cancer in 2002 in Granada were 406 (CI 95%: 392–420) and 268 (CI 95%: 256–281) per 100,000 men and women respectively, while the incidence rates measured by the GCR was 372 and 276. Expected and observed curves were comparable in levels and trends over 20 years, with a mean absolute percentage difference over all the considered years of 4.6% in men and 6.3% in women. The estimated number of prevalent cancer cases in 2002 in Granada was 6700 in men and 8200 in women.

Conclusions. A general consistency over all the study period was found between observed and estimated (MIAMOD) total cancer incidence in Granada, which is indicative of the quality and the completeness of all data involved as well as the appropriateness of model choices. MIAMOD can be used for ascertaining quality of cancer registry data and to estimate cancer incidence and prevalence trends in regions not covered by registration, provided that good quality data on cancer-specific mortality and survival are available.

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Key words: Estimation; Incidence; Prevalence; Population-based cancer registry; MIAMOD

THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL

Session 3:

Cancer registries in the evaluation of screening and early detection

Invited Lecture – IL04

EVALUATION OF COLORECTAL CANCER SCREENING

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Bowel cancer screening programmes are being rolled out in the 4 countries of the United Kingdom. All are based on the early detection of colorectal cancer (CRC) using the guaiac faecal occult blood test (FOBT) but differ in the age group offered the test. The English programme includes the limited age range 60-69 years, while Scotland and Wales aim to include the 50-74 year age group. The English decision to restrict the age range was based on the need to ensure that adequate colonoscopy resources are available to investigate all screen-positives whilst not jeopardizing the symptomatic service. Once roll-out over the whole of England has been achieved in 2009, a decision will be made whether to increase the age range or add flexible sigmoidoscopy screening. The guaiac FOBT was selected as three large clinical trials had demonstrated a reduction in colorectal (CRC) cancer mortality of the order of 16%. The trials have as yet shown no effect on CRC incidence rates. Evaluating the effectiveness of the CRC programme is going to be as challenging as that for the breast screening programme which also aims to reduce mortality rates but does not decrease incidence. Mortality rates for CRC have been steadily falling over the past decade and it will be necessary to demonstrate the proportional contribution of the screening programme to any subsequent decrease in mortality. In the short-term surrogate endpoints such as the incidence of late stage CRCs will be required. This will require that cancer registries are able to collect timely, accurate information on cancer stage. We have been monitoring the timeliness and quality of stage data provided by registries and clearly some will find this requirement will be difficult to achieve. The government is applying a mandatory 18-week target for the diagnosis and treatment of cancer, and the databases used to audit compliance with this target will be a rich source of data that may help the registries to provide the required data for evaluation of the screening programme. Another source of data is being explored. The hospital episode statistics (HES) data warehouse contains all patient-based records of hospital admissions and day cases by diagnosis, operation and speciality from NHS hospitals in England. It has recently been expanded to cover outpatient and emergency attendances and should enable more timely ascertainment of new cancer diagnoses, although the accuracy of the dataset is currently being explored by several registries. We have been evaluating flexible sigmoidoscopy as an alternative method of screening for CRC. As this method detects rectal and sigmoid colon adenomas with high sensitivity and appears to have a long duration of effect, it may be a highly cost-effective method of reducing distal CRC incidence rates. A number of trials are in progress to test this hypothesis. Our trial (the Flexi-Scope trial), in which screening was offered to 57,000 people between 1996 and 1998, is due for analysis in 2008. We have relied heavily on registries to provide timely data on new CRC registrations among the 170,000 men and women aged 55-64 who were randomized to the intervention or control groups at baseline. Registries have also, to a variable extent, been providing data on cancer stage. If we can achieve complete ascertainment of cancer stage by 2008 by supplementing data from registries with that from hospital pathology departments, we will be able to use incidence of advanced cancers as a surrogate for death and predict the effect of a single flexible sigmoidoscopy screen on CRC death rates.

Oral Presentation – OP23

CERVICAL CANCER IN NORTHERN IRELAND AND ESTONIA: A CHALLENGE FOR THE FUTURE

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Background. Estonia (population 1.3 million) and Northern Ireland (NI) (1.7 million) each have a national health service. However the experience of cervical cancer is remarkably different, with 181 cases and 58 deaths in Estonia in 2004, contrasting with 72 cases and 30 deaths in NI. We explore reasons for the difference.

Methods. Mortality data were available for both areas from 1968 and incidence data Estonia from 1968 and NI from 1993. Staging information from 1995–2003 was available. Data on social factors were compared.

Results. EASR mortality for cervical cancer fell in Estonia from 14.3 per 100,000 in 1968 to 8.1 in 2000 while in NI the rate fell from 6.4 to 3.8. Of those with cervical cancer, a higher proportion of younger women (under age 65) in NI was observed compared to Estonia (79% and 53% respectively). The proportion of adenocarcinomas in NI was 15.5% compared with 6.1% in Estonia. Microinvasive cancers were not distinguishable in Estonia but contributed 25% of cervical cancer in NI. The percentage of women presenting with early stage cancer (i.e. FIGO stage II or below) was similar at 65–70% in both countries. Smoking levels among women were similar whereas sexually transmitted diseases were higher in Estonia. The fertility rate in NI was almost twice that of Estonia, accompanied by a low official abortion rate of 5 per 100 live births, in contrast to 83 in Estonia. The percentage of children born outside of marriage was 36% in NI and 58% in Estonia.

Conclusions. Here we have two EEC countries with similar populations, yet Estonia has over twice the number and age standardised rate for cervical cancer. Whilst the rates are decreasing in both countries, the pattern of microinvasive disease, adenocarcinomas and cases presenting at a younger age in Northern Ireland suggests the impact of screening not yet seen in Estonia where organised cervical cancer screening started in 2006. There is evidence of sexual behaviour differences between the two populations which suggest varying risk factors, however further studies are required. If the Northern Ireland rates applied to Estonia then approximately 30 deaths and 100 cases of cervical cancer per year could be prevented.

Key words: Cervical Cancer; Mortality; Incidence; Country comparison

OP24

THE NATION-WIDE CERVICAL CANCER SCREENING PROGRAMME IN LITHUANIA

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Lithuania is known to have the highest mortality rates of cervical cancer in year 2004 among the EU countries. At the same year the Ministry of health has adopted the national cervical cancer screening programme aimed to reduce incidence and mortality. There are 725,000 women at age 30–60 years on the target of the programme that suppose to be invited once in three years. The programme was launched along the routine medical services. The reimbursement for service was used as a procedure to distribute the funding to primary health care centre by state patient fund. The PAP smears are to be taken at primary health care centre and general practitioners (GP) at the centre are responsible to invite woman and offer the screening. There are 382 primary health care centres in Lithuania covering the population of 3.4 million. Each GP is supposed to serve 1500–2500 of population. There are 10 labs around the country that are responsible to assess the PAP smear. The Bethesda system is used to evaluate the smears and the results of smears are reported to state patient fund. There were more than 300,000 of smears taken since the programme start. The cancer registry is responsible for the monitoring of cervical cancer early detection, incidence and mortality trends and to provide the necessary information to the authorities on prevalence and survival also. The cancer registration in Lithuania is based on compulsory reporting all malignant cases to the cancer registry. The linkages are possible with some of pathology labs and also with state patient fund to find out the PAP smear evidence. There were 360 new cervical cancer cases in year 1992 – the lowest number since the 1978. The number of new cases was growing year by year reaching the highest (572) in year 2004 when the programme started. The recent figures of the year 2005 and 2006 show slowdown of the new malignant cases (500 and 480, respectively) and the rapid increase the cases of *Ca in situ*, that is expected continue to grow. The key for success of the programme is organisation, existence of national standards for quality assurance and control and constant monitoring of short- and long-term indicators. Running the screening programme along the system of routine medical services has the advantages of the coverage. It has also disadvantages related to insufficient service and late joint to the programme of the smaller primary health care centres. The programme is the challenge for the cancer registry to gain more experience and to join other cancer prevention programmes – breast, colorectal – in future.

Key words: Cancer registry; Cervical cancer screening; PAP smear

OP25

MASS SCREENING PROGRAMMES IN RELATION TO TRENDS IN INCIDENCE AND MORTALITY OF CERVICAL CANCER IN FINLAND AND THE NETHERLANDS

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Background. Finland and the Netherlands are comparable in most characteristics, e.g., gross domestic product, fertility rate and the existence of a national screening programme for cervical cancer for several years.

Aim. The aim of this study was to compare the trends in incidence and mortality of cervical cancer in Finland and the Netherlands, and relate these to the extent and intensity of the screening programmes.

Methods. Incidence rates were calculated for cervical cancer using the national Cancer Registries of Finland and the Netherlands. Mortality rates were obtained from the national statistic offices and data on screening intensity were obtained from the Finnish Cancer Registry and the Erasmus University in the Netherlands. Screening programmes in Finland and the Netherlands started in 1963 and 1988 respectively. In both countries women aged 30 to 60 are screened on 5-year intervals from 1992 and 1996 on, respectively. Practice of screening in terms of evaluating of smears and referral to the gynaecologist is comparable in both countries. In Finland, the excess use of Pap smears (all smears that are taken in a certain period that do not contribute to the observed coverage in the target population) is 121 per 1000 women in a 5 year period compared to 24 in the Netherlands.

Results. Incidence and mortality rates were declining more in Finland than in the Netherlands. In 2003, the age adjusted incidence and mortality rates in Finland were 4.0 and 0.9 and in the Netherlands 4.9 and 1.4 per 100,000 woman-years, respectively. In Finland, an increase of the incidence among young women was seen in recent years, especially in some cities, where the rates are now on the Dutch city level (around 15 per 100,000).

Discussion. Differences in incidence might be due to differences in risk factors for cervical cancer: in contrast to Finland, the Netherlands does have a higher percentage of (female) smokers, which are both risk factors for cervical cancer. The enormous difference in excess smear use may be an important factor because approximately 1–10% of all smears are considered abnormal: more abnormalities are thus found in Finland. Low-grade cervical abnormalities are managed by repeated testing, while for high-grade abnormalities women are referred for colposcopic evaluation. Both approaches may cause significant anxiety in women. Whether excess smear use affects quality of life should be included in the evaluation of the screening programmes.

Key words: Cervical cancer; Mass screening programmes; Incidence; Mortality

OP26

SCREENING FOR CERVICAL CANCER RESULTS IN LOWER STAGE CARCINOMAS

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Introduction. In the region of the Comprehensive Cancer Centre North-Netherlands (CCCN) women aged 30–60 years are invited to participate in the cervical cancer screening programme once every five years since 1996. The CCCN region comprises the Cervical Cancer Screening North-Netherlands (BCNN) and two other regional screening organizations. We analyzed the characteristics of cervical cancer, comparing screened to non-screened women with data available from 2001 onwards.

Methods. Patients diagnosed with cervical cancer between January 2001 and January 2006 were selected from the population based cancer registry of the CCCN. BCNN provided data on invited women and screening results. For patients living in the BCNN region record linkage was performed between the databases of CCCN and BCNN using the identifiers date of birth, first initial, first four characters of the surname and postal code. Screening relation was defined as screen-detected carcinoma (SC), interval carcinoma (IC), non-participants (NP) and not-invited patients (NI). Differences in characteristics were studied using Anova and Chi2-tests.

Results. BCNN invited 218,218 women for screening with a response rate of 68.9%. In the CCCN region 442 patients were diagnosed with invasive cervical cancer between 2001 and 2006, of which 172 patients lived in the BCNN region. At time of diagnosis, 3 patients were younger than 30 years and 38 patients were over 60 years, leaving 131 patients for further analysis. Of those, 35 (26.7%) were diagnosed as SC, 13 (9.9%) IC, 63 (48.1%) carcinomas in NP and 20 (15.3%) in NI. This resulted in average yearly incidence rates of 4.7/100,000, 1.8/100,000 and 18.5/100,000 women for SC, IC and NP respectively. Of the SC, 85.7% was diagnosed as stage I carcinoma compared to 46.2% of the IC, 49.2% of the NP and 35.0% of the NI ($p = 0.005$). In 74.3% of all patients histological classification showed a squamous cell carcinoma. No significant difference in classification was observed between SC and other patients ($p = 0.208$). Mean age differed between groups: 40.6 years for SC versus 46.6, 44.9 and 45.1 years for IC, NP and NI, respectively ($p = 0.054$). Mean follow-up time was 2.3 years (range 0.01–5). Relative 5-year survival was 80% (95% CI: 69%–87%). No significant difference was observed between groups ($p = 0.124$), although follow-op time was short.

Conclusion. Screen-detected cervical carcinomas were diagnosed at younger age and were more often stage I compared to IC or carcinomas diagnosed in NP or NI. No difference in cancer classification and relative survival between groups was observed.

Key words: Cervical cancer; Screening; Interval carcinoma; CCCN

Invited Lecture – IL05

THE ROLE OF CANCER REGISTRIES IN THE EVALUATION OF MAMMOGRAPHY SCREENING PROGRAMMES

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Somehow parallel to the development of cancer registration in Europe, mammography screening programmes have rapidly expanded in the last two decades and now cover a large portion of the European population in all but a few of the 27 Member Countries. The association is not completely casual, as Cancer Registries and Screening Programmes, both population-based, share the need of an efficient health and administrative information system. Furthermore, cancer registration serves essential needs of screening programmes starting from the planning phase throughout the evaluation of results. They share, as well, some current difficulties and limitations, like for example the exceedingly restrictive privacy regulations in some European Countries.

In the exchange between Cancer Registries and Screening Programmes the latter not only receive essential information from the former, but also provide some benefits. These include a check on the completeness of cancer registration thanks to active follow-up of screen positive cases and the provision of information on variables that are recorded in the screening files. The need of timely and detailed data may serve, in itself, as a welcome motivation in improving cancer registration. Furthermore, screening may provide a special chance for Cancer Registries to work in close conjunction with clinicians involved in specialist Units and to be exposed to the latest advancement in the diagnosis and treatment of the disease. Screening Programmes, in fact, are required to document quality of diagnosis and treatment of screen detected case, and they often do so by using specialised clinical databases. Finally, information on the extension of population screening is fundamental for the interpretation of breast cancer time trends, as it has been highlighted in a recent debate in the literature.

This is why and how any Registry working with a Breast Screening Programme must become somehow a “specialist” in this disease. In areas where population cancer registration for all sites is not available, these functions must necessarily be established ad hoc for breast cancer.

In the planning phase of a screening programme a Cancer Registry can provide essential information on breast cancer incidence by age and stage and on the volume and quality of diagnosis and treatment facilities.

While a screening programme is running, cancer registration assists in the follow-up of screen detected cases and in the identification of interval cases. These functions allow to compute screening performance indicators such as detection rate and other measures of sensitivity. Cancer registration may also provide important indicators of how well screening covers the target population, like the proportion of all cancers that are screen detected and the proportion of ductal carcinoma in situ.

Last but certainly not least is the evaluation of the impact of screening on mortality. Mammography screening is recommended in women 50-69, having been found efficacious on the basis of results of clinical trials. Organized screening programmes have been initiated on this ground. The issue of the effectiveness of such “service” programmes is now in order. The use of information from and the partnership with Cancer Registries is mandatory for these research projects.

Screening Programmes must seek the collaboration of Cancer Registries and value the expertise and information they can provide. Registries need to update their practice in order to be able to perform specialist functions in breast cancer screening, for example by improving data collection and reporting on carcinoma in situ. Screening and Cancer Registry files must be individually linked, and screening history should become a standard piece of information in cancer registration. Europe wide information on screening coverage and main performance parameters should be made available within European Networks (European Cancer Network, European Network for Information on Cancer) and kept regularly updated.

Oral Presentation – OP27

EVALUATION OF A QUALITY ASSURANCE PROJECT IN BREAST CANCER DIAGNOSIS WITH CANCER REGISTRY DATA

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Cancer registration is regulated by public laws in Germany. One of the explicitly stated tasks in these laws is the evaluation of preventive interventions (primary as well as secondary). The following example shows how cancer registries can be used for public health research in Germany. In the year 2001 in Schleswig-Holstein, the northernmost federal state of Germany with a population of 2.8 million, a pilot project (called *QuaMaDi*) was set up to improve the standard of breast cancer diagnosis, especially the quality of mammography. In a defined region (365,000 women live in this region) a process-orientated and comprehensive quality management was implemented. Although *QuaMaDi* is not a screening programme, the quality definitions and quality indicators of the project follow the European guidelines for mammogramphy screening. In addition to an intense documentation and evaluation of process quality, a population-based evaluation of outcome quality, measured by changes of incidence and tumour stages, was performed. For this purpose cancer data from the state cancer register were compared between the pilot region and the rest of the state on a population base. From 2001 to 2005 about 60,000 women were examined with 100,000 diagnostic processes. Breast cancer incidence increased in the pilot region compared to the rest of the state and compared to the time before the onset of the project. In the rest of the state the incidence did not change. In the pilot region a population-based shift to more favourable tumour stages was observed. About 60% of all breast cancer cases in the pilot region were T1 or *in situ* (50% in rest of the state). Tumour stage specific incidence was lower in the pilot region for larger tumours (in favour of smaller tumours). Due to these results the project was enlarged to the whole state of Schleswig-Holstein in the year 2006. The cancer registry is now observing the situation in the other parts of the state. It is expected that tumour stages will also improve there. Further research questions, such as survival of patients (with and without quality assured diagnosis) or interval carcinomas, are in progress.

Key words: Breast cancer – diagnosis, early detection, quality assurance; Cancer registry

OP28

ORGANISED MAMMOGRAPHY SCREENING REDUCES BREAST CANCER MORTALITY: A COHORT STUDY

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Background. Effectiveness of mammography screening has been debated during the last years.

Objectives. To evaluate the effectiveness and the efficacy of population-based mammography programme in Finland.

Main outcome. Incident-based mortality from breast cancer by participation and five-year age groups at death.

Material and Methods. The study was based on an individual follow-up of screening invitees and participants from 1992–2003, and population level data from 1974–1985 and 1992–2003. We compared observed deaths from breast cancer with expected breast cancer deaths without screening in ages 50–69 at death. The observed deaths were obtained from a cohort of individual invitees (n = 361,848), the expected deaths by modelling breast cancer mortality rates at population level. The population data were derived from the same municipalities (n = 260) that were incorporated into the cohort. The coverage of screening invitations was 95% among 50–59 years old women, and 25% among women aged 60–69 years.

Results. The breast cancer mortality among invitees was reduced by 22% (relative risk 0.78, 95% confidence interval 0.70–0.87). After adjusting by self-selection, the efficacy among participants was 28% (0.72, 0.56–0.88).

Conclusion. The organised mammography screening in Finland has been effective. The number of prevented breast cancer deaths could probably be increased, if service screening were uniformly extended to 60–69 years old women.

Key words: Effectiveness; Mammography; Screening; Breast cancer

OP29

INTERPRETING THE DECREASE OF BREAST CANCER INCIDENCE IN TURIN, ITALY BY LINKING CANCER REGISTRY AND SCREENING FILES

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Breast cancer (BC) has been steadily increasing, almost with no exception. Recently SEER data showed a marked decrease in white women since 2002. We found a similar pattern in Turin, and we investigated if it was related to organised screening programme for BC. We reviewed all incident BC cases from 1988 to 2003 and analyzed incidence time trends. As the target population invited in the BC screening programme corresponded exactly with the population covered by the Registry, we were able to individually link the Registry and the screening files and classify all incident invasive and in situ BC by screening history, using then such information for estimating underlying incidences in the absence of the screening programme in two different ways: 1. excluding all cases detected at the first screen (prevalent round); 2. excluding 75% of prevalent round cases. Observed invasive BC incidence had changed from 1988 to 2000 with an estimated annual percent change (EAPC) of +2.8%. Since the year 2000 incidence decreased at an EAPC of –4.6%, from a high world standardized incidence rate of 93.2 cases per 100,000 in 1999 to a low of 85.0 in 2003. The decreasing trend has a significant period component (after adjustment for age and birth cohort) and is restricted in women of 50 years of age or older. Excluding all or 75% of cases detected at the first screen the increasing time trend up to year 1999 flattened and the subsequent decrease disappeared. Speculations on the causes of this pattern are several, including a change in risk factors and a screening related effect. A change in risk factors may have been prompted by the publication in July 2002 of results of the WHI study and in August 2003 of the Million Women Study. However, the decrease in BC incidence in Torino concerns a period prior to the WHI publication. In Turin population BC screening with active invitations started in 1992 for women 50–59 and was extended in 1998 to women 60–69, with a particularly long build-up period. It appears that the overall decreasing trend is completely explained by the corresponding decrease in screen-detected cancers at the first screen, which were responsible of the increase in the previous years. Interestingly, ductal carcinoma in situ trends do not show any decrease. This interpretation of the incidence pattern may be relevant to other areas characterized by a gradual increase in the extension of early diagnosis.

Key words: Breast cancer; Time trend; Screening

OP30

MORTALITY REDUCTION FROM BREAST CANCER AFTER THIRTEEN YEARS OF MAMMOGRAPHY SCREENING, IN THE REGION OF THE MAASTRICHT CANCER REGISTRY, THE NETHERLANDS

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Objective. Currently, a study is being done to evaluate the effectiveness of the Dutch national breast screening programme in the region of the Maastricht Cancer Registry (MCR), a department of the Comprehensive Cancer Centre Limburg (IKL), the Netherlands. A follow-up time of over thirteen years allows an evaluation of mortality from breast cancer. Trends in incidence and mortality of breast cancer are described and extra attention is paid to the occurrence of interval carcinomas.

Methods: From December 1990 onwards, women in the target age group (50–75) and living in the study region, biennially get an invitation for mammography screening. Until 1998, only women aged 50-69 were invited. Data from the Breast Screening Programme (BSP) and the MCR are used for the analyses. Linked data from the BSP and the MCR are available up to and including 2003, while total incidence and mortality data from the MCR are available up to 2005. We calculated rate ratios and accompanying 95% confidence intervals per year. To compare outcomes among screened and unscreened women, we made use of a reference population of women who have not been screened, in the years previous to screening (1987–1990). Age-standardised incidence and mortality rates (ESR's) have been calculated for the trends in mortality and incidence, together with EAPC's over these trends.

Results. The incidence of in-situ breast tumours increased in incidence over the screenings period (1991–2005). The EAPC over the screenings period for in situ tumours is 2.68 ($p = 0.02$), while the EAPC for invasive tumours is 0.32 ($p= 0.63$). Both the incidence of large and node positive tumours has decreased with about 2% over the years, since the introduction of screening. For large tumours ($T \geq 2$) the EAPC is –2.06 ($p = 0.001$), for node positive tumours ($N \geq 1b$) the EAPC is –1.95 ($p = 0.002$). For invasive cancers, the rate ratio in 2005 was 1.43 (95% CI: 1.25; 1.63) compared to 1987–1990. The rate ratio for mortality dropped to 0.60 (95% CI: 0.48; 0.74) in 2005, compared to the reference period. The proportion of interval cancers stabilized after the initial rounds and makes up 1/3 of the combined incidence of screen-detected and interval cancers.

Conclusion. The decrease in mortality and the slight decrease of large and lymph node positive tumours indicate that the screening programme is effective. The increase of invasive tumours, despite screening, might be attributable to an overall increase in background incidence of breast cancer.

Key words: Breast cancer; Mammography screening; Incidence; Mortality; Interval cancer; Evaluation; Cancer registry; Netherlands

OP31

BREAST CANCER IN THE ELDERLY: DIVERGING STAGE, TREATMENT, AND OUTCOME INDICATORS TRENDS BY AGE CLASS

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Aim of this study is to investigate progress in breast cancer control among elderly women in an Italian region (Umbria), and explain health outcomes using data on stage and treatment.

Breast cancer incident cases diagnosed (1994–2003) were identified from the cancer registry database. Cases were followed-up till 31/12/2005. Mortality data were supplied by the Regional mortality registry (1994–2003). Detailed information on stage and treatments (cases 1994–2001) (2600 women). Incidence and mortality trends were analysed by joinpoint regression. Relative survival was calculated using the Estève's method:

- in the age class 60–69: relative survival increased (RS5y from 84% for 1994–1998 cases to 88% for 1999–2003 cases) and mortality decreased (EAPC 1994–2004 –3.5, 95% IC from –6.7 to –0.2);
- in the age class 70–79: relative survival increased (RS5y from 79% for 1994–1998 cases to 87% for 1999–2003 cases) and mortality decreased (EAPC 1994–2004 –2.3, 95% IC from –7.4 to +3.2);
- in the oldest old age group (80+): relative survival (RS5y from 78% for 1994–1998 cases to 74% among 1999–2003 cases) and mortality (EAPC mortality +2.8 95% IC from –1.9 to +7.7) both had unfavourable trends.

Incidence trend in the 60–69 age class was correlated to mammography screening started in 1998 (joinpont in 2001). No significant incidence tend was observed in the older ages. Among women 60–69 years old, the average tumour size decreased from 19 mm in 1994 to 15.5 mm in 2001 while in the 70–79 age class tumours size decreased from 21 mm in 1994 to 20 mm in 2001. In the oldest age class cancer size remained unchanged (25 mm). pN and c/pM information may not be compared properly as well due to lack of information for a major quote of the oldest cases. In the 80+ age class only, the percentage of women not undergoing surgical treatment increased significantly. In the same age class, chemotherapy use among cases N+ M0 or cancer size > 20 mm M0 decreased from rarely adopted to almost never used. Instead the use of chemotherapy increased among 70–79 years old women from 15% to 40% (p trend 0.008) and remained quite stable among 60–69 years old cases (80%) (cases N+ M0 or > 20 mm M0). In the 60–69 age class, treatment improvement and an initial effect of screening introduction in 1998 may have determined the observed favourable survival and mortality. In the 70–79 age class, treatment improvement and, particularly, the increasing administration of chemotherapy according to guidelines developed for younger patients, may explain cancer control results. It is surprising that, over the study period, treatment become even less aggressive among the oldest old despite the worse control and clear undertreatment already present at the beginning of the study; moreover undertreatment of women 80+ was paralleled by increasing mortality. The screening introduction (+100 cases per year on average) may have influenced access to care for the oldest old.

Key words: Breast cancer; Elderly; Cancer control

OP32

ORAL CANCER INCIDENCE: INCREASING DIAGNOSIS OR SCREENING EFFECT?

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Introduction. In Brazil the incidence rates for oral cancer ranges from 8.92 to 20.22 in south part of Brazil and in central part from 5.62 to 8.91 for 100,000 males. For female the incidence rates are 3, 87 to 6, 71 in southwest and in north of Brazil (INCA, 2006).

Aims. Verify of incidence of oral cancer cases in 15 years period, related to T stage, size of tumour.

Methodology. We analyzed all oral cancer incidents cases from PBCR for the period 1988 to 2002. These cases were analyzed by gender; age < 40 and > 40 years, incidents rates for the same period, T stage, (UICC, 2006), for tumours submitted surgical treatment we evaluate the size of the tumour (< 1 cm ; > 1 cm).

Results. There were 337 incident cases, excluded 50 cases without any information on T stage and size of tumour. From them 210 (72.3%) male, 77 (26.8%) female, 3/1 (m/f). For group age < 40 years 17 (5.9%) cases; > 40 years, 270 (94.1%) cases. The frequency of cases by stage were: T1 = 46 (16%); T2 = 50 (17.4%), T3 = 64 (23.3%), T4 = 115 (40.1%), in 12 cases we cannot access T Stage. The cases distribution for periods was: 1988–1992, T1-T2, 28.8% (17) cases, T3-T4, 71.2% (42); 1993–1997, T1-T2, 32% (44 cases), T3-T4 68% (51 cases); 1998–2002, T1-T2, 39% (55 cases), T3-T4, 61% (86 cases). The distribution by site were tongue 36.9% (106), others parts of the mouth, 29.6% (85) floor of the mouth 16.0% (46); palate 10.1% (29), gum 7.3% (21). The tumour size from 155 patients submitted to surgical procedures 10.9% (17 pts) < 1.0 cm, < 1.0 cm 94.8% (138) patients. The Odds ratio for tumours < 1.0 cm, > 1.0 cm for 1988–1992; compared to 1998–2002, was OR = 9.36 (2.47–35.5) p < 0.00. In 15 years period the number of cases increases for all T stages, but in 1998–2002, we observe a decrease of 10% for T 4 increase of 10% for T1.

Discussion. Oral cancer diagnosis is improving all over the world in special at the developing countries where the information about the diagnosis of oral cancer is improving to the health personnel. Visual inspection of the oral cavity is an accurate screening for to detect oral cancer. In Goiania the number of incident cases increased in 15 years period. This can be related to the diagnosis information improvement since the number of cases increased for all T stages (p = ns).

Conclusions. The incidence of oral cancer cases in Goiania is increasing mainly in the period of 1998–2002; these figures could be correlated with more information on diagnosis since T stage and tumour size still large tumours.

Key words: Oral cancer; T stages; Tumour size

THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL

Session 4:
Cancer registries in the evaluation of cancer care and survival

Invited Lecture – IL06

SURVIVAL OF CANCER PATIENTS IN EUROPE: EUROCARE-4 RESULTS

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Eurocare is the largest population-based co-operative study on cancer patient survival. Eurocare-4 analysed data on 2,699,086 adult cancer cases, from 83 cancer registries in 22 European countries, diagnosed in 1995–1999, and followed to December 2003. Country specific age-standardised five-year relative survival was computed for 42 cancer sites and for all cancers combined (adjusted for case-mix), and mean weighted European relative survival was estimated. Changes were analysed relative to cases diagnosed in 1990–1994. Mean age-standardised five-year relative survival for several major cancer sites, e.g. large bowel, lung, breast, prostate and ovary (average survival 54%, 12%, 76%, 36%, respectively) was best in Nordic countries (except Denmark) and central Europe, intermediate in southern Europe, lower in the UK and Ireland, and lowest in eastern Europe. Survival for melanoma (82%), testicular cancer (94%) and Hodgkin's disease (80%) varied little with geography. All-cancer survival correlated with total national expenditure for health (TNEH). Denmark and the UK had lower all-cancer survival than countries with similar TNEH; Finland had high all-cancer survival but moderate TNEH. Survival increased, and inter-country survival differences narrowed, between 1990–1994 and 1995–1999 for Hodgkin's (range 66–83% vs. 74–84%), colorectal (29–57%, vs. 39–60%), and breast (62–83% vs. 69–88%) sites. Such survival increase, and reduction in geographic differences over time, which is mainly due to improvements in countries with poor survival, may reflect better cancer care. Wealthy countries with high TNEH generally had good cancer outcomes, but countries with conspicuously worse outcomes than those with similar TNEH may not be allocating health resources efficiently. To shorten the delay in providing survival estimates we computed 5 and 10-year period survival estimates, based on 47 cancer registries that collected follow-up information for patients treated in 2000–2002. We observed major recent survival improvement for colorectal, breast, prostate, and thyroid cancers, and for lymphomas.

Oral Presentation – OP33

NON-HODGKIN LYMPHOMA SURVIVAL IN EUROPE AND THE US

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Aim. To compare survival for non-Hodgkin lymphoma (NHL) in Eurocare and US-SEER.

Material and Methods. We analyzed 31,665 (13,149 in Eurocare-3 and 18,516 in US-SEER) NHL cases diagnosed in 1990–1994 and followed-up for at least five years. The Eurocare-3 registries included in *the study were those with morphology coded according to ICDO-2 and with less than 50% of cases with* not otherwise specified (NOS) morphology. The European registries were grouped geographically: Eurocare west (registries from France, Germany, Italy, the Netherlands, Spain, Switzerland and the national registries of Iceland and Malta) and Eurocare east (Czech Republic, Estonia, Slovakia and Slovenia). The SEER cancer registries were considered together. NHL morphology was classified according to ICDO-2 and grouped into 12 categories: Diffuse B (9595 9680-84 9686), Small cell Lymphocytic (9670), Lymphoplasmacytic (9671 9715), Lymphoblastic (9685), Burkitt's (9687), Follicular B (9675 9676 9690-9698), T Lymphomas cutaneous (9700 9701 9709), Mantle cell/centrocytic (9672-9674 9677), Other T cell Lymphomas (9702-07 9713 9714 9720), Other specified NHL (9711 9712), NH NOS (9591-9593), NOS lymphoma (9590 9594). We used four age categories: 0–14, 15–49, 50–69 and 70–99 years. Five-year relative survival was estimated by the Hakulinen method. The relative excess risks (RERs) of death by geographical area, adjusted by years since diagnosis, age at diagnosis, sex and morphological group were estimated using a multiple regression approach by Dickman et al.

Results. Diffuse B cell were 33% in Eurocare vs. 48% in the US (on cases with specified morphology). Follicular B showed similar frequencies (28% vs. 27%, respectively). NH NOS formed 19% in Eurocare, 2% in SEER. The multivariable analysis showed that, adjusting by geographical area, age, sex and years since diagnosis, the excess risk of death was significantly higher than SEER (reference) in Eurocare east (RER 1.36 95% CI 1.28–1.44) and was equal to reference in Eurocare west (RER 1.01 95% CI 0.97–1.05). When morphological groups were included in the model RERs did not change substantially for both Eurocare east and west; considering as reference Diffuse B, the excess risk was significantly higher for Burkitt's and for NOS lymphomas, while the excess risk was significantly lower for Small cell, lymphoplasmacytic, Follicular B, Mantle cell/centrocytic, T lymphoma cutaneous, Other specified NHL and NH NOS. Conclusions The excess risk of death for NHL was similar in Eurocare west and in SEER, while it was significantly higher in Eurocare east. Morphology is not sufficient to explain the bad prognosis in Eurocare east, probably due to treatment and stage differences.

Key words: Non-Hodgkin lymphoma; Eurocare; SEER; Survival; Morphology

OP34

CHILDHOOD AND ADOLESCENT CANCER SURVIVAL: A PERIOD ANALYSIS OF DATA FROM THE CANADIAN CANCER REGISTRY

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This study provides up-to-date estimates of childhood and adolescent (ages 0 to 19) cancer survival in Canada (excluding Quebec) using data from the Canadian Cancer Registry (CCR). Cases were classified according to the third edition of the International Classification of Childhood Cancer classification scheme. Analyses were restricted to first primary tumours only. Follow-up for vital status was determined through record linkage to the Canadian Mortality Data Base, and from information reported by provincial/territorial cancer registries. Observed survival proportions (OSPs) were based on period analysis (1999 to 2003). The 1-, 3-, and 5-year OSPs for all cancers combined were 92%, 85%, and 82% respectively. Among diagnostic groups, five-year survival estimates were highest for retinoblastoma (99%), carcinomas and other malignant epithelial neoplasms and malignant melanomas (91%), and for renal tumours (91%); they were poorest for hepatic tumours (68%), and for malignant bone tumours (68%). The five-year period survival estimate for all diagnostic groups combined was determined to be about 3% higher than the most up-to-date estimate possible based on a traditional cohort analysis (79%). Period estimates of five-year survival were similar to (< 1.0 difference) or greater than the corresponding cohort estimates for all diagnostic groups and subgroups analyzed; differences were greatest for acute myeloid leukaemias (5.3%) and for non-Hodgkin lymphomas (4.8%). The predicted five-year survival was 11% higher (82% versus 71%) than was reported in the only previous Canadian national study, which analysed cases diagnosed from 1985 to 1988. Among diagnostic groups, the largest survival increases were observed for hepatic tumours (20%), leukaemias (15%), and central nervous system neoplasms (14%). The current survival estimates provide a more realistic outlook of survival in this population and may consequently prevent patients, their families, and clinicians from being unduly discouraged.

Key words: Adolescent; Child; Epidemiological methods; Neoplasms; Prognosis; Registries

OP35

SURVIVAL FROM CANCER IN VICTORIA, AUSTRALIA USING THE "PERIOD" METHOD

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Period analysis was used to produce survival estimates using cancer registry data from 1982–2004. Survival was estimated for all cancers combined and for 34 common cancers by sex, age group at diagnosis and region of residence. Where appropriate, survival was also estimated for morphological subgroups or subsites. For total and the 10 most common cancers, survival was estimated for the state's 8 Integrated Cancer Services (ICS) regions. Trends were assessed by examining estimates for certain years, 1990, 1995, 2000 and 2004. The most recent estimates of 5-year period survival for prevalent cases in 2004 and were as follow: total cancer 61%, oesophagus 17%, stomach 25%, colon 63%, rectum 63%, liver 10%, pancreas 5%, larynx 64%, lung 11%, melanoma 90%, female breast 87%, cervix uteri 70%, corpus uteri 84%, ovary 41%, prostate 845, testis 99%, bladder 51%, kidney 68%, CNS 23%, NHL 66%, HL 82%, MM 32%, ALL 66%, CLL 56%, AML 43% and CML 56%. These compare well to other published estimates. Generally, estimates for females were superior to those for males with statistically significant differences observed for; total cancer 64 vs 58%, lung 14 vs 9%, melanoma 93 vs 86%, thyroid 94 vs 85% and AML 18 vs 9%. There was statistically significant regional variation in survival for a number of cancers. Generally, Melbourne metropolitan residents enjoyed better survival than non-metropolitan residents, 62% vs 59%. Statistically significant metropolitan/non-metropolitan variations were observed for oesophagus 21 vs 11%, stomach 27 vs 20%, colon 63 vs 61%, liver 12 vs 5%, pancreas 6 vs 3%, lung 12 vs 9%, melanoma 91 vs 88%, prostate 86 vs 80%, kidney 69 vs 65% HL 86 vs 73% and AML 17 vs 12%. There was also statistically significant variation in survival between the 8 ICS regions; ranging from 64–57% for all cancers, 29–16% for stomach, 12–8% for lung and 67–55% for kidney cancers. For a few cancers, however, there was insignificant regional variation in survival; e.g. 5-year breast cancer survival varied from 85–90% ($p = 0.13$). Colorectal cancer and NHL also showed little regional variation in survival. Reasons for the patterns of variation observed and the strategic use of this information to progress efforts at cancer control will be discussed. As interpretation of survival differences is limited currently by lack of prognostic information, plans are being drawn to collect a minimum clinical data set including details of staging and treatment on a population basis.

Key words: Period survival analysis; Victoria trends; Regional variation

OP36

PROGNOSIS FOR LONG-TERM SURVIVORS OF CANCER

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Background. Many cancer patients who have already survived some time want to know about their prognosis, given the pre-condition that they are still alive. We described and interpreted population-based conditional 5-year relative survival rates.

Patients and Methods. The longstanding Eindhoven Cancer Registry collects data on all patients diagnosed with cancer in the southern part of the Netherlands. Patients aged 25–74 years, diagnosed between 1960 and 2004 were included. Conditional 5-year relative survival was computed for every additional year survived (follow-up period 1980–2004).

Results. For patients with colorectal cancer, cutaneous melanoma or stage I breast cancer, conditional 5-year relative survival was over 95% after having survived 3–15 years. However, for stomach, lung, stage II or III breast, prostate cancer or Hodgkin lymphoma, conditional 5-year relative survival did not exceed 75–94%. Initial differences in survival at diagnosis between age, gender and stage groups largely disappeared after having survived for 5–10 years.

Conclusion. Prognosis for patients with cancer generally improved with each year survived. Patients with colorectal cancer, cutaneous melanoma or stage I breast cancer hardly exhibit any excess mortality after 3–15 years, whereas for patients with other tumours survival remained poorer than for the general population. Insight in conditional survival is especially useful for (ex)patients, who may use this information to plan their remaining life.

Key words: Cancer; Conditional survival; Long-term prognosis; Period survival; Population-based

Invited Lecture – IL07

PROVISION OF LONG-TERM SURVIVAL ESTIMATES FOR CANCER PATIENTS DIAGNOSED AND TREATED IN THE REMOTE PAST, IN RECENT YEARS AND AT PRESENT: FROM COHORT ANALYSIS TO PERIOD ANALYSIS TO MODELLED PERIOD ANALYSIS

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During the past decades, long-term survival expectations have substantially improved for many forms of cancer. However, these improvements have often been disclosed with substantial delay by traditional cohort-based methods of survival analysis. Period analysis, first introduced in 1996,1 has been shown to provide more-up-to-date estimates of long-term cancer survival. 2-4 However, even period estimates of long-term survival can lag behind survival expectations of newly diagnosed patients in case of ongoing improvement in prognosis, particularly since cancer registry data often become available with a delay of several years. Recently new methods of modelled period analysis have been proposed to overcome this limitation.5,6 The presentation will give an overview on these methodological developments and illustrate their use for estimating long-term survival of for cancer patients diagnosed and treated in recent years and at present.

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Oral Presentation – OP37

MELANOMA PATTERNS OF CARE STUDY

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Introduction. Australia has the highest incidence rate of melanoma in the world (i). Melanoma is also the fourth most common cancer in Australia (after colorectal, breast and prostate cancer) (ii). In 2004, a total of 3402 cases of cutaneous melanoma were registered in New South Wales (NSW) (1951 in men, and 1451 in women) (iii).

Purpose. To evaluate the care received by patients recently diagnosed with melanoma in NSW and to compare present care with the best-practice guidelines in Australia (iv).

