World Health Organization (WHO)
International Agency for Research on Cancer (IARC)
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EUROPEAN NETWORK FOR INDICATORS ON CANCER (EUNICE)

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Project Coordinator: IARC

First Interim Technical Implementation Report and

Consolidated Financial Statement

for the period 1 September 2005-28 February 2007

First Interim Technical Implementation Report for the period 1 September 2005-28 February 2007

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INTRODUCTION

IARC coordination

The first meeting of the Steering Committee (SC) was held in Lyon, 6-7 March 2006 (report attached).

The Secretariat has maintained the liaison with the ENCR SC for all common activities namely data collection (see section 1 below), data analysis and the development of a website. Contacts with the EUROCARE and EUROCHIP projects were also established.

IARC data collection

Incidence

The protocol of data collection and conditions of use were developed and the "Call for Data" was launched in March 2006. This included two questionnaires on standard registry practices and variables routinely collected by the registries. By mid-October out of 155 population-based registries contacted 93 had submitted incidence, population and mortality data. Data checking and quality analyses are on-going.

Mortality

Cancer registries submit mortality data for the area they covered.
Mortality statistics at the national level were updated on-line (<www-dep.iarc.fr>) in June 2006 with the most recent WHO data.

Survival data: data collection.

The EUROCARE group launched a Call for Data in 2004 so that at time of signature of the EUNICE Agreement had already collected data from many of the registries that regularly perform cases' follow-up.
EUROCARE had already planned to carry out the classical observed and relative survival cohort analysis.
By the time the EUNICE group (DZFA) finalized the contract and plan of action, the work of the EUROCARE group was already advanced. EUNICE will obtain estimates of the expected survival of currently diagnosed cases based on projections of period analysis. See section 3 below.

EUNICE proposes therefore to provide additional new indicators of cancer survival (not covered by the EUROCARE programme), recently developed by methodological research, that are potentially of greater value to the evaluation of health services and clinical management. EUNICE will estimate the expected survival probability of cases diagnosed recently and therefore reflecting the current status and performance of the health systems rather than the historical situation. See section 3 for more information on the value of these new indicators.

This represents a deviation from the initial work plan, agreed by the EUNICE coordinator and partner involved and for which the coordinator has to seek approval by the EC. The change of plan is justified by the will to avoid 1) duplicating work being

performed by another group and 2) fuelling a competition that would cause distress among the data providers (ENCR).

Screening: interaction with cancer registry data

The need to introduce a third level of evaluation of screening activities and performance at the individual level by linking screening, cancer and population registries was discussed within the ENCR SC and the EBCN. It will be a subject of presentation and discussion in the forthcoming meeting of the breast cancer screening working group organized in Brno.

SCIENTIFIC INSTITUTE OF PUBLIC HEALTH, BRUSSELS (BELGIUM)
Dr Marc Arbyn

Data collection of screening process and performance parameters in EU member states

A template for data collection was composed, tested and further improved.
This template consists in 3 parts: (1) tables describing characteristics of the screening programmes (target population, policy for screening and management of screen-positives, invitation and information system; (2) tables with aggregated absolute data on screening-invitation coverage, compliance, screen test results, follow-up compliance, results of follow-up; (3) tables with screening performance data to be computed from (2).

The template tables (1) and (2) are included as an annex to chapter 2 of the European Guidelines on Quality Assurance in Cervical Cancer Screening, which are currently in press. Template tables (3) are included as chapter 7 of the same guideline.

The content of these tables was discussed with epidemiologists from x member states during a meeting in Tallinn, 9-10 February 2006. These discussions resulted in a final version to be included in the EU guidelines

Using these template tables data were collected from Belgium, Denmark, Estonia, Finland, France, Italy, Ireland, Latvia, Lithuania, Norway, Poland, Romania, Sweden, The Netherlands, UK. The data are currently being compiled by Dr. A. Anttila (Helsinki) and Dr. G. Ronco (Turin). Two publications are planned. The results of the data collection will discussed a meeting in Turin, planned early 2007.

See further reports of A. Anttila (Helsinki) and G. Ronco (Turin)

Analysis of temporo-spatial trends of cervical cancer incidence and mortality - Burden of cervical cancer in Europe: estimates for 2004

Data were received from IARC on the estimated incidence of and mortality from cervical cancer and total uterus cancer from 40 European countries.

Background
The European Council recommends offering organised cervical cancer screening in all member states. To evaluate the impact of current and new prevention methods regularly updated information on the burden of cervical cancer is needed.

Methods
The best estimates of mortality and incidence rates are applied on the 2004 projected population of 40 European countries using methods developed by the International Agency for Research in Cancer. The absolute number or cases and deaths, the standardised and cumulative rates (up to age of 74 years) are computed for individual countries and aggregated

for the 15 prior and the 10 new member states of the European Union (EU). For 28 countries (25 belonging to the EU and 3 others), deaths from uterine cancer not otherwise specified was reallocated using age-specific rules described in GLOBOCAN2002. For all 40 European countries, incidence of and mortality from uterus cancer. The importance of cervix cancer mortality in the whole of Europe was assessed by considering uterus cancer deaths among women younger than 45 years.

Results
In 2004, approximately thirty one thousand women in the EU got cervical cancer and almost 14,000 died from the disease. A striking contrast is noted between the prior and new EU member states: world-age standardised incidence (per 10^5 women-years) of 9.5 versus 16.7; standardised mortality rate of 4.9 versus 10.7; cumulative mortality of 0.27% versus 0.71%). The burden was lowest in Finland (cumulative incidence and mortality rate of 0.38% and 0.12%) and highest in Lithuania (cumulative incidence and mortality of 1.64% and 0.94%). Mapping of uterus cancer mortality among women younger than 45 years indicate that the burden of cervical cancer is particularly high in the whole of Eastern Europe.

Conclusion
Cervical cancer still constitutes a considerable public health problem in Europe. The dramatic contrast between West-and East European states merits the particular attention from health authorities of the countries concerned and the EU. The European Commission should maintain cervical cancer control in future action plans and increase support for the most affected member states.

Time trends of mortality from cervical cancer

Recent data were downloaded from http://www.who.int/whosis/mort. Data are compiled and cleaned. A statistician (Mr. A. Raifu) has been recruited by the Scientific Institute of Public Health. Methods were developed for filling the gaps for lacking year, using imputation.
Countries with acceptable data for age-specific reallocation of the uterine cancer deaths into respectively cervix uteri cancer and corpus uteri cancer are selected which can be used as external template for countries which proportion (>25%) of uterine cancer deaths without specification of the topographic origin.

Methods are discussed with F. Bray & E. Weiderpass (Norwegian Cancer Registry).

The objective is to produce 3 papers:

1) Standardised mortality rates of corrected cervical cancer, age specific trends by time and cohort, SMR and standardised cohort mortality ratio.
2) Age-cohort period modelling
3) Parallelism between incidence and mortality.

Burden of cervical cancer in the Baltic countries

Data were received on number of cases of cervix and corpus uteri cancer from the cancer registries of Estonia, Latvia and Lithuania (by calendar year, 5 year age group and corresponding female population).

