Global surveillance of cancer survival 1995–2009: analysis of individual data for 25 676 887 patients from 279 population-based registries in 67 countries (CONCORD-2)

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Summary

Background Worldwide data for cancer survival are scarce. We aimed to initiate worldwide surveillance of cancer survival by central analysis of population-based registry data, as a metric of the effectiveness of health systems, and to inform global policy on cancer control.

Methods Individual tumour records were submitted by 279 population-based cancer registries in 67 countries for 25·7 million adults (age 15–99 years) and 75 000 children (age 0–14 years) diagnosed with cancer during 1995–2009 and followed up to Dec 31, 2009, or later. We looked at cancers of the stomach, colon, rectum, liver, lung, breast (women), cervix, ovary, and prostate in adults, and adult and childhood leukaemia. Standardised quality control procedures were applied; errors were corrected by the registry concerned. We estimated 5-year net survival, adjusted for background mortality in every country or region by age (single year), sex, and calendar year, and by race or ethnic origin in some countries. Estimates were age-standardised with the International Cancer Survival Standard weights.

Findings 5-year survival from colon, rectal, and breast cancers has increased steadily in most developed countries. For patients diagnosed during 2005–09, survival for colon and rectal cancer reached 60% or more in 22 countries around the world; for breast cancer, 5-year survival rose to 85% or higher in 17 countries worldwide. Liver and lung cancer remain lethal in all nations: for both cancers, 5-year survival is below 20% everywhere in Europe, in the range 15–19% in North America, and as low as 7–9% in Mongolia and Thailand. Striking rises in 5-year survival from prostate cancer have occurred in many countries: survival rose by 10–20% between 1995–99 and 2005–09 in 22 countries in South America, Asia, and Europe, but survival still varies widely around the world, from less than 60% in Bulgaria and Thailand to 95% or more in Brazil, Puerto Rico, and the USA. For cervical cancer, national estimates of 5-year survival range from less than 50% to more than 70%; regional variations are much wider, and improvements between 1995–99 and 2005–09 have generally been slight. For women diagnosed with ovarian cancer in 2005–09, 5-year survival was 40% or higher only in Ecuador, the USA, and 17 countries in Asia and Europe. 5-year survival for stomach cancer in 2005–09 was high (54–58%) in Japan and South Korea, compared with less than 40% in other countries. By contrast, 5-year survival from adult leukaemia in Japan and South Korea (18–23%) is lower than in most other countries. 5-year survival from childhood acute lymphoblastic leukaemia is less than 60% in several countries, but as high as 90% in Canada and four European countries, which suggests major deficiencies in the management of a largely curable disease.

Interpretation International comparison of survival trends reveals very wide differences that are likely to be attributable to differences in access to early diagnosis and optimum treatment. Continuous worldwide surveillance of cancer survival should become an indispensable source of information for cancer patients and researchers and a stimulus for politicians to improve health policy and health-care systems.

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Introduction

The global burden of cancer is growing, particularly in countries of low and middle income. The need to implement effective strategies of primary prevention is urgent.[1,2] Prevention is crucial but long term. If WHO's global target of a 25% reduction in deaths from cancer and other non-communicable diseases in people aged 30–69 years is to be achieved by 2025 (referred to as

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25×25),[3] we will need not only more effective prevention (to reduce incidence) but also more effective health systems (to improve survival).[4]

In the first international comparison of cancer survival, a transatlantic study of patients diagnosed during 1945–54, survival for 12 cancers in three US states was typically higher than in six European countries.[5] In 2008, a global comparison of population-based cancer survival (CONCORD) showed very wide variations in survival from cancers of the breast (women), colon, rectum, and prostate.[6] That analysis included 1·9 million adults (age 15–99 years) diagnosed with cancer during 1990–94 and followed up until 1999 from 31 countries (16 with 100% population coverage) on five continents.

Three large international comparisons of cancer survival have been published since 2008. The European cancer registry study on survival (EUROCARE)-5 provided survival estimates for all cancers for patients diagnosed during 2000–07 in 29 countries in Europe.[7] In SurvCan (cancer survival in Africa, Asia, the Caribbean, and Central America), relative survival estimates were reported for patients diagnosed during 1990–2001 in 12 low-income and middle-income countries.[8] The International Cancer Benchmarking Partnership published survival estimates for four common cancers for patients diagnosed during 1995–2007 in six high-income countries.[9] These three studies differ with respect to geographic and population coverage, calendar period, and analytical methods and do not enable worldwide comparison of cancer survival.

Surveillance of cancer survival is seen as important by national and international agencies, cancer patient advocacy groups, departments of health, politicians, and research agencies. Cancer survival research is being used to formulate cancer control strategies,[9] to prioritise cancer control measures,[10] and to assess both the effectiveness[11,12] and cost-effectiveness[13] of those strategies.

We designed CONCORD-2 to initiate long-term worldwide surveillance of cancer survival on the broadest possible basis. Our aim is to analyse progress toward the overarching goal in the Union for International Cancer Control's World Cancer Declaration 2013: "there will be major reductions in premature deaths from cancer and improvements in quality of life and cancer survival".[14]

Methods

Cancer registries

We identified population-based cancer registries that were operational in 2009 and had either published reports on survival or were known to follow up registered cancer patients to establish their vital status. Many registries had met quality criteria for inclusion in either the quinquennial compendium *Cancer Incidence in Five Continents*,[15,16] published by the International Association of Cancer Registries (IACR) and the International Agency for Research on Cancer (IARC), or similar compendia; other registries were established more recently.

We invited all these registries to contribute data for patients diagnosed during all or part of the 15-year period 1995–2009, including data on their vital status at least 5 years after diagnosis, or at Dec 31, 2009, or a later year. Of 395 registries invited, 306 (77%) agreed to participate: of these, 24 (8%) did not submit data, either because of resource constraints (n=4), legal constraints (1) or reversal of the original decision (3), or because they could not provide complete follow-up data (6) or did not respond to further communication (10). We excluded three registries because they provided data that did not adhere to the protocol and could not be rectified, leaving 279 participating registries (71% of those invited).

Among the cancers suggested by participating registries, the ten we prioritised for study (referred to as index sites) accounted collectively for almost two-thirds of the estimated global cancer burden in 2008, both in developed and developing countries.[4] They comprised cancers of the stomach, colon, rectum, liver, lung, breast (women), cervix, ovary, and prostate in adults (age 15–99 years), and leukaemia in adults, and precursor-cell acute lymphoblastic leukaemia in children (age 0–14 years).

Ethics approval

We obtained approval for CONCORD-2 from the Ethics and Confidentiality Committee of the UK's statutory National Information Governance Board (now the Health Research Authority; ECC 3-04(i)/2011) and the National Health Service (NHS) research ethics service (southeast; 11/LO/0331). We obtained separate statutory or ethics approval (or both) in more than 40 other jurisdictions to secure the release of data. Registries in all other jurisdictions obtained their own ethics approval locally.

We applied strict security constraints to the transmission of data files. We gave every registry a set of unique numeric codes for the name of every file; these codes have no meaning outside the CONCORD-2 study. All data fields were numeric or coded. We developed a file transmission utility deploying 256-bit advanced encryption security, with random, strong, one-time passwords that were generated automatically at the point of data transmission but sent separately, thus eliminating the need for email or telephone exchanges to confirm passwords. We also provided free access to a similar commercial utility (HyperSend; Covisint, Detroit, MI, USA) that complies with US federal law on the secure transmission of sensitive health data.

Protocol

We finalised the protocol (in which we defined the data structure, file transmission procedures, and statistical analyses) after a 2-day meeting in Cork, Ireland, in September, 2012, with 90 members of the CONCORD Working Group from 48 countries (the protocol was revised by October, 2012). English poses a communication barrier in many countries; therefore, native speakers

For the **protocol** see http://www.lshtm.ac.uk/eph/ncde/cancersurvival/research/concord/protocol/index.html

translated the protocol into Chinese (Mandarin), Portuguese, and Spanish, and other native speakers did back-translation to check the translation against the English original. We made the protocol available in all four languages. We held protocol workshops in Argentina (for Spanish-speaking South American researchers), Brazil, China, India, Japan, Puerto Rico, Russia, and the USA (for North America), which we followed up with conference calls and online seminars. We responded to telephone or email queries in Chinese, English, French, Italian, Portuguese, and Spanish.

We defined countries, states, and world regions by their UN names and codes (as of 2007).[17] Only Cuba and Puerto Rico provided data from the Caribbean and Central America so we grouped them with South America as America (Central and South). We wrote this Article and prepared the maps without prejudice to the status, boundaries, or name of any country, territory, or region. We have shortened some names for convenience (eg, Korea for South Korea), which does not have any political significance. We created world maps and 27 regional maps in ArcGIS version 10, using digital boundaries (shapefiles) of countries and subnational regions from the Database of Global Administrative Areas (GADM 2.0).[18] We obtained national populations for 2009 from the UN Population Database[17] or national authorities (Canada, Portugal, and the UK) and subnational populations from the relevant registries.

We defined solid tumours by anatomical site (topography) and leukaemia by morphology (table 1). We coded topography and morphology according to the International Classification of Diseases for Oncology (3rd edn; ICD-O-3).[19] For ovarian cancer, we included the fallopian tube, uterine ligaments, and adnexa, and the peritoneum and retroperitoneum, where high-grade serous ovarian carcinomas are often detected. We excluded Kaposi's sarcoma and solid tumours with lymphoma morphology.

The classification of leukaemias and lymphomas has changed since the mid-1990s. To minimise differences in the range of leukaemia subtypes included in our analyses, we asked registries to provide data for all haemopoietic malignant diseases in adults and children, as defined by the ICD-O-3 morphology code range 9590–9989. In consultation with specialists in the cancer registry-based project on haematologic malignancies (HAEMACARE) group,[20] we selected subtypes of adult leukaemia from nine morphology groups,[21] excluding myelodysplastic and myeloproliferative neoplasms such as chronic myeloid leukaemia (appendix p 2). Precursor-cell acute lymphoblastic leukaemia is the most common form of leukaemia in children; we included HAEMACARE group 15—a relatively homogeneous group comprising precursor-cell lymphoblastic lymphoma and precursor-cell lymphoblastic leukaemia (B-cell, T-cell, and not otherwise specified), and we refer to these six entities as acute lymphoblastic leukaemia.[22]

	Topography or morphology codes*	Description
Stomach	C16·0–C16·6, C16·8–C16·9	Stomach
Colon	C18·0–C18·9, C19·9	Colon and rectosigmoid junction
Rectum	C20·9, C21·0–C21·2, C21·8	Rectum, anus, and anal canal
Liver	C22·0–C22·1	Liver and intrahepatic bile ducts
Lung	C34·0–C34·3, C34·8–C34·9	Lung and bronchus
Breast (women)	C50·0–C50·6, C50·8–C50·9	Breast
Cervix	C53·0–C53·1, C53·8–C53·9	Cervix uteri
Ovary†	C48·0–C48·2, C56·9, C57·0–C57·4, C57·7–C57·9	Ovary, fallopian tube, and uterine ligaments, other and unspecified female genital organs, peritoneum and retroperitoneum
Prostate	C61·9	Prostate gland
Leukaemia (adults)‡	9670, 9687, 9727, 9728, 9729, 9800, 9801, 9805, 9820, 9823, 9826, 9832, 9833, 9835, 9836, 9837, 9840, 9860, 9861, 9866, 9867, 9870, 9871, 9872, 9873, 9874, 9891, 9895, 9896, 9897, 9910, 9920, 9930, 9931, 9940, 9984, 9987	Leukaemia
Leukaemia (children)‡	9727, 9728, 9729, 9835, 9836, 9837	Precursor-cell acute lymphoblastic leukaemia

*International Classification of Diseases for Oncology, 3rd edn (ICD-O-3).[19] We defined solid tumours with topography (anatomical site) codes. †Includes peritoneum and retroperitoneum (C48·0–C48·2), where ovarian cancers of high-grade serous morphology are frequently detected; also includes the fallopian tube, uterine ligaments, and adnexa (C57·0–C57·4), and other and unspecified female genital organs (C57·7–C57·9). ‡We defined adult leukaemia subtypes with morphology codes in HAEMACARE groups 6, 11, 15, 17, 18, 19, 20, 21, and 22 (appendix p 2).[20] The six morphology codes used to define precursor-cell acute lymphoblastic leukaemia (referred to as acute lymphoblastic leukaemia) in children are those in HAEMACARE group 15 only.

Table 1: **Definition of malignant diseases**

For survival analyses, we included only invasive primary malignant diseases (ICD-O-3 behaviour code 3). To facilitate quality control and comparisons of the intensity of early diagnostic and screening activity, however, we asked registries to submit data for all solid tumours at each index site, including those that were benign (behaviour code 0), of uncertain or borderline malignancy (1), or in situ (2).

We asked registries to submit full dates (day, month, year) for birth, diagnosis, and death or last known vital status, both for quality control and to enable comparable estimation of survival.[23] When the day of diagnosis or the day or month of birth or last known vital status were missing, we developed an algorithm to standardise the imputation of missing dates for all populations (details available on request). Participating registries completed a detailed questionnaire on their methods of operation, including data definitions, data collection procedures, coding of anatomical site, morphology and behaviour, the tracing of registered cancer patients to ascertain their vital status, and how tumour records are linked with data on vital status.

See Online for appendix

We included patients who were diagnosed with two or more primary cancers at different index sites during 1995–2009 in the analyses for each cancer—eg, colon cancer in 2000, breast cancer in 2005. We measured survival from the date of diagnosis until the date of death, or loss to follow-up, or censoring. When two or more

primary malignant diseases occurred at the same index site during 1995–2009, we included the first cancer only. We retained the most complete record for patients with synchronous primary cancers in the same organ.

North American registries define multiple primary cancers under the rules of the Surveillance, Epidemiology and End Results (SEER) programme,[24] whereas registries in the European Network of Cancer Registries (ENCR) and elsewhere generally use the rules of the IACR,[25] which are more conservative. The North American Association of Central Cancer Registries (NAACCR) prepared a program to enable all North American registries to recode their entire incidence databases to the IACR multiple primary rules, before their datasets for 1995–2009 were extracted for CONCORD-2.

Quality control

The quality and completeness of cancer registration data can affect both incidence and survival estimates and, thus, the reliability of international comparisons.[26] We developed a suite of quality control programs,[27] extending the checks used in the first CONCORD study,[6] cross-checked with those used in the EUROCARE study,[28] IARC/IACR tools for cancer registries,[29] and WHO's classification of tumours.[22,30–32] We applied these checks systematically in three phases and sent registries a detailed report on how to revise and resubmit their data, if needed, after every phase.

