ECRM
European Cancer Research Managers Forum

Linking Europes Cancer Researchers

Investment and Outputs of Cancer Research: from the Public Sector to Industry

The Second Cancer Research Funding Survey

Authors:
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September 2007


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Portugal
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United Kingdom
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About the Authors

Seth Eckhouse began his career in archaeology working in the USA and the Middle East before pursuing a different career path. Shifting into the field of pre-hospital medicine he spent seven years as a paramedic in the civilian world, as well as four years serving with the United States Marine Corps. He is a graduate of Boston University's School of Public health (USA), where he received his Master of Public Health degree. He has been the Chief Project Officer of the ECRM for the past three years, where he was responsible for setting up and running the Secretariat and the cancer research funding surveys, and currently serves as the Director.

Grant Lewison was trained as an engineer and worked on ship research for nearly 20 years before switching to science policy at the UK Department of Trade and Industry. Following a secondment to the European Commission, where he began his studies in bibliometrics, he worked for a small consultancy company on research evaluation, and in 1993 moved to The Wellcome Trust in London. He designed and operated the Research Outputs Database of nearly half a million UK biomedical papers, all of which were looked up in libraries to determine their financial acknowledgements, on behalf of the Trust and a "club" of about 30 other funders of medical research.

In 2001 he moved to City University as Visiting Professor in the Information Science Department, where he led a bibliometrics research group, carrying out research and doing consultancy work for a wide range of clients. He left City at the end of 2005 and set up a consultancy company with Dr Philip Roe, Evaluametrics Ltd, to conduct the "evaluation of research through publication metrics".

Richard Sullivan qualified in medicine at St. Marys Hospital, Paddington and trained in urology. He undertook a PhD and post-doctoral research at University College London before moving to industry where he worked in Medical Affairs, and the R&D divisions of radiology, interventional devices and oncology. Richard joined Cancer Research UK in 2000. He has served on the charity's Executive Board and as Director of Clinical Programmes and Centres he is responsible for the management of the clinical research portfolio, as well as clinical policy development in a broad range of areas from paediatric regulations to Europe. He serves on a number of external national advisory boards - Academy of Medical Science (clinical careers committee) and UKCRC (Regulatory and Governance group) as well as journal editorial boards. Richard is also chairman of the European Cancer Research Managers Forum, and UK Director of the Council for Emerging National Security Affairs (CENSA), a Washington-based think-tank. He continues with his research interests in a variety of areas including biomedical research policy and the anti-cancer properties of medicinal mushrooms. Richard has published widely on international security (counter-proliferation), ancient Egyptian medicine and the policy aspects of biomedical research.

Introduction from Chairman

It is my great pleasure to present the second cancer research funding survey by the European Cancer Research Managers Forum (ECRM). Since the first survey in 2005 we have been working with Forum members to enhance the quality of the funding data and widen the scope of the project. The aims of the ECRM remain as they always have been; to provide independent intelligence to enable evidence-based policy making in cancer research with the aim, ultimately, of bringing the control and cure of *all* cancers a step closer for patients. The job at hand of making this a reality should not be underestimated. As Robert Weinberg succinctly put in *One Renegade Cell*, "cancer wreaks havoc in almost every part of the human body". Cancer is a hugely complex disease that requires a globally co-operative approach.

When the *Structure of Scientific Revolutions* was published in 1962 Thomas Kuhn's masterpiece was hailed by proponents as providing (among other things) an explanation for the persistent tendency of scientists to talk past each other as they operated from different paradigms. Likewise the globalisation of cancer research has spawned multiple policy paradigms across the public and commercial sectors despite the need for a common framework. Promoting a global cancer research oligopoly (competition and co-operation) requires evidence-based policy making and a holistic vision of cancer research. The Forum hopes that the information and commentary that this second report contains will further these aims. The data presented in this survey identify much to celebrate, some issues to decry but overwhelmingly it calls for a much stronger co-operative global framework for funding cancer research.

I am as ever hugely indebted to the many Forum members who have contributed data over the last two years, and to my two co-authors Seth Eckhouse and Grant Lewison who have worked tirelessly on this project. I am also grateful to many colleagues who have taken time to review and comment on the various iterations of this report, particularly Professors John Toy (UK), Kenneth Nilsson (Sweden) and Volker Diehl (Germany) as well as Mr Nathan Gray (USA). The strengths of this report reflect the diligence of my co-authors and Forum members, any deficiencies or errors are entirely my responsibility.

Prof Richard Sullivan MD PhD
Chairman, ECRM
(Director, Clinical Programmes & Centres, Cancer Research UK)

Executive Summary

- Non-commercial (public) funding organisations in EUROPE spent €1,971 million on the direct funding of cancer research in 2004, compared to €5,158 million by the USA. In EUROPE* this represents a 38% increase since the last survey whereas funding in the USA has remained relatively static. In addition, EUROPE has €1,364 million flowing through national healthcare systems and universities to support cancer research compared to €109 million in the USA.

- The public spend in EUROPE is evenly balanced between charitable and governmental organisations with 47% and 53% of spend, respectively. The majority of spend (80%) from charitable organisations is concentrated in 14 organisations compared to 29 governmental funders. However, many countries (n=9) still do not have a balance of governmental and charitable funding with one source or the other dominating. In comparison, governmental organisations were the dominant source of cancer research funding in the USA with 96% of all funds from **just** 10 federal funders.

- Direct cancer research investment by funding organisations as a % of GDP and per capita remained higher in the USA compared to EUROPE, three and five times respectively. However, adding in the indirect funding this gap narrows (0.03% GDP EUROPE compared to 0.06% USA and €5.79 per capita EUROPE compared to €17.98 by USA). In comparison Canada, Japan and Australia spent an estimated as €8.66, €7.86 and €8.05 per capita on cancer research.

- Global public sector cancer research funding (including indirect sources) has been estimated at €14,030 million for 2004. EUROPE spent €1,155 per incident case and €1,949 per cancer death compared to €3,857 per incident case and €9,361 per cancer death in the USA.

- We have estimated the 2004 direct spend by the top 18 pharmaceutical companies on cancer research as €3,095 million. This figure does not include all industry (for instance biotechnology and SME).

- EUROPE and the USA are evenly matched for cancer research outputs (volume of cancer research publications) with 52% and 48% of the total output and 1.3 versus 1.4 papers per billion euro GDP. Four Member States produced over 6% of all cancer publications in this survey year.

- In both the USA and EUROPE publications in cancer research have become more clinical in the last 8 years. Over this same time period there has been a shift in 23 of the 31 countries in EUROPE towards more clinical research with some notable exceptions who producing more basic research outputs.

- As measured by volume of cancer research publications (outputs) the geographical origin of work funded by the pharmaceutical industry over the last 4 years has been dominated by EUROPE (46% of the share) and the USA (40%) compared to the rest of the world (13.6%).

- With over 100 major funders in EUROPE and the USA (> €1M per annum spend), as well as a number of important representational bodies, substantial scope exists for a more co-operative approach to cancer research, particularly towards the funding of trans-national research activities and programmes.

- Over management and regulatory bureaucracy are serious threats to cancer research. Funding organisations and government policy makers must guard against these dangers and, where necessary, simplify and harmonize procedures.

- Contrary to popular beliefs, both the USA and EUROPE are significant contributors to cancer research in terms of investment, outputs and pharmaceutical activities. Therefore, the possibilities for partnerships not only exist, but are actively called for.

- Many Member States still need to increase their governmental investment in cancer research to more closely resemble the portfolios of other countries (as a percent of overall R & D spend, even bearing in mind the relative sizes of their R & D budgets).

* Europe is defined for this report as the 31 countries listed in the appendix on page 46

Introduction

Human lives are increasingly burdened by cancer. One in three will develop the disease within their lifetime, and one in four will die from it. The total number will increase with the ageing population. The World Health Organisation reported in 2002 that "*The cancer burden is expected to increase by 50% in the next twenty years*". The burden of cancer has wide reaching ramifications which extend beyond the personal and family to its impact on the healthcare systems and economies of countries.

In 2001, within the European Unions Sixth Framework Programme a start was made to address the organisation and co-ordination of cancer research in the EU by creating the European Cancer Research Managers Forum (ECRM). This Forum, part of the European Research Area initiative, created a platform for dialogue and for policy research by bringing together cancer research managers from across the EU, with the aim of improving transparency around cancer research funding.

The ECRM's immediate goals were two-fold. One was to promote networking and co-operation between national funding bodies through policy research. The second was to provide high quality data for cancer research policy makers.

The Forum conducts the business of data collection and dissemination through the ECRM Secretariat. The Secretariat is now in its fourth year having already completed and published the first cancer research funding survey in 2005. The Secretariat is committed to informing the public and research community through its web-site, press releases, and Forum policy publications. All of the data collected are placed freely into the public domain.

The long-term objectives of the ECRM are also twofold: to promote better understanding and co-operation between the global funders of cancer research, and to ensure that cancer research is driven forward through the application of evidence-based policy.

"By the year 2020, 10 million people will die each year from cancer"

- American Cancer Society

Identifying The Funders of Cancer Research in Europe

Building upon the contacts and knowledge base of the first cancer research funding survey (2003), this second year survey seeks to continue the work of mapping the funding mechanisms of cancer research, with the axium that there can be no research without funding. The ECRM Secretariat has spent the time since the publication of the first report verifying and adding to the established database, and all of these organisations were directly contacted and asked to share their 2004 direct spend[a] on cancer research.

On 15th September, 2005, the first round of contact letters was sent with a follow up letter to those organisations which had not responded on the 24th of November. The websites of organisations were vigorously interrogated for financial information which was, in the absence of any reply, entered into the funding database. All information received was cross-checked and validate against other sources. Organisations which had still not responded were again sent a letter on the 7th of February, 2006 with a final request for funding information.

If a funding organisation reported a spend between two amounts, the higher amount was always used. Annual direct cancer research spend does not include educational grants, non research staff salaries, physical infrastructures, spend on advocacy or service delivery. Any organization reporting spend in currencies other than Euro had the reported amount of spend converted using the web site www.xe.com, all currencies were converted within two days of receipt of the information.

On the 8th of February, 2006, a final verification letter was sent to all organisations still in the database. This letter explained that the data collection phase of the survey was coming to an end and provided the direct spend figures in our database, along with their address and other contact information. They were informed that they had two weeks from the posting of the letter to respond to the Secretariat with any changes in the data for their organization, or this information would be considered complete and accurate, and would be made publicly available. The information on the other organisations within that country was provided as a final verification step At the end of this two week period the funding database for the second ECRM survey was locked.

At the end of the data collection phase of the survey, 144 out of 153 identified European funding organisations had reported back to the Secretariat, giving a 96% response rate. Five organisations reported that they were unable to provide funding information due to accounting practices within their organisation.

Funding from Trans-European Organisations

In the first survey, organisations which supported cancer research in Europe, but were not limited by Member State/national boundaries were identified. Originally, twenty organisations were included in this category due to broad criteria of inclusion. However, only one organisation, EORTC, supports direct cancer research; the reminder were primarily umbrella organisations. For this survey, the direct spend figures for EORTC were updated in exactly the same manner as the other organisations funding cancer research in Europe.

It should be noted that one other organisation in Europe directly supports cancer research — The International Agency for Research on Cancer (IARC)[b]. However, due to their nature as a world–wide organisation, it was impossible to separate the European spend only.

Identifying the Funders of Cancer Research in the USA

The methodological approach to identifying the funders of cancer research in the USA was based on the model of a previous report from 1999[i]. Using these identified organisations, with the addition of several new ones collected by the Secretariat, spend data was collected in a

[a] Annual direct cancer research spend is defined as: salaries of researchers, laboratory equipment they use, and any consumables and/or other costs of the research. However, it does not include salaries of non-researchers, physical plant costs, or any other expenditure that does not produce research.

[b] Whilst IARC is primarily an epidemiology and bio-statistics unit, the WHO (its governing body) describes them as also engaging in basic sciences related to cancer.

variety of ways. Non-governmental organisations were contacted directly for their 2004 direct spend, and annual reports were also queried for this information. Where available, financial data on research expenditure from web sites were integrated into the total spend for that organisation; consideration was taken in deciding what expenditures met with the 'direct spend' criteria. Spend by individual States in the USA was taken directly from the previous survey of USA cancer research spend, and adjusted for inflation[ii].

Many government organisations, such as the Department of Defence and the National Cancer Institute, report their total cancer research expenditure in annual reports. For government agencies which did not report a direct spend in published documents, the RAND Corporation's RaDiUS[c] (Research and Development in the United States) database was used. This database identifies (by agency) all the intramural and extramural projects or tasks in which the search criteria appear in the title or abstract.

At the end of data collection, amounts were converted from USD to Euro using the average exchange rate for 2004[iii].

Bibliometric Approach to Cancer Research Expenditure

This method of quantifying the cancer research spend of various organisations is based on a previously developed methodology[iv]. The work was carried out in two phases. In the first of these, files of the bibliographic data on cancer research papers, 1994-2003, were compiled from the Science Citation Index (SCI) (© Thomson Scientific) on CD-ROM. These were then analyzed to show the outputs of the world and 35 countries, and compared with their health research outputs overall so as to reveal their relative commitment to cancer research. The research levels of the papers were determined, on a scale from clinical to basic, to show whether this was changing with time, and how European countries compared in this respect with the USA.

In the second phase, the leading cancer researchers world-wide were identified, together with their addresses and e-mail addresses. They were sent a short questionnaire asking about their cancer research budgets. From their responses, the mean cost per paper for each of them was determined, and thereby the total amount spent on public-domain cancer research world-wide and in selected countries by multiplication of their annual outputs by this mean cost, corrected to allow for varying health research costs in different countries. The contributions of the leading funding organizations were also determined from an examination of the funding acknowledgements on a large sample of 2003 cancer papers from different countries. This analysis also allows for the funding (usually from governmental sources) of university and hospital papers without funding acknowledgements[e]. Account was also taken of the much higher expenditures of the pharmaceutical industry by fractionating their published R&D spends in recent years by the percentage of their published papers within the sub-field of cancer research.

To calculate the bibliometric estimate of worldwide spend for 2004, the data was corrected by +6% increased research spend per year, and an allowance of +10% for missing papers (processed late by the SCI). These corrections were arrived at by looking at the latest (corrected) global estimates of health R&D spending published by the Global Forum for Health Research, as compared to the overall outputs of papers; achieving a 20% cost per paper rise over three years (assuming equal research success rates between research areas). These numbers are bourn out when viewed as cancer research's represented part in global expenditure on health R&D using the

"Every day 3185 Europeans die from cancer"

-European Cancer Patient Coalition

[c] found at https://radius.rand.org

[d] It is probably safe to assume that the apparently unfunded papers in the European countries are in fact funded by the state in some form: this "hidden" source of funding clearly is important, and accounts for more than 40% of the total for several countries.

percentage increase above, or about 10.6% of total.

Lastly, as the bibliometric approach to worldwide cancer spend is subject to a margin of error of ±5%, the spend has been rounded to the nearest million Euro.

Calculating cancer-related R&D expenditures of the pharmaceutical industry

Countries involved in the European aspect of the funding survey

Since it has been estimated by the Global Forum for Health Research[v] that world-wide expenditure on health research was $106 billion in 2001 and of this total $51 billion was estimated to have come from industry, it is clear that a major fraction of all cancer-related research will also have come from companies, particularly the large pharmaceutical companies (big pharma). [Some health research money comes from non-pharma companies, e.g., those involved with medical devices and instrumentation for diagnosis.] Since almost all big pharma companies are publicly listed, there is a requirement that they disclose their annual R&D expenditures in their annual reports, and data from these for the last five years have been compiled by the UK Department of Trade and Industry in their annual R&D "Scoreboard" reports. For the pharmaceutical companies, over 160 are listed from 13 countries, but 32 of these are UK subsidiaries of foreign companies that have their own labs and research programmes. For the 129 Independent companies, their combined R&D expenditure for 2001 was about $45 billion: this is 88% of the estimated total commercial health research expenditure for that year given above. The remaining 12% will partly be accounted for by smaller pharma companies missing from the DTI list, and partly by non-pharma companies. We may reasonably assume that the pharma company total would have been about $48 billion.

Of this total, the large majority (80%) was spent by the 24 largest companies whose combined R&D expenditure was $38.7 billion in 2001. All of these companies were represented among the addresses on cancer papers in the SCI files for the years 1999-2003. A search was also made in the SCI for all papers with an address from one or more of each of these companies in these same five years. The assumption was then made that the company's R&D expenditure was devoted to cancer research in the proportion that its cancer papers bore to its total output of papers (both on integer counts).

For example, Pfizer had an annual average R&D expenditure from 1999-2003 of €3.58 billion and published an average of 477 papers per year, of which 23.2 were on cancer (5.2%). It was therefore estimated that its total cancer R&D spend would have averaged at least €185 million over the period. Of this, a small amount would have gone on the work actually reported in SCI papers; much more would have been spent internally and in ways not leading to published outputs.

Each Pharma company was contacted via a letter sent to the publicly listed CEO or CFO of that organisation explaining both this report and the aims of the ECRM. The amount we calculated for their 2004 spend on cancer research was listed, and they were given the opportunity to respond to our figures; either accepting them, or providing us with a new figure, so long as there was a proper explanation to go with this number. Of all of the organisations contacted, one replied that our figure was acceptable to them and five responded that this was proprietary information, and therefore could not be shared. One organisation replied with a largely different figure from that which is in our report, but never followed up with any explanation of how they came to this amount. The remainder of the organisation failed to respond.

Database and IT Management

The EU Cancer Forum website was produced by CombinedMedia from Dublin, Ireland using Macromedia DreamweaverMX to create the basic site structure in HTML pages. FireworksMX was used to create, edit and update images on the site and FlashMX elements were used as appropriate; e.g. Top Bar, for use on the spinning logo.

The site is physically hosted with INET7; based in the US, and mirrored in the UK. The hosting is based on Windows 2000 server running IIS and uses Coldfusion MX for the database driven elements. The database is encrypted and backed up nightly to ensure data integrity and is currently a standard MS SQL database. The hosting also provides dynamic web statistics. The site includes several database driven components including Members Login Facilities and several interactive surveys.

Behind the scenes there is a large administration and report generation system. These facilities allow dynamic graph and chart generation using ColdfusionMX. Other facilities within this administration section include more detailed access to the collected data and update/edit facilities.

Calculations such as GDP[iv] and per Capita[v] expenditure were made using ColdfusionMX, and verified with Microsoft Excel, based upon data groomed from multiple sources. At the end of this document is a compilation of all of the contact details received from this survey, as well as each organisation's annual direct spend.

Data presented in this survey are subject to the following caveats:

- All of the data and analysis that follows are based upon the information received or in the researched from the public domain.

- This survey only addresses direct cancer research funding. A number of charitable organisations provide funding for advocacy, outreach programmes and cancer service delivery which is not included in this survey.

- It is acknowledged that the vast majority of Governmental funders of cancer research also support research into other diseases and bio-medical domains. In addition, it is acknowledged that government funding may also be under represented due to 'hidden', or non-direct, spend to hospitals and universities which is not specifically earmarked for (but is used for) cancer research.

- European Commission funding is likely to be under-represented. The data for this survey were collected during the inter-framework programme period between FP6 and FP7.

DEFINITIONS

Charity[viii] and Private, not for profit[ix]–
An institution or organization for public benefit, partially or wholly exempt from taxes, and which relies (solely) upon donations for financial support, and/or an organization or institution whose securities are not offered to the public, where any and all profits or surpluses must be used to further its purposes; it is prevented from distributing its profits or assets for the benefit of particular persons whilst operating, and upon winding up.

e.g. Cancer Research U.K., The Wellcome Trust

Government Agency[x] –
An administrative unit of government, supported in whole or part by public funds, charged by another official, body, or agency to make reports, investigations, or recommendations.
e.g. Medical Research Council, NIH

Direct Spend on research includes: salaries of researchers, laboratory equipment they use, and any consumables and/or other costs of the research. However, it does not include salaries of non-researchers, physical plant costs, or any other expenditure that does not produce research.