Do files in STATA (ver 7 and 9) for detailed age-cohort-period modelling were developed at the Scientific Institute of Public Health and shared with colleagues in the Baltic countries, allowing

them to perform their own trend analyses in the future. Data with mortality from cervix, corpus and uterus cancer were obtained from Lithuania. Mortality data from Latvia and Estonia were extracted from the WHO mortality data base.
The purpose is to produce 4 papers: one for each country and a pooled Baltic analysis.

Site visits/conferences

Tallinn: 8-10 February 2006

- Cervical cancer screening registration and data collection, Cervical Cancer Screening Working Group/EUNICE

Lyon: 6-7 March 2006

- 1st steering group meeting of EUNICE
- Discussion of work plan for working group 7: data collection cervical cancer screening, burden of cervical cancer and HPV distribution in Europe.

Vilnius: 19-22 June 2004 (in collaboration with the Finnish Cancer Registry (Dr. A. Anttila)

- Collection of incidence and mortality
- Instruction of Lithuanian statistician
- Conference at the National Institute of Oncology: Presentation of European Guidelines
- Meeting with representatives of the Ministry of Health, University Laboratory of Cytopathology, Dr. Dickute (member of European Parliament and Vice-president of the MEP Interest Group for Cervical Cancer Prevention.
- Discussions with Mr K Kartuatis, responsible of the Lithuanian Cancer Registry on organisation of cervical cancer screening
- Discussion on production of a Lithuanian paper including the cancer registry

Luxembourg: 3-4 July

- Working meeting with Mad. A. Scharpantgen, Dr. Schneider (virologist, expert in HPV testing), Mr. J. Mossong on future organisation of cervical screening in Luxembourg.
- Data for Luxembourg (European questionnaire) are prepared but were not yet received.

Reims: 31 July-1 August 2006

- Working meeting with Prof. C. Clavel, Prof. P. Birembaut, Dr. V. Dalstein on prevalence of HPV in Reims and Soissons according to age.
- Statistical analysis of screening data from 2 cohorts of women, screened with combination of cytology and HPV and with cytology and HPV triage.
- A paper is being prepared.
- An oral presentation was done at the HPV Congress in Prague.

Rabat: 14-15 September 2006

- Meeting on cervical cancer prevention strategies on developing countries, organised by Lalla Salma de Lutte Contre le Cancer, Institut National du Cancer (France), WHO.
- Presentation of "Epidemiology of Cervical Cancer in the World"

Gembloux: 23 September

- Congress organised by the Francophonic Society of Gynaecology
- Presentation on organisation of screening in Belgium and Europe, production of a scientific paper.

Paris: 25-26 September 2006

- Working group meeting with French cervical cancer screening experts, organised by the Institut National du Cancer.
- Preparation of a document on cervical cancer screening in Europe (this document will be integrated in a final report) .
- Discussion with Dr. C. Mahé on future collaboration on improvement on information systems used in EU member states in the framework of cervical cancer screening.

Compilation of data on HPV distribution in EU

- Discussion with epidemiologists of the HPV vaccine manufacturers
- A collaboration on data collection via screening and vaccination registries is being negotiated.
- A detailed analysis of a Belgian and French data set was performed.

GERMAN CANCER RESEARCH CENTRE DIVISION OF CLINICAL EPIDEMIOLOGY AND AGEING RESEARCH (H. Brenner, DZFA)

By the time the EUNICE contract was finalized, the EUROCARE group had already collected data for and actually initiated the "classical" type of period analyses of survival for European countries proposed in the original EUNICE application. In the meantime, H. Brenner has further advanced the period analysis methodology so that it can be used not only to predict cancer survival of patients diagnosed in the most recent years for which cancer registry data are available (typically a few years in the past), as is the case in "classical" period analysis, but also to predict survival of concurrently diagnosed patients. This is achieved by a modelling strategy which has been developed and thoroughly evaluated by H. Brenner together with T. Hakulinen from the Finnish Cancer Registry (1,2).

In order to avoid duplication of work already conducted by the EUROCARE group, and not confuse data providers and users by results from competing analyses of cancer registry data, and in order to provide even more useful and up-to-date indicators of cancer survival, H Brenner has designed and initiated a comparative cancer survival analysis, which will provide, for the first time, modelled period estimates of 5- and 10-year relative survival of cancer patients diagnosed in 2005-2009 in various European countries. To achieve this goal, a consortium was created consisting of a selected group of 10 out of the best and most informative population-based cancer registries from all parts of Europe (2 registries each from Eastern, Southern, Western, Northern and Central Europe: Lithuania, Cracow (Poland), Slovenia, Tuscany (Italy), Eindhoven (Netherlands), Scotland, Norway, Finland, Bas-Rhin (France), Saarland (Germany)), all of which agreed to participate and to the study protocol and have sent their data for comparative analyses by October 2006. Currently, data checks and editing are ongoing. Survival analyses using the latest methodological developments will start in January 2007.

At the same time, H. Brenner is involved in and contributes to the "classical" period analyses conducted by the EUROCARE group and has finalized reports from comparative period analyses of childhood cancer in Europe (3-7), i.e., he contributes to provision of both the originally proposed "classical" period estimates of cancer survival in Europe, and the more advanced, newly developed modelled period estimates.

In parallel with the conduction of the survival analyses outlined above, H. Brenner continues advancement of methodology for population based survival analysis (8,9).

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2. Brenner H, Hakulinen T. Up-to-date estimates of cancer patient survival even with common latency in cancer registration. Cancer Epidemiol Biomarkers Prev 2006;15:1727-1732.
3. Steliarova-Foucher E, Arndt V, Parkin DM, Berrino F, Brenner H. Timely disclosure of progress in childhood cancer survival by period analysis in the Automated Childhood Cancer

Information System (ready for submission).

4. Brenner H, Steliarova-Foucher E, Arndt V. Up-to-date monitoring of childhood cancer long-term survival in Europe: methodology and application to all forms of cancer combined (ready for submission).
5. Brenner H, Coebergh JW, Parkin DM, Izarzugaza I, Clavel J, Steliarova-Foucher E, Arndt V. Up-to-date monitoring of childhood cancer long-term survival in Europe: leukaemias and lymphomas (ready for submission).
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7. Arndt V, Lacour B, Steliarova-Foucher E, Spix C, Znaor A, Pastore G, Stiller C, Brenner H. Up-to-date monitoring of childhood cancer long-term survival in Europe: tumours of the sympathetic nervous system, retinoblastoma, renal, bone and soft tissue tumours (ready for submission).
8. Brenner H, Hakulinen T. Maximizing the benefits of model based period analysis of cancer patient survival (submitted).
9. Brenner H, Hakulinen T. Model based hybrid analysis of cancer patient survival (submitted).