First, we sent registries a protocol adherence report that showed, for every cancer, the proportion of tumour records that were coded in compliance with the protocol. Second, we checked the data in every tumour record for logical coherence against 20 sets of criteria, including eligibility (eg, age, tumour behaviour), definite errors (eg, sex-site errors and invalid dates or date sequence), and possible errors including a wide range of inconsistencies between age, tumour site, and morphology.[27] We sent registries exclusion reports that showed, for every index cancer and calendar period, the number of tumour records in each category of definite or possible error, the number of tumours registered from a death certificate only or detected at autopsy, and the number of patients whose data could be included in survival analyses. When we identified errors in classification, coding, or pathological assignment, we asked registries to correct and resubmit their data. Finally, we analysed: the proportion of tumour records with morphological verification or non-specific morphology; distributions of the day and month of birth, diagnosis, and last known vital status; and proportions of patients who died within 30 days, were reported as lost to follow-up, or were censored within 5 years of diagnosis.

Follow-up for vital status

Cancer registries use various methods to ascertain the vital status (alive, dead, emigrated, lost to follow-up) of registered cancer patients. In countries with limited administrative infrastructure, so-called active follow-up can be used to establish vital status via direct contact with the patient, the family, or a local authority (eg, a village headman), or by home visit. Many registries in both high-income and low-income countries also seek information from the hospital or the treating clinician in hospital or primary care.

Most registries link their database with a regional or national index of deaths, using identifiers such as name, sex, date of birth, and identity number. Tumour records that match to a death record are updated with the date of death. Many registries also use other official databases (eg, hospital and primary care databases, social insurance, health insurance, drivers' licences, and electoral registers) to establish the date on which a patient was last known or believed to have been alive, to have migrated within the country, or to have emigrated to another country. Cancer registrations are updated with the vital status and the date of last known vital status. These methods are typically summarised as passive follow-up.

Some registries receive information on the vital status of all registered patients on an almost continuous basis, or at least every month or every 3 months. Other registries seek to trace the vital status of patients registered in a particular calendar year only, 1 year or even 5 years after the end of that year: this approach can increase the proportion of patients lost to follow-up. It also means that 5-year survival estimates for more recently diagnosed patients cannot be obtained, even with the period approach.

We asked all 279 participating registries how they ascertained the vital status of registered cancer patients. Of 243 registries that responded to the question, 147 (60%) stated that they used only passive follow-up, 92 (38%) that they used both passive and active follow-up, and four (2%) only active follow-up.

Statistical analysis

Most registries submitted data for patients diagnosed from 1995 to 2009, with follow-up to 2009 or later; some registries only began operation after 1995 or provided data for less than 15 years. We were able to estimate 5-year survival using the cohort approach for patients diagnosed in 1995–99 and 2000–04, because in most datasets, all patients had been followed up for at least 5 years. We used the period approach[33] to estimate 5-year survival for patients diagnosed during 2005–09, because 5 years of follow-up data were not available for all patients (appendix p 174).

We estimated net survival up to 5 years after diagnosis for both adults and children. Net survival represents the cumulative probability that the cancer patients would have survived a given time, say 5 years or more after diagnosis, in the hypothetical situation that the cancer was the only possible cause of death. Net survival can be interpreted as the proportion of cancer patients who survive up to that time, after eliminating other causes of

death (background mortality). We used the recently developed Pohar Perme estimator[34] of net survival implemented with the program stns[35] in Stata version 13.[36] This estimator takes unbiased account of the fact that older patients are more likely than younger patients to die from causes other than cancer—ie, that the competing risks of death are higher for elderly cancer patients.

To control for the wide differences in background mortality between participating jurisdictions and over time, we constructed 6514 life tables of all-cause mortality in the general population of each country or the territory covered by each participating registry, by age (single year), sex, and calendar year of death, and by race or ethnic origin in Israel (Arab, Jewish), Malaysia (Chinese, Malay, Indian), New Zealand (Māori, non-Māori), and the USA (Black, White). The method of life table construction depended on whether we received raw data (numbers of deaths and populations) or mortality rates, and on whether the raw data or the mortality rates were by single year of age (so-called complete) or by 5-year or 10-year age group (abridged). We checked the life tables by examination of age-sex-mortality rates, life expectancy at birth (appendix p 175), the probability of death in the age bands 15–59 years, 60–84 years, and 85–99 years and, where necessary, the model residuals.

Of the 279 participating registries, 21 provided complete life tables that did not need interpolation or smoothing, for each calendar year. For 172 registries, we obtained raw data from either the registry, the relevant national statistical authority, or the Human Mortality Database.[37] We derived life tables for 1996 and 2010 if possible, each centred on three calendar years of data (eg, 1995–97, 2009–11) to increase the robustness of the rates. We modelled raw mortality rates with Poisson regression and flexible functions to obtain smoothed complete life tables extended up to age 99 years. We then created life tables for every calendar year from 1997 to 2009 by linear interpolation between the 1996 and 2010 life tables.[38] Rather than extrapolate, we used the 1996 life table for 1995.

62 of 279 registries provided abridged mortality rates, or complete mortality rates that were not smoothed. We used the Ewbank relational model[39] with three or four parameters to interpolate (if abridged) and smooth the mortality rates for the registry territory against a high-quality smooth life table for a country with a similar pattern of mortality by age. We could not obtain reliable data on all-cause mortality for 24 registries. We took national life tables published by the UN Population Division[40] and interpolated and extended them to age 99 years with the Elandt-Johnson method.[41]

For each country and registry, we present estimates of age-standardised net survival for each cancer at 5 years after diagnosis. We report cumulative survival probabilities

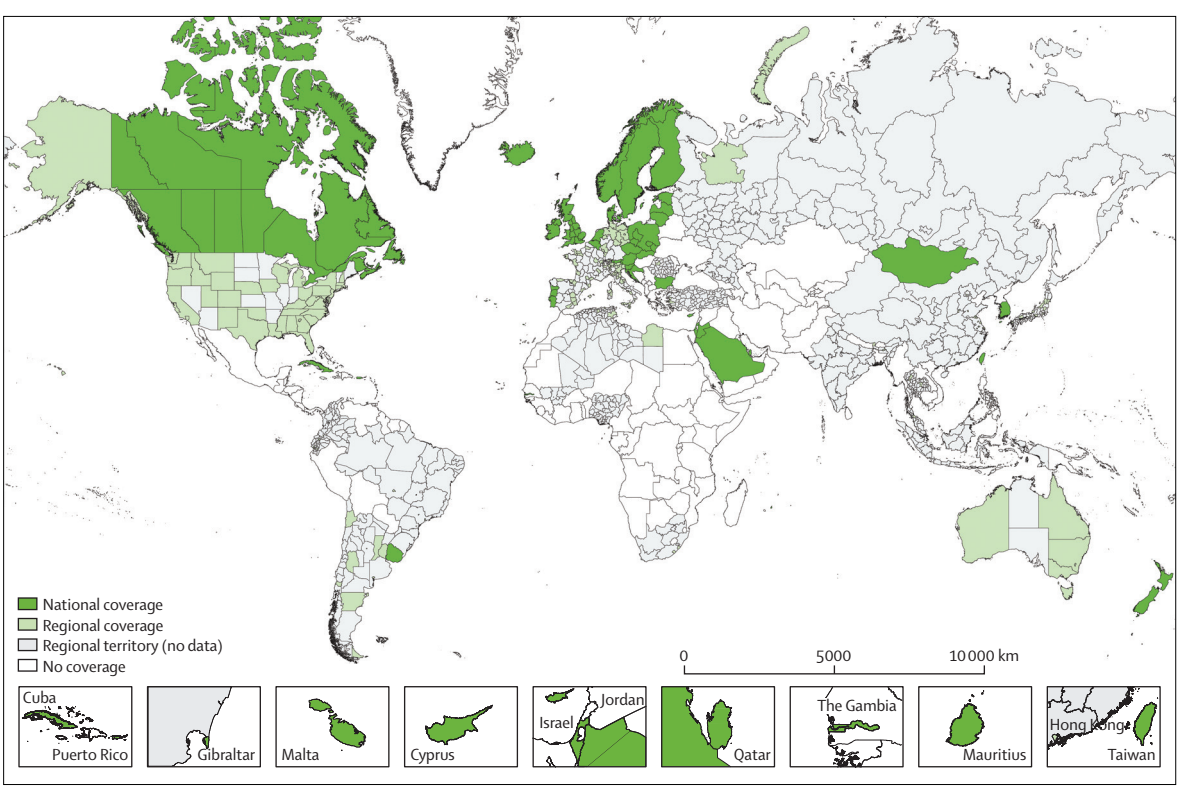

Figure 1: **Participating countries and regions (adults)**
National registries in smaller countries are shown in boxes at different scales. 28 regional maps and a world map for childhood acute lymphoblastic leukaemia are in the appendix (pp 112–40).

as percentages. For adults, we used the International Cancer Survival Standard (ICSS) weights, with age at diagnosis categorised into five groups: 15–44 years, 45–54 years, 55–64 years, 65–74 years, and 75–99 years for eight solid tumours and leukaemia in adults; and 15–54 years, 55–64 years, 65–74 years, 75–84 years, and 85–99 years for prostate cancer.[42] For children, we estimated survival for the age groups 0–4 years, 5–9 years, and 10–14 years; we obtained age-standardised estimates by assigning equal weights to the three age-specific estimates.[43] We derived CIs for both unstandardised and age-standardised survival estimates assuming a normal distribution, truncated to the range 0–100. We derived SEs with the Greenwood method[44] to construct the CIs

We did not estimate survival if fewer than ten patients were available for analysis. If between ten and 49 patients were available for analysis in a given calendar period (1995–99, 2000–04, 2005–09), we merged data for two consecutive periods. For less common cancers in the smallest populations, we sometimes needed to merge data for all three periods. When between ten and 49 patients in total were available, we only estimated survival for all ages combined. If 50 or more patients were available, we attempted survival estimation for each age group. If an age-specific estimate could not be obtained, we merged data for adjacent age groups and assigned the combined estimate to both age groups. If two or more age-specific estimates could not be obtained, we present only the unstandardised estimate for all ages combined.

Role of the funding sources

The funders had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all data in the study and had final responsibility for the decision to submit for publication.

Results

279 cancer registries from 67 countries provided data for this study (figure 1; appendix pp 112–40). Nine African countries took part (ten registries), eight countries were in Central and South America (27 registries), Canada and the USA comprised North America (57 registries), 16 countries were in Asia (50 registries), 30 European countries participated (128 registries), and New Zealand and Australia represented Oceania (seven registries). For countries with less than 100% coverage of the population, the country name is used for brevity in the text (eg, Libya, the USA), but a more accurate term is used in the tables (eg, Libya [Benghazi], US registries). Some registries provided data for only part of their territory.

We examined records for 28 685 445 patients diagnosed with cancer of the stomach, colon, rectum, liver, lung, breast (women), cervix, ovary, and prostate in adults (age 15–99 years), leukaemia in adults, and precursor-cell acute lymphoblastic leukaemia in children (age 0–14 years) during the period 1995–2009 (table 2). Of these, 1 682 081 (5·9%) records were for an in situ cancer, mostly of the cervix, breast, colon, or prostate. The proportions of in situ cancer are not comparable directly because some registries do not record in situ cancer, others did not submit data for index sites in which in situ malignant disease is common, and screening programmes in which in situ cancers are frequently detected were introduced in some countries during 1995–2009. The variation between continents is still of interest: for example, a little over 1% of cervical cancers in African registries were in situ, compared with 20% in Central and South American registries and 81% in Oceania. For breast cancer in situ, the variation was from 0·1% in African registries to 16% in North American registries and about 4–5% in other regions of the world (appendix pp 3–63). Patients with in situ cancer were not included in survival analyses.

We excluded a further 360 773 (1·3%) patients either because their year of birth, month or year of diagnosis, or year of last vital status were unknown, or because the tumour was not primary invasive malignant disease (behaviour code 3) or the morphology was that of Kaposi's sarcoma or lymphoma in a solid organ, or for other reasons (table 2). The proportion of patients with an unknown date of last vital status ranged from 0% to 40% or more for some cancers in some African registries. Proportions are presented in the appendix (pp 3–63) for each registry, for all cancers combined, and for each cancer separately.

Of 26 642 591 patients eligible for inclusion in the survival analyses, 905 841 (3·4%) were excluded because their cancer was registered from a death certificate only or discovered at autopsy (table 2), and 59 863 (0·2%) were excluded for other reasons, including definite errors (eg, unknown vital status or sex, sex-site error, or invalid dates or sequence of dates) or possible errors (eg, apparent inconsistencies between age, cancer site, and morphology) for which the record was not later confirmed as correct by the relevant registry.

Of 25 676 887 patients available for survival analyses (96·4% of those eligible), pathological evidence of malignant disease (histological, cytological, or haematological findings) was available for 23 338 015 patients for all cancers combined (91·1%; table 2), ranging from 83·1% in Asian registries, 85·5% in African registries, and 87·4% in Central and South American registries to 90–95% in Europe, Oceania, and North America. The range of pathological evidence at a national level was very wide, from 15% in The Gambia, 36% in Mongolia, and 66% in Chinese registries, up to 99% or more in Belgium, Mauritius, and Sweden. For 938 703 (3·7%) patients, morphological features were poorly specified (eg, malignant neoplasm or tumour, ICD-O-3 codes 8000–8005): this proportion also varied widely, from around 1% in North American registries to 17% for all African registries combined and as high as 59% in The Gambia. Data for every registry are shown in the appendix (pp 3–63).