Materials and Methods. In association with the NSW Central Cancer Registry (CCR), we are identifying all new notifications of melanoma in NSW residents received by the Registry over a one-year index period. The index period began in late October 2006 and will extend to October 2007. During this period, notifications of melanoma are being identified as soon as possible after they reach the CCR and made available for the Study. In addition, clinicians identified in the notifications are being asked to complete a questionnaire on the care they have given their patient. If patients were referred on to other clinicians, these clinicians are also being asked to complete a questionnaire.

Results. This study is currently in progress. Patterns of care information obtained will include: nature and utilisation of diagnostic services; access to and utilisation of diagnostic and pathology services; quality of pathology services; regional variations in the assessments and procedures performed; adherence to best-practice guidelines for surgery, chemotherapy, radiotherapy, and psychosocial support or counselling; documentation of family history; and referral to specialist melanoma centres.

Discussion. Valuable information on the distribution, coordination and quality of existing services in NSW will be made available through this study. It is envisaged that this will contribute towards the planning and development of such services in the future.

Key words: Patterns of care; Delivery of health care; Health care surveys; Guideline adherence; Melanoma

OP38

GENDER DIFFERENCES IN CANCER PATIENT SURVIVAL FOR SOLID CANCER SITES – A POPULATION BASED ANALYSIS IN TYROL/AUSTRIA

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Introduction. Several groups in our country are of the opinion that female cancer patients experience worse survival compared to male patients. Therefore it was our goal to investigate whether there are gender differences in cancer survival for solid cancer sites.

Material and Methods. The study was conducted as population-based observational study. We analysed the most recent ten year incidence data from Tyrol/Austria, covering years of diagnosis 1994 to 2003. Patient status was assessed via passive follow-up by record linkage to the official mortality data. We applied an excess hazard model by modelling relative survival rates restricted to the first five years of follow-up by a generalised linear model as proposed by Hakulinen and Tenkanen. Relative survival rates were calculated using procedure strs written by Paul Dickman et al. We analysed most solid cancer sites.

Results. For females, we found no statistically significant higher excess risk and a statistical lower excess risk for lung cancer. Excess risk for melanoma and for liver was at borderline significance. In detail: excess risk for females, adjusted for age, stage and type of hospital, was 0.81 for oesophagus cancer (95% CI 0.46, 1.41), 0.90 for stomach cancer (95% CI 0.77, 1.05), 1.05 for colorectum cancer (95% CI 0.92, 1.20), 1.35 for liver cancer (95% 0.99, 1.86), 0.93 for pancreas cancer (95% CI 0.70, 1.23), 0.78 for lung cancer (95% CI 0.70, 0.87), 0.59 for melanoma (95% CI 0.34, 1.01), 1.04 for bladder cancer (95% CI 0.80, 1.37), 1.04 for kidney cancer (95% CI 0.72, 1.48) and 0.80 for head and neck cancer (95% CI 0.61, 1.05).

Key words: Survival; Gender difference

OP39

AUTOPSY-BASED CANCER DIAGNOSES: EXPERIENCE OF THE FRIULI VENEZIA GIULIA CANCER REGISTRY (NORTHEAST ITALY) AND IMPLICATIONS FOR INCIDENCE AND SURVIVAL ESTIMATES

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The Friuli Venezia Giulia (FVG) Cancer Registry (CR), Northeast Italy, is active on regional bases since 1995; however, cancer registration in the Trieste province actually begun in 1984. Autopsy exams in a large percentage of deceased subjects at the Trieste Hospital represented a peculiarity in the national and international scenarios of cancer registration. An appropriate assessment of the impact of autopsy-based diagnosis seems, thus, necessary for a systematic comparison of cancer incidence and survival rates in FVG with rates from other Italian and international CRs. Thus, to verify the impact of autopsy-based diagnoses, we conducted a statistical analysis on 88,798 cases of malignant primary cancers registered in FVG between 1995 and 2003. We included in the analysis incident cases in which the autopsy exam was the only diagnostic method (i.e. autopsy-based diagnoses). Among the 88,798 incident cancers registered from 1995 to 2003, 2.1% was diagnosed at autopsy. This percentage was much higher than that reported from other CRs (on average, 0.1–0.3%) and ranged from 0.4% for cases registered in the provinces of Udine and Pordenone to 6.1% for cases registered in the provinces of Trieste. Autopsy-based diagnoses were particularly common in the elderly (4.1% in ≥ 75 years), and showed a slight decrease in 2000–2003 as compared to 1995–1999. The autopsy-based diagnoses were particularly frequent for pancreas and hepatic carcinomas (7.3% and 6.3%, respectively) and for lung cancer (3.4%). Less frequent were the autopsy-based diagnoses of non-Hodgkin lymphomas (2.5%), and rare those of breast cancer. The high frequency of autopsy-based diagnoses can lead to a substantial re-examination of cancer incidence in FVG, with respect to other Italian areas. For instance, the analysis of hepatocarcinoma or kidney cancer incidence, limited to cases diagnosed in living subjects (i.e. cases with an impact on the national health care system) could see a substantial reduction, curbing the gap between FVG CR rates and other Italian CRs. There also implications for survival analysis, that are represented by the potential heterogeneity in the classification of these cases, which is an obstacle to overcome in the identification, by a univocal approach, of autopsy-based cases that should be excluded from survival analysis.

Key words: Autopsy-based cancer diagnosis; Cancer incidence; Survival; Cancer registry

OP40

POPULATION SURVIVAL FROM CHILDHOOD CANCER IN GREAT BRITAIN DURING ERAS OF ENTRY TO CLINICAL TRIALS

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Background. Between 1978 and 2002 there were marked increases in the range of clinical trials available for children with cancer in Britain and the numbers of patients entered in them. Over the same period, five-year survival for children diagnosed before age 15 with any type of cancer rose from 49% to 79%.

Aims. To document and interpret trends in population-based survival from childhood cancer during eras of entry to successive national and international trials during 1978–2002, using data from the National Registry of Childhood Tumours.

Methods. Diagnostic categories included were all those with annual incidence above 1 per million for which a trial was open during at least half the study period: precursor-cell acute lymphoblastic leukaemia (ALL), acute myeloid leukaemia (AML), Hodgkin lymphoma, non-Hodgkin lymphoma (NHL, including mature B-cell leukaemia), medulloblastoma, neuroblastoma, Wilms tumour, hepatoblastoma, osteosarcoma, Ewing sarcoma of bone, rhabdomyosarcoma and non-CNS germ-cell tumours. The study included 22,764 children, 66% of all registered childhood cancers in the study period. Follow-up was virtually complete to 31 January 2007. Actuarial survival was calculated by the Kaplan-Meier method, with heterogeneity of survival curves tested by log-rank tests. Time trends in survival were analysed by Cox regression. Change in risk of death was defined as 1 minus the hazard ratio. Since there were often separate trials for younger and older children with ALL, medulloblastoma and neuroblastoma, separate analyses were done for children diagnosed in these categories at ages below and above 1 year, 3 years and 1 year respectively.

Results. Survival increased significantly during 1978–2002 for every diagnostic category, with annual reduction in risk of death (ARR) ranging from 3.0% (medulloblastoma, age 0–2) to 12.3% (gonadal germ-cell tumours). Survival varied significantly between eras for all categories. For many categories there were steady improvements between trial eras, e.g. the risk of death always fell between successive eras by > 20% for ALL age 1–14 and by > 10% for Wilms tumour and rhabdomyosarcoma, whereas there was little sign of change since the mid 1980s for medulloblastoma age 0–2, osteosarcoma or Ewing sarcoma. Survival increased signifycantly within at least one trial era for ALL (age 1–14), AML, Hodgkin lymphoma, NHL, neuroblastoma (age 1–14), Wilms tumour, Ewing sarcoma and germ-cell tumours.

Conclusions. Changes in population-based survival between trial eras parallel the improvement (or lack of improvement) reported by the relevant clinical trials. Improvements within eras perhaps reflect wider participation in trials and increasing experience with their regimens.

Key words: Childhood cancer; Survival; Clinical trials; Evaluation of care

THE ROLE OF CANCER REGISTRIES IN CANCER CONTROL

Session 5:

Cancer registries in the evaluation of late effects of treatment for a primary cancer

Invited Lecture – IL08

CANCER SURVIVORSHIP: LATE HEALTH EFFECTS AND RESEARCH STRATEGIES

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A number of large studies have investigated the occurrence of neoplastic and – to some extent also – nonneoplastic diseases after a successful treatment for cancer. In addition, psychosocial late effects have been a new area of rising concern and interest over the past decade. Since the 1960s the 5-year relative survival has increased steadily to reach one of 65% around the turn of the century, implying between 3 and 4% of the population in the industrialized countries of to day are cancer survivors. This enlarging cancer survivor population provides important opportunities for biological, clinical and epidemiological research into disease mechanisms, effects from treatment and disease prevention. Population-based cancer registries have so far been an invaluable source of information in this type of research as they have provided large study populations with a first primary cancer. This has enabling the detection of even small increases in the risk of second primary cancers or – potentially – other late complications of cancer therapy, and the evaluation of long-term trends according to type of first cancer, sex and age at treatment. However, limitations of registry-based cohort studies are primarily lack of information on nonneoplastic outcomes, no storage of bio specimens, and insufficient availability to treatment data, although the latter on some occasions has been overcome by use of a nested case-control design with review of the medical records of the patients. Of course, results from this type of research may be of direct and immense value in counselling of patients and their families, e.g. through the description of treatment-associated risks for second cancer and the documentation of dose-response relations between specific chemotherapeutic agents, or therapeutic radiation, and site-specific risk. However, the growing population of cancer survivors, if registered with pertinent epidemiological, clinical and biological data, may also serve as a strong research platform in future studies of gene-environment and gene-gene interactions in carcinogenesis and other toxic body reactions. The establishment of well-functioning, large bio banks in conjunction with cancer registries, clinical databases, or multi-centre clinical trials may constitute the next big step forward in research of biological mechanisms behind chronic diseases. Such systems will include documentation on the potentially carcinogenic anti-cancer treatments (chemotherapy and radiotherapy), data on the exposure window in age and time, and bio specimens for high-quality genotyping and for tumour phenotyping. Such data are all needed for the detailed study of the disease-causing interaction between exposure of the individual and his genotypic composition. It has been estimated that genetics contributes 20–95% of the variability in cytogenetic drug disposition and effects. The prospective identification of patients genetically susceptible to the late complications of cancer treatment could – by the end – result in opportunities to individualize therapy in a way which will maximize therapeutic benefit and minimize serious late toxicity.

Oral Presentation – OP41

MORTALITY FROM HEART DISEASE AFTER RADIOTHERAPY FOR BREAST CANCER

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Radiotherapy for early breast cancer can reduce breast cancer mortality, but the treatment often involves some unwanted irradiation of other tissues, particularly the heart. Clinical trials have shown that some radiotherapy regimens used in the past led to increased mortality from heart disease, and that the magnitude of this increase has sometimes been large enough to reduce the beneficial effect of the radiotherapy substantially. Radiotherapy techniques have changed in recent years and present day radiation doses to the heart are usually lower than previously. Nevertheless, many regimens still involve cardiac doses well above those that have increased mortality from heart disease in other populations, such as the survivors of the Japanese atomic bombings. Radiotherapy regimens that irradiate the heart generally do so to a greater extent when used to treat left-sided than when used to treat right-sided breast cancer. Therefore, a comparison of heart disease mortality rates between women irradiated for left-sided and for right-sided breast cancer can give an indication of the extent to which the risk of heart disease has been increased as a result of the radiotherapy. The Collaborative Group on Observational Studies in Breast Cancer Survivors has recently been established with the aim of using data from cancer registries to find out more about the long-term side-effects of treatment for breast cancer. The main focus at present is on radiotherapy. Questions that are being addressed include:

- How long does any risk of radiation-related heart disease take to appear?
- How long does the excess risk last?
- Does the risk vary from country to country?
- Does the risk vary according to patient's age?
- Does chemotherapy or hormonal therapy (especially with drugs known to damage the heart) modify the radiation-related risk?
- Is there any evidence that the risk has decreased in recent years?

Over 40 cancer registries in all five continents have joined the Collaborative Group. It is expected that together they will be able to provide data on about a million women irradiated for breast cancer. This should help to characterise the risk of heart disease resulting from radiotherapy for breast cancer. Such information will be relevant both to the development of cancer treatment guidelines and to decisions regarding individual patients in the clinic. Preliminary results from this collaboration will be presented.

Key words: Breast cancer; Cancer survivors; Radiotherapy; Heart disease

OP42

DEVELOPING OESOPHAGEAL ADENOCARCINOMA AS A SECOND PRIMARY AFTER PROSTATE OR BREAST CANCER: HORMONES, TREATMENT OR SOMETHING ELSE?

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Introduction. In the last three decades there has been a dramatic rise in the incidence of oesophageal adenocarcinoma (OAC) in Northern Europe and the USA, with rates seen in men being 5-times higher than in women. We explored whether androgens or oestrogen could have a role in the aetiology of OAC by examining whether there was an increased risk of developing oesophageal cancer overall, and for OAC and oesophageal squamous cell carcinoma (OSCC) separately, in patients previously diagnosed with hormone-related cancers of either prostate or breast. Additionally, we examined whether use of radiotherapy (RT) for breast cancer increased this risk, as previously reported in the USA.

Methods. Cancer registry data for the West Midlands, UK (pop = 5.3 million) were used to identify patients with a first invasive primary of either the prostate or the breast between 1977 and 2004. These patients were then followed up until a diagnosis of a second invasive cancer (excluding non-melanoma skin cancer), death or end of time frame (31/12/2004). Age- and period-adjusted standardised incidence ratios (SIRs) were calculated to obtain estimates of the relative risk of a second malignant primary of oesophageal cancer overall, OAC and OSCC.

Results. Initial work suggests that men with a prior diagnosis of prostate cancer had an SIR of 0.70 (0.50, 0.95) of developing OAC. This pattern was not seen for OSCC (1.03; 0.69, 1.49). Women with a previous diagnosis of breast cancer were no more likely to develop OAC (1.05; 0.71, 1.49) than would be expected in the general population for the same period/age structure. Use of RT for breast cancer was also not shown to increase the risk of OAC (0.99; 0.50, 1.78) or for all oesophageal cancers (1.07; 0.79, 1.41) in our study with overall nearly half a million person-years of follow-up.

Conclusions. Neither androgen- nor oestrogen-related tumours appear to increase the risk of developing oesophageal cancer; indeed men having prostate cancer appear to have a protective effect against the risk of getting OAC. This may be due to confounding; for example, with obesity, other lifestyle behaviour changes, social affluence, ethnicity or PSA screening and testing. The adverse effect seen elsewhere of RT for breast cancer increasing the risks of developing both OAC and OSCC, may have been avoided in the West Midlands because irradiation of the internal mammary chain was not performed after the early 1980s.

Key words: Oesophageal adenocarcinoma; Risk of second primary cancers; Hormone-related tumours; Age- and period-adjusted SIRs; Aetiology of oesophageal cancer

OP43

CARDIAC DAMAGE AFTER TREATMENT OF CHILDHOOD CANCER

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The purpose of the study was to determine the frequency of late effect on the heart of childhood cancer survivors in Slovenia and to identify groups at the highest and lowest risk. Included in the study were 211 survivors, treated between 1968 and 1998 at ages of less than 18 years. All were over 18 years and at least 5 years after end of treatment. The observation time was 5–32, average 16 years. Fifty-nine had been treated surgically, 191 had received chemotherapy, 166 radiation, in 56 of whom the heart had been within the field of radiation. The total radiation dose with the area of the heart was between 10–42 Gy, average 28 Gy. Chemotherapy with anthracyclines had been given to 146 patients, to the total dose of 50–620 mg/m^2, average 247 mg/m^2. Antracyclines together with alkylating agents had been given to 136 patients. Thirty-three children had been treated with anthracyclines and radiation to the heart area. The cardiological diagnostic methods included history, physical examination, electrocardiogram (ECG), electrocardiographic exercise testing on a bicycle ergometer and echocardiography. Descriptive and univariate analysis (chi square test) as well as multivariate analysis (decision tree) were used for data analysis. Our analysis showed abnormalities in the structure and function of the heart in 53% of survivors. They were all asymptomatic. However, in 2 of these, cardiac death occurred. The period time of treatment (1989–1998) emerged as an important risk factor for any injury to the heart (73% of survivors). Among survivors treated earlier are at the highest risk those with Hodgkin lymphoma treated with radiation above 30 Gy and those treated for sarcoma. At the lowest risk for injury of the heart are those treated for brain tumours and those with other malignancies treated with low total dose of anthracyclines. Among specific forms of heart injury, patients treated with large doses of anthracyclines or concomitant alkylating agents are at highest risk of systolic function defect and enlarged heart chambers and those treated with anthracyclines are at highest risk of diastolic function defect. Radiation to the heart area correlated to the valve injury both in uni- and multivariate analysis.

Key words: Cardiac damage; Childhood; Cancer

OP44

BREAST CANCER RECURRENCE IN NORTH-HOLLAND/FLEVOLAND, THE NETHERLANDS: A POPULATION-BASED STUDY AMONG WOMEN DIAGNOSED WITH BREAST CANCER IN 2000

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During the past decades, breast cancer treatment in the Netherlands changed considerably. Locoregional treatment has shown a tendency towards less mutilating breast conserving surgery, while the introduction of the sentinel node biopsy has decreased the number of axillary lymph node dissections. On the other hand, the proportion of women receiving adjuvant therapy has gradually increased. In this study we have investigated the odds of recurrence in a recent population based cohort of women diagnosed with breast cancer in 2000. A total of 1579 women with operable breast cancer (T1-2, N0-1) and 134 women with locally advanced breast cancer (T3 and/or N2-3) were selected from the Amsterdam Cancer Registry, which covers two out of twelve Dutch provinces. All women underwent radical surgery. Active follow-up was performed in all hospitals and all recurrences were registered. Recurrence in the overlying skin, in the remaining breast after breast conserving therapy or soft tissues of the breast after mastectomy was considered as local recurrence. Recurrence in regional lymph nodes (axillary, infraclavicular, supraclavicular, internal mammary) was considered as regional recurrence and all other sites as distant recurrence. Local recurrence within five years after surgery occurred in 46 women (2.7%), while 20 women had regional recurrence (1.2%). As six women had both local and regional recurrence a total of 60 women experienced locoregional recurrence (3.5%). This percentage was higher for locally advanced breast cancer (9.7%) than for operable breast cancer (3.0%). Distant recurrence occurred in 213 women (12.4%). No statistically significant difference in local recurrence was found between breast conserving therapy and mastectomy, nor was a difference in regional recurrence observed between sentinel node biopsy and axillary lymph node dissection. The risk of locoregional recurrence increased with higher T/N-stage and less favourable tumour grading. Survival after locoregional recurrence was mainly determined by the occurrence of distant metastasis. In conclusion, locoregional recurrence only occurred in 3.5% of the women. Recurrence was associated with tumour characteristics, but not with locoregional treatment.

Key words: Breast cancer – recurrence, survival

STRATEGIES OF CANCER CONTROL

OP45

UICC STRATEGIC DIRECTION FOR ASIAN CANCER PREVENTION AND CONTROL

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From the current international cancer statistics of the WHO, a number of annual cancer incidences in the world was estimated at more than 10 million and more than 50% are detected in Asia. To establish practical strategies for cancer controls in Asia, first we should accumulate epidemiological evidences on risk and protective factors of cancers to promote the primary prevention. From epidemiological evidences in Asian Pacific, more than 30% of cancers are attributable to tumour viruses, bacteria and parasites, respectively. Furthermore, habitual smoking is a definitive cause of 25–35% of cancers. The remaining 20–30% of cancers are caused by dietary habits and physical inactivity. Global and regional strategic direction for cancer control should change over time with new developments in technology, but the principle idea remains based on general lifestyle improvement as a primary prevention and early detection for effective treatment as a secondary prevention. Establishing a practical prevention programme for cancer control in Asia under the UICC and related organizations could be a model of cancer control programme in developing countries in the world.

Key words: Cancer prevention; Asia; UICC

OP46

MONITORING AS A KEY COMPONENT OF THE WHO GLOBAL ACTION PLAN AGAINST CANCER

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WHO has developed the Global Action Plan Against Cancer (GAPAC) which converges global WHO programmes into country tailored national cancer control programs (NCCP) in a step wise way. The four goals of the GAPAC are: to prevent cancer, to cure and care for cancer patients and to manage for results. Managing means developing cancer prevention and control programmes based on evidence about the burden of cancer and the level of risk and monitoring implementation along well defined indicators.

GAPAC stems upon the existing WHO programs needed to address the full continuum of cancer control which includes programs targeting behavioural risk factors as well as infections control (immunization), WHO occupational and environmental health programmes, health system development, essential medicines and technologies and surveillance programmes. At the country level WHO provides with the National Cancer Control Program (NCCP) framework a blueprint governments can use to improve cancer control according to need and opportunities. The development of surveillance systems which include cancer registries are crucial for NCCP development and implementation.

WHO supports NCCP planning in WHO Member States by developing a global monitoring system for cancer prevention and control based on country specific information. A first set of country specific data based on the WHO mortality data base is available at www.who.int/cancer. This set of country information will be expanded by including data about the main cancer risk factors. The cooperation between WHO surveillance programes and IACR will be important to provide good quality data on the cancer burden for WHO Member States.

Poster session 1:

GEOGRAPHY OF CANCER

P003

SOLID CANCER INCIDENCE RATES IN THE REPUBLIC OF BELARUS (1970–2005)

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Objective. Obligatory cancer registration in Belarus has been started since the 1953d. Personified data on cancer incidence in Belarus from 1960 to 1990 is saving in the Department of Cancer Epidemiology of N.N. Alexandrov Research Institute of Oncology and Medical Radiology (the Head cancer research centre in Belarus). Since the 1989 data on cancer incidence and mortality have been fully computerised. Belarussian Cancer Register contains information on each case by more than 60 points (including data on person, diagnosis, treatment, morphology, outcome and etc). Both existing systems are to be used in descriptive and analytical epidemiological studies of cancer. Time and geographically related analysis of cancer distribution in population is crucial to clarify many questions on cancer aetiology, pathogenesis and prevention.

Methods. The data on cancer incidences of Belarussian Cancer Registry study for the past 36-years (more than 880,000 cases since 1970 to 2005). Time-related trends for Age Standardized Incidence Rates (ASRWorld) were analyzed. We used GIS methodology visually demonstrate standardized incidence ratios (SIR) in dynamics for 1970–2005 in the 117 political districts.

Results. Notable changes in the structure of cancer incidence occurred over the period considered. Five main types of time-related ASR trends were distinguished. No considerable changes in ASR were detected for liver, pancreas, oesophagus, larynx, lung, cervix uteri, ovarian and bladder female cancers. A gradual growth of ASR was noted for colon cancer and melanoma of skin in both males and females; breast, corpus uteri and renal female cancers. Considerable decrease in ASR of stomach cancer in both males and females and lip cancer in males was shown. ASR for female and male rectosigmoidal cancer and male cancers of thyroid gland, oesophagus, larynx, lung and bladder had been increasing till the middle of the 90s to be fixed at a certain level then. Incidence rates for skin cancers in both sexes, prostatic and renal cancer in males and thyroid cancer in females slowly increasing from the 70s began to grow rapidly in the middle of the 90s. The above-mentioned 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.

Key words: Solid cancers; Incidence rates trends; GIS; Atlas of cancer incidence rates

P009

THE CANCER REGISTRY OF NEW CALEDONIA: THE BASIC TOOL TO HIGHLIGHT

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In New Caledonia, mesothelioma presents very high incidence rates: the world-standardized incidence for the period 1989–2003 is 11.2 for male and 9.4 for female in Melanesians. The sex ratio close to 1 and the young age of the cases are consistent with environmental exposure. In 1994, a relationship was established between excess cases and a traditional lime, called “Pö”, to cover Melanesian houses. A case control study was conducted in 2004 by the Cancer Registry and showed that the major risk area were located in Houailou (OR = 119; 95% CI = 34; 502). Mining activity and Pö were not significant risk factors. The existence of a significant relationship between soil containing serpentinite and mesothelioma was demonstrated ($p = 0.017$). A research project has been initiated in the two highest risk areas, with the objective of determining the possible exposure factors. All pleural mesotheliomas diagnosed between 1984 and 2006, confirmed by histology, and living in the highest risk districts, were selected from the Cancer Registry of New Caledonia. Epidemiological and geological investigations were conducted, fibres sensors were placed on life zones, and samples were geochemically analysed. All data were integrated into a Geographical Information System. The distributions of mesothelioma incidence rates by tribes, exposure to the Pö, tremolite and chrysotile outcroppings, tracks, mining activity, and airborne pollution are presented on maps.

Key words: Mesothelioma; Asbestos; Environmental exposure risk investigation; Epidemiology; Geology; Maps

P013

PROSTATE CANCER PATTERN IN THE BORDERING AREAS OF FRIULI-VENEZIA GIULIA, ITALY, AND SLOVENIA, 1995–2003

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Aim. The province of Trieste, the south-eastern part of Italian Friuli-Venezia Giulia (FVG) region on western Slovenian border, has displayed an excess of prostate cancer (PC) since the availability of mortality statistics at province level in 1970s. This study aimed to clarify the origin of such pattern by comparing the geographical distributions of PC incidence in two neighbouring regions: FVG and western Slovenia.

Materials and Methods. Number of cases disentangled by age, residence (219 municipalities in FVG and 40 municipalities in western Slovenia), and period (1995–98, and 1999–2003) were obtained from FVG and Slovenian cancer registries. Incident cases based on autopsies were excluded. Corresponding resident populations were derived from Italian and Slovenian National Institute of Statistics. As the data on PC cases at municipality level are scarce, a fully Bayesian modelling approach with Markov Chain Monte Carlo method was used to compute relative risk (RR) estimates. Computations were conducted separately for each country to prevent smoothing in bordering municipalities. In addition age-standardized rates (ASR) (European population) were computed.

Results. PC incidence increased during recent years. In 1999–2003, ASRs were 113/100,000 and 56/100,000 in FVG and West-Slovenia, respectively. In Trieste province ASR was 130/100,000. Moreover, the RR in Trieste province was statistically higher then in other parts of FVG in both observed periods. The RR of the 40 western Slovenian municipalities tended, although not significantly, to be lower than Slovenia average and displayed a north-south spatial gradient (higher risk in northern part). No significant excesses were displayed by any Slovenian municipality bordering Trieste.

Conclusions. This preliminary study confirms an excess of PC incidence in Trieste province. The Slovenian municipalities bordering Trieste province displayed no significant excesses of PC incidence and an ASR more than half the rate of Trieste. FVG and Slovenia have been almost completely divided in the past by political reasons, while populations are genetically related. The modern diagnostic techniques together with PSA testing have been introduced in both regions simultaneously so it seems that the PC cases surpluses in Trieste could be attributable to the difference in the risk factors. A comparison of factors such as diet, sexual behaviour or awareness of PC would probably help understanding the described geographical PC pattern.

Key words: Prostate cancer – Italy, Slovenia, bordering areas

P060

CANCER INCIDENCE IN TWO AREAS OF CATALONIA, SPAIN. SIMILARITIES AND DIFFERENCES

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Background. Tarragona and Girona provinces are situated in Catalonia, Spain. They are covered by population-based cancer registries which use the same rules for registration and codification. They have similar values of quality indexes.

Objective. To compare the cancer incidence between both provinces and to enumerate the hypothesis that could explain the differences.

Material and Methods. All cancers (invasive and *in situ*) except skin non melanoma cancers registered by Tarragona and Girona cancer registries for the period 1998–2001 were *included in the analysis. Crude and world age-standardized incidence rates were calculated* using the direct method. Standardized incidence rates were compared using the approximate method and the Mantel-Haenszel test was applied to the cancers with a $p < 0.10$.

Results. In men, Girona province has significantly higher rates than Tarragona for lung (57.6 vs 49.9), prostate (57.7 vs 44.3) and all cancers as a whole (342.2 vs 312.9). In women, Girona presents significantly higher rates for thyroid (7.1 vs 4.4) and *in situ* cervix (26.2 vs 14.7) and *in situ* breast (7.2 vs 3.3) cancers. Girona also has higher (but not statistically significant) lung cancer rate in women (5.6 vs 4.1). Tarragona only has a higher incidence in youngest female's skin melanoma. The rates of the rest of tumours are not statistically different.

Discussion. In women, global cancer incidence is similar in both geographical areas and in men is slightly higher in Girona and these differences are concentrated in the oldest ages and in all ages in lung and prostate cancers. Lung cancer rates are higher in Girona in males and (not statistically significant) in females, probably showing a higher tobacco smoking prevalence in this province. The higher incidence for prostate cancer in Girona could be explained by a major use of PSA test in this province. Higher thyroid cancer incidence in Girona is explained by a cluster identified in one of the counties of the province. Until now the cause of this cluster is not known. Invasive breast and cervical cancer incidence are similar in both areas whereas *in situ* cancer rates of these sites are higher in Girona. The factor that could better explain these differences is the higher use of screening test for these cancers in this area.

Conclusion. Differences of cancer incidence were found in five types of cancer and for three of them they are probably caused by a major use of opportunistic screening. A higher tobacco consumption could explain the differences in lung cancer. Specific studies have been addressed to investigate these hypotheses.

Key words: Cancer incidence – comparison, geography

P093

GEOGRAPHIC INEQUALITIES IN LARYNX CANCER INCIDENCE AND MORTALITY IN MEN IN THE CITY OF ZARAGOZA (SPAIN)

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Objectives. Several studies relate low socio-economic status to a higher risk of cancer incidence and mortality. In addition, the geographic patterns shown by some tumours suggest the importance of environmental factors in their aetiology. Within the framework of the Spanish project MEDEA, this work tries to identify geographic inequalities in larynx cancer (LC) incidence and mortality in men in Zaragoza in the period 1996–2003 and its association with deprivation and environmental factors.

Methods. Mortality data of LC were available from the Aragon Mortality Registry and incident data from the population-based Zaragoza Cancer Registry. Socio-economic data were obtained from the 2001 national Census and the 2001 European Pollutant Emissions Register (EPER) database was used as source of location of potential polluting industries. The geographical analysis unit was the census tracts (CT) (462). The Standardised Incidence and Mortality Ratios (SIR and SMR) were obtained for each CT, using the CL incidence rates of the province of Zaragoza in men and the mortality rates of Spain respectively as standard. In each CT a synthetic indicator was obtained by principal components analysis from 5 socio-economic variables. The SIR and SMR were adjusted by a Bayesian GLMM model that accounts for the spatial heterogeneity. Deprivation indicator was introduced in the model discretised in quartiles. Environmental risk was considered as a binary variable that indicated if the centre of the CTs was 1 km or less from any of the industries included in the EPER.

Results. During the period of study 613 incident cases were registered and 211 deaths. The geographic analysis, comparing incidence and mortality, revealed greater differences in the northern CTs of the city of Zaragoza. The CTs in the lowest quartile (Q1) (lowest deprivation index) had lower risk of incidence as well as mortality by LC, with a risk increase in the higher quartiles. Thus, mortality due to LC of the highest quartile (Q4) was 2.74 times greater than Q1, and the incidence 2.26 times. These results remained after controlling for environmental risk, although the geographic variability explained by this variable was not significant.

Conclusions. The CTs with lowest socio-economic status have higher risk of LC incidence and mortality in men in Zaragoza for the study period. Nevertheless, the possible exposition to the polluting industrial focus does not explain the geographic variability of the incidence and mortality of this tumour.

Key words: Geographical variability; Larynx cancer; Deprivation index

P115

GEOGRAPHICAL DISTRIBUTION OF NASOPHARYNGEAL CANCER IN SARAWAK, MALAYSIA

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Sarawak is situated in the island of Borneo with multiple ethnic groups population. Hong Kong has been reported to have the highest incidence of nasopharyngeal cancer (NPC) with Age-Standardized Rate (ASR) of 21.4 and 8.3 cases per 100,000 populations for males and females respectively. The objective of this study is to determine the geographical distribution of NPC in Sarawak by utilizing geographical information system (GIS). Data of Sarawak Cancer Registry (1996–2004) was used for analysis. Global Positioning System receivers were used to determine the geographical coordinates of the cancer cases. Data of NPC cases were overlayed on population census map and base maps and spatial analysis was performed. The incidence rate of NPC in Sarawak (ASR: 17.4 and 7.2 for males and females respectively) is almost as high as Hong Kong. Males Bidayuhs ethnic group has the highest NPC incidence rate (ASR: 34.1). Females Bidayuhs also has highest NPC incidence (ASR: 15.3). The incidence rate of NPC among Bidayuhs for both males and females in one province is 58.7 and 27.7 respectively which is about 3 times the incidence of NPC in Hong Kong. There are some small areas with high NPC incidence rates with highest as 108.5 and 138.9 for males and females respectively compared to the fairly homogenous distribution of other non-NPC cancers. There is a geographical variation in the distribution of NPC in Sarawak and certain provinces and small areas with very high incidence of NPC.

Key words: Nasopharyngeal cancer – geography, map, Sarawak, Malaysia

P152

GEOCODING THE NSW CENTRAL CANCER REGISTRY DATABASE: IMPLICATIONS FOR CANCER CONTROL IN SYDNEY AUSTRALIA

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Introduction. The NSW Central Cancer Registry records the residential address of all persons with cancer at the time of diagnosis. On the basis of this address, a National Locality coder is applied that determines the Local Government Area of residence and subsequently, the Area Health Service of Residence. When new boundaries are introduced to these jurisdictions, addresses need to be remapped to these boundaries so that numerator and denominator information is compatible. To facilitate remapping and increase the understanding of effects of geographical factors on cancer incidence, geocoding has been undertaken.

Methods. All addresses of NSW cases recorded on the NSW Central Cancer Registry database and diagnosed between 1972 and 2004 were geocoded using two different geocoding methods. As a result, a longitude and latitude coordinate was obtained for every case, as well as an updating of the entire database using 2001 census boundaries.

Results. A comparison is made of cases geocoded to 2001 ASGC boundaries and cases allocated to 1991 boundaries using the National Locality Index coded. Differences in numbers of cases and incidence rates were considered for all NSW Local Government Areas. In addition, the quality of address information on the Registry and levels of confidence associated with different geocoded coordinates will be presented. Distances in kilometres between cancer cases and the centre of Sydney have been calculated using the Great Circle Distance Calculator.

Conclusion. Geocoding of the Central Cancer Registry database ensures that boundary changes in the future can take place with relative ease. Geocoding also will facilitate measurement of changes in socio-economic status and the production of indices of remoteness, as well as enable a better understanding of outcomes based on distance travelled to access cancer services in Sydney Australia.

Key words: Geocoding; Great distance circle calculator; Cancer registry; Cancer control

Poster session 2:

SURVIVAL AND CARE OF CANCER PATIENTS

P028

STAGING NON-SMALL CELL LUNG CANCER WITH MEDIASTINOSCOPY ACCORDING TO GUIDELINE?

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Objective. Treating non-small cell lung cancer (NSCLC) patients according to guidelines is important for the quality of care. A mediastinoscopy is an important aspect of staging as it can spare patients an unnecessary thoracotomy. We set out to evaluate the use of mediastinoscopy, and the effect on lead time, for staging NSCLC in relation to the Dutch national guideline.

Method. Patients diagnosed with NSCLC in the period May – November 2005 were selected from the population-based cancer registry of the Comprehensive Cancer Centre North Netherlands (CCCN). Additional data were collected from the medical files concerning referral and diagnostic examinations. According to the prevailing guideline a patient should first receive a FDG-PETscan and second a mediastinoscopy before undergoing a thoracotomy. Staging NSCLC should be done within 21 and 35 days depending on indication for mediastinoscopy. The norm for waiting time from last staging activity until start treatment is 14 days.

Results. In the CCCN-region 521 patients were diagnosed with NSCLC. Patients were excluded because of metastasis outside the thorax (n = 107), early death (n = 11) or other reasons (n = 34). The study comprised 369 patients. The male-female ratio was 10:3 with a mean age of 68.3 years (range 35.8–90.7). In total, 122 patients (33.1%) underwent a thoracotomy. Only 35 (28.7%) received a FDG-PETscan and mediastinoscopy prior to thoracotomy. Seventy-seven patients (63.1%) only underwent a FDG-PETscan and 6 (4.9%) only a mediastinoscopy before thoracotomy. In total 64 (17.3%) of the 369 patients underwent mediastinoscopy. Of those, 50 (78.1%) met the requirements for mediastinoscopy. Of the remaining 305 patients, 174 (57.0%) correctly did not get mediastinoscopy, according to the guideline. Overall, for 60.7% of the patients the guideline was followed regarding mediastinoscopy. Twenty-seven patients (42.2%) underwent mediastinoscopy within 35 days after first hospital visit. In comparison, 169 patients (60.4%) without mediastinoscopy received a diagnosis within 21 days. Eleven (17.0%) of 53 patients, who underwent mediastinoscopy received further treatment within 14 days. Fourteen (10.6%) of 132 patients, who did receive treatment but had no prior mediastinoscopy, started treatment within 14 days after diagnosis. Combined, from first visit until start treatment, 25 (42.4%) of 53 patients with mediastinoscopy were within the norm (49 days) compared to 27 (20.5) of 132 patients without mediastinoscopy (35 days).

Conlusion: The guideline for mediastinoscopy was followed correctly in 60.7% of the patients. For diagnostic lead time, patients with mediastinoscopy (42.4%) scored more frequently within the norm than those without mediastinoscopy (20.5%).

Key words: Guideline; NSCLC; Mediastinoscopy

P042

TREATMENT AND SURVIVAL OF NON-SMALL CELL LUNG CANCER STAGE I AND II IN THE NETHERLANDS, 1995–2002

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Background. Lung cancer is a major health problem. It is the number one cause of death among cancers. About 75% of all lung cancers are Non-Small Cell Lung Carcinoma (NSCLC). Aim of this study was to give an overview of trends in histology, stage, treatment and survival of Non-Small Cell Lung Cancer in the period 1995 to 2002 in the Netherlands.

Method. Over the period 1995–2002 all cases of NSCLC stage I and II were selected from the Netherlands Cancer Registry (NCR). From the regional cancer registries additional data on treatment and follow-up was collected. Univariate and multivariate Cox-regression was used to determine the influence of age at diagnosis, tumour stage, morphology, year of diagnosis and region of Comprehensive Cancer Centre (CCC) on treatment, postoperative mortality and survival up to 6 months. Relative survival was calculated in STATA.

Results. In total 15,794 tumours (78% stage I and 22% stage II), in 15,491 patients, were selected. Male-female ratio was 3.6 : 1. During the study period the incidence decreased among males and increased among females. In the period 1995–2002 the proportion of squamous cell carcinomas among males declined from 60.7% to 54.0%, whereas those of adenocarcinomas increased from 22.9% to 25.6%. In females a decrease in the proportion of squamous cell carcinomas occurred, from 37.3% to 31.8%. Surgical resection was performed in 67% of all patients. The resection rate declined from 86% in patients younger than 60 years to 17% in patients older than 80 years. Six-month relative survival was 84%. Risk of mortality was higher among elderly, males, stage II, large cell undifferentiated carcinoma compared to squamous cell carcinoma, and those not undergoing surgery, and lower for adenocarcinoma compared to squamous cell carcinoma. For patients who underwent surgery, postoperative mortality (up to 60 days after diagnosis) was higher for males and for elderly.

Conclusions. Over the period 1995–2002 the incidence of NSCLC has decreased among males and has increased among women. The percentage squamous cell carcinoma declined both in men and in women. The resection rate was lower for elderly. Elderly, males, stage II, large cell undifferentiated carcinoma and patients not undergoing surgery had a higher risk of death.

Key words: Lung cancer – trends, resection, survival, post-operative mortality

P050

TRENDS IN PROSTATE CANCER MANAGEMENT AND SURVIVAL

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Background. Currently there is no consensus on the best treatment of prostate cancer. Surveys in the UK of oncologists and urologists have found wide variations in the management of prostate cancer.

Aims. To look at the variation in treatment received for prostate cancer across the Northern and Yorkshire region of England. We will investigate what factors are associated with the modality of treatment received and how survival varies by treatment.

Data and Methods. 17,065 men diagnosed with prostate cancer in NYCRIS region between 2000 and 2004, men with metastases at diagnosis were excluded from analysis (n = 2325). The principal method of treatment was recorded for each patient in addition to their age at diagnosis, deprivation quintile, year of diagnosis and cancer network of residence. Logistic regression was used to assess what factors were significantly associated with treatment received. Period analysis was used to calculate the relative survival of the patients overall and stratified by treatment.

Results. The overall age standardised incidence rate (European) was 355 per 100,000 population. Hormone therapy was the most common mode of treatment (44%), 18% of patients received no treatment while 10% of patients received a radical prostatectomy. The rate of radical prostatectomy increased from 7% in 2000 to 13% in 2004 while the use of hormone therapy decreased over time from 46% to 38%. The odds of having a radical prostatectomy, brachytherapy or external beam therapy were lower for men aged 70 and over compared to men aged 55–69 years (OR = 0.05, OR = 0.08 and OR = 0.22 respectively), while the odds of receiving hormone therapy, other and no treatment were significantly higher in the older age group (OR = 3.86, OR = 1.98 respectively). Men diagnosed with prostate cancer in 2004 were 75% more likely to receive a radical prostatectomy than men diagnosed in 2000. The odds of receiving a radical prostatectomy, brachytherapy or external beam radiotherapy were all significantly lower in the most deprived areas compared to the most affluent (OR = 0.61, OR = 0.29 and OR = 0.79 respectively). The odds of getting hormone therapy increased as deprivation increased (OR = 1.50 for most deprived areas compared to most affluent areas), while there was no significant association between deprivation and receiving other and no treatment. The overall 5 year relative survival rate was 95%, this varied by treatment groups.