FINNISH CANCER REGISTRY, INSTITUTE FOR STATISTICAL AND EPIDEMIOLOGICAL CANCER RESEARCH, HELSINKI
Dr Nea Malila

Screening for colorectal cancer

Colorectum Cancer Consortium, Finnish Cancer Society, deliverables:

- Demonstration on screening for colorectal cancer
  - Programme on-going, expansion in 2005 and 2006
- Indicators on use and outcome of screening
  - Compliance, test results (positive, negative, renewal), referrals for colonoscopy, colonoscopy results (adenomas, cancers, other, no relevant findings)
  - Adenomas and cancers are specified according to site, histology, grade, TNM and stage
  - First process indicators available from 2004-2005.
- Coverage, stage at diagnosis, impact of screening
  - Impact of screening will be studied eventually after 10 years follow-up comparing the screening group to the control group
- Specific attention to the development of indicators relevant to the process of Colorectal cancer screening
  - On-going using preliminary data from demonstration project
- Combined resources with ECN (Julietta Patnick, Nereo Segnan)
  - Discussions started during 2006
- Disseminate data via electronic media (e-health)
  - Under planning
- Model of implementing colorectal cancer screening as a public health policy (report)
  - Design and planning report done
  - Demonstration project on-going since 2004. Data retrieval via web-based IT-system (secured) built in 2004 and developed further during 2005-2006 (EUNICE).

Monitoring and registration of cervical cancer screening programmes in Europe
A. Anttila

An interim activity report of the project group within the CCSWG/EUNICE, activity period 9/2005-8/2006.

1. Project group plenary meeting was held in Tallinn in 9th-10th February 2006. Organisers: A.Anttila, Helsinki; G.Ronco, Turin. Local organising committee: A.Aasmaa, T.Aareleid; Tallinn. Cervical Cancer Screening Working Group/EUNICE: M.Arbyn, Brussels. We thank EUNICE co-ordination at IARC, Lyon: P.Pisani, E.Steliarova-Foucher.
There were 29 participants from 17 countries and in addition 3 observers.

1. 1. Opening session (A.Anttila, G.Ronco)
Core of this project: countries with screening registration running or being planned, structured data collection as far as possible. There are several new member & applicant states, many of

which with high cervical cancer rates. We need to clarify whether planning or piloting new programmes is taking place; how registration and monitoring has been arranged, and what are the early monitoring results. There are needs also to improve monitoring and evaluation of screening programmes among 'well-to-do' European countries, where validated register-based indicators and outcomes on screening need to be made available in as much as possible.

1.2. Session on what is EUNICE (E.Steliarova-Foucher, M.Arbyn)

EUNICE collaborators: 7 institutions; Coordination: IARC (Lyon, France); Co-sponsor: European Commission; Work of 120 European population-based cancer registries, builds on results of European projects. Objectives of EUNICE: To establish and operate EUNICE network of data providers. To provide the EU with updated and standardized indicators of cancer burden. To ensure maximum availability of data on cancer in traditional publications as well as via electronic media.

Working group on Cervical Cancer Screening
Partners CPO Piemonte, IPH Belgium, Cancer Society of Finland
Objectives
Network within and outside EUNICE
Provide information on the use and outcome of screening programmes for cervical cancer
Promote international comparability of data on screening
Analyse and interpret collected data
Disseminate results

Indicators production for CCSWG
Population coverage by screening programmes
Stage at diagnosis
Compliance and waiting time
Treatment modes
Time series wherever possible
Impact of screening
Mortality (crude, standardised, PYLL)
Incidence (by age, stage, region, SES)
5-year survival

1.3. Registration and monitoring of cervical cancer screening: methods and data collection

G.Ronco presented the methodological aspects, based on the drafted EU guideline. We had 17 country-specific presentations on the status of cervical cancer screening programmes, their registration, and monitoring. Presenters: M.Arbyn, Belgium; E.Lynge, Denmark; A.Aasmaa, Estonia; L.Kotaniemi-Talonen, Finland; M.Fender, France; N.Becker, Germany; L.Döbrössy, Hungary; K.Kelleher, Ireland; G.Ronco, Italy (in section III.); J.Kurtinaitis, Lithuania; S.Thoresen, Norway; A.Chil, Poland; O.Suteu, Romania; M.Primic Zakelj, Slovenia; P.Sparen, Sweden; M.Rebolj, Netherlands; J.Patnick, UK. The participants were also requested to bring data on selected monitoring information tables about the programmes. A.Anttila summarised the collected info. The current response rate is 13/17.

1.4. Discussion and decisions

Budget includes two meetings with 15-20 countries. The first meeting in Tallinn in Feb 2006. The second meeting after about one year, budgeted in Turin.
Based on Tallinn materials, a descriptive paper will be produced on registration systems, based on presentations in Tallinn (year 1). Responsibility: A.Anttila
Data collection on screening programmes including comparisons of coverage, compliance, cytology, referral, histology, possibly on treatments of precancerous lesions) on-going. Deadline for the final (corrected) version of the B-tables: 2nd meeting. A small group meeting to process the B-tables before the 2nd plenary meeting.

Treatment data possibly available from very few countries; post-treatment follow-up data not available.

Ad hoc publications will be used, if available, in countries where systematic routine registration is not in use

A paper on comparative screening monitoring tables will be produced after the 2nd meeting. Responsibility: G.Ronco. Possibility of comparing 'performance indicators' clarified in the data collection process. Further dissemination through EUNICE.

Collaboration with the ECN: Data collection on screening policies on-going and can be extended to any other country in Europe and include more details of information. A.Anttila & G.Ronco will consider with ECN (represented by M.Arbyn)

2. Activities performed

Preparing the meeting and data collection materials (A.Anttila, A.Pehkonen) during September-January. Chairing the meeting (A.Anttila). Reporting to EUNICE and ECN (A.Anttila, Feb-March 2006). Finalised instructions for the data collection sheets were mailed (A.Anttila, A.Pehkonen). Receiving data on B-tables of the guideline (coverage, compliance, cytology, referral, histology, treatments of precancerous lesions if available) on-going; to be accomplished before the end of 2006. Reporting data on the Finnish programme (L-Kotaniemi-Talonen & A.Anttila). A descriptive paper on screening registration systems on-going (A.Anttila).

The project has proceeded according to the plan. Working time consumption according to the budgeted for the first year of the activity plan (preparing and leading the meeting, reporting, data collection on the screening programmes performed after the Tallinn meeting).

CPO-PIEMONTE, TURIN, ITALY
Dr Antonio Ponti

Breast cancer screening

Activity has been conducted according to project protocol and to deliberations of the EUNICE Steering Committee (meetings of March and November 2006). The following meetings of the EUNICE breast group have been organized:

- Brno (Czech Republic) on 10-11 November 2006. This meeting has involved, in particular, representatives from new member States and applicant Countries and has dealt with screening extension, documentation, monitoring of performance parameters based on aggregate and individual data, and impact of screening. The meeting was included among those listed in the project protocol, but compared to what specified in the protocol it was deemed necessary to modify the meeting location from Budapest to Brno as Adam Svobodnik and his team volunteered for local organisation.
- In preparation of the Brno meeting, it was deemed necessary to organise a supplementary work meeting in Turin on 19-20 October with participation of Dr. Larry von Karsa, ECN co-ordinator, and a multi-disciplinary team from Slovenia.
- Turin, Italy, on 24-26 January 2007. This meeting involved a small working group and mainly concerned the design of the protocol and of the data reporting form for the aggregate data project (see below).