	Calendar period	Patients submitted (n)	Ineligible patients¶		Eligible patients (n)	Exclusions‖		Available for analysis (n)	Data quality indicators††			
			In situ (%)	Other (%)		DCO (%)	Other (%)		MV (%)	Non-specific morphology (%)	Lost to follow-up (%)	Censored (%)
Africa		23325	0·2%	39·5%	14048	1·4%	9·6%	12509	85·5%	17·0%	10·2%	28·8%
Algerian registries	1995–2009	6919	<0·1%	5·8%	6515	0·3%	17·4%	5358	93·8%	12·3%	0·0%	21·5%
Lesotho (childhood)†	1995–2009	22	0·0%	0·0%	22	0·0%	0·0%	22	100·0%	0·0%	0·0%	11·8%
Libya (Benghazi)	2003–2005	1698	0·0%	0·4%	1692	8·9%	0·5%	1533	84·4%	16·5%	0·0%	32·4%
Mali (Bamako)	1995–2009	1007	0·0%	78·3%	219	5·0%	2·3%	203	58·6%	41·4%	83·7%	6·4%
Mauritius*	2005–2005	855	0·0%	0·6%	850	0·0%	0·9%	842	100·0%	24·1%	0·0%	NA
Nigeria (Ibadan)	1998–2007	2192	2·1%	60·1%	830	0·6%	3·6%	795	70·8%	0·0%	8·9%	65·1%
South Africa (Eastern Cape)	1998–2007	2404	0·0%	2·9%	2335	0·1%	4·4%	2230	70·5%	32·8%	45·7%	25·1%
The Gambia*	1995–1997	387	0·0%	10·1%	348	0·9%	10·3%	309	15·2%	58·9%	3·2%	14·2%
Tunisia (Central)	1995–2007	7841	0·1%	84·1%	1237	NA	1·6%	1217	99·1%	1·0%	0·7%	51·2%
America (Central and South)		467456	3·0%	8·0%	416140	13·7%	0·7%	356173	87·4%	7·7%	0·1%	2·9%
Argentinian registries	1995–2009	40482	5·0%	7·6%	35377	11·1%	0·5%	31244	97·9%	3·7%	<0·1%	14·6%
Brazilian registries	1995–2009	119423	5·4%	20·0%	89067	9·5%	0·5%	80113	92·8%	7·1%	0·2%	1·7%
Chilean registries	1998–2008	8920	8·2%	0·7%	8121	10·7%	0·5%	7213	90·3%	4·1%	0·5%	0·0%
Colombian registries	1995–2009	36140	1·5%	5·7%	33550	5·7%	0·8%	31365	88·5%	12·0%	<0·1%	19·5%
Cuba*	1998–2006	120748	0·3%	2·1%	117883	23·7%	0·3%	89576	70·6%	11·7%	0·0%	0·0%
Ecuadorian registries	1995–2009	35395	1·3%	5·7%	32924	9·7%	4·3%	28314	92·0%	3·7%	0·0%	<0·1%
Puerto Rico*	2000–2009	81886	3·9%	4·5%	74937	6·7%	0·3%	69745	97·2%	1·4%	0·0%	0·0%
Uruguay*	2002–2009	24462	0·4%	0·3%	24281	23·4%	0·0%	18603	80·6%	20·9%	0·0%	0·0%
America (North)		12233257	6·0%	1·3%	11340569	1·8%	0·2%	11109332	94·8%	1·3%	0·8%	<0·1%
Canada*	1995–2009	1392677	4·3%	0·6%	1324227	1·8%	0·5%	1294159	88·7%	1·5%	0·0%	<0·1%
US registries	1995–2009	10840580	6·2%	1·4%	10016342	1·8%	0·2%	9815173	95·6%	1·3%	0·9%	<0·1%
Asia		3581339	3·3%	0·9%	3432472	4·4%	0·2%	3274733	83·1%	11·4%	0·7%	2·6%
Chinese registries	1995–2009	241044	0·1%	1·3%	237656	1·6%	<0·1%	233736	66·4%	38·7%	3·5%	0·1%
Cyprus*	2004–2009	9986	2·8%	2·7%	9437	8·6%	0·2%	8609	98·7%	2·1%	0·0%	0·1%
Hong Kong*	1997–2006	6184	0·0%	0·0%	6184	0·0%	0·2%	6169	99·6%	<0·1%	9·0%	8·5%
Indian registries	1995–2009	11732	0·0%	1·5%	11551	2·7%	0·1%	11235	81·8%	9·7%	22·9%	9·9%
Indonesia (Jakarta)	2005–2007	3830	0·0%	18·1%	3138	1·3%	0·2%	3091	75·4%	23·0%	0·0%	NA
Israel*	1995–2009	202745	6·1%	2·0%	186266	3·2%	0·2%	179921	94·2%	6·4%	0·0%	0·0%
Japanese registries	1995–2009	1065707	3·7%	1·0%	1015315	13·3%	<0·1%	879341	86·4%	9·9%	0·0%	3·6%
Jordan*	2000–2009	19191	0·0%	0·6%	19081	<0·1%	0·9%	18896	99·3%	1·5%	54·9%	0·0%
Korea*‡	1995–2009	1191749	0·0%	0·8%	1182442	<0·1%	0·1%	1180925	82·5%	8·9%	0·0%	0·0%
Malaysia (Penang)	1995–2009	15842	0·0%	2·5%	15447	2·4%	1·8%	14800	92·0%	9·8%	0·0%	<0·1%
Mongolia*	2005–2009	13415	1·8%	0·6%	13096	<0·1%	4·5%	12510	35·7%	1·2%	16·9%	NA
Qatar*	2002–2009	780	0·8%	0·1%	773	2·7%	0·4%	749	90·0%	6·4%	0·0%	5·1%
Saudi Arabia*	1995–2008	24216	1·4%	0·1%	23876	2·6%	10·1%	20860	95·2%	1·6%	0·0%	61·3%
Taiwan*	1995–2009	662906	9·2%	<0·1%	601480	0·0%	0·1%	600934	83·1%	9·6%	0·0%	0·0%
Thai registries	1995–2009	47263	1·4%	0·7%	46279	4·0%	0·1%	44406	58·5%	38·4%	0·1%	23·4%
Turkey (Izmir)	1995–2009	64749	3·3%	3·4%	60451	3·0%	0·2%	58551	92·9%	2·1%	<0·1%	30·7%
Europe		11449869	6·5%	1·0%	10584050	4·5%	0·2%	10086145	89·7%	3·5%	0·3%	0·4%
Austria *	1995–2009	353194	6·9%	0·6%	326730	0·1%	0·9%	323432	97·6%	2·5%	0·0%	0·0%
Belarus (childhood)†	1995–2009	726	0·0%	0·0%	726	0·0%	0·0%	726	99·9%	0·0%	2·8%	0·0%
Belgium*	2004–2009	256073	8·7%	0·6%	232152	<0·1%	0·2%	231734	98·7%	1·5%	1·1%	0·0%
Bulgaria*	1995–2009	255768	<0·1%	0·2%	255158	11·2%	<0·1%	226566	81·4%	1·3%	0·1%	0·0%
Croatia*	1998–2009	148131	0·0%	0·1%	148031	6·0%	<0·1%	139147	84·9%	0·4%	0·0%	0·0%
Czech Republic*	1995–2009	469330	6·4%	1·3%	433523	7·9%	0·9%	395462	90·8%	1·9%	0·0%	0·0%
Denmark*	1995–2009	251533	0·0%	0·2%	250931	0·4%	0·0%	249943	93·2%	8·0%	0·1%	0·0%
Estonia*	1995–2008	51544	1·4%	1·1%	50283	3·8%	0·4%	48193	89·0%	3·5%	0·4%	0·0%

(Table 2 continues on next page)

	Calendar period	Patients submitted (n)	Ineligible patients¶		Eligible patients (n)	Exclusions‖		Available for analysis (n)	Data quality indicators††			
			In situ (%)	Other (%)		DCO (%)	Other (%)		MV (%)	Non-specific morphology (%)	Lost to follow-up (%)	Censored (%)
(Continued from previous page)												
Finland*	1995–2009	235156	6·5%	2·9%	213137	2·3%	<0·1%	208129	96·1%	7·3%	0·1%	0·0%
French registries†	1995–2009	227210	<0·1%	0·3%	226622	<0·1%	0·2%	226234	96·3%	2·6%	3·9%	4·1%
German registries	1995–2009	1668355	4·0%	1·2%	1582464	13·5%	0·1%	1367345	94·9%	1·0%	0·3%	0·1%
Gibraltar*	1999–2009	665	13·8%	15·8%	468	NA	1·3%	462	85·7%	0·9%	0·0%	2·2%
Iceland*	1995–2009	10805	0·0%	0·8%	10722	0·2%	0·0%	10704	97·2%	2·8%	0·0%	0·0%
Ireland*	1995–2009	169818	14·9%	1·4%	142134	2·4%	0·1%	138602	91·0%	1·1%	0·0%	0·0%
Italian registries	1995–2009	877272	2·7%	0·5%	849556	2·1%	0·2%	830162	87·5%	12·5%	0·8%	1·0%
Latvia*	1995–2009	78334	0·1%	0·2%	78141	6·1%	0·5%	72992	81·5%	0·5%	0·0%	0·0%
Lithuania*	1995–2009	132425	2·8%	0·5%	127999	3·6%	0·0%	123380	84·9%	2·0%	1·0%	0·0%
Malta*	1995–2009	11630	0·0%	0·9%	11526	2·6%	0·5%	11173	96·3%	7·9%	0·0%	<0·1%
Netherlands*	1995–2009	716617	2·9%	0·9%	688714	0·3%	0·3%	684601	97·0%	3·1%	0·5%	0·0%
Norway*	1995–2009	202823	0·0%	0·4%	202016	0·8%	0·0%	200334	95·5%	4·7%	0·2%	0·0%
Poland*	1995–2009	813485	1·2%	0·2%	802179	4·1%	0·4%	766183	79·6%	0·5%	0·1%	0·0%
Portugal*	1998–2009	240114	2·8%	2·7%	226878	0·2%	0·2%	225902	95·9%	3·3%	0·1%	1·4%
Romania (Cluj)	2006–2009	6900	3·9%	0·7%	6583	18·0%	2·0%	5264	93·0%	0·8%	0·0%	NA
Russia (Arkhangelsk)	2000–2009	23609	0·0%	<0·1%	23602	3·3%	0·7%	22643	82·4%	3·5%	1·1%	0·0%
Slovakia*	2000–2007	92942	0·0%	0·3%	92655	9·9%	<0·1%	83449	95·3%	5·5%	0·0%	0·0%
Slovenia*	1995–2009	95466	14·8%	2·5%	78973	2·7%	<0·1%	76835	94·5%	5·9%	0·1%	0·0%
Spanish registries	1995–2009	338249	3·9%	2·4%	317154	2·6%	0·3%	308081	91·5%	5·4%	0·2%	0·8%
Sweden*	1995–2009	395792	0·0%	<0·1%	395744	NA	0·0%	395744	98·9%	2·1%	0·2%	0·0%
Swiss registries	1995–2009	151879	6·9%	0·4%	140737	1·7%	0·1%	138125	95·2%	2·9%	3·2%	6·0%
UK*	1995–2009	3174024	14·5%	1·4%	2668512	3·5%	0·1%	2574598	83·3%	3·4%	<0·1%	0·1%
Oceania		930199	7·5%	0·6%	855312	1·8%	0·2%	837995	92·0%	4·2%	0·0%	4·1%
Australian registries	1995–2009	766090	9·1%	0·7%	691260	1·4%	0·2%	680295	91·9%	3·4%	0·0%	5·0%
New Zealand*	1995–2009	164109	0·0%	<0·1%	164052	3·3%	0·6%	157700	92·6%	7·6%	0·0%	0·0%
Total		28685445	5·9%	1·3%	26642591	3·4%	0·2%	25676887	91·1%	3·7%	0·6%	0·7%

NA=not available. *100% coverage of the national population. †100% coverage of the national population for childhood leukaemia only. ‡South Korea. ¶In situ malignant disease (ICD-O-3 behaviour code 2): some registries do not register in situ cancers, other registries did not submit them. Other: records with incomplete data; or tumours that are benign (behaviour code 0), of uncertain behaviour (1), metastatic from another organ (6), or unknown if primary or metastatic (9); or patients falling outside the age range 0–14 years (children) or 15–99 years (adults); or other conditions. ‖DCO=tumours registered from a death certificate only or detected solely at autopsy. Other: vital status or sex unknown; or invalid sequence of dates; or inconsistency of sex-site, site-morphology, age-site, age-morphology, or age-site-morphology. †† MV=microscopically verified. Non-specific morphology (solid tumours only): ICD-O-3 morphology code in the range 8000–8005. Censored: patients diagnosed during 1995–2004, with last known vital status "alive" but less than 5 years of follow-up.

Table 2: **Data quality indicators for patients diagnosed during 1995–2009, by continent and country (all cancers combined)**

Morphological confirmation for each cancer varied widely between continents and countries. Overall, 48·2% of liver cancers had morphological data available compared with 84·4% of lung cancers, at least 90% of other solid tumours and adult leukaemia, and 99% of childhood acute lymphoblastic leukaemia (appendix pp 3–63). Morphological confirmation was available for 100% of acute lymphoblastic leukaemias in all the specialist childhood cancer registries, including the national registries in Lesotho and Belarus.

The 279 participating cancer registries represented an estimated total population of about 896 210 000 people in 2009, or 18·6% of the combined national populations of the 67 countries (4·8 billion total population; table 3); details by registry are provided in the appendix (pp 64–80). 100% coverage of the national population was provided by 40 countries. Population coverage in Australia was 91%, and in the USA it was 83%. In the remaining 25 countries, population coverage ranged from 0·5% to 47%. In China, 21 participating registries covered 37·7 million people (2·8% of 1·35 billion total population), whereas the four registries in India covered 5·9 million people (0·5% of 1·19 billion total population). China and India apart, data from 254 registries covered 37% of the combined population of 2·3 billion people in 65 countries.