Conclusions. There are variations in the modality of treatment received in men with prostate cancer. Non clinical factors such as deprivation are associated with treatment received. These finding have implications for quality of care.

Key words: Prostate cancer – treatment, survival

P081

IMPROVED SURVIVAL AFTER RESECTABLE GASTRIC CANCER IN THE NETHERLANDS SINCE 1986: A POPULATION-BASED STUDY

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Background. Complete surgical resection is essential for cure in the treatment of localised gastric cancer. The Dutch D1-D2 Trial introduced standardised surgical procedures for lymph node dissections in the Netherlands. In a population-based study, we evaluated the effect of surgical training and quality assurance on overall survival for patients with resectable gastric cancer who were treated during and after the D1-D2 Trial in the region of the Comprehensive Cancer Centre West (CCCW) in the Netherlands.

Methods. From the regional cancer registry, we selected all patients with resectable gastric cancer who were surgically treated in one of three periods: pre-trial period (1986–1989; n = 273), trial period (1989–1993; n = 255) and post-trial period (1993–1999; n = 219). In a multivariate analysis, overall survival in these periods was compared after adjustment for age, gender, T-stage and N-stage.

Results. Crude 5-year overall survival was highest in the post-trial period: 42% compared to 39% in the trial period and 34% in the pre-trial period, although these differences were not statistically significant (p = 0.31). In the multivariate analysis, the improvement of survival over time was more apparent (p = 0.004). The hazard ratio was 0.84 (95% confidence interval, 0.69–1.03) for patients treated in the trial period and 0.70 (95% confidence interval, 0.56–0.87) for patients treated in the post-trial period, as compared to patients treated before the trial. No adjuvant therapy was given throughout the study period.

Conclusions. Overall survival of patients with resectable gastric cancer has improved since 1986 in the CCCW region. This increase in survival was caused by an improved quality of surgery.

Key words: Gastric cancer – surgery, survival, population-based study

P089

INCIDENCE AND SURVIVAL OF CHILDHOOD HAEMATOLOGICAL MALIGNANCIES IN SPAIN

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Introduction. Recently, the International Classification of Childhood Cancer Third edition (ICCC-3) has been published. ICCC3, which utilizes the International Classification of Diseases Third edition (ICDO-3) codes, introduces major changes in the classification of leukaemias and lymphomas. Our objective was to estimate incidence and survival of childhood haematological malignancies (HM) using ICCC-3 in the population covered by Girona and Zaragoza population-based cancer registries, both involved in the Haemacare project.

Methods. All HM cases aged less than 15 years and registered by the Girona and Zaragoza cancer registries during 1993–2002, were extracted. Pathological and haematological diagnoses were reviewed, recoded using the ICD-O-3, and reclassified following the ICCC-3. Age-adjusted incidence rates (ASR per million children-years) were calculated using the "World Population" as a standard. The end of follow-up period was considered to be either the date of death or the 31-12-2005. The Kaplan-Meier method was applied to estimate observed survival rates.

Results. On the basis of 150 cases, the overall ASR of childhood HM was 78.9. According to ICCC3, precursor cell-leukaemia was the most frequent HM at 60% yielding an ASR of 48.0. The inmunophenotype distribution was 78.9% B-cell; 16.2% T/NK-cell; 5.8% NOS. The five-year observed survival (5-y-OS%) for precursor cell-leukaemia was estimated at 77.5%. Precursor cell-lymphomas accounted for 4.2% of all HM with 50% T/NK cell; 33.3% B-cell; 16.7% NOS. The 5-y-OS% for precursor cell-lymphoma was estimated at 33.3%. Hodgkin lymphomas (16% of all HM) yielded an ASR of 10.8 and the 5-y-OS % of 88.0%. Nodular sclerosis was the predominant subtype. The ASR for Burkitt lymphoma was 5.4 and the 5y-OS% of 90.9%. Regarding myeloid lineage, all of them were acute myeloid leukaemias showing an ASR of 5.2 and the 5y-OS% of 45.0%. When analyses were carried out separately, similar results were found for both the Girona and Zaragoza registries.

Conclusions. Prognosis of childhood HM on the basis of morphology shows a wide variability. Although the WHO classification avoids the arbitrary distinction between lymphoid leukaemia and lymphomas, these entities remain separately in both ICD-O3 and ICCC3. Therefore, geographical and trend comparisons should be interpreted cautiously when analyses are carried out separately.

The Valencia Childhood Cancer Registry has been incorporated in this project and data will be included in the analysis.

Key words: Childhood haematological malignancies – incidence, survival; International classification of childhood cancer, ICCC-3

P090

EFFECT OF THE ACCESS TO THE SPANISH NATIONAL DEATH INDEX ON SURVIVAL RATES OF BREAST CANCER IN GIRONA AND ZARAGOZA

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Introduction. Monitoring survival for patients with cancer can be an effectiveness measure of health intervention. The population-based Cancer Registries (PBCR) do a passive follow-up by means of record-linkage procedures with different sources of data. In Spain has been possible to check the vital status with the Spanish National Death Index (IND) since 2006. The aim of this study was to evaluate the degree of improvement in the completeness of the follow-up using the IND in the survival rates in women diagnosed with invasive breast cancer during the period 1995–1999 in two Spanish areas covered by a PBCR.

Methodology. Incident invasive breast cancer diagnosed during the period 1995–1999 was obtained from the population-based Girona Cancer Registry (GCR: 1381) and Zaragoza Cancer Registry (ZCR: 1951), excluding the cases identified only by the death certificate (GCR: 26; ZCR: 68). The follow-up was carried out by checking the vital status with the IND. The 5-year observed (OS) and relative survival (RS) was compared before and after incorporating the information obtained by the IND. The follow-up was done until December 2004. The comparison of survival curves was made with the log Rank test.

Results. After checking with the IND the date of death of 13 cases in Girona (0.9% of the total) and 210 in Zaragoza was filled in or modified (10.8%). The 5-year RS of patients with invasive breast cancer in Girona was 81.0% [IC95% 78.5–83.6]. After the follow-up with the IND the RS was 80.5% [IC95% 78.0–83.1]. In Zaragoza the 5-year RS was 85.6% [IC95% 83.6–87.6]. After the follow-up with the IND was 81.7% [IC95% 79.6–83.8]; the difference was statistically significant in Zaragoza.

Conclusion. The use of the IND as an information source in both PBCRs has resulted in a decrease in the estimation of the 5-year RS (0.5% in Girona) and (3.9% in Zaragoza). In addition, although the survival continues to be higher in Zaragoza than in Girona, after the introduction of the information of the IND the differences have been reduced. This could be explained, at least partially, by the differences in the access to the death data in both PBCRs. Therefore, the use of the IND as a systematic source of information in the population Cancer Registries will improve the estimation of the survival and comparability of survival rates in Spain.

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Key words: Breast cancer – survival; Spanish national death index

P106

UNACCEPTABLE VARIATION IN ABDOMINOPERINEAL RESECTION (APER) RATES FOR RECTAL CANCER – TIME TO INTERVENE?

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Background. Surgery is the only curative treatment for rectal cancer and optimising its delivery is important. Abdominoperineal resection (APER) and anterior resection (AR) are the main operations used in managing this disease. APER must be used for patients with very low rectal tumours but for the majority either operation may be performed. Evidence now exists to suggest that, in this latter group, current APER operations have inferior oncological outcomes to AR and also result in a permanent colostomy so the use of APER should be reduced where possible.

Aims. To determine the variations in the rates of use of APER by cancer network, hospital Trust and surgeon across England between 1998 and 2004 and determine if any variation could be explained by differences in patient characteristics such as Dukes stage, age, gender or socio-economic deprivation.

Methods. Information about all patients diagnosed with rectal cancer over the study period were obtained from the English Cancer Registries and these data linked to HES via the patient identifiers of NHS number, postcode, gender and date of birth. Information about each patient's main surgical procedure were obtained from HES whilst casemix information was taken from the registries. Rates and odds of use of APER were determined in relation to patient casemix and each patient's managing surgeon, Trust and cancer network.

Results. 30,967 patients received a major abdominal operation for rectal cancer over the study period. The rate of use of APER decreased from 30.4% in 1998 to 23.0% in 2004. Older patients, males, the economically deprived and those managed by low workload surgeons were significantly more likely to receive an APER. There were also significant variations in the odds of receiving an APER between individual surgeons and hospital Trusts independently of patient casemix.

Conclusions. Over the study period the use of APER decreased but significant variation was observed in its use independently of casemix. Reducing this variation will remove inequalities, reduce colostomy rates, and improve outcomes in rectal cancer. APER rates could be used as a national performance measure.

Key words: Rectal cancer surgery

P120

INTERLABORATORY VARIATION IN RESULTS OF TESTING FOR HER2 IN BREAST CANCER PATIENTS

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Survival for patients with breast cancer can be improved by treatment with monoclonal antibodies against Her2 receptors. Her2 is an epidermal growth factor and overexpression of the Her2 gene in breast cancer tumour cells indicates poor prognosis. The new national guideline for breast cancer in the Netherlands (2004) recommended that tumour material should be tested for Her2 overexpression. Given the promising results and financial consequences of the new treatment option, accurate determination of Her2 receptor status has become critical for both the patient and the health care system. According to recent literature, 20% of newly diagnosed breast cancer patients have Her2 receptor overexpression. To study the potential of cancer registry data for quality control, we investigated interlaboratory variation in the prevalence of Her2 positive breast cancers and developed a multivariable model to control for differences in patient-mix. The Rotterdam Cancer Registry covers the southwestern part of the Netherlands, a region with 2.4 million inhabitants, 16 hospitals and 8 Pathology Laboratories. From the registry, we selected patients diagnosed with invasive breast cancer in 2005, in whom Her2 receptor status was determined. Other relevant clinical and pathologic findings were derived from the electronic records. Determinants of the prevalence of positive Her2 results were analyzed both univariable and multivariable. Significant variables ($p < 0.05$) were used to develop a case-mix model. This model was then applied to analyze results by Pathology Laboratory. The study population consisted of 894 female patients with invasive breast cancer of whom 168 (19%) were diagnosed with Her2 overexpression. Correlates of Her2 overexpression were non lobular tumour type, younger age at diagnosis, higher grade tumours, negative hormonal receptor status, local and regional metastasis at diagnosis and being diagnosed in the second half of 2005. Standardized prevalence rates varied between laboratories from 6% to 40%, which is equivalent to risk ratios ranging from 0.4 to 1.6, as compared to the mean. Due to the association between traditional prognostic factors and Her2 overexpression, the actual prevalence is dependent on selection criteria for testing. Because selection criteria may differ between hospitals, multivariable analysis is needed to study variation between Pathology Laboratories. A case-mix model can be used to derive a standardized prevalence. Even after controlling for case-mix, considerable variation between Laboratories was observed. Our results show that Cancer Registry data can be used for quality control but close communication between epidemiologists and clinicians is needed to improve collaboration and efficient data collection.

Key words: Breast cancer; Her2 receptor; Quality control; Case-mix model

P121

CHANGE IN THE INCIDENCE OF LARYNX CANCER ANATOMICAL SUB-SITES AND SURVIVAL: THE DATA FROM THE PIEDMONT CANCER REGISTRY

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Mortality for larynx cancer is constantly decreasing from the beginning of the eighties in all the developed country (world standardised rate from 1980 to 2002: USA 2.1–1.5, Sweden 0.9–0.4, France 11.1–3.2, Italy 6.4–3.2 per 100,000). This decrease seems mainly due to a parallel decrease of incidence and some doubts remain on a real increase of survival. We took all patients with a primary cancer of the larynx diagnosed between 1985 and 2003 in Turin, Italy (about 900,000 inhabitants). We computed incidence and mortality time trends as well as time trends of relative survival at 1–3–5 years. In addition, we undertook these analyses by anatomical sub-sites (glottis, supra- and sub- glottis). Incidence rates decreased from 16.3 in 1985 to 7.11 per 100,000 in 2003 in men and remained substantially the same in women (about 1 per 100,000). Also mortality rates decreased in the same period from 5.4 to 2.1 per 100,000 in men, remaining substantially stable in women (about 0.4 per 100,000). Five-year relative survival in men increased from 63.9% for cases incident in 1985–1988 to 79.1% in cases incident in 1997–1999, with a significant increasing trend ($p < 0.05$). We observed a larger increasing trend in women, but not statistically significant because of the more sparse data. The analysis by sub-sites showed that patients with cancer of the glottis in 1997–1999 had a very good survival at 5 years (95.7%), about 30–35 points higher than that of patients with lesions in other sub-sites of the larynx. Survival substantially improved from the first (1985–1988) to last period (1997–1999) for patients with cancer of the glottis, while remained substantially unchanged for patients with cancer of other sub-sites of the larynx. In the same period, considering incidence trends, we observed that the incidence decrease is mainly due to the decrease of supraglottis cancers that, together with the subglottis cancers, are the most aggressive ones. Therefore, we can conclude that t he mortality decrease for larynx cancer is mainly due to a decrease of incidence and, as a parallel, the increase in survival is partially due to a shift in the larynx cancer sub-site incidence, in favour of the less aggressive cancer of the glottis.

Key words: Larynx cancer – glottis, survival, incidence trends

P164

THE RISK OF NON-HODGKIN'S LYMPHOMA IN PEOPLE WITH A HISTORY OF NON-MELANOMA SKIN CANCER: STRONGER ASSOCIATIONS WITH SQUAMOUS CELL THAN BASAL CELL CARCINOMAS

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Introduction. Non-melanoma skin cancer (NMSC) and non-Hodgkin's lymphoma (NHL) have become more common in recent decades. Ultraviolet radiation (UVR) increases the risk of skin cancer and may increase the risk of non-Hodgkin's lymphoma (NHL) though evidence for this is conflicting. There is consistent evidence that people with a history of NMSC are at an increased risk of NHL which suggests common causal factors. We aimed to examine whether the risk of NHL differs by type and number of previous NMSCs using data from the Tasmanian Cancer Registry.

Methods. The records of persons with a diagnosis of NHL reported to the Tasmanian Cancer Registry during 1980–2001 were linked with the records of persons diagnosed with NMSC in the same period. Person-years of follow-up were calculated from the date of diagnosis of the first NMSC to the date of diagnosis of NHL, date of death, or end of follow-up (31 Dec 2001), whichever was soonest. The observed number of cases of NHL in persons with a history of NMSC was compared with the expected number, calculated by applying the 5-year age group, sex and year specific NHL incidence rates to the NMSC cohort. Standardised incidence ratios (SIR) were derived from the ratio of observed to expected NHL cases.

Results. Among 17,660 males and 13,823 females with NMSC, 169 cases of NHL were observed and 128.8 cases were expected [SIR 1.31 (1.13–1.53)]. Analysis by type of NMSC showed that the risk of NHL was increased in persons with a history of squamous cell carcinoma (SCC) [males SIR 1.60 (1.12–2.29); females SIR 1.78 (1.14–2.80)] but not in those with a history of basal cell carcinoma (BCC) [males SIR 1.05 (0.78–1.42); females SIR 0.87 (0.58–1.31)]. Males with 2 or more SCCs [SIR 2.80 (1.59–4.93)] and females with 2 or more SCCs [SIR 3.07 (1.28–7.37)] or BCCs [SIR 1.94 (CI 1.07–3.50)] had the highest risk. Males and females with only one prior SCC or BCC, and males with 2 or more BCCs, were at no greater risk of NHL.

Conclusion. The risk of NHL in persons with a history of NMSC is stronger for those with a prior SCC than BCC and is restricted to those with a history of two or more NMSCs. While other common causal factors cannot be excluded, the findings are consistent with the hypothesis that immunosuppression resulting from chronic UVR exposure is a risk factor for NHL.

Key words: Non-melanoma skin cancer; Non-Hodgkin's lymphoma; Sun exposure

Poster session 3:

SURVIVAL AND CARE OF CANCER PATIENTS

P132

PHYSICAL AND PSYCHOSOCIAL COMPLAINTS ONE YEAR AFTER BREAST CANCER TREATMENT

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Background. Breast cancer should be treated within a specialised multidisciplinairy breast cancer care setting. Within this setting patients visit breast cancer care nurses regularly. During this consult attention is paid to physical and psychosocial complaints after breast cancer treatment.

Aim. To describe the physical and psychosocial burden one year after breast cancer treatment.

Methods. Women (n = 76) were evaluated with a physical and psychosocial questionnaire one year after breast cancer treatment between April 2005 and December 2006. Data of the questionnaire was linked to clinical data from the regional cancer registration. Spearman Rank correlation and Chi-square test were used to reveal relationships between clinical and patient data (age, surgical treatment, lymph node dissection) with the physical and psychosocial burden.

Results. Thirty-six patients were treated for their physical or psychosocial burden. 78% of patient with physical complaints had psychosocial complaints as well (Corr 0,21, p = 0.07). When patients were in need to talk to a professional care giver they all scored on the psychosocial items (Corr 0,62, $p < 0.05$). Of the patients who did not wanted to talk 28% still had a high score on the psychosocial items. No relation was found on the treatment with psychosocial complaints. Patients who underwent non breast conserving surgery had in 74% physical complaints, compared to only 46% in the breast conserving group (Corr 0.28, $p< 0.05$). Lymph node dissection had little effect on having physical complaints or not.

Conclusion. Physical and psychosocial burden should be taken into account at the follow-up visits of breast cancer patients. This can be done by a breast cancer care nurse who uses a special developed questionnaire. Most of the patients with complaints had a combination of both physical and psychosocial complaints. Surgical treatment is the main factor influencing the physical complaints. More definitive results can be presented after inclusion of more patients.

Key words: Breast cancer – psychosocial and physical burden, treatment

P146

THE UK BREAST CANCER CLINICAL OUTCOMES MEASURES (BCCOM) PROJECT

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Background. The BCCOM Project aims to audit the management of symptomatic breast cancers in the UK. Information is obtained by tapping into existing sources such as the data currently collected by cancer registries, taking advantage that UK cancer registries collect data on a population basis.

Method. UK cancer registries sent the BCCOM data items for validation to breast surgeons who had previously agreed to participate. Surgeons were encouraged to check their own data but could submit data unchecked into the audit.

Results. Over the last three years, data for primary symptomatic breast cancers diagnosed in 2002–2004 were received from all 11 UK cancer registries, incorporating more than 200 consultant surgeons who contributed a total of 43,766 cases. Patients not receiving surgery increased from 5% in those aged 50–64 to 24% in those aged 70 and above. Overall, half of the surgically treated cases had a mastectomy, but rates varied from 19% to 92% between surgeons. The proportion of patients treated with radiotherapy and chemotherapy fell sharply with age, in contrast to the increase in the use of hormone therapy with age. In one region (West Midlands, population 5.3 million), 4511 female symptomatic cancers submitted into the BCCOM audit in 2002–2003 were compared with data collected through the UK NHS Breast Screening Programme audit on 2019 screen-detected cancers diagnosed in the region for the same time period. Symptomatic cancers were larger (mean size 28.2 vs. 17.1 mm) and more likely to be node positive (42.5% vs. 21.4%). The Nottingham Prognostic Index (NPI) was calculated for the invasive cases. For those with a known NPI score, 61% of screen-detected cancers fell into the excellent and good prognostic groups compared with only 29% of the symptomatic breast cancers. Overall, 30% of the screen-detected breast cancers diagnosed in 2002–2003 had a mastectomy.

Discussion. The BCCOM audit has been successful, with good quality data being collected for symptomatic breast cancers. The detailed audit of case ascertainment and data completeness undertaken in the first year of the audit was a benefit to cancer registries; it helped identify missing data and ways of improving the data collection process. Cases in BCCOM have a unique identifier on local cancer registry databases: this will allow long-term follow-up of the cohort for survival information.

Key words: Symptomatic breast cancer – clinical outcomes, breast cancer screening programme, audit

P151

OVARIAN CANCER SURVIVAL IS AFFECTED BY STAGE AND HISTOLOGICAL TYPE: IMPLICATIONS FOR CANCER CONTROL IN SYDNEY AUSTRALIA

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Objectives. To investigate

1. associations of degree of spread, histological type and socio-demographic factors with the risk of death from invasive ovarian cancers in patients diagnosed in NSW in 1980–2003;
2. accompanying time trends, socio-demographic and histological differences in degree of spread; and
3. research and cancer-service implications.

Methods. NSW Central Cancer Registry data were analysed using univariate tests and multivariable regression to show predictors of survival from ovarian cancer and degree of spread.

Results. Five-year case survivals approximated 40% for 1999–2003 diagnoses. Compared with localised disease, case fatality was three-to-four and six times higher respectively for cancers with regional spread and distant metastases throughout the study period. After adjusting for degree of spread, socio-demographic differences and histological type, the relative risk (95% confidence limits) of death from ovarian cancer reduced to 0.51 (0.46, 0.57) for 1999–2003 compared with the 1980–1983 baseline. Relative risks were higher for adenocarcinomas (not otherwise specified) and other specified and unspecified cancers than for the more common serous carcinomas, but lower for endometrioid carcinomas, and sex cord-stromal and germ cell tumours. A reduction in risk of death in the more recent diagnostic periods was evident, irrespective of whether adjustment was made for degree of spread. The probability of diagnosis with localised as opposed to more advanced disease was lower in older patients, the lowest socio-economic stratum, women born in a non-English speaking country, and those diagnosed in more recent periods. Compared with serous lesions, localised disease was more common for mucinous, endometrioid and clear cell carcinomas, and sex cord-stromal and germ cell tumours. Approximately 61% of ovarian cancers had distant metastases at diagnosis in 1999–2003.

Conclusions. Degree of spread and histological type is a powerful predictor of case fatality. The increased frequency of cases diagnosed with distant metastases probably is due to better surgical staging at diagnosis and secondary cytoreduction. Death rates have fallen in more recently diagnosed patients, irrespective of degree of spread, likely due to treatment advances. Poorer survivals apply to older patients. Survival differences were not found by socio-economic status or geographic remoteness of residential area. Increasing awareness of symptoms in women, finding technologies for earlier diagnosis and improved outcomes from these cancers is a research priority.

Key words: Cancer registry; Survival; Logistic regression; Histological type of cancer and survival differences

P156

CO-MORBIDITY AFFECTS TREATMENT POLICY IN UTERINE CANCER: A POPULATION-BASED STUDY IN THE NETHERLANDS, 1995–2004

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Background. Patients with low socio-economic status (SES) and co-morbidity are generally at risk of not being treated according to treatment recommendations and might therefore have excess hazards of dying.

Aim. To evaluate the effects of age, co-morbidity and SES on the application of treatment modalities and prognosis for patients with cervix and corpus uteri cancer.

Methods. All newly diagnosed patients with cervix and corpus uteri cancer diagnosed in the period 1995–2004, whose co-morbidity at diagnosis had been recorded, (n = 2773) were selected from the Eindhoven Cancer Registry.

Results. 89% of patients with FIGO IB-IIA cervical cancer without co-morbidity underwent surgery vs. 55% in the presence of co-morbidity ($p < 0.001$). Although patients of high SES had less co-morbidity (22% vs. 31%, $p = 0.04$) they did not undergo surgery more often than low SES patients. In multivariate analysis, age and treatment (but not co-morbidity or SES) were independent prognostic indicators: after adjustment, a 3.5 times increased risk of death was found among patients who received radiotherapy ($p = 0.007$) compared to patients who underwent surgery. 94% of patients with FIGO IIB-IVA without co-morbidity underwent surgery compared to 6% in patients without co-morbidity ($p = 0.02$) and 50% of patients < 70 years vs. 5% of patients ≥ 70 years received chemoradiation ($p < 0.001$). Co-morbidity and SES were not independent prognostic factors. In patients with corpus uteri cancer FIGO I, treatment modality hardly differed between younger and older patients, regardless of co-morbidity and SES. However in multivariate analysis, an increased risk of death was seen for patients with a previous cancer (HR = 2.3, $p = 0.003$) and for patients with ≥ 2 co-morbid conditions (HR = 2.1, $p < 0.001$). Few differences in treatment modality according to age, co-morbidity and SES became visible in FIGO II-III patients. In multivariate analysis, the risk of dying for patients who received radiotherapy after surgery was only 60% of that of patients who received surgery only ($p = 0.02$).

Conclusion. In uterine cancer, elderly patients and patients with co-morbidity might have been 'under-treated', according to national treatment recommendations, conveying worse survival. We do not know whether there might have been more complications when these patients would not have been 'under-treated', i.e. whether this selection was justified. In an increasingly ageing population co-morbidity is likely to play a larger role in clinical decision-making. Development of age-specific guidelines may be warranted, reflecting increased awareness about possibilities of treatment of patients with certain co-morbid conditions among physicians and patients.

Key words: Cervical cancer, corpus uteri cancer – co-morbidity, socio-economic status, treatment

P157

COLORECTAL CANCER CARE: A MULTIDISCIPLINARY MONITORING SYSTEM

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Objective. In the past years the awareness of differences in the quality of cancer care has grown. A monitoring system might give insight in the potential causes of these differences. Together with the development and implementation of national guidelines the Comprehensive Cancer Centre West (CCCW) therefore intended to set up a database covering detailed information concerning multidisciplinary care for the colorectal cancer patient. This information enables the evaluation of process and treatment outcomes, as well as the adherence to treatment guidelines.

Methods. Patients with a colorectal cancer diagnosed in January 2006 or later were included. Every year about 900 patients are diagnosed within the region. Based on national treatment guidelines and international literature a series of indicators was developed concerning infrastructure, process of care and treatment outcomes. Additional items were collected by employees of the CCCW in conjunction with the standard dataset of the Leiden Cancer Registry. There was an intentional delay of 9 months between the date of diagnosis and registration.

Results. Preliminary results are the following: almost all patients were diagnosed and treated in the same hospital. In 5 out of 9 hospitals there was specialisation of colorectal surgery (range 27–57% of surgeons operating colorectal cancer). Multidisciplinary consultations were held pre- as well as post-operatively, although the latter took place more often (52% vs. 89%). Median time between first visit to the hospital and diagnosis is 5 days. Median interval between diagnosis and first treatment (radiotherapy, surgery or chemotherapy) was 28 days and median hospital stay after surgery was 10 days. Surgery was radical (R0) in 95% of the primary operations. In 46% of the patients 10 or more lymph nodes were examined by the pathologist. Many indicators show smaller or larger differences between hospitals. At this time the dataset is too limited to draw conclusions regarding chemo- and radiotherapy because of the limited number of patients.

Conclusions. This multidisciplinary monitoring system for colorectal cancer patients provides a lot of information about process and treatment outcomes. The results will be helpful in providing feedback to hospitals in order to further improve the quality of care for this group of patients.

Key words: Colorectal cancer – cancer care, indicators

P158

SHARING SENSITIVE DATA BY CLINICIANS CONCERNING THE QUALITY OF LOW VOLUME CANCER SURGERY

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Objective. In September 2005 the regional network of oncologic surgeons agreed on the concentration of low volume cancer surgery. The main objective of concentration was to improve surgical treatment outcomes of tumours of the oesophagus, pancreas, liver and rectum (T4) in the region of the Comprehensive Cancer Centre West (CCCW). To evaluate the effect of the concentration of care a monitoring system was developed.

Methods. A dataset was defined in close co-operation with the regional surgeons with a majority of non-tumour specific items and a number of tumour specific items. Data collection is performed by the surgeons themselves, because of the desired short term of feedback. A comparison of results is made between the participating hospitals regarding patient flows, through put times and the quality of surgical care. Currently data are entered into an Excel spreadsheet, which was started in January 2006. Aggregation and feedback is performed and provided by the CCCW every 3 months. In the meantime 6 CCCs developed a web-based application, Oncobase which will be operational in June 2007. This will enable the required instant feedback to the specialist and a comparison not only with regional but also with national data.

Results. All hospitals performing low volume cancer surgery participated in the regional tumour registry of the CCCW in Excel. Tumour data from January 2006 until June 2007 are aggregated by the CCCW and published on a restricted part of the CCCW website. The collected data are compared with data from the Leiden Cancer Registry to check for completeness and quality. Data concerning the contents of the database will be presented on the conference.

Conclusions. Many surgeons in the CCC-regions in the Netherlands are willing to participate and to give insight in their results. Concentration of low volume surgery is experienced as a necessary direction where close monitoring is needed, not only in the CCCW-region. Oncobase is the next step in this process. Within the region the collected data form an essential element in the discussion concerning the benefit of the concentration of cancer care.

Key words: Low volume cancer surgery; Shared database; Oncobase

P159

EVALUATION OF CARE FOR BREAST CANCER PATIENTS IN THE NETHERLANDS

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Background. There are evidence-based national guidelines on screening, diagnosis (update 2000) and treatment (update September 2005) of breast cancer In the Netherlands. This study aimed to evaluate the compliance to these guidelines on a population based level in order to identify potential bottlenecks in the use of the guidelines in daily practice.

Methods. The national guidelines working group formulated indicators in order to pinpoint the important decision moments in the guidelines. These indicators give information on diagnosis and treatment of cancer, as well as the organisation and accessibility of care. We used data of the cancer registry to evaluate the compliance to the guidelines, supplemented with extra items which were not available in the registry. In three comprehensive cancer regions (CCCA, CCCMN and CCCW) these extra items were collected for patients diagnosed from November 2005 till March 2006 (for CCCW from January 2006 till March 2006). Registrars collected all information directly from the hospital patient files, including the pathology reports. The description of the extra items was formulated in a codebook to avoid lack of clarity.

Results. All 37 hospitals, including general hospitals, four university hospitals and a specialized cancer hospital, gave permission for the collection of extra items for this study. Nearly 1200 breast cancer patients were included. Data were missing in less than 2 percent. Results on diagnosis will be presented as well as results concerning surgical treatment, including lymph node staging. Furthermore, results regarding radiotherapy and systemic therapy with chemotherapy, hormone therapy or biologicals will be presented. We will report on the analysis of subgroups based on relevant clinical and pathological factors such as age, stage, oestrogen and progresterone receptor status and Her2Neu receptor status. Also, waiting times will be reported.

Discussion. The final results will be presented at the meeting and lead to revision of the guidelines.

Key words: Breast cancer – guidelines, evaluation of cancer care

P165

ESTIMATING CANCER SURVIVAL RATES IN THE ITALIAN REGIONS BY MEANS OF SOCIO-ECONOMIC AND HEALTH-RELATED ECOLOGICAL VARIABLES

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Background & Objectives. There have been evidences confirming that cancer survival is closely related to socio-economic characteristics. In the framework of the CaMon project, survival was estimated for European countries totally or partially covered by Cancer Registries (CRs) by investigating the association of cancer survival with socio-economic, demographic and health-related factors at the ecological level. This study is aimed at applying the same procedure to Italian regions, in order to estimate survival rates in the areas not or not totally covered by CRs.

Material & Methods. The ASSR-5yrs by gender for 12 cancer sites and overall cancers came from 22 CRs of 14 regions and regarded the patients of the period 1995–1999. Data of the same region CRs were pooled to calculate the observed weighted ASSR-5yrs. The socio-economic variables and the characteristics of the health care systems (SEH) at regional level were obtained from Italian National Statistics Office (1995–2003). The database included: gross domestic product (€ per-capita), total health and public health expenditure (% of GDP); the % of labour force employed in agriculture, industry and services, the % of unemployment; the number of practitioners and nurses (per 1000 pop.); computed tomography scanners, equipments for nuclear magnetic resonance, ecography and radio-therapy (per 100,000 pop.); hospital beds (per 10,000 pop.) and stays (per 1000 pop.). A Pearson's correlation was performed to screen the variables, then linear regression models (RMs) were estimated considering the ASSR-5yrs as dependent variable and the SEH factors as independent variables. The best models were selected by a forward stepwise procedure. The predicted survival by site and sex was computed as result of the final linear RMs, which included the pooled observed survival and the SEH factors at regional level as dependent and independent variables respectively.

Results. For most cancer sites, the variables included into the RMs explained more than 75% of the observed variance of relative survival. In men the adjusted R square ranged from 68% to 96% for all the cancers sites, excepted colon (49%) and melanoma (46%). In women the range was 74–100%, excepted ovary (41%), breast (54%) and stomach (62%). Lung in women showed no correlation in the model. The best application of the model was observed for all cancers combined, whose adjusted R squares were 96% and 100% in men and women respectively.

Conclusions. The correspondence between the observed and the predicted survival in the Italian regions largely (more than 50%) or less covered by cancer registration was impressive, justifying the statement that "cancer is a socio-economic determined disease" not only in terms of incidence, but mostly in terms of taken in charge. The authors believe that these estimating methods could be worldwide applied to estimate the burden of cancer survival for health planning purposes.

Key words: Cancer survival estimates; Socio-economic determinants; Health-related technologies

P066

SENTINEL NODE BIOPSY IN BREAST CANCER: IMPLEMENTATION AS STANDARD-OF-CARE IN THE NETHERLANDS 1998–2003

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Background. The sentinel node biopsy (SNB) is described in the Dutch clinical practice guideline on breast cancer as a method for intra-operative lymphatic mapping since 1999. This population-based study describes the implementation of the SNB in The Netherlands in 1998–2003. We examined the extent and time trends of the use of SNB of patients who were considered eligible for SNB on the basis of their clinical status.

Methods. The project concerns a retrospective study on patients diagnosed with primary breast cancer who are recruited from the Netherlands Cancer Registry. The study includes a total of 34,007 breast cancer patients who were diagnosed with small tumours (≤ 5.0 cm), negative axillary lymph node status and no distant metastasis at diagnosis between January 1, 1998, and December 31, 2003 in six (of a total of nine) regions of the Comprehensive Cancer Centres in The Netherlands. Of all patients, information on axillary surgery is classified as SNB alone, SNB and axillary lymph node dissection (ALND), ALND alone, or none. Patterns of use of axillary surgery are summarized as the percentage of patients receiving each surgery type.

Results. Overall, 24.4% of patients underwent SNB alone, 15.6% underwent SNB + ALND, 52.9% had ALND alone, and 7.1% did not have axillary surgery. Use of SNB is statistically significantly ($p < 0.0001$) associated with breast-conserving surgery, and the same is true for use of SNB alone. The percentage of patients who underwent a SNB alone or in combination with ALND increased over the study period, from 7.8% in 1998 to 68.6% in 2003. The six regions examined showed differences in pattern of dissemination in the use of SNB over the study period.

Conclusions. SNB has become standard-of-care for the treatment of breast cancer patients with small tumours, negative lymph nodes and without distant metastasis.

Key words: Sentinel node biopsy; Breast cancer; Population-based study

Poster session 4:

REPORST FROM CANCER REGISTRIES

P034

MALIGNANT RENAL TUMOURS IN CHILDREN IN MOSCOW REGION, RUSSIAN FEDERATION

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The aim of this study was to assess the main epidemiologic characteristics of malignant renal tumours in children in Moscow Region, Russian Federation. The data on children of 0–14 years old for the period 2000–2005 were retrieved from the database of Childhood Cancer Register of Moscow Region. The average paediatric population in the given period was 901,829 ± 45,660 per year. Total 36 cases of malignant renal tumours were recorded. The male-to-female ratio was 0.71 : 1. The most cases − 22 (61.1%) – were diagnosed in the group of 1−4 years of age. The annual incidence rate (IR) of malignant renal tumours was 0.66 ± 0.09 per 100,000 children (range 0.33−0.91) and had an age-dependent pattern with the highest IR observed in infants (2.11 ± 0.51 per 100,000). Wilms' tumour was the most common entity representing 83.3% (30 cases) of diagnoses. It had the IR 0.55 ± 0.09 per 100,000 followed by renal-cell carcinoma (0.05 ± 0.03 per 100,000), clear cell sarcoma of kidney (0.03 ± 0.02 per 100,000) and malignant rhabdoid tumour of kidney (0.01 ± 0.01 per 100,000). The annual mortality rate in patients with malignant renal tumours was 0.01 ± 0.02 per 100,000. Wilms' tumour was the main cause of death − 5 cases (83.3%). The studied epidemiologic characteristics were similar to those in the most European countries. Wilms' tumour had a lower incidence rate in 5−9 and 10−14 years of age groups and renal-cell carcinoma incidence rate was higher compared to the data from the most European registries.

Key words: Renal tumours, Wilm's tumour – children, incidence, mortality, Moscow region

P035

MALIGNANT TUMOURS IN INFANTS IN MOSCOW REGION, RUSSIAN FEDERATION

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The aim of this study was to assess the main epidemiologic characteristics of malignant tumours in infants in Moscow Region, Russian Federation. The data were retrieved from the database of Childhood Cancer Register of Moscow Region. One hundred and three infants (6% of all children in the registry) born from 1982 until 2004 were included in analysis. Median age was 7 months (range 27 days – 11 months), males – 45 (43.7%), females – 58 (56.3%), M : F ratio – 0.76 : 1. Urban residents – 77 (74.5%), rural residents – 26 (25.5%). In 5 infants (4.9%) cancer was diagnosed during the first month of life, in 35 infants (34%) – during the first 6 months of life. Retrospectively the data on 54 patients born from 1982 until 2000 were registered, prospective retrieval yielded 49 patients born from 2000 until 2005. In retrospective group 3 malignancies were diagnosed in average per year in comparison to 9 in prospective group. Eleven cancer types were revealed. Embryonal tumours prevailed with neuroblastoma (16.4%), Wilms' tumour (16.4%) and retinoblastoma (12.6%). In general our prospective data corresponded to the data from other European and North American registries. Nevertheless, age at diagnosis differed in our study: the most cancers in infants were diagnosed in the second half-year of life. The lower survival rate was observed in infants as compared to older children (OS 63% vs 74%, respectively, $p = 0.04$). We conclude that late diagnostic of cancer in infants represents one of the main problem in paediatric oncology in our region.

Key words: Cancer – infants, Moscow region

P041

CANCER INCIDENCE IN EASTERN LIBYA: PRELIMINARY RESULTS OF THE YEAR 2004

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Background. Cancer registration in northern Africa is still limited, and until 2003 there have been no population based data for Libya. Benghazi Cancer Registry (BCR) was founded in 2002 and it covers the whole region of Eastern Libya (1.6 million population). Actually BCR is the only population-based cancer registry in Libya and has recently published his first report on cancer incidence for the year 2003.

Methodology. All malignant cases diagnosed during 2004 were collected from different sources of information, including death certificates. Data were checked through IARCcrgTools software, developed by IARC. Cases were coded using the third edition of the International Classification of Diseases for Oncology (ICD-O-3). The most valid basis of diagnosis for a given cancer case was coded using the recommendations of the European Network of Cancer Registries (ENCR). World standard population was used to calculate age-standardized rates (ASR).

Results. A total of 1070 new cancer cases (including non-melanomatous skin cancer) were diagnosed in 2004 (updated May 2007). The incidence rates for all cancers were 66 per 100,000 (crude) and 120 (95% CI: 94.9– 114.4) per 100,000 (ASR) for males and 56 (crude) and 102 (95% CI: 76.1–93.9) per 100,000 (ASR) for females. The most common cancers in males were lung (19%), colon and rectum (10%) and bladder cancer (9%). The most common cancers in females were breast (26%), colon and rectum (11%) and endometrium (8%). The percentage of cases diagnosed on the basis of histology or cytology was 75% in males and 85% in females whereas the proportion of cases registered on the basis of death certificate only (DCO) was 7%. Childhood cancers represent 4% of all cases diagnosed in 2004.

Conclusion. These preliminary results of the year 2004 show that cancer incidence rates in Eastern Libya are similar to those reported in 2003. The reduction of cases reported by DCO is sign of improvement in data quality while some slightly increased incidence rates may be due to a better data collection. Cancer registry remains essential tool to provide policy makers with reliable data on cancer epidemiology in order to contribute towards the formulation of cancer treatment strategies. The co-operation of the medical community should be encouraged to ensure the provision of high-quality information.

Key words: Cancer – incidence, population-based registry, Libya

P075

TRENDS OF MORTALITY OF OESOPHAGUS AND LUNG CANCER IN SEMIPALATINSK IN THE REPUBLIC OF KAZAKHSTAN

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Introduction. In the Republic of Kazakhstan many nuclear tests were conducted by the Former Soviet Union in many places. Especially, at the Semipalatinsk Nuclear Test Site in the region of East Kazakhstan, approximately 460 nuclear tests were conducted from 1949 to 1989. From 1949 to 1962, the nuclear tests were conducted both on the ground and above ground. With regard to epidemiological research, it is a serious problem that there has not been enough data for comprehensive research into the effects of low dose radiation exposure. In order to solve this problem, we immediately began the preparation for the construction of database, and started the input of data necessary for epidemiological research in August 2003.

Methods. The causes of death recorded on ZAGS (the certificates of birth and death) were encoded according to the 9th edition of the International Classification of Diseases (ICD). The 9th edition defines leukaemia as 204–207, and other cancers (all cancers except leukemia) as 140–203. The total of 136,000 cases of residents and 69,000 cases of mortality has been registered in the database as of November 2006. We calculated the age standardized mortality rate (ASR) per 100,000 of the oesophagus and lung cancer from 1940 to 1975 and 1989 using the world population as a standard population.