End Notes

[i] McGeary M., Burstein M. *Sources Of Cancer Research Funding in the United States.* Prepared for the National Cancer Policy Board, Institute of Medicine. June 1999

[ii] "U.S. Inflation rate". GPEC Information Center. Available at: http://www.gpec.org/InfoCenter/Topics/Economy/USInflation.html

[iii] "Exchange Rates". Internal Revenue Service (US). Available at: http://www.amb-usa.fr/irs/irsrates.htm

[iv] This work was commissioned by the Global Forum for Health Research and has been published in two recent papers:
Lewison G, Lipworth S and de Francisco A (2002) *Input indicators from output measures: a bibliometric approach to the estimation of malaria research funding*. Research Evaluation, 11(3), pp 155-162.

[v] Lewison G, Rippon I, de Francisco A and Lipworth S (2004) *Outputs and expenditures on health research in eight disease areas using a bibliometric approach*. Research Evaluation, 13 (3), pp 181-188.

[vi] Global Forum for Health Research (2004) *Monitoring Financial Flows for Health Research*. Geneva: GFHR.

[vii] "Total GDP 2004". World Development indicators database, World Bank, 15 July 2005. Available at: http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf

[viii] "Population 2004". World Development indicators database, World Bank, 15 July 2005. Available at: http://siteresources.worldbank.org/DATASTATISTICS/Resources/POP.pdf

[ix] Inquiry into the Definition of Charities and Related Organisations , 10 November 2000. As found online at http://www.cdi.gov.au/html/issues_paper.htm

[x] Government Agency, 2003. As found at http://dictionary.reference.com/search?q=government%20agency

Investment in Cancer Research

European Direct Research Funding

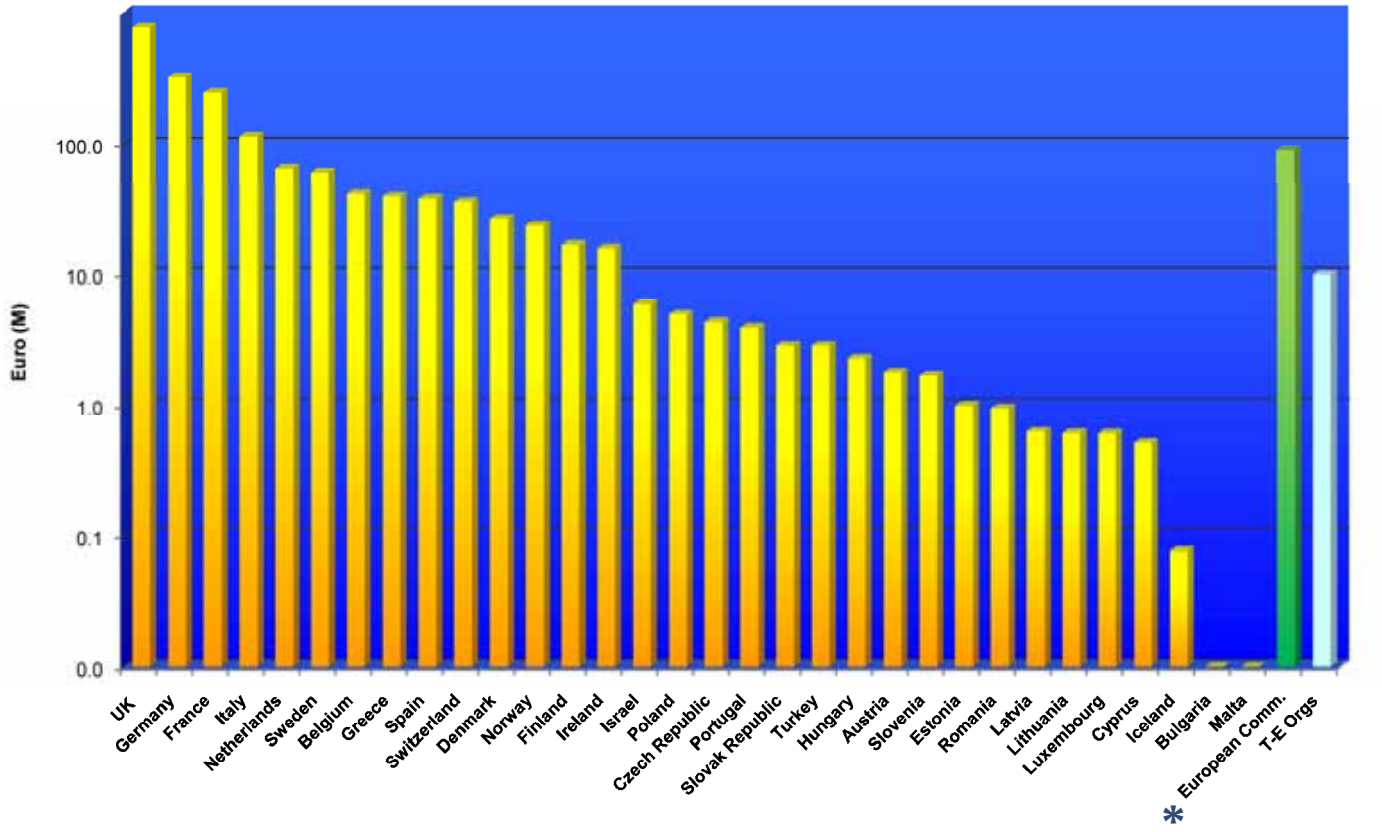


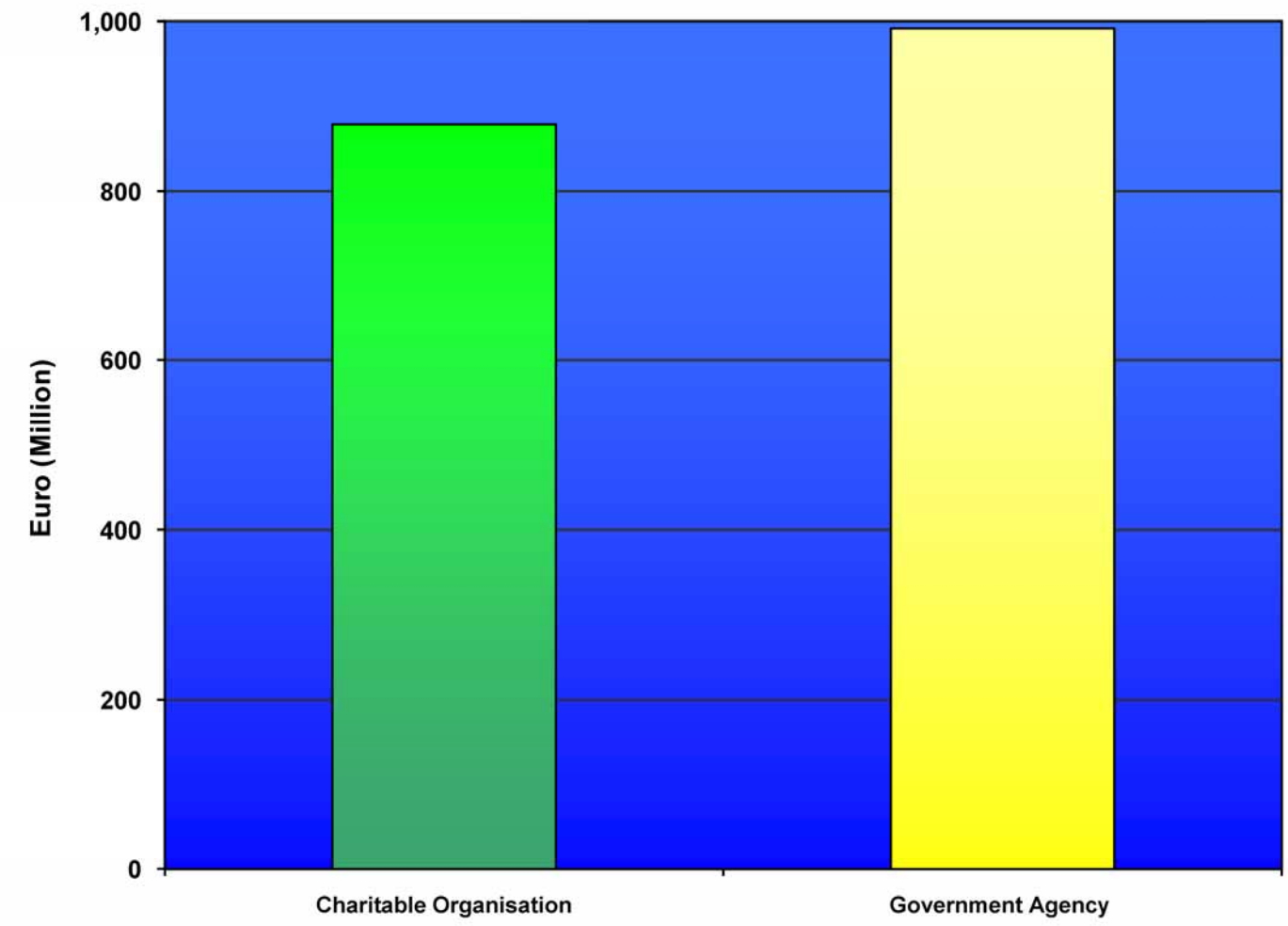
Figure 1 - 2004 Direct Cancer Research Spend in Europe
NOTE: **Graph on Log Scale**

- €1,971 M was spent by non-commercial organisations on cancer research in Europe in 2004. This is a 38% increase from the 2003 survey.
- The maximum spend by any country was the UK, with €783 M, minimum spend: Malta with zero.
- The UK had the largest growth from 2003 - 202% (absolute increase of €395 M). Greece increased its spend by 93%, Cyprus by 74%.
- Iceland had the largest percent decrease with a loss of 51% from 2003. Other decreases were Latvia (48%), and Luxembourg (43%), although the absolute decreases in both cases were small.
- Bulgaria failed to report on any spend for 2004, Malta spend was zero.

(*Per Annum average during Framework Programme 6)

Country	Spend €, M
UK	783
Germany	324
France	249
Italy	115
Netherlands	65
Sweden	61
Belgium	42
Greece	40
Spain	38
Switzerland	36
Denmark	27
Norway	24
Finland	17
Ireland	16
Israel	6.0
Poland	5.0
Czech Republic	4.4
Portugal	4.0
Slovak Republic	2.9
Turkey	2.9
Hungary	2.3
Austria	1.8
Slovenia	1.7
Estonia	1.0
Romania	0.95
Latvia	0.64
Lithuania	0.61
Luxembourg	0.61
Cyprus	0.52
Iceland	0.08
Bulgaria	NR
Malta	0.0
European Comm.	90
T-E Orgs	10

European Direct Spend by Funding Organisation Type

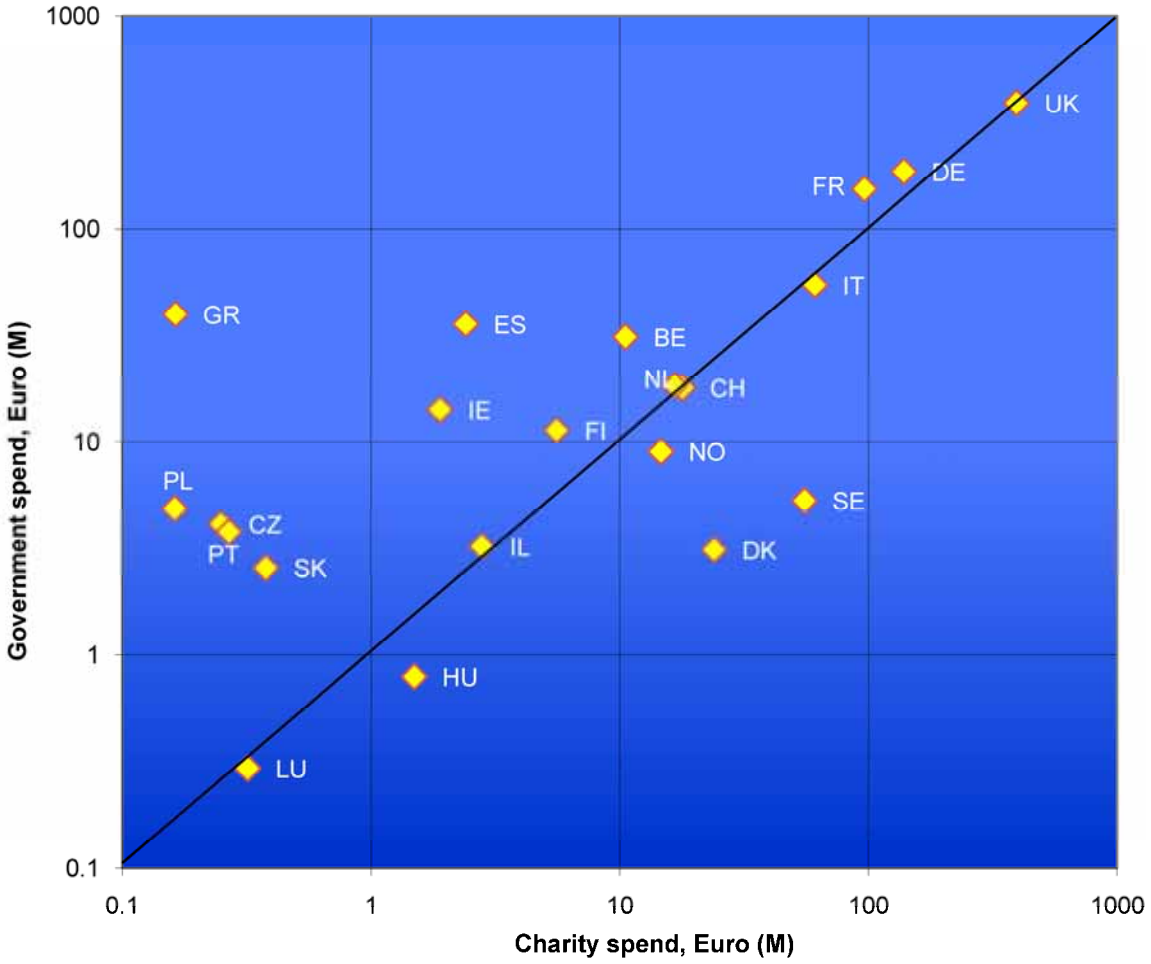


Organisation Type	Spend € (M)
Charitable Organisation	879
Government Agency	992

Figure 2 - 2004 European Direct Cancer Spend by Organisation Type

- 53% of cancer research spend originates from Government agencies.
- 47% of cancer research spend originates from the Not for Profit sector (Charities/Foundations).
- 75 Charities spent €879 M.
- 79 Government Agencies spent €992 M.
- Government spend increased by €378 M from the last survey (38% increase).
- Charities increased their spend by €209 M (24% increase).
- 29 Government agencies are responsible for 80% of all Government spend, or 40% of the identified total in Europe.
- 14 Charities are responsible for 80% of all Charity spend, or 36% of the identified total in Europe.
- Overall, only 29 organisations are responsible for 80% of total identified spend in Europe.

European Direct Spend by Organisation Type and Country

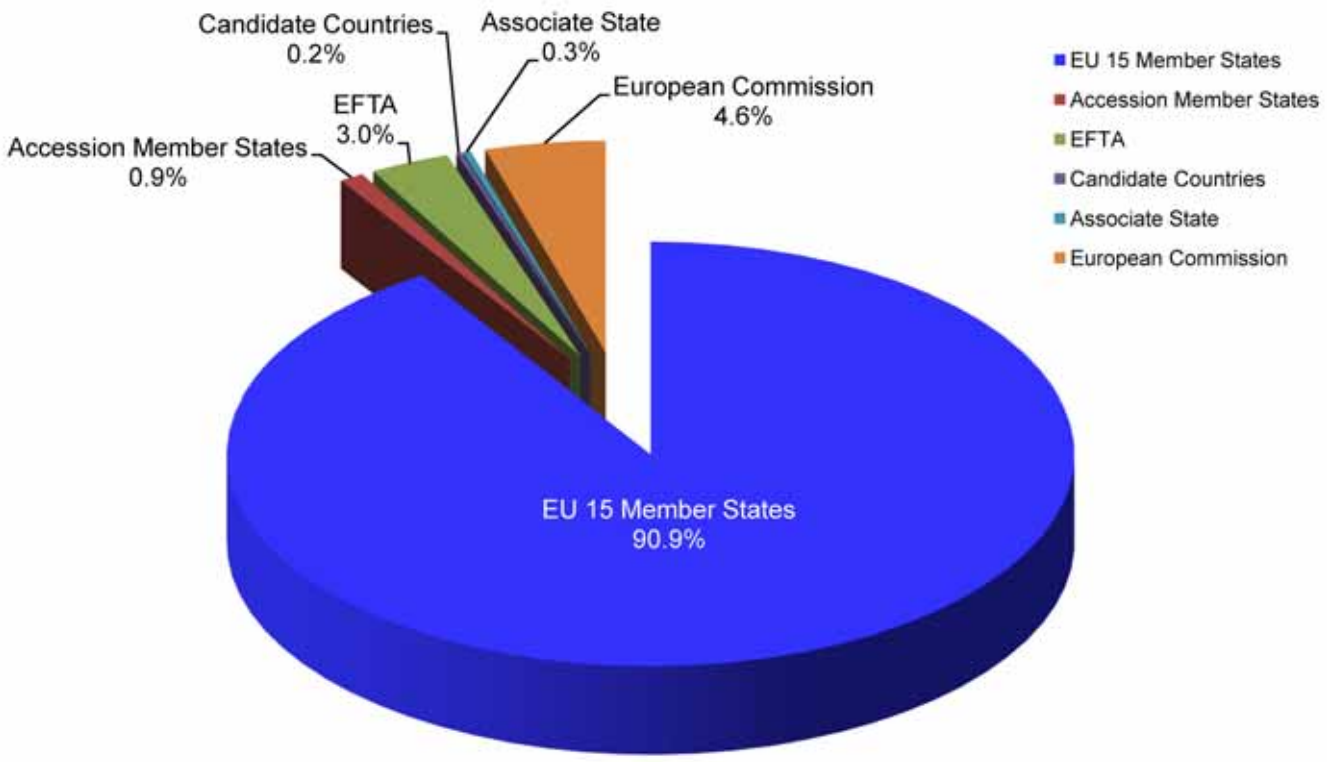


Country	Spend Charity	€ (M) Gov.
UK	396	387
Germany	139	184
France	97	153
Italy	61	54
Netherlands	47	18
Sweden	56	5.3
Belgium	11	31
Greece	0.16	39
Spain	2.4	36
Switzerland	18	18
Denmark	24	3.1
Norway	15	9.0
Finland	5.6	11
Ireland	1.9	14
Israel	2.8	3.2
Poland	0.16	4.9
Czech Rep.	0.25	4.1
Portugal	0.27	3.8
Turkey	0.43	2.9
Slovak Rep.	0.38	2.5
Austria	0.60	1.7
Hungary	1.5	0.79
Slovenia	0.00	1.7
Estonia	0.00	1.0
Romania	0.00	0.95
Iceland	0.22	0.55
Latvia	0.00	0.64
Lithuania	0.00	0.61
Luxembourg	0.32	0.29
Cyprus	0.52	0.00
Bulgaria	0.00	0.00
Malta	0.00	0.00

Figure 3 - Direct spend in Europe by Country, shown as Government against Charity funding streams

- Seven countries have no major spend from charities supporting cancer research, three have no Governmental spending.
- The average charity spend is €27.5 M , (range €0 : €396 M), median €451 K.
- The average Government spend is €31 M, (range €0 : €386 M), median of €3.5 M.
- The UK had the largest increases in both Charity and Government funding from 2003 as an absolute value, however Greece had the largest percentage change in Government spending (this is primarily due to more organisations reporting their spend rather than any real increase in funding).
- Iceland and Poland suffered the biggest percentage decreases in Charity funding (78% and 97%, respectively), and Luxembourg for Government funding (59%).