In the stated time-period, main areas of activities have been the following:

- conduction, in conjunction with ECN (European Cancer screening Network), of a survey by questionnaire on organisation of breast cancer screening programmes in European Countries. Questionnaires from 23 Countries have been received as for February 2007. Data analysis is on-going.
- Design of a survey of aggregate data. Even if the survey itself will initially concern a single year (2005), the aim is establishing a routine - yearly - monitoring of screening performance parameters, Country-based, in Europe. Information on breast screening in Europe (coverage, main performance parameters) is at present lacking. However, some Countries do collect these parameters. Others may need guidance in doing so. The object of the project is building the appropriate documentation, methods and tools for uniform and timely collection of main screening performance parameters in Europe.
- Design of a standard data record for collection of individual data on breast cancer screening and operational definition of screening performance indicators based on the data record. Demonstration projects and data collection with existing databases on screening performance (QT, SEED) are also being conducted, in order to diffuse and update these tools.
- Definition of a manual of good practise in screening documentation and data management.

Cervical cancer screening

In agreement with Dr. Arbyn and Dr. Anttila, Dr. Ronco contributed to the project for standardising cervical cancer screening monitoring. Sheets for aggregated data based on the tables included in the updated European guidelines currently in press were prepared and sent to the representatives of 17 countries.

A meeting, co-organised by Dr. Ronco, was held in Tallin, Estonia with the participation of 29 delegates from 17 countries and 3 observers. The situation concerning cervical cancer screening and its registration and monitoring in each country was presented. Methodological issues concerning principles of cervical monitoring and problems in standardisation were discussed.

Preliminary data, mainly concerning some aspects of the screening organisation were collected. More detailed data about intermediate results of the screening process are being collected.
The next meeting on cervical cancer screening monitoring will be held in Turin on 26-27 June, 2007.

KAROLINSKA INSTITUTE, STOCKHOLM, SWEDEN
Prof. Ulrik RINGBORG/Dr Nils Wilking

Treatment of cancer patients (Ulrik Ringborg)

Depending on the type of disease, clinical stage, age of the patients and comorbidity the aims of treatment are to cure, prolong survival and improve quality of life.
There are a number of treatments: radiation therapy, medical oncology – chemotherapy, hormonal treatments, treatments with biologicals, immunotherapy, targeted therapy etc.
There is a strong development towards integration of different treatment methods, multimodality. According to a Swedish investigation that more than 80% of patients treated with radiation also received other types of oncological treatments. In order to optimize the multimodality multidisciplinarity is a necessity.
Multidisciplinarity should not only include different types of treatments but also the diagnostic disciplines like tumor pathology/cytology, imaging and laboratory medicine as well as different forms of supportive care, psychosocial oncology and palliative care. Multidisciplinarity is increasing in complexity by time.
Innovation is of great importance for the cancer treatment. The expansion of knowledge in the basic research area makes the translational research mandatory to shorten the time from discovery to clinical trials. Important is also a strategy to implement and evaluate new research results in the routine care of patients. Therefore the integration of the health care, research and development should be optimized.
To reach acceptable quality education of different types should also be integrated with the care system. The ideal situation is comprehensiveness, which means integration of care, prevention, research, development and education. By time the preventive activities are increasing in the health care system and in the near future chemoprevention will be a reality for preventing tumor diseases.
At present we have problems with the opposite to comprehensiveness – fragmentation. Fragmentation is a threat to multidisciplinarity, integration and the necessary critical mass.

<u>Important questions for future work</u>
There are two main important questions:
Indicators of fragmentation; is outcome better in cancer care organized according to the principle of comprehensiveness ?
It is possible to identify a number of indicators of fragmentation. Some examples: insufficient multidiscplinarity, small volumes of patients for advanced surgical treatments, small number of linear accelerators, lack of evidence based clinical guidelines, lack of a strategy to implement and evaluate new research results in the clinical care.
There are difficulties to measure treatment outcome in comprehensive cancer centers and compare to the fragmented health care system. By a questionnaire developed by OECI (Organization of European Cancer Institutes) it is possible to identify measurable characteristics and infrastructures of cancer centers. The questionnaire contains more than 300 questions and

the centers can be fairly well characterized. The difficulty is to evaluate outcomes of treatments.

There is a discussion about the possibility to register the outcome in different countries and compare with the presence of comprehensive cancer centers. There is also possibility within a defined country to analyze the background why outcome is good or bad for different tumor diagnosis. This could reveal whether multidisciplinarity is the background.
According to data from IARC the improvement of breast cancer measured as reduced mortality is highly variable in different countries. Does this reflect insufficient multidisciplinarity and/or lack of innovation ?
Further work will focus on these questions.

Medical treatment of cancer (Nils Wilking)

We have over the last decades seen rapid progress in basic research in the field of oncology. This has resulted in the identification of a number of new targets for drug development. At the same time, the pharmaceutical industry has increased their investments in cancer research and oncology drug development in a way never seen before. These investments in cancer R&D have resulted in that a number of new drugs, often indicated for limited patient populations, at least at launch, have reached the market. With few exceptions these new, often very innovative drugs have come at high prices. This in combination with better informed patients and a revolution in the way the general public can access information about new technology through the internet, has lead to a new situation with respect to cancer treatment. There is a growing interest for innovation in cancer, and issues about patients' access to these innovations.

Cancer accounted for 16.7% of all 'healthy' years lost in EU-25 in 2002 and 12.5% of all 'healthy' years lost in USA and Canada. Cancer is second or third in terms of disease burden in most countries. However, the share of healthcare expenditure allocated to cancer is significantly lower than the share of the burden of the disease. Cancer accounts for about 5% of total health care costs in for example the US and Germany, and this share has been rather constant over a long time. Inpatient hospital care accounts for the majority of expenses. Cancer drugs account for between 10 and 20% of health care expenditures for cancer, and about 5% of total drugs expenditures.

Cancer treatment today is characterized by multimodal treatment using surgery, radiotherapy and a rapidly increasing number of available anti-tumour agents. Most anti-tumour agents are introduced in patients with late-stage (metastatic) disease. In many cases, efficacy in metastatic disease translates to increased cure rates when the agent is introduced in the adjuvant setting in conjunction with surgery.
Increased survival in almost all tumour forms has led to the development and introduction of an increasing number of compounds to improve the quality of life for patients – supportive drugs. The decreased toxicity of new agents, a trend towards oral agents and the use of supportive drugs have enabled patients to spend fewer days in hospital and led to an increased number of day-care treatments.

It is now also becoming possible to predict if a tumour is likely to respond to treatments in some instances. Gene/protein expression analyses of tumours are likely to improve accuracy in the treatment offered to individual patients in the near future.

We describe the market introduction and total sales of 67 oncology products in 25 countries, 19 countries in Europe as well as the US, Canada, Japan, Australia, New Zealand, and South Africa. The total sales of these drugs in the period 1995-2005 are divided into four periods: drugs launched before 1995, drugs launched from 1995-1999, drugs launched from 2000-2002, and drugs launched from 2003-2004.
Total sales of oncology drugs in the selected countries have increase substantially over the period 1995-2005 from €5 billion to over €23 billion. Drugs introduced in the year 2000 and later account for about 20% of total sales of oncology drugs in 2005. Almost all of the increased costs relates to drugs introduced after 1995. The US has the largest share of costs for drugs introduced 2003 or later; 17% compared to an average for all countries of 9%. The US has been the country of first launch for close to half of the oncology drugs brought to market in the last 11 years.