Results. A total of 5967 cases of cancer mortality were registered. The most common cancers were stomach (33.4%) and oesophagus (33.4%). The lung cancer was 9.3%. It is well known that the area from the Turkoman plain in northern Iran through the central Asian republics to Henan Province in North-Central China is characterized as the "oesophagus cancer belt." The high mortality rate of oesophagus cancer in Semipalatinsk shows that this area is apparently on this belt. ASR of the lung cancer in males in 1950 to 1960 was under 20, but increased remarkably in 1960 to 1970. The increase of lung cancer in females was not observed at all.

Conclusion. The mortality rates of stomach and oesophagus cancer were high, but they were decreasing. The mortality rate of lung cancer in males is dramatically increasing. Kazakhstan people did not have a habit to smoke and started smoking in the military during World War II, and the increase of lung cancer was not observed in females, so there is a strong possibility that the cause of lung cancer is by smoking.

Key words: Oesophagus cancer; Lung cancer; Kazakhstan

P086

INCIDENCE OF PRIMARY LIVER CANCER IN ITALY BETWEEN 1988 AND 2002: AN AGE-PERIOD-COHORT ANALYSIS

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The incidence of primary liver cancer (PLC) in Italy is higher than in many other developed countries and approximately 60% of PLC is attributable to hepatitis C virus (HCV), 20% to alcohol abuse, and 10% to hepatitis B virus. We conducted a study to evaluate PLC trends and to disentangle period effects from birth cohort effects. The overall study population included 22,096 PLC cases (ICD10 = C22 other than C22.1), aged less than 80 years during 1988–2002, diagnosed in all Italian areas covered by Cancer Registries (CR). Standardized incidence rates (IR) were calculated for all CRs. Age-period-cohort (APC) effects were estimated using a Poisson model including CRs with at least 12 years of observation. Cases were grouped by sex into 5-year age groups at diagnosis, between the limits of 30 and 79 years. IRs were 18/100,000 men and 5/100,000 women in 1988–92; 20 and 6 in 1993–97, and 19 and 6 in 1998–2002. In Italy, however, geographical heterogeneity was relevant and IRs in the last period ranged between 11/100,000 in Romagna and 50/100,000 in Naples. A similar figure emerged in women, with PLC IRs ranging from 3/100,000 in Romagna to 15/100,000 in Naples. Thus, male-to-female ratio was 3.5 overall, with half of CRs ranking between 3 and 4. Rising age-specific incidence emerged for men and women aged 50 years or less. Among males, an upward cohort effect emerged up to the cohort born around 1945, when a more marked increased emerged. In women, however, no cohort effect was appreciable up to the cohort born in 1955, when a noticeable upward effect was noted. A slightly decreasing period-effect emerged in both sexes. In conclusion, our analysis showed that PLC IRs levelled off starting in the late 1990's. Nevertheless, high IRs are expected for at least two decades given the increasing IRs in younger age groups and the long latency period (30 years or more) from risk factors to PLC. Our findings confirm the great need for further efforts to eradicate HCV diffusion and to reduce alcohol intake to prevent PLC.

Key words: Primary liver cancer – incidence; Cancer registries; Italy

P129

TRENDS IN TOBACCO RELATED CANCERS IN THE POPULATION BASED CANCER REGISTRY OF BHOPAL, INDIA

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In the year 1982, Indian Council of Medical Research (ICMR) initiated a network of cancer registries across the country under the National Cancer Registry Programme (NCRP). A Population Based Cancer Registry (PBCR), established in the year 1986 at Bhopal is also functioning under the network of NCRP. About 50% of all cancers cases among men and about 15% among women are associated with Tobacco Related Cancers (TRCs). Sites of cancer that are included under TRC are that of lip, tongue, mouth, oropharynx, hypopharynx, oesophagus, larynx, lung and urinary bladder. Based on the data generated by the NCRP it was observed that the highest proportion of these TRCs is reported from PBCR of Bhopal. Therefore an attempt was made to assess the trend in the incidence of TRCs over the period of 1988–2003 According to 2003 data, the mean age of males who were exposed to TRC was 58.4 ± 11.95 years while among females the average age was 57.3 ± 12.03. The proportion of TRCs among males, varied from (35.4% in Bangalore PBCR to 47.2% in Bhopal PBCR) while among females it varied from (10.1% in Delhi to 15.4% in Bhopal). In Bhopal PBCR, a rising trends of tobacco related cancers have been observed among males. Among the females, the % of TRCs showed more variation from one year to another. Further, the Age Adjusted Rate (AAR) of tongue cancer among males of Bhopal has registered as the highest in the world (12.2 per 100,000 persons). Cancer of the tongue, oesophagus and lung are the major contributors to male TRCs while cancer the oesophagus contributed the maximum of TRCs for females. Increasing trends of oral cavity, oesophageal and lung cancers have been noted among males. A comparison of TRC contribution by age groups among males indicated that incidence of oral cavity cancers showed a significant rising trend in the age group 35–44 years. Similarly, the rise of oesophageal cancer is significant in the age group of 55–64 years while cancer of the lung recorded a significant rise among the elderly males of <70 years. In males, an increasing trend is seen in the rates of TRC only in the age group of 55–59. Among females almost all the five yearly age groups showed no trend in their age specific rates with time.

Key words: Tobacco Related Cancers, TRC; National Cancer Registry Programme, NCRP; Age Adjusted Rate, AAR; Population Based Cancer Registry, PBCR

P167

MESOTHELIOMA IN THE SOUTH WEST OF ENGLAND: TRENDS, GEOGRAPHICAL DISTRIBUTION AND GENDER DIFFERENCES

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Background. Mesothelioma is a rare cancer of the lining of the lung or abdomen, at least 80% of cases caused by asbestos exposure. Average time from exposure to diagnosis is 35–40 years. Most patients die within a year. The South West had the second highest male death rate per million of regions in England and Wales (2005) (Office of National Statistics). 12% of all cases are female.

Methods. A study of temporal trends, geographical and gender variations in mesothelioma was undertaken using the South West Public Health Observatory population based cancer registry (population resident base 6.6 million). Modelling estimated when and how high the future peak in cases would be. The model was confirmed. Death certificates were examined and Health and Safety Executive (HSE) and Trade Union Congress (TUC) consulted regarding the geographical/occupational variations and variations in gender ratio.

Results. The number of mesothelioma cases in the South West of England has been steadily rising; 608 (1985–1989), 829 (1990–1994), 1056 (1995–1999) and 1500 (2000–2004). Age specific incidence rates were highest at ages 80–84 (21 per 100,000 in 2000–2004). 1985–99 data was used to model the expected peak predicted to occur between 2010 and 2015 at ~325 cases (1.5x the current level). In 2006 data up to 2004 was added and the predictions confirmed. 78% of death certificates stated industrial disease as the cause of death, only 13% mentioned asbestos. Highest levels of mesothelioma were seen in Local Authorities with shipbuilding/railway industries but with striking difference in the male : female ratios; Plymouth 25 : 1, Portsmouth 9 : 1, Southampton 8 : 1 Bristol 3 : 1. The TUC revealed that Plymouth had an onsite laundry for the men's overalls. Less than 1% female cases had 'high risk' occupations on death certificate but 23% had husband's occupation as 'high risk' c.f. 1% total female population. 43% of males had 'high risk' occupations on death certificate c.f. 9% total male population.

Conclusions. Our data have been used to confirm to Directors of Public Health that increases, particularly in shipbuilding areas, are in line with predictions, and for planning of oncology services. The onsite laundry in Plymouth may have been protective to wives of workers, explaining in part the low number of female cases in comparison to the other high incidence areas. Further work is underway to examine this hypothesis.

Key words: Mesothelioma – gender differences, asbestos, ship building

P169

ENHANCING THE REGISTRATION OF NON-MELANOMA SKIN CANCERS – AN EPIDEMIOLOGICAL AND HEALTH SERVICE IMPERATIVE

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Background. Skin Cancer is the most common cancer in England. The incidence continues rising despite the 1992 England Health of the Nation target to 'halt year on year increase in skin cancer by 2005'. Non-melanoma skin cancers (NMSC) outnumber Malignant Melanomas (MM) many-fold but the true incidence is not known as Cancer Registries rarely register all NMSCs because of enormous workload with significant implications for understanding the epidemiology of NMSC in particular:

1. temporal trends/geographical patterns,
2. the risks of developing metachronous cancers,
3. incidence rates in high risk patients e.g. post transplant,
4. effects of health promotion programmes.

The paucity of data compromises health services planning as few patients are managed as inpatients and Hospital Episode Statistics (HES) provide a limited picture. The data on MM epidemiology and health service usage is good.

Aim. To use an electronic population based (6.6 million residents) cancer registry registering all new melanomas, every first BCC and SCC and maintains pathology records of all skin cancers to examine trends, geographical distribution region, risk of metachronous tumours and workload.

Methods. The South West Public Health Observatory (Cancer Registry) data-base was analysed, HES data for inpatient and day case activity, extensive pathology records of metachronous non-melanoma skin cancers.

Results. Age standardised rate for BCC is approx 6 times higher (124 per 100,000) than for MM (21 per 100,000) with SCC at 29 per 100,000 (2004 South West data) Incidence of SCC and BCC increased over the past 15 years, more common in men than women, with older distribution than for MM. SW Local Authorities with statistically significant incidence rates for NMSC compared with England do necessarily coincide with areas with high incidence rates for MM. Inpatient burden of treating NMSC cases is less than for MM but the outpatient, primary care and pathology workloads are very significantly greater. Within five years of a first skin cancer being diagnosed the chances of a metachronous diagnosis was high e.g following a first melanoma 62% got BCC, 10% a second MM, 15% SCC and 13% other histology skin cancer.

Conclusions. Data, as above, from the SWPHO informed the National, NICE Guidance for Commissioners on Skin Cancer. Although it may not be feasible for all cancer registries to collect data on all skin cancers the value of at least one cancer registry being able to do this is demonstrated for its insight into risk to patients and workload for the health service.

Key words: Skin cancer – melanoma, basal carcinoma, squamous carcinoma, risks, health service planning

Poster session 5:

REPORST FROM CANCER REGISTRIES

P088

TRENDS IN INCIDENCE OF BRAIN CANCER IN CANADA, 1982–2003

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Objectives. Increasing incidence of brain cancer has been reported from many countries. The aim of this nationwide population based study was to examine the trends in incidence of brain cancer in Canada from 1982 to 2003.

Methods. Data was provided by Canadian Cancer Registry. All cases with a diagnosis of the primary malignant brain tumour (brain cancer) were used in analysis. Cases of lymphoma were excluded. Incidence rates per 100,000 were adjusted to the 1991 Canadian population (ASIR). Time trend analysis was conducted using linear regression to calculated average annual percentage change (AAPC) and joinpoint regression analysis.

Results. A total of 41,032 cases of brain cancer were registered in Canada for the study period. 74% of the cancers had a microscopically confirmed diagnosis (71% in 1991 to 77% in 2003). Overall, ASIR of brain cancer stabilized for all ages combined. ASIRs declined from 11.6 to 9.7 for age 45–64 years and increased from 17.5 to 22.2 for age 65 or over. The ASIRs of oligodendrogliomas, ependymomas, medulloblastoma, glioblastoma and other gliomas were significantly increasing overall. The incidence of total astrocytomas (AAPC, –1.2; 95% CI, –1.9, –0.4) and all other neoplasms (AAPC, –2.7; 95% CI, –3.5, –1.9) was decreasing. Trends in the incidence of gliomas by grade showed an increase for high-grade gliomas (AAPC, 0.9, $p < 0.01$) and decrease for low-grade gliomas (AAPC, –1.6, $p < 0.01$). The AAPCs showed a slight increase for high or low grade gliomas in childhood (not significantly different). Joinpoint analysis showed that low-grade glioma incidence began to decline after 1994 for those 15 –64 years old and after 1992 for those 65 years old or over. High-grade glioma rates continued to rise throughout the study period among those 45 years old or over, but only statistically significantly increased among those 65 years old or over (AAPC, 2.1).

Conclusions. The results support the previous Canadian report and other population-based studies in western countries. Although introduction of computed tomography (CT), magnetic resonance imaging (MRI), and stereotactic biopsy procedures could partly explain the increased trend, our result suggests that the increase in incidence of some particular histological types of brain cancer are real and may reflect changes in the exposure of risk factors. Further studies are needed to investigate the aetiology of these changes.

Key words: Primary brain cancer – histological type, epidemiology, trends, incidence; Cancer registry

P097

EPIDEMIOLOGY AND MOLECULAR BIOLOGY OF GASTROINTESTINAL STROMAL TUMOURS. PRELIMINARY RESULTS OF A POPULATION-BASED STUDY, TICINO (SWITZERLAND) 1999–2005

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Background. Gastrointestinal stromal tumours (GISTs) are the most common mesenchymal neoplasms of the gastrointestinal tract. Although the interest for the clinical and biological nature of GIST is increasing, population-based studies are still rare. The present retrospective study represents the first scientific contribution including a Central Europe population and the first with a population-based molecular characterization.

Methods. All patients with potential GIST tumours diagnosed and surgically resected in Ticino between 1999 and 2005 were identified through a comprehensive computer search for topographical and morphological codes. All histopathologic diagnosis were revised by a pathologist and confirmed by immunohistochemical stainings (CD117). In addition, all GIST tumours were investigated for KIT (exons 9, 11, 13, 14 and 17) and PDGFRA (exons 12, 14 and 18) mutations. European age-adjusted incidence rates were calculated. Fisher exact test was used to identify the significant association at $p < 0.05$ level.

Results. One hundred potential GISTs were retrieved in the period 1999–2005. Fifty-seven patients were excluded, 5 because not resident at diagnosis time, 52 because not satisfying GIST diagnostic criteria. Forty-three cases were recognised as GIST and included in the study. GISTs were more common in females (56%); median age was 64 years and median tumour size was 6.0 cm; 60% of tumours were located in the stomach. Referring to the NIH system for assessing the risk of malignant behaviour, 64% of cases were classified as intermediate/very high risk. European age-standardized incidence rate for the study period was 1.47 cases per 100,000 inhabitants. DNA sequences were available for 40 patients. Overall, 29 patients showed a gene alteration in either c-Kit or PDGFRA gene (72.5%), and the vast majority occurred in c-Kit exon 11 (24 cases). In the other exons of the c-Kit gene, point mutations were found in exon 9, whereas no alterations were detected in exons 13, 14 and 17. In the PDGFRA gene, two patients had a mutation in exon 12 and two in exon 18.

Conclusion. This is the first population-based study of GIST incidence and molecular biology in Central Europe. Our data point out that GISTs from Ticino display similar clinical features as those observed in other population-based studies from Europe, such as Iceland, Sweden, and Girona (Spain), At molecular level some peculiarities may be outlined suggesting that environmental factors might lead to different type of alterations in the genes involved in GIST development.

Key words: Gastrointestinal stromal tumours – incidence, molecular biology; Cancer registry

P118

A COMPARISON BETWEEN METHODS OF AGE-STANDARDIZATION OF RELATIVE SURVIVAL RATIOS

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There are three different methods for age-standardizing relative survival ratios (traditional and two methods by Brenner et al.). The traditional method uses the age distribution in the standard population at the beginning of follow-up as weights for the age-specific relative survival ratios. The first Brenner et al. method (1) uses the expected age distribution of survivors at the given follow-up time in the standard population according to the general mortality in the standard population. The second Brenner et al. method (2) substitutes each patient by a ratio of age-specific proportions at the beginning of follow-up in the standard population and patient group and continues as a non-standardized analysis with these ratios as observational units. It is shown and demonstrated with real data that the methods are targeting at different survival probabilities defined by the excess mortality hazard the patients have compared to the respective general population group. Two of them can be recommended being not confounded by differences between groups in general mortality or censoring. They are the method by Brenner and Hakulinen (2003) and the traditional method, respectively, for estimating the conditional and the non-conditional net probabilities of survival related to the cancer of the patients.

Key words: Relative survival ratio; Age-standardization; Potential follow-up; Potential censoring

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P135

THE ROLE OF CANCER REGISTRIES IN THE 3RD-TERM COMPREHENSIVE TEN-YEAR STRATEGY FOR CANCER CONTROL (2004–2013) IN JAPAN

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In Japan, population-based cancer registry is administrated by the local public authorities known as prefectures. Of the 47 prefectures in Japan, approximately two-thirds have population-based cancer registries. Population-based cancer registration was officially described for the first time by the 2003 Health Promotion Law, but it was defined only to be voluntary task. At the same time, because of the recent concern about the right to privacy, the 2003 Act on the Protection of Personal Information was enacted and this became a barrier for registries to improve their activities. Another issue is that prefectural ordinances at the local level supercede national laws, such as the Health Promotion Law, some prefectures have made it difficult for registries to perform their functions. However, the situation is changing in favour of cancer registries. The Cancer Control Act was approved in 2006 and the Basic Plan to Promote Cancer Control Program is being developed in 2007, in which cancer registry is recognized as one of the most important axis of the cancer control activities. One development that is expected to be advanced by the Plan is mandatory hospital-based registry in designated cancer care hospitals. In 2004, the Japan Cancer Surveillance Research Group, which is composed of core members of the National Cancer Center and representatives from 9 population-based cancer registries, became involved in the 3rd-Term Comprehensive Ten-Year Strategy for Cancer Control (2004–2013). The First Period (2004–2006) was focused on introducing the standardization of the cancer registration procedure, the Second Period (2007–2009) focuses on disseminating this procedure, and the Third Period (2010–2013) focuses on achieving standardization. Another positive development was the opening of the Center for Cancer Control and Information Services (CIS) at the National Cancer Center. The CIS is responsible for overseeing all cancer registries in Japan, disseminating information, and fostering specialists in cancer registration. Japanese cancer registration has previously been regarded as slow to progress; however, thanks to dramatic changes to promote cancer control programme both at national and prefectural level, new challenges and opportunities are now available to us.

Key words: Hospital-based cancer registry – legislative support, standardization; Cancer control

P125

ANALYSIS OF HOSPITAL-BASED CANCER REGISTRY DATA COLLECTED AT CANCER TREATMENT CENTRES IN JAPAN

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The cancer registry system in Japan can be divided into three types of hospital-based, population-based, and site-specific cancer registries. The population-based registry started first in 1951 and the hospital-based registry followed in 1985 as cancer research projects of several study groups, grant-aided by the Ministry of Health, Labor and Welfare of Japan. Currently, 25 out of 30 member institutions of the Japanese Association of Clinical Cancer Centers (JACCC) are committed to survival rate estimation in cancer patients. In the present analysis study, five-year relative survival rates were estimated by affected sites and clinical stages in patients who were admitted to one of the affiliated JACCC hospitals for the first time during 1997, 1998 and 1999. Overall, the number of admitted cancer patients was high for cancer of the stomach, breasts, lungs, and colon in the JACCC hospitals. The five-year relative survival rate was 71.0% (n = 12,753) in the entire patient population with gastric cancer (ICD code: C16) and 74.2% (n = 9086) in those undergoing surgical treatment; the rate was 35.8% (n = 10,302) and 62.1% (n = 4645) for lung cancer (C33, 34), and 86.6% (n = 10,021) and 90.3% (n = 8833) for breast cancer (C50), respectively. The follow-up rates were ≥ 97% in all the sites involved. The standardized hospital-based cancer registry has just commenced its registration since January 2007 across the designated hub facilities for cancer care in Japan, under the Anti-Cancer Measures Basic Law enacted on June 2006. A substantial improvement in the accuracy of the domestic cancer registry is anticipated in the near future.

Key words: Hospital-based cancer registry – survival rates, Japan

P174

ROLE OF CANCER REGISTRY IN DETERMINING CANCER MORTALITY IN ASIA

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Data on incidence, prevalence and disease specific mortality are frequently incomplete, not very reliable or lacking in many countries, particularly in Asia and Africa. In the absence of dependable data from the Civil Registration System (CRS), many countries have developed their own Sample Registration System (SRS). Under the scheme in India the SRS collects information on fertility and mortality indicators at state and national levels. India lacks nationwide cancer registration and systematic death registration. Gaining insight into the magnitude of the cancer problem in the country therefore depends mainly on 14 population based cancer registries, which provide relatively accurate statistics, although the area and population covered by the registries is minimal at about 7–8% (25% of urban & 1% of rural populations). When the estimates of cancer mortality figures of SRS system and cancer deaths collected by the registry are compared the SRS estimates are found to be unrealistic. Normally registries collect cancer mortality data from the records of Municipal Corporations, but a common problem encountered is that cause of death is often not mentioned Population Based Cancer Registries (PBCRs) improve cancer mortality statistics by their own methods. The death registration system in Greater Mumbai is relatively good and the registration cause of death statistics is 97.1% complete. Mumbai Cancer Registry scrutinizes each and every death within the Municipality and when cancer register figures were compared with the figures published by our Municipal Corporation it was observed that we recorded 30% more cancer deaths are recorded by our cancer registry. In the absence of cause of death and complete information for the disease, the registration of cancer deaths becomes very difficult, resulting in poor mortality data. Chennai cancer registry overcomes this problem by collecting all the deaths, regardless of the cause, and matching them with the morbidity data. The M/I ration thereby improved from 28 to 54%. Bhopal registry overcomes the problem by collecting information on all deaths by visiting burial grounds resulting in improvement in the M/I ration from 11 to 36%. Barshi rural registry collects cancer death information by making a house-to-house survey once in a year. Special cross sectional surveys in PBCR areas have provided additional data and information about cancer mortality. In Asia in general and in India in particular, cancer registries have played a crucial role in providing improved cancer mortality data.

Key words: Mortality; Incidence; Cancer registry; Cause of death

P175

ASSESSING THE IMPACT OF MISCLASSIFICATION OF DISEASE STAGE ON ESTIMATES OF REGIONAL VARIATION IN COLORECTAL CANCER SURVIVAL: A POPULATION-BASED STUDY, NEW SOUTH WALES, AUSTRALIA

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Background. Stage is the most important prognostic factor contributing to variation in colorectal cancer survival. However, errors in staging may reduce the ability to control for the effects of earlier detection, leaving residual confounding. In this study, we quantified errors in stage obtained from an Australian population-based cancer registry and assessed the potential impact of such errors on stage-specific estimates of area variation in colorectal cancer survival.

Methods. The study population included colon and rectal cancer patients diagnosed in 1992–2000 in New South Wales (NSW) and notified to the population-based NSW Central Cancer Registry. We previously investigated the impact of health area of residence on colon and rectal cancer survival by estimating area-specific relative excess risk of death (RER), stratified by stage at diagnosis. For cases diagnosed in 2000, we compared the Registry stage with that from a survey of treating surgeons. We then randomly reallocated all cases in the analysis to a simulated "corrected" stage according to the misclassification probabilities observed and repeated the analysis of area variation stratified by simulated stage 1000 times.

Results. We found 70% agreement between the registry and survey stage. After taking the misclassification into account, reallocation of the registry stages resulted in substantial variation in area-specific RERs across the simulated samples. Area variation in survival for localised colon and rectal cancer, which was previously statistically significant when classified using registry stage, appeared no longer to be so. However, area variation for non-localised colon cancer remained significant, with 90% of the p-values for the test of the null hypothesis of no area variation being < 0.05, and the magnitude of the variation changed little (0.08 vs 0.09).

Conclusions and implications. Misclassification of cancer registry stage can have an important impact on estimates of spatial variation in stage-specific colon and rectal cancer survival. If population-based cancer registry data are to be effectively used in evaluating and improving cancer care, the quality of stage data may need to be improved. This finding can be used as a cautionary note to researchers who use such data. However, it is not certain to what extent the impact of staging error that we observed will be applicable in other similar circumstances.

Key words: Measurement error; Staging; Misclassification; Confounder; Cancer registry; Relative survival; Regional variation

P180

VERY HIGH INCIDENCE OF STOMACH CANCER IN MIZORAM, A NORTH-EASTERN STATE OF INDIA: FIRST REPORT OF MIZORAM POPULATION BASED CANCER REGISTRY

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Mizoram Population Based Cancer Registry (an associate member of IACR) was established at Aizawl in 2003 under the auspices of National Cancer Registry Programme (NCRP) of Indian Council of Medical Research (ICMR). This Registry covers the entire state of Mizoram, situated in the North Eastern part of India. This is the first report of this PBCR for the year 2003–2004. Cancer cases were collected actively from about 25 sources from inside and outside Mizoram comprising of cancer hospitals, district hospitals, nursing homes, diagnostic laboratories and death registration offices. A special software designed by NCRP was used for the purpose and duplicity and consistency checks were done at the registry and then at Monitoring Unit at Dibrugarh and at NCRP headquarters in Bangalore. A total of 2158 cancer cases were registered during the two year period from 1 January 2003 to 31 December 2004. The overall age-adjusted (world population) incidence rates (AAR) were 194.53 per 100,000 males and 155.73 per 100,000 females for the entire Mizoram State, which is the highest incidence rate reported so far by any cancer registry in India. Rates were also analysed separately for Aizawl district, which is the main district in Mizoram, and the AARs were 277.23 per 100,000 males and 231.52 per 100,000 females. Most common cancer sites among males were stomach (24.6%), lungs (11.2%), oesophagus (10.9%), and hypopharynx (5.7%). In females, they were cervix (14.9%), lungs (13.9%), stomach (13.0%), and breast (11.9%). The incidence (AAR) of stomach cancer among males (Aizawl district – 57.31, Mizoram State – 50.64) and females (Mizoram – 23.29, Aizawl district – 33.61) are comparable to those of the highest in the world. This pattern is not seen anywhere else in India. This may be due to peculiar food habits like high consumption of smoked foods, tobacco-infused water (tuibur) etc., or genetic component may play a part as Mizos are ethnically and geographically closer to the Mongolian race like Chinese, Korean, Japanese – all of whom show very high incidence of stomach cancer. Also, incidence of lung cancer among females in Aizawl (AAR– 42.2) is 14 times higher than that of Delhi (AAR – 3.0). This may be due to high prevalence of tobacco habits as consistently seen in various surveys like GYTS, NFHS etc. Cancers of cervix, oesophagus (males) and hypopharynx (males) are other cancers that show higher incidence compared to other registries in India. This observed cancer patterns indicate the need for more research so that control measures can be quickly instituted.

Key words: Stomach cancer – incidence, control, North-east India; Cancer registry

Poster session 6:

VARIOUS TOPICS

P007

CANCER IN ADOLESCENTS AND YOUNG ADULTS: INCIDENCE, SURVIVAL AND SECONDARY TUMOURS

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Introduction. Cancer is uncommon in adolescents and young adults (AYA), however despite its rarity, cancer is among the most common causes of death in this age category. Furthermore, an increase in incidence has been reported over the past three decades. Aim of this population-based study was to analyse the incidence and survival of cancer in AYA (12–24 years) diagnosed in the North-Netherlands between 1989 and 2003 and assess the risk of a second(ary) tumour.

Methods. Patients were selected from the regional registry of the Comprehensive Cancer Centre North-Netherlands (CCCN) and classified by the Classification Scheme by Birch et al. The annual age-specific incidence rates per 100,000 for each tumour type were calculated according to gender and period of diagnosis. The association of age, year and sex with incidence was analysed using a multivariate Poisson model. Survival rates for 3, 5 and 10 years were calculated and multivariate Cox proportional hazard analysis was performed to determine factors associated with survival. To asses the risk of secondary tumours Standardized Incidence Ratio (SIR) and Cumulative Incidence (CI) were calculated.

Results. A total of 1118 patients aged 12–24 years were diagnosed with cancer in the period 1989–2003 in the North-Netherlands. The incidence for the ages 12–15, 16–19 and 20–24 was 13.4, 26.9 and 27.5 for males and 13.9, 20.7 and 20.7 for females. The most common cancers were germ cell tumours for males (5.5/100,000) and lymphomas for males (5.2/100,000) and females (4.5/100,000). In multivariate analyses incidence increased over time (IRR 1.03, $p< 0.0005$) and with age ($p < 0.0005$). Overall 5-year and 10-year survival were 80.8% (78.1%–83.1%) and 78.8% (76.0%–81.4%). In multivariate analysis, only year of incidence (HR 0.96, $p = 0.03$) was associated with survival. With a median follow-up time of 5.3 years (range 0–16), 28 patients developed a second tumour. This corresponds with a SIR of 32.9 (CI 21.9–47.6; $p< 0.05$). The cumulative incidence at 10 years was 3.0% (1.9%–4.5%).

Conclusion. Between 1989 and 2003 incidence of cancer in AYA increased, however no increase in survival was seen. The risk to develop a secondary tumour was high, confirming the importance of close follow-up. Further research is warranted to identify reasons for this changing incidence, for optimizing treatment and improving outcomes of these patients.

Key words: Secondary tumours – adolescents, young adults, incidence, survival

P014

PROACTIVE AUTOMATIC QUALITY CONTROL IN A CANCER REGISTRY INFORMATION SYSTEM

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The term "proactive" represents an action taken before a given situation could reach an open and clear crisis. This paper deals with a set of proactive control procedures that run in background in the cancer registry information system (CRIS), in order to control manual coding and, in case of need, to suggest possible corrections. Main reasons for a proactive automatic quality control (PAQC) are:

1 Many consistency rules to be applied in order to comply with IARC controls (DepEdits). The system contains all rules and apply them just before saving the case.

2 Complex data to be checked. E.g. the proposed incidence date is matched with the first of the hospitalizations with malignant tumour indications, the first histological examination, the first chemotherapy treatment and so on. If the CRIS disagrees with the manual incidence date it sends a message with an explanation.

3 The PAQC consistently applies the registry specific coding policy.

4 The PAQC offers wider explanations for inconsistence than those available in the batch procedures used for checking data before sending to major organizations or before exporting them to a statistical programme such as SEER Stat.

5 Better results are expected if the corrections can be made when the registrar is dealing with the specific case and not in a batch retrospective mode.

A short demo of the PAQC features is presented with an evaluation of its impact on daily coding activity in terms of efficiency and time savings. Our experience suggests that PACQ is strongly needed in the registry routine work, not only for the quality control itself, but also as a "on field" teaching tool about the registry coding policy. Moreover, the concept of PAQC, as demonstrated in the cancer registry, is very important for other medical activities, first of all the daily work with a computerised medical record in a clinical department.

Key words: Automatic quality control; Cancer registry information system; Inconsistence checking procedures; Coding policy; Computerised medical record

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P017

COMPUTERISED REGISTRATION OF CERVICAL CANCER SCREENING IN POLAND – PRINCIPLES OF FUNCTIONING AND CURRENT PROBLEMS

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Poland is a country where the mortality ratio for cervical carcinoma is high. In the past years Pap smears in Poland were taken only in opportunistic screening. As a consequence, only group of 30% of Polish women had cytology regularly performed. At the beginning of 2007 an organised national cervical cancer screening programme started. About 8 million of women aged 25–59 in the nearest two years will receive invitations for cytology sent by National Health Fund (NHF). In order to collect data of women participating in organised screening, the computer database of prophylaxis started to work. Details of invited women are entered into computer system which consists of three levels. The first level is fulfilled by out-patient clinic in the moment when Pap smear is taken. The second level is fulfilled by cytology lab when the smear is evaluated. And the last one in the colposcopy clinic if the cytological smear is abnormal and further diagnostic is necessary. In the database there can be registered following data of invited patients: personal identifier, time and place of Pap test, clinical information, analysing laboratory, cytological diagnosis, recommendations, colposcopy result and histology findings. Because the database is hosted on NHF's servers, each institution participating in screening programme has access to these information on-line. First months of implementing screening programme have indicated following problems:

1 The database contains only details of women participating in organised screening. Most women in Poland have Pap tests taken in opportunistic screening. Pap test which has been taken in opportunistic screening is better paid by NHF than the test taken in organised programme.

2 The demand of entering information of patient into database when the smear is taken in out-patient clinic excludes from programme small gynaecological offices with no access to the web. Computer equipment and software must be also financed by the gynaecologist himself. For these reasons the number of places where Pap smear can be taken is very limited. Presently less than 10% of invited women participate in organized programme.

3 Very low number of women with abnormal Pap smears attend the colposcopy clinics working in programme (at present less than 5%). These women are lost from observation and their details in the database are incomplete.

4 The screening database is not linked to cancer registry. As a result, some screening performance indicators, e.g. interval cancers number, cannot be reliably assessed.

Key words: Cervical cancer – screening, monitoring

P023

RELIABILITY OF BREAST CANCER INCIDENCE ESTIMATES IN THE PROVINCE OF PALERMO (SICILY): A COMPARISON BETWEEN TWO CASE ASCERTAINMENT SYSTEMS

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Breast cancer in women accounts for about 10% of all incident cancer cases. High survival rates may lead to biased estimation of incidence, especially by newly established registries. We compared a new population-based registry with a more established, specialized registry. The Palermo Province Cancer Registry (PPCR) started in 2006 and is based on integration of electronic data systems maintained by the Sicilian health authority for residents in the province of Palermo (hospital discharge forms (HDF) and the Death Registry), with a database containing all pathology reports, developed by the PPCR. Medical record review is performed as necessary. The Palermo Breast Cancer Registry (BCR) started in 1999 and actively ascertains breast cancer cases through review of medical records at public and private hospitals. BCR staff use HDF data to verify the completeness of case ascertainment. The BCR is accredited by the Italian Association of Tumour Registries (AIRTum). The PPCR defined a 2004 incident case as 1) any subject identified by at least one HDF-coded diagnosis of 174 (ICD-IX) in 2004 but not in 2002–2003, in association with a) a procedure code related to breast surgery (ICD-IX CM codes 85.11–85.48) or b) a morphology code consistent with a malignant breast tumour in a pathology report issued in 2004, or 2) a 2004 breast cancer decedent classified as a death certificate-only case. The BCR provided the 2004 incident series submitted to the AIRTum. To assess the reliability of case ascertainment, we computed the proportion of concordant cases and its confidence interval, and McNemar's chi-squared statistic to test whether discordant cases were evenly distributed. We assessed the sensitivity of incidence estimates to errors by comparing incidence rates computed using either set of numerators and 2004 population denominators. A total of 692 incident cases were ascertained by the PPCR, and 675 by the BCR during 2004 (concordance: 85%, 95% CI: 82–88%). Discordant cases (PPCR+/BCR–: N = 65; PPCR–/BCR+: N = 48) were evenly distributed (p = 0.37). The crude and age-standardized (per 100,000 Italian population, 1981) incidence rates were 108 and 97.6 according to the PPCR, and 105 and 95.3 according to the BCR. The age-specific incidence rate curves produced with the two sets of numerators were virtually identical (goodness of fit chi-squared test p = 0.9). Despite the recent start of the PPCR, comparison with the BCR showed that the ascertainment systems produce equivalent incident case series. General and age-specific incidence rate estimates produced by the two registries are virtually identical.

Key words: Cancer registries; Cancer incidence; Malignant neoplasms of the breast; Reliability; Information systems

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P025

GUIDELINE ADHERENCE FOR DIAGNOSIS OF THYROID GLAND NODES (WITH FINE NEEDLE ASPIRATION CYTOLOGY) IN THE REGION OF THE COMPREHENSIVE CANCER CENTRE NORTH NETHERLANDS (CCCN)

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Objective. Evaluate the compliance with the CCCN guideline for the diagnostic work-up of thyroid gland nodes.

Method. 650 patients who had a first fine needle aspiration cytology (FNAC) of the thyroid gland node between January 2002 and June 2003 were selected through 4 regional pathology laboratories. Data were collected from the medical files concerning the reason for referral, diagnostic examinations and treatment. The diagnostic guideline include the following steps. The first step is to measure the thyrotropin level in the blood. When the thyrotropin level is normal a FNAC is indicated. The recommendation for a benign cysts or a nodular hyperplasia is follow-up (3–12 months). Surgery is indicated for carcinomas. A repeat of the FNAC is indicated when the outcome is uncertain or insufficient material.

Results. In 14.6% of the cases the thyrotropin level was unknown, in all other cases the level was measured (normal 72.2%, raised 2.9%, reduced 10.3%). In 71.7% (466/650) one or more diagnostic examinations before the FNAC was performed. Mostly it was an ultrasound examination (86.5%). The FNAC showed the following results: benign cysts 24.6%, carcinoma 1.6%, follicular lesion 4.8%, nodular hyperplasia 37.4%, uncertain diagnosis or insufficient material 24.4%. Other: 7.2% (i.e. chronic inflammation, no deviations, anaplastic carcinoma, unknown). The "follow-up" recommendation in the guideline for the diagnosis benign cysts was followed in 45.6%. The remaining patients underwent a new FNAC (12.5%) or discharged from follow-up (29.4%). For the diagnosis uncertain or insufficient material the guideline was followed in 29.6% respectively 54.2%. Instead of repeat FNAC follow-up (23.4%) and surgery (13.9%) was the policy for the remaining patients. Scintigraphy was recommended for the diagnosis follicular lesion, but was only used in 16.1%. The remaining patients generally underwent surgery (64.5%).

Conclusion. This study showed that the first step of the diagnostic process was followed in 84.5% of the cases. The second step in the guideline should be the FNAC. This step was not followed for a large proportion of the patients. Imaging techniques before the FNAC was carried out in a lot of cases. The impact of this lack of adherence, especially with respect to missing thyroid carcinomas, is unclear and longer follow-up of this cohort will have to be awaited for further conclusions can be drawn.

Key words: Thyroid gland nodes – fine needle aspiration cytology, guideline adherence

P037

A COMPARISON OF SURVIVAL FROM CUTANEOUS MALIGNANT MELANOMA BY TUMOUR THICKNESS IN YORKSHIRE, UK AND NEW SOUTH WALES, AUSTRALIA BETWEEN 1993 AND 2003

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Background. Incidence rates of cutaneous malignant melanoma (CMM) are much higher in Australia than the UK. In recent years, the proportion of thin tumours has been increasing in both populations, partly as a result of public health campaigns, which have been running for differing time periods. The aim of this study was to use cancer registry data to compare survival from CMM in two populations with different incidence rates (Yorkshire, UK and New South Wales [NSW], Australia), with particular regard to tumour thickness, and to look at whether greater investment in melanoma prevention and early detection in Australia has resulted in improved survival.

Data & Methods. All patients diagnosed with CMM between 1993 and 2003 in Yorkshire (n = 4102) and NSW (n = 30,138) were identified from the cancer registry databases and prognostic information (age, sex, body site and Breslow thickness) extracted. An area-based measure of socio-economic background (SEB) was added. World age-standardised incidence rates were calculated as three-year rolling averages. Five-year relative survival rates were calculated using socio-economic life tables. Relative excess risks of death due to diagnosis of melanoma were calculated to compare survival across regions and time periods, after adjusting for prognostic factors.

Results. Between 1993–1995 and 2001–2003, incidence increased from 4.9 to 7.8 per 100,000 in males and from 7.4 to 10.9 per 100,000 in females in Yorkshire. In NSW, incidence increased from 33.4 to 43.5 and 23.8 to 29.2 per 100,000 in males and females respectively. These increases were mainly seen in thin tumours (< 1mm). Relative survival was 86.9% (95% CI 85.2–88.5) in Yorkshire and 88.6% (95% CI 88.1–89.1) in NSW. Survival was higher for those with thin tumours (101.1%; 95% CI 90.4–106.2 in Yorkshire and 99.0%; 95% CI 98.5–99.4 in NSW) compared to those with thick tumours (> 4mm) (53.9%; 95% CI 45.2–62.3 in Yorkshire and 54.5%; 95% CI 51.1–57.8 in NSW). There was no significant change in survival over the time period in either area. After adjustment for age, sex, SEB, site and thickness the relative excess risk of death in Yorkshire compared to NSW reduced from 1.36 (95% CI 1.20–1.53) to 1.11 (95% CI 1.00–1.24), p = 0.06.

Conclusions. Most of the increase in CMM incidence has been driven by an increase in thin tumours. However, this has not translated in to an improvement in survival during the period of this study. After adjusting for demographic and prognostic factors survival was slightly higher in NSW than in Yorkshire.

Key words: Cutaneous malignant melanoma – survival, Breslow thickness, cancer registry data

P059

INTERVAL CANCERS OF THE FIRST TWO ROUNDS IN THE TARRAGONA BREAST CANCER SCREENING PROGRAMME

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Objective. To analyse the differences of the interval breast cancers between the 1st and the 2nd rounds in the Tarragona Breast Cancer Screening Programme.

Methods. Each time that a round is finished in the Tarragona Breast Cancer Screening Programme, the interval cancers of the previous round are detected with the support of the Tarragona Cancer Registry which covers exactly the same area. Interval cancers are defined as any primary malignant tumours of the breast diagnosed in the women participating in the Programme with a negative result and diagnosed between two routine mammograms. Stages at diagnosis of these cancers are studied. Careful revision of all screening and diagnostic mammograms is carried out following a strict protocol.