Life expectancy at birth in 2009 varied widely between the 279 registry populations: for females, the range was 46–87 years and for males it was 45–81 years (appendix, p 175). Life expectancy rose slightly from 1995 to 2009 in

	Population covered¶		Stomach (n)	Colon (n)	Rectum (n)	Liver (n)	Lung (n)	Breast‖ (n)	Cervix (n)	Ovary (n)	Prostate (n)	Leukaemia (n)		Total (n)
	n	%										Adults	Children	
Africa														
Total	15 983 791	5·8%	830	958	756	445	1833	3202	2357	346	1085	592	105	12 509
Algerian registries	2 099 478	5·8%	551	406	343	177	908	1582	514	153	364	327	33	5358
Lesotho (childhood)†	756 000	100·0%	..	..	..	..	..	..	..	..	..	..	22	22
Libya (Benghazi)	1 582 160	26·5%	87	225	105	61	317	352	57	68	153	93	15	1533
Mali (Bamako)	902 723	13·4%	..	..	..	..	..	203	..	..	..	..	..	203
Mauritius*	1 226 840	100·0%	65	81	65	23	84	290	93	52	58	31	..	842
Nigeria (Ibadan)	1 853 300	1·2%	..	70	108	..	..	..	315	..	263	39	..	795
South Africa (Eastern Cape)	1 094 303	2·2%	54	40	38	98	216	372	1168	46	198	..	..	2230
The Gambia*	1 628 330	100·0%	21	..	..	85	21	33	149	..	..	..	..	309
Tunisia (central)	4 840 657	46·1%	52	136	97	1	287	370	61	27	49	102	35	1217
America (Central and South)														
Total	43 562 690	13·2%	24 610	43 552	10 405	4076	51 054	111 382	26 389	10 022	64 579	4960	5144	356 173
Argentinian registries†	5 123 973	12·8%	1742	4172	1308	14	2463	9886	2189	1076	4883	15	3496	31 244
Brazilian registries	11 012 413	5·7%	3689	3457	1681	672	4192	52 198	3209	1203	8292	1117	403	80 113
Chilean registries	931 477	5·5%	1333	614	270	181	878	1174	562	229	1653	257	62	7213
Colombian registries	3 139 671	6·9%	4773	2439	..	741	3135	8346	3795	1352	6177	170	437	31 365
Cuba*	11 288 830	100·0%	5026	11 393	..	..	25 654	18 757	10 726	3551	14 372	97	..	89 576
Ecuadorian registries	4 987 086	33·8%	4821	1880	907	815	1698	5627	3957	1207	5333	1484	585	28 314
Puerto Rico*	3 718 810	100·0%	3226	11 930	3115	1653	5222	15 394	1951	1404	23 869	1820	161	69 745
Uruguay*	3 360 430	100·0%	..	7667	3124	..	7812	..	..	..	..	..	..	18 603
America (North)														
Total	291 101 829	84·8%	289 269	1 533 456	428 293	201 342	2 532 324	2 493 295	175 743	302 513	2 689 226	432 639	31 232	11 109 332
Canada*	33 628 600	100·0%	43 996	194 803	49 333	21 124	305 723	286 173	20 651	25 874	289 868	53 175	3439	1 294 159
US registries	257 473 229	83·2%	245 273	1 338 653	378 960	180 218	2 226 601	2 207 122	155 092	276 639	2 399 358	379 464	27 793	9 815 173
Asia														
Total	219 911 285	6·9%	680 012	405 348	229 351	465 575	594 333	414 619	139 621	71 388	194 319	70 615	9552	3 274 733
Chinese registries	37 688 165	2·8%	47 580	17 894	15 261	37 555	65 320	27 667	5251	5316	5597	6025	270	233 736
Cyprus*	819 100	100·0%	407	1330	375	104	1150	2482	150	265	1936	376	34	8609
Hong Kong*	3 707 500	100·0%	..	..	..	..	..	..	3792	2377	..	..	..	6169
Indian registries	5 877 408	0·5%	1942	147	138	242	1746	2691	2960	631	128	426	184	11 235
Indonesia (Jakarta)	9 607 787	4·0%	67	229	142	301	406	1004	459	235	137	97	14	3091
Israel*	7 273 800	100·0%	10 161	34 810	9595	2291	23 739	49 458	2887	5928	30 921	9339	792	179 921
Japanese registries	37 172 726	29·2%	230 800	139 071	63 269	81 085	154 292	97 409	17 249	17 221	65 114	12 784	1047	879 341
Jordan*	6 181 310	100·0%	1217	2653	1069	303	2518	6674	373	691	1457	1451	490	18 896
Korea*‡	48 164 970	100·0%	324 913	118 155	87 349	183 659	197 382	118 602	61 815	20 394	42 921	21 970	3765	1 180 925

(Table 3 continues on next page)

	Population covered¶		Stomach (n)	Colon (n)	Rectum (n)	Liver (n)	Lung (n)	Breast‖ (n)	Cervix (n)	Ovary (n)	Prostate (n)	Leukaemia (n)		Total (n)
	n	%										Adults	Children	
(Continued from previous page)														
Malaysia (Penang)	1458900	5·3%	1125	1931	1011	877	2784	3803	1227	719	740	424	159	14800
Mongolia*	2672220	100·0%	2532	354	60	6358	1196	392	1178	264	39	113	24	12510
Qatar*	1564080	100·0%	41	109	39	65	90	248	31	31	56	39	..	749
Saudi Arabia *	26796380	100·0%	1707	2515	1238	3165	2094	5179	734	954	1473	1801	..	20860
Taiwan*	23119772	100·0%	51506	78146	45212	133440	111317	82264	35308	13036	36455	12239	2011	600934
Thai registries	3938859	5·9%	1337	3198	1827	14840	8382	5770	4722	1607	1120	1275	328	44406
Turkey (Izmir)	3868308	5·4%	4677	4806	2766	1290	21917	10976	1485	1719	6225	2256	434	58551
Europe														
Total	301311488	46·5%	621585	1487141	691181	210272	1983228	2281321	245190	373542	1836205	330922	25558	10086145
Austria*	8371710	100·0%	21262	45039	23989	9368	51467	70149	7140	12357	71407	10570	684	323432
Belarus (childhood)†	1387671	100·0%	..	..	..	..	..	..	..	..	..	..	726	726
Belgium*	10862440	100·0%	8180	33007	14454	3050	43212	57203	3851	5783	55141	7447	406	231734
Bulgaria*	7446200	100·0%	21072	31599	20332	5164	45999	49420	15317	11643	18612	6859	549	226566
Croatia*	4349930	100·0%	12341	19816	12240	4063	33037	26912	4389	5885	14885	5227	352	139147
Czech Republic*	10486430	100·0%	24175	73556	31175	8062	80304	77632	15605	17702	54772	12479	..	395462
Denmark*	5524430	100·0%	8014	36668	19769	4035	56379	59135	6104	9328	41162	8806	543	249943
Estonia*	1302970	100·0%	6093	6159	3097	876	9975	8201	2317	2296	7060	2038	81	48193
Finland*	5343930	100·0%	10911	22300	11548	4129	30317	54675	2353	7714	57012	6576	594	208129
French registries†	11563608	18·4%	10890	36315	14723	8996	30470	52334	3549	5835	47893	9508	5721	226234
German registries	36511217	43·9%	83205	204411	107477	27951	232433	323100	31607	44569	265955	44460	2177	1367345
Gibraltar*	29253	100·0%	32	73	17	5	61	176	11	13	63	11	..	462
Iceland*	313800	100·0%	532	1333	509	130	2053	2371	223	366	2813	346	28	10704
Ireland*	4410420	100·0%	6952	20706	8813	1564	25042	31160	3232	4933	30060	5669	471	138602
Italian registries	23238302	38·6%	67401	139202	40810	42965	153997	181654	10400	23787	135881	32057	2008	830162
Latvia*	2112340	100·0%	9476	8380	5236	1376	15713	13617	3016	4533	8994	2555	96	72992
Lithuania*	3101970	100·0%	14672	11677	8578	1944	22425	19047	7179	6392	26047	5120	299	123380
Malta*	422870	100·0%	687	1693	722	141	1866	3238	160	549	1662	399	56	11173
Netherlands*	16561280	100·0%	31142	109467	41810	4788	144869	176885	10292	21021	120745	22549	1033	684601
Norway*	4835630	100·0%	8765	33809	15840	1789	32745	38651	4573	7660	50016	5962	524	200334
Poland*	38193590	100·0%	60115	93762	60178	15018	225554	151046	39367	39430	79083	2630	..	766183
Portugal*	10776872	100·0%	25315	39016	18641	3647	27423	47868	6861	4977	46210	5530	414	225902
Romania (Cluj)	677942	3·1%	535	618	275	161	1028	1073	458	213	655	240	8	5264
Russia (Arkhangelsk)	1246204	0·9%	5006	2927	1840	225	5220	3654	1005	1078	1331	357	..	22643
Slovakia*	5425040	100·0%	6767	16002	7521	1295	15545	15859	4349	3564	8914	3407	226	83449
Slovenia*	2044250	100·0%	6864	11173	6409	1658	15976	15240	2827	2837	11025	2673	153	76835
Spanish registries	10002689	21·9%	22326	54275	18868	12105	58048	57242	5316	8948	58421	11541	991	308081
Sweden*	9310300	100·0%	15320	50722	29449	7543	46744	90168	6780	12999	121681	13451	887	395744
Swiss registries†	3666300	47·4%	5901	18300	7457	4072	23183	33550	1924	4579	32976	5514	669	138125
UK*	61791900	100·0%	127634	365136	159404	34152	552143	620061	44985	102551	465729	96941	5862	2574598

(Table 3 continues on next page)

	Population covered¶		Stomach (n)	Colon (n)	Rectum (n)	Liver (n)	Lung (n)	Breast‖ (n)	Cervix (n)	Ovary (n)	Prostate (n)	Leukaemia (n)		Total (n)
	n	%										Adults	Children	
(Continued from previous page)														
Oceania														
Total	24 339 214	92·3%	29 290	142 612	53 875	12 739	131 489	183 109	12 925	21 491	213 853	33 860	2752	837 995
Australian registries	20 016 274	90·8%	23 821	114 778	44 152	10 583	108 025	148 633	10 219	16 899	173 796	27 162	2227	680 295
New Zealand*	4 322 940	100%	5469	27 834	9723	2156	23 464	34 476	2706	4592	40 057	6698	525	157 700
Worldwide														
Total	894 710 154	18·6%	1 645 596	3 613 067	1 413 861	894 449	5 294 261	5 486 928	602 225	779 302	4 999 267	873 588	74 343	25 676 887

*100% coverage of the national population. †100% coverage of the national population for childhood leukaemia only. ‡South Korea. ¶Data are from the UN Population Division for 2009,[40] national authorities in Canada, Portugal, and the UK, or the cancer registry. ‖In female patients.

Table 3: **Population coverage and number of patients diagnosed during 1995–2009, by continent and country**

most populations, but in some countries it changed substantially between the earliest and latest years for which data were available, from a decline of 6–9 years in South Africa and Lesotho (attributable largely to HIV/AIDS),[45] to an increase of 6 years or more in Estonia, Latvia (for male patients), and South Korea, and in some regions of Brazil (male patients), China, and Germany (male patients; data not shown).

Whenever possible, findings are presented for patients diagnosed during 1995–99, 2000–04, and 2005–09, by continent, country, and registry (figures 2 to 4; appendix pp 3–173). When data were available for more than one registry in a given country, survival estimates were derived by pooling data for that country, excluding data from registries for which estimates were judged less reliable (figures 2 and 3). Survival estimates were flagged as less reliable if a higher than usual proportion of patients was excluded from analyses because their cancer was registered from the death certificate only, or had an unknown date for last vital status, or because not all deaths were ascertained. Less reliable estimates are not always outliers in the global distribution, but when they are, they have been omitted from this discussion. Less reliable estimates are also excluded from the distribution of survival among registries in each continent (figure 4).

Data for stomach cancer are available for 1 645 596 patients. 191 registries in 48 countries contributed data for 1995–99, 241 registries in 56 countries provided data for 2000–04, and 241 registries in 59 countries provided data for 2005–09 (table 3; appendix pp 64–80). For patients diagnosed during 2005–09, age-standardised 5-year net survival for stomach cancer was very high in South Korea (58%), Japan (54%), and Mauritius (41%; table 4; appendix p 142). 5-year survival from stomach cancer was 30–39% in Austria, Belgium, China, Germany, Iceland, Italy, Portugal, Switzerland, and Taiwan. 5-year survival in Denmark, Malta, Poland, and the UK was lower than in most other European countries (18–19%). Survival was less than 10% in Gibraltar and Libya, but those two estimates are based on fewer than 100 cases (table 4; appendix pp 64–80). In most countries, survival from stomach cancer remained in the narrow range of 25–30% from 1995–99 to 2005–09. Very large increases were seen in South Korea (from 33% to 58%) and China (from 15% to 31%), but survival rose by less than 10% in some countries on all continents (appendix p 153). Survival from stomach cancer fell by 6–17% in Brazil, Cyprus, Malaysia, Thailand, and Turkey, declines that were not seen for most other cancers in these registries. We could not assess survival trends for stomach cancer in African countries. The range of 5-year survival estimates for stomach cancer in 2005–09 varied widely between registries in Africa, Asia, and Central and South America (appendix p 164).

Data for colon cancer are available for 3 613 067 patients (table 3). 191 registries in 48 countries contributed data for 1995–99, 244 registries in 58 countries provided data for 2000–04, and 242 registries in 61 countries had data for 2005–09 (appendix pp 64–80). For patients diagnosed with colon cancer during 2005–09, age-standardised 5-year net survival was 50–59% in many countries, although it did surpass 60% in North America, Oceania, 12 European countries, and a few countries in Central and South America and Asia (table 4; appendix p 143). 5-year net survival from colon cancer was 40–49% in Argentina, Bulgaria, Chile, Colombia, Latvia, and Russia, and it was less than 40% in India, Indonesia, and Mongolia. In most countries, 5-year survival from colon cancer increased from 1995–99 to 2005–09, but it fell in Argentina and Cyprus (table 4; appendix p 154). Pooled 5-year survival estimates for Canada and the USA were already high (57% and 61%, respectively) for patients diagnosed with colon cancer in 1995–99, but they increased to 63% and 65%, respectively, for individuals diagnosed during 2005–09. Data were generally available from the same registries throughout the period 1995–2009 in North America and

Figure 2: **Global distribution of age-standardised 5-year net survival for women diagnosed with breast cancer during 1995–99, 2000–04, and 2005–09, by continent and country**
Age-standardised 5-year net survival estimates for other cancers are presented in the appendix (pp 141–51). Survival estimates for every country are ranked from highest to lowest within every continent; for ease of reference, the ranking for 2005–09 is used for 1995–99 and 2000–04. Error bars represent 95% CIs. Grey bars represent African countries; red bars represent America (Central and South); light green bars represent America (North); purple bars represent Asian countries; blue bars represent European countries; and dark green bars represent Oceania. *100% coverage of the national population. †National estimate not age-standardised. §National estimate flagged as less reliable because the only estimate or estimates available are from a registry or registries in this category.

Oceania, where survival from colon cancer was either stable or improving, and the range of estimates was narrow (appendix p 165). High outlier values for 2005–09 are for Yukon (Canada; 78%, a merged estimate based on 109 cases) and Australian Capital Territory (Australia; 74%, based on 247 cases; appendix pp 64–111).