Spend by European Union Status



Status	Spend € (M)
EU 15 Member States	1783
Accession Member States	19
EFTA	60
Candidate Countries	3.9
Associate State	6.0
European Commission	90

Figure 4 - Direct cancer research spend by European Union Status.

- Description of EU Status (see full list in index, page 47):
  - Accession Member States – joined the EU in May, 2004.
  - European Free Trade Association: Iceland, Norway, Switzerland
  - Candidate Countries: Bulgaria, Romania, Turkey.
  - Associate State: Israel
- Accession Countries total spend represents only 1% of the EU-15 spend.
- EU Commission spend remains low, as data for this survey were captured prior to the start of FP7.
- Israel increased its spend by nearly 50% since the 2003 survey.
- The Accession countries was the only group to have a decreased level of spend (16%), but in absolute terms this was small (€3 M).

Public Investment (USA)

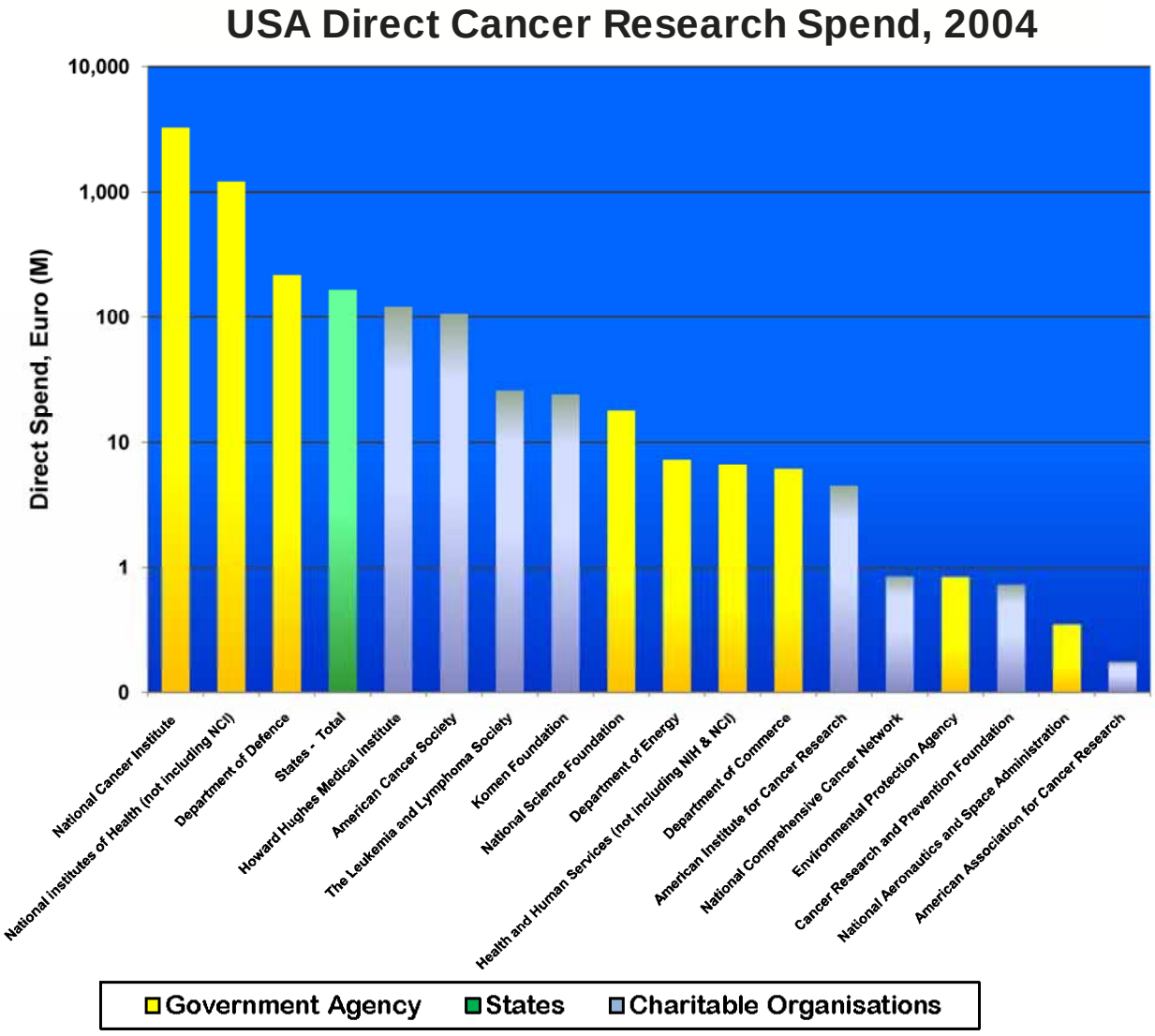


Figure 5 - Direct spend on Cancer Research in the USA, 2004
NOTE: **Graph on Log Scale**

- USA data was categorised according to a previous, 1999 survey ("Sources of Cancer Research Funding in the United States." June, 1999 [see previous citation]).
- The largest contributor to cancer research in the USA is the Federal Government through the Department of Health and Human Services, of which the National Cancer Institute is the major division.
- Governmental funding was 94% of overall USA 2004 spend, Charitable organisations contributed 6%.

Organisation	Direct Spend Euro (M)
National Cancer Institute	3,252
National institutes of Health (not including NCI)	1,207
Department of Defence	214
States - Total	164
Howard Hughes Medical Institute	120
American Cancer Society	105
The Leukemia and Lymphoma Society	26
Komen Foundation	24
National Science Foundation	18
Department of Energy	7.3
Health and Human Services (not including NIH & NCI)	6.6
Department of Commerce	6.1
American Institute for Cancer Research	4.5
National Comprehensive Cancer Network	0.84
Environmental Protection Agency	0.83
Cancer Research and Prevention Foundation	0.72
National Aeronautics and Space Administration	0.35
American Association for Cancer Research	0.18

2004 USA non-commercial cancer research spend €5,168 M

Direct Cancer Research Spend per Capita

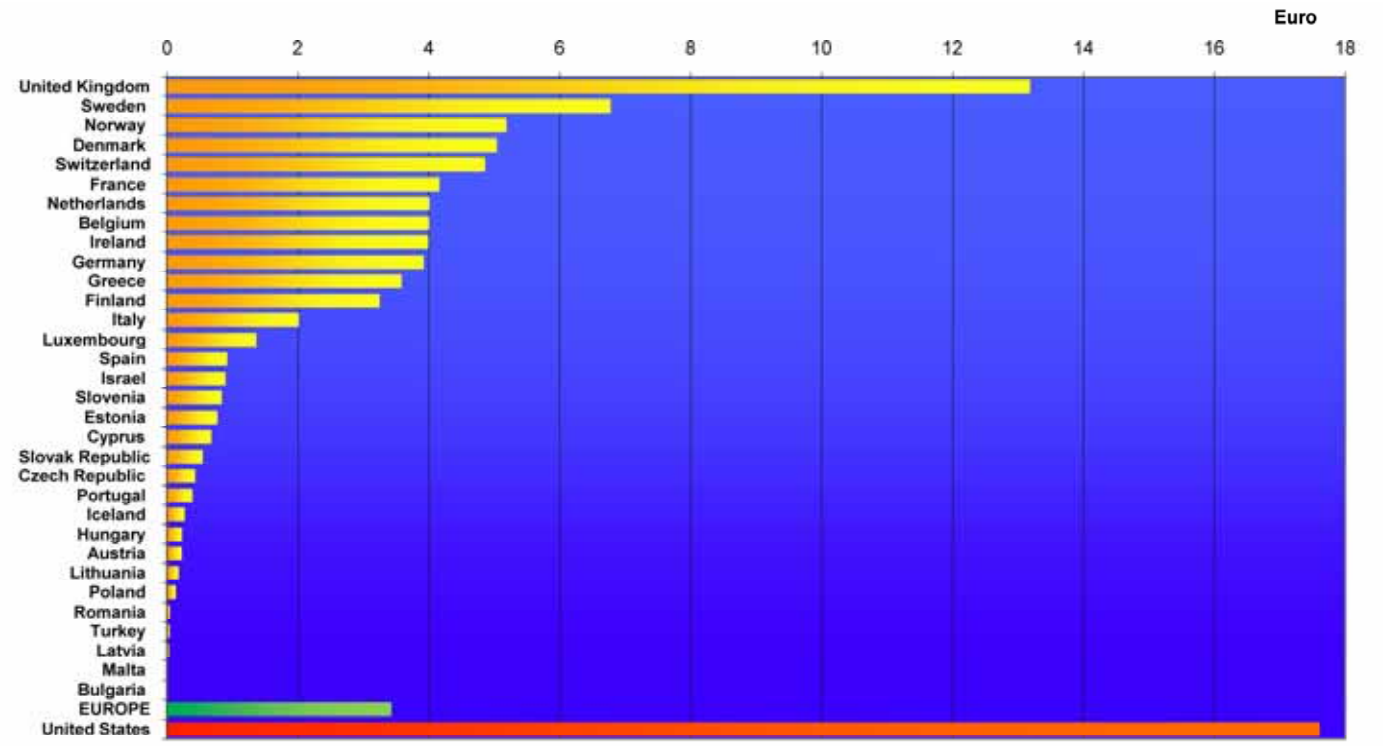


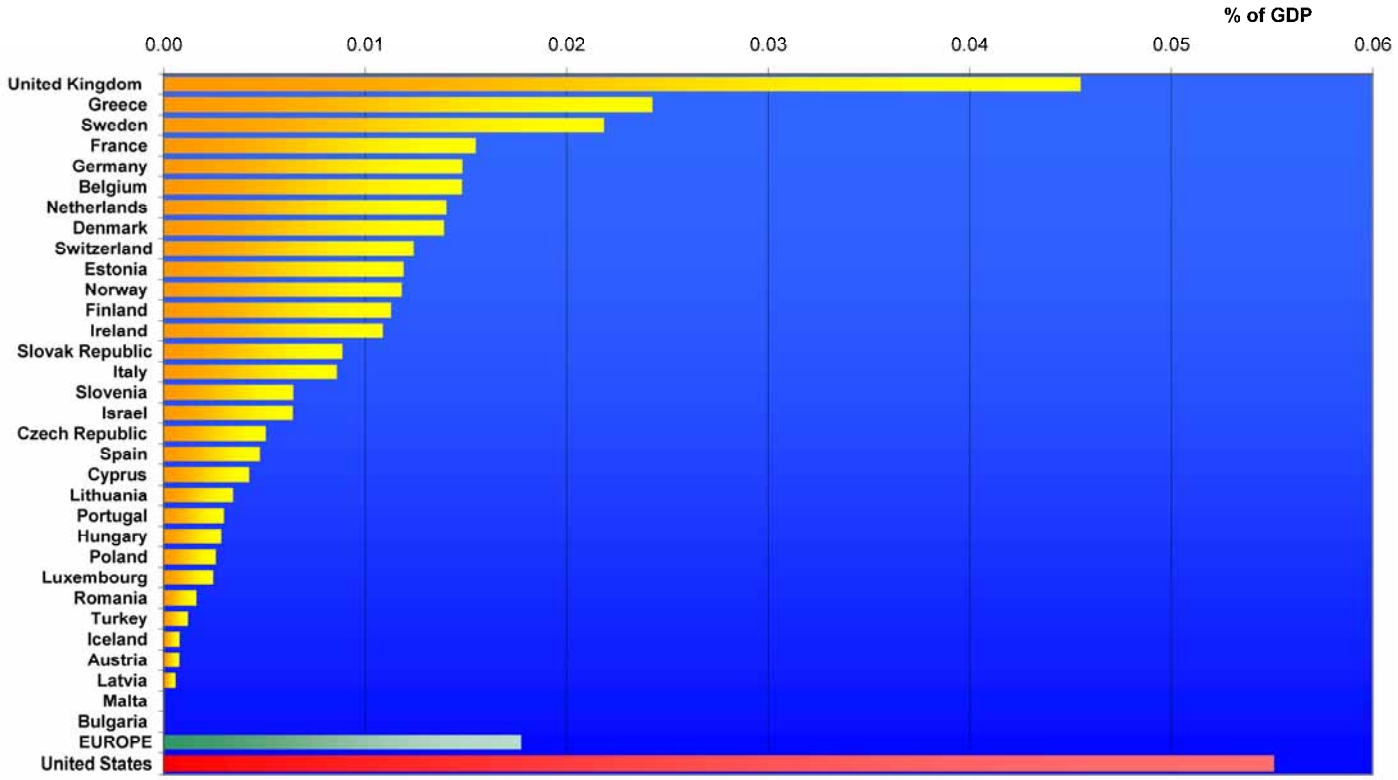
Figure 6—2004 European Direct Cancer Spend per Capita, with USA for Comparison

Country	Spend
United Kingdom	€ 13.18
Sweden	€ 6.77
Norway	€ 5.18
Denmark	€ 5.03
Switzerland	€ 4.85
France	€ 4.16
Netherlands	€ 4.00
Belgium	€ 4.00
Ireland	€ 3.99
Germany	€ 3.92
Greece	€ 3.58
Finland	€ 3.24
Italy	€ 2.00
Luxembourg	€ 1.36
Spain	€ 0.92
Israel	€ 0.89
Slovenia	€ 0.83
Estonia	€ 0.77
Cyprus	€ 0.68
Slovak Republic	€ 0.54
Czech Republic	€ 0.43
Portugal	€ 0.39
Iceland	€ 0.27
Hungary	€ 0.23
Austria	€ 0.22
Lithuania	€ 0.18
Poland	€ 0.13
Romania	€ 0.04
Turkey	€ 0.04
Latvia	€ 0.03
Malta	€ 0.00
Bulgaria	€ 0.00
EUROPE	€ 3.42
United States	€ 17.61

- **EUROPE** contains 32 countries, European Commission and Trans-European organizations (see index at rear of publication for full list).
- The average spend per capita across Europe was €3.42, a 34% increase since 2003 (Note: Switzerland was included in the 2004 calculations, but not in 2003).
- USA per capita spend was €17.61, five times greater than Europe (was 7x for 2003 Survey, or a 29% decrease in this gap).

Note: this comparison includes only directly reported/ open spend, and does not take into account 'hidden spend' for cancer research as revealed through the Bibliometric approach (see figures 8 and 9).

Direct Cancer Research Spend as Percentage of GDP



Country	Spend
United Kingdom	0.0455%
Greece	0.0242%
Sweden	0.0218%
France	0.0155%
Germany	0.0148%
Belgium	0.0148%
Netherlands	0.0140%
Denmark	0.0139%
Switzerland	0.0124%
Estonia	0.0119%
Norway	0.0118%
Finland	0.0113%
Ireland	0.0109%
Slovak Republic	0.0089%
Italy	0.0086%
Slovenia	0.0064%
Israel	0.0064%
Czech Republic	0.0051%
Spain	0.0048%
Cyprus	0.0042%
Lithuania	0.0034%
Portugal	0.0030%
Hungary	0.0029%
Poland	0.0026%
Luxembourg	0.0024%
Romania	0.0016%
Turkey	0.0012%
Iceland	0.0008%
Austria	0.0008%
Latvia	0.0006%
Malta	0.0000%
Bulgaria	0.0000%
EUROPE	0.0177%
United States	0.0551%

Figure 7—2004 European Direct Cancer Spend as Percentage of GDP, with USA for Comparison

- **EUROPE** contains 32 countries, European Commission and Trans-European organizations (see index at rear of publication for full list).
- The average spend for EUROPE was .0177% of GDP, which is a 14% increase from 2003 survey.
- The average spend for the USA was .0551% of GDP, a 5% decrease from 2003 survey.
- The USA spent three times as much as a percentage of GDP compared with EUROPE (this was 4x in 2003 Survey).

Note: this comparison includes only directly reported/open spend, and does not take into account 'hidden spend' for cancer research as revealed through the Bibliometric approach (see figures 8 and 9).

Spend on Cancer Research as a Percentage of GDP

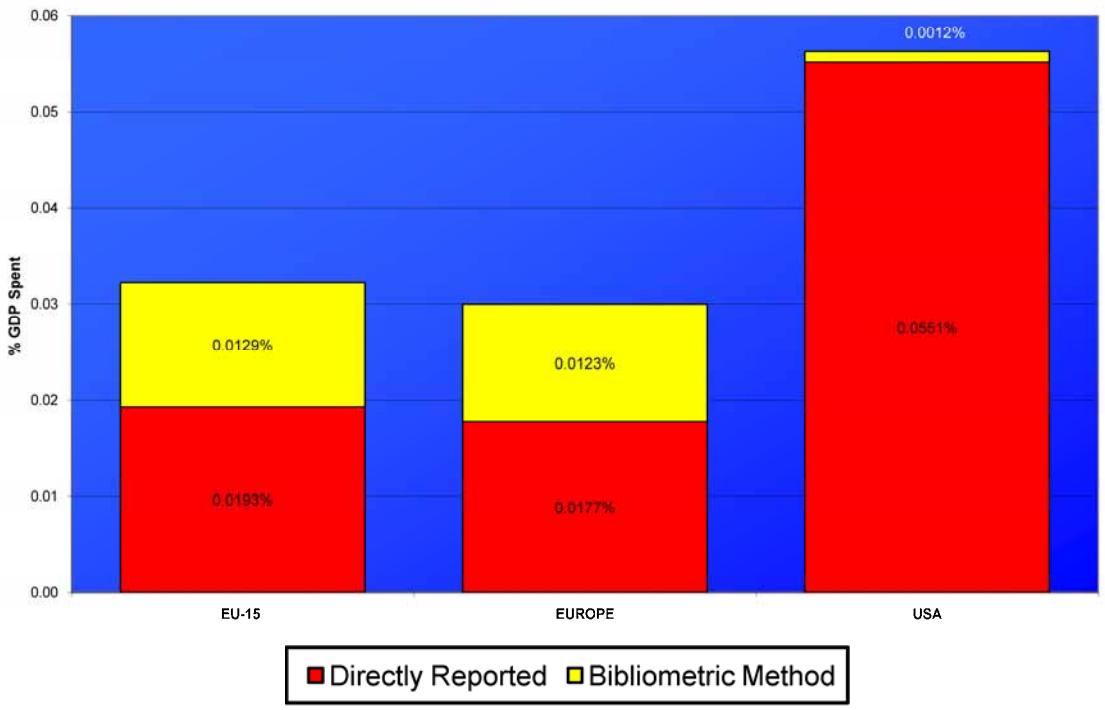


Figure 8 - Comparison of cancer research spend between the USA, Europe and EU-15 Member States as a percentage of GDP.