The development of new innovative drug therapies for cancer depends on a combined effort by public and private investment into cancer research. This includes (1) the discovery of new targets within cancer cells, and in cells interacting with tumours, against which new innovative cancer therapies can be developed, (2) the clinical 'proof of concept' of these new cancer drugs, essentially proving the theory that these drugs are effective and do provide benefit, and (3) the clinical development and clinical trials process to prove efficacy and effectiveness and provide comparisons with established treatments.
€1.43 billion was spent on cancer research in Europe in 2002/2003 by public funding organizations including charities and government (50:50). The US outspends Europe with regards to public funding of cancer research. It is estimated that the pharmaceutical industry spends between €5-6 billion on cancer research per year worldwide, mainly in Europe and in the US. Today approximately 10-12% of research expenditures by the pharmaceutical industry are spent on cancer research. This is two to three times more than the proportion of cancer drug sales (about 5% of total drug sales).
From 1995 to 2004, 14% of all new drugs approved by FDA were cancer drugs (44 oncology drugs out of a total of 307 NCEs). Improved collaboration and joint evaluation processes have reduced the lag in market access due to this. However, further work is necessary and ongoing, for example collaboration between FDA and EMEA, to optimize the regulatory process and minimize the time lag before new drugs can be available.

Following granting of marketing authorization, an additional process with national price negotiations and the granting of reimbursement is taking place. National price negotiations and reimbursement approval have been identified as a reason for delayed access.
Cost-effectiveness is one of several factors guiding reimbursement decisions in certain countries. However, only a few countries require a full economic evaluation to support the decision for reimbursement. A significant number of health economic evaluations related to cancer have been published, in particular in the mid and latter part of the period 1990-2005. This can be seen as a sign of the growing importance of economic evaluation and cost-effectiveness.

Europe plays a major role in the production of HTAs and economic evaluations. In particular, the UK is the leader in terms of the number of HTA reports produced, driven by the National Institute for Health and Clinical Excellence (NICE). It was the explicit objective at the establishment of NICE to avoid any significant delays to bringing innovations to market in the UK. There is yet no evidence that this objective is met.

In this report, we present three types of evidence about the effect of cancer drug vintage on cancer survival and mortality using actual utilization data. All three studies were based on group-level data, and employed difference-in-difference research designs, which enable us to control for the influence of potentially confounding variables far better than cross-sectional or time-series models. The studies cover different time periods and different countries than the studies referred in the previous report.

- The first analysis used data on cancer drug vintage, survival, and other variables, by primary cancer site and year, for US cancer patients during the period 1992-2002. We found that the cancer sites whose drug vintage (measured by the share of post-1990 treatments) increased the most during the 1990s tended to have larger increases in observed survival rates, ceteris paribus. The fraction of the 1992-1999 change in the observed survival rate that is attributable to the increased utilization of post-1990 drugs was estimated to 44%.
- The second analysis used data by primary cancer site and country, for five large European countries. Drug vintage (in this case measured by the share of post-1985 treatments) had a positive and statistically significant effect on both 1-year and 5-year survival rates. The difference in the fraction of post-1985 cancer drugs accounted for a 14-19% of the 5-year survival rate differential, adjusted for international differences in distribution of cancer sites. Since the data on survival and on drug utilization pertain to different time periods, this estimate is probably conservative.
- The third analysis was based on data by country and year, for all cancer sites combined, for 20 countries during the period 1995-2003. We found that countries with larger increases in the mean launch year of cancer drugs had larger declines in the age-adjusted cancer mortality rate. The increase in cancer drug vintage—in other words, the use of newer cancer drugs—accounts for about 30% of the GDP-growth-adjusted decline in the age-adjusted cancer mortality rate.

Although cancer drugs account for a minor part, 10-20%, of the total healthcare expenditures for cancer and represent 3.5-7% of the total drug costs, but they are an easily identified target for cost-containment policies. In efforts to manage healthcare budgets, decision makers may therefore seek to delay or restrict access to these new innovative drugs. While we recognize that health care resources are limited and priorities has to be made, such actions may have unintended as well as intended consequences for access to new treatments. How to adapt health care, and especially hospital budgets to accommodate the introduction of new cancer drug therapies is an issue that must be addressed if a rational and equitable access to new cancer drugs shall be achieved.

There is an imbalance in public investments in cancer research between Europe and the US. Not only is the magnitude of public research at a different level in the US, it is also to a greater extent directed to clinical research. There is a need for a significant increase in the public research for cancer in Europe, particularly devoted to clinical research. Such research effort are necessary to ripe the full benefit form introduction of new drugs. There is a need for further follow up and evaluation when the drugs are on the market, and there is a need for further studies of therapeutic alternatives, combining different drugs and treatment modalities.
Cancer drugs represent 3.5-7% of total pharmaceutical sales. The pharmaceutical industry spends approximately 10-12% of all its research expenditure on cancer research. Recent data also show that 27% of all research projects have cancer as one of their therapy area targets (up from 13% in 1985). Therefore, the amount of investment into cancer research by the pharmaceutical industry is two to three times the percentage of new cancer drugs coming to the market, and is two to four times greater than the proportion of cancer drugs in terms of total pharmaceutical sales. Discovery of a new drug therapy is, however, only the starting point on the road to making new cancer drugs available to patients. Following, for example, EU market authorisation and licence approval, there are additional hurdles. Although there is an EU timeline of 180 days, within which new drugs are supposed to be available on national markets following CHMP (Committee for Medicinal Products for Human Use) EU approval (which, as stated, takes a median 418 days), this timeline is not always enforced. Therefore, delays in access to cancer drugs may also be introduced at this stage. It is also worth noting that, despite the CHMP granting one marketing authorisation for the entire EU, countries may still apply restrictions as part of their own price negotiations and reimbursement criteria thus establishing yet another level of inequity within Europe.

There is a shortage of research investigating the long term impact of innovation in cancer. To facilitate such studies there is a need for further improvements of data on incidence, mortality and survival. But this is not enough. There is also a need to follow up on the long term consequences for patients' quality of life, as well as consequences for the cost of care. Such long term studies do not replace, but is a complement to, specific studies on the cost-effectiveness of defined therapeutic alternatives. These studies are of importance for documenting the consequences of innovation, and as a background for designing the proper incentives for continued progress.

<u>Conclusions</u>

- Further reduce the review time for the marketing authorization of new innovative cancer drugs through the competent authorities.
- Ensuring that once authorization is obtained the drug is available at the national level without further delays due to price and reimbursement negotiations.
- Ensuring that any economic evaluation or health technology assessment regarding a new cancer drug, such as reviews by the National Institute for Health and Clinical Excellence (NICE) in the UK, are done quickly to facilitate, and not delay, patient access.
- Ensuring that appropriate and adequate funding for new innovative cancer drugs is available in the healthcare system and hospital budgets preferably on a proactive and not reactive basis.
- Common views on patient benefit are needed, including rapid health technology assessments and evaluations when drugs have been in clinical use for some time.