Data for rectal cancer are available for 1 413 861 patients (table 3). 188 registries in 46 countries provided data for 1995–99, 240 registries in 57 countries had data available for 2000–04, and 238 registries in 60 countries contributed data for 2005–09 (appendix pp 64–80). For patients diagnosed with cancer of the rectum during 2005–09, age-standardised 5-year net survival was in the range 50–59% in many countries. Survival was very high (70% or more) in Cyprus, Iceland, and Qatar, and high (60–69%) in South Korea, North America, Oceania, and nine European countries (table 4; appendix p 144). Survival from rectal cancer was very low in India (29%). During 1995–2009, survival from rectal cancer increased in most countries, but it

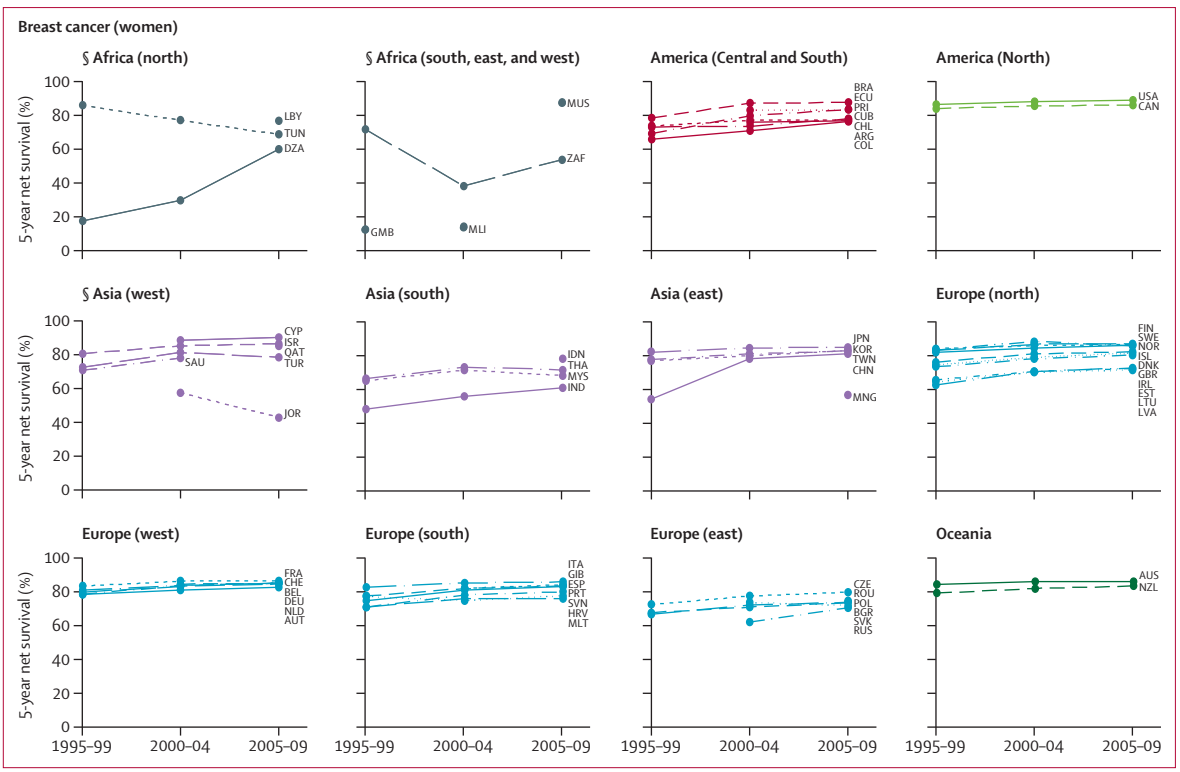

Figure 3: **Trends in age-standardised 5-year net survival for women diagnosed with breast cancer during 1995–99, 2000–04, and 2005–09, by continent or region and country**

Trends in age-standardised 5-year net survival for other cancers are presented in the appendix (pp 152–62). Countries have been grouped into 12 geographical regions. ARG=Argentina. AUS=Australia. AUT=Austria. BEL=Belgium. BGR=Bulgaria. BRA=Brazil. CAN=Canada. CHE=Switzerland. CHL=Chile. CHN=China. COL=Colombia. CUB=Cuba. CYP=Cyprus. CZE=Czech Republic. DEU=Germany. DNK=Denmark. DZA=Algeria. ECU=Ecuador. ESP=Spain. EST=Estonia. FIN=Finland. FRA=France. GBR=United Kingdom. GIB=Gibraltar. GMB=The Gambia. HRV=Croatia. IDN=Indonesia. IND=India. IRL=Ireland. ISL=Iceland. ISR=Israel. ITA=Italy. JOR=Jordan. JPN=Japan. KOR=South Korea. LBY=Libya. LTU=Lithuania. LVA=Latvia. MLI=Mali. MLT=Malta. MNG=Mongolia. MUS=Mauritius. MYS=Malaysia. NLD=Netherlands. NOR=Norway. NZL=New Zealand. POL=Poland. PRI=Puerto Rico. PRT=Portugal. QAT=Qatar. ROU=Romania. RUS=Russia. SAU=Saudi Arabia. SVK=Slovakia. SVN=Slovenia. SWE=Sweden. TWN=Taiwan. THA=Thailand. TUN=Tunisia. TUR=Turkey. USA=United States of America. ZAF=South Africa. §Continent or region with one or more national estimates flagged as less reliable.

was stable or even falling in Argentina, Brazil, Chile, India (Karunagappally), Malaysia, and Uruguay (appendix p 155).

Data for liver cancer are available for 894 449 patients (table 3). 189 registries in 46 countries contributed data for 1995–99, 236 registries in 54 countries provided data for 2000–04, and 236 registries in 57 countries had data available for 2005–09 (appendix pp 64–80). However, international comparisons are more limited for liver cancer than for other malignant diseases because estimates from 20 countries were flagged as less reliable, mainly because of a high proportion of cancer registrations from a death certificate only (appendix pp 24–28). Age-standardised 5-year net survival from liver cancer was generally low (10–20%) in most countries, both in the developed and developing world, throughout the period 1995–2009 (table 4; appendix p 145). Survival only reached 20% or more for patients diagnosed during 2005–09 in some east Asian countries (Japan, South Korea, and Taiwan), where a steady rise in survival from liver cancer has been seen since 1995–99. Even for 2005–09, survival was still very low (less than 10%) in Colombia, Denmark, Estonia, Finland, India, Malta, Mongolia, Norway, Russia, Slovenia, Thailand, and the UK. Estimates judged less reliable were mostly very similar to those that were robust. 5-year survival from liver cancer increased between 1995–99 and 2005–09 in the two countries in North America, four countries in Asia, and 13 European countries. Survival declined in Thailand from 16% to 8% (based on 14 800 cases). The high survival estimate for Mauritius (53%) is a national figure, but it is based on only 23 cases and is not age-standardised.

Data for lung cancer are available for 5 294 261 patients (table 3). 190 registries in 48 countries provided data for 1995–99, 240 registries in 57 countries contributed data for 2000–04, and 240 registries in 60 countries had data available for 2005–09 (appendix pp 64–80). Age-standardised 5-year net survival from lung cancer was typically low, in the range 10–20% for most geographical areas, both in the developed and developing world (table 4, appendix pp 146 and 168). The general pattern is very similar to that of liver cancer. International variation in survival is less striking than for cancers with good prognosis, but differences are still noticeable.

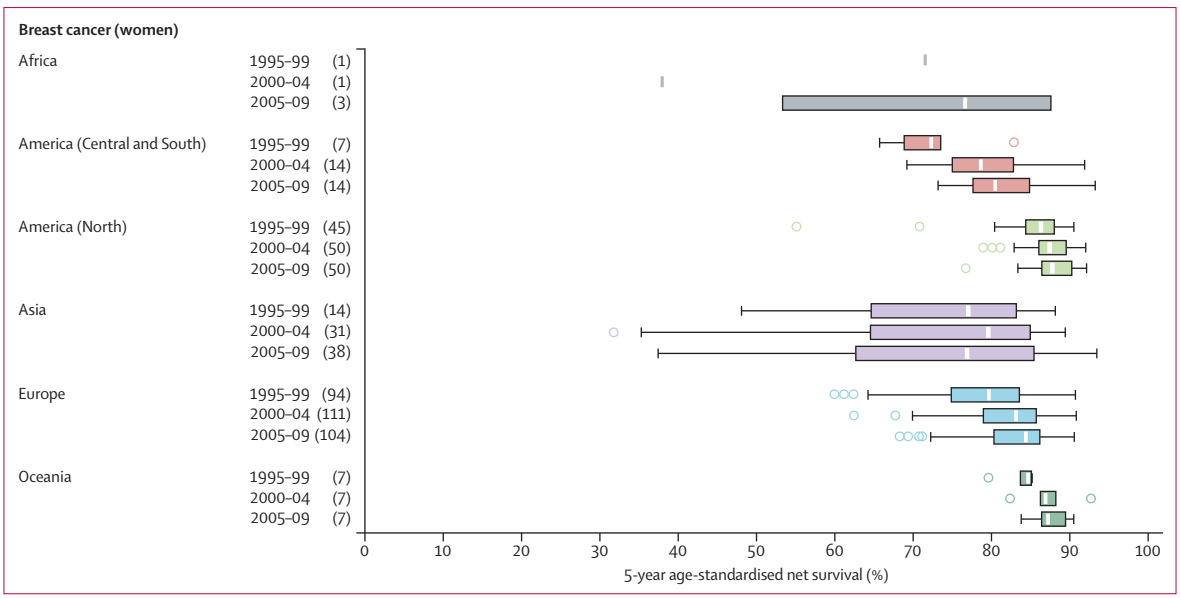

Figure 4: **Global range of age-standardised 5-year net survival estimates for women diagnosed with breast cancer in 228 cancer registry patients**
Each box-plot shows the range of survival estimates among all those cancer registries for which suitable estimates could be obtained for patients diagnosed in a given calendar period in each continent. The number of registries included in each box-plot is shown in parentheses. Survival estimates considered less reliable are not included. The vertical line inside each box denotes the median survival value, and the box shows the IQR between the lower and upper quartiles. The extreme limits of the box-plot are 1·5 times the IQR below the lower quartile and above the upper quartile. Open circles indicate outlier values, outside this range. Data for other cancers are presented in the appendix (pp 163–73).

For patients diagnosed during 2005–09, 5-year survival from lung cancer was higher than 20% in only three countries: Japan (30%), Israel (24%), and Mauritius (37%). The survival estimate for Mauritius is based on only 84 cases diagnosed in 2005 (appendix pp 64–80). Survival from lung cancer was very low (less than 10%) in Bulgaria, Lithuania, Mongolia, and Thailand, and only 2% in Libya (Benghazi; based on 317 patients diagnosed during 2003–05). Between 1995–99 and 2005–09, survival from lung cancer rose by 7% in Israel and Japan, and it increased in China (from 8% to 18%), India (Karunagappally; from 4% to 10%; appendix pp 81–111) and South Korea (from 10% to 19%). Rises of 2–4% were noted in Colombia, North America, and Europe. Survival from lung cancer fell from 19% to 10% in Turkey (Izmir), but this reduction could be attributable to improvement in data quality. Smaller decreases (2–4%) were seen in Cyprus, Croatia, Malaysia, and Lithuania.

Data for breast cancer are available for 5 486 928 women (table 3). 193 registries in 49 countries provided data for 1995–99, 245 registries in 57 countries had data available for 2000–04, and 243 registries in 59 countries contributed data for 2005–09 (appendix pp 64–80). Most survival estimates were judged reliable. For women diagnosed during 2005–09, age-standardised 5-year net survival from breast cancer was 80% or higher in 34 countries around the world (table 4, figures 2 to 4). However, breast cancer survival was lower than 70% in Malaysia (68%) and India (60%) and very low in Mongolia (57%) and South Africa (53%). Between 1995–99 and 2005–09, survival from breast cancer increased in Central and South America, particularly in Brazil (from 78% to 87%), Colombia (from 66% to 76%), and Ecuador (from 69% to 83%; figure 3). Survival also rose in Algeria (from 17% to 60%), but this trend is less reliable. We were unable to assess survival trends in most other African countries. The very low survival estimate for breast cancer in Mali (13·6%; Bamako) is not age-standardised and is a pooled estimate based on 203 women diagnosed during 1995–2004. These women represent only a small proportion of all those registered with breast cancer in this period; for most women, obtaining information on their vital status proved impossible. In North America and Oceania, survival from breast cancer was high, with a fairly narrow range between registries (84–89%) and with stable or slightly improving survival seen up to 2005–09. Survival also rose in Europe but was generally lower than in North America and Oceania and with a much wider geographic range (figure 4).