Spend on Cancer Research per Capita

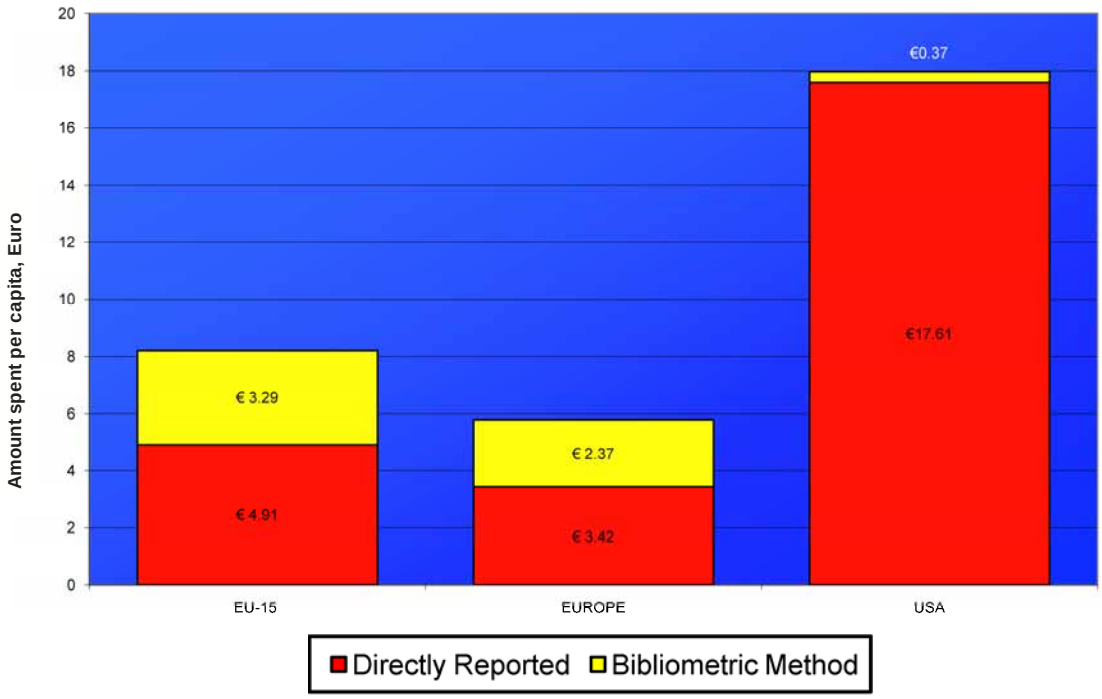


Figure 9 - Comparison of cancer research spend between the USA, Europe and EU-15 Member States (per capita)

- Figures 8 and 9 compare EU-15, EUROPE and USA public sector spend for the 2004 fiscal year using directly reported figures from funding organisations and an assessment of 'hidden' investment in cancer research through national systems (University and Healthcare) by the bibliometric approach.
- Absolute USA spend was down slightly from the 2003 survey as percentage of GDP (-5%)but remained stable as an amount spent per capita.
- EU-15 spend was substantially higher per capita (increase of €1.24), as well as a percentage of GDP (18% increase) from 2003 survey.

Global Public Sector Cancer Research Spend, 2004

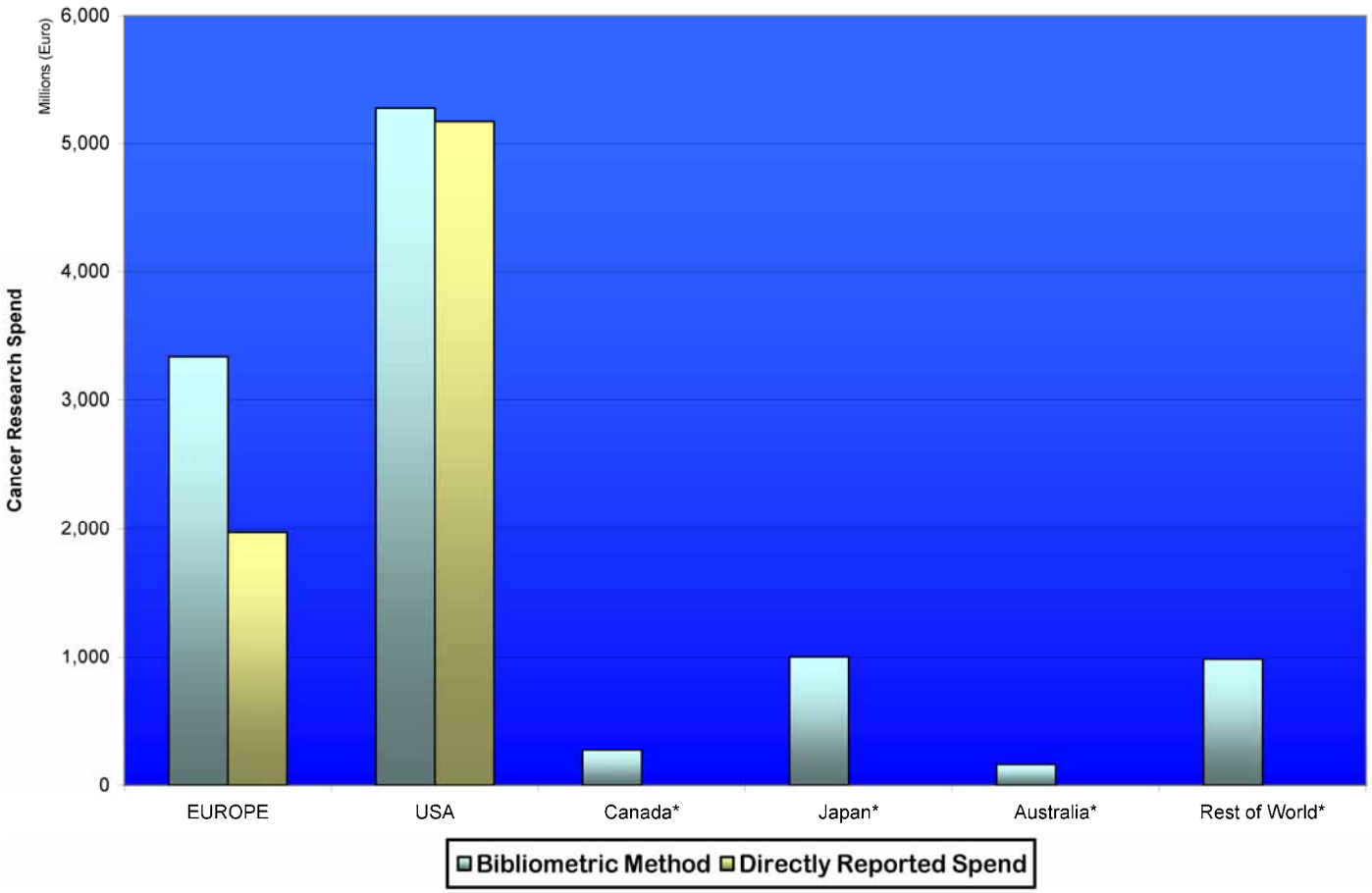


Figure 10– Global cancer research spend, assessed using two approaches: Bibliometric approach, and directly reported spend by funding organisations.

Country	Bibliometric Method (M)	Directly Reported Spend (M)
EUROPE	€ 3,335	€ 1,971
USA	€ 5,277	€ 5,168
Canada	€ 276	Not Sought
Japan	€ 1,004	Not Sought
Australia	€ 162	Not Sought
Rest of World	€ 981	Not Sought

- **Total global public sector cancer research spend for 2004 is estimated at €11,035 million.**
- Spend estimated by the Bibliometric approach is 41% greater than directly reported spend from funding organisations across EUROPE, but only 2% greater in the USA.
- This 'hidden spend' (the difference between directly reported and Bibliometric approach national estimated spend) in Europe comes from infrastructure funding for cancer research through universities and health services.
- This 'directly reported spend' includes that by EORTC, as well as European Commission contributions, which together total €100M.

*Directly Reported Spend from funding organisations was not sought for this survey.

Cancer Research Spend by Major Pharmaceutical Companies Estimated from Bibliometric Method

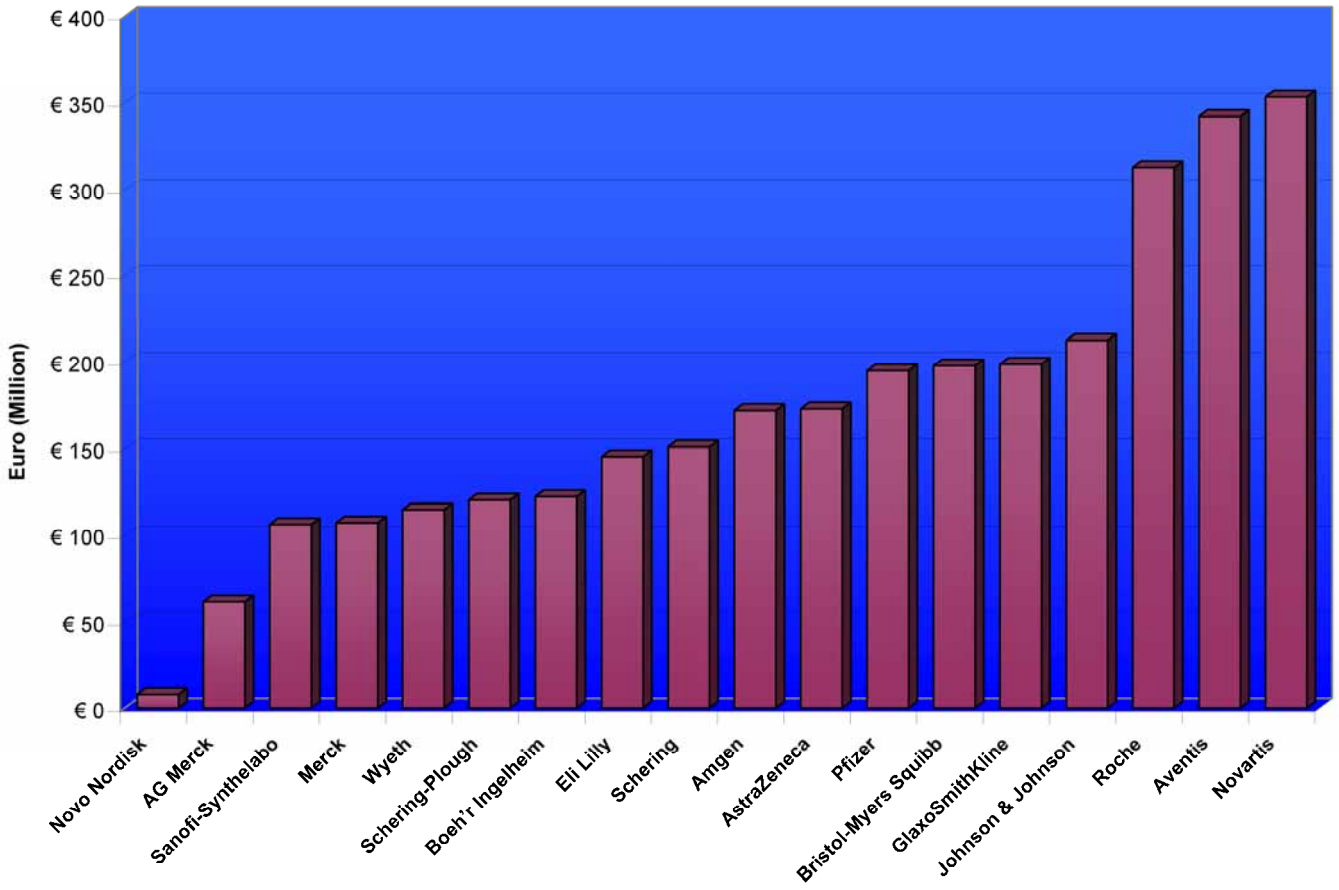


Figure 11 - Cancer Research Spend by Major Pharmaceutical Companies Contributing to Public Domain Knowledge, as determined through the indirect, Bibliometric method.

Company Name	Spend € (M)
Novo Nordisk	8.4
AG Merck	62
Sanofi-Synthelabo	106
Merck	107
Wyeth	115
Schering-Plough	120
Boeh'r Ingelheim	122
Eli Lilly	145
Schering	151
Amgen	173
AstraZeneca	173
Pfizer	195
Bristol-Myers Squibb	198
GlaxoSmithKline	199
Johnson & Johnson	213
Roche	312
Aventis	342
Novartis	353

- Total major Pharma spend contributing to public domain knowledge for 2004 is €3.1 billion.
- This amount represents 8% of the worldwide BioPharmaceutical industry R & D expenditures of €39.6 billion.
- Company declared R & D expenditure from annual reports has been fractionated on the basis of how many of their published papers are in cancer research.

Total 2004 Major Pharma Spend - €3,095 M

Outputs of Cancer Research

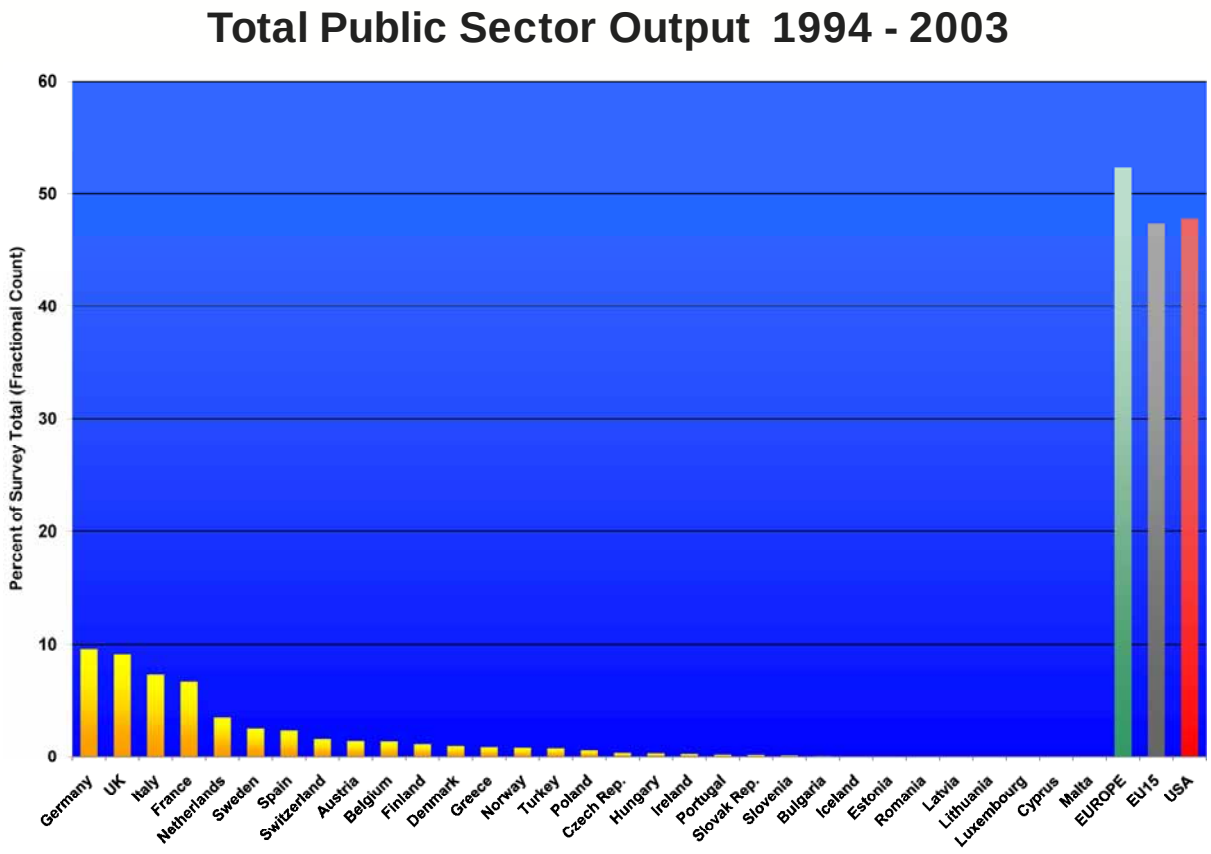


Figure 12 - Fractional count of all journal articles and papers in the survey used for Bibliometric output by Country/Region.

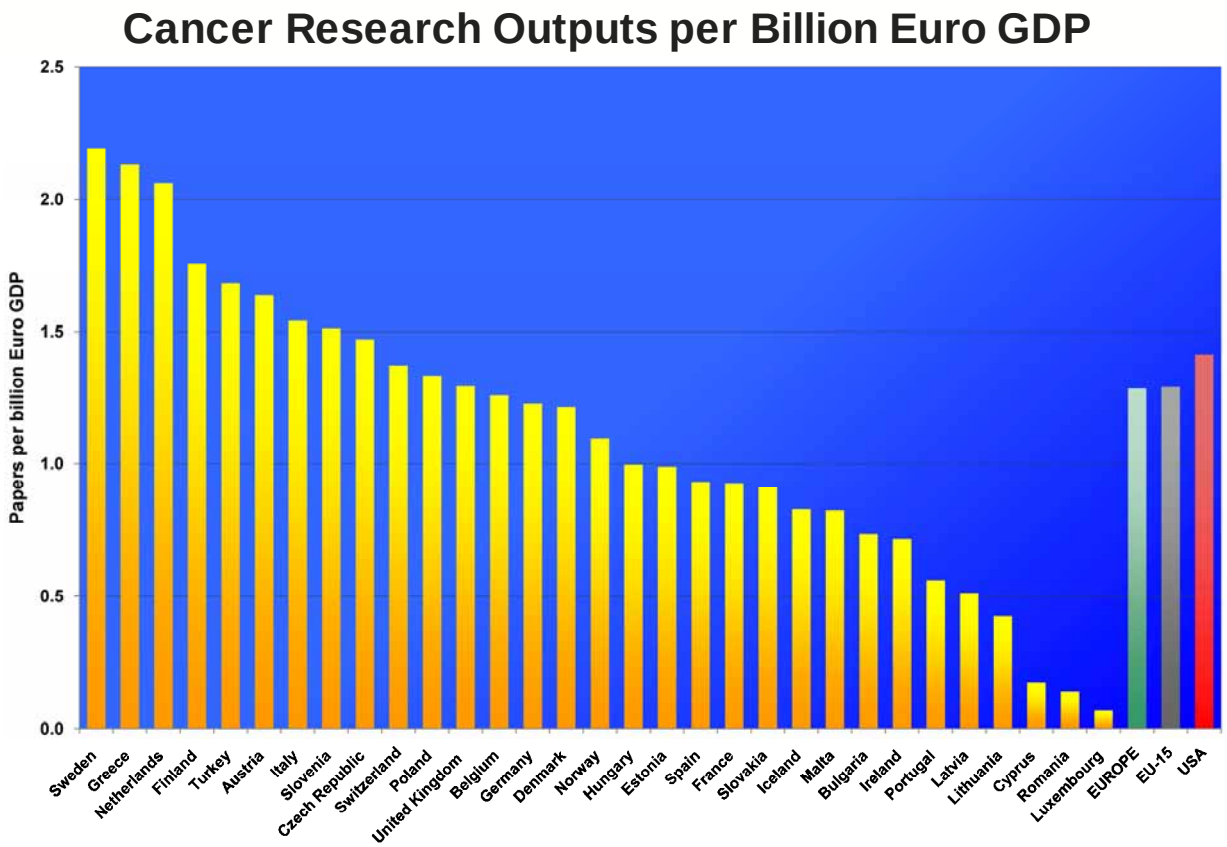


Figure 13 - Fractional count of all cancer research output per billion Euro GDP .

Trends in Public Sector Outputs

Country	% of Total
Germany	9.6
UK	9.1
Italy	7.3
France	6.7
Netherlands	3.6
Sweden	2.5
Spain	2.3
Switzerland	1.6
Austria	1.4
Belgium	1.3
Finland	1.1
Denmark	0.99
Greece	0.88
Norway	0.82
Turkey	0.77
Poland	0.59
Czech Rep.	0.36
Hungary	0.31
Ireland	0.26
Portugal	0.19
Slovak Rep.	0.17
Slovenia	0.12
Bulgaria	0.06
Iceland	0.05
Estonia	0.03
Romania	0.02
Latvia	0.01
Lithuania	0.01
Luxembourg	0.01
Cyprus	0.00
Malta	0.00
EUROPE	52
EU15	47
USA	48

Country	Pap./B GDP
Sweden	2.2
Greece	2.1
Netherlands	2.1
Finland	1.8
Turkey	1.7
Austria	1.6
Italy	1.5
Slovenia	1.5
Czech Repub.	1.5
Switzerland	1.4
Poland	1.3
UK	1.3
Belgium	1.3
Germany	1.2
Denmark	1.2
Norway	1.1
Hungary	1.0
Estonia	0.99
Spain	0.93
France	0.93
Slovak Repub.	0.91
Iceland	0.83
Malta	0.83
Bulgaria	0.73
Ireland	0.72
Portugal	0.56
Latvia	0.51
Lithuania	0.43
Cyprus	0.17
Romania	0.14
Luxembourg	0.07
EUROPE	1.3
EU-15	1.3
USA	1.4

- Outputs figure for countries/region was estimated as the average over a 9 year period (1994 - 2003)
- Fractional count was achieved by dividing the total credit per paper/article (one) by the number of different countries cited in the address section of the SCI.
- Journal impact factors and citation scores were not used for comparison in this report, but would be an interesting aspect of study in future reports.