Results. The Programme did 28,178 mammograms in the 1st round and 36,038 in the 2nd one. 124 cancers were detected in the 1st round and 116 in the 2nd one (detection rates: 4.4‰ and 3.2‰) whith a great variability depending on the radiological unit. 29 interval cancers were detected in the 1st (1.0‰) and 40 in the 2nd round (1.1%). The variability between units in the rates of interval cancers was higher in the 1st round. The interval cancer rates of the 1st year were 0.21‰ and 0.63‰ in the 1st and the 2nd rounds respectively. The rates of the 2nd year were 0.71‰ and 0.49‰. Three cases were detected after two years in the 1st round. In *the 1st round, the proportion of interval cancers in relation to the underlying expected incidence* in the absence of screening was 0.21 in the 1st year and 0.71 in the 2nd one. In the 2nd round, the values were 0.63 and 0.43. Taking in account the incidence and prevalence screening mammograms and according to the European Guidelines for Quality Assurance in Mammography Screening all these values are in the desirable level except the proportion of the 2nd year of the 2nd round. The distribution of interval cancers by stage were: 1st round: 6.9% *in situ*, 27.6% stage I, 41.4% stage II, 17.2% stage III and 6.9% stage IV. 2nd round: 8.3% *in situ*, 11.1% stage I, 33.3% stage II, 41.7% stage III and 5.6% stage IV. According to the category after the mammograms revision the distributions were: 1st round: 6.9% occult, 31.0% true interval, 27.6% minimal signs present, 20.6% false negative and 13.8% not evaluable. 2nd round: 2.5% occult, 25.0% true interval, 15.0% minimal signs present, 27.5% false negative and 30.0% not evaluable. The re-examinations were useful to know the errors in the reading of the mammograms of the Programme. After excluding the cancers classified as "true interval" and "occult", the sensitivity of the test was 87.9% and 80.0% in the 1st and 2nd rounds, respectively.

Conclusions. Cancer registries are useful in the evaluation of the breast cancer screening programmes. Among other functions, they can be used to ascertain the interval cancers of these programmes and their characteristics.

Key words: Breast cancer – interval cancer, screening, evaluation, cancer control

P171

THE EFFECT OF RACE/ETHNICITY AND INSURANCE IN THE ADMINISTRATION OF STANDARD THERAPY FOR LOCAL BREAST CANCER IN FLORIDA

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Objectives. We studied the receipt of standard treatment for local breast cancer in Florida and its association with race/ethnicity and insurance coverage.

Methods. Local breast cancers diagnosed between July, 1997 and December, 2000 and reported to Florida's statewide registry, were linked to the Agency of Healthcare Administration inpatient and out-patient databases, to enhance the registry's treatment data, resulting in 23,817 local breast cancer cases with non-missing treatment information. Standard treatment for local breast cancer was defined as mastectomy or breast conserving surgery followed by radiation therapy. The receipt of standard treatment was modelled as a function of health insurance, adjusting for facility type, age, race/ethnicity and marital status.

Results. Approximately 88% of the local breast cancer cases were administered standard therapy. The age at diagnosis was a significant predictor of standard treatment for local breast cancer, reducing the odds by 3% per year of increase in age. Compared to white non Hispanic, black non-Hispanic women were approximately 20% less likely to receive standard treatment (OR = 0.81, 95% CI = (0.68, 0.97)) and Hispanics were 23% less likely (OR = 0.77, 95% CI = (0.66, 0.89)). It was 20% more likely to get standard treatment in non-teaching facilities compared to teaching facilities (OR = 1.21, 95% CI = (1.05, 1.38)). Marital status and health insurance had a joint effect on standard treatment: compared to the uninsured, married women on Medicare were 116% more likely to receive standard treatment (OR = 2.16, 95% CI = (1.50, 3.12)) and the privately insured were 37% more likely (OR = 1.37, 95% CI = (0.96, 1.96)), although the later effect was not statistically significant; single, separated or divorced and widows under Medicare were more likely (62–86%) to receive standard treatment than the uninsured, but these findings were not statistically significant. Single women insured by Medicaid were 50% less likely to receive standard treatment than the uninsured (OR = 0.50, 95% CI = (0.24, 1.06)), whereas married, and separated or divorced women insured by Medicaid had a similar odds compared to the uninsured.

Conclusion. A substantial number of women with local breast cancer in Florida received guideline-based treatment. Age at diagnosis, facility type, race/ethnicity, and marital status combined with health insurance were all associated with receipt of standard treatment. Future efforts should target Hispanic and black women, the elderly, widows and the single women under Medicaid, in order to reduce disparities in the treatment of local breast cancer.

Key words: Local breast cancer – patterns of care, race, ethnicity, health insurance, treatment disparities

P085

THE CANCER REGIONAL REGISTRY FOR THE SOUTH OF THE PROVINCE OF BUENOS AIRES AND THE PRIMARY PREVENTION

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The organization of the Cancer Registry began in 1986. Trying to secure its continuity an NGO was created: the Argentina Association for Cancer Education and Prevention, AAPEC. There was not any population based cancer registry working in Argentina at that time and medicine had a very strong bias towards the assistance of patients rather than financial support for registries or prevention plans. In the statute of the new association it was stated like priority the creation and maintenance of a cancer registry and the improvement of cancer control. So it was possible in 1994, five years after the beginning of the Cancer Registry, to perform a pilot study in the neighbourhood of Ingeniero White to try to diminish the tobacco use prevalence among adolescents and increase awareness of the risks of its use. The results of this research were published in the Rosario Medical Magazine. The prevalence of tobacco use, also, was broadly studied among health workers of the Interzonal Hospital Doctor José Penna (seat of the Cancer Registry) and also among adolescents in a broad area between 1994 and 1998. In 2000 the Help Support Groups to help smoking patients quit started in our hospital organized by our Association and such groups continue until now. More than 350 patients have attended those groups. In 2002–2003 a survey was conducted in order to know the best strategy to change doctors' attitudes towards their smoking patients. Both the Association and the Registry have been involved in the training of health professionals in tobacco control and with other national experts, we performed the National Guide for Tobacco Addiction Cessation and the National Guide for Free Smoke Environments. Since July 2006, our Association has been leading the Dr. Jose Penna Interzonal Hospital Smoke Free Programme. The Registry's active participation in tobacco primary prevention was also a means to make it better known by the community and get more financial help. The decrease in tobacco use prevalence among health professionals and the general population of Bahía Blanca from 35% and 38%, respectively, in 1997 to 27% and 34% in 2006 could be partially attributed to AAPEC and the Registry activity.

Key words: Cancer registry; Tobacco control

P091

THE INFLUENCE OF THE SPANISH NATIONAL DEATH INDEX ON SURVIVAL RATES IN TARRAGONA AND GIRONA CANCER REGISTRIES

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Introduction. Tarragona and Girona cancer registries do a systematic passive follow-up by means of record-linkage procedures with the Catalonian Mortality Registry database in order to estimate the survival rates in cancer patients. In 2006 we did a supplementary active follow-up on some of the most lethal cancers diagnosed during the period 1995–1999 to evaluate the level of incompleteness of the systematic passive follow-up and its influence in the survival rates.

Objective. To evaluate the degree of improvement in the completeness of the follow-up using the Spanish National Death Index after the usual passive follow-up and its influence in the survival rates.

Methods. We carried out two separate studies:

1 a follow-up of all the stomach and rectum cancers diagnosed during the period 1995–1999 (2303 cases);

2 a follow-up of the oesophagus, liver, biliary tract, pancreas and lung cancers diagnosed during the period 1995–1999 where the patients were alive at December 2003 after a passive and an active follow-up (4441 cases).

In both cases, the follow-up was carried out by searching the date of death in the National Death Index database until December 2003. We calculated the degree of incompleteness of systematic passive follow-up and estimated the new survival rates for the studied tumours. Finally, we applied this survival correction for the most frequent types of cancer assuming the same level of incompleteness of follow-up.

Results. Only 80.5% of the cases already registered as dead were found in the Index. For the cases registered as alive, we found the date of death in: 1) 38 cases of stomach and rectum cancers; 2) 45 cases of oesophagus, liver, biliary tract, pancreas and lung cancers. The 5-year relative survival rates before and after this supplementary follow-up for the two areas together were: 1) stomach 27.6 and 25.2; rectum 50.1 and 48.5; stomach-rectum 39.0 and 37.1 (Tarragona 39.9 and 37.0, Girona 38.2 and 37.1). 2) oesophagus 9.8 and 9.4; liver 10.1 and 8.6; billiary tract 14.9 and 13.1; pancreas 4.4 and 3.5; lung 10.1 and 8.7; and all these most lethal cancers as a group 9.7 and 8.4 (Tarragona 10.0 and 8.3, Girona 9.4 and 8.5). The rates for all invasive except non-melanoma skin cancers were estimated as 50.4 and 48.9.

Conclusion. In the Tarragona and Girona Cancer Registries, the systematic passive follow-up based only in the Catalonian Mortality Registry produces an estimated over-estimation of the 5-year relative survival rates of 1.5% for all cancers globally. The main reason for the incompleteness in this passive follow-up is the emigration to other parts of Spain. The use of the Spanish National Death Index database to ascertain the death of the emigrated cases should be used systematically in both registries but only as a supplementary method of follow-up.

Key words: Cancer registry; Cancer survival; Follow-up; Quality control

THER POSTERS

P001

STANDARDIZATION OF CANCER REGISTRATION METHODS AND IMPROVEMENTS IN CANCER STATISTICS IN JAPAN

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Background. In Japan, local public authorities, known as prefectures, administrate population-based cancer registries. However, the system has been voluntarily and independently improved by each registry due to inadequate financial and technical support from the Japanese government. Consequently, various registration methods and database systems have been developed by each registry, and it is necessary to standardize the cancer registration procedure throughout Japan in order to improve the quality of the data.

Methods. The Japan Cancer Surveillance Research Group was organized and subsidized by the national government in the Strategy for Cancer Control (2004–13) project. The aim of the First Term (2004–06) of this project was to initiate the standardization strategy by:

1 Establishing the standards and objectives to be achieved during the 10-year project, represented by the following 8 items: legislative authorization, standard data content and format, data completeness, data timeliness, data quality, patient follow-up surveys, annual reporting, and data used for epidemiological research;
2 Planning the development of a standard registry system using the standard registration process defined by the research group;
3 Providing a standard registry system for cancer registries on request to improve the registration procedure (inputting data, identification of individuals, consolidation of data, statistical analysis) in the training of local staff; and
4 Establishing a "question and answer" system for registries in order to create an archive of Frequently Asked Questions (FAQs) based on discussions among research group members.

In 2004 and 2006, we conducted a questionnaire survey for all cancer registries in order to investigate the current situation and improvements in standardization during the First Term. The First Term will be followed by the Second (2007–09) and Third (2010–13) terms.

Results. The standard registry system has been developed in the Radiation Effects Research Foundation in Hiroshima and has been repeatedly updated and tested in the model area (Yamagata Prefectural Cancer Registry). As of May 2007, of 35 population-based cancer registries in Japan, 9 registries introduced the standard registry system and 8 registries were planning to introduce the system. Furthermore, training and technical support provided by the research group led to improvements in cancer registration standardization during the First Term.

Discussion. Currently, we have just launched the Second Term of the Strategy for Cancer Control. We will continue to promote the standardization of the cancer registration procedure, and provide technical support and training for registry staff.

Key words: Standardization; Population-based cancer registry; Japan

P004

CAPACITY OF BELARUSSIAN POPULATION CANCER REGISTRY TO IDENTIFY OCCUPATIONAL SKIN CANCER IN POLOTSK

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Background. In the end of 80th 25 cases of carcinoma of skin of the arm (C44.6) in workers of Polotsk Glass Fiber Enterprise were occasionally found by us. Most cases of cancer were at the stage of distant metastasis and bad prognosis. All affected workers were operators and had a long term direct professional contact with lubricating agent N80.

Aims. The purpose of this work was to estimate the possibility of determination of localization of carcinogenically dangerous production by data of Belarussian cancer registry.

Materials and Methods. Skin cancer in two close settled cities Polotsk and Novopolotsk and whole Belarussian urban population was estimated by data of Belarussian Cancer Registry for 1990–2006. Standardized incidence ratios (SIRs) were calculated using the Belarussian urban population incidence rates to generate expected numbers. We have used in the study GIS methodology to make the Atlas of skin cancer SIR time (1978–2005) distribution by 117 regions of Belarus.

Results. We designed some criteria for primary identification of occupational risk factors in small towns based on data of Population Cancer Registry. There are high numbers of cancer cases with specific localization and morphology, younger mean age of patients and plurality of tumours. Since 1990 to 2006 it was established 956 cases of skin cancer (C44) in Polotsk, 856 cases in Novopolotsk and 61,586 in Belarus. According to Atlas of Skin cancer Standardized Incidence Ratios distribution Polotsk region seems to have high skin cancer risk compared with other Belarussian areas. The proportions of C44.6 localization were 6.5% in Polotsk, 4.3% in Novopolotsk and 3.9% in Belarus. But in the same time among C44.6 cases the proportions of carcinoma were 66% in Polotsk, 32% in Novopolotsk and 20% in Belarus. The next feature is the number of plural primary malignant tumours (10 double and 4 triple of metachronous tumours C44.6 in Polotsk against 1 of double tumours in Novopolotsk). The mean age of diseased of carcinoma C44.6 was 55.0 in Polotsk and 62.7 in Novopolotsk and 68.7 years in Belarus. SIR of C44.6 for Polotsk (SIR = 2.18; 95% CI = 1.67–2.82) and Novopolotsk (SIR = 1.58; 95% CI = 1.11–2.18) were significantly higher than in whole population. Thus we can conclude that presence of a significant professional carcinogenic factor in small city could be discovered in population-based descriptive epidemiological study.

Key words: Occupational skin cancer; Population cancer registry; Criteria of identification

P005

SURVIVAL OF PROSTATE CANCER PATIENTS DIAGNOSED BETWEEN 1990 AND 1998: A STUDY OF POPULATION–BASED SILESIA CANCER REGISTRY (SOUTHERN POLAND)

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Background. The survival of prostate cancer patients has been assessed only in some urban areas in Poland as the national estimate of survival of prostate cancer patients in Poland until recently. The purpose of the present study was to estimate 5-year relative survival of prostate cancer patients based on the data from population-based Silesia Cancer Registry.

Methods. Analyses were based on 1760 men diagnosed with malignant prostate cancer, ages 15 years and older recorded by population-based Silesia Cancer Registry between 1990 and 1998, actively followed for vital status through 31 December 2003. Of all cases registered, 68.4% were histologically confirmed. The influence of stage and time of follow-up on the relation between age at diagnosis and survival was considered. Hakulinen method and regression models for relative survival were applied for survival assessment.

Results. 5-year relative survival for cases diagnosed in 1990–1994 and 1995–1998 were similar (42.0% and 40.9% respectively). 5-year relative survival increased, levelled off, and then decreased over age span. The relationship between age and 5-year survival was influenced by stage at diagnosis. The relative survival was the lowest in the youngest age group (age 15–54 years) at 1 to 5 year of follow-up.

Conclusion. We assessed for the first time relative survival on the basis of the prostate- cancer data from population-based cancer registry in Silesia. There were no survival improvements over two time period. 5-year standardized (Eurocare-3 prostate-specific standard) relative survival during the period 1990–1994 was significantly lower than the overall estimate for Europe.

Key words: Prostate cancer – survival, registry

P006

EUROCHIP UK PILOT STUDIES: ESTABLISHING BY QUALITATIVE QUESTIONNAIRE THE FEASIBILITY OF COLLECTING POPULATION-BASED DATA INTO "DELAYS IN TREATMENT" AND "COMPLIANCE WITH GUIDELINES" IN THE UK

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Objective. To gather knowledge from the UK's 11 cancer registries on information sources, actually collected or potentially usable, that contain population-based data on "delays in treatment" and "compliance with treatment guidelines" for breast and colorectal cancer patients. In addition, the extra resources needed by the registries to capture new sources of information to be estimated.

Methods. A qualitative questionnaire, in three parts, was designed in Access. Part 1 enquired of the registry the amount of registration presently undertaken (C00-C97) and its cost. In Part 2, registries listed all sources (that they were aware of) and estimated what % of registered patients could be found in them, and how information would be collected. If presently the source was not collected, the registry estimated the time and the extra resources required to do so. For Part 3, 18 items of information relating to "delays in treatment" or "compliance with guidelines" were considered for the sources (in Part 2) that could contain them; the item in each individual source was assessed for completeness, quality, and coding effort.

Results and Conclusion. Currently among the 11 UK cancer registries there are a variety of methods and sources used to register breast and colorectal patients, however, the National Cancer Waiting Times Database, hospital administration data (HES), and multidisciplinary team meetings databases, hold out real hope that good quality, medium-cost population-based data on "delays in treatment" and "compliance with guidelines" could be collected in the near future in the UK.

Key words: Information sources; Treatment delays & compliance

P010

COMPARISON OF CANCER INCIDENCE AND SURVIVAL IN CHILDREN RESIDENT IN THE NORTHERN REGION OF PORTUGAL IN THE PERIODS 1989–1993 AND 1999–2003

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The incidence of cancer in children under 15 years old in Europe has come to increase and has been accompanied with the improvement of the survival rate for this illness. The objective was to evaluate the incidence and the survival of the cancer in minors less than 15 years, resident in the Northern Region of Portugal in the period form 1999– 2003, and compare these results with the incidence of cancer in the period from 1989– 1993, and with the situation in the Europe and the U.S.A. Working with the existing records in the RORENO database, the crude incidence rates and the standardized incidence rates have been calculated. The rate ratio and the 95% confidence interval have been calculated and compared for both periods. The survival rate was calculated by the method of Kaplan-Maier and the differences analyzed with the Log-rank test. During the period form 1999–2003, 420 children under 15 years were diagnosed with cancer in the Northern Region of Portugal. This represents an incidence rate of 148.2/106. The risk for cancer was higher for males (161.2/106) and for the age group between 1–4 years old (219.3/106). The kinds of cancer with higher incidence rates have been leukaemia (39.2/106), followed by tumours of the central nervous system (34.2/106) and lymphomas (19.4/106). An identical pattern has been verified both in Europe and in the U.S.A. By histology, the lymphoid leukaemia, the astrocytomas and the neuroblastomas were the most frequent tumours. Overall, the incidence rates of cancer in children have increased from 1989–1993 to 1999–2003, and in particular the tumours of the central nervous system. Compared with Europe, the Northern Region of Portugal had higher standardized rates for tumours of the central nervous system, for lymphomas and for hepatic tumours, among others. But it had inferior rates for neoplasias such as leukaemia, sarcomas of the soft tissues and nephroblastomas. The 5-year-survival rates for cancer had an increased trend in the Northern Region of Portugal, going from 55% in 1989–1993 to 78% in 1999–2003. Acute myeloid leukaemia, lymphomas, PNET, bone tumours and sarcomas of the soft tissues, have been the cancer diseases where the survival rates improved significantly. On the contrary, for astrocytomas and nephroblastomas, the prognosis did not improve in recent years.

Key words: Cancer – incidence, survival, population-based registry, childhood cancer

P011

MAPPING CHILDHOOD CANCER INCIDENCE AT NORTHERN REGION OF PORTUGAL

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Spatial epidemiology is concerned with the description and understanding of the spatial variations on the disease risk and the related variables. The description of incidence patterns for the detection of risk and inequalities is best done by small areas diseasing atlas. The goal of this presentation is twofold. First, we report and describe some data on childhood cancer in North Portugal. The childhood cancer data information was gathered from the population-based cancer registry (RORENO, Registo Oncológico Regional do Norte), Portugal. The data contain all the children (age below 15 years old) diagnosed with cancer, between 1999 until 2003, resident in the North of Portugal region, including the five districts; namely Porto, Braga, Bragança, Vila Real e Viana do Castelo. The children were followed until April 30th 2006. Second, we present the incidence map of the childhood cancer at North of Portugal region, by municipal division, using the usual model for the observed number of cases of disease in each region by the Poisson model. In each of the districts above, we have considered a division by council (14 in Braga, 12 in Bragança, 18 in Porto, 10 in Viana and 14 in Vila Real). Deviation indices (from the Poisson model) in these councils vary from 0.03 (Vila Flor, Bragança) to 0.72 (Montalegre, Vila Real). In both cases, these indices are shown to be less and greater than expected, respectively, according to a Poisson underlying model. We also find that only Bragança and Vila Real have councils in the lowest and highest quantiles for deviation indices. We will also consider a Bayesian approach, using an Empirical Bayesian method. In this case, a random effect (for each region) is introduced in the model. A parametric distribution (i.e. gamma or log-normal) is used as a prior for the relative risk and the parameters in this prior are approximated from the data.

Key words: Childhood cancer – mapping, Poisson model, empirical Bayesian model, relative risk

P015

RESULTS OF AN OPPORTUNISTIC MAMMOGRAPHY SCREENING STRATEGY: TICINO (SWITZERLAND), 1996–2005

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Background. Breast cancer screening has attracted a lot of attention from healthcare organisations worldwide, and has been accepted as a viable tool in reducing mortality. In the liberal Swiss health-care system there is a coexistence of systematic screening programmes (Vaud, Valais, Geneva) and opportunistic screening, as in Ticino.

Objectives of the study are to produce population-based indicators derived from an opportunistic screening strategy, on the basis of Ticino Cancer Registry, and to perform comparisons to controlled screening targeted populations.

Methods. We included all patients with invasive breast cancer occurred in Ticino from 1996 to 2005. Age-standardized incidence and mortality rates are produced and joinpoint regression analysis is performed to analyse time trends. Proportion of in-situ cancers vs invasive ones, distribution of cases according to tumour diametre (≤ 1cm, 1–2 cm, 2–5 cm, > 5 cm), time trends for median diametre and for proportion of invasive carcinomas with a diametre ≤ 1cm are provided for both the entire case study and the screening targeted population (50–69 years old). Results are compared to population based available literature data.

Results. Between 1996 and 2005 more than 2300 new incident breast cancers were diagnosed, corresponding to about 30% of all female cancers and to a world age-standardized incidence rate equal to 80 cases per 100,000 inhabitants. Incidence trend is significantly increasing, while mortality results show a reduction. The proportion of *in-situ* carcinomas seems to be constant overtime, equal to about 6%, on average. Regarding distribution of cases according to tumour diametre, about 15% of patients have a diametre smaller or equal to 1 cm, while more than 40% have a diametre greater than 2 cm.

Conclusion. Incidence, mortality and survival data show similar time trends with respect to other national and international sites with controlled screening programme. However, proportion of *in-situ* cases registered in Ticino is lower than American population-based registries finding (16.2%, Goodman MT et al, 2006) and screening targeted population results of Canton Vaud (20.3%, Rapport d'activité 2005). Also the proportion of invasive cancers with diametre ≤ 1cm observed in Ticino is well below the UE standards for controlled programmes (15% vs ≥ 25%). On the basis of these results we can affirm that population-based Ticino results coming from an opportunistic screening strategy are not in line to other sites with controlled screening programme. The low incidence of *in-situ* carcinomas in Ticino, constant overtime, has to be better investigated.

Key words: Breast cancer – opportunistic screening; Cancer registry

P019

RAPID INCREASE OF THYROID CANCER INCIDENCE IN GWANGJU, SOUTH KOREA, 1996–2005

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The incidence of thyroid cancer is rapidly increasing in South Korea. Whether this is due to a real increase in disease or changes in the practice for the management of thyroid disease is not clear. To identify possible causes for the increasing incidence of thyroid cancer, we examined the trends in thyroid cancer incidence, histology, size distribution, distribution of disease detection characteristics, and mortality. Gwangju is located on the southwestern tip of Korean peninsula. The population of the city was 1,401,745 (695,687 men and 706,058 women) on July 1, 2005. The cancer database was collected for the population-based cancer registry of the city over a ten year period, from January 1, 1996 to December 31, 2005. The crude incidence rates and the age-standardized incidence rates (ASR) with Segi's world population were calculated. Total incidence cases of thyroid cancer were 2600 (337 in men and 2263 in women). Between 1996 and 2005 thyroid cancer incidence rates in Gwangju increased from 1.6 (ASR: 1.8) per 100,000 to 12.5 (ASR: 10.9) per 100,000 among males and from 9.9 (ASR: 9.9) per 100,000 to 80.2 (ASR: 65.5) per 100,000 among females. This increase is more evident in recent five years. Thyroid cancer-specific mortality rate has remained stable in male but increased in female between 1992 and 2004. The proportion of papillary carcinoma was increased from 60.0% to 97.7% in male and from 81.5% to 97.7% in female. The proportion of cancers measuring 1 cm or less was increased from 8.3% to 35.1% in male and from 42.5% to 54.4% in female between 1997 and 2003. Number of hospitals and clinics which practiced fine-needle aspiration and thyroid caner screening using ultrasound was increased from 5 to 49 between 1996 and 2005. The proportion of cancers detected by health care practitioners was increased from 58.3 to 65.8 in male and from 45.8 to 76.2 between 1997 and 2003. These results suggest that the cause of rapid increase of thyroid cancer incidence be the screening effect, not the real increase in the occurrence of thyroid cancer.

Key words: Thyroid cancer – incidence

P020

A TIME TREND ANALYSIS OF PAPILLARY AND FOLLICULAR CANCERS AS A FUNCTION OF TUMOUR SIZE: A STUDY OF DATA FROM 6 CANCER REGISTRIES IN FRANCE (1983–2000)

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Objective. The incidence of papillary forms of thyroid cancers has been increasing sharply for many years in Western countries. However, the factors explaining this increase have not been clearly established. Some studies mention the effects of radioactive fallout, particularly after the accident in Chernobyl. Another probable cause is related to progress in diagnosis practice. We describe time trends in the incidence of papillary and follicular cancers, taking into account the size of the tumour at the time of diagnosis.

Methods. The analysis was carried out on cases from 6 French cancer registries for the period 1983–2000. Anatomopathological reports concerning 3381 cancer cases were systematically recoded and centralised, following ICDO-3 rules.

Results. Over the whole period, the annual percent change of the incidence of papillary cancers was +8.13% and +8.98% respectively in men and in women. For micropapillary carcinomas (≥ 10 mm), this increase was respectively +12.05% and +12.85%. There was no significant effect of the period apart from micropapillary carcinomas in women. However, a birth cohort effect existed for some groups. This effect corresponds to an acceleration in the risk for people born after the nineteen thirties. For the most recent period (1998–2000), half the cases of papillary cancer were micropapillary carcinomas, and for one third of these, the tumour was ≥ 5 mm.

Conclusions. Our description of a time trend in the incidence as a function of tumour size supports the hypothesis of the predominant role of diagnosis practice in a context of high prevalence.

Key words: Thyroid cancer, papillary – tumour size, incidence, time trend

P021

THE ROLE OF CANCER CONTROL DEPARTMENT IN OUR COMPREHENSIVE CANCER CENTER – ONCOLOGICAL INSTITUTE "ION CHIRICUTA", CLUJ-NAPOCA, ROMANIA

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Background. Oncological Institute "Ion Chiricuta" set-up in 1929 as "Institute for Research and Cancer Prevention" always had as one of major fields of interest cancer registration and prevention programmes. Cancer Registry operates within the framework of Cancer Control Department which is also involved in the organized screening programme for cervical cancer and development of new screening programmes (breast, colorectal) in Cluj region. The major goal is the set-up of a Regional Cancer Registry with respect to the quality of data and quality of registration according to the ENCR standards and recommendations. In 2004–2005 a working team from the cancer registry was involved in the cancer component of EU Phare Project, aiming to promote, implement and manage EU compliant population-based cancer registration practices in Romania.

Results. Since 1955 about 125,000 new cancer cases were diagnosed and/or treated in the institute. Merely after 1989 the number increased by 2.5 times (2628, respectively 6205 in 2006). In the last decade the average number of new patients addressees annually is 14,000, among which about 5000 are new cancer cases. In the automatized data base, since 1995, there are 51,680 cancer cases, 17,805 males and 33,875 females. The main primaries are represented by breast and cervical cancer, which together total over 35% of all new cancer cases, 78% respectively 55% of these primaries were first treated in the institute. Each year about 75% of new patients addressed to IOCN are non-residence in Cluj county, area covered by the cancer registry. Taking into account demographic criteria, institutional availability, existing human resources and material infrastructure, including a Romanian version of IACR software *CanReg4*, our Cancer Registry is one of the five Regional Registries recommended to be established in main Romanian regions and ready to function. The Regional Cancer Registries are planned to be organized at ENCR standards in respect of number of population, dataset, coding and classifications, follow-up and trace-back procedures. The Regional Cancer Registries are meant to produce estimates of the cancer burden in population, incidence and mortality data, and to offer good quality where comparability, completeness and validity are concerned.

Conclusions. With our tradition and experience, staff and infrastructure, willingness and enthusiasm, availability and involvement in an area which outclass the boundaries of our county, Oncological Institute from Cluj, comprehensive cancer center, is right and suitable to maintain the Regional Cancer Registry, covering a population of about 6 million.

Key words: Cancer registry – regional, quality, standards

P026

DIAGNOSIS OF THYROID GLAND NODES WITH FINE NEEDLE ASPIRATION CYTOLOGY IN THE REGION OF THE COMPREHENSIVE CANCER CENTRE NORTH NETHERLANDS (CCCN)

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Objective. Aim of this study was to evaluate the diagnostic work-up of thyroid gland nodes in relation to the 2000 revison of the CCCN guideline.

Method. 650 patients who had a first fine needle aspiration cytology (FNAC) of a thyroid node between January 2002 and June 2003 were selected through 4 regional pathology laboratories. Additional data were collected from the medical files concerning the reason for referral, diagnostic examinations and treatment. Patients were followed using the regional cancer registry until June 2006.

Results. Most patients were female (85.7%) with a mean age of 50 years. The FNAC was carried out by specialists in internal medicine (50.2%), surgeons (29.7%) or radiologists (17.1%). A total of 875 biopsies was performed, 186 (28.6%) patients had 2 and 34 (5.2%) patients 3 biopsies. In 12.4% of all FNAC the diagnosis was either uncertain or insufficient material was collected, irrespective of the specialist that performed the FNAC. Fourteen thyroid gland carcinomas, were diagnosed by FNAC, 11 of these patients were operated; 132 patients underwent surgery, generally consisting of a hemithyroidectomy (75%). The reasons for surgery were: carcinoma (n = 11), goiter (n = 24), follicular lesion (n = 29) benign cysts (n = 11), uncertain FNAC diagnosis (n = 15) and insufficient material (n = 18). No reason was specified for 24 (18.2%) patients. Another 15 carcinomas were diagnosed among the operated patients. The indications for surgery for these 15 patients were uncertain FNAC diagnosis (n = 7), follicular lesion (n = 2), insufficient material (n = 2), goiter (n = 1), chronic inflammation (n = 1) and unspecified (n = 2). During follow–up with the cancer registry another patient was diagnosed with thyroid carcinoma, 2.4 years after the last recorded follow-up.

Conclusion. The specificity was high and the sensitivity of FNAC for thyroid carcinoma was 45.2% in our population, 67.7% including uncertain diagnosis. In total 29 of the 30 (96.7%) patients who developed a thyroid carcinoma were diagnosed by FNAC.

Key words: Thyroid gland nodes – diagnosis, fine needle aspiration cytology

P027

INSTITUTIONAL CANCER REGISTRY – FIRST REPORT FROM THE NATIONAL CENTER OF ONCOLOGY, LUANDA, ANGOLA

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The registry of cancer based in the data obtained from the case sheets of National Center of Oncology began at the beginning of 2006. Variables studied were: gender, colour of the skin, age, location of the primary tumour, diagnoses sources, anatomopathogical findings, differentiation degree, clinical stage and treatment required. Six hundred twenty-one tumours were registered; 415 (66.8%) in female patients. The commonest ages were 30–34 years and from 45–49 years with 48 tumours for each group. Breast was the most frequent organ involved (148), followed by cervical uterine cancer (100); skin (80) and lymphomas (35). Breast and uterine cervix were the more frequent organs affected in females. Skin was the most frequent location in men. Clinical stages III and IV were predominant. Chemotherapy and chemotherapy with surgery were the treatment of choice. Radiotherapy is still not available in Angola. We are reporting the first institutional registry devoted to cancer patients in Angola.

Key words: Cancer registry

P030

THE EFFECT OF QUALITY CONTROL ON THE ACCURACY OF A CANCER REGISTER: A BELGIAN SINGLE INSTITUTION EXPERIENCE

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Background. In 2004 a registration procedure maintained by dedicated registrars was implemented at the UZ Brussel. A validation study of the breast cancer database for the first full registration year has been reported in a companion communication presented at this meeting. We found that six cases were not detected and seventeen cases had coding errors in the year of incidence. Following this study additional measurements were taken: extended data search on coding systems such as ICD-9 codes and Leidse codes and systematic review of the data entries.

Purpose. The purpose of the present study is to evaluate these measurements by comparing the registrars database (RDB) with a surgical and radiotherapy database (SDB and RTDB) (year 2004).

Material and Methods. The RDB consists of all breast cancer patients with a histological diagnosis made in the UZ Brussel and with a histological ICD-O-3 code of malign or *in situ* neoplasm (behaviour code /3 and /2) completed with searches on behavior code /1 and Leidse and ICD-9 codes. In this DB the date of incidence corresponds to the date of first cytological/histological diagnosis. The data is entered by dedicated registrars but contains entries by clinicians. The SDB consists of breast cancer patients surgically treated in the UZ Brussel. In the SDB the date of incidence corresponds to the date of surgery. The RTDB consists of internally and externally referred breast cancer patients for radiotherapy. For this study only the internally referred cases were analysed.

Results. For the year 2004, 188 cases were registered in the RDB. One case which was present in the RTDB was missing in the RDB compared to six missing cases in the previous study. This case was not entered by the registrars despite the presence of a histological report. In the RDB three cases with a coding error in the year of incidence were found compared to 17 cases in the previous study. In the SDB no missing cases were detected. In the RTDB 14 cases were missing which were present in the RDB.

Conclusion. The measurements taken proved to be more effective. Consulting different data sources offers a more complete detection of missing cases and incorrect data. A dedicated registry is an important tool to validate existing clinical databases.

Key words: Quality control; Cancer register; Breast cancer; Cancer registration

P031

THE EFFECTS OF OPPORTUNISTIC SCREENING OF BREAST CANCER IN POLAND

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Introduction. Breast cancer is the most common cancer among women in the developed societies, including Poland. The frequency of occurrence of breast cancer in Poland is relatively low in the comparison with other developed countries. However, there is no doubt that the level of incidence rates in Poland will equate with the level observed in Europe.

Data and Methodology. The presented data are based on two resources: the death certificates from the Central Statistical Office (GUS) and the incidence of breast cancer collected by Polish National Cancer Registry. The data about population and fertility of women come from GUS. The data were standardized for standard world population.

Results. Breast cancer accounts for 20% of incidence of cancer among women and 13% deaths of cancer. Twelve thousand women in 2004 were diagnosed with breast cancer, and the number of deaths caused by those cancers was almost 5000. The highest number of breast cancer is observed in women aged 45–69. Incidence rates increase linearly with the age between 40 and 59 years old, after which the frequency of incidence stabilizes, and even falls down after the age of 70. The trends of incidence and mortality of breast cancer among women are demonstrated by different tendencies from the 1980s. Until the end of the 1970s there was increase in both mortality and incidence, but then the mortality curve was flatten until 1990s and since then there is declining tendency observed. The comparison of mortality and incidence of breast cancer in the 1990s and decade later shows the change in course of the phenomenon.

Conclusion. The faster rate of growth of incidence than the rate of mortality indicates an improvement in early diagnostic and treatment, especially among young and middle-aged women. The changes occurring in the risk of Polish population can be partially explained by reproducing behaviours. The hindrance of mortality increase in the 1980s can be connected to changes in the breast cancer treatment, whereas negligible decrease in mortality rates observed since the1990s can be the effect of opportunistic screening, which due to public campaigns came into existence. Population screening in the direction of breast cancer was introduced in the year 2006 and its effects on the trends of mortality and incidence will not be spotted until a few years pass.

Key words: Breast cancer screening – opportunistic screening

P033

WAITING TIMES IN DIAGNOSIS AND TREATMENT OF LUNG CANCER PATIENTS, IN THE REGION OF THE MAASTRICHT CANCER REGISTRY, THE NETHERLANDS

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Lung cancer is the leading cause of death from cancer in both men and women and has a poor survival. The overall 5-year survival rate is 10–15% worldwide. Some studies on lung cancer have indicated that delay in diagnosis/treatment negatively affects the prognosis while others have not shown such an association. The aim of this study was to study whether the waiting times for lung cancer patients during the diagnostic and therapeutic process in the region of the Maastricht Cancer Registry have been changed in the period 2001–2004. The Maastricht Cancer Registry (MCR) included all incident lung cancer cases diagnosed in the years 2001 and 2004 in the study. Several additional extra items were collected during the study period. These additional items were date of visit to general practitioner, date of first and second clinic visit to lung physician. Also date of first bronchoscopy, mediastinoscopy and operation were registered. Furthermore, the start of radiotherapy and chemotherapy were recorded. Co-morbidity was routinely collected for lung cancer cases. The median time from general practitioner (GP) referral to outpatient attendance was in 2001 3 days and in 2004 2 days. Seventy five percent of the patients had been at outpatients departments within 5 days in 2004.The diagnostic process (time between 1st and 2nd visit to lung physician) took 10 days for 50% of the patients in 2001 as well as in 2004. The median time to surgery was 45 days in 2001 and 42 days in 2004. In 2001, only 10% of the patients had surgery within 30 days of diagnosis. In 2004, 25% of the patients had their surgery within 30 days. Three quarters of the patients had to wait 60 days for surgery after their 1st visit to the lung physician in 2004. Waiting time from 1st visit lung specialist to start initial chemotherapy was 22 days in 2001 and 23 days in 2004, respectively. The median time to the start of radiotherapy was 39 days in 2001 and 40 days in 2004. None of the differences were significant. The results of this study showed a strong delay in waiting time for treatment of lung cancer according to the recommended guidelines. The results also indicate that there was no change in waiting times for lung cancer diagnosis and treatment since the first measurement of the waiting times in 2001, despite the interest of this subject by lung physicians.

Key words: Lung cancer – waiting times; Maastricht cancer registry

P036

SOLID TUMOURS IN YOUNG CHILDREN IN MOSCOW REGION OF RUSSIAN FEDERATION

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The aim of the study was to assess the main epidemiologic characteristics of solid tumours in 1–4 years old children. The data were retrieved from the database of Childhood Cancer Register of Moscow Region which was established in 2000. One to four years old children with solid tumours (III–XII main diagnostic group according to International Classification of Childhood Cancer, 2nd edition) diagnosed in 2000–2006 were included in analysis. The average annual pediatric population of the given age was 196,159 ± 6105. Total 101 children with solid tumours were included. The average number of annually registered cases was 14.4 ± 1.8. The male-to-female ratio was 0.92 : 1. The average incidence rate (IR) of all solid tumours was 7.35 ± 0.92 per 100,000 children per year (range 4.95–11.06). The following IRs per 100,000 for certain malignancies were found: CNS tumours 1.70 ± 0.47, renal tumours 1.76 ± 0.26, sympathetic nervous system tumours 1.73 ± 0.30, retinoblastoma 0.87 ± 0.24, soft tissue sarcomas 0.70 ± 0.46, germ-cell tumours 0.19 ± 0.13, hepatic tumours 0.14 ± 0.09, bone tumours 0.13 ± 0.08, carcinomas 0.07 ± 0.07. The average annual incidence of solid tumours in young children in Moscow Region was lower than in European countries. The lower IR of CNS tumours can be explained by under-reporting of this cancer type in Moscow region as a result of the scattering of some patients with these tumours through non-oncological hospitals. In comparison to the data from cancer registries of the most European countries similar IR of sympathetic nervous system tumours and renal tumours, lower IR of retinoblastoma and higher IR of soft tissue sarcomas were revealed in this study.

Key words: Solid tumours – children, incidence, Moscow Region

P038

ASSESSMENT OF CHILDHOOD CANCER INCIDENCE IN ROMANIA

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Assessment of childhood cancer incidence in Romania and ways of improvement is a project supported by UICC and Sanofi-Aventis in the *My Child Matters* programme. The main objectives of the project are: to improve the knowledge of the extent of cancer burden in the Romanian population of children and to improve the access to treatment by identification of current problems and real needs for proper treatment. The total number of children in Romania is of 3,500,149 (Annual Report of Centre for Health Statistics, 2004). As a start-point in the project we analysed data on all malignant tumours in children collected from all counties of Romania for the period 2000–2004 by the Centre for Health Statistics. Data on 1591 childhood tumours were available. In Romania there are two Institutes of Oncology (Bucharest and Cluj). Also, there is a hospital with a tradition in childhood cancer treatment and data collection (Bihor). Therefore we decided to analyze data from the whole country and in-depth analysis for three regions: Bucharest, Cluj and Bihor. The plan is to actively collect the data for the incidence year 2005 from these three regions. Population covered by each region (number of children aged 0–14) is as follows: 223,782 (Bucharest), 96,313 (Cluj), 100,127 (Bihor). In the analysis, we compared the incidence rates in Romania with the incidence rates in Europe, reported in the European Journal of Cancer from the ACCIS Study. Leading sites were leukaemia (ASR = 2.82) followed by central nervous system (ASR = 1.16) and lymphoma (ASR = 1.03). Overall quality indicators prove high %DCO, low % MV and high M : I ratio. % DCO = 5% in Bucharest, 14.7% in Cluj, and 1.8% in Bihor. The DCO cases are reported from the counties as DCO cases, the local database is not linked with death certificate database for identifying the DCO cases. %MV = 55% in Bucharest, 72% in Cluj and 58.3% in Bihor. % of other methods of diagnosis were: 35% in Bucharest, 5.8% in Cluj and 40% in Bihor. M : I ratios were 1.38 in Bucharest, 0.29 in Cluj and 0.43 in Bihor. Cancer reporting is compulsory in Romania since 1980, by the Ministerial Order No. 219/June 3, 1980 which was revised later in November 2002, Ministerial Order No. 871. The system has not been revised, though. The deficiencies of this system are not few and there could be mentioned some: collected data are not compliant with WHO (World Health Organization), IARC (International Agency for Research on Cancer), ENCR (European Network of Cancer Registries), no monitoring of data and registration quality, passive and one-time reporting, no follow-up or trace-back, no monitoring of the quality indicators for cancer registries (completeness of cover, % of microscopically confirmed cases, etc.), no specific trained and paid personnel.