Data for cervical cancer are available for 602 225 women (table 3). 192 registries in 51 countries provided data for 1995–99, 244 registries in 58 countries contributed data for 2000–04, and 244 registries in 61 countries provided data for 2005–09 (appendix pp 64–80). The global range in 5-year net survival from cervical cancer is very wide, particularly in Africa, Central and South America, and Asia (table 4; appendix p 169). For women diagnosed with cancer of the cervix during 2005–09, age-standardised 5-year net survival was 70% or higher in Iceland, Mauritius, Norway, South Korea, and Taiwan; the estimate for Qatar is also above 70% but is based on only 16 cases and is not age-standardised (table 4; appendix p 147). In 34 of 61 countries around the world,

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
Africa											
Algerian registries											
1995–99	5·1§ (2·0–8·2)	10·8§ (7·9–13·6)	7·9§ (4·0–11·8)	..	6·0§ (3·9–8·0)	17·1§ (13·8–20·3)	23·4§ (18·0–28·9)	13·9§ (7·9–19·9)	44·0§ (34·3–53·8)	21·2§ (10·1–32·4)	..
2000–04	17·6§ (11·6–23·7)	48·6§ (33·6–63·6)	41·2§ (32·5–49·8)	17·9§ (11·5–24·4)	8·2§ (4·6–11·9)	29·5§ (25·3–33·6)	59·5§ (51·5–67·5)	42·9§ (20·8–64·9)	55·5§ (50·6–60·3)	32·3§ (22·1–42·5)	..
2005–09	10·3§ (6·7–14·0)	57·2§ (45·6–68·9)	45·5§ (36·3–54·8)	17·5§ (11·7–23·4)	14·8§ (11·2–18·4)	59·8§ (48·6–71·1)	55·1§ (49·8–60·4)	41·8§ (22·2–61·4)	58·5§ (51·2–65·9)	13·6§ (6·7–20·5)	54·1§ (31·3–76·8)
Lesotho (childhood)†											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	..	..	..	..	..	..	..	..	..	..	39·5 (16·4–62·7)
Libya (Benghazi)											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	3·0 (0·0–7·6)	30·7 (21·0–40·5)	50·5 (33·2–67·9)	0·2§ (0·0–0·8)	2·2 (0·7–3·6)	76·6 (55·5–97·7)	39·4 (28·5–50·4)	22·1 (10·3–33·9)	41·4 (27·3–55·6)	6·2 (1·4–11·0)	70·1 (43·4–96·9)
Mali (Bamako)											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	13·6§ (0·0–30·1)	..	..	..	..	..
2005–09	..	..	..	..	..	..	..	..	..	..	..
Mauritius*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	40·7 (24·3–57·0)	55·5 (41·0–70·1)	68·9 (48·6–89·2)	52·6 (28·9–76·3)	37·2 (24·4–50·0)	87·4 (78·1–96·7)	86·7 (77·9–95·6)	82·7 (63·8–100·0)	77·3 (61·0–93·5)	57·2 (37·4–76·9)	..
Nigeria (Ibadan)											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	93·6§ (83·7–100·0)	..	97·4§ (89·5–100·0)	..	..
2005–09	..	0·1§ (0·0–0·4)	46·0§ (18·4–73·6)	..	..	..	96·0§ (90·4–100·0)	..	91·0§ (81·8–100·0)	82·7§ (59·8–100·0)	..
South Africa (Eastern Cape)											
1995–99	..	..	..	..	..	71·5 (51·4–91·6)	37·0 (24·7–49·4)	..	..	..	..
2000–04	..	..	..	..	..	37·9 (21·1–54·7)	63·0 (54·2–71·8)	..	85·3§ (60·0–100·0)	..	..
2005–09	..	..	..	10·2§ (0·0–22·9)	19·0§ (0·0–38·4)	53·4 (35·5–71·3)	54·9 (41·5–68·3)	90·9§ (67·8–100·0)	100·0§ (85·5–100·0)	..	..
The Gambia*						.					
1995–99	0·3§ (0·0–1·0)	..	..	4·5§ (0·2–8·8)	30·0§ (3·6–56·4)	11·9§ (0·0–24·7)	19·5§ (11·0–28·0)	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	..	..	..	..	..	..	..	..	..	..	..
Tunisia (central)											
1995–99	..	..	..	..	6·9§ (0·9–12·9)	85·6§ (71·5–99·7)	..	..	..	..	..
2000–04	..	..	..	..	15·0§ (4·3–25·7)	76·7§ (66·8–86·7)	..	..	..	..	..
2005–09	49·0 (27·9–70·2)	67·6§ (57·4–77·8)	78·5§ (64·6–92·4)	..	10·3§ (0·0–20·6)	68·4§ (64·5–72·2)	42·4§ (25·7–59·0)	47·8§ (25·2–70·5)	100·0§ (100·0–100·0)	26·5§ (15·0–37·9)	50·1§ (26·0–74·2)

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
America (Central and South)											
Argentinian registries†											
1995–99	..	..	..	..	..	..	45·9 (35·0–56·8)	..	..	..	..
2000–04	19·2§ (14·9–23·6)	46·0§ (42·0–50·0)	44·4 (34·4–54·3)	..	20·8§ (16·3–25·2)	75·5 (70·5–80·5)	52·0 (46·5–57·5)	26·8 (17·7–35·9)	85·0 (75·5–94·4)	..	64·6 (62·2–67·0)
2005–09	16·0§ (12·9–19·2)	40·6§ (34·5–46·7)	31·0 (23·3–38·7)	24·2§ (1·6–46·7)	11·9§ (9·6–14·2)	76·6 (71·4–81·9)	50·6 (46·7–54·5)	29·7 (23·7–35·8)	86·6 (80·6–92·6)	90·0§ (68·0–100·0)	66·9 (64·4–69·3)
Brazilian registries											
1995–99	33·1 (24·7–41·5)	55·9 (48·6–63·3)	54·7 (45·3–64·1)	15·9§ (7·1–24·7)	18·6 (11·2–26·0)	78·2 (73·5–82·8)	60·2 (55·0–65·4)	35·1 (26·0–44·3)	83·4 (78·7–88·2)	34·3§ (16·2–52·4)	71·9 (58·9–84·8)
2000–04	28·2 (24·2–32·2)	58·1 (54·2–62·0)	52·8 (46·6–59·1)	17·9§ (12·3–23·6)	13·7 (9·4–18·0)	86·9 (84·3–89·5)	67·5 (64·0–71·0)	41·3 (34·6–48·1)	93·0 (90·5–95·5)	30·1§ (16·3–43·9)	68·7 (60·5–77·0)
2005–09	24·9 (21·2–28·6)	58·2 (54·4–61·9)	55·9 (50·2–61·7)	11·6§ (7·5–15·7)	18·0 (12·8–23·2)	87·4 (84·8–90·0)	61·1 (57·4–64·9)	31·8 (25·5–38·2)	96·1 (93·9–98·4)	20·3§ (11·0–29·7)	65·8 (57·7–74·0)
Chilean registries											
1995–99	13·4§ (7·7–19·1)	39·0 (24·5–53·6)	..	..	..	73·3 (58·2–88·5)	41·9 (30·9–53·0)	..	69·7 (58·3–81·2)	..	..
2000–04	16·4 (12·7–20·1)	36·4 (28·3–44·5)	41·7 (32·2–51·2)	4·5§ (1·4–7·6)	6·2 (2·4–10·0)	76·8 (69·7–84·0)	55·5 (49·1–61·9)	29·6 (20·1–39·2)	81·2 (75·0–87·5)	10·3 (4·8–15·8)	..
2005–09	18·0 (14·3–21·7)	43·3 (34·9–51·7)	37·7 (27·9–47·5)	7·9§ (2·0–13·8)	6·3 (2·2–10·4)	77·1 (70·4–83·8)	50·9 (44·3–57·5)	32·2 (19·2–45·1)	88·7 (83·5–93·8)	16·1 (8·4–23·9)	66·4 (51·3–81·5)
Colombian registries											
1995–99	15·4 (13·1–17·8)	29·2 (24·8–33·7)	..	3·7 (0·0–7·7)	6·1 (4·2–8·0)	65·7 (61·0–70·3)	50·6 (46·8–54·5)	27·3 (20·5–34·1)	67·1 (63·1–71·1)	..	40·9 (31·5–50·3)
2000–04	17·7 (15·2–20·2)	42·3 (37·9–46·7)	..	4·3 (1·4–7·3)	9·0 (6·8–11·2)	70·4 (67·0–73·9)	56·8 (53·3–60·2)	33·0 (27·0–39·0)	80·5 (77·6–83·4)	19·6 (7·8–31·4)	49·3 (40·1–58·4)
2005–09	16·6 (13·9–19·2)	43·3 (38·8–47·9)	..	5·3 (2·2–8·5)	9·0 (6·6–11·4)	76·1 (72·2–80·0)	59·3 (55·4–63·2)	31·1 (25·4–36·8)	78·6 (75·4–81·8)	20·1 (8·2–32·0)	53·8 (43·9–63·6)
Cuba*											
1995–99	26·2§ (23·2–29·2)	45·8§ (43·2–48·3)	..	..	21·8§ (20·5–23·2)	72·8 (70·1–75·5)	66·4 (63·2–69·6)	35·4 (30·7–40·0)	54·5§ (51·5–57·6)	..	..
2000–04	23·8§ (22·0–25·6)	44·1§ (42·7–45·6)	..	..	14·1§ (13·4–14·8)	73·3 (71·9–74·8)	61·9 (60·2–63·7)	34·7 (31·9–37·5)	47·6§ (45·8–49·3)	..	..
2005–09	26·2§ (23·1–29·3)	46·4§ (44·0–48·8)	..	..	18·2§ (17·0–19·4)	77·7 (75·4–79·9)	64·0 (61·2–66·7)	39·8 (35·5–44·2)	56·1§ (53·2–59·0)	59·6 (46·6–72·7)	..
Ecuadorian registries											
1995–99	40·1§ (34·9–45·4)	61·5 (52·1–71·0)	45·5 (34·6–56·5)	16·2§ (9·2–23·2)	34·5§ (22·2–46·9)	68·9 (62·9–74·9)	59·7 (54·5–65·0)	35·2 (27·3–43·1)	76·3 (70·7–81·9)	29·5 (22·3–36·7)	63·6 (53·4–73·8)
2000–04	28·5§ (25·7–31·3)	69·9 (58·4–81·5)	48·3 (38·6–58·0)	15·3§ (10·0–20·5)	37·8§ (26·9–48·7)	79·6 (74·5–84·6)	58·5 (53·7–63·3)	44·7 (35·2–54·2)	90·9 (86·5–95·3)	36·0 (28·1–44·0)	64·2 (54·9–73·6)
2005–09	31·9§ (29·1–34·6)	68·2 (57·7–78·7)	52·6 (44·3–61·0)	17·7§ (12·3–23·2)	28·7§ (22·0–35·4)	83·2 (79·2–87·2)	61·7 (56·8–66·5)	47·0 (37·1–57·0)	92·4 (88·7–96·0)	33·5 (26·3–40·7)	62·6 (53·7–71·6)
Puerto Rico*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	26·8 (24·3–29·3)	60·3 (58·7–61·9)	54·3 (51·2–57·3)	12·2§ (9·4–15·0)	14·8§ (13·2–16·4)	82·6 (81·1–84·1)	60·9 (57·2–64·6)	34·5 (30·5–38·6)	97·5 (96·5–98·5)	34·1 (30·0–38·2)	78·8 (69·8–87·7)
2005–09	28·6 (26·0–31·2)	60·9 (59·4–62·3)	57·8 (54·7–60·8)	9·2§ (7·1–11·2)	15·8§ (14·2–17·4)	83·0 (81·6–84·5)	59·3 (55·7–62·9)	34·8 (30·8–38·8)	97·7 (96·8–98·6)	30·2 (26·9–33·5)	80·1 (71·1–89·0)
Uruguay*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	56·5§ (54·1–59·0)	53·0 (49·0–57·1)	..	12·5§ (10·9–14·0)	..	..	..	..	..	..
2005–09	..	53·4§ (50·5–56·3)	49·4 (45·6–53·2)	..	9·1§ (7·9–10·3)	..	..	..	..	..	..

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
America (North)											
Canada*											
1995–99	21·1 (20·4–21·9)	56·8 (56·3–57·3)	56·5 (55·4–57·5)	12·1 (11·2–13·1)	15·1 (14·8–15·3)	83·7 (83·3–84·1)	66·2 (64·8–67·5)	36·5 (35·3–37·7)	87·5 (87·1–87·9)	46·8 (45·9–47·8)	85·8 (83·4–88·2)
2000–04	23·1 (22·3–23·9)	60·1 (59·6–60·6)	60·5 (59·6–61·5)	15·4 (14·5–16·4)	15·6 (15·4–15·9)	85·3 (84·9–85·7)	67·5 (66·1–68·8)	35·5 (34·4–36·6)	91·0 (90·7–91·4)	52·4 (51·5–53·2)	91·0 (89·0–92·9)
2005–09	24·8 (24·0–25·6)	62·8 (62·4–63·3)	62·8 (61·9–63·7)	17·7 (16·8–18·7)	17·3 (17·1–17·6)	85·8 (85·5–86·2)	66·8 (65·4–68·1)	37·5 (36·3–38·6)	91·7 (91·4–92·0)	55·2 (54·4–56·0)	90·6 (88·6–92·7)
US registries											
1995–99	22·1 (21·8–22·5)	60·5 (60·3–60·7)	60·0 (59·6–60·4)	8·5 (8·2–8·8)	15·2 (15·1–15·3)	86·0 (85·8–86·1)	64·2 (63·6–64·7)	38·9 (38·5–39·2)	93·2 (93·0–93·3)	44·5 (44·2–44·9)	83·1 (82·1–84·0)
2000–04	25·8 (25·5–26·2)	63·7 (63·5–63·9)	63·1 (62·7–63·4)	11·9 (11·7–12·2)	16·6 (16·5–16·7)	87·9 (87·8–88·1)	63·6 (63·1–64·1)	39·6 (39·3–40·0)	96·4 (96·3–96·5)	48·8 (48·5–49·1)	86·6 (85·8–87·4)
2005–09	29·1 (28·7–29·4)	64·7 (64·5–64·9)	64·0 (63·6–64·3)	15·2 (14·9–15·5)	18·7 (18·6–18·8)	88·6 (88·5–88·7)	62·8 (62·3–63·3)	40·9 (40·5–41·2)	97·2 (97·0–97·3)	51·8 (51·5–52·1)	87·7 (86·9–88·4)
Asia											
Chinese registries											
1995–99	15·3 (12·2–18·3)	33·5 (28·3–38·8)	28·9 (23·9–33·9)	2·4 (1·6–3·2)	7·5 (5·7–9·3)	53·8 (44·3–63·2)	40·1 (30·0–50·2)	41·0 (26·9–55·1)	62·9 (45·2–80·6)	4·7 (1·9–7·5)	10·9 (1·5–20·2)
2000–04	29·0 (28·1–29·9)	51·2 (49·4–53·0)	48·0 (46·2–49·9)	10·9 (10·2–11·7)	18·1 (17·5–18·8)	78·0 (75·5–80·5)	56·1 (52·0–60·1)	42·6 (38·3–47·0)	55·8 (50·5–61·1)	18·2 (15·7–20·8)	50·0 (39·7–60·2)
2005–09	31·3 (30·4–32·1)	54·6 (53·1–56·0)	53·2 (51·6–54·9)	12·5 (11·8–13·3)	17·5 (16·9–18·0)	80·9 (79·1–82·7)	59·9 (57·2–62·7)	38·9 (36·4–41·3)	63·8 (59·6–68·1)	21·2 (19·1–23·4)	61·1 (51·3–70·8)
Cyprus*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	42·9 (28·8–57·0)	68·4 (60·5–76·3)	..	..	18·4 (12·3–24·5)	88·7 (80·9–96·5)	..	..	..	..	..
2005–09	26·3 (19·9–32·6)	58·1 (48·7–67·4)	70·2 (61·0–79·3)	9·8§ (2·4–17·1)	15·4 (12·2–18·6)	90·6 (85·6–95·5)	64·5 (55·6–73·5)	43·2 (34·3–52·2)	93·1 (89·0–97·2)	61·3 (53·4–69·2)	83·2 (69·7–96·7)
Hong Kong*											
1995–99	..	..	..	..	..	..	68·7 (65·8–71·7)	47·0 (41·0–53·0)	..	..	..
2000–04	..	..	..	..	..	..	72·1 (69·9–74·3)	53·3 (48·8–57·9)	..	..	..
2005–09	..	..	..	..	..	..	69·4 (65·9–72·9)	52·9 (45·8–60·0)	..	..	..
Indian registries											
1995–99	21·2 (6·1–36·2)	..	..	..	4·4 (1·9–6·9)	48·1 (37·2–58·9)	49·1 (39·4–58·9)	23·2§ (8·8–37·7)	..	7·3§ (0·9–13·7)	..
2000–04	9·3 (4·2–14·4)	33·2 (23·0–43·4)	40·7 (24·5–57·0)	1·8 (0·0–4·0)	9·8 (3·8–15·8)	55·3 (42·2–68·5)	47·4 (36·0–58·9)	..	35·7 (20·0–51·4)	..	..
2005–09	18·7 (9·3–28·2)	37·3 (26·7–48·0)	29·4 (17·5–41·3)	4·3 (0·0–9·4)	9·6 (4·7–14·5)	60·4 (46·5–74·3)	45·8 (34·9–56·7)	13·9§ (6·8–21·0)	58·1 (38·3–77·8)	6·0§ (0·3–11·6)	64·7 (50·1–79·2)
Indonesia (Jakarta)											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	18·4 (0·0–40·5)	28·1 (18·8–37·3)	58·0 (38·3–77·8)	19·9 (4·3–35·5)	12·2§ (1·1–23·3)	77·7 (65·3–90·2)	65·1 (55·8–74·3)	39·9§ (27·0–52·8)	43·5 (1·1–85·9)	39·8 (20·1–59·4)	44·3 (13·4–75·3)
Israel*											
1995–99	26·5 (24·8–28·3)	60·0 (58·8–61·2)	56·8 (54·6–59·0)	8·2§ (6·0–10·4)	17·3 (16·3–18·3)	80·9 (79·8–81·9)	62·5 (58·7–66·2)	38·9 (36·3–41·4)	85·0 (83·4–86·6)	43·7 (41·5–45·9)	82·3 (76·5–88·1)
2000–04	29·3 (27·5–31·0)	66·2 (65·1–67·3)	62·5 (60·5–64·6)	14·7§ (11·9–17·6)	20·7 (19·7–21·7)	85·5 (84·5–86·5)	65·8 (62·4–69·2)	40·5 (38·2–42·8)	91·9 (90·8–93·0)	54·5 (52·4–56·7)	84·7 (80·0–89·5)
2005–09	28·6 (26·9–30·3)	69·4 (68·3–70·4)	66·6 (64·5–68·6)	14·2§ (11·6–16·7)	23·8 (22·8–24·9)	86·7 (85·8–87·7)	65·9 (62·6–69·3)	42·0 (39·7–44·4)	94·0 (93·0–95·0)	50·4 (48·4–52·4)	85·0 (80·5–89·4)