Trends in Cancer Research Outputs

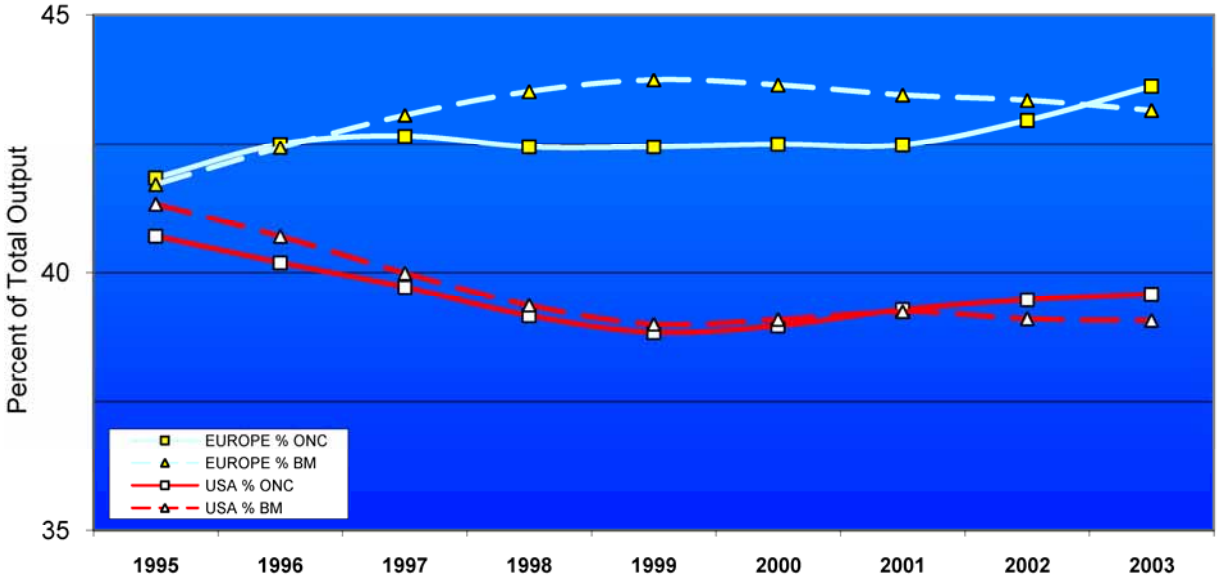


Figure 14 - Trends in cancer research outputs (% ONC) compared to overall biomedical outputs (%BM).

Trends in Relative Level◇ of Cancer Research Publications

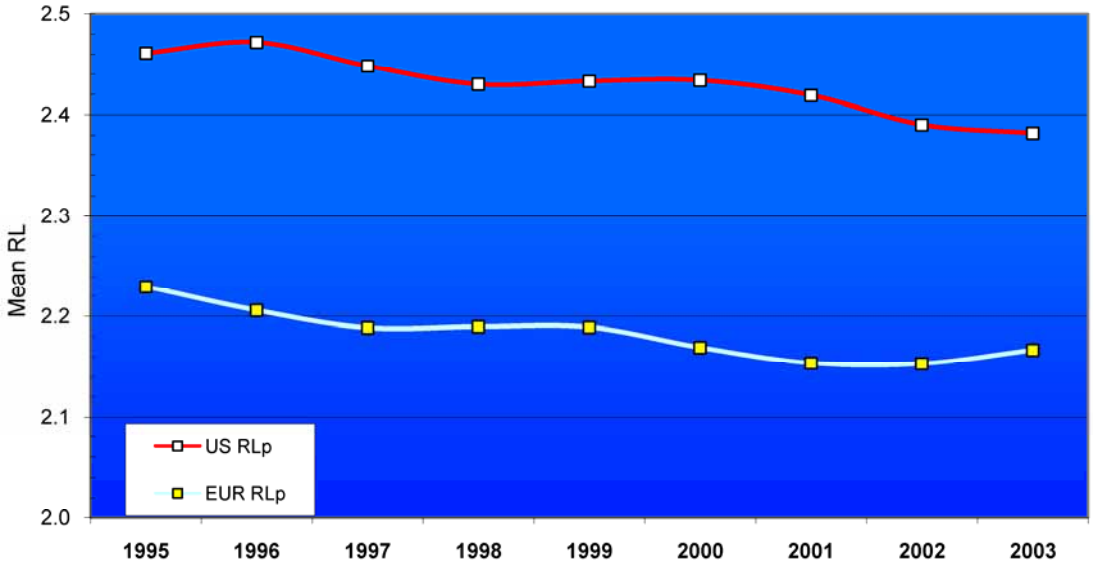


Figure 15 - Trends in relative level of outputs (basic to clinical), Europe and the USA.

- Mean RL score: 1 = very 'clinical' publications compared with a score of 4 = fundamental, basic science publications.
- Output data does not include publications from Israel.
- Overall, the cancer research publications originating from the USA were more basic than the outputs from EUROPE.
- Both the USA and EUROPE publications have trended towards more clinical work over the past 8 years.
- Over this period, EUROPE published 9% more non-commercial cancer research papers than the USA

◇ RL describes how 'fundamental', or clinical (applied) a publication is.

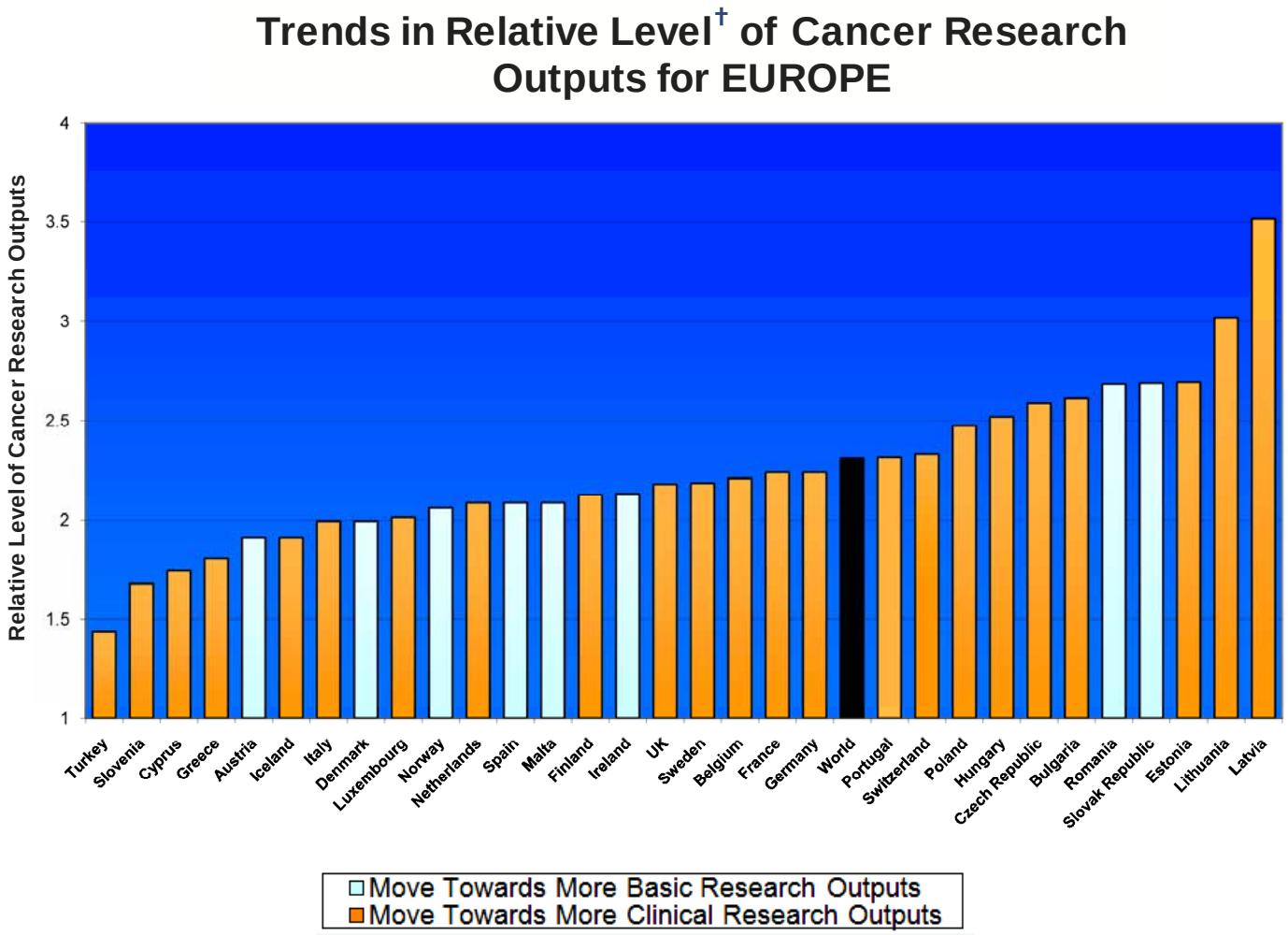


Figure 16 - European trends in relative level of oncology research papers between 1995 and 2003, with world average for comparison.

- Mean RL score: 1 = very 'clinical' publications compared with a score of 4 = fundamental, basic science publications.
- Overall, the Baltic states and the other countries of Eastern Europe are publishing the most basic research.
- In the past ten years, there has been a shift towards more clinical work in 23 of 31 European countries in this survey.

† RL describes how 'fundamental', or clinical (applied) a publication is.

Geographical Origin of Cancer Research Papers From Major Pharmaceutical Companies

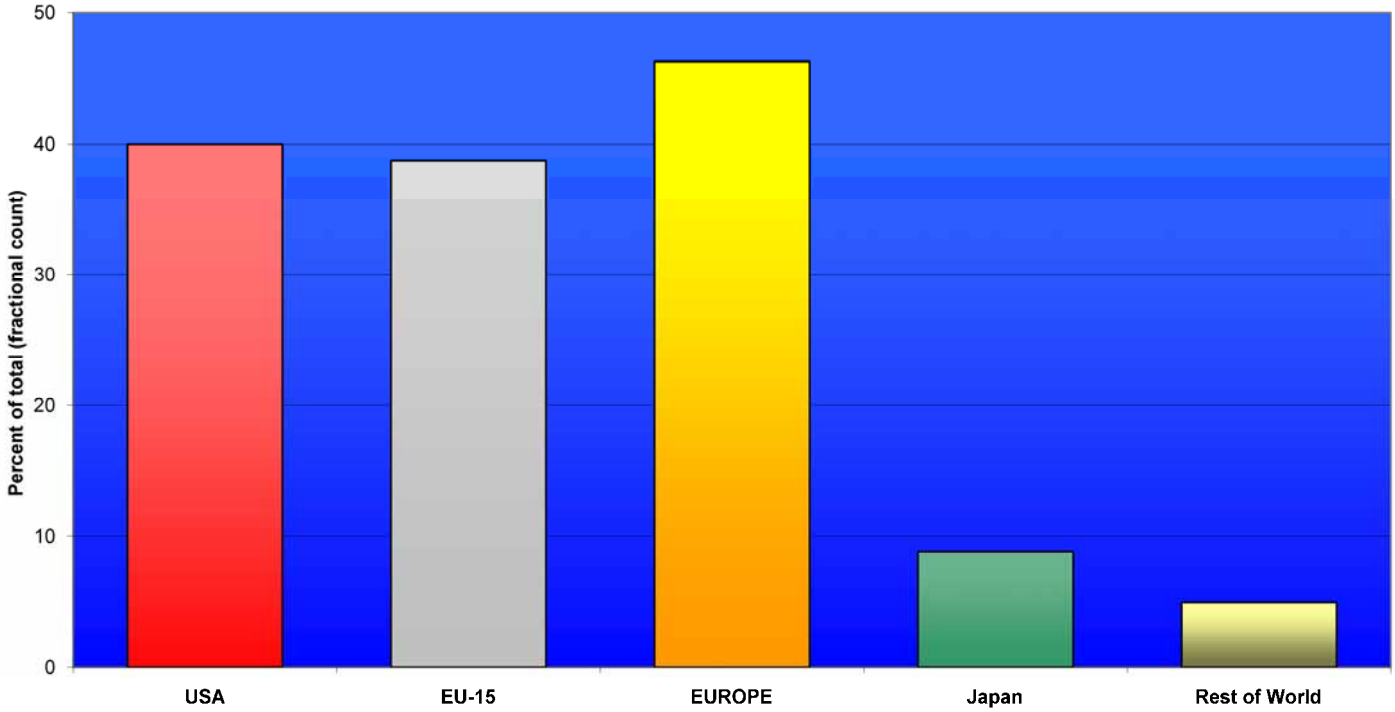


Figure 17 - Geographical origin of cancer research papers from one or more address of pharmaceutical companies (n=24) engaged in cancer R & D between 1999 and 2003.

Region	% Total
USA	40
EU-15	39
EUROPE	46
Japan	8.8
Rest of World	4.9

- This distribution resembles that of non-commercial cancer research papers overall, except that "Rest of the World" is under-represented.
- The EU15 total (39%) is only just less than that of the USA (40%), and EUROPE as a whole is actually greater (46%).
- The geographical distribution of major pharmaceutical companies headquarters is uneven, with eight of the 24 being headquartered in the USA, 6 in Japan, 3 in Germany, 2 each in France, Switzerland and the UK, and 1 in Denmark. However because they have labs in many countries, the actual geographical distribution of papers from one or more of the 24 pharmaceutical companies listed is rather more widespread.

Discussion

What has changed since the last survey?

It is almost two years since we published the first European Cancer Research Mangers Forum (ECRM) funding survey[1]. The second ECRM survey has addressed some of the deficits of the first – inaccuracies in reported research funding, missed funding organisations, etc – and developed new methodologies to validate spend. The use of bibliometrics to address the latter is a valid and novel way of determining research spend based on actual output. The application of the bibliometric method in this second survey has improved our confidence around the report figures, and also thrown up some interesting findings, most notably the level of funding that flows through healthcare and university systems rather than directly from funding organisations. We have also used this method to estimate the direct annual spend of the major pharmaceutical companies involved in cancer research. This we acknowledge is controversial. All the companies in this survey were invited to report their direct spend but, unsurprisingly, cited business confidentiality as the main reason for not providing the data. This survey has also updated the figures for the USA which had become seriously out of date (the last official work was by the Institute of Medicine in 1997[2]).

Finally we have taken the plunge into providing output data. Again we acknowledge that there are many ways of 'describing' cancer research activity from gross volumetric assessments of publications (the approach we have taken), patents filed, impact measures (such the citation of publications in clinical management guidelines), numbers of clinical trials, etc. through to approaches based on narrative. All have their merits and deficits. We have steered clear of making any 'quality' assessments of the respective outputs of continents and countries[3]. This area is fraught with methodological issues, particularly between continents where the tendency of under / over citing can lead to citation (and impact) bias. In this survey we have instead used bibliometrics to probe macro-productivity and act as a surrogate for objectively describing cancer research activities. Our approach should be seen as a tool to provide reliable data around which one can construct a policy narrative.

Since the publication of the first survey we have seen its findings incorporated into a wide range of policy and research documents[4]. An excellent and comprehensive public and private funding survey has also been completed for brain research in Europe[5]. Such additional disease specific studies add to the corpus of high quality intelligence for policy makers.

In summary, this second ECRM survey has -

- Updated cancer research spend in EUROPE
- Updated cancer research spend in USA
- Estimated non-direct funding through University and Healthcare Systems in EUROPE and USA
- Estimated global cancer research funding
- Estimated major pharmaceutical direct spend on cancer research
- Described cancer research activities - levels of research (whether more fundamental or clinical), and volume productivity – through the use of bibliometrics.

"We are not dealing with a scientific problem. We are dealing with a political issue."

-Samuel Epstein, M.D.

Cancer Research in EUROPE: towards an oligopoly

By the end of the 20th century Europe was witness to some 2.5 million annual cancer deaths[6]. Although Europe comprises only one eighth of the world's population it suffers a quarter of the global burden in terms of incidence. In 2004 there were an estimated 2,886,800 new cases of cancer with 1,711,000 deaths[7].

The notable feature of this second survey has been the estimation of cancer research funding that flows through Member State healthcare and university systems. The figures for EUROPE* are substantial and, at over a billion euro per annum, pose a major challenge to designing policy tools for promoting cancer

*Europe is defined for this report as the 31 countries listed in the appendix on page 46

research or creating strategic frameworks. 21 of Member States have increased their funding of cancer research in real terms since the last survey, 4 have not. Indeed the major policy issue is the real differences in cancer research investment between the Member States themselves, rather than the prevailing gaps in cancer research funding between EUROPE and the USA, which have been a driving force for EU policy making to date [8].

A balance between charitable and governmental funding is also absent in a number of Member States. Whilst we will discuss philanthropy in greater depth in the next section it is clear that some governments are still failing to appropriately support cancer research. There are of course natural limits for a number of countries. The majority of cancer research funding is raised and spent within EU-15 Member States. For the remainder the priority for resources is cancer control programmes (such as tobacco control) not major cancer research funding[9]. For these countries the need for specific policy actions to ensure a limited core of high quality research within their institutions is important if these Member States have aspirations to become major locations of cancer research in the future[10]. Over a ten year period Germany, UK, Italy and France dominated absolute European cancer research output, however, when compared to GDP Sweden, Greece and Netherlands had the greatest output. Nearly all members of EUROPE have seen a shift towards more applied, clinical research. There are some notable exceptions to this – Spain and Denmark, for example, where the switch to more fundamental cancer research is likely to be a combination of strategic direction and / or limited funding which particularly favours less expensive fundamental research that traditionally has a quicker return on investment.

Regulatory and research policy frameworks have a major influence on the intrinsic creativity of European cancer research. However, it is debatable at current levels of spend whether cancer research funding at the EU level through the Framework Programmes and other streams will have a major impact on the rate and direction of European cancer research[11]. With a budget for Framework Programme 7 (2007-13) set at €5,984 million[12] however, there is scope for the European Commission to have a major impact, in addition to its commitment for the European Research Council and Joint Technology Platforms (through which the Innovative Medicine Initiative will be funded).

The EU research policy of specific research programmes and thematic calls has been questioned[13], however, the suggested solutions – networks and delegation of research programmes to specific agencies should be in addition to ring-fenced funding for cancer not as a substitute. EU research policy needs to recognise and fund core trans-EU infrastructure such as phase IV clinical trials, paediatric research networks (e.g. Innovative Therapies for Children with Cancer) and Cancer Registries to name but a few[14]. In all these areas European funding to cement already cooperative groups would deliver substantial added value to existing Member State support which mostly flows through highly competitive streams.

This survey underscores yet again the great number of major national and trans-national funders (*more than 150*), in addition to European umbrella groups such as Federation of European Cancer Societies (FECS), cancer research policy initiatives (e.g. EURoCAN plus, EUSTIR[15]), and patients groups (e.g. Europa Donna) that are involved in one way or another in cancer research. The impression is of numerous groups attempting to occupy the same political and policy ground. Presenting a co-operative front to ensure a better deal for research and cancer control programmes would seem an important but politically challenging goal[16].