Key words: Childhood cancer – incidence, Romania

P045

RISK FACTORS FOR BREAST CANCER AMONG SUDANESE FEMALES

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Background. Breast cancer onset may correlate with one or more risk factors (RF). A great number of these RFs have been investigated in different reports. This study was thought to assess the risk factors among selected group of Sudanese females. The study looked at many risk factors. These included residence, states, tribe, age, occupation, marital status, menarche, menopause, parity, contraception, obesity, and past family history of breast cancer.

Method. A case-control study was conducted from May 1999 to May 2003 in INMO, Sudan Demographical data and related information were collected using a short structure questionnaire. Odds ratio and 95% confidence intervals (CIs) were derived from logistic regression analysis.

Results. In all, 100 women with breast cancer and 100 control women were interviewed. In univariate analysis, breast cancer risk was significantly greater in premenapusal women p = .002 (OR = 3.9, 95% confidence interval {CI} 2.0452–7.5427), and women use of oral contraceptive P = .04 (OR = 11.3 95% (confidence interval {CI} 5.8023–22.3675). However, other variables did need more investigation.

Conclusion. The findings of present study suggest that premenopause and the use of oral contraceptive may have impact on the incidence of breast cancer in Sudanese women.

Key words: Breast cancer – case-control study, epidemiology, risk factors

P046

VISIONS FOR *CANREG5*

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What is *CanReg*? *CanReg* is a configurable computer programme designed for cancer registration in population-based registries. Version 4 was released six years ago and is now used in 140 registries in 75 countries. Training courses have been held around the world in the use of the programme and in coding in the third edition of the International Classification of Diseases for Oncology (ICDO-3). The Programme's Data-Entry module provides consistency checking for impossible/rare cases, search for duplicate records/multiple primaries using probability matching, and conversion from one classification system to another. Easy-to-use analysis options include Frequency distributions, Reports, Incidence tables and an interface into EpiInfo6. It can be used in a Windows-based network environment. Why a new "*CanReg*"? One main concern when *CanReg4* was developed at IARC was that the programme should run on lower end machines so it was programmed in such a way that it would use little resources – using few standard libraries. This makes the code base difficult to maintain. Since the computers have gotten more powerful, the next version could utilize more standard libraries and focus more on user friendliness and maintainability on top of a more powerful database engine. A modern programming language with a vast standard library, like for example Java, will help us do that. Features could be added or updated to facilitate the work of cancer registrars and analysts. Some examples: Computer networks have gotten more and more common. The current version of *CanReg* does not handle this adequately. Basic network support could be improved – both with respect to stability and features. Also we could focus on an integration of internet for example to be able send data rapidly (and safely) between registries. *CanReg4* was designed to run in a Windows environment. Due to the amount of "custom code" used it is difficult to port it to other platforms. With the increasing use of Linux as an alternative to the Microsoft platform it makes sense to implement a multi platform *CanReg*. Which steps to take? Step 1 would be to do a survey among current and potential users of *CanReg* to see, for example, what aspects of the programme they like, which features they use and what they would like to see improved. Step 2 will be to seek out the best technology for the task. Open standards are central. Initial propositions: Java as the core programming language, SWT for the GUI, XML for the dictionaries and specification files, JavaDB/Derby/SQL for the database and DES for encryption.

Key words: *CanReg*; Cancer registration – software

P047

CANCER INCIDENCE IN ANTALYA PROVINCE OF TURKEY IN 1998–2002

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Introduction. Antalya is situated in the southern part of Turkish Mediterranean region. The province of Antalya is located between the north latitudes of 36.07–37.29 and east longitudes of 29.20–32.35. The population of Antalya according to health statistics is 1,392,172 (2000), 74% of the population lives in the urban areas. Antalya has the fastest population growth in Turkey in recent years because of internal immigration. Regional income comes from trade, agriculture, tourism and construction. Here we are presenting results of Antalya Cancer Registry which are the second loop of the cancer registry chain of Turkey pioneered by Izmir Cancer Registry.

Method. A population-based cancer registry, covering the province of Antalya in Turkey was established in 1995. The registry centre is staffed by a public health specialist (MD), and full-time health workers. Additionally there are 17 cancer registrars employed in hospitals. ICD-O3 is used for topography and histology coding; *CanReg4* is used for data base and data processing.

Results. Overall cancer incidence was higher in males than in females (age-standardised rates 182.0 and 125.8 per 100,000, respectively), as in Izmir Cancer Registry's series. The principal cancer sites in males were lung (age-standardised incidence rate (ASR) 37.5, prostate (ASR 19.1) and bladder (ASR 15.8). Skin cancers were also relatively common (ASR 19.8 for cancers excluding melanoma). In women, breast cancer was by far the most common malignancy (ASR 29.1); cervical cancer was relatively rare (ASR 4.4).

Conclusion. There is probably an underestimate of incidence, due to the inability to use data from certain sources (e.g. death certificates), resulting in a rather high proportion of histological verified cases (92.5% overall). Nevertheless, the overall profile is an accurate reflection of incidence in this region of Turkey and provides much of the information required for planning strategies to control cancer.

Key words: Cancer registry; Cancer incidence rates; Antalya;Turkey

P048

CHILDHOOD CANCER INCIDENCE IN TEN YEARS PERIOD IN IZMIR, TURKEY

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Here we present childhood (under 15) cancer incidence rates for ten years in Izmir province by two periods, 1993–1997 and 1998–2002. There are 453 cases (238 boys, 215 girls) for 1993–1997 and 527 cases (301 boys, 225 girls) for 1998–2002. ASR* for all sites is 125.9 per million for 1993–1997 and 141 per million for 1998–2002; SIR = 1.12; 95% CI 0.99–1.27. Leukaemia is at the first row in both of the periods. In the first period leukaemias comprise 36% of all under 15 cancers, while in the second period this portion comprises 31.3%. In 1993–1997 lymphomas are at the second row followed by CNS tumours at the third row, as in the majority of less developed countries. But the relative frequencies of those two are quite close, 16.6% and 17%, respectively. In 1998–2002 the ranks of lymphomas and CNS tumours are inverted. CNS tumours settle down at the second row with 20.1% and lymphomas follows in third row (15%). ASR for lymphomas is 19.1 and 19.9 per million for 1993–1997 and 1998–2002, respectively (SIR = 1.04; 95% CI 0.76–1.43). ASR of CNS tumours is 20.9 and 27.8 per million respectively (SIR = 1.33; 95% CI 0.99–1.78). There are slight increases for most of the other sites excluding renal tumours and malignant bone tumours; the maximum SIR is for retinoblastoma (SIR = 2; 95% CI 0.86–4.63). But none of those distinctions have statistical significance. We understand that the pattern of the childhood cancers in Izmir has been transformed into a pattern resembling the childhood cancer incidence pattern in the majority of the developed countries and has to be followed closely by the means of increasing since the non-significant statistics can be connected with small numbers.

Key words: Childhood cancer incidence – Izmir, Turkey

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*world standard population

P049

IS COLORECTAL CANCER INCIDENCE INCREASING IN IZMIR?

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Turkey is a transition country between Asia and Europe, East and West, Less Developed and More Developed, Poor and Rich… We can follow the effects of this phenomenon via cancer patterns besides many other characteristics. Izmir is at the western edge of the country and one of the most westernized parts. Although we see the same mixed pattern in Izmir: among men very high incidence rates of lung cancer, high incidence rates of other tobacco-related cancers, as bladder and larynx; relatively low rates of prostate and colorectal cancers, low rates of liver and stomach cancer. The overall rates for women are quite low and the male/female ratio is high. Breast cancer with moderate rates is ranked first.

Key words: Cancer incidence – Izmir, Turkey

P052

INDUCTION CHEMOTHERAPY AND RESULTS FOR METASTATIC NASOPHARYNGEAL CARCINOMA

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Nasopharyngeal carcinoma (NPC) is an epidemiological disease in Algeria. Nearly 25% of the patients who will eventually die from their cancer will have distant metastases either at the time of presentation or following initial treatment. The metastatic nasopharyngeal carcinoma is frequent and is a therapeutic problem. In periods 1991–1996, 1998–2001, and in 2004, 88 patients were treated in oncology center; 22% of them had at first metastasis. The mean age was 40 years, range 9–75 years. Male prevalence (sex ratio) of 2.4 was clear. Undifferentiated carcinoma (UCNT) was found in 84%, and 16% had squamous cell carcinoma. The performance status in more than half of the cases was limited to 60%. The delay between the diagnosis and the hold in charge is > 6 months in 50% of cases. According to the TNM classification of the UICC of 1997, T3-T4 were present in 30–50% and 20–59% had a status of nodes N2-N3. The stage IV of the UICC was dominant with (IVA20%–IVB58%–IVC22%). The bony localization was the most frequent (60%), symptomatic and more frequent in the UCNT. It predominates regardless of the histological type in the T3-T4, N2-N3 which is fixed and bilateral. The hepatic localization represents 13% of all metastases with an attack > 50% of several hepatic lobes. The chemotherapy associates different drugs with first, second and third line. The rates of objective response and of stabilization were 40% and 6%, respectively. The rate of global survival to 2 years was 10%. The mean survival is low, less than 6 months (literature: 6.5 to 11 months). For the bony attack, the response was obtained when localizations were ≤ 2. The delays of apparition of other metastases sites varied from 4 to 24 months. These results remain encouraging and incite us to find urgently other molecules, combinations and new therapeutics.

Key words: Nasopharyngeal, undifferentiated carcinoma – induction chemotherapy, metastases

P053

WHAT ABOUT TAKING IN CHARGE MALIGNANT TUMOURS OF THE SALIVARY GLANDS?

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Surgery is the common therapy for tumours of the salivary glands. There are many patients suffering from post-operative disease recurrence and metastases and this series analysed with respect to pathology the place of chemotherapy regardless of other treatments. We studied retrospectively 15 patients treated for malignant tumours of the salivary glands to the exclusion of the lymphoma in our service between 2001 and 2006. The average age of patients was 43 years, with extremes of 9 and 70 years, and the sex-ratio = 2. Among these 15 patients 3 had total surgery with clearing-out of the ganglionary of which a came back positive, 3 complete surgery without clearing-out ganglionary ,6 partial surgery and, finally, 3 resection biopsies. The histology recovers a big variety of tumours: 6 cylindroma, 4 squamous cell carcinoma, 1 undifferentiated carcinoma, 1 melanose of Dubreuilh, 1 tumour to acinuos cell, and 2 rhabdomyosarcoma. The post-operative immediate radiotherapy (delay ≤ 2mons) was achieved only in 4 patients and palliative in 2 cases. The chemotherapy was neo-adjuvant (4 cases), adjuvant (3 cases), palliative (6 cases) and 2 patients challenged against indication. The toxicity was essentially digestive and haematological of rank II-III .The neo-adjuvant chemotherapy permitted to get 37% of RO solely for squamous cell carcinoma and the rhabdomyosarcoma, whereas total failure was observed in palliative (recurrence and metastases), either because of the histological type or the therapeutic protocol used. The adjuvant and immediate chemotherapy postoperatively and before radiotherapy under reserves of margins of healthy resection and without sheathed around nerve, would seem to find their place solely for the squamous cell carcinoma; however, if the surgery and the post-operative radiotherapy play certain and major role, the places of chemotherapy remain very limited.

Key words: Cancer of the salivary glands – chemotherapy, metastases

P054

CANCER SHOULD BECOME A REPORTABLE DISEASE IN ALBANIA

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In Albania, cancer continues to be a major problem which needs to be addressed by a public health approach, not only by a therapy approach. There are approximately 3500 new cases of cancer each year. The cancer data available is based partly on the registry of the Oncology Centre of Tirana and Hospital University Center (HUC) "Mother Teresa", and partly from the registries of the district hospitals and pathology services. The low incidence of cancer in Albania registered (about 100 new cases per 100,000 inhabitants), as compared with that of the other European countries, may be due to incomplete registration, and/or the high proportion of young people in Albania. The objective of Pact (IAEA) role is setting up a national cancer registry (population-based). The accurate preparation (collection, storage, analysis and reporting) of data on cancer incidence, prevalence and mortality, will be of value in establishing the epidemiological picture of cancer in Albania as well as its dynamics and variations over time. Activities to support this work would be:

- Development of legal and institutional framework for mandatory notification of malignant neoplasms, even though, at least for the first decade, the active method of case finding based on the register staff visiting and collecting the information directly from the data sources (case records, discharge summaries, pathology reports and death certificates) will remain the main method of registering the incident cancer cases.
- Assessment of the progress with the assistance of IARC. Development and implementation of a plan to upgrade completeness of the registry coverage with reference to the population resident in Tirana city.
- Utilization of registry data in planning and evaluating the cancer control programme. A population based cancer registry in Albania is an indispensable foundation of an effective surveillance system.

Key words: National cancer registry; Reporting of data

P056

CR CONFIDENTIAL

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Objective. Enhance security in the Cancer Registry, in relation to the users' authentication and the managing of media containing confidential data.

Method. A literature search was performed to determine the technical issues and existing solutions. A commercial firm was contacted with regard to the authentication; initially an in-house product was developed to clear/sanitize media although this was later replaced with an inexpensive commercial tool. The encryption features provided by Windows 2000/XP were considered strong enough to protect laptops.

Results.

1. A user can access the registration system only via their fingerprint thus ensuring a very high level of security.
2 All removable media containing identifiable data are wiped, as soon as the data have been transferred. Hard disks are cleaned when they are redeployed. NICR initially developed an application which closely follows the US Department of Defence standards and guidelines given by Peter Gutmann (University of Aukland). Subsequent commercially available tools following the same standards and guidelines are now available and are being used within NICR.
3 Working folders on each laptop are encrypted by the user; the entered data (still encrypted) are transferred to the system by connecting the machine to the internal network.

Conclusions. Users' authentication and electronic data 'shredding' are two central issues for the preservation of data confidentiality. Passwords are currently being replaced, where a more secure environment is required, by biometric solutions. The fingerprint recognition system adopted has proved, after a short settlement period, to be both convenient and secure. Present techniques, for the recovery of erased data from magnetic media, render inadequately simple deletion of confidential files. The use of readily available software tools allows a secure clearing of magnetic storage media. The level of security is customizable and is adequate to the subsequent use (internal/external/redeployment) of the disk. File encryption restricts information access only to the data owner, transparently. It is an essential technique for confidential mobile computing.

Key words: Data confidentiality; IT security; Encryption; Biometric authentication; Mobile computing

P057

ELECTRONIC DATA PROTECTION AMONG CLINICIANS – A SMALL SURVEY

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Objective. Assess the measures taken by clinicians to protect confidentiality when handling electronic patient data.

Method. Completion of a structured questionnaire regarding computer use, data protection and electronic confidentiality practices. The questionnaire was given to a small sample of Northern Ireland surgical trainees who were attending an unrelated meeting. They were asked to complete it at the end of the meeting.

Results. Of the thirty-two trainees who were invited to participate, 29 (91%) returned completed questionnaires. Sensitive data were held on desktops (90%), laptops (66%) and handheld PCs (48%), with only 21%, 42% and 21% respectively forcing logons via passwords. 55% of trainees used the same password for all machines and 90% of passwords were less than 8 characters long. Two trainees declined to reveal details of their passwords. All desktops, 84% of laptops and 36% of handhelds were regularly connected to the internet, but 50% had never adjusted their internet security firewall. Encryption was not used in 97% of cases, while just under one-third (30%) confessed to transmitting unencrypted patient-identifiable data over the internet, e.g. by email to a Hotmail account.

Conclusions. Electronic data confidentiality practices amongst the given sample of surgical trainees are poor. Cancer Registries would suffer heavily in the event of a breach of confidentiality, which would have widespread repercussions on public trust. Simple practical measures exist to reasonably protect patients' confidential data and should be implemented on a routine basis.

Key words: Data confidentiality; IT security; Encryption; Patient-identifiable data; Firewall

P058

GIST – CANCER REGISTER MADEIRA ISLAND

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Introduction. Gastrointestinal stromal tumours (GISTs) are very rare mesenchymal malignancies of the gastrointestinal tract. They represent about 1–3% of all gastrointestinal tumours. The majority, around 70%, come from the stomach, 20–30% from the small gut, and 10% come from the oesophagus, colon and rectum. Annual incidence among Caucasian patients is around 15 cases per 1,000,000 inhabitants. Aggressive tumours have a five years survival rate of 45%. Till 2000, these tumours were classified as leiomyomas, leiomyosarcomas, leiomyoblastomas and Schwannomas. But their specific molecular biology, immunohistochemical profile, and specific therapeutic response to *Imatimib*, led to the identification of this entirely new entity. Madeira Island has around 750 registered new cases/year of malignant tumours, representing an annual incidence of 271.76 cases per 100,000 inhabitants. Gastrointestinal tumours account for 10% to the cases with an incidence of 1.8 to oesophagus, 2.5 to stomach and 11.5 colon and rectum cases/year.

Methods. The authors reviewed the entire gastrointestinal tract tumours classified as fibrosarcomas, leiomyomas, leiomyosarcomas, leiomyoblastomas, Schwannomas, sarcomas SOE and GISTs diagnosed between 2001 and 2006. All the tumours, excluding the GISTs, were submitted to a new anatomopathological observation, registration of the morphologic characteristics, immunohistochemical study using CD117, cD34, actin, desmin, S100 and Ki67 antibodies. Positive cases for CD117 and CD134 were stratified according to Fletcher and al's 2002 risk consensus proposal.

Results. From 2001 to 2006 the authors identified 9 cases, 3 females and 6 males, 43–73 years old, with a median age of 61.1 years. They were classified as: 4 GISTs; 2 leiomyosarcomas; 2 leiomyomas; 1 Schwannoma. The last 5 cases were reviewed according to the new immunohistochemical markers and reclassified as GISTs. Four were from the stomach, 3 from the small gut, 1 from the colon and 1 from the rectum. According to the stratification risk, 2 were classified as low risk, 3 with medium risk and 4 with high risk. Follow-up until December the 31st of 2006 showed that 2 patients diagnosed in 2006 are in remission with surgery procedure alone; one diagnosed in 2003 and another one in 2002 are also in complete remission. The other 5 patients died.

Conclusion. New science developments in oncology, particularly GISTs tumours, have undergone important diagnostic and therapeutic advances in these last years. But without a good cancer registration these advances probably couldn't be made. In our study, these new advances changed the first diagnosis to a final diagnosis of GIST in 5 cases. Although in small number, our cases have the same patterns as those described in the literature, but with a lower median age.

Key words: GIST – gastrointestinal tumours; Cancer registration

P062

AUTOMATED CANCER REGISTRATION IN UKRAINE: DATA EXCHANGE AND RECORD LINKAGE

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Ukrainian National Cancer Registry (UCR) works as a network of regional cancer registries which covers all the country since 2002. The unified software for it was developed and introduced, and database accumulates incident cases from the whole country. Along with the population-based cancer registries, a number of hospital cancer registries cover more than 25 oncological clinics of Ukraine, being the important sources of data for UCR. Hospital and population-based cancer registries were developed so to make possible data exchange. The population-based cancer registry receives information about new patients, cases, treatments, etc. from the hospital-based registry using special automated technology that reduces human work and mistakes arising on data input stage. The vast amount of the information accumulated causes necessity of using the record linkage technologies. For this, some record linkage tools and algorithms in UCR are developed and used for solving the following problems:

- de-duplication;
- finding in the population-based registry the information about follow-up and vital status of patients for performing survival clinical research;
- finding of cancer cases in special population cohorts (Chernobyl liquidators; workers of hazardous industry; etc.);
- comparison and joining information from different sources;
- checking the completeness of information, etc.

Developing and using of record linkage tools in the common practice of UCR improves the quality of data, makes the work of the Registry more effective, and allows realizing new research ideas.

Key words: Ukraine – cancer registry, automated cancer registration, record linkage

P064

TEMPORAL TRENDS IN AGE-SPECIFIC INCIDENCE AND MORTALITY OF BREAST CANCER IN 38 COUNTRIES

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Background. Since 1985 considerable changes in breast cancer detection and management have occurred. We quantified temporal trends in breast cancer incidence and mortality in 38 European, North American, Asian countries, Australia and Israel.

Methods. Joinpoint regression was used to analyse in a systematic manner incidence data from 30 countries and mortality data from 38 countries.

Results. Since 1960, steep increases in incidence often in the order of 2 to 4% per year occurred in all countries, mainly in the 50–69 age-group whose incidence in 11 countries reached or surpassed the incidence in women 70 years old. In the USA, an abrupt inversion of incidence trends occurred in 2001 in women 50 years old or more and not in women less than 50 years old. In most countries mortality started to decrease between 1985 and 1995 about simultaneously in all age-groups. Between 1990 and 2002, decreases in mortality of more than 20% were observed in Australia, Austria, Canada, England and Wales, Scotland, Spain, Switzerland and the United States while decreases of less than 10% were observed in Belgium, Bulgaria, Denmark, Finland, France, Greece, Hungary, and Poland. Mortality decreases were more pronounced among 35–49 years old women. After 2000, mortality continued to increase in several Eastern European countries, in South Korea, Japan and Singapore.

Conclusions. While increases in breast cancer incidence mainly concerned women 50 years old and more, decreases in mortality were more marked in women 35–49 years old. The inversion of incidence trends in the USA may be due to decreased use of post-menopausal hormone therapy. Disparities in changes in mortality rates probably reflect differences in detection and management with lower economic resources being another cause in some Eastern European countries. In Asian countries, increases in mortality paralleled increases in incidence, reflecting strong modifications in underlying risk factors.

Key words: Breast cancer – epidemiology, incidence, mortality, temporal trends

P065

DIETARY PATTERNS AND THE RISK OF BREAST CANCER IN JAPANESE WOMEN

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Components of the Japanese diet which might contribute to the relatively low breast cancer incidence rates in Japanese women have not been clarified in detail. To evaluate associations between broad dietary patterns and breast cancer risk in a Japanese population, we conducted a case-control study using data from the hospital-based epidemiologic research programme at Aichi Cancer Center (HERPACC). Utilizing hospital-based cancer registry system, we have conducted the HERPACC study, which comprised a self-administered questionnaire completed by first-visit outpatients. The data collected were linked with hospital-based cancer registry files. The present analysis was restricted to women aged 40–79 years surveyed from 1989 to 2000. Using nutritional data from 26,160 female non-cancer patients, we conducted a factor analysis to identify major dietary patterns. Four dietary patterns emerged: prudent (mainly consisting of vegetables and fruit, soybean curd, fish and milk); fatty (mainly consisting of meat and fatty foods); Japanese (rice for breakfast and *miso* soup); and salty (pickles, dried or salted fishes and salty foods). We next calculated the factor score for each dietary pattern for each woman. Factor scores were used to assess the association of the dietary patterns with the risk for breast cancer. In total, 2129 breast cancer cases were included and 26,160 female non-cancer patients were recruited as the control group. Odds ratios (OR) and 95% confidence intervals (95% CI) were determined by multiple logistic regression analysis. After adjusting for potential confounders, there were no clear associations between the fatty, Japanese or salty dietary patterns and overall breast cancer risk. In contrast, an inverse association was evident for the prudent dietary. Women in the highest quartile of the prudent dietary pattern scores had a 27% decreased risk of breast cancer compared with those in the lowest (95% CI: 0.63–0.84, p for trend < 0.0001). In addition, women with body mass index (BMI) < 25 had a greater risk reduction in the highest quartile of the prudent pattern (OR = 0.70, 95% CI: 0.60–0.82 with a significant trend ($p < 0.0001$)); whereas women with BMI ≥ 25 had not. For women with BMI ≥ 25, the highest quartile of the fatty factor score was associated with a 58% increment in breast cancer risk compared to the lowest quartile, with a significant linear trend ($p = 0.027$). We have found that the prudent dietary pattern is associated with reduced breast cancer risk. These findings suggested that a diet rich in vegetables and fruit, soybean curd, fish and milk protects against breast cancer.

Key words: Breast cancer – dietary pattern, Japanese

P067

HOSPITAL PROCEDURE VOLUME AND SURVIVAL FOR CANCER PATIENTS IN OSAKA, JAPAN

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Background. Recent studies reported hospital procedure volume was directly proportional to cancer survival, however the degree of association might be different according to the primary site, extent of disease, and year of diagnosis. We examined survivals by hospital procedure volume systematically according to the primary site with inclusion of latest cases in Osaka, Japan.

Method. Individual data on reported cancer cases with active follow-up information and diagnosed in 1994–98 were retrieved from Osaka Cancer Registry's database. Analyzed primary sites were oesophagus, stomach, large bowel, liver, gallbladder, pancreas, lung, breast, uterus, ovary, prostate, bladder and lymphoma. Hospitals were ranked as high-, medium-, low- and very low-volume hospitals in every site by dividing the number of cancer patients who underwent treatments in hospitals into 4 quartiles.

Result. The association between hospital procedure volume and cancer survival has been classified into three types: Type 1 showed a higher procedure volume associated with better survival in oesophagus/liver/lung/ovary/prostate/lymphoma, type 2 showed a higher procedure volume associated with better survival but with equivalent survivals between high- and medium-volume hospitals for uterus, and type 3 showed almost equivalent survivals among high-, medium- and low-volume hospitals for stomach/large bowel/gallbladder/pancreas/breast/bladder.

Conclusion. Further centralization of treatments in higher volume hospitals and closer cooperation between hospitals would be desirable for improving the survival of cancer patients in Osaka where there are many hospitals.

Key words: Hospital procedure volume; Survival; Primary site

P070

RISK OF BREAST CANCER FOLLOWING MASTITIS: A STUDY BASED ON DATA FROM THE SWEDISH CANCER REGISTER AND IN PATIENT REGISTER

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Background. Mastitis – inflammation in the breast – is a condition which occurs mainly in lactating women. Based on theories that inflammation may play a role in carcinogenesis, we hypothesised that mastitis may be related to an increased risk of breast cancer.

Registry linkages. Our study population was defined from the Swedish Multigeneration Register, where we identified all women born 1944 or later. For the purpose of the present study, we identified women hospitalised for mastitis in the Swedish Inpatient Register. In a subsequent step, this database was linked to the Swedish Cancer Register to identify women with breast cancer. For all women, we also obtained information on reproductive history from the Medical Birth Register.

Analyses. We will present results from Cox regression analyses with estimated incidence rate ratios comparing women with at least one event of severe mastitis to women with no such event on record, while adjusting for age, age at first birth and parity.

Methodological issues. In the context of this study, we will discuss some methodological issues, such as study designs based on register linkages and misclassification of mastitis (exposure). Different starting years and regional coverage of each register, as well as the age span at which the mastitis and breast cancer can occur, must be taken into account. There is no point in adding risk time (person-time) during age and calendar periods when no one is exposed or when no cases occur. Misclassification of exposure may dilute the true effect. The "no mastitis" group may include women with mild mastitis that did not require hospitalisation.

Key words: Breast cancer; Swedish Cancer Register; Mastitis; Record linkage; Cohort study

P071

CANCER INCIDENCE IN LOP BURI 1998–2002

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Lop Buri is one of 24 provinces in Central part of Thailand, covering the area of 6199.8 square kilometres. It consists of 11 *Amphoes* (districts). The population census in 2000 of Lop Buri was 745,506 persons with 369,950 males 375,556 females. Ratio male : female was 99 female per 100 male. The average population density was 120.3 persons per square kilometre, the highest population density was in Mueang Lop Buri district (437.1 person per square kilometre), and Tha Luang district was the lowest (49 per square kilometre). Lop Buri has 17 hospitals, both governmental and private, with 1851 beds. The ratio of doctors to population is 1 : 1214. In the period of 1998–2002, Lopburi Cancer registry received 4988 incidence cases of which 2396 were males and 2592 were females. The average annual age-standardization incidence rates (ASR) per 100,000 persons for males and females were 127.2 and 120.0, respectively. Liver cancer was the first common new cancer in males (ASR = 23.8), lung cancer was the second (ASR = 21.4) and colon and rectum cancer was the third (ASR = 9.4); oral cancer remains the fourth new cancer (ASR = 6.3). Leukaemia ranked fifth amongst new cases. The five common cancers in females were breast (ASR = 21.8), cervix (ASR = 21.8), colon and rectum (ASR = 7.7), oral cavity (ASR = 7.4) and liver (ASR = 7.0). For children aged under 15 years, leukaemia was the most common cancer with 27% of all cases. Histologically verified were 37.4% of all cases in males and 54.2% in females. Death certificate only for all sites of cancer were obtained in 8.8% in males and in 5.3% of females. After mapping by 11 districts, Ban Mi District has the highest by incidence, both male and female (ASR = 220.1 for men and 199.2 for women), while Tha Luang District had the lowest incidence (ASR = 90.6 for men and 84.4 for women).

Key words: Incidence rate; Leading cancers

P073

POPULATION-BASED CANCER REGISTRATION IN GERMANY

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Population-based cancer registration in Germany has a long tradition. Germany's first and oldest cancer register exists in Hamburg since 1926. The common cancer registry for eastern Germany was founded in 1953, the Saarland registry in 1967. The Federal Republic of Germany, with a total population of about 82,000,000 inhabitants, consisted of 16 single federal states (ranging from 0.5 to 18 million inhabitants). Many public tasks, such as cancer registration, were organized on the level of these 16 states. In the past only some states were willing to organize cancer registration. In 1995 a federal law made it mandatory for all states to compile population-based cancer registries up to 31st December 1999. After that the picture of population-based cancer registration in Germany changed drastically. New cancer registries came up in uncovered regions of the country and mandatory cancer registration improved the collection rates of existing cancer registries. Since 2007 special cancer registration laws exist in all federal states. With that Germany has nationwide cancer registration in progress. Right now many of the state cancer registries can provide complete and actual data on cancer. Working as a national data centre, the Robert Koch Institute in Berlin collects data from the state registries and estimates the completeness of registration. Using the data of complete cancer registries a national estimate for cancer incidence at different sites is done. These nationwide estimates and the data of the single registries are published biannually in the publication 'Cancer Incidence in Germany'. Four state registries showed completeness for all cancer sites diagnosed in the year 2002 (ICD-10 C00-C97, except C44). The estimated number of new cancer cases for Germany was 425,000, age-standardized rates (Europe) were 451 and 334 per 100,000 men and women, respectively. Most common cancers were prostate (22%), colorectal (16%) and lung cancer (15%) in men, and breast (27%), colorectal (17%) and lung cancer (6%) in women. Single sites as breast cancer were complete in almost all active registries. Germany's cancer registration is on a right path. Cancer registration is present in all 16 federal states. Four states already showed complete data in 2002. The ongoing estimate of completeness for the year 2004 will possibly reveal an increase in number of complete registries.

Key words: Cancer registration; Germany

P077

TRENDS IN CERVICAL CANCER IN FUKUI PREFECTURE

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We surveyed the trend of mortality and morbidity of cervical cancer based on the data of Fukui Cancer Registry. We studied the trend of cervical cancer regarding mortality and morbidity between 1984 and 2000, and 5-year survival rates between 1984 and 1996. The morbidity in Fukui prefecture decreased and the morbidity of young people increased. The number of people who took screening examination decreased. We compared 5-year survival rates between screening-detected and clinically diagnosed cervical cancer. The survival rates were significantly higher in screening detected groups than in clinically diagnosed groups for I and II clinical stages. We also observed significant survival benefit in screening detected groups of more than 30 year of age. We found significant benefit in screening for cervical cancer in mortality and morbidity.

Key words: Cervical cancer – trends, Fukui prefecture

P078

PREDICTORS OF OVARIAN CANCER SURVIVAL IN SWEDEN

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Introduction. Ovarian cancer is the leading cause of death from gynecologic malignancies. Little is known about reproductive factors or life-style determinants and ovarian cancer prognosis. We examined whether ovarian cancer survival is influenced by tumour characteristics (FIGO stage and WHO grade of differentiation), reproductive history (parity, age at first or last birth, oral contraceptive use, age at menarche or menopause), anthropometric characteristics (body size and shape in different periods of life), pre-diagnostic life-style factors such as alcohol consumption, smoking, physical activity and family history of breast or ovarian cancer.

Methods. Six hundred and thirty-five epithelial ovarian cancer (EOC) cases were identified in women of age 50–74 in Sweden between 1993 and 1995. Exposure data on pre-diagnostic factors of interest were collected through questionnaires at the beginning of the study. Clinical data were abstracted from medical records. Cases were followed-up by record linkages to nationwide registers until December 31, 2002. Cox proportional hazard regression model estimated the prognostic effect of each factor in terms of hazard ratios and 95% confidence intervals, following adjustment for age at diagnosis, FIGO tumour stage and WHO grade of tumour differentiation. Possible effect modification from use of hormone replacement therapy (HRT) was evaluated.

Results. Tumour characteristics significantly influenced the risk of death from EOC. After adjustment for these tumour characteristics, women who reported being overweight throughout life had an increased risk of death indicating that anthropometric factors might have some influence on EOC survival. No clear associations were detected between reproductive history, life-style factors nor family history of breast cancer or ovarian cancer and risk of death from EOC. Neither was there any evidence of effect modification from use of HRT. Our findings indicate that the investigated pre-diagnostic factors have little or no influence on EOC survival.

Key words: Epithelial ovarian cancer – risk factors, survival, prospective study, Sweden

P079

GEOGRAPHICAL VARIATION IN SURVIVAL TIME OF NEW JERSEY RESIDENTS DIAGNOSED WITH COLORECTAL CANCER

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Purpose. In this study we examined the geographical variation in survival time of New Jersey residents diagnosed with colorectal cancer. We also investigated the extent to which areas of long or short survival are associated with differences in race/ethnicity, treatment, insurance coverage, and socio-economic status (SES).

Methods. The study included 11,525 New Jersey residents diagnosed between 1997 and 2003 with first primary colorectal cancer at Surveillance, Epidemiology and End results (SEER) Summary Stage 3, 4, or 7. All cases were reported to the New Jersey State Cancer Registry (NJSCR) and were followed through the end of 2006. Age-adjusted cause specific survival time was evaluated using the exponential based spatial scan statistic to determine statewide areas with statistically significant short or long survival.

Results. No statistically significant areas of short or long survival were found for colorectal cancer cases diagnosed at stage 7. For stage 3 or 4 cases, we located one area with statistically significant short survival and one area with significant long survival. The area with shorter survival had a greater percent of cases that were black or Hispanic, of low SES, and without private insurance compared with the area with longer survival.

Conclusion. Our results demonstrate the utility of the spatial scan statistic designed for survival time as a tool for identifying disparities and targeting areas at risk of poor outcomes. In future work we plan to examine the geographical variation in survival for other cancer sites.

Key words: GIS; Survival; Spatial statistics; Colorectal cancer; Surveillance

P080

SURVIVAL OF FEMALE BREAST CANCER: A POPULATION-BASED STUDY IN SOUTHERN POLAND

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Background. Survival after diagnosis of cancer is a good criterion for cancer control. Major survival differences between countries have been reported by the Eurocare studies. The 5-year breast cancer survival in Poland (Eurocare-3 – two cities: Warsaw and Krakow) was 63%, which is rather low compared with other European countries. The aim of this study was to evaluate breast cancer survival in Southern Poland.

Methods. This population-based study used data on 7703 new cases of female breast cancer diagnosed in the period of 1990–1998 from Regional Silesia Cancer Registry in Southern Poland. Relative survival rates were calculated according to the Hakulinen method. Relative risks for excess mortality due to the diagnosis of breast cancer were assessed with a regression model for relative survival rates.

Results. The overall 5-year relative survival rate was 64%. Relative 5-year survival decreased with age from 69% (15–44 years) to 54% (> 74 years). Comparing the two periods 1990–1994 and 1995–1998, age-standardized 5-year relative survival improved from 61% to 67%. However, after adjusting for age, stage and histological type, this difference disappeared. The multivariate analyses showed significant increase in excess mortality related to disease stage and significant decrease to the lobular carcinoma diagnosis compared to ductal carcinoma. Compared to age < 45 years, patients aged 55–64 and > 74 years had significantly increased excess mortality.

Conclusions. The improvement of breast cancer survival over two time period was only observed among patients with localized and regional stage. Survival rate during the period 1990–1994 was lower than elsewhere in Europe and has improved less.

Key words: Female breast cancer – survival, registry

P084

FIVE-YEAR SURVIVAL RATES FOR SELECTED CANCERS DIAGNOSED DURING 1997–2000 IN GWANGJU CANCER REGISTRY, SOUTH KOREA

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Objective. Five-year survival rates are among the most commonly measured outcomes of cancer patients, employed as an indicator of the treatment efficacy. Relative survival rate has become the preferred measure for the analysis of patient survival based on data from population-based cancer registries. This study aimed to calculate 5-year observed survival rates (OSR) and relative survival rates (RSR) of major cancers in Gwangju Cancer Registry (GCR), South Korea.

Subjects & Method. A total of 5404 male and 4474 female cancer cases, diagnosed from 1 January 1997 to 31 December 2000 and were not DCO cases, were extracted from GCR database. We linked the data to the Death Certificate Register database maintained by Korean National Statistics Office, and the death of 5859 cases had been registered until 31 December 2004. The age-, sex- and calendar year-specific OSR were calculated for overall cancer cases and for each cancer site. RSR was calculated as the ratio of the OSR to the expected survival rate, derived from life–table of the general Korean population using Hakulinen's method.

Results. The estimated overall 5-year OSR and RSR were 32.3% and 37.7% for men, and 53.9% and 58.5% for women, respectively. Five-year RSR have slightly increased over time in both sexes, from 37.2% and 54.4%, diagnosed in 1997, to 39.6% and 59.0%, in 1999, respectively. Among the major 15 primary sites, pancreas and liver cancers showed the lowest RSR, while the skin and thyroid cancers showed highest RSR in men and women, respectively.

Summary. Annual RSR estimation for each primary site, using population-based registry data, is meaningful for monitoring the trends in survival of curable cancer.

Key words: Cancer – relative survival rate

P154

PROPORTION AND SURVIVAL OF CANCER PATIENTS TREATED IN THE DESIGNATED REGIONAL CANCER HOSPITALS: THREE PREFECTURES COMPARISON

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Based on the data from three population-based cancer registries of Osaka, Yamagata and Fukui prefectures, we analyzed the proportion and the survival of cancer patients who were treated in the designated regional cancer hospitals. The proportion was 24.8% in Osaka, 52.4% in Yamagata, and 69.5% in Fukui among the newly diagnosed and registered cancer patients for all sites during the period of 2000–2002. The designated hospitals treated more patients in the localized stage than the other facilities. In general, relative 5-year survival of cancer patients treated in the designated hospitals was higher than each corresponding population-based cancer survival, although the differences were various according to the primary site and the extent of disease. The survival differences were remarkable in Osaka. Furthermore, population-based stage specific survival tended to be lower in Osaka than in Yamagata and Fukui. Proportion of cancer patients treated in the designated or university hospitals was suggested to be smaller in Japan than in the US. The results suggest importance of centralization of cancer treatment and cooperation of cancer medical care in Japan.

Key words: Cancer – survival, designated regional cancer hospitals, cancer medical care

P094

MIDTERM SURVEY OF THE CURRENT ACTIVITIES OF POPULATION-BASED CANCER REGISTRIES IN JAPAN, PART 1

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Background. The importance of cancer registration has been described in the Comprehensive Strategy for Cancer Control (2004–2013) in Japan. The Japan Cancer Surveillance Research Group, funded by the Ministry of Health, Labour and Welfare, aims to meet 8 criteria for cancer registry standardization during this 10-year project. The promotion of the standardization of population-based cancer registration will play a key role in this project.

Methods. In July 2004 and August 2006, the research group and the Japanese Association of Cancer Registries conducted a questionnaire survey on the current activities of population-based cancer registries. Herein, we report the survey results regarding the following 4 of the 8 standardization criteria: (1) legislative authorization, (2) standard data contents and format, (3) data completeness, and (4) data timeliness.