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
Japanese registries											
1995–99	51·7 (51·2–52·2)	61·4 (60·7–62·1)	56·6 (55·5–57·6)	21·4 (19·5–23·3)	22·9 (21·5–24·3)	81·8 (80·8–82·9)	65·7 (64·1–67·3)	26·3 (24·2–28·4)	65·7 (63·4–67·9)	12·1 (10·0–14·2)	77·5 (72·4–82·6)
2000–04	53·6 (53·2–54·1)	62·2 (61·6–62·7)	57·8 (57·0–58·7)	26·4 (24·3–28·5)	28·5 (27·5–29·5)	84·2 (83·5–84·8)	65·1 (63·9–66·4)	33·1 (31·3–34·8)	83·4 (82·4–84·5)	17·9 (16·5–19·4)	77·8 (72·8–82·8)
2005–09	54·0 (53·6–54·5)	64·4 (63·9–64·9)	60·3 (59·6–61·1)	27·0 (25·5–28·4)	30·1 (29·1–31·0)	84·7 (84·1–85·3)	66·3 (65·2–67·5)	37·3 (35·6–38·9)	86·8 (86·0–87·7)	18·9 (17·6–20·3)	81·1 (76·8–85·4)
Jordan*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	48·2§ (31·7–64·8)	53·0§ (40·1–65·8)	26·3§ (11·8–40·9)	22·9§ (5·2–40·6)	7·7§ (4·3–11·2)	57·6§ (46·4–68·8)	17·1§ (3·1–31·0)	17·2§ (6·9–27·5)	35·5§ (23·8–47·2)	6·9§ (0·0–15·8)	15·1§ (6·4–23·8)
2005–09	28·8§ (14·6–43·0)	48·1§ (35·0–61·3)	21·4§ (9·6–33·2)	17·1§ (3·2–31·1)	4·4§ (2·0–6·8)	43·1§ (31·2–55·0)	10·3§ (0·0–21·8)	8·0§ (2·9–13·2)	27·4§ (16·3–38·5)	7·1§ (0·0–16·3)	16·4§ (6·8–26·0)
Korea*‡											
1995–99	32·8 (32·5–33·1)	42·5 (41·9–43·1)	51·6 (50·5–52·8)	10·8 (10·4–11·3)	9·6 (9·4–9·9)	76·7 (74·4–78·9)	73·7 (72·8–74·6)	42·1 (39·6–44·6)	63·7 (61·5–65·9)	15·4 (13·9–17·0)	62·9 (60·1–65·7)
2000–04	41·0 (40·8–41·3)	60·4 (59·8–61·1)	60·8 (60·0–61·5)	15·2 (14·9–15·6)	15·2 (14·9–15·5)	79·6 (78·1–81·0)	70·0 (69·5–70·6)	43·3 (41·5–45·1)	75·8 (74·4–77·3)	18·8 (17·6–20·0)	72·8 (70·3–75·4)
2005–09	57·9 (57·5–58·2)	66·0 (65·4–66·6)	65·9 (65·2–66·6)	20·1 (19·8–20·5)	18·5 (18·2–18·8)	82·7 (81·4–84·0)	77·1 (76·4–77·8)	44·2 (42·6–45·8)	82·2 (81·1–83·3)	23·4 (22·2–24·6)	77·1 (74·7–79·5)
Malaysia (Penang)											
1995–99	34·3 (27·9–40·7)	52·4 (46·1–58·7)	48·3 (38·4–58·2)	10·3 (5·7–14·9)	15·1 (12·1–18·0)	64·8 (56·8–72·9)	54·6 (48·6–60·5)	44·7 (30·0–59·3)	62·4 (52·0–72·8)	16·0 (3·6–28·4)	77·3 (65·5–89·2)
2000–04	26·5 (20·9–32·1)	47·9 (42·7–53·1)	38·7 (32·1–45·2)	19·2 (12·1–26·3)	13·1 (10·6–15·6)	71·1 (64·3–78·0)	58·4 (53·0–63·7)	42·5 (30·3–54·6)	57·8 (48·3–67·3)	25·2 (13·4–37·1)	68·7 (56·5–81·0)
2005–09	24·2 (19·6–28·8)	53·3 (48·7–57·9)	42·5 (36·3–48·7)	13·3 (9·3–17·4)	10·7 (8·6–12·7)	67·8 (62·4–73·3)	55·2 (50·2–60·2)	42·9 (33·6–52·1)	66·4 (57·8–74·9)	12·1 (7·4–16·9)	69·4 (57·4–81·5)
Mongolia*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	15·1 (12·6–17·6)	30·6 (22·5–38·8)	15·9 (0·9–30·8)	8·5 (6·9–10·0)	6·6 (4·1–9·1)	56·5 (46·1–66·8)	59·5 (53·3–65·8)	52·1 (39·7–64·5)	39·6 (17·2–61·9)	35·6 (23·7–47·5)	34·3 (11·9–56·8)
Qatar*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	27·3 (11·8–42·7)	68·2 (48·2–88·1)	77·8 (58·3–97·3)	4·1 (0·0–10·3)	13·2 (3·2–23·2)	85·3 (66·8–100·0)	85·5 (71·6–99·3)	37·2 (10·1–64·2)	55·3 (47·2–63·4)	52·8 (29·6–76·0)	..
Saudi Arabia*											
1995–99	33·6§ (20·8–46·3)	43·3§ (31·9–54·7)	61·0§ (8·3–100·0)	23·5§ (15·5–31·5)	21·3§ (8·5–34·1)	70·9§ (56·6–85·3)	62·2§ (50·6–73·8)	49·4§ (31·6–67·3)	64·8§ (53·9–75·8)	61·4§ (47·1–75·7)	..
2000–04	44·1§ (31·8–56·3)	49·0§ (37·8–60·2)	59·3§ (7·3–100·0)	16·0§ (10·8–21·2)	12·9§ (7·3–18·5)	78·4§ (68·3–88·5)	65·6§ (56·8–74·4)	53·0§ (38·2–67·9)	65·3§ (55·8–74·8)	50·9§ (41·4–60·4)	..
2005–09	..	..	..	..	..	..	..	..	..	..	..
Taiwan*											
1995–99	36·1 (35·2–37·0)	56·2 (55·2–57·1)	56·2 (55·0–57·4)	17·1 (16·6–17·6)	13·3 (12·8–13·8)	77·2 (75·4–79·0)	75·4 (74·5–76·3)	44·2 (41·0–47·4)	69·7 (67·5–71·9)	24·3 (22·3–26·3)	63·4 (59·4–67·3)
2000–04	35·8 (35·0–36·6)	57·1 (56·3–57·8)	58·1 (57·1–59·1)	19·5 (19·1–19·9)	11·6 (11·3–12·0)	80·7 (79·4–82·1)	74·5 (73·6–75·4)	44·3 (42·0–46·6)	76·0 (74·3–77·7)	22·3 (20·7–23·9)	71·8 (68·1–75·5)
2005–09	36·4 (35·5–37·2)	59·5 (58·8–60·2)	60·5 (59·5–61·4)	22·2 (21·8–22·6)	14·3 (13·9–14·7)	82·4 (81·1–83·6)	74·0 (73·0–75·0)	45·6 (43·5–47·8)	77·9 (76·5–79·3)	22·9 (21·4–24·3)	77·9 (74·5–81·3)
Thai registries											
1995–99	18·5 (9·7–27·4)	43·7 (34·0–53·4)	34·9 (22·7–47·1)	15·6 (12·0–19·2)	31·9 (20·2–43·6)	65·9 (50·3–81·6)	55·0 (48·8–61·3)	55·7 (36·1–75·4)	51·3 (30·8–71·7)	9·7 (3·4–16·0)	51·2 (39·5–62·9)
2000–04	15·3 (11·1–19·6)	52·2 (47·4–57·1)	35·7 (30·2–41·2)	10·5 (9·2–11·8)	9·7 (8·3–11·2)	72·9 (63·7–82·0)	57·7 (54·4–61·0)	47·3 (37·4–57·1)	64·7 (56·4–72·9)	17·2 (12·2–22·3)	58·9 (49·2–68·6)