Despite the lessening emphasis on the Lisbon target (this is the EU achieving a spend of 3% of GDP on science and technology) this still remains an important goal[17] (EU research monies have the potential to make huge differences in some countries [Greece, Ireland], but much less in others [Germany, UK] due to the existing contributions of governments and charities operating within those countries). This survey demonstrates the substantial impact that cancer research has to play with an annual public (government and charitable) sector investment of over €3.2 billion, coupled to vibrant commercial activities and strong outputs. Sustaining this through pro-research policies, avoidance of negative, bureaucratic regulations and strong funding streams will pay handsome dividends to both patients and Europe's economic targets.

Funding Cancer Research – the Role of Philanthropy

Charity plays a remarkable and essential role in supporting cancer research. Unsurprisingly given the fiscal dominance of the National Cancer Institute, EUROPE has a great portion of its funding through the philanthropic sector. The USA, however, dominates overall philanthropic giving with levels of nearly 2% of GDP across all charities (compared to 0.8% UK, 0.5% Netherlands & Sweden and 0.3% France[18]). In EUROPE the role of philanthropy has been belatedly recognised as an underexploited source of income for research[19]. However, charity is a complex phenomenon with different attitudes and giving patterns almost on a country by country basis[20]. Furthermore our understanding of altruism as a sociobiological phenomenon when applied to today's philanthropy, particularly those around secular causes has not been studied in any depth beyond the theoretical[21]. What might work at one level in a one Member State may not work in another. Other health charities, overseas aid, human welfare and heritage preservation groups are also increasing the pressure on charitable funds. Because of these inherent uncertainties philanthropy in cancer research should in policy terms be seen as additional to the overall global effort, which is mainly funded through taxation and private enterprise (industry) [22].

With the influx of single, wealthy donors to philanthropic causes the talk has been of a shift into philanthrocapatalism, essentially the 'businessnification' of charity[23]. Whilst this might superficially appear to inject more rigour into philanthropy there is little evidence that it is the right path. Indeed, becoming more like a business in the social sector, as Jim Collins has pointed out, is unlikely to be the right route for the simple reason that most businesses are mediocre. Furthermore the transactional nature of business is not conducive to philanthropy which requires a strong social bond with its donors. Whilst this survey has identified the major cancer research philanthropic funders in EUROPE and the USA, an analysis of their structures or strategies was beyond its scope[24]. It is likely that there are many organisations that raise private or public funds to support cancer service delivery – none of those have been captured by this survey. Nevertheless such information from future studies would be beneficial for promoting greater co-operation and collaboration.

European philanthropic organisations have identified three key issues for the future of this sector[25],

- Greater complementarity between philanthropic and government funding
- Co-operation among philanthropic organisations across borders
- Greater understanding of the different philanthropic typologies with fit-for-purpose regulatory environment.

Inroads have been made to greater co-operation between governmental and philanthropic funders both in Europe (the UK's NCRI and France L'INCa) and the USA (C-Change) and, whilst preserving the essential independence of philanthropic funders there is little doubt this is the best model. Whilst the major philanthropic funders of cancer research have begun to co-operate and engage across national borders (particularly in tobacco control) this is an area that needs further progress. There are difficulties to this goal with issues around the culture of philanthropy in respective countries (do people only give for cancer research in their own country?), regulatory complexities of conducting trans-national research, and intellectual property, to name but a few. However, all are surmountable hurdles that need to be overcome to provide the funding frameworks for the research community to collaborate across national borders.

"In women breast cancer is the most common form of cancer, amounting to nearly 31% of all incidence cases"

- IARC

Global Comparisons of Cancer Research

The ECRM survey has revealed some important differences to global cancer research funding, particularly the relative distribution between public and private sectors and funding through national healthcare and university systems.

Source of Funding	Funding (m, €)	As a % of Estimated Global Spend
Pharmaceutical Industry (top 24 companies)	3,095	22.1
USA (Government)	4,712	33.5
USA (Charitable)	456	3.3
USA ('Locked' in healthcare & university systems)	109	0.8
EU (Government)	992	7.1
EU (Charitable)	879	6.3
EU ('Locked' in healthcare & university systems)	1,364	9.7
Rest of World	2,423	17.2
TOTAL	**14,030**	

Whilst the USA has pursued a centrist funding model (the NCI and NIH combined are responsible for €4,459 billion or 86% of total USA spend) EU funding is highly distributed and directly governmentally controlled streams account for only 7.1% of funding compared to nearly 10% embedded in healthcare and university systems, and the 6.3% contributed by philanthropic organisations. In comparison to the USA the EU is faced with the complicated task of networking and aligning diverse and in many cases 'hidden' funding streams. Policy's that fail to take this into account are doomed to failure almost from the outset. Globally cancer research is being conducted by a diverse group driven by mostly competing agendas and strategies. There is no one dominant player, although with nearly a third of global funding the USA comes close to this. This is an important point as many policy makers assume that the global funding for cancer research is overwhelmingly concentrated in the USA. Our data indicates that this is not true and the effort is truly a global one. No one country or funder has the monopoly on the mission to beat cancer.

Global levels of expenditure on cancer research as a percentage of GDP or per capita continue to show substantial differences between the USA and EUROPE, however, this gap has substantially narrowed. A major part of this is the ability of this survey to estimate the cancer research funding flowing through national healthcare and university systems in EUROPE but there has also been a real increase in some Member State funding whilst the USA shrinks in real terms[26]. In comparison Japan, Canada and Australia are spending between €7.86 and €8.66 per capita on cancer research. The higher resolution of this second survey also allows comparison of spend per new case of cancer diagnosed (incidence) and per death from cancer (mortality). In 2004 there were an estimated 2,886,800 new cases of cancer with 1,711,000 deaths in EUROPE which gives a spend per incident case of €1,155 and per death €1,949[27]. In comparison USA spent in the same year some €3,857 per incident case and €9,361 per cancer death[28].

Whilst the gap between cancer research funding in EUROPE and USA remains substantial, cancer research outputs over a ten year period have been similar with EUROPE producing more cancer research publications by a steady 4-5% above USA since 1997. Indeed our data suggests that EUROPE is now increasing its share of global cancer research outputs with an upward trend that started in 2001, at the same time that the USA remains relatively flat. The type of research that is being conducted and then published is also changing. We have found that the published research in EUROPE to be more 'clinical' than that in the USA with a modest trend in the latter towards even 90 more clinical outputs[29]. Interestingly a separate study has found that globally cancer research has changed from a bipolar allegiance to either clinical or laboratory styles in the 1980's to the creation of a 'third' style by 2000 where research activity is structured by a common orientation to a translational research domain[30].

The impact of regulatory policy on research funding and productivity remains, as it was for the first survey, a critical issue for all countries.

As EUROPE has recently discovered, changes to regulatory policy can have a dramatic effect on the cost of research[31]. Over the last decade the fashion for ever increasing regulation across all domains – clinical trials, healthcare data, human tissue – has led to an increase in the unit cost of research in the absence of any tangible social benefit of many of those regulations. Good research governance is essential but bureaucracy is absorbing too much of the global investment in cancer research[32]. There is an urgent need to reconsider the regulatory paradigms that have been built into a thriving industry around cancer research, and reverse this trend.

Public and Private Investment: distinctive or complimentary?

As the OECD noted companies are increasingly making use of public research through direct funding and more collaboration with public research institutions[33]. Likewise in response to the high social priority given to health by a number of countries, total R&D budgets are rising with particular emphasis on cost-effective innovations. Data from this survey give a gross estimate of those countries for which cancer is a clear socio-political priority – USA, UK, Sweden, Norway, etc – based on spend per capita / % GDP and outputs. Importantly we have found that there remains in some EU Member States substantial under funding by certain governments despite strong S&T policies overall. The political deprioritisation and under funding of cancer research by those countries that can, a) afford it and, b) have the research workforce remains a serious concern.

Although the USA is the dominant country for commercially sponsored phase III pivotal clinical trials[34] this survey has found substantial cancer research activity conducted by the pharmaceutical industry in both EUROPE and USA on the basis of the geographical origin of published cancer research papers. Much of this work (>50%) is the result of collaborations with the public sector. Our data (not presented in this report) show that this trend has been increasing. Our estimates of cancer research spend by the major pharmaceutical companies necessarily underestimate total global spend by omission of SME and biotech firms and current spend on pivotal phase III clinical trials. However, the gross figure of just over €3 billion per annum helps place industries global contribution in perspective with other governmental and charitable funders. Industry is responsible for around a quarter of global investment in cancer research. To put the industry expenditure into perspective in 2004 global pharmaceutical R&D expenditures reached €41 billion (c. $56 billion) with, according to this survey, around 7% of this flowing into cancer research[35]. Traditionally EUROPE has been considered relatively weak in attracting industry R&D funding, however, certainly when one considers the geographical origin of pharmaceutical industry publications EUROPE is very much an equal partner with the USA in cancer research. Indeed EUROPE attracts some 45.9% of *total* pharmaceutical R&D expenditure[36].

"In men, prostrate cancer is the most common form of cancer, amounting to 24% of all incidence cases"

- IARC

Nearly all major recent policy cancer research funding and policy initiatives have emphasised the public-private partnership route[37]. EU money is often being partnered with industry and there is a real danger that if all increases in EU cancer research funding go this way Europe's intrinsic creativity would be distorted by encouraging subsidy-seeking behaviour and essential areas of public health relevant to cancer, but not amenable to a business approach would remain orphans. Increasingly research policy has been directed to supporting the transfer of technology from knowledge-generating organisations in the public sector (e.g. universities) to firms through the establishment of co-operative links[38].

In considering the global role of industry in cancer control, it is true (as the World Health Organisation have articulated) that any new treatment is unlikely to be a 'magic bullet' and that health promotion and cancer prevention

must remain a very high priority for governmental and charitable funders[39]. Indeed, there is sound reason to believe that priority-setting focused on predicted practical relevance, i.e. industrial utility should be avoided by EUROPE. Firstly most technology advances are derived from a broad base of scientific and technological fields and second, as Keith Pavitt describes, "our ability to understand the present and to predict successful future applications is very limited. In detail, predictions will often be wrong, and in broad scope it will be obvious[40]."

The politics of cancer research

Whilst this survey has identified some €14 billion spent annually on global cancer research the scope of the cancer control problem is so vast that even these substantial sums are insufficient and complex socio-political decisions will still need to be made on what research is (or is not) funded. As an editorial in Science recently noted the $5 million allocated to the Cancer Genome Atlas project could fund five National Institute of Health grants on such topics[41]. The constraints on the NCI budget over the last few years have forced the policy debate within the USA cancer research community. Arguments both for and against the need for more funding are being aired and serious questions are now being asked about the strategic emphasis on new drug discovery and development at the expense of more concerted action around prevention and early diagnosis[42].

As research unravels the complex and complicated structure of cancer and delivers increasingly sophisticated management (from diagnosis onwards) cost has now become a dominant factor in policy making. In developed countries healthcare costs are rising so quickly that all containment strategies seem doomed to eventual failure. Indeed, and paradoxically, it is scientific research that is responsible for establishing the basis for expensive new medical interventions and thus driving health care expenditure according to Victor Fuchs of Stanford[43]. But of course it is research that provides the only realistic way to address this issue through the discouragement of treatments that have no efficacy and / or that are likely to cause unacceptable side effects. Whilst the prevailing fashion is for new drugs there remains tremendous scope and mileage in cancer research aimed at improving existing treatments (both surgical and pharmaceutical) as well as health management, quality of life and prevention studies. Organisational funding strategies need to cover the broad church that makes up cancer research.

The association between cancer research activity and patient outcomes for any given healthcare system or country is a complex one. Intuitively centres, countries and continents that are research active should deliver higher standards of care to patients through the application of more effective medical technologies and the more widespread adherence to best practice / guidelines. Indeed, the data we have presented in this survey on both funding levels and outputs demonstrate some association with gross outcome measures such as survival[44].

In comparison to the first survey we have not attempted to estimate the distribution of research funding by either site (breast, bowel, etc) or research domain (fundamental biology, prevention, etc.). The self reported methodology contained too many errors for it to be valid for policy makers. Some progress has been made around the use of the Common Scientific Outline to code research using a common language. However, the future utility of this approach depends on Europe adopting this important policy tool. Important questions remain about the relative efforts on various site specific cancers and research domains which can only be addressed with appropriate evidence and policy tools e.g. International Cancer Research Portfolio[45] and a cooperative programme of strategic planning. The importance of transparency and openness by organisations funding cancer research to sharing this information cannot be underestimated.

Cancer research is a complex global activity aimed at controlling a complicated disease that will affect of over 15 million people by 2020. Efforts to control and cure cancer are multifaceted and subject to many interdependencies. The second ECRM survey has mapped out in greater detail the many and diverse funding streams for global cancer research as well as global outputs. Traditional research cultures compartmentalised to specific domains (laboratory or clinical), geography, and institutions are evolving to fit the global research paradigm.

However, great discoveries that will help cancer

patients and their families will only come from a climate of intellectual freedom and tolerance that fosters an atmosphere of creativity. Bureaucracy and over-management remain constant dangers to progress and never has there been a more urgent need for a 'third culture' to drive the engagement between research community and public[46]. Much has been achieved, and yet, much still remains to be accomplished.

END NOTES

[1] Full report at www.ecrmforum.org & Eckhouse S, Sullivan R. A Survey of Public Funding of Cancer Research in the European Union **PLoS Medicine** 3 (7), e267.

[2] McGeary M and Burstein M. *Sources of cancer research funding in the United States*. Prepared for the National Cancer Policy Board, Institute of Medicine, June 1999.

[3] There has already been one attempt to assess oncological productivity in the EU: see Ugolini D *et al*. Assessing oncological productivity: is one method sufficient? **Eur J Cancer** 2002, 38: 1121-1125.

[4] For example, chapter 19 *Research* in Judith MacKay *et al*. *Cancer Atlas*. ACS, CDC, IARC, 2005 and Anna Wagstaff's European research crisis: the cancer community must make its voice heard. **Cancer World**, 2005, July-Aug: 12-21.

[5] Sobocki P *et al*. Resource allocation to brain research in Europe – a full report. **Eur J Neurosci,** 2006: 24(10): 1-24.

[6] Ferlay J *et al*. *GLOBOCAN 2000* www.iarc.fr IARC Cancer Base No.5 Lyon France.

[7] Boyle P. Ferlay J. Cancer incidence and mortality in Europe, 2004. **Annals Oncology** 2005, 16: 481-88.

[8] Pavitt K. The inevitable limits of EU R&D funding. **Res. Policy** 1998, 27: 559-68.

[9] The recent Warsaw declaration signed by patient groups attending the European Cancer Patient Coalition / Slovenian Cancer Summit in November 2006 strongly supported the need to invest and improve cancer control programmes as a priority.

[10] Some of the measures, e.g. INCO and ERA-NET, outlined in the European Commission's *A New Approach to International S&T Co-operation In the EU's 7th Framework Programme (2007-13*) EUR 22582, 2007, may facilitate this but it will still remain the responsibility of individual countries to implement an action programme to address cancer research funding deficits.

[11] See http://cordis.europa.eu/lifescihealth/cancer/cancer-pro-calls.htm for the cancer proposals funded under FP6.

[12] Presentation Dr Octavi Quintana Trias (Director, DG Research) *Biotechnology for Health Future Perspectives* to EC -US Task Force for Biotechnology, 19 July 2006.

[13] Laredo, P. The networks promoted by the framework programme and the questions they raise about its formulation and implementation. **Res. Policy** 1998, 27: 589-98.

[14] The need for such European infrastructure funding has already been recognised in a European Council report. European Strategy Forum on Research Infrastructures. *European Roadmap for Research Infrastructures Report 2006*. Luxembourg ; specifically the sections on biobanking and clinical trials are directly relevant for cancer research.

[15] EUROCAN+ aims to improve the coordination of cancer research in Europe (www.eurocanplus.org) and EUSTIR aims to create a European strategy for the integration of research on breast cancer.

[16] This debate has already begun, see Wagstaff A. On the road to a single European cancer society. **Cancer World** 2005, Sept-Oct: 14-24. Despite the hegemony of the NCI in the USA a similar situation exists with a diverse and large number of highly active philanthropic funders and patient advocates.

[17] Gelauff, GMM, Lejour AM. *The new Lisbon Strategy. An estimation of the economic impact of reaching five Lisbon targets*. Industrial Policy and Economic Reforms paper 1 for DG Enterprise, European Commission, 2006.

[18] Philanthropic giving as a % of GDP, 1995-2002. John Hopkins Comparative Nonprofit Sector Project.

[19] Report of the independent Expert Group on R&D and the Innovation appointed following the Hampton Court summit and chaired by Mr Esko Aho. *Creating an Innovative Europe*. Jan 2006. EUR 22005.

[20]Karen Wright. Charitable Change – creating a new culture of giving for Britain. **LSE Magazine** Winter 2000: 19-21.

[121] Nick Humpries. Varieties of altruism – and the common ground between them. **Social Research** 1997, 64: 199-209.

[22] Around three quarters of cancer research funding in EUROPE and the USA flows from taxation (governmental organisations and healthcare/university systems) and industry.

[23] Economist. *The business of giving. A survey of wealth and philanthropy*. Feb, 25th 2006.

[24] Development Assistance Committee. Philanthropic Foundations and Development Co-operation. **OECD. DAC Journal** 2003, 4(3): 1-24.

[25] Giving More for Research in Europe: *Strengthening the role of philanthropy in the financing of research.* Brussels, 27 -28 March 2006. EUR 2261 EN

[26] The downward trend is most simply demonstrated by the requested and actual budgets of the NCI since 2006: In Fiscal Year (FY) 2006 NCI requested budget was $6.17 Bn (estimated actual budget $4.79 Bn); FY2007 requested budget $5.95 Bn (estimated actual $4.75 Bn) and the FY2008 requested budget is $5.8. See, *plan.cancer.gov*

[27] Boyle P. Ferlay J. Cancer incidence and mortality in Europe, 2004. **Annals Oncology** 2005, 16: 481-88.

[28] Jemal A *et al*. Cancer Statistics 2004. **CA Cancer J Clin** 2004, 54: 8-29.

[29] The roots of this difference can be traced back to the broader post-war 1950's US research policy that saw Federal R&D spending dominated by basic science. Mowery, DC. The changing structure of the US national innovation system: implications for international conflict and co-operation in R&D policy. **Res. Policy**, 1998, 27: 639-54.

[30] Cambrosio A *et al*. Mapping the emergence and development of translational cancer research. **Eur J Cancer** 2006, 42: 3140-3148.

[31] Hartmann, M. Hartmann-Vareillas, F. The clinical trials Directive: how is it affecting Europe's non-commercial research? **PLoS Clinical Trials** 1(2): e13. DOI:10.1371/journal.pctr.0010013

[32] Costs for cancer clinical trials in the UK have doubled for the non commercial sector since the introduction of the 'Clinical Trials' directive. Hearn J. Sullivan R. The impact of the 'Clinical Trials' directive on the cost and conduct of non-commercial cancer trials in the UK **Eur J Cancer** 2007, 43: 8 -13.

[33] Science and Innovation Policy. *Key challenges and opportunities. OECD*. Meeting of the Committee for Scientific and Technological Policy at Ministerial Level 29-30 January 2004. [Report]

[34] CMR International. *2006/2007 Pharmaceutical R&D FactBook*. 2006.

[35] This is a low estimate as it does not account for either SME, biotech funding nor the current expenditure on phase III pivotal trials. The true level of expenditure may be nearly double to around 15% of total R&D expenditure. Additionally the total global estimates of health R&D spend published by Global Forum for Health Research are around $106 billion.

[36] Centre for Medicines Research International. *The 2005/2006 CMR International R&D factbook*, CMR, Surrey 2006.