Results. Thirty-two population-based cancer registries participated in the survey. Legislative approval of cancer registration by local privacy protection committees had been obtained in 68% of registries in 2004 and 81% in 2006. The percentage of registries using standardized items for monitoring cancer incidence increased from 3% in 2004 to 31% in 2006. In 2004, we identified 12 indices for use in monitoring of the national cancer incidence. Currently, we are considering methods for collecting data regarding these 12 indices at 35 registries. Registries able to submit all 12 items to the National Cancer Center increased from 29% in 2004 to 59% in 2006. The IM ratio, DCN% and DCO% did not improve from 2004 to 2006. Based on incidence data for the year 2002, the percentage of registries with an IM > 1.75, low DCN % (< 30%) and low DCO% (< 20%), were 16, 13, and 22%, respectively. Follow-up surveys for DCN cases were conducted in approximately half of the registries in 2006. The latest incidence data available was for 2002 (≤3.5-year delay) at 81% of registries surveyed in 2006.

Discussion. Regarding the accomplishments of the First Term (2004–06) of the Strategy for Cancer Control, moderate improvements have been observed in the approval processes for cancer registries in local governments and in the standardization of data content and formats at these registries. In the Second Term, the improvement of data completeness will be a major goal.

Key words: Population-based cancer registry – Japan, survey of current activities

P095

MIDTERM SURVEY OF THE CURRENT ACTIVITIES OF POPULATION-BASED CANCER REGISTRIES IN JAPAN, PART 2

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Background. The importance of cancer registration has been described in the Comprehensive Strategy for Cancer Control (2004–2013) in Japan. The Japan Cancer Surveillance Research Group, funded by the Ministry of Health, Labour and Welfare, aims to meet 8 criteria for cancer registry standardization during this 10-year project. The promotion of the standardization of population-based cancer registration will play a key role in this project.

Methods. In July 2004 and August 2006, the research group and the Japanese Association of Cancer Registries conducted a questionnaire survey on the current activities of population-based cancer registries. Herein, we present the survey results regarding the following 4 of the 8 standardization criteria: (5) data quality, (6) patient follow-up survey, (7) annual reporting and (8) data use for epidemiological research, during the first term of the 10-year programme.

Results. Individual case data on gender, birth year, and primary tumour sites were almost complete for all registries. Registries with less than 2% of cases with unknown primary tumour sites comprised 91% of all registries in 2006, while the proportions of unknown histological code or stage were also high. Registries with less than 20% of cases with unknown histological code or stage were 12% and 6% in 2006, respectively. Logic checks of registry data were done at 65% of registries in 2004 and 84% in 2006. Follow-up of registered cases was conducted by 56% of registries in 2006, slightly higher compared to the 2004 survey (47%). Annual reports were issued by 97% of the registries in both the 2004 and 2006 survey. In the 2006 annual reports, most of the registries reported cancer incidence statistics for cancer patients newly diagnosed in 2002. Processes for using data for research purposes were established in 94% of registries.

Discussion. Since 2004, the Japan Cancer Surveillance Research Group has been promoting the standardization of cancer registries in Japan. While the goals of the group have not been completely realized at the midterm point, some standardization has been achieved. Although local governments usually allocate small budgets for population-based cancer registries, support by the research group remains important in order to advance cancer registration in Japan.

Key words: Population-based cancer registry – Japan, survey of current activities

P096

GEOGRAPHICAL DIFFERENCE OF LEUKAEMIA INCIDENCE ACCORDING TO HISTOLOGIC SUBTYPE IN JAPAN

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Background. Leukaemia incidence according to histologic subtype in Japan has been scarcely described so far. Human T-cell leukaemia virus-I (HTLV-I) infection is known to predispose adult T-cell leukaemia (ATL) and HTLV-I prevalence is remarkably high in Kyushu area, south-western part, compared with Honshu area (mainland). Therefore, an incidence of leukaemia according to histologic subtype is expected to differ. To illustrate this geographical difference, we analyzed pooled data of population-based cancer registries in Japan.

Method. Pooled data included 28,464 incident cases of leukaemia in Japan between 1993 and 2002. Data were collected from 15 population-based cancer registries (eleven from Honshu area and four from Kyushu area). Average age-standardized (World Standard Population) incidence rates 1993 to 2002 were estimated in three ways: overall, Honshu and Kyushu area. Leukaemia subtypes considered in the analysis were acute myeloid leukaemia [AML: ICD-O-3M(O3M): 9840, 9860, 8961, 9866, 9867, 9870, 9872, 9874, 9891, 9910, and 9930], acute lymphocytic leukaemia (ALL; O3M 9835), chronic myeloid leukaemia (CML; O3M 9863), chronic lymphocytic leukaemia (CLL; O3M 9823), adult T-cell leukaemia (ATL; O3M 9827), other type and histology unknown.

Results. Age standardized incidence per 100,000 overall analysis were as follows: AML (Male 2.37, Female 1.49), ALL (M1.22, F0.98), CML (M0.68, F0.38), CLL (M0.13, F0.06), ATL (M0.60, F0.45), others (M0.10, F0.04) and unknown (M0.56, F0.32), respectively. In Honshu area, AML (M2.34, F1.50), ALL (M1.25, F1.00), CML (M0.70, F0.38), CLL (M0.13, F0.06), ATL (M0.27, F0.21), others (M 0.09, F0.03) and unknown (M0.60, F0.35), respectively. In Kyushu area, AML (M2.62, F1.45), ALL (M1.08, F0.87), CML (M0.56, F0.35), CLL (M0.15, F0.07), ATL (M2.89, F1.92), others (M 0.15, F0.06) and unknown (M0.29, F0.16), respectively. Difference in ATL incidence between two areas was remarkable. No obvious decreasing trend was observed in ATL.

Discussion. Incidence of leukaemia according to histologic subtype was first descrbied. Moreover, geographical difference, especially in ATL, was observed between Honshu and Kyushu area. Considering administration of preventive action for mother to child transmission of HTLV-I in Kyushu area and decrease in prevalence of HTLV-I in children, decrease of ATL incidence will be expected in a few decades. Continuous monitoring is desired.

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Key words: Leukaemia – subtype, Japan, adult T-cell leukaemia

P098

EVALUATION OF A 5-YEAR SURVIVAL OF CANCER PATIENTS TREATED IN SPECIALIZED CANCER CLINICS AND SURGICAL DEPARTMENTS OF GENERAL HOSPITALS
(POPULATION INVESTIGATION)

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General and obligatory registration of cancer patients was set in Russia in 1953. The first Population-based Cancer Registry, which operates according to the international standards, was organized by us in St. Petersburg in 1993. Its experience served as a basis for establishing the system of population-based cancer registries in Russia. At present, excluding our Registry in St. Petersburg with the population of 4.6 million, elaboration of survival rates (observed and relative) in Russia is performed by Registries in Regions of Pskov and Krasnodar. They use our programmes. Treatment of cancer patients in Russia is carried out by specialized cancer dispensaries and institutes as well as surgical hospitals in towns and districts. It is important to mark that of 19,745 patients who received radical treatment in St. Petersburg during the period of 2003–2005, 11,488 patients (58.2%) were treated in specialized cancer institutions and 8257 (41.8%) – in surgical hospitals of the general health system. We studied a 5-year survival of patients treated in specialized cancer clinics (Ns) and general hospitals (Ng) using information of the Population-based Cancer Registry in St. Petersburg. Our investigation showed that patients treated in general hospitals have had a 5-year observed survival significantly less than patients treated in specialized cancer institutions – by 26.2% in males and by 20.7% in females. These differences were particularly noticeable in patients who needed combined and complex methods of treatment. In accordance with the majority of sites a 5-year relative survival of cancer patients in St. Petersburg was close to data presented in Eurocare-3.

Key words: Cancer – survival, treatment, type of medical institution

P100

THE MOST FREQUENT CANCERS IN HOLYCROSS REGION – COMPARISON WITH SELECTED REGISTRIES FROM VARIOUS CONTINENTS

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Introduction. The Holycross Cancer Registry (HCR) is one of the 16 regional registries of malignant tumours in Poland. It has been functioning since 1986. The population covered by the Registry was 1,299,974 persons in 2004, including 665,804 women and 634,170 men.

Aim of the study: Defining a list of 10 most frequent cancers in Holycross Region (HR) between the years 1993 and 1996 and comparing this cancer incidence to a few chosen registries from various continents. Comparisons were also made for all sites cancer.

Methods. The choice of the most frequently appearing cancers between the years 1993 and 1996 was made based on the size of age-standardized incidence rate (ASR).

Results. In HR between the years 1993 and 1996 the most frequent cancer sites among women were: breast, cervix uteri, corpus uteri, ovary, stomach, colon, gallbladder, trachea, bronchus and lung, other skin, brain and nervous system, and among men: stomach, colon, pancreas, larynx, trachea, bronchus and lung, prostate, kidney, bladder, brain and nervous system, other skin. A group of ten most frequent cancers in the HR accounts for 68% of all cases for women and 73% for men. ASR for all sites in analyzed registries changes from 118.0 in India (Madras) to 360.1 in Brazil (Goiania) among women and from 108.0 India (Madras) to 438.4 in Brazil (Goiania) among men. The level of ASR in the HR for all sites amounted to 208.0 for women and 266.1 for men and was similar to the level of ASR in Cracow and Warsaw. A considerable diversity of ASR for other skin cancers both for women and for men was found. In Brazil (Goiania) it amounted to 154.8 for women and 169.5 for men whereas in India (Madras), USA (Utah), Canada (British Columbia), New Zealand, China (Beijing) it didn't exceed the level of 2.0. In HR ASR for other skin cancer amounted 19.7 for men and 15.9 for women and was twice as big in comparison with ASR in Poland (Warsaw). A relatively low diversity of ASR was found in the case of ovary and breast cancer for women and for brain and nervous system cancer for men as well as for women. A high incidence of colon cancer for men and stomach cancer both for women and for men in Japan (Hiroshima) is worth noticing.

Conclusions. The highest diversity of ASR was found in the scope of skin cancer incidence. The most even level of ASR was found in the case of ovary cancer.

Key words: Cancer incidence

Reference

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P101

THE EVALUATION OF THE BREAST CANCER SCREENING IN OPEN

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Introduction. The breast cancer screening is the most effective way of secondary prevention in the breast cancer care.

Goals. The evaluation of the breast cancer screening launched by Center of Cancer Prevention and Epidemiology in Poznań in the 2001–2006 period for women aged 50–69.

Methodology. The following indicators of the effectiveness of the breast cancer screening programme were used:

- the participation rate
- the recall rate
- technical repeat rate
- the breast cancer detection rate
- stage ≥II/total cancers detected at screening rate
- invasive cancers ≤ 10 mm/total invasive cancers detected at screening rate
- invasive cancers/total cancers detected at screening rate
- node-negative cancers/ total cancers detected at screening rate
- interval cancer rate.

Results. The participation rate in the breast cancer screening in OPEN was 45% for the initial screening examinations and 46% for the subsequent screening examinations. The recall rate was 5.7% for the initial screening and 2.7% for the subsequent screening examination. The breast cancer detection rate: 4 per 1000 in the initial screening examination, 3 per 1000 in the subsequent screening examination.

Conclusions. The early effect of the breast cancer screening in OPEN is the increase of the detection rate of the cancers of the early stage (0 and I) and small cancers (≤ 10 mm). For the well-organized breast screening programme the cooperation between the centres included in the programme is necessary to increase the participation rate and for the effective evaluation of the screening.

Key words: Breast cancer – secondary prevention, screening, evaluation

P103

AN AUTOMATED CANCER REGISTRATION SYSTEM: BUT IS THE DATA ANY GOOD?

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Background. One of the most powerful tools to assure data quality for cancer registration is re-abstraction of information from primary sources and comparison with existing registrations. Direct comparisons with other studies are difficult as cancer registries do not generally publish such studies, although error rates of 5% are not uncommon. The N. Ireland Cancer Registry (NICR) has been operating an automated cancer registration system since 1993, whereby the majority of our registrations are made by consolidating electronic sources on patients and tumours.

Method. Re-abstraction was carried out on mature cancer registration data for the years 2002/2003. A random sample of registrations (excluding non-melanoma skins) were chosen and examined by two experienced tumour registration staff. For 2002, 351 cases (5.2% of the total registrations for that year) were re-abstracted and examined using either histopathology reports, or where these were unavailable full clinical notes. For 2003, 141 (2.1% of the total registrations for that year) cases were re-abstracted, this time using full clinical notes. Core registration data of “Site of Tumour”, “Behaviour of Tumour”, “Morphology of Tumour”, “Date of Diagnosis” and “Basis of Diagnosis” were analysed and the re-abstracted data compared to that already on the NICR database.

Results. Discrepancies between the re-abstracted data and the existing data were classified into “Major” and “Minor” differences. “Major Differences” would alter incidence data figures and “Minor Differences” which whilst improving data quality would not alter incidence data figures. The Table below shows the percentage agreement for “Major Differences” with “Minor Differences” agreement in brackets. Data Item 2002 2003 Site of Tumour 97% (90%) 99% (75%) Behaviour 99% (99%) 96% (96%) Morphology 99% (87%) 96% (79%) Basis 94% (91%) 89% (89%) Diagnosis Date 98% (91%) 98% (94%).

Conclusion and Discussion. This exercise has shown that NICR data are consistent with that which could be collected by a more conventional cancer registration system. However “Minor Differences” still persist, particularly in “Site of Tumour” and “Morphology of Tumour” where a more specific site expressed by the last digit of ICD10 was found manually or a less general morphology was found e.g. “small cell carcinoma” as opposed to the existing “carcinoma”. This work has provided a base line whereby we can monitor and improve data quality in the future.

Key words: Automated Cancer Registration; Data Quality

P104

TOPOGRAPHY DISTRIBUTION OF CERVICAL CANCER IN VOJVODINA

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Topography distribution of Cervical Cancer in Vojvodina In Vojvodina from 1999 to 2003, 1471 new cases of cervical cancer were registered. This disease was the third cancer among women in 2003. The standardized incidence rate in observed period was nearly 20/100,000 (one of the highest in Europe), but with difference within the studied region. We analyzed the incidence of cervical cancer in Vojvodina with direct age-standardized method in 45 municipalities. Vojvodina is a region with 2,100,000 inhabitants. We used the world standard population (Doll et al., 1966) for standardization. The study was based on the data of Cancer Registry of Vojvodina. The average standardized incidence rate was 19.60/100,000. The highest rate was in 2000 (23.63/100,000) and the lowest was in 2003 (17.04/100,000). Novi Bečej was the municipality with the highest standardized incidence rate (41.6/100,000). The second incidence was found in Mali Iđoš (32.17/100,000) and the third among the population of Čoka (28.32/100,000). The lowest standardized incidence rates were found in Sremski Karlovci (10.5/100,000), Ada (8.68/100,000), and Titel (6.93/100,000). Ratio between the rates in Novi Bečej and Titel was 6. Total rates in 24 municipalities were between 10 and 20/100,000 and in 17 municipalities were between 20 and 30/100,000. In Stara Pazova, the crude rate and standardized rate were very similar (difference was 3%). The highest difference between these two rates was in Ada (about 50%). Topography distribution of cervical cancer in Vojvodina shows different rates in 45 municipalities. Standardization enables comparison between populations with differences in the age structure that is present in this region. Problem of obtaining all information about cancer cases in different municipalities of Vojvodina is constantly present.

Key words: cervical cancer, Vojvodina, topography, standardization

P107

THE ESTIMATION OF THE CURE PROBABILITY BY MARKOV MODEL

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Background. On the follow-up of patients, observable prognosis is living or death. In general, we can't predict whether a patient will be cured or not at the time of the beginning of the treatment, however, it is reasonable to assume that a patient has some probability of complete remission at that time. In this paper, we investigated the probability of complete remission assuming the Markov property in the patient prognosis.

Model description. In a Markov model, the present state depends on the latest past state. When one-year transient probability matrix is obtained, the n-th year distribution would be estimated by multiplying this matrix n-time. In this study, a three-state Markov model is assumed to describe the prognosis of the cancer patient. The Markov model consists of three states; 'complete remission' state, 'temporary remission' state and 'death' state, where 'death' state and 'complete remission' state are supposed to be absorbing. It is difficult to distinguish the 'complete remission' state from the 'temporary remission' state observationally. The probability is defined as "cure probability", the probability as "remission probability", and the probability as "death probability", respectively.

Estimation of the cure probability. The process of the estimation of the cure probability is as follows:

1 The RSR curve for a specific site is calculated.

2 The first-year relative survival rate is assumed to be the summation of the cure probability and remission probability.

3 Under the constraint (2), a transient matrix is proposed with a cure probability and the matrix is 10th powered.

4 The procedure (3) is iterated changing the cure probability from 0.0001 up to 0.9999 to find the nearest survival rate to the 10-year's RSR, explanatory.

Example of the Osaka Cancer Registry. Data registered in 1990–1993 and 10-year followed-up, 3764 of female breast cancer data was used to get the RSR up to 10-years and the trend of the cure probability was investigated by stage 5.

Results and Discussion. The estimated cure probability for total breast cancer patient was estimated as 0.0637, and 0.1604 for "spread to adjacent tissue and regional lymph node", 0.1048 for "metastasis". In case of the "localized" stage, the cure probability couldn't be estimated by this method and further investigation for the estimation method would be needed.

Key words: Cure probability; Markov model

P108

ENHANCING THE MULTIDISCIPLINARY TEAM PROCESS AND EXPLOITING ITS OUTCOMES FOR CANCER REGISTRATION

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Introduction. In the UK, decisions on the management of cancer patients are now largely focused at the Multidisciplinary Team Meeting (MTM). The Meeting's potential for streamlining of patients care is enormous. However, their organisation is still variable with communication between professionals sometimes on an *adhoc* arrangement. The Multidisciplinary Team Meeting is a source of valuable cancer indicators data including the data required for national audits, cancer waiting times, staging and other items required to monitor/audit cancer.

Method. The N. Ireland Cancer Registry in conjunction with the N. Ireland Cancer Network and local clinicians has developed an Electronic Multidisciplinary Team Management System which:

1 facilitates inter-professional discussion and decision making at the meeting,
2 enhances the patient journey by ensuring records are accurate and by providing immediate referral letters/GP letters,
3 provides an easy electronic method to collect cancer staging data,
4 provides a mechanism for all patients to be included in relevant national audits.

The system also interfaces with a Waiting Time Monitoring System, developed by the N. Ireland Cancer Registry, which provides additional features for the monitoring of the waiting times between key stages of the patient's care pathway. This facilitates the detection of patients who are experiencing unacceptable delays, in order to rectify the individual patient's problems but also to identify recurrent bottlenecks in the cancer care path and assess the performance of health care departments.

Discussion and Results. Both systems are described and measures to illustrate the improvements in the four areas above are presented. Initial investigation of the data indicates an improvement in recording of measures such as stage from 28% to 85% and ECOG status from 31% to 87%.

Key words: Multidisciplinary team meeting; Electronic information; Cancer care

P109

IMPORTANT PROGNOSTIC FACTORS AUTOMATICALLY DERIVED FROM ELECTRONIC TEXT REPORTS

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Objective. Currently, the Northern Ireland Cancer Registry receives electronic pathology text reports. The reports are unstructured and require manual inspection in order to glean information on tumour stage and grade. This is most time consuming and thus a more automated means of extracting such data was sought. Hence the main objectives of the project were the development of a simple automated text mining method and evaluation of this method against manual inspection of the reports.

Methods. Using a PERL script implementation of a regular expression search, pathology reports for selected cancers diagnosed between 1993 and 2004 were scanned for the extraction of specific prognostic factors. The set of PERL routines were progressively enhanced using an iterative method.

Results. Using the PERL scripts to extract Gleason scores for prostate cancer, Clarke level and Breslow depth for melanoma, proved to be repeatable and accurate and compared favourably with corresponding data extracted via manual inspection. The method has also been applied with success to reports in foreign languages such as Italian.

Conclusions. A more user friendly implementation in Excel has been developed and is available on request. We also plan to extend this work to gain additional staging for other cancers and to improve morphological coding of cancer registrations. Future work will involve a higher level of technical sophistication incorporating the use of ontologies in the development of an automated tool for text mining in order to enhance cancer registration data.

Key words: Pathology report; Text mining; Regular expression; Staging; Coding

P110

CANCER STATUS IN JORDAN 1996–2003

Nimri OF

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Objectives.
- Reduce the burden of cancer to individual & community.
- Determine the annual incidence rates of all cancers.
- Observe the trends changes of all cancers incidences.
- Scrutinize the geographical differences of cancer incidence in Jordan according to governorates.
- Study the risk factors and their effects.
- Calculate the survival time for different cancers...
- Learn the mortality rates for different cancers...

Methods.
- JCR collect data on cancer cases from all health sectors, hospitals (public, private, teaching, and military) in addition to the pathology and hematology labs. All over the kingdom.
- JCR employs a combination of Passive method, which a trained focal personal abstract cancer data from patients file and a complete notification form is forward to the JCR and Active method in collect and case finding of cancer data. Visit by the JCR staff to the medical facility.
- Data filtered and coded using ICD-O3, a software *CanReg4* is used for data processing, data statistically and epidemiologically analyzed, world standard population is used for standard rates calculations to facilitate comparison.
- Internal as well external quality control is applied.

Results. Incidence of the most common cancers among Jordanians and Non-Jordanians, distributed by age, gender, site and geographically. A total of 31,671 cases of which 26,860 Jordanian (13,660 males, 13,200 females). The leading cancer in adults, males was lung 10.7%) followed by colorectal (9.7%) and urinary bladder (9.1%), while in females breast (30.7%), colorectal (9.0%) and leukaemia (6.3%). Leukaemia (34.1%) stood 1st among childhood cancers followed by brain & CNS (18.3%) and lymphomas (14.1%).

Recommendations. Knowledge to action
- Use the huge amount of cumulated data in early detection and prevention programs and more research.
- Further studies of the epidemiology of cancer problem in Jordan are needed.
- Improve JCR capacity and capability of cancer surveillance in Jordan.
- Expand efforts to educate people of the risk factors and its avoidance.
- Cooperation and combine hard work and efforts with others, NGOs, medical and educational partner, local community foundations and members, all those who can share the hope, care and feel with.

Key words: Cancer – Jordan, epidemiology, registry

P111

MULTIPLE PRIMARY CANCERS IN THE LIFE SPAN STUDY COHORT

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Epidemiological characteristics of multiple primary cancers were examined in the Life Span Study cohort of the Radiation Effects Research Foundation. As the Hiroshima and Nagasaki population-based cancer registries were established in 1957 and in 1958, respectively, only those who were alive and not known to have been diagnosed with any type of invasive cancer as of January 1, 1958, were included in the analyses. Death certificate only cases were included. Of the 120,321 members of the LSS cohort, a total of 23,154 were diagnosed with invasive cancer during the follow-up period through the year 2000. Of these subjects, 2038 were diagnosed with two or more primary cancers. The mean ages at diagnosis of the first primary cancers and the second primary cancers were 65 years and 71 years, respectively. Cases with the first two cancers diagnosed within 6 months of each other were excluded from the analyses. The four most common first primary cancer sites for these cases were stomach (21.7%), breast (12.2%), cervix uteri (10.5%), and colon (9.3%). Among subjects with the first primary cancer being the stomach, the four most common second primary cancer sites were lung, liver, colon and stomach.

Key words: multiple primary cancer

P112

THE IMPACT OF INTRODUCING PROSTATE-SPECIFIC ANTIGEN MASS SCREENING ON PROSTATE CANCER INCIDENCE IN MIYAGI PREFECTURE, JAPAN

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Background. Age-standardized prostate cancer incidence in Miyagi prefecture, Japan has continued to increase since the 1970's. In 1995, mass screening with prostate-specific antigen (PSA) tests started in one city, and after 2000, the number of municipalities introducing prostate-specific antigen screening increased in the prefecture. We investigated the impact of recent introduction of prostate-specific antigen mass screening on prostate cancer incidence in Miyagi prefecture.

Methods. Trends in prostate cancer incidence between 1993 and 2002 in Miyagi prefecture were examined according to diagnostic opportunity (screen-detected and others). The incidence was also compared between municipalities introducing mass screening and those without screening.

Results. Age-standardized (world standard) prostate cancer incidence in 1993 and 2002 was 10.5 and 29.7 per 100,000 person-years. The incidence of screen-detected cancer was nearly zero until 2000, but afterward elevated and reached 6.7 in 2002. The incidence of prostate cancer excluding screen-detected cancer was 10.2 in 1993, and 23.0 in 2002. The incidence was 2.7 times higher in the area with screening after the introduction of prostate-specific antigen screening and 60 percent greater in the area without screening during the same period.

Conclusions. The recent increase of prostate cancer incidence in Miyagi prefecture may be due both to the wide-spread introduction of mass screening with prostate-specific antigen tests and changes in prevalence of risk factors probably affecting the incidence since the 1970's.

Key words: Prostate cancer – prostate-specific antigen, mass screening, Japan

P114

A FOLLOW-UP STUDY OF THE COHORT POPULATION WHO HAD A CHECK-UP IN LUNG CANCER CT SCREENING PROGRAMME

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An evaluation study about the effectiveness of lung cancer screening programme using a low-dose CT has been carried out. The object of this study is a cohort population with 1936 who received CT screening more than once at the Association of Kanagawa Preventive Medicine for periods from a CT screening start point in time of April, 1996 to August, 2002. A follow-up survey about lung cancer incidence, mortality, and moving to outside the Kanagawa Prefecture has been conducted chronologically. Twenty-six lung cancer patients (adeno-carcinoma:19; small cell carcinoma:4; squamous call carcinoma:3) were checked from this cohort population by CT screening and by record-linkage to the data of Kanagawa Cancer Registry. The follow-up survey by inquiry to the government office of cities, towns and villages until the end of December, 2005, the dead of 62 examples and the persons on moving to outside of 80 examples were confirmed. Inspecting the death certification with permission of Japanese Government, the cause of death was revealed and all cancer death was 30 examples including lung cancer of 3 examples. The analysis was executed by the standardized detection ratio (SDR) and the Observed number / Expected number (O/E) ratio using the person-years method. As a result, the SDR of lung cancer incidence was a high value of 3.78 ($p< 0.01$). The O/E ratios of the all death, the all cancer death and the lung cancer death were 0.46 (62/134.1, $p < 0.01$), 0.57 (30/52.2, $p < 0.01$), and 0.30 (3/10.0, $p < 0.01$), respectively. In spite of the high SDR, the O/E ratio of lung cancer mortality was significantly lower. Because it was indicated that the CT screening for lung cancer was effective to decrease the mortality, it was necessary to extend an observation period of this cohort and to confirm a decrease effect of the lung cancer mortality in future.

Key words: Low-dose CT; Lung cancer; Screening programme; Evaluation

P116

A TEN-YEAR DESCRIPTIVE RETROSPECTIVE STUDY OF COLORECTAL CARCINOMA IN ILE-IFE

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Background. Given the improved knowledge of colonic carcinoma worldwide, it is becoming increasingly clear that there are perhaps distinct clinico-pathological, and probably molecular biological, differences between the high-incidence colorectal carcinoma and low-incidence disease. Whereas there are putative explanations, the bases for the observed differences have however not been well explored. Our purpose for carrying out the study was to document the detailed pathological characteristics of the disease amongst our patients.

Method. We retrospectively reviewed all cases of colorectal carcinomas registered at the Ife-Ijesha Cancer Registry from 1994 to 2003 for site of the lesion in each case, gross appearances of the tumour, the histological type and depth of invasion of the wall of the bowel. Staging was done using the Astler-Coller scheme. The presence or not of any other co-existing pathological changes in the adjoining mucosa was also noted.

Results. A total of 115 cases of colorectal carcinoma were studied. Minimum age was 6 years. The mean age was 49.92 years; the peak age of incidence in this study was in the 41 to 50 years age groups, In this study the female to male ratio was about 1 : 1. The commonest site of this cancer was the rectum and the least occurred in the transverse colon. Over 95% of the cases seen in this study were polypoid masses. Non mucinous adenocarcinoma is the commonest histological presentation. The mucinous adenocarcinoma account for 33.0%: we found that that high grade and malignant mucinous tumours tend to occur in persons younger than 40 years. The signet-ring cell carcinoma found in this study accounted for 3.5%. Similar to previous reports all the signet-ring cell carcinoma cases seen in this study were of the poorly differentiated grade. Majority of the cases seen in this study were in Astler and Coller stage B2 and C2. We found only one case of associated schistosomiasis in this study. No case of the known premalignant lesions such as colonic polyposis or inflammatory bowel disease was found in this study.

Conclusion. The remarkable rarity of well-known pre-malignant lesions, such congenital familial colonic polyposis, adenomatous polyposis and inflammatory bowel disease in indigenous Africans makes the aetiopathogenesis of colorectal carcinomas yet an unexplored territory. Studies aimed at unravelling the molecular epidemiology of these tumours in Africans may yet provide the guiding light for such an exploration.

Key words: Colorectal carcinoma – non-mucinous, mucinous, Signet ring cell, adenocarcinoma

P117

PATTERN & INCIDENCE OF CANCERS IN THE NORTH-EASTERN REGION OF INDIA

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The 6 (six) North East Regional Population Based Cancer Registry (NERPBCR) in the 4 (four) states of North-East Region of India had started collecting information on cancers under the National Cancer Registry Programme of India from January 2003 with monitoring unit at Regional Medical Research Centre for North East, Dibrugarh, Assam with the objective of assessing the magnitude and type of various cancers that are comparable to the incidence of various cancers of registries of other parts of India that established earlier under the National Cancer Registry Programme. 1) Assam state - i) Dibrugarh district; ii) Kamrup urban district; iii) Silchar town 2) Manipur state - iv) Imphal west district 3) Mizoram state - v) Covering entire state 4) Sikkim state - vi) covering entire state. The AAR of all anatomical sites of cancer of the registries under NERPBCR has reported the incidence rate of well over 100/100,000 than earlier established registries of India. Overall, Mizoram state as a whole and particularly the Aizawl district of Mizoram recorded the highest AAR (all sites) reported as yet from the Indian sub continent. Stomach cancer in Mizoram has accounted for almost a quarter of all cancers among males in Mizoram. Among females in Mizoram, stomach and lung were among the leading cancer sites after cervix uteri. In Assam, among males, oesophagus was the leading site. Lung cancer incidence rate was high in Imphal west district of Manipur in both sexes. In females, it surpassed cervix and breast cancer as the leading site of cancer. The AAR of cancer of the stomach in both sexes in Mizoram was many times higher that that recorded in Chennai and Bangalore. Though Delhi PBCR has consistently reported a higher incidence of cancer of the gall bladder among women but Kamrup urban district showed a marginally higher incidence rate. The results of these registries have set priorities for cancer research and identified target sites for cancer control measures. Stomach cancer in Mizoram is both a priority for research and target for early detection. Similarly, cancer of the gall bladder, nasopharynx, thyroid and myeloid leukaemia has to be undertaken for aetiological studies. There also appears a need to have an extended and explicit programme of cancer control for the north-east region of India, not only because of the high incidence of certain cancers, but also because, of the distinct patterns of cancer seen here, that that observed in the rest of the country.

Key words: North east regional population based cancer registries (NERPBCR); Age adjusted rate (AAR)

P119

OVERALL AND CAUSE-SPECIFIC MORTALITY AMONG CHERNOBYL CLEANUP WORKERS FROM ESTONIA 1986–2005

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After the accident at the Chernobyl Nuclear Power Station on April 26, 1986, about 600,000 men from the former Soviet Union were sent to the Chernobyl area to participate in the environmental cleanup activities. Among them were almost 5000 men from Estonia. Estonian cohort of Chernobyl cleanup workers was assembled in 1992 and consisted of 4832 men who spent at least one day in the Chernobyl area during the time period 1986–1991. Follow-up for death or emigration was performed through population and mortality registries from 1986 to 2005 using unique personal identification number and/or name, date of birth and place of residence. We could not trace 46 persons. A total of 4786 men contributing 78,505.9 person-years at risk were included in the analysis. Death risk in the cohort compared to the male population of Estonia was measured by the standardized mortality ratio (SMR) expressed as the ratio of observed to expected number of deaths. The expected number of deaths in the cohort was calculated by multiplying person-years by the national mortality rates stratified by five-year age groups and calendar periods. There were 686 deaths registered vs. 695.62 expected (SMR = 0.99; 95% CI 0.91–1.06) for the period of 1986–2005. No increased risk was found for overall mortality and for the most groups of death causes. There was no evidence of increased risk for all neoplasms (89 observed cases; SMR = 1.00; 95% CI 0.80–1.23). One leukaemia death occurred, no thyroid cancer deaths were registered. Statistically significant excess was found for brain cancer (8; 2.46; 1.06–4.84). Elevated mortality was observed for suicide (74; 1.24; 0.98–1.56) and suicide combined with injury undetermined whether accidentally or purposely inflicted (88; 1.20; 0.96–1.48). The results of the analysis of mortality confirm previous evidence that among the Chernobyl cleanup workers psychological distress prevails over radiation-induced medical consequences.

Key words: Chernobyl; Mortality; Estonia

P122

ACUTE CHILDHOOD LEUKAEMIA IN THE WESTERN CAPE PROVINCE (WCP) OF SOUTH AFRICA

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Introduction. The Western Cape Province Children's Tumour registry reports to the national tumour registry. Two studies have evaluated the incidence of leukaemia in this province. The latest (Hesseling PB et al, 2004) reports on the incidence of children aged 0–12 years.

Aim. To review, analyze and report on all cases of leukaemia in children less than 15 years of age which was reported in the Western Cape Province over an 18 year period.

Methods. Retrospective analysis of prospectively registered cases of leukaemia diagnosed by internationally accepted standards, and reported to the registry, were analyzed to determine incidence, age at diagnosis, race and type of diagnosis.

Results. Four hundred and twenty five cases of leukaemia were registered over the 18 year period. The crude and adjusted incidence rates were 19.3 and 20.1 per million children respectively. The population denominator was obtained from the official SA census of 1996. The crude and adjusted incidence rates for the 3 main race groups were as follows: 19.4/million and 19.5/million 31.6/million and 35.7/million, and 20.0/million and 21.0/million for Black, White and Coloured patients respectively. One hundred and ten cases (26.4%) of leukaemia were AML. The mean age at diagnosis for boys and girls for AML was 6.0 years and 4.9 years for boys and 4.7 years for girls respectively for ALL.

Conclusion. The overall number of leukaemia cases registered indicates a low incidence rate. Leukaemia is diagnosed more frequently in White children than in Coloured or Black children. Studies are needed to determine whether this is due to a low rate in Black children or underascertainment or underdiagnosis of cases in certain population groups.

Key words: Leukaemia – incidence, Western Cape Province, South Africa

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VIRUS DEPENDENT CANCER (POPULATION INVESTIGATION)

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Annually 10–12 million of cancer cases appear in the world and one third of them are virus dependent. In 2006 in St. Petersburg of registered 18,244 cancer cases, HPV could cause malignancy in 5235 patients. In 2004 in St. Petersburg of 12,326 people died of cancer, 1670 patients (males and females) died of virus dependent forms of cancer. According to investigations carried out by us in St. Petersburg during a period 1999–2006, 28–34% females at the age of 20–60 years are infected by HPV of the high cancer risk (HPV 16 and 18 types). HPV is responsible for developing cancer of: cervix (99.7%), vulva, vagina, penis (10–30%), anal area (10–30%), throat and oral cavity (10–30%). Current molecular-genetic investigations allow obtaining more precise gradation of extent of oncological risk – the highest, high, middle, low. Creation of database and monitoring in a group of people who have the highest and high oncological risk of developing virus dependent cancer (9–11%) among women of St. Petersburg at the age of 20–50 years and modern treatment permit to reduce morbidity and mortality from cancer of above mentioned sites. In 2006 we opened consultant-diagnostic centre to organize a system of primary prophylaxis of virus dependent cancer under the auspices of the social charitable fund “Prophylaxis of Cancer”. Each patient, included in the programme, passes both general oncogynecological examination and specific examination to detect HPV of a high cancer risk. If HPV 16 and 18 types are diagnosed, genetic typification is performed to determine its cancer risk. If HPV of the highest and high cancer risk are detected, the next procedure is to specify the level of absolute and relative hyperprolactinemia. We have studied efficacy of different methods of treatment for HPV. Investigations of the last year that were aimed at the study of HPV’s role in developing cancer of skin of head and neck and discovering DNA virus in skin papillomas gave a possibility to suppose that not removed papillomas could become a cause of HPV recurrence. Exactly because of it, treatment, which is conducted in the Centre of Preventive Medicine, is started from removing of skin papillomas and it allows, according to our study, to reduce frequency of HPV recurrences by 30%. Research in this direction continues already with a use of database of the Population-based Cancer Registry in St. Petersburg in order to study remote results of treatment.

Key words: Cancer – viruses, population, prophylaxis

P128

TREND IN INCIDENCE OF ADENOCARCINOMA OF THE OESOPHAGUS IN JAPAN, 1993–2001

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Background. The rising trends of incidence of oesophageal adenocarcinoma in some European countries, North American countries and Australia have been reported in last 2 decades by several well-established studies. The established risk factors are gastro-oesophageal reflux, obesity and negative infection of helicobacter pylori. Recently, people having these risk factors are also increasing in Japan, so an incidence of oesophageal adenocarcinoma is expected to rise. Our objective is to show a trend of incidence of oesophageal adenocarcinoma among Japanese using a pooled large data collecting from several regional population-based cancer registries in Japan.

Methods. Cancer incidence data for 1993–2001 were from 15 population-based cancer registries that were collected by the Japan Cancer Surveillance Research Group in 2005. The present study was performed using the data from 8 registries according to inclusion criteria for data quality. The population covered by the 8 registries was 19,400,747, corresponding to 15% of the total population of Japan in 1997.

Results. A total of 16,913 male and 3180 female patients were diagnosed having oesophageal cancer in the eight regional cancer registries during the period in Japan. Squamous cell carcinoma accounted for 72.2% of the oesophageal cancers, while adenocarcinoma accounted for 2.7%. Age standardized (Japanese standardized population) incidence rates per 100,000 during this recent 3-year period were as follows: all oesophageal cancer (male 16.5, female 2.3) and adenocarcinoma (male 0.5, female 0.06), respectively. The estimated average annual percent change of the rates of oesophageal adenocarcinoma during the period was 4.7% (CI +0.7, +8.9) among males, and 5.7% (CI +1.0, +10.6) among females.

Discussion. The incidence rate for oesophageal adenocarcinoma was a little increasing regardless of sex in Japan. However, the increasing speed was not dramatic and the absolute incidence was rather lower than that of western countries.

Acknowledgement. Authors would like to express great appreciation to persons involved in 15 registries: Miyagi, Yamagata, Chiba, Kanagawa, Niigata, Fukui, Aichi, Shiga, Osaka, Tottori, Okayama, Saga, Nagasaki, Kumamoto and Okinawa. This study is supported by the Third Term Comprehensive 10 year Strategy for Cancer Control from the Ministry of Health, Labor and Welfare, Japan.

Key words: Adenocarcinoma – oesophagus, incidence, Japan

P134

EPIDEMIOLOGICAL AND CLINICAL CHARACTERISTICS OF BRAZILIAN WOMEN WITH PRE-CANCER AND CERVICAL CANCER: A BIRTH COHORT ANALYSIS

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Objective. The prevalence of risk factors associated to cervical cancer may change along time as a consequence of behavioural and/or cultural determinants. This study aimed to determine the prevalence of epidemiological and clinical aspects related to cervical cancer development in three different birth cohorts of Brazilian women in the state of Rio de Janeiro.

Material and Methods. From October 2004 to May 2006 a cross sectional study was carried out among 318 Brazilian women who have searched health care in an oncological reference hospital in Rio de Janeiro, showing histological diagnosis of negative, pre-cancer or cancer lesion. Among the enrolled participants, 136 women were born between 1976 and 1988, 138 between 1956 and 1975, and 44 between 1937 and 1955. Antecedents of exposures to known cervical cancer risk factors and clinical characteristics were ascertained through an interview-administered questionnaire. Colposcopy and lesion excision were carried out, when indicated. Crude and adjusted prevalence ratios of the studied variables in the different cohorts (1937–1955, 1956–1975, and 1976–1988), with the respective confidence intervals, were calculated using Poisson regression analysis.

Results. Comparatively to women with negative results, HSIL/cancer patients showed the following prevalence ratios for selected risk factors in the 1976–88 cohort: number of pregnancies (adjusted PR 1.16, 95% CI 1.01–1.32) and menarche < 12 years (adjusted PR 1.95, 95% CI 1.17–3.25) were statistically associated to cervical cancer in the 1976–1988 cohort. Menopause age (adjusted PR: 1.21, 95% CI 1.04–1.41) and current tobacco smoking (adjusted PR: 1.37, 95% CI 1.10–1.37) were independent risk factors for cervical cancer in the cohort 1956–1975.

Conclusions. Risk factors for HSIL/cervical cancer seem to have played different risks among the studied Brazilian women from the three different cohorts). The observed results suggest that cervical cancer prevention and early detection programs should have different approaches according to different birth cohorts to be more effective.

Key words: Cervical cancer – birth cohort, pre-cancer, epidemiology, risk-factors

P136

TRENDS OF CERVICAL CANCER IN NAGASAKI, JAPAN

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Introduction. A decrease in the mortality and incidence rate of cervical cancer in Japan has been observed owing to cervical cancer screening initiated in the early 1960s. Since 1990, onset of cervical cancer at younger ages has become apparent. Severe dysplasia was recognized as a tumour-like lesion, it was recently categorized as an *in situ* carcinoma. We studied the current status of cervical cancer in Nagasaki.