- There is a need for costs and budget impact to be addressed up front. Healthcare systems and the pharmaceutical industry must jointly plan for new drug introductions with a perspective of 1-2 years (as increases in costs greater than 5% are often difficult to address with ad hoc budgetary solutions).
- We need to recognize that although industry has the capacity to develop new innovative drugs, it comes to the health care system to integrate these drugs into therapy programs. We need to gain knowledge about efficacy and toxicity among for example elderly patient, often not included in the pivotal trials.
- With respect to pricing, there are two questions that need to be addressed. First, we have moved from a national to a global pricing structure and this will impact accessibility in countries with low purchasing power. Secondly, new drugs are often launched in a small indication with high medical need (at a high price), but later its efficacy is shown in major broad indications, with much larger volumes of sales.
- There is a need for society to take a long-term perspective on the entire life cycle of a new drug. This includes the periods of the premium as well as of the generic phase. For example, many new drugs have been introduced in the treatment of breast cancer and thus the cost of treatment is rapidly increasing. If we take a historical perspective, when tamoxifen was introduced it was seen as an extremely expensive option, while today it is regarded as overall the most cost-effective cancer treatment.

INTERNATIONAL AGENCY FOR ATOMIC ENERGY, VIENNA, AUTRIA
Dr Eduardo Rosenblatt

Since 1959, the IAEA has maintained a register of radiotherapy hospitals and clinical institutions having radionuclide and high-energy teletherapy machines. The Directory of Radiotherapy Centres (DIRAC) was first published in book form in 1968. The present web-based version of the Directory is a continuous update, based on replies to questionnaires circulated by the IAEA among its Member States. It includes data not only on teletherapy machines, but also on sources and devices used in brachytherapy, and on equipment for dosimetry, patient dose calculation and quality assurance. Staff strength at the installations (radiation oncologists, medical physicists, technicians, etc.) is included as well.

Since 1995, the Applied Radiation Biology and Radiotherapy (ARBR) Section and the Dosimetry and Medical Radiation Physics (DMRP) of the Division of Human Health (NAHU) of the IAEA, undertook a project to build a computerized international registry of radiation sources. This registry was named DIRAC (**DI**rectory of **RA**diotherapy **C**entres). The project was joined by WHO in subsequent years. Initially in a joint effort with the M.D. Anderson Cancer Centre (MDACC, Texas), a questionnaire was developed which was distributed to hospitals and scientific institutions worldwide. The questionnaire encompassed data to be compiled not only on teletherapy but also data on brachytherapy, personnel and ancillary equipment. The MDACC assumed the initial responsibility for collecting data for North and South America, and the Agency addressed the remaining regions.

Many Agency staff members have contributed to the dissemination of the questionnaires during travel missions. Those responsible for the project (Pedro Andreo and Victor C. Levin) are grateful to all who contributed to the data collection.

In 2000 the database included more than 5000 centres but it was still far from being a complete description of the present status or radiotherapy worldwide. This is due to practical problems of retrieving completed questionnaires and the continuous establishment of new radiotherapy centres. It is also necessary to record the updating and disposal of existing equipment included in the current version of the directory. Comprehensive quality control and subsequent update of the data are ongoing tasks.

Recently the DIRAC has undergone substantial revisions. It is being updated in order to make reliable data available to users worldwide via this link: http://www-naweb.iaea.org/dirac/nahu/dirac/default.shtm. It is now possible for Member States and individual institutions to update their relevant data online using the link stated above.

The current online version of the DIRAC is being continuously updated, based on individual online updates of counterparts and replies to the questionnaires circulated. It includes data on teletherapy machines, devices and sources used in brachytherapy and equipment for dosimetry, patient dose-calculation and quality assurance. The number of staff at the installations

(radiation oncologists, medical physicists, radiation therapy technologists etc.) is included as well. No effort is expended on tracking brachytherapy resources for single applications and permanent implant sources.

The Directory is run by SQL server 2000 and is being maintained via a web interface. A special Microsoft Access 2003 tool helps administer user-access and the validation of external online updates. For counterparts and institutions that are not able to update their hospital data online there is still the possibility to download the DIRAC questionnaire that can be found at the 'Directory' section of the webpage.

We are aware that the database is not complete and in some cases may contain outdated information. Therefore users are urged to validate and update information regarding equipment and staff in their centres online.

EUROPE

A retrieval of the DIRAC data for Europe in October 2006 reveals that there are 25 countries Member States of the European Union and 5 candidates. In the 25 Member States there is a total of 887 radiotherapy centres, operating 1537 linear accelerators and 415 cobalt-60 machines. Regarding brachytherapy, there are 814 brachytherapy systems. Ten of these systems are cobalt-60 based brachytherapy devices.

The following tables list (see attached Excel file) the main equipment resources for the 25 Member States and for non-EU countries for the year 2000. The rate of teletherapy machines per million of population is also presented for each country. The source of these data is the QARTS project (Quantification of Radiotherapy Infrastructure and Staffing Needs) conducted by ESTRO with support from the European Commission Directorate General Research-Quality of Life and Management of Living Resources under contract: QLG4-CT-2002-30583.

Staff resources can also be retrieved from the DIRAC database.

				Number of Equipment Items (≙ 2000)				
EU Area	**Country**	***Population***	**RT Centres**	**Linacs**	**Cobalts**	**KV Machines**	**Other Teletherapy**	**Brachytherapy**
Initial EU	**Austria**	*8,188,207*	12	34	9	0	2	15
Initial EU	**Belgium**	*10,289,088*	28	58	19	25	0	32
Initial EU	**Denmark**	*5,384,384*	7	24	2	0	0	5
Initial EU	**Finland**	*5,219,732*	9	26	0	5	0	8
Initial EU	**France**	*58,518,748*	179	275	83	92	0	207
Initial EU	**Germany**	*82,398,326*	210	363	44	183	0	185
Initial EU	**Greece**	*10,665,989*	21	16	16	3	0	10
Initial EU	**Ireland**	*3,924,140*	4	10	2	2	0	3
Initial EU	**Italy**	*57,723,000*	128	198	51	0	0	66
Initial EU	**Luxembourg**	*454,157*	1	2	0	0	0	0
Initial EU	**Netherlands**	*16,150,511*	21	75	1	7	0	41
Initial EU	**Portugal**	*10,102,022*	12	17	15	0	0	11
Initial EU	**Spain**	*40,217,413*	74	68	60	8	0	44
Initial EU	**Sweden**	*8,878,085*	17	59	13	1	1	23
Initial EU	**United Kingdom**	*56,830,155*	57	199	8	0	0	56
Initial EU TOTAL		***374,943,957***	**780**	**1,424**	**323**	**326**	**3**	**706**
New EU	**Cyprus**	*771,657*	2	2	2	2	0	1
New EU	**Czech Republic**	*10,249,216*	39	26	25	24	15	18
New EU	**Estonia**	*1,408,556*	2	2	3	0	0	3
New EU	**Hungary**	*10,045,407*	13	19	11	11	0	13
New EU	**Latvia**	*2,348,784*	4	5	5	1	0	3
New EU	**Lithuania**	*3,592,561*	5	2	9	8	0	7
New EU	**Malta**	*400,420*	1	1	1	1	0	1
New EU	**Poland**	*38,622,660*	25	42	21	6	0	45
New EU	**Slovakia**	*5,430,033*	15	11	13	12	0	15
New EU	**Slovenia**	*1,935,677*	1	3	2	0	0	2
New EU TOTAL		***74,804,971***	**107**	**113**	**92**	**65**	**15**	**108**
Non EU	**Albania**	*3,582,205*	2	0	3	0	0	0
Non EU	**Armenia**	*3,326,448*	2	0	4	0	0	2
Non EU	**Belarus**	*10,322,151*	13	4	30	0	0	4
Non EU	**Bosnia**	*3,989,018*	1	1	2	0	0	1
Non EU	**Bulgaria**	*7,537,929*	13	1	9	2	0	7
Non EU	**Croatia**	*4,422,248*	7	12	7	1	0	14
Non EU	**Georgia**	*4,934,413*	1	0	3	0	0	1
Non EU	**Iceland**	*280,798*	1	2	0	0	0	0
Non EU	**Israel**	*6,116,533*	8	14	7	0	0	6
Non EU	**Macedonia**	*2,063,122*	1	2	1	0	0	2
Non EU	**Moldova**	*4,439,502*	1	0	3	0	0	2
Non EU	**Monaco**	*32,130*	1	1	0	0	0	0
Non EU	**Norway**	*4,546,123*	8	30	0	5	0	5
Non EU	**Romania**	*22,271,839*	17	2	19	0	0	5
Non EU	**Serbia & Montenegro**	*10,655,774*	6	8	2	0	0	6
Non EU	**Switzerland**	*7,318,638*	23	30	14	1	0	12
Non EU	**Turkey**	*68,109,469*	44	13	14	0	0	17
Non EU	**Ukraine**	*48,055,439*	27	3	41	0	0	3
Non EU TOTAL		***212,003,779***	**176**	**123**	**159**	**9**	**0**	**87**
	Grand Total	**661,752,707**	**1,063**	**1,660**	**574**	**400**	**18**	**901**