[37] For example, the Innovative Medicines Initiative (IMI) Strategic Research Agenda aimed at drug development which will be funded through Framework 7 and include cancer.

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[39] Kaplan W, and Laing R. *Priority Medicines for Europe and the World.* WHO/EDM/PAR/2004.7, Nov. 2004.

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[41] First pass at Cancer Genome reveals complex landscape. **Science**, 2006, 313: 1370.

[42] Vanchieri, C. National Cancer Act: a look forward and a look backward. **JNCI**, 2007, 99 (5): 342-345.

[43] Survey of health-care finance. **Economist**, 2004: 3-18.

[44] Coleman, MP *et al*. EUROCARE-3 summary. **Annals Oncol.** 2003, 14 (suppl 5):v.128-149.

[45] http://www.cancerportfolio.org/index.jsp

[46] Snow CP. *The two cultures and the scientific revolution.* New York: Cambridge University Press 2nd edition, 1963.

Appendix

Database of European Funding Survey

Country	Name	Address	Type	Web Address	2004 Spend (m)
Austria	**Fellinger-Krebsforschung**	Gemeinnütziger Verein zur Förderung der Krebsforschung Rudolfinerhaus Billrothstr. 78 A-1190 Wien	Charity		€ 0.060
Austria	**Fonds zur Förderung der wissenschaftlichen Forschung (FWF)**	Weyringergasse 35 A-1040 Wien	Government Agency	www.fwf.ac.at	€ 1.74
Belgium	**Belgian Federal Science Policy Office**	Rue de la Science 8 Wetenschapsstraat B-1000 Brussels	Government Agency	www.belspo.be	€ 1.69
Belgium	**Belgian Federation against Cancer**	Fédération Belge contre le Cancer Chaussée de Louvain 479 1030 Bruxelles	Charity	www.cancer.be	€ 5.00
Belgium	**Centrum voor Studie en Behandeling van Gezwelziekten Gent**	Universitair Ziekenhuis Kliniek voor Radiotherapie en Kerngeneeskunde De Pintelaan 185 B-9000 Gent	Government Agency		€ 0.060
Belgium	**F.N.R.S. Fonds National de la Recherche Scientifique**	F.N.R.S. Rue dEgmont 5 B-1000 Bruxelles	Government Agency		€ 13.9
Belgium	**F.W.O. (Research Foundation Flanders)**	F.W.O.-Vlaanderen Egmontstraat 5 1000 Brussels	Charity	www.sun.fwo.be	€ 3.52
Belgium	**Flemish League against Cancer**	(Vlaamse Liga tegen Kanker - Kom op tegen Kanker) Koningsstraat 217 B- 1210 Brussel	Charity	www.tegenkanker.net	€ 1.16
Belgium	**Fortis FB Verzekeringen**	Wolvengracht 48 1000 Brussel	Charity	www.fortisbank.com	€ 0.880
Belgium	**Het Limburgs Kankerfonds vzw**	Limburgs Universitair Centrum Universitaire Campus Gebouw A B-3590 Diepenbeek	Government Agency		**No Response**
Belgium	**I.W.T**	Instituut voor de aanmoediging van Innovatie door Wetenschap en Technologie in Vlaanderen Bischoffsheimlaan 25 B-1000 Brussel	Government Agency	www.iwt.be	€ 9.13
Belgium	**King Baudouin Foundation**	Brederodestraat 21 B-1000	Charity	www.kbs-frb.be	€ 0.045
Belgium	**La Région Wallonne Direction Générale des Technologies de la Recherche et de l'Energie**	Avenue Prince de Liège 7 B-5100 Jambes	Government Agency		€ 0
Belgium	**Televie**	rue d' Egmont 5 B - 1000 Bruxelles	Government Agency	www.fnrs.be	€ 6.21
Bulgaria	**Ministry of Health**	Public Relations Office 5 Sveta Nedelia Square Sofia 1000	Government Agency	www.mh.government.bg	
Cyprus	**The Cyprus Association of Cancer Patients and Friends**	12 & 14 Photinou Pana Street P.O.Box 23868 1687 Nicosia	Charity	www.cancercare.org.cy	€ 0
Cyprus	**The Cyprus Anti-Cncer Society**	2 Paraskeva Ioannou Dhasoupolis 2020 Strovolos P.O. Box 25296 1308 Nicosia	Charity	www.anticancersociety.org.cy	€ 0.052
Cyprus	**The Cyprus Research Promotion Foundation**	P O Box 23422 1683 Nicosia	Charity	www.research.org.cy	€ 0.472
Czech Republic	**Grant Agency of the Academy of Sciences of the Czech Republic (GAAV)**	Narodni 3 117 20 Prague	Government Agency	www.gaav.kav.cas.cz	€ 0.355
Czech Republic	**Grant Agency of the Czech Republic (GACR)**	Narodni 3 110 00 Prague	Government Agency	www.gacr.cz	€ 0.838
Czech Republic	**Internal Grant Agency of the Ministry of Health of the Czech Republic**	Palackeho nam. 4 128 01 Prague	Government Agency	www.mzcr.cz	€ 2.91
Czech Republic	**The League Against Cancer Prague**	Na slupi 6 128 42 Praha 2	Charity	www.lpr.cz	€ 0.250
Denmark	**Børnecancerfonden**	Blegdamsvej 27 Postboks 847 2100 København Ø	Charity	www.boernecancerfonden.dk	€ 0.288
Denmark	**Danish Cancer Society**	Kræftens Bekæmpelse Strandboulevarden 49 Kobenhavn	Charity	www.cancer.dk	€ 23.2
Denmark	**Danish Medical Research Council**	Forskningsstyrelsen Artillerivej 88 2300 København S	Government Agency	www.forsk.dk	€ 3.10
Denmark	**Dansk Kræftforskning Fond (Danish Cancer Research Foundation)**	Amerika Plads 37 2100 København Ø	Charity	www.dansk-kraeftforsknings-fond.dk	€ 0.603
Estonia	**Estonian Ministry of Education and Research**	Munga 18 50088 TARTU	Government Agency	www.hm.ee	
Estonia	**Enterprise Estonia**	Liivalaia 13/15 10118 Tallinn	Government Agency	www.eas.ee	€ 0.977
Estonia	**Estonian Science Foundation**	Endla 4 10142 Tallinn	Government Agency	www.etf.ee	€ 0.058
Finland	**Cancer Society of Finland**	Liisankatu 21 B FIN-00170 Helsinki	Charity	www.cancer.fi	€ 4.30

Country	Name	Address	Type	Web Address	2004 Spend (m)
Finland	**Finnish Cultural Foundation**	P.O.Box 203 (Bulevardi 5 A) FIN-00121 Helsinki	Charity	www.skr.fi	€ 0.300
Finland	**Ministry of Social Affairs and Health**	P.O.Box 33 FIN-00023 Government	Government Agency	www.stm.fi	€ 0.030
Finland	**Sigrid Juselius Foundation**	Aleksanterinkatu 48 B FIN-00100 Helsinki	Charity	www.terkko.helsinki.fi	€ 1.00
Finland	**TEKES**	Finnish Funding Agency for Technology and Innovation P.O. Box 69 FI-00101 Helsinki	Government Agency	www.tekes.fi	€ 10.0
Finland	**The Academy of Finland**	Research Council for Health P.O.Box 99 (Vilhonvuorenkatu 6) FIN-00501 Helsinki	Government Agency	www.aka.fi	€ 1.28
France	**Assistance Publique - Hôpitaux de Paris**	Service de Formation contunue des médecins Assistance Public Hospital de Paris 3 Ave Victoria 75184 Paris Cedex 04	Government Agency		€ 20.0
France	**Association Franciase les Myopathies**	9 place de Rungis 75013 Paris	Charity		**No Response**
France	**Association pour la Recherche surle Cancer**	9, rue Guy Moquet 94803 Villejuif Cedex	Charity	www.arc.asso.fr	€ 23.4
France	**FEGEFLUC**	Federation Groupements Entreprises Francaises Lutte Contre Cancer 30 rue Montgrand 13006 Marseille	Charity		€ 0.698
France	**Fondation de France**	40, avenue Hoche 7 5008 Paris	Charity	www.fdf.org	€ 2.90
France	**Fondation pour la Recherche Medicale**	54, rue de Varennes 75007 Paris Cedex 07	Charity	www.frm.org	€ 4.00
France	**INSERM**	Bureau des Contrats, DEFR INSERM 101, rue de Tolbiac 75654 Paris Cedex 13	Government Agency	www.inserm.fr	€ 48.2
France	**Institut Curie**	26, rue d'Ulm 75248 Paris Cedex 05	Charity	www.curie.fr	€ 38.0
France	**Institut National de la Recherche Agronomique (INRA)**	147, rue de l'Université 75338 Paris Cedex 07	Government Agency	www.inra/fr	€ 0.500
France	**Le Centre national de la recherche scientifique (CNRS)**	3, rue Michel-Ange 75794 PARIS cedex 16	Government Agency	www.cnrs.fr	€ 84.0
France	**LEEM Recherche**	25 rue de Montevideo 75016 Paris	Government Agency	www.afrt.org	**No Response**
France	**Ligue Nationale contre le cancer**	14, rue Corvisart 75013 Paris	Charity	www.ligue-cancer.asso.fr	€ 27.6
Germany	**Bundesministerium für Bildung und Forschung (BMBF)**	Hannoversche Straße 28-30 D 10115 Berlin	Government Agency	www.bmbf.de	€ 184
Germany	**Deutsche Forschungsgemeinschaft**	Kennedyallee 40 D-53175 Bonn	Charity	www.dfg.de	€ 60.0
Germany	**Deutsche José Carreras Leukämie-Stiftung e. V.**	Arcisstraße 61 D-80801 München	Charity	www.carreras-stiftung.de	€ 8.15
Germany	**Deutsche Krebshilfe**	Thomas-Mann-Str. 40 Postfach 1467 D-53111 Bonn	Charity	www.krebshilfe.de	€ 61.8
Germany	**Wilhelm Sander-Stiftung**	Goethestraße 74 D-80336 München	Charity	www.wilhelm-sander-stiftung.de	€ 9.09
Germany	**Wilhelm-Vaillant-Stiftung**	Frauenklinik der Ludwig-Maximilians-Universität Maistraße 11 D-80337 München	Charity	www.wilhelmvaillantstiftung.de	€ 0.124
Greece	**General Secretariat of Research and Technology**	14-18 Mesogeion St 115 27 Athens	Government Agency	www.gsrt.gr	€ 38.7
Greece	**Hellenic Cancer Society**	18-20 An. Tsoha Street Athens GR- 115 21	Charity		€ 0.165
Greece	**Ministry of Health and Welfare**	17 Aristotelous Street 10187 Athens	Government Agency	www.ypyp.gr	**No Response**
Greece	**National Hellenic Research Foundation**	The Institute of Biological Research and Biotechnology 48 Vassileos Constandinou Avenue 116 35 Athens	Government Agency	www.eie.gr	€ 0.800
Hungary	**Ministry of Education**	Szalay u. 10-14. 1055 Budapest	Government Agency	www.om.hu	€ 0.600

Country	Name	Address	Type	Web Address	2004 Spend (m)
Hungary	**Ministry of Health, Social and Family Affairs**	Arany Janos U. 6 – 8 1051 Budapest	Government Agency	www.eszcsm.hu/eszcsm	€ 0.190
Hungary	**National Institute of Oncology**	7-9 Ráth György Street 1122 Budapest	Charity	www.oncol.hu	€ 1.50
Iceland	**The Icelandic Science Fund, RANNIS**	Laugavegi 13 101 Reykjavik	Government Agency	www.rannis.is	€ 0.0003
Iceland	**Icelandic Cancer Society**	Skogarhlid 8 105 Reykkjavik	Charity	www.krabb.is	€ 0.022
Iceland	**The University of Iceland Research Fund**	University of Iceland Sudurgata, 101 Reykjavik	Government Agency	www2.hi.is/page/rannsoknasjodir	€ 0.055
Ireland	**Childrens Leukaemia Research Project**	1 Carraroe Avenue Donaghmeade Dublin 13	Charity		€ 0.100
Ireland	**Health Research Board**	73 Lower Baggot Street Dublin 2	Government Agency	www.hrb.ie	€ 3.40
Ireland	**Higher Education Authority**	Marine House Clanwilliam Ct Dublin 2	Government Agency	www.hea.ie	€ 7.00
Ireland	**Enterprise Ireland**	Glasnevin Dublin 9	Government Agency	www.enterprise-ireland.com	**No Response**
Ireland	**Irish Cancer Society**	5 Northumberland Road Dublin 4	Charity	www.cancer.ie	€ 1.81
Ireland	**Science Foundation Ireland**	Wilton Park House Wilton Place Dublin 2	Government Agency	www.sfi.ie	€ 3.71
Israel	**Chief Scientist Office, Ministry of Health**	2 Ben Tabai St. Jerusalem 91010	Government Agency	www.health.gov.il	€ 0.368
Israel	**DKFZ/MOST**	Ministry of Science Hakiria Hamizrachit Blgd 3 POB 49100 Jerusalem 91490	Government Agency	www.dkfz-heidelberg.de/israel	€ 0.600
Israel	**German-Israel Fund - GIF**	16 King Goerge St. POB 7008 Jerusalem 91070	Government Agency	www.gifres.org.il	€ 1.40
Israel	**Israeli Cancer Association**	7 Revivim St. POB 437 Givataim 53103	Charity	www.cancer.org.il/home.asp	€ 0.813
Israel	**Israel Cancer Research Fund - ICRF**	9 Haluman Street Suite 205, P.O. Box 53442 Jerusalem, 91533	Charity	www.icrfonline.org	€ 1.32
Israel	**Israeli Ministry of Science**	POB 49100 Jerusalem 91490	Government Agency	www.most.gov.il	**No Response**
Israel	**Israel Science Foundation - ISF**	Albert instein Sq. POB 4040 Jerusalem 91040	Government Agency	www.isf.org.il	€ 0.850
Israel	**The Middle East Cancer Consortium**	P.O.B. 7495 Haifa 31074	Charity	ecc.cancer.gov	€ 0.692
Italy	**Associazione Italiana contro le Leucemie -Linfomi e Mieloma**	Via Ravenna 34 00161 Roma	Charity	www.ail.it	€ 5.82
Italy	**Associazione Italiana per la Lotta al Neuroblastoma**	Istituto G. Gaslini Largo G. Gaslini, 5 16148 Genova	Charity	www.neuroblastoma.org	€ 0.524
Italy	**Associazione Italiana per la Ricerca sul Cancro (AIRC)**	Via Corridoni 7 20122 Milano	Charity	www.ail.it	€ 19.4
Italy	**Comitato Telethon Fondazione Onlus - Fondazione Telethon**	Via G. Saliceto, 5a 00161 Roma	Charity	www.telethon.it	€ 0.496
Italy	**Consiglio Nazionale delle Ricerche**	piazzale Aldo Moro 7 00185 Roma	Government Agency	www.cnr.it/sitocnr	€ 19.0
Italy	**Fondazione Italiana per la Ricerca sul Cancro**	Via Corridoni 7 20122 Milano	Charity	www.airc.it/sito/firc	€ 18.2
Italy	**Fondazione Umberto Veronesi**	Piazza Valasca 5 20122 Milano	Charity	www.fondazioneveronesi.it	€ 1.49
Italy	**Istituto Superiore di Sanità**	viale Regina Elena 299 00161 Roma	Government Agency	www.iss.it	€ 5.85
Italy	**Lega Italiana per la Lotta contro i Tumori**	Via Torlonia 15 00161 Roma	Charity	www.legatumori.it	€ 15.2
Italy	**Ministero della Salute**	Dipartimento dell' Innovazione Piazzale dell'Industria, 20 00144 Roma	Government Agency	www.ministerosalute.it	€ 5.20
Italy	**Ministero dell'Istruzione dell' Università e della Ricerca**	Piazzale Kennedy 20 00144 Roma	Government Agency	www.miur.it	€ 24.2
Latvia	**Latvian Council of Science**	Akademijas laukums 1 Riga 1050	Government Agency	www.lzp.lv	€ 0.064
Lithuania	**Institute of Oncology, Vilnius University**	Santariskiu str. 1 LT-08660 Vilnius	Government Agency	www.loc.lt	€ 0.615
Luxembourg	**Centre Hospitalier de Luxembourg (CHL)**	2, rue Barblé L-1210	Government Agency	www.chl.lu	**No Response**
Luxembourg	**CRP-Santé (Centre de Recherche Publique)**	18, rue Dicks B.P. 2021 L-1020	Government Agency	www.sante.lu	€ 0.295
Luxembourg	**Fondation Luxembourgoise contre le Cancer**	209, Route d'Arlon L-1150	Charity	www.cancer.lu	€ 0.317

Country	Name	Address	Type	Web Address	2004 Spend (m)
Luxembourg	**Fondation pour la Recherche sur le Cancer et les Maladies du Sang (FRCMS)**	2, rue Barblé L-1210 Luxembourg	Charity		**No Response**
Netherlands	**Dutch Cancer Society**	P.O. Box 75508 1070 AM Amsterdam	Charity	www.kwfkankerbestrijding.nl	€ 46.7
Netherlands	**Ministry of Helath, Welfare and Sport**	PO Box 20350 2500 EJ The Hague	Government Agency	www.minvws.nl	€ 10.2
Netherlands	**Netherlands Genomics Initiative**	Laan van Nieuw Oost Indië 300 P.O. Box 93035 2509 AA The Hague	Government Agency	www.genomics.nl	€ 2.92
Netherlands	**ZonMw (The Netherlands Organisation for Health Research and Development)**	P.O. Box 93245 2509 AE The Hague	Government Agency	www.zonmw.nl	€ 5.20
Norway	**Norwegian Cancer Society**	P.O. Box 4 Sentrum 0101 OSLO	Charity	www.kreftforeningen.no	€ 14.7
Norway	**The Research Council of Norway**	P.O. Box 2700 St. Hanshaugen N-0131 Oslo	Government Agency	www.forskningsradet.no	€ 9.00
Poland	**Ministry of Education and Science**	Department of International Cooperation Wspólna St. 1/3 00-529 Warsaw 53	Government Agency	www.kbn.gov.pl	€ 2.25
Poland	**Ministry of Health**	Department of Science and Higher Education ulica Miodowa 15 00-952 Warsaw	Government Agency	www.mz.gov.pl	€ 0.055
Poland	**Polish Anti-Cancer Committee**	5 Roentgena Street 02-781 Warsaw	Charity	www.coi.waw.pl	€ 0.163
Poland	**The Maria Sklodowska-Curie Memorial Centre on Oncology**	PO Box 106 5 W.K. Roentgena Str. 02-781 Warsaw	Government Agency		€ 2.55
Portugal	**Liga Portuguesa Contra o Cancro**	Av. Columbano Bordalo Pinheiro n.º 57 3.º frente 1070-061 LISBOA	Charity	www.ligacontracancro.pt	€ 0.270
Portugal	**Fundação para a Ciência e a Tecnologia**	Av. D. Carlos I, 126, 2º 1249-074 Lisboa	Government Agency	www.fct.mct.pt	€ 3.77
Romania	**Ministry of Education, Research and Youth**	Str. Gen. Berthelot 28-30 Sector 1 70738, Bucuresti	Government Agency	www.ed.ro	€ 0.950
Slovak Republic	**Cancer Research Foundation**	Vlarska 7 833 91 Bratislava	Charity	www.nr.sk	€ 0.156
Slovak Republic	**Science and Technology Assistance Agency of Slovak Republic**	Hanulova 5/B 841 01 Bratislava	Government Agency	www.apvt.gov.sk	€ 1.25
Slovak Republic	**Slovak Academy of Sciences**	Stefanikova 49 814 38 Bratislava	Government Agency		€ 1.30
Slovak Republic	**The League against Cancer of the SR**	Spitalska 21 81232 Bratislava	Charity	www.lpr.sk	€ 0.223
Slovenia	**Ministry of Health**	Stefanova 5 SI 1000 Ljubljana	Government Agency		€ 0.013
Slovenia	**Slovenian Research Agency**	Trg OF 13 SI-1000 Ljubljana	Government Agency	http://www.mszs.si	€ 1.65
Spain	**Comunidad Autonoma de Madrid**	Alcalá, 30-32 Madrid 28014	Government Agency	www.madrid.org	€ 0.668
Spain	**Asociación Española contra el Cáncer**	Amador de los Rios 5 28010 Madrid	Charity	www.aecc.es	€ 1.05
Spain	**Fundación La Caixa**	Avda. Diagonal, 621. Barcelona 08028	Charity	www.lacaixa.es	€ 1.37
Spain	**Instituto de Salud Carlos III - FIS (Ministerio de Sanidad y Consumo)**	Sinesio Delgado, 6 Madrid 28029	Government Agency	www.msc.es	€ 21.3
Spain	**Ministerio de Educación y Ciencia (Ministry of Education and Science)**	Paseo de la Castellana, 160 Madrid 28046	Government Agency	www.mcyt.es	€ 13.6
Sweden	**Cancer och Trafiksakadades Riksförbund**	Box 9509 SE-102 74 Stockholm	Charity	www.ctrf.se	€ 0.215
Sweden	**Barncancerfonden**	P. O. Box 5408 S-114 84 Stockholm	Charity	www.barncancerfonden.se	€ 10.3
Sweden	**Cancer- Och Allergifonden**	Tomtebogatan 39 113 38 Stockholm	Charity	www.cancerochallergifonden.se	€ 6.11
Sweden	**Cancerfonden**	David Bagares gata 5 SE-10155, Stockholm	Charity	www.cancerfonden.com	€ 31.1
Sweden	**Gunnar Nilssons Cancerstiftelse**	Box 1027 251 10 Helsingborg	Charity	www.cancerstiftelsen.com	€ 4.79
Sweden	**Radiumhemmets forskningsfonder**	Box 25 SE 17111 Solna	Charity	www.radiumhemmetsforsknings fonder.com	€ 3.09
Sweden	**Vetenskapsrådet - Medicin**	Regeringsgatan 56 103 78 Stockholm	Government Agency	www.vr.se	€ 5.30
Switzerland	**Krebsliga Schweiz**	Effingsrstrasse 40 Postfach 8219 CH-3001 Bern	Charity	www.swisscancer.ch	€ 3.70
Switzerland	**Oncosuisse**	Effingerstr 40 Postfach 7021 CH-3001 Bern	Charity	www.oncosuisse.ch	€ 7.77