Subjects and Methods. The Nagasaki cancer registry was established in 1958. In 1973, a tissue registry programme was initiated for collecting pathological diagnoses and tissue specimens including tumour like lesions. Using incidence data of 1958–2003, we studied the incidence of carcinoma (Ca), carcinoma *in situ* including severe dysplasia (CIS), severe dysplasia (SD), and Ca + CIS (All) and the treatment types for CIS and SD.

Results. The incidence of Ca decreased from 220.6 in 1960 to 75.8 in 2000. The incidence of CIS increased from 6.5 in 1960 to 115.9 in 2000, with an increase in SD contributing to the above increase after 1990. The number of cases of Ca and CIS was reversed between 1968–1972 and 1998–2002, with CIS greater than Ca among those aged less than 60 during the latter period. Although the incidence of Ca by age has generally decreased, an increasing tendency has recently been observed for those aged 30–44. An increasing tendency has also been observed for CIS for the wide age-range of 25–59. The most common treatment for CIS during the 1980s was hysterectomy, a procedure applied to almost 90% of CIS cases at its peak use. However, in the 1990s, conization and observation became more common. This tendency has been further enhanced by an increase in cases diagnosed of SD. The 2003 data showed that 20% of SD cases underwent conization, and 13% hysterectomy. Until 1989, there were many cases aged under 40 underwent hysterectomy. Since 1990, the frequency of conization increased for those under 40, while that of hysterectomy decreased.

Conclusions. With the spreading of relevant screening, cervical cancer is now frequently detected during the early stage as CIS/SD. However, our study showed a recent increase of Ca for those aged 30–44, suggesting the need to increase the participation rate in cancer screening. Through the current study, we have reconfirmed the importance of registering CIS/SD and Ca separately.

Key words: Cervical cancer carcinoma – *in situ*, severe dysplasia, incidence, cancer registry

P138

THE EUROCADET PROJECT: KEY DETERMINANTS OF THE FUTURE INCIDENCE OF CANCER ACROSS EUROPE; IMPACT OF PREVENTION

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Within Europe there is a great variety in lifestyle, for example differences in diet, alcohol consumption, smoking behaviour and physical exercise. These differences in behaviour are reflected in cancer incidence rates, which for many cancers show marked variations within Europe. The variation in exposures and cancer incidence within Europe illustrates the scope for prevention of cancer. By investigating the various situations and policies existing across Europe, we can identify valuable preventive policies to be implemented at European level, making use of the variation across Europe in the prevalence of risk factors and the incidence rates of cancer. Eurocadet (www.eurocadet.org) is an EC-funded (FP-6) project aiming to contribute to the prevention of cancer in Europe by identifying effective preventive strategies and making estimations of the effects of successful implementation of these effective strategies. In the project we will:

1 Estimate the prevalence and quantitative impact of major lifestyle (smoking, excessive alcohol use, fruit and vegetable consumption, overweight, physical (in)activity) and socio-economic determinants on cancer incidence across Europe. Eurocadet will focus mainly on cancers amenable to changes of lifestyle of the oral cavity, larynx, lung, oesophagus, stomach, pancreas, colo-rectum, bladder, kidney, breast, endometrium and prostate. Together these cancers comprise about 60% of the cancer incidence in Europe.
2 Investigate how the socio-economic status contributes to (un)healthy behaviour and how behavioural changes in high risk socio-economic groups can be accomplished.
3 Assess the possibilities to reduce unhealthy behaviour by:
   - reviewing evidence of effectiveness of interventions and policies;
   - identifying barriers to implementation.
4 Estimate the future burden of cancer across Europe based on:
   - autonomous trends;
   - scenarios of implementation of effective interventions.

Estimating the quantitative expected impact of different interventions and considering the tremendous variation within Europe will help optimise policies and underpin priorities.

Key words: Cancer incidence – risk factors, intervention, future scenarios

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BREAST CANCER SUBTYPES ACCORDING TO IMMUNOHISTOCHEMICAL MARKERS; TICINO CANCER REGISTRY (SWITZERLAND), 2003–2006

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Background. Breast cancer may be classified in distinct biological subtypes based on gene expression profiling and/or immunophenotypic characteristics. This new classification may replace old classifications based on morphological features because of its significance in term of prognosis and clinical outcomes.

Aim of the present population-based study is to reclassify breast cancer cases according to immunohistochemical (IHC) subgroups, and to identify possible associations with principal clinical and pathological variables.

Methods. The analysis is based on all invasive breast cancer cases with available IHC data that occurred between 2003 and 2006, selected from the files of Ticino Cancer Registry. IHC markers, obtained from studies on formalin-fixed paraffin-embedded tumour blocks, are used to define four subtypes of cancers: luminal A (oestrogen receptor positive [ER+] and /or progesterone receptor positive [PR+], HER2-), luminal B (ER+ and /or PR+, HER2+), basal-like (ER-, PR-, HER2-) and HER2+/ER- (ER-, PR-, HER2+). Differences among breast cancer subtypes are evaluated using 1-way analysis of variance for patient age and Chi-square or Fisher exact test for principal clinicopathological characteristics, as tumour istotype, histologic grade, age, menopausal status, and axillary lymph node status. P-value less than 0.05 are considered significant.

Results. Of 1104 invasive breast cancers, 984 (89%) have an IHC profile and are included in the study. The distribution of cases according to IHC subtypes is the following: 698 (71%) luminal A, 150 (15%) luminal B, 84 (9%) basal-like, 52 (5%) HER2+. The IHC subtypes differ significantly by age ($p = 0.0011$), menopausal status ($p = 0.01$), and histologic grade ($p < 0.0001$), Patients with luminal A tumours are significantly older than patients with basal-like carcinomas and luminal B cancers. Basal-like and luminal B cancers are more frequent in premenopausal patients, representing respectively 12% vs 7% and 19% vs 14% of cases. By contrast, more than 78% of postmenopausal patients are diagnosed with luminal A and HER2+/ER- cancers (72.8% and 5.8%, respectively). The highest percentage of poorly differentiated cancers is found in basal-like (75%) and HER2+/ER- cases (62%).

Conclusion. This is the first European population-based study on breast cancer subtypes achieved by the analysis of IHC markers. The proportion of basal-like tumours is higher in premenopausal women and in poorly differentiated cancers whereas, the proportion of luminal A cases is higher in postmenopausal women and in well/moderate differentiated cancers. These preliminary results represent an important basis for further investigations in term of survival and freedom from occurrence of metastasis/recurrences.

Key words: Breast cancer; Immunohistochemistry; Cancer registry

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FOLLOW-UP TIME REQUIRED FOR CURE OF CANCER PATIENTS USING MIXTURE CURE MODELS IN OSAKA, JAPAN

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Background. In general, the 5-year survival rate is regarded as an index of cancer treatment level and "five year" is a common duration to get a rough idea for medical follow-up. In this study, we investigate the follow-up time to cure, applying the mixture cure model to the data of the Osaka Cancer Registry registered in 1990–93.

Methods. The relative survival rates (RSR) up to 10 years for the patients with stomach cancer (10,600), colon cancer (4382), lung cancer (5426), female breast cancer (3764) and prostate cancer (613) were calculated. The Exponential and Weibull cure models were applied to these RSRs up to 10 years. The agreement of the model was evaluated by MSE (Mean Square Error) and the better-fitting model was selected. In the mixture cure model, the total patients group consists of two groups, one is the 'cure fraction' who are to be cured, and the remaining are 'uncured' group following with an exponential or Weibull survival function. We defined αas the proportion of the 'uncured' group still alive and the nomination time for the medical follow-up(T-year) as the time when $\alpha = 0.1$, 0.05, and 0.01. We investigated the nomination time by site and discussed the recommendable medical follow-up time.

Results & Conclusion. The Weibull cure model showed better fitting than that of the Exponential cure model in all sites. For stomach, T (years) was 3.22, 4.81, 9.27 where $\alpha = 0.1$, 0.05, and 0.01, respectively. For colon, T was 4.91, 7.01, 12.54. For lung, T was 2.58, 3.71, 6.75. For breast, T was 8.51, 10.73, 15.67. For prostate, T was 6.66, 8.49, 12.62. These results suggested the necessity to change the common image of "five year follow-up".

Key words: Follow-up time; Cure

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THE DISTINCTIVE CHANGE IN HEPATITIS C VIRUS-RELATED HEPATOCELLULAR CARCINOMA INCIDENCE RATE BETWEEN 1990 AND 2003 IN THE JAPANESE POPULATION

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Objective. It has been reported that age-standardized incidence rate of liver cancer in Japan increased sharply starting in the mid-1970s and levelled off in the mid-1990s. The trend was considered to be affected by hepatitis C virus (HCV) outbreaks after Second World War in Japan. We characterized the recent time trend of HCV-related hepatocellular carcinoma (HCC) incidence rate between 1990 and 2003 in the Japanese population.

Methods. We used information from the Osaka Cancer Registry (OCR) which is covering 8.7 million population in Osaka Prefecture. Sex-, age- and period-specific incidence rate of HCC (ICD-10: C220) were multiplied by the corresponding sex-, age- and period-specific proportion of anti-HCV positive among HCC patients who were diagnosed in eight teaching hospitals in Osaka. We assumed that the HCC patients with anti-HCV positive developed HCC which was caused by chronic HCV infection.

Results. The OCR obtained 54,755 incident cases of liver cancer in 1990–2003. We identified 5552 patients with HCC aged 50–79 years from the eight teaching hospitals in this period. The incidence rate (per 100,000) of HCV-related HCC for male between 1990–1992 and 2002–2003 declined from 93 to 27 in 50–59 year-old age group. The rapid decrease was also evident in females in the same age group from 13 to 4. There was a peak incidence rate among men aged 60 to 69 years in 1993–95 (283), among men aged 70–79 years in 1999–2001 (271), among women aged 60–69 years in 1996–1998 (65) and among women aged 70–79 years in 1996–1998 (103).

Discussion. This calculations clarified the distinctive change of HCV-related HCC incidence rate between 1990 and 2003 in Osaka. The trend was considered to be affected by the birth cohort effect of the chronic HCV infection.

Key words: Hepatocellular carcinoma – Incidence rate; Hepatitis C virus; Osaka Cancer Registry

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OESOPHAGEAL CARCINOMA: THE INFLUENCE OF SOCIO-ECONOMIC STATUS AND ETHNICITY IN THE WEST MIDLANDS, UK

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Introduction. The incidence of oesophageal cancer (OC), especially oesophageal adenocarcinoma (OAC), has risen dramatically in the developed world over the last 30 years. In the USA, oesophageal squamous cell carcinoma (OSCC) is associated with deprivation and black ethnicity, whilst oesophageal adenocarcinoma (OAC) is more common in white populations. Work in Scotland in 2000 showed that whilst oesophageal cancer overall was strongly linked with deprivation, OAC did not have the same association.

Aims and Methods. West Midlands Cancer Intelligence Unit (WMCIU) data was used to study the incidence of OSCC and OAC between 1977 and 2004 and to examine the influence of age, sex, socio-economic status (Townsend Quintiles by postcode) and ethnicity (Hospital Episode Statistics).

Results. From 1977–2004, 15,138 OC were identified within the unchanging borders of the registry. OC incidence increased between the periods 1977–1981 and 2000–2004, with five year rolling directly age standardised incidence rates per 100,000 (95% CI) for men changing from 8.6 (8.0, 9.1) to 13.7 (13.1, 14.3) and for women from 5.0 (4.7, 5.4) to 6.3 (5.9, 6.6). OSCC incidence was not significantly altered, but OAC incidence has been rising rapidly, particularly in men from 2.1 (1.9, 2.4) to 8.5 (8.1, 9.0). The median age of diagnosis of OAC has risen from 65 to 70 years in men and 73 to 78 in women. OSCC was strongly associated with the most socially deprived quintile, until the 1990s, when the rising incidence in the most affluent quintile converged with the falling incidence in the most deprived quintile. OAC was not associated with differences in socio-economic status. OAC was significantly more common in white men 7.3 (6.9, 7.7) and women 1.5 (1.3, 1.6) than in black and asian populations. There was a larger age-standardised rate for OSCC than OAC for black males.

Conclusions. Within the West Midlands, the incidence of OAC has been increasing dramatically, whilst the incidence of OSCC has not significantly altered in the last three decades. The incidence of OSCC was strongly associated with deprivation in the earlier time periods, but this association was no longer present by the end of the 20th century. OAC was more common in white populations, but no association with deprivation was found.

Key words: Oesophageal cancer adenocarcinoma – epidemiological trends, socio-economic status, ethnicity

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UK ASSOCIATION OF CANCER REGISTRIES: QUALITY PERFORMANCE INDICATORS 2006

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Objective. Every year, each UK cancer registry provides information on a number of measures to allow comparison of the timeliness, quality and completeness of their data. The tenth UKACR Quality Performance Indicators Report was compiled in October 2006, with work now underway on the 2007 report.

Methods and Results. The first measure assessed was timeliness. In the UK all cancers diagnosed in a calendar year should be registered within 18 months of that year's end. In 2006, 9 of the 12 UK registries met the target of registering 100% of patients diagnosed in 2004 by 30 June 2006. The quality and completeness of specific data fields were examined. For example, the proportion of cases that had a known date of birth, NHS number, ethnicity, tumour behaviour code, and what proportion of breast cancer cases had a valid and known stage. The proportion of death certificate only (DCO) cases was also monitored. Registries with a high proportion of DCO cases will have lower quality data because they have few details about the tumour for these cases. UK averages for DCOs were 3.2% for males (range: 0.1%, 6.3%) and 3.4% for females (range: 0.1%, 6.9%). The final measures examined ascertainment (looking for over- or under-registration). These included the proportion of microscopically verified cases (UK average of 81.4% for males; 82.6% for females), childhood cancer incidence rates, the stability of incidence rates (identifying changes for specific tumours) and mortality to incidence ratios. A very high M : I ratio (a high proportion of deaths compared to cases) compared to other registries suggests under-ascertainment in that registry. The average M : I ratios for the UK ranged from 0.85 for lung cancer to 0.20 for melanoma skin cancer.

Conclusion. Annual production of this report has driven up the quality of data in the UK and now underpins the peer review assessment of cancer registry performance in the UK.

Notes: The UKACR QA group meets quarterly. For further information about the Group or the Annual PIs Report, please contact Catherine Thomson on tel: +44 121 414 3095 or email: catherine.thomson@wmciu.nhs.uk

Key words: cancer registry data quality assurance performance indicators cancer peer review

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INCIDENCE AND TREATMENT OF TRACHEAL CANCER: A NATIONWIDE STUDY IN THE NETHERLANDS

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The aim of this study was to assess the incidence, tumour- and patient characteristics, treatment and survival of patients with tracheal malignancies in the Netherlands. All cases of tracheal cancer in the period 1989–2002 were identified from the Netherlands Cancer Registry. The nine Regional Cancer Regsitries provided data on histological type, age at time of diagnosis, treatment and survival. The annual incidence was 0.142 per 100,000 inhabitants (308 cases, of which 15 were found incidentally at autopsy). Of these, 72% were men. In 52.9% the histological type was squamous cell carcinoma and in only 7.1% adenoid cystic carcinoma (ACC). Mean age at diagnosis was 64.3 years. Thirty-four patients underwent surgical resection (11.6%), 156 patients (53.1%) received radiotherapy and 104 patients (35.4%) neither. Median survival of all 293 patients was 10 months (mean 28 months) with 1-year and 5-year survival rates of 43% and 15%, respectively. The prognosis of patients with ACC was significantly better. The 5-year survival rate in patients who underwent surgical resection was 51%. Tracheal cancer is a rare malignancy with a poor prognosis. After surgical treatment, survival rates were much better. However, only selected patients undergo surgery, which also explains a part of the better survival. In view of the technical advances in the field of tracheal surgery, more patients should be offered surgical treatment. Introducing guidelines for the diagnosis and treatment of tracheal cancer and centralizing the care and treatment could make surgery accessible to a larger number of patients.

Key words: Tracheal cancer – incidence, treatment, survival

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THE IMPORTANCE OF DATABASE VALIDATION IN CANCER REGISTRATION: A BELGIAN SINGLE INSTITUTION EXPERIENCE

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Purpose. In 2004 a registration procedure was implemented at the UZ Brussel maintained by dedicated registrars. In parallel to this breast cancer patients undergoing surgery are routinely registered by a breast surgeon. The purpose of this study is to validate the registrars breast cancer database (RDB) by comparing it to the surgical databases (SDB) (year 2005).

Materials and Methods. The RDB consists of all breast cancer patients with a histological diagnosis made in the UZ Brussel and with a histological ICD-O-3 code of malign or *in situ* neoplasm (behaviour code /3 and /2). In this DB the date of incidence corresponds to the date of first cytological/histological diagnosis. The data is entered by dedicated registrars but contains also entries by clinicians. The SDB consists of breast cancer patients surgically treated in the UZ Brussel. In the SDB the date of incidence corresponds to the date of surgery.

Results. For the year 2005, 168 internally referred cases were registered in the RDB. A surplus of 17 cases was detected due to coding errors in the year of incidence. Ten patients with histological diagnosis in 2005 were present in the RDB but not in the SDB because surgery was performed in 2006. Seven cases were present in the RDB but not in the SDB because no breast surgery was performed. Six cases which were present in the SDB were missing in the RDB. Five of these cases were not detected because no histological code was entered in the histopathological report. One case had a correct code but was not entered by the registrars. In one case the histological diagnosis was made externally. After surgery which was performed internally no residual malignancy was found. Hence, this case was not detected by the histological code. In order to ensure a more systematic and accurate registration of the histological codes measurements were taken: additional data search on behaviour code /1 and coding systems such as ICD-9 codes and Leidse codes and systematic review of the data entries.

Conclusion. The registration of the RDB seemed incomplete with six missing cases and incorrect in 17 cases (wrong incidence year). Quality control of cancer registration is mandatory. Comparison of the registrars database with an independent clinical databases is found to be a good tool for quality control.

Key words: Cancer registration; Cancer register; Breast cancer; Breast cancer database; Quality control

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SURVIVAL DIFFERENCES IN PATIENTS WITH COLORECTAL CANCER BETWEEN RESIDENTS IN THE CITY AND IN OTHER PARTS OF GENOA PROVINCE

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Background. Population based colorectal cancer survival among patients residents in Genoa province was lower that in Genoa city.

Aims. To investigate this difference we analysed relative survival taking into account sex, age, subsite of tumour, type of surgery, kind of hospital and place of residence. Materials and methods: All patients diagnosed with cancer of colon (C18) or rectum (C19-21) in 2000 were included in the analyses. Only first primary malignant tumours were considered. Both microscopically-verified and non-verified cases were included, but cases known by death certificate only (DCO) were excluded. The age-adjusted relative survival was estimated using the Hakulinen method with the regional life tables.

Results. The available data included 579 cases of colorectal cancer (69% colon and 31% rectum) for Genoa municipality and 206 (63% colon and 37% rectum) for the other municipalities of province. For colon cancer, the overall proportion of patients aged 75 years or over at diagnosis wasn't similar in the city (39% males, 48% females) and in the other parts of province (37% males, 55% females) with a higher percentage of older women in the province. Both for colon and rectum cancer, patients with age ≥ 75 years have an elevated percentage of not surgery or a not curative treatment (about 20%); subsequently, the proportion of patient not surgically treated was higher in the other parts of province, particularly in females (27% vs. 19%). The relative survival rates at 3 years from diagnosis in Genoa municipality was 65% vs. 52% in the province and 64% vs. 58%, in males and females respectively.

Conclusion. The survival was lower among patients residents in Genoa province little municipalities than in Genoa city. The reasons for the poorer survival is probably due to the older age of these patients, that are generally submitted to a less aggressive treatment and/or curative surgery. Further, detailed results regarding the worse access to optimal care centre, due to the distance from the hospital, will be presented.

Key words: Colorectal cancer – relative survival, access to care services, elderly patients

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CERVICAL CANCER IN POLAND – WHAT IS POSSIBLE?

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Introduction. Cervical cancer is in Poland still a significant social problem. At the beginning of 21st century almost 3500 new cases and 1800 deaths are registered annually, over half before the age of 55. There is observed diversification in cancer mortality depending on the level of education. Health surveys conducted by the Central Statistical Office showed that there are about 3 million cervical smear tests done in Poland annually. That means that with a good organization of such tests it is possible to test whole population of Polish women aged 25–59 within 3 years. In reality lower educated women, considerably rarer take cervical smear test, what in consequences leads to significantly higher mortality due to cervical cancer in that social group compared to better educated women.

Reuslts. Cervical cancer mortality in the "old" European Union countries (EU15) is systematically declining. At the beginning of 21st century average mortality rate was 2/100,000. Similar tendency has been observed in Poland for the last 30 years, however the speed of mortality decline is lower, and mortality rate in Poland is three times higher than in EU15 (6/100,000). Cervical cancer incidence is strongly connected with socio-economic status, which is in Poland determined by education level. Mortality increases with lowering the education level. Research on diversification of mortality according to education in years 1994–2002 shows, that mortality declines in better educated women (decrease by 30%), and increase in the worst educated women (increase by 4%). In the 25–59 age group (the screening group) cervical cancer mortality rate in better educated women averaged 16/100,000. 3 to 7-times higher mortality rates in the worst educated women are illustrating well the preventable excess of mortality due to that cancer site. If cervical cancer mortality was in all social strata as in women with academic education, estimated annual number of deaths would average about 800 cases (on average 1000 deaths less annually), and the mortality rate due to that cancer site in Poland would be at similar level as in the EU15 countries.

Conclusions. Cervical cancer belongs to easily preventable cancer sites. Screening programs, functioning in majority of Western European countries, showed its efficiency in fight against cervical cancer. However, none programme will achieve expected results, if it does not reach groups of highest risk. In Poland these are women with low education level. Success of screening programme in Poland depends highly on participation in the group of uneducated women.

Key words: Cervical cancer – screening, prevention, Poland

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ESTIMATING CANCER PREVALENCE WITH A SIMPLE SAS PROGRAMME

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Background. Cancer prevalence is a count of the number of living patients in the population at a given time. Prevalence statistics are useful for identifying the burden of disease and influencing health care planning in terms of allocation of resources and services. But its use has been limited by its computational complexity. We developed and validated a SAS programme to estimate cancer prevalence using data from an Australian population-based cancer registry.

Methods. Data from the New South Wales (NSW) Central Cancer Registry were used for illustration and validation. The registry covers a population of 6.6 million in the State of NSW, Australia and maintains a record of all cases of cancer diagnosed in NSW residents since 1972, which were followed up to 31 December 2002 to determine survival status. We used a counting method, which uses individual incidence and vital status of follow-up to count patients living in the population at a defined time. We validated our SAS programme in two ways; we compared our counts with estimates from the well-established PREVAL software and compared our age-adjusted prevalence rates with those from Queensland, another State of Australia, using the same Australian standard population.

Results. Our results were very similar to the estimates from PREVAL for cancers of the liver, lung, breast and prostate. For cancers with good prognosis the differences were relatively larger (breast: 36,286 vs 36,274 and prostate: 26,400 vs 26,390). Compared with the age-adjusted rate from Queensland, our 1-year prevalence estimate for all cancers combined for 2002 was almost identical (374 per 100,000 vs 376 per 100,000).

Conclusions. A simple programme written in SAS seems to be reliable for estimating prevalence using population-based cancer registry data. This allows for ease of data manipulation and further analysis of the data.

Key words: Cancer prevalence; SAS programme; Population-based cancer registry

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GONADAL DYSFUNCTION IN PATIENTS TREATED FOR CHILDHOOD CANCER

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The survival of children with cancer has improved markedly in the last decades. The treatment of childhood cancer may leave consequences on different organs and organ systems, thus also on gonads. The life expectancy of these young patients being long, research has focused on the late effects of childhood cancer treatment in the last years. The aim of our study was to evaluate the incidence of hypogonadism within the population of youngsters, treated for childhood cancer in Slovenia 1965–1995 and cured, as well as risk factors for hypogonadism in them.

Population and Methods: 297 youngsters were included, 115 females and 182 males. They were 0–16 years of age at the diagnosis of malignancy (median 9 yrs), they had hormone testing at 3–32 (median 11.5) years after completed treatment at ages 14–42 (median 20) years. Treatment included chemotherapy with alkylating agents (ChT-AA) in 189 (63%) pts, ChT without AA in 53 (18%) pts. Fifty-one (17%) pts had radiation treatment (RT) to the pelvis, 100 (34%) pts had cranial RT. Evaluation of gonadal function included clinical examination and laboratory testing (GnRH-test). To evaluate the risk factors for hypogonadism after treatment for childhood cancer, we used a multivariate analysis model of the classification decision tree which allows simultaneous evaluation of the influence of each independent variable, as well as their interacting on the dependent variable.

Results. We found primary hypogonadism (PH) in 76 (26%) youngsters, 62 (34%) males and 14 (12%) females. High incidence (50%) of PH was found in those treated for Hodgkin's disease (HD). A group of males, treated for HD with ChT was at high risk (72%) for PH. At high risk for damage to and dysfunction of the germ epithelium of the testes were those treated with RT to the pelvis and ChT with AA. ChT according to the LOPP protocol (leuceran, vincristine, procarbazine and prednisone) was less toxic for the testes than that according to MOPP (nitrogen mustard, vincristine, procarbazine and prednisone).

Conclusions. Damage to the gonads is frequent after treatment for childhood cancer, therefore testing of gonadal function in these individuals is necessary. The ovaries are less sensitive than the testes to ChT and RT. The degree of the damage to the ovaries or germ epithelium of the testes didn't change after 10 years of observation.

Key words: Childhood cancer – late effects, gonadal dysfunction

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THE ROLE OF CANCER REGISTRY IN BREAST CANCER SCREENING PROGRAMME IN CROATIA

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Breast cancer incidence and mortality rates have been increasing in Croatia over the past 30 years, reaching the ASR(EU) of 73.1/100,000 for incidence and 26.9/100,000 for mortality in 2004. Stage at diagnosis in 2004 was localized cancer in 36.2%, lymph node metastases in 38.4%, distal metastases in 8.7% and unknown in 19.9% cases. At the end of 2006, mammography screening programme was launched as the first national-based cancer screening programme in Croatia. The target population are women aged 50–69, which is about 560,000 Croatian women, with two years screening interval. The 21 county institutes of public health are in charge of collaboration with mammographic units, distributing invitations and coordination at the county level, while the programme is centrally co-ordinated by the Croatian National Institute of Public Health, where the National Cancer Registry is located. For the purpose of screening programme implementation and monitoring, a separate database has been formed for each county (including the data on all detected cancers). The central unit can access each of these databases through a common server located at the Croatian Ministry of Health and Welfare. There are 101 mammografy units participating in the programme. By May 2007, nearly 180,000 women were invited, and participation rate was 50%. The number of screen-detected cancers was 3.8/1000 mammographies. The Croatian National Cancer Registry will be included in the long term monitoring and evaluation of the programme. For this purpose, a new information item on whether the cancer was screen-detected was introduced in cancer notifications from primary health care and from hospitals, and will be entered in the Registry database at the start of processing of the 2006 data. The cancer registry and the breast cancer screening registry data will be periodically linked to be able to classify incident breast cancer cases as screen-detected, interval, cases in non-participant or in not invited women. For the purpose of long-term evaluation of the programme, cancer registry will monitor breast cancer incidence and mortality trends in screened and non-screened population. A similar model of monitoring and evaluation is planned also for the colorectal and cervical cancer national screening programmes that will start as pilot programmes by the end of 2007.

Key words: Breast cancer; Screening programme; Cancer registry

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CONNECTION OF CANCER REGISTRY OF SLOVENIA TO OTHER STATE DATABASES

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Notification of cancer has been compulsory in Slovenia since the foundation of the Cancer Registry of Slovenia (CRS) in 1950 and is prescribed by law. The main sources of data are cancer notification forms gathered from all hospitals and diagnostic centres in Slovenia, except in some cases where patient is not referred for further diagnostic investigations required information is also send by primary health care centres. The aim of cancer registration is completeness and accuracy of collected data. For this purpose we link CRS with Central Register of Population (CRP) in order to obtain the latest information on registered residents such as changes of address and date of death. Based on this up to date data we can assure better follow-up and more precise statistical calculations such as survival. Synchronization of resident's data between different systems is based on comparing unique personal identification number (PIN), which together with several other measures built into synchronization process guaranties data integrity, data quality and prevents duplicates. From the database of death certificates managed by Institute of Public Health of the Republic of Slovenia CRS obtains causes of death for registered cases. In addition CRS also obtains detailed information about all residents for which main cause of death is cancer, which is used for expanding the database with new cases (so called death certificate only cases). CRS also obtains data for cervical cancer and CIN III cases from registry of national cervical cancer screening programme (named ZORA). Similar screening programme for breast cancer (named DORA) is going to be implemented in November this year. At the moment the information system CRS is being upgraded in two different areas. First step is to ensure online synchronization between CRS and CRP by September 2007. It means that all new data on registered residents in CRS will be obtained on demand and instantaneously through secure on-line connection (24/7 availability). This new and modern connection between the systems on one hand audits all transactions and on the other hand enables employees of CRS to perform their work faster, more efficient and more accurate. Afterwards we will also upgrade CRS's information system with modern software solutions. New information system will be user friendly and will also enable CRS to receive cancer notification forms electronically – via Internet (WEB form), while at the moment all data providers can only submit paper forms.

Key words: Cancer Registry of Slovenia; Database link; Personal identification number

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SURVIVAL OF PATIENTS WITH INVASIVE URINARY BLADDER CANCER IN SLOVENIA REGARDING TO STAGE OF DISEASE AND TREATMENT IN YEARS 1987–1997

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Background. The relative five-year survival rate of patients with invasive urinary bladder cancer in Slovenia has steadily increased until 1987, following by small decline in 1987–1992 in spite of development within the field of surgery as well as irradiation and chemotherapy treatment. According to Eurocare-3 research, the five-year survival rate was low compared to Europe (42% against 71%).

Aim. The aim of the research was to find reasons for low survival rate of Slovenian patients with invasive non-disseminated cancer of urinary bladder in 1987–1997 using the selected three-year sample.

Patients and Methods. The research contains retrospective data on patients with the invasive cancer of urinary bladder who were entered into the Cancer Registry of Slovenia (CRS). We have thoroughly analysed Registration forms for cancerous diseases of 518 patients with invasive cancer of urinary bladder who were treated in the years 1987, 1992 and 1997. The data from the CRS for 1992 has been checked and, if necessary, corrected according to documentation from all Slovene health institutions. We have compared data acquired before and after documentation revision. Survival rate graphs and analysis were made for each group. Survival rate was analysed according to disease stage and the resulting charts were compared.

Results. Urological departments of Slovene hospitals do not regularly and accurately report invasive cancer of urinary bladder to the CRS. Even after repeated review of registration forms, the stage of disease was unknown or impossible to determine in 45% of all cases. The analysis of medical treatment reveals that the most common procedure by the muscle invasive cancer was transurethral resection (TUR) of bladder performed in as much as 57% of all cases. Only 6.6% of patients did undergo cystectomy. Approximately 6% were treated with combined methods which preserve the bladder. After documentation revision the share of unknown disease stage has dropped, but still remained very high (31%); the share of T1 and T2 remained almost on the same level, while the percentage of T3 stage has increased. The share of patients treated with TUR of bladder has decreased, but unfortunately the share of cystectomies has not significantly increased and remained at 9%. The percentage of patients who undergo combined treatment which preserve bladder increased from 7 to 15%. Histological findings of more than half of the patients were not adequate. 5-year survival rate of the patients entered into CRS and the group of patients whose medical documentation was reviewed is approximately similar, i.e. between 42 and 45%. The low survival rate has been recorded by all patients with known disease stage in both groups for the year 1992. Based on the stage of disease, the survival rate according to CRS and hospital's documentation is as expected at T1 stage and very low at T2 stage (32 and 36%). Five-year survival rate for T3 and T4 stage is 33%.

Conclusion. Registration forms submitted in the above mentioned period of time by the urology departments were inadequate and did not enable the right disease stage determination. Histological preparations were not suitable because mostly the recection in the muscle tissue did not reach deep enough and pathologists did not describe the state of the muscle. The reason for low survival rate may be inadequate registration, inappropriate registration and not enough diagnostic checkups for disease mapping. Survival analysis according to disease stages revealed inadequate medical treatment above all for the T2 stage.

Key words: Invasive urinary bladder cancer – inaccurate reporting to the Cancer registry, treatment options, survival

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MORTALITY FROM MALIGNANT NEOPLASMS IN PEOPLE OLDER THAN 20 YEARS IN MEXICO 2000–2005

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Objective. To describes the global cancer mortality and the specific mortality patterns for the main neoplasms among people older than 20 years in Mexico.

Material and Methods. Using official information about death certificates and population during 2000–2005, national and regional annual global cancer mortality as well as specific mortality rates for the 10 most frequent malignant neoplasms by sex were estimated among people older than 20 years of age. The trends for these neoplasms during the study period were estimated by means of Poisson regression. The rate differences in specific cancer mortality by region and sex, for the major neoplasms, were calculated subtracting specific regional rates from the respective national rate in 2005.

Results. In this period of study the global mortality rate for cancer among men increased from 122.7 in 2000 to 149.2 per 105 inhabitants in 2005; and among women from 119.6 to 140.8 per 105 inhabitants, representing an increase of 17.8% and 15.1% men and women respectively during the study period. Among men, neoplasms of colon, kidney, non-Hodgkin's lymphoma, pancreas and brain showed the major increment; among women, neoplasms of ovary, colon, breast, and pancreas had the most significant increment.

Conclusion. In Mexico its necessary the implementation of a population based cancer registry. The registry will play a main role in disease surveillance and control; will give basic information over incidence and temporal variation, and could be the main source of information for epidemiologic research, as well as planning and evaluation of the quality of medical attention services such as prevention and early diagnosis and treatment.

Key words: Poisson regression; Malignant neoplasms – mortality, standardized rates; cancer epidemiology

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USE OF OPEN REGISTRY SOFTWARE FOR AUTOMATIC GENERATION OF CANCER INCIDENCE DATA IN THE LOMBARDY PROVINCES OF SONDRIO, BRESCIA AND VARESE

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The collection and maintenance of health databases (e.g. cancer registry databases) is becoming routine since data sources are increasing available in electronic form. However, it is important that health databases are accurate and complete. The Lombardy Cancer Registry, covering the Province of Varese, was established in January 1976 and over 30 years accumulated the experience necessary for the development of the Open Registry software for the automatic generation of cancer cases from electronic data sources. Open Registry was introduced for the routine generation of cases in the Lombardy Cancer Registry in 1997, and has been extensively assessed for accuracy and completeness (Meth Inf Med, 2005; Pop Health Metrics; 2006, J Biomed Inform, 2007). The cancer registries (CRs) of the Lombardy Provinces of Sondrio and Brescia were established much more recently and have used the Open Registry software for case generation from the beginning. The data produced by Open Registry in the three CRs of Lombardy are presented and assessed.

Methods. Open Registry was designed to automatically scan electronic data sources and from them generate malignant cancer incidence data. Malignant cancers are those with ICD-9 codes 140–208. Open Registry is implemented on a Linux operating system and employs and Oracle database. Algorithms operate on the source data to generate cases automatically. Cases with inadequate or incongruent data are rejected by the system and flagged for manual checking. We analysed the performance of Open Registry for the incidence years 1998 to 2002 for the Sondrio registry, 1999 to 2001 for the Brescia registry, and 1997 to 2000 for the Varese registry.

Results. Overall, 59% of Varese cases, 58.2% of Sondrio and 58% of Brescia cases were generated automatically. For each cancer site the percentage of automatic registration by each CR was generally similar, with greatest variation for breast, lung, pleural, liver, and oral cavity sites. This variation was largely due to differences between the CRs in terms of the quality of the electronic data sources. Considering all CRs together the proportion of automatically generated cases varied markedly according to site: from over 80% for breast, skin, thyroid, and prostate sites to only 12% for metastatic, poorly defined and retroperitoneal sites. The variations are attributable to inconsistent coding practices related to classification difficulties.

Conclusions. Open Registry is an effective and efficient programme for the automatic generation of cancer cases in CRs differing in terms of the extent of availability of electronic data. Close to 60% of the data are generated automatically, implying that only 40% of cases require operator intervention and this is a massive reduction in operator workload compared to manual registration which required operator intervention in 100% of cases.

Key words: Automated registration; Cancer population-registry

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PLANS FOR A POPULATION-BASED ORGANISED BREAST CANCER SCREENING PROGRAMME IN SLOVENIA

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Introduction. In Slovenia women can attend preventive mammography on an opportunistic basis in the diagnostic setting. For the time being there is no population-based breast cancer screening programme in place. The opportunistic screening, without monitoring the important quality control parameters, is not giving satisfactory results. The basic epidemiological parameters, such as the proportion of localised impalpable cancers diagnosed, breast cancer survival rate and mortality rate, have not been improving sufficiently over the last years. The consequences of such a screening are the low percentage of screened women in the target population (50–69 years) where the screening is the most effective, screening intervals are too short, and women who do attend are usually too young. Clinical examination is still used as a preventive screening method.

Like in most European countries, breast cancer ranks first also in Slovenia by its incidence and cancer-related mortality among females. Since this important public health problem is increasing, a well-organised early breast cancer screening programme is due to start in December 2007. Together with the effective diagnostic procedures and optimal treatment it is hoped to reduce the current mortality rates and the burden of the disease in the population.

Discussion. High-quality organization of a screening programme is of essential importance for early detection of breast cancer and reduction of mortality due to this disease. The key elements of a high-quality screening programme include the appropriate education and multidisciplinary team working, monitoring of performance indicators and audit, appropriate technical quality of mammographs and setting of an adequate information system. In addition, the target population needs to be selected for screening in an organized and systematic way, and an appropriate response in this population must be achieved.

Target population in Slovenia counts 243,243 women, aged 50–69, so each year around 120,000 women will be invited to a screening test. The basic organizational and functional element in breast cancer screening is the screening unit, which cooperates very closely with diagnostic unit professionally as well as functionally. Our screening programme will use digital mammography machines which will be placed in two stationary screening units; in Ljubljana and Maribor, and in six mobile units, all together covering the entire Slovenia. Each mobile unit will have the capacity between 12,000 to 15,000 mammograms per year. Each mammogram will be read by two readers and, in case of discordance in BIRAD results, the picture will be assessed at the consensus conference where the two readers and the lead radiologist would make final decision about the screening result. All women with suspicious mammograms will be invited to a diagnostic centre for further assessment; in the diagnostic centres, treatment of all screen detected cancers would also take place.

Conclusions. The Slovenian breast cancer screening programme to be started in Dec. 2007 will fulfil the European guidelines for quality assurance in breast cancer screening and diagnosis. It is expected to cover the entire target population in the next few years. Women aged 50–69 will be invited for screening mammography every two years by regular mail giving the date and the place of the screening test. The quality control indicators will be monitored and reported by the Register and programme Dora, Epidemiology and cancer registry department at the Institute of Oncology Ljubljana, Slovenia.

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PLANS FOR NATIONAL ORGANISED COLORECTAL CANCER SCREENING PROGRAMME IN SLOVENIA

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In the last years, colon and rectum are the most common cancer sites in Slovenia. The incidence of colorectal cancer (CRC) has been steadily increasing in the last two decades. Even though the relative 5-year survival of patients is improving, the majority of them are diagnosed in advanced stages of the disease and thus have a poor prognosis. Diagnosis in advanced stages leads to lower patient survival, high mortality rates and high costs of treatment. Epidemiological data on CRC in Slovenia and the fact that CRC is a curable disease if diagnosed and treated at an early stage have necessitates a systematic approach at the national level. In 2003, the Council of the European Union recommended implementation of organised CRC screening programmes to all member states. The proposed screening method, which is acceptable for the population and also effective, is the faecal occult blood test. Evidence shows that the faecal immunochemical test has a better sensitivity and specificity ratio and better predictive value than the guaiac faecal occult blood test. By screening the target age group with faecal occult blood test and then performing endoscopy of the colon and rectum in those patients who have a positive faecal blood test, CRC mortality rates can be lowered by 18–33%. The Slovenian Health Council approved the national organised CRC screening programme in December 2006, and its implementation will start in 2008. This programme will target the population between 50 and 69 years of age and will use postal invitations and delivery of immunochemical faecal blood tests by mail, while the test results will be interpreted at a central laboratory. In the case of positive tests, colonoscopy will be performed as well. The programme will provide central management of planning, call and recall, monitoring and control, as well as the evaluation and coordination of all procedures and outcomes of the screening programme. In line with CRC screening development and implementation requirements, a quality assurance and quality control system for all diagnostic and treatment procedures for CRC is being defined and will be implemented. To achieve expected outcomes of the national organised CRC screening, a lower mortality and incidence of CRC and a higher rate of CRC detected at an early stage, and therefore lower the costs of CRC treatment, the compliance of the target population must be over 50% in the first screening round and it will also have to remain high during rescreening. Furthermore, quality assurance of the programme is an essential requirement to achieve this goal.

Key words: Colorectal cancer – screening, guaiac faecal occult blood test

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