				Equipment: Items Per Million of Population (≙ 2000)				
EU Area	**Country**	***Population/ Million***	**RT Centres/ Million**	**Linacs**	**Cobalts**	**KV Machines**	**Other Teletherapy**	**Brachytherapy**
Initial EU	**Austria**	*8.188207*	1.47	4.15	1.10	0.00	0.24	1.83
Initial EU	**Belgium**	*10.289088*	2.72	5.64	1.85	2.43	0.00	3.11
Initial EU	**Denmark**	*5.384384*	1.30	4.46	0.37	0.00	0.00	0.93
Initial EU	**Finland**	*5.219732*	1.72	4.98	0.00	0.96	0.00	1.53
Initial EU	**France**	*58.518748*	3.06	4.70	1.42	1.57	0.00	3.54
Initial EU	**Germany**	*82.398326*	2.55	4.41	0.53	2.22	0.00	2.25
Initial EU	**Greece**	*10.665989*	1.97	1.50	1.50	0.28	0.00	0.94
Initial EU	**Ireland**	*3.924140*	1.02	2.55	0.51	0.51	0.00	0.76
Initial EU	**Italy**	*57.723000*	2.22	3.43	0.88	0.00	0.00	1.14
Initial EU	**Luxembourg**	*0.454157*	2.20	4.40	0.00	0.00	0.00	0.00
Initial EU	**Netherlands**	*16.150511*	1.30	4.64	0.06	0.43	0.00	2.54
Initial EU	**Portugal**	*10.102022*	1.19	1.68	1.48	0.00	0.00	1.09
Initial EU	**Spain**	*40.217413*	1.84	1.69	1.49	0.20	0.00	1.09
Initial EU	**Sweden**	*8.878085*	1.91	6.65	1.46	0.11	0.11	2.59
Initial EU	**United Kingdom**	*56.830155*	1.00	3.50	0.14	0.00	0.00	0.99
Initial EU TOTAL		***374.943957***	**2.08**	**3.80**	**0.86**	**0.87**	**0.01**	**1.88**
New EU	**Cyprus**	*0.771657*	2.59	2.59	2.59	2.59	0.00	1.30
New EU	**Czech Republic**	*10.249216*	3.81	2.54	2.44	2.34	1.46	1.76
New EU	**Estonia**	*1.408556*	1.42	1.42	2.13	0.00	0.00	2.13
New EU	**Hungary**	*10.045407*	1.29	1.89	1.10	1.10	0.00	1.29
New EU	**Latvia**	*2.348784*	1.70	2.13	2.13	0.43	0.00	1.28
New EU	**Lithuania**	*3.592561*	1.39	0.56	2.51	2.23	0.00	1.95
New EU	**Malta**	*0.400420*	2.50	2.50	2.50	2.50	0.00	2.50
New EU	**Poland**	*38.622660*	0.65	1.09	0.54	0.16	0.00	1.17
New EU	**Slovakia**	*5.430033*	2.76	2.03	2.39	2.21	0.00	2.76
New EU	**Slovenia**	*1.935677*	0.52	1.55	1.03	0.00	0.00	1.03
New EU TOTAL		***74.804971***	**1.43**	**1.51**	**1.23**	**0.87**	**0.20**	**1.44**
Non EU	**Albania**	*3.582205*	0.56	0.00	0.84	0.00	0.00	0.00
Non EU	**Armenia**	*3.326448*	0.60	0.00	1.20	0.00	0.00	0.60
Non EU	**Belarus**	*10.322151*	1.26	0.39	2.91	0.00	0.00	0.39
Non EU	**Bosnia**	*3.989018*	0.25	0.25	0.50	0.00	0.00	0.25
Non EU	**Bulgaria**	*7.537929*	1.72	0.13	1.19	0.27	0.00	0.93
Non EU	**Croatia**	*4.422248*	1.58	2.71	1.58	0.23	0.00	3.17
Non EU	**Georgia**	*4.934413*	0.20	0.00	0.61	0.00	0.00	0.20
Non EU	**Iceland**	*0.280798*	3.56	7.12	0.00	0.00	0.00	0.00
Non EU	**Israel**	*6.116533*	1.31	2.29	1.14	0.00	0.00	0.98
Non EU	**Macedonia**	*2.063122*	0.48	0.97	0.48	0.00	0.00	0.97
Non EU	**Moldova**	*4.439502*	0.23	0.00	0.68	0.00	0.00	0.45
Non EU	**Monaco**	*0.032130*	31.12	31.12	0.00	0.00	0.00	0.00
Non EU	**Norway**	*4.546123*	1.76	6.60	0.00	1.10	0.00	1.10
Non EU	**Romania**	*22.271839*	0.76	0.09	0.85	0.00	0.00	0.22
Non EU	**Serbia & Montenegro**	*10.655774*	0.56	0.75	0.19	0.00	0.00	0.56
Non EU	**Switzerland**	*7.318638*	3.14	4.10	1.91	0.14	0.00	1.64
Non EU	**Turkey**	*68.109469*	0.65	0.19	0.21	0.00	0.00	0.25
Non EU	**Ukraine**	*48.055439*	0.56	0.06	0.85	0.00	0.00	0.06
Non EU TOTAL		***212.003779***	**0.83**	**0.58**	**0.75**	**0.04**	**0.00**	**0.41**
	Grand Total	***661.752707***	**1.61**	**2.51**	**0.87**	**0.60**	**0.03**	**1.36**