Country	Name	Address	Type	Web Address	2004 Spend (m)
Switzerland	**Schweizerischer Nationalfonds (Swiss National Science Foundation)**	Wildhainweg 20 CH-3012 Bern	Government Agency	www.snf.ch	€ 10.7
Switzerland	**Staatssekretariat für Bildung und Forschung SBF**	Hallwylstrasse 4 CH-3003 Bern	Government Agency	www.sbf.admin.ch	€ 7.30
Switzerland	**Swiss Institute for Experimental Cancer Research**	Ch.des Boveresses 115 Postfach CH-1066 Epalinges	Charity	www.isrec.ch	€ 6.40
Turkey	**Cancer Control Department of Turkish Ministry of Health**	Saglik Bakanligi Mithatpasa Caddesi No:3 06410 Sihhiye, Ankara	Government Agency	www.saglik.gov.tr	€ 1.23
Turkey	**The Scientific and Technical Council of Turkey (TUBITAK)**	Ataturk Bulvari No:221 Kavaklidere Ankara	Government Agency	www.tubitak.gov.tr	€ 1.19
Turkey	**Turkish Association of Cancer Research and Control (TKAK)**	Ataç Sokak No:21 06420 Yenisehir, Ankara	Charity	www.turkkanser.org	€ 0.043
Turkey	**Turkish Prime Ministry State Planning Organization (DPT)**	Necati Bey Caddesi No:108 06100 Yücetepe, Ankara	Government Agency	www.dpt.gov.tr	€ 0.453
UK	**Association for International Cancer Research**	Madras House St. Andrews Fife, Scotland KY16 9EH	Charity	www.aicr.org.uk	€ 12.3
UK	**Biotechnology and Biological Sciences Research Council**	Polaris House North Star Avenue Swindon SN2 1UH	Government Agency	www.bbsrc.ac.uk	€ 15.9
UK	**Breakthrough Breast Cancer**	3rd Floor Kingsway House 103 Kingsway London WC2B 6QX	Charity	www.breakthrough.org.uk	€ 9.71
UK	**Breast Cancer Campaign**	Clifton Centre 110 Clifton Street London EC2A 4HT	Charity	www.breastcancercampaign.org	€ 3.43
UK	**Cancer Research UK**	P.O. Box 123 Lincoln's Inn Fields London WC2A 3PX	Charity	www.cancerresearchuk.org	€ 297
UK	**Department of Health**	Richmond House 79 Whitehall London SW1A 2NL	Government Agency	www.dh.gov.uk	€ 204
UK	**Economic and Social Research Council**	Polaris House North Star Avenue Swindon SN2 1UJ	Government Agency	www.esrcsocietytoday.ac.uk	€ 5.27
UK	**Leukaemia Research Fund**	43 Great Ormond Street London WC1N 3JJ	Charity	www.lrf.org.uk	€ 23.3
UK	**Ludwig Institute of Cancer Research**	Horatio House 77-85 Fulham Palace Road 5th Floor South London W6 8JC	Charity	www.ludwig.ucl.ac.uk	€ 5.27
UK	**Macmillan Cancer Relief**	Cambridge House, Cambridge Grove Hammersmith London W6 0LE	Charity	www.macmillan.org.uk	€ 0.591
UK	**Marie Curie Cancer Care**	89 Albert Embankment London SE1 7TP	Charity	www.mariecurie.org.uk	€ 5.26
UK	**Medical Research Council**	20 Park Crescent London W1B 1AL	Government Agency	www.mrc.ac.uk	€ 145
UK	**Northern Ireland HPSS R&D**	12-22 Linenhall Street Belfast BT2 8BS	Government Agency	www.rdo.csa.n-i.nhs.uk/rdo	€ 1.48
UK	**Roy Castle Lung Cancer Foundation**	200 London Road Liverpool Merseyside, L3 9TA	Charity	www.roycastle.org	€ 1.77
UK	**Scottish Executive Health Department**	St Andrew's House 3EN Edinburgh, EH1 3DG	Government Agency	www.show.scot.nhs.uk	€ 16.7
UK	**Tenovus The Cancer Charity**	43 The Parade Cardiff CF24 3AB Wales	Charity	www.tenovus.com	€ 1.77
UK	**Wales Office of R&D**	Welsh Assembly Government 4th Floor Cathays Park Cardiff CF10 3NQ	Government Agency	www.word.wales.gov.uk	€ 1.45
UK	**Wellcome Trust**	Gibbs Building 215 Euston Road London NW1 2BE	Charity	www.wellcome.ac.uk	€ 30.6
UK	**Yorkshire Cancer Research**	39 East Parade Harrogate HG1 5LQ	Charity	www.ycr.org.uk	€ 5.38

NOTE:
Organisations which failed to respond are listed as 'No Response'.
Organisations which stated they were unable to provide data are left blank under Direct Spend.

Comments

Country	Name	Comment
Belgium	Belgian Federal Science Policy Office	2003 Data
Belgium	Televie	2003 Data
Bulgaria	Ministry of Health	Professor Dr. Piperkova, rep from Bulgaria states no centralized/ specialized funding for CA.
Cyprus	The Cyprus Association of Cancer Patients and Friends	"The Cyprus Association of Cancer Patients and Friends ... had no cancer direct spend for the years 2003-2005"
Czech Republic	Grant Agency of the Academy of Sciences of the Czech Republic (GAAV)	2003 Data
Denmark	Danish Medical Research Council	2003 Data
Estonia	Estonian Ministry of Education and Research	Unable to provide cancer research funding levels, as accounting does not differentiate from general medical science.
Finland	Ministry of Social Affairs and Health	2003 Data
Finland	TEKES	2003 Data
Finland	The Academy of Finland	2003 Data
France	Assistance Publique - Hôpitaux de Paris	2003 Data
France	INSERM	2003 Data
France	Institut National de la Recherche Agronomique (INRA)	2003 Data
Germany	Wilhelm-Vaillant-Stiftung	2003 Data
Greece	National Hellenic Research Foundation	2003 Data
Hungary	Ministry of Education	2003 Data
Hungary	National Institute of Oncology	2003 Data
Iceland	The Icelandic Science Fund, RANNIS	2003 Data
Ireland	Health Research Board	2003 Data
Ireland	Science Foundation Ireland	2003 Data
Israel	Chief Scientist Office, Ministry of Health	Funding of Medical and bio-medical research in hospitals and research institutes in Israel
Israel	DKFZ/MOST	Joint German-Israel Fund with MOST, separate sponsorship in Germany
Israel	German-Israel Fund - GIF	Funds wide range of research, including Cancer. Public Agency, Government linked. Unable to provide financial data until next year.
Israel	Israel Science Foundation - ISF	We would like to emphasize that the budget allocation at the ISF is based solely on scientific merit and therefore differs every year among the various fields, disciplines and approaches. Therefore the information is valid for a given year only.
Italy	Associazione Italiana per la Lotta al Neuroblastoma	2003 Data
Italy	Consiglio Nazionale delle Ricerche	The direct spend figure is actually 2005 data, and is certainly underestimated, considering that some other projects non specifically devoted to the field concerned may contain sub-projects or possible applications which could be of interest for it.
Italy	Lega Italiana per la Lotta contro i Tumori	2003 Data
Italy	Ministero della Salute	2003 Data
Italy	Ministero dell'Istruzione dell' Università e della Ricerca	Funding by the Ministry is underestimated as it does not include salaries for university researchers. Moreover, the MIUR is funding national research projects on Biomedical Sciences which include Cancer; however, these projects are not specifically itemized, so it is difficult to identified them
Poland	Ministry of Education and Science	Director Jedrzejczak states that the Ministry was unable to verify this information; the ECRM Secretariat has made the decision to include it.
Portugal	Liga Portuguesa Contra o Cancro	2003 Data
Romania	Ministry of Education, Research and Youth	2003 Data
Slovak Republic	Slovak Academy of Sciences	2003 Data
Spain	Comunidad Autonoma de Madrid	2003 Data
Spain	Ministerio de Educación y Ciencia (Ministry of Education and Science)	This level of funding does not include salaries of researchers.
Sweden	Barncancerfonden	Supports experimental and clinical research on children cancers.
Sweden	Vetenskapsrådet - Medicin	Postal address: S-103 78, Stockholm
Switzerland	Staatssekretariat für Bildung und Forschung SBF	Controls budget for Swiss inst. for experimental ca research, and Swiss inst. of applied ca research.
Turkey	Turkish Prime Ministry State Planning Organization	2003 Data
UK	Economic and Social Research Council	this figure was arrived at by independent coding of award details according to the agreed CSO used by NCRI
UK	Ludwig Institute of Cancer Research	2003 Data

Database of USA Funding Survey

Organisation	Address	Type	Web Address	2004 Spend (m)
American Association for Cancer Research	615 Chestnut St., 17th Floor Philadelphia, PA 19106-4404	Charity	www.aacr.org	€.18
American Cancer Society	Inforum, 250 Williams Street Northwest Atlanta, GA 30303	Charity	www.cancer.org	€105.31
American Institute for Cancer Research	1759 R Street NW Washington, DC 20009	Charity	www.aicr.org	€4.48
Avon Foundation	1345 Avenue of the Americas New York, NY 10105-0196	Charity	www.avoncompany.com/women	€2.91
Cancer Research and Prevention Foundation	1600 Duke Street Alexandria, VA 22314	Charity	www.preventcancer.org	€.72
Department of Agriculture	1400 Independence Ave., S.W. Washington, DC 20250	Government Agency	www.usda.gov	€4.59
Department of Commerce	1401 Constitution Ave., NW Washington, DC 20230	Government Agency	www.commerce.gov	€6.11
Department of Defence	1000 Defense Pentagon Washington, DC 20301	Government Agency	www.defenselink.mil	€214.04
Department of Energy	1000 Independence Ave., SW Washington, DC 20585	Government Agency	www.energy.gov	€7.27
Environmental Protection Agency	Ariel Rios Building 1200 Pennsylvania Avenue, N.W. Washington, DC 20460	Government Agency	www.epa.gov	€.83
Howard Hughes Medical Institute	4000 Jones Bridge Road Chevy Chase, MD 20815-6789	Charity	www.hhmi.org	€120.47
Komen Foundation	5005 LBJ Freeway, Suite 250 Dallas, TX 75244	Charity	www.komen.org	€23.96
National Aeronautics and Space Administration	NASA Headquarters Suite 5K39 Washington, DC 20546-0001	Government Agency	www.nasa.gov	€.35
National Cancer Institute	6116 Executive Boulevard Room 3036A Bethesda, MD 20892-8322	Government Agency	www.cancer.gov	€3,252
Health and Human Services (**not including NIH & NCI**)	200 Independence Avenue, S.W. Washington, D.C. 20201	Government Agency	www.hhs.gov	€6.59
National institutes of Health (**not including NCI**)	9000 Rockville Pike Bethesda, Maryland 20892	Government Agency	www.nih.gov	€1,207
National Comprehensive Cancer Network	500 Old York Road, Suite 250 Jenkintown, PA 19046	Charity	www.nccn.org	€.84
National Science Foundation	4201 Wilson Blvd Arlington, VA 22230	Government Agency	www.nsf.gov	€17.78
Prostate Cancer Foundation	1250 Fourth Street Santa Monica, CA 90401	Charity	www.prostatecancerfoundation.org	€2.71
States	n/a	Government Agency	n/a	€164.16
The Leukemia and Lymphoma Society	1311 Mamaroneck Avenue White Plains, NY 10605	Charity	www.leukemia-lymphoma.org	€25.72

Subordinates of United States Federal Organisations with Direct Spend on Cancer Research

Department of Agriculture:
- Agriculture Research Service
- Cooperative State Research, Education, and Extension Service

Department of Commerce:
- National institute of Standards and Technology

Department of Defense:
- Defence Advanced Research Projects Agency
- Department of the Air Force
- Department of the Army
- Office of the Secretary of Defense

Department of Energy:
- Energy Supply
- Fossil Energy Research and Development
- Science

Environmental Protection Agency:
- Extramural Projects

Health and Human Services:
- Agency for Healthcare Research and Quality
- Centers for Disease Control
- National Institutes of Health
- Clinical Center
- John E. Fogarty International Center
- National Cancer Institute
- National Center for Complementary and Alternative Medicine
- National Center for Research Resources
- National Eye Institute
- National Heart, Lung, and Blood Institute
- National Human Genome Research Institute
- National Institute for Nursing Research
- National Institute of Allergy and Infectious Diseases
- National Institute of Arthritis Musculoskeletal, and Skin Diseases
- National Institute of Biomedical Imaging and Bioengineering
- National Institute of Child Health and Human Development
- National Institute of Deafness and Other Communicative Disorders
- National Institute of Dental and Craniofacial Research
- National Institute of Diabetes and Digestive and Kidney Diseases
- National Institute of Environmental Health Sciences
- National Institute of General Medical Sciences
- National Institute of Mental Health
- National Institute of Neurological Disorders and Stroke
- National Institute on Aging
- National Institute on Alcohol Abuse and Alcoholism
- National Institute on Drug Abuse
- National Library of Medicine
- Office of the Director

National Aeronautics and Space Administration:
- Exploration Systems Research and Technology
- Human Systems Research and Technology

National Science Foundation:
- Biological Sciences
- Computer and Information Science and Engineering
- Education and Human Resources
- Engineering
- Geosciences
- Mathematical and Physical Sciences
- Office of International Science and Engineering
- Social, Behavioural, and Economical Sciences

US/European Pharma Database

Company	Country	Address	2004 Name (if applic.)	Web Address	2004 Spend (m)
Novo Nordisk	Denmark	Novo Allé 2880 Bagsværd		www.novonordisk.com	€8.4
Sanofi-Aventis	France	174, avenue de France 75013 Paris	Aventis, Sanofi - Synthelabo	en.sanofi-aventis.com	€106, €342
Boehringer Ingelheim	Germany	Corporate Headquarters Binger Str. 173 55216 Ingelheim		www.boehringer-ingelheim.com	€122
Merck KGaA	Germany	Frankfurter Str. 250 64293 Darmstadt		www.merck.de	€62
Schering	Germany	Bayer Schering Pharma AG Müllerstr. 170-178 13353 Berlin		www.schering.com	€151
Novartis International AG	Switzerland	Postfach CH-4002 Basel		www.novartis.com	€353
Roche	Switzerland	Group Headquarters Grenzacherstrasse 124 CH-4070 Basel		www.roche.com	€312
AstraZeneca	UK	15 Stanhope Gate W1K 1LN London		www.astrazeneca.com	€173
GlaxoSmithKline	UK	80 Great West Road Brentford, Middlesex, TW8 9GS		www.gsk.com	€199
Amgen	USA	One Amgen Center Drive Thousand Oaks, CA 91320-1799		www.amgen.com	€173
Bristol-Myers Squibb	USA	345 Park Avenue New York, New York 10154-0037		www.bms.com	€198
Eli Lilly and Company	USA	Lilly Corporate Center Indianapolis, Indiana 46285		www.lilly.com	€145
Johnson & Johnson	USA	One Johnson & Johnson Plaza New Brunswick, NJ 08933		www.jnj.com	€213
Merck & Co., Inc.	USA	One Merck Drive P.O. Box 100 Whitehouse Station, NJ 08889-0100		www.merck.com	€107
Pfizer	USA	235 East 42nd Street New York, New York 10017		www.pfizer.com	€195
Schering - Plough	USA	2000 Galloping Hill Road Kenilworth, N.J. 07033-0530		www.schering-plough.com	€120
Wyeth	USA	5 Giralda Farms Madison, NJ 07940		www.wyeth.com	€115

EU - 15 Countries—2004

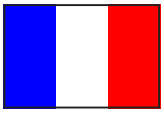
Austria

Belgium

Denmark

Finland

France



Germany

Greece

Ireland

Italy

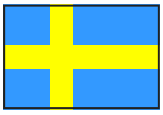
Luxembourg

Netherlands

Portugal

Spain

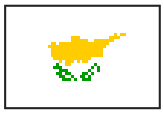
Sweden



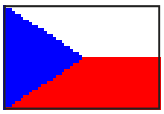
UK

May 2004 Enlargement (Accession) Countries—2004

Cyprus



Czech Repub.



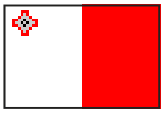
Estonia

Hungary

Latvia

Lithuania

Malta



Poland

Slovak Repub.

Slovenia

European Free Trade Association (EFTA) - 2004

Iceland

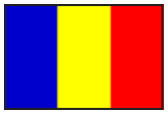
Norway

Switzerland

Candidate Countries—2004

Bulgaria

Romania



Turkey

Associate State—2004

Israel

Note: This table is correct for the countries contained within this report at time of data collection, but will have changed by the time of publication.

Notes


Israel
Spain
Sweden
Italy
Ireland
Netherlands
Slovak Republic
Poland
Norway
Greece
Lithuania
Romania
Portugal
France
United Kingdom
Finland
Slovenia
Turkey
Iceland
Austria
Belgium
Hungary
Estonia
Cyprus
Czech Republic
Germany
Denmark
Lithuania
Luxembourg

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