Current Linacs per Million of Population (♎ 2000)		
EU Area	**Country**	**Linacs/Million**
Initial EU	**Sweden**	6.65
Initial EU	**Belgium**	5.64
Initial EU	**Finland**	4.98
Initial EU	**France**	4.70
Initial EU	**Netherlands**	4.64
Initial EU	**Denmark**	4.46
Initial EU	**Germany**	4.41
Initial EU	**Luxembourg**	4.40
Initial EU	**Austria**	4.15
Initial EU	**United Kingdom**	3.50
Initial EU	**Italy**	3.43
Initial EU	**Ireland**	2.55
Initial EU	**Spain**	1.69
Initial EU	**Portugal**	1.68
Initial EU	**Greece**	1.50
Initial EU TOTAL		**3.80**
New EU	**Cyprus**	2.59
New EU	**Czech Republic**	2.54
New EU	**Malta**	2.50
New EU	**Latvia**	2.13
New EU	**Slovakia**	2.03
New EU	**Hungary**	1.89
New EU	**Slovenia**	1.55
New EU	**Estonia**	1.42
New EU	**Poland**	1.09
New EU	**Lithuania**	0.56
New EU TOTAL		**1.51**
Non EU	**Monaco**	31.12
Non EU	**Iceland**	7.12
Non EU	**Norway**	6.60
Non EU	**Switzerland**	4.10
Non EU	**Croatia**	2.71
Non EU	**Israel**	2.29
Non EU	**Macedonia**	0.97
Non EU	**Serbia & Montenegro**	0.75
Non EU	**Belarus**	0.39
Non EU	**Bosnia**	0.25
Non EU	**Turkey**	0.19
Non EU	**Bulgaria**	0.13
Non EU	**Romania**	0.09
Non EU	**Ukraine**	0.06
Non EU	**Georgia**	0.00
Non EU	**Moldova**	0.00
Non EU	**Albania**	0.00
Non EU	**Armenia**	0.00
Non EU TOTAL		**0.58**
	Grand Total	**2.51**

>= 4 Linacs per Million

< 4 Linacs per Million

Linacs per Million of Population (& Target Requirements to meet >= 4 Linacs per Million)							
			Current (≙ 2000)		Extra Required	Future	
EU Area	Country	*Population/ Million*	Number Linacs	Linacs/Million	Number (>= 4 Linacs/Million)	Number Linacs	Linacs/Million (>=4)
Initial EU	**Austria**	*8.188207*	34	4.15	**0**	34	4.15
Initial EU	**Belgium**	*10.289088*	58	5.64	**0**	58	5.64
Initial EU	**Denmark**	*5.384384*	24	4.46	**0**	24	4.46
Initial EU	**Finland**	*5.219732*	26	4.98	**0**	26	4.98
Initial EU	**France**	*58.518748*	275	4.70	**0**	275	4.70
Initial EU	**Germany**	*82.398326*	363	4.41	**0**	363	4.41
Initial EU	**Greece**	*10.665989*	16	1.50	**27**	43	4.03
Initial EU	**Ireland**	*3.924140*	10	2.55	**6**	16	4.08
Initial EU	**Italy**	*57.723000*	198	3.43	**33**	231	4.00
Initial EU	**Luxembourg**	*0.454157*	2	4.40	**0**	2	4.40
Initial EU	**Netherlands**	*16.150511*	75	4.64	**0**	75	4.64
Initial EU	**Portugal**	*10.102022*	17	1.68	**24**	41	4.06
Initial EU	**Spain**	*40.217413*	68	1.69	**93**	161	4.00
Initial EU	**Sweden**	*8.878085*	59	6.65	**0**	59	6.65
Initial EU	**United Kingdom**	*56.830155*	199	3.50	**29**	228	4.01
Initial EU TOTAL		***374.943957***	**1424**	**3.80**	**212**	1,636	4.36
New EU	**Cyprus**	*0.771657*	2	2.59	**2**	4	5.18
New EU	**Czech Republic**	*10.249216*	26	2.54	**15**	41	4.00
New EU	**Estonia**	*1.408556*	2	1.42	**4**	6	4.26
New EU	**Hungary**	*10.045407*	19	1.89	**22**	41	4.08
New EU	**Latvia**	*2.348784*	5	2.13	**5**	10	4.26
New EU	**Lithuania**	*3.592561*	2	0.56	**13**	15	4.18
New EU	**Malta**	*0.400420*	1	2.50	**1**	2	4.99
New EU	**Poland**	*38.622660*	42	1.09	**113**	155	4.01
New EU	**Slovakia**	*5.430033*	11	2.03	**11**	22	4.05
New EU	**Slovenia**	*1.935677*	3	1.55	**5**	8	4.13
New EU TOTAL		***74.804971***	**113**	**1.51**	**191**	304	4.06
Non EU	**Albania**	*3.582205*	0	0.00	**15**	15	4.19
Non EU	**Armenia**	*3.326448*	0	0.00	**14**	14	4.21
Non EU	**Belarus**	*10.322151*	4	0.39	**38**	42	4.07
Non EU	**Bosnia**	*3.989018*	1	0.25	**15**	16	4.01
Non EU	**Bulgaria**	*7.537929*	1	0.13	**30**	31	4.11
Non EU	**Croatia**	*4.422248*	12	2.71	**6**	18	4.07
Non EU	**Georgia**	*4.934413*	0	0.00	**20**	20	4.05
Non EU	**Iceland**	*0.280798*	2	7.12	**0**	2	7.12
Non EU	**Israel**	*6.116533*	14	2.29	**11**	25	4.09
Non EU	**Macedonia**	*2.063122*	2	0.97	**7**	9	4.36
Non EU	**Moldova**	*4.439502*	0	0.00	**18**	18	4.05
Non EU	**Monaco**	*0.032130*	1	31.12	**0**	1	31.12
Non EU	**Norway**	*4.546123*	30	6.60	**0**	30	6.60
Non EU	**Romania**	*22.271839*	2	0.09	**87**	89	4.00
Non EU	**Serbia & Montenegro**	*10.655774*	8	0.75	**35**	43	4.04
Non EU	**Switzerland**	*7.318638*	30	4.10	**0**	30	4.10
Non EU	**Turkey**	*68.109469*	13	0.19	**260**	273	4.01
Non EU	**Ukraine**	*48.055439*	3	0.06	**189**	192	4.00
Non EU TOTAL		***212.003779***	**123**	**0.58**	**745**	868	4.09
	Grand Total	***661.752707***	**1660**	**2.51**	**1148**	2,808	4.24

The European Society of Therapeutic Radiology and Oncology (ESTRO) keep two additional data-bases: one of radiotherapy centres in Europe and another of centres practicing brachytherapy. The second one is a work in progress as part of the “Patterns of Care for Brachytherapy in Europe” (PCBE) project. These databases will be discussed during the meeting.

ANNEXES

(1) Minutes of the 1st EUNICE Steering Committee held at IARC, 6-7 March 2006

(2) Minutes of the 2nd EUNICE Steering Committee held at IARC, 20-22 Nov. 2006

(3) Report on the Workshop on Monitoring Cervical Cancer Screening Programmes in Europe, Tallinn, 9-10 February 2006

(4) Minutes on the DIRAC Database Use for the EUNICE Project (IAEA/IARC)

(5) Article by Arbyn et al. (Annals of Oncology – 16 March 2007)

Consolidated Financial Statement
for the period 1 September 2005-28 February 2007