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
2005–09	12·4 (9·0–15·8)	50·4 (46·2–54·6)	39·7 (34·7–44·6)	7·8 (6·7–8·8)	8·1 (7·0–9·2)	71·3 (65·8–76·8)	55·9 (52·7–59·1)	41·1 (33·2–49·0)	57·7 (50·7–64·7)	13·5 (9·5–17·5)	55·1 (45·5–64·6)
Turkey (Izmir)											
1995–99	32·5 (25·8–39·1)	54·3 (48·3–60·4)	47·5 (40·4–54·6)	11·8 (6·5–17·1)	19·2 (15·7–22·7)	72·8 (67·6–78·0)	59·2 (51·0–67·5)	40·7 (32·6–48·8)	77·4 (69·3–85·5)	31·5 (23·0–40·1)	63·7 (54·2–73·3)
2000–04	20·0 (16·8–23·2)	50·4 (46·8–54·0)	46·8 (42·4–51·2)	19·2 (14·2–24·1)	11·0 (9·7–12·3)	81·5 (78·4–84·5)	63·4 (58·4–68·5)	46·0 (38·1–54·0)	80·2 (76·0–84·4)	36·4 (30·3–42·5)	69·1 (60·9–77·2)
2005–09	17·1 (14·9–19·2)	52·9 (49·9–55·9)	45·3 (41·5–49·0)	14·2 (10·4–18·0)	10·1 (9·1–11·0)	78·6 (76·0–81·2)	60·9 (56·3–65·4)	39·0 (33·3–44·8)	80·6 (77·6–83·6)	33·1 (28·8–37·4)	73·1 (66·1–80·2)
Europe											
Austria*											
1995–99	29·5 (28·3–30·7)	57·1 (56·0–58·1)	54·8 (53·5–56·2)	8·7 (7·5–10·0)	14·1 (13·5–14·7)	78·7 (77·8–79·5)	62·3 (60·3–64·4)	42·2 (40·7–43·8)	84·7 (83·8–85·6)	39·8 (37·7–41·9)	85·9 (80·6–91·2)
2000–04	30·0 (28·7–31·3)	60·2 (59·3–61·2)	59·8 (58·5–61·1)	11·0 (9·8–12·2)	15·6 (15·0–16·3)	81·4 (80·6–82·2)	65·4 (63·3–67·4)	40·4 (38·9–42·0)	89·8 (89·1–90·5)	43·3 (41·5–45·1)	89·8 (85·3–94·2)
2005–09	33·1 (31·7–34·5)	63·0 (62·1–64·0)	62·1 (60·8–63·4)	12·9 (11·6–14·3)	17·9 (17·3–18·6)	82·9 (82·1–83·7)	66·0 (63·8–68·2)	41·6 (40·0–43·2)	90·5 (89·8–91·2)	45·8 (44·1–47·6)	91·1 (86·9–95·2)
Belarus (childhood)†											
1995–99	..	..	..	..	..	..	..	..	..	..	74·7 (69·4–79·9)
2000–04	..	..	..	..	..	..	..	..	..	..	78·4 (72·9–83·9)
2005–09	..	..	..	..	..	..	..	..	..	..	88·3 (83·6–93·0)
Belgium*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	27·9 (25·1–30·8)	64·0 (62·3–65·6)	62·3 (59·8–64·8)	19·9 (15·5–24·4)	15·3 (14·3–16·3)	84·8 (83·5–86·1)	66·0 (62·0–70·0)	42·5 (39·3–45·7)	92·0 (90·7–93·3)	57·5 (54·2–60·7)	80·2 (69·8–90·6)
2005–09	33·4 (31·9–34·8)	64·6 (63·8–65·4)	64·7 (63·5–66·0)	19·6 (17·7–21·6)	16·6 (16·1–17·2)	85·4 (84·7–86·0)	65·2 (63·1–67·2)	43·0 (41·2–44·7)	92·6 (91·9–93·2)	59·4 (57·7–61·0)	89·7 (86·1–93·3)
Bulgaria*											
1995–99	11·2§ (10·2–12·2)	39·5 (38·0–41·0)	31·0 (29·4–32·6)	4·7§ (3·3–6·0)	5·9 (5·2–6·6)	68·0 (66·5–69·5)	46·7 (44·9–48·5)	27·7 (25·7–29·8)	45·2 (42·5–47·8)	21·2 (19·0–23·4)	58·0 (50·5–65·5)
2000–04	11·1§ (10·2–11·9)	43·8 (42·6–45·0)	36·9 (35·5–38·3)	3·8§ (2·7–4·8)	5·7 (5·0–6·4)	71·2 (70·0–72·5)	49·4 (47·8–51·0)	32·9 (30·9–34·9)	49·7 (47·3–52·0)	24·1 (21·9–26·2)	63·3 (55·4–71·2)
2005–09	12·9§ (12·0–13·8)	47·0 (45·8–48·2)	40·8 (39·3–42·3)	5·0§ (3·8–6·3)	6·3 (5·6–7·1)	73·9 (72·7–75·1)	53·0 (51·4–54·6)	35·4 (33·5–37·2)	53·4 (51·1–55·8)	25·0 (22·9–27·1)	71·0 (64·2–77·7)
Croatia*											
1995–99	24·0 (21·7–26·3)	50·1 (47·6–52·7)	44·6 (41·5–47·6)	13·2§ (9·8–16·5)	16·5 (15·1–17·9)	77·5 (75·0–79·9)	68·1 (64·2–72·1)	37·5 (32·9–42·2)	61·4 (56·8–66·0)	38·6 (34·3–42·8)	..
2000–04	21·6 (20·3–22·9)	49·8 (48·4–51·2)	46·5 (44·8–48·3)	11·6§ (9·8–13·4)	15·2 (14·5–16·0)	75·1 (73·7–76·4)	65·6 (63·0–68·3)	39·1 (36·7–41·4)	67·7 (65·5–69·9)	37·2 (34·8–39·6)	77·6 (70·8–84·4)
2005–09	21·3 (20·0–22·6)	52·0 (50·7–53·3)	48·2 (46·5–49·9)	12·2§ (10·4–14·0)	13·6 (12·9–14·3)	77·9 (76·6–79·3)	65·3 (62·7–68·0)	36·8 (34·6–39·1)	75·1 (73·2–77·1)	37·6 (35·3–39·9)	85·9 (80·0–91·8)
Czech Republic*											
1995–99	16·6 (15·7–17·6)	45·3 (44·4–46·1)	38·6 (37·4–39·9)	4·7§ (3·7–5·7)	8·5§ (8·1–9·0)	72·7 (71·7–73·7)	61·3 (59·8–62·7)	32·6 (31·1–34·0)	64·6 (63·0–66·1)	42·8 (40·8–44·9)	..
2000–04	21·8 (20·7–22·9)	51·4 (50·6–52·2)	46·9 (45·7–48·1)	5·5§ (4·4–6·5)	10·9 (10·4–11·4)	77·8 (77·0–78·6)	62·2 (60·7–63·8)	34·5 (33·2–35·9)	75·6 (74·4–76·9)	46·8 (45·0–48·6)	..
2005–09	23·2 (22·0–24·3)	54·9 (54·1–55·7)	50·3 (49·1–51·5)	7·2§ (6·0–8·4)	12·3 (11·8–12·9)	80·0 (79·2–80·8)	64·5 (63·0–66·1)	36·6 (35·3–38·0)	83·1 (82·1–84·1)	46·1 (44·3–47·8)	..
Denmark*											
1995–99	13·8 (12·3–15·3)	48·2 (47·1–49·4)	47·6 (46·0–49·2)	2·6 (1·6–3·5)	8·0 (7·5–8·5)	75·8 (74·8–76·8)	63·1 (60·9–65·4)	31·2 (29·5–33·0)	46·4 (44·5–48·3)	45·4 (43·2–47·5)	85·6 (79·4–91·8)
2000–04	15·3 (13·7–16·9)	52·1 (50·9–53·2)	53·8 (52·2–55·3)	4·4 (3·1–5·7)	9·6 (9·1–10·1)	80·7 (79·8–81·6)	63·2 (60·8–65·6)	33·2 (31·5–34·9)	64·0 (62·5–65·5)	51·2 (49·1–53·3)	84·5 (78·9–90·1)
2005–09	17·9 (16·2–19·5)	55·9 (54·8–57·0)	58·4 (56·9–59·8)	6·1 (4·4–7·7)	11·3 (10·7–11·9)	82·0 (81·1–82·9)	64·8 (62·3–67·2)	37·3 (35·4–39·2)	77·2 (75·9–78·5)	56·8 (54·6–59·0)	87·2 (81·5–92·9)

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
Estonia*											
1995–99	20·0 (18·2–21·9)	49·7 (46·8–52·6)	37·7 (34·0–41·3)	5·4 (2·8–7·9)	8·2 (7·0–9·5)	62·3 (59·3–65·2)	58·2 (54·4–62·1)	28·2 (25·0–31·3)	55·9 (51·3–60·6)	37·4 (32·9–42·0)	..
2000–04	22·3 (20·3–24·4)	48·8 (46·1–51·5)	46·5 (43·0–50·1)	5·6 (2·8–8·3)	10·9 (9·6–12·3)	70·4 (67·8–73·0)	62·9 (59·0–66·8)	31·3 (27·9–34·8)	67·1 (63·7–70·4)	43·5 (39·2–47·8)	..
2005–09	22·8 (20·5–25·2)	51·7 (48·7–54·6)	48·9 (44·9–52·9)	8·7 (5·1–12·3)	11·9 (10·3–13·5)	72·4 (69·6–75·2)	66·7 (62·6–70·8)	38·7 (34·6–42·8)	73·2 (69·9–76·5)	38·4 (34·1–42·7)	62·6 (52·0–73·3)
Finland*											
1995–99	27·0 (25·4–28·6)	58·7 (57·2–60·2)	54·6 (52·5–56·7)	6·9 (5·1–8·8)	11·0 (10·2–11·7)	82·8 (81·7–83·9)	66·2 (62·6–69·8)	39·1 (36·8–41·4)	79·3 (77·9–80·6)	45·1 (42·5–47·7)	82·4 (76·3–88·4)
2000–04	25·9 (24·3–27·6)	61·2 (59·8–62·6)	59·8 (57·9–61·8)	7·2 (5·5–8·8)	11·8 (11·0–12·6)	86·5 (85·5–87·4)	68·1 (64·6–71·6)	40·9 (39·0–42·8)	90·0 (89·1–90·9)	47·6 (45·3–50·0)	84·7 (78·0–91·4)
2005–09	25·2 (23·5–26·9)	62·9 (61·5–64·3)	62·9 (61·1–64·8)	7·9 (6·2–9·6)	12·3 (11·5–13·2)	86·8 (85·9–87·7)	65·3 (61·7–69·0)	44·9 (42·9–46·9)	93·2 (92·3–94·0)	50·7 (48·4–52·9)	81·9 (75·3–88·5)
French registries†											
1995–99	25·7 (24·2–27·2)	57·2 (56·1–58·2)	54·4 (52·8–56·0)	11·1 (9·8–12·5)	12·8 (12·2–13·5)	83·7 (82·9–84·6)	66·3 (63·9–68·8)	33·5 (31·6–35·4)	79·4 (78·1–80·7)	54·6 (52·6–56·6)	82·9 (81·0–84·8)
2000–04	27·3 (25·8–28·8)	59·7 (58·6–60·7)	57·0 (55·4–58·6)	13·5 (12·3–14·8)	13·9 (13·3–14·5)	86·5 (85·7–87·3)	60·5 (57·7–63·3)	39·8 (37·7–41·9)	89·4 (88·6–90·2)	58·9 (57·2–60·6)	88·4 (86·8–90·0)
2005–09	27·7 (25·3–30·2)	59·8 (58·2–61·4)	56·8 (54·5–59·1)	14·4 (12·6–16·2)	13·6 (12·7–14·6)	86·9 (85·7–88·0)	58·9 (53·9–63·8)	39·0 (35·9–42·2)	90·5 (89·4–91·6)	59·2 (56·6–61·8)	89·2 (87·7–90·8)
German registries											
1995–99	22·8 (21·5–24·2)	48·7 (47·5–49·9)	51·9 (50·7–53·1)	6·5 (4·8–8·2)	11·6 (11·0–12·2)	81·2 (80·6–81·8)	64·7 (63·3–66·0)	37·7 (36·2–39·1)	77·1 (75·6–78·5)	42·9 (40·9–44·9)	86·7 (83·5–89·9)
2000–04	30·0 (29·2–30·7)	62·1 (61·6–62·7)	60·2 (59·6–60·9)	10·5 (9·0–12·0)	15·1 (14·7–15·4)	84·1 (83·7–84·4)	64·8 (63·7–65·9)	39·9 (38·9–41·0)	89·3 (88·7–89·8)	50·1 (48·9–51·3)	87·3 (84·6–89·9)
2005–09	31·6 (30·8–32·3)	64·6 (64·1–65·1)	62·1 (61·5–62·7)	14·4 (12·9–16·0)	16·2 (15·8–16·5)	85·3 (84·9–85·6)	64·9 (63·9–65·9)	39·7 (38·7–40·7)	91·2 (90·7–91·6)	53·6 (52·5–54·6)	91·8 (89·8–93·7)
Gibraltar*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	82·4 (70·3–94·4)	..	..	..	..	..
2005–09	9·4 (0·0–22·0)	57·9 (43·8–71·9)	57·8 (27·0–88·6)	..	20·2 (7·2–33·3)	84·4 (73·4–95·5)	63·0 (23·8–100·0)	59·3 (25·7–92·9)	67·4 (54·0–80·7)	44·0 (7·0–81·1)	..
Iceland*											
1995–99	23·9 (17·4–30·4)	54·1 (47·9–60·2)	51·7 (42·8–60·7)	..	14·3 (11·4–17·2)	83·0 (77·9–88·1)	63·6 (51·0–76·2)	30·4 (21·1–39·6)	74·8 (68·7–80·8)	39·1 (30·2–48·0)	..
2000–04	34·2 (26·1–42·3)	60·8 (54·9–66·8)	72·2 (63·8–80·7)	1·6 (0·0–3·7)	14·5 (11·5–17·4)	88·1 (83·5–92·8)	70·7 (61·8–79·6)	34·1 (26·9–41·4)	79·5 (74·8–84·1)	56·6 (45·6–67·6)	..
2005–09	32·3 (24·3–40·3)	65·1 (59·6–70·6)	76·5 (68·3–84·6)	11·0 (4·8–17·1)	15·0 (11·9–18·2)	85·3 (80·7–89·9)	73·1 (61·8–84·3)	38·6 (30·0–47·2)	83·5 (79·4–87·5)	54·4 (43·1–65·7)	84·1 (70·0–98·3)
Ireland*											
1995–99	17·6 (15·7–19·4)	50·8 (49·2–52·4)	48·1 (45·6–50·5)	6·8 (3·8–9·8)	9·5 (8·6–10·3)	73·1 (71·5–74·7)	58·9 (54·5–63·3)	28·1 (25·7–30·6)	69·8 (67·8–71·8)	47·3 (44·2–50·4)	79·8 (72·9–86·7)
2000–04	18·7 (16·9–20·6)	53·6 (52·1–55·1)	51·5 (49·4–53·7)	11·8 (8·9–14·7)	10·3 (9·4–11·1)	77·7 (76·4–79·1)	58·1 (54·4–61·9)	29·6 (27·3–32·0)	84·2 (83·0–85·4)	54·9 (52·2–57·6)	83·1 (76·9–89·4)
2005–09	22·7 (20·7–24·7)	58·6 (57·2–60·0)	56·1 (53·9–58·3)	12·8 (10·0–15·6)	12·9 (12·0–13·8)	80·0 (78·7–81·3)	55·9 (52·6–59·3)	32·2 (29·8–34·6)	88·4 (87·3–89·5)	56·4 (53·9–59·0)	85·3 (79·1–91·5)
Italian registries											
1995–99	31·1 (30·4–31·8)	57·5 (56·9–58·1)	53·3 (52·3–54·4)	11·5 (10·8–12·2)	12·9 (12·6–13·3)	82·8 (82·3–83·3)	64·4 (62·8–66·1)	36·1 (35·0–37·2)	79·1 (78·2–80·0)	47·0 (45·8–48·1)	82·8 (79·7–85·9)
2000–04	32·0 (31·3–32·6)	60·1 (59·6–60·6)	56·7 (55·8–57·6)	15·5 (14·8–16·2)	14·0 (13·7–14·4)	85·5 (85·1–85·9)	67·1 (65·6–68·6)	37·9 (36·9–38·9)	88·6 (88·1–89·1)	47·3 (46·3–48·3)	83·0 (79·9–86·1)
2005–09	32·4 (31·7–33·2)	63·2 (62·7–63·7)	59·5 (58·5–60·4)	17·9 (17·2–18·7)	14·7 (14·3–15·0)	86·2 (85·7–86·6)	68·3 (66·7–69·9)	39·2 (38·1–40·3)	89·7 (89·2–90·2)	46·7 (45·6–47·7)	87·7 (84·9–90·5)

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
Latvia*											
1995–99	21·3 (19·7–22·9)	40·9 (38·5–43·3)	34·1 (31·1–37·0)	7·2§ (4·4–9·9)	12·1 (10·8–13·3)	64·1 (61·7–66·6)	52·9 (49·2–56·6)	30·6 (28·0–33·2)	51·9 (47·8–56·0)	44·6 (40·4–48·9)	..
2000–04	20·7 (19·0–22·5)	42·4 (40·1–44·8)	36·4 (33·6–39·2)	7·2§ (4·3–10·0)	13·8 (12·6–15·1)	69·8 (67·5–72·1)	51·7 (48·0–55·4)	35·7 (32·9–38·6)	65·3 (62·2–68·5)	43·1 (38·9–47·2)	..
2005–09	22·8 (21·0–24·6)	45·3 (43·0–47·7)	38·6 (35·6–41·5)	6·4§ (4·0–8·8)	16·2 (14·9–17·6)	71·1 (68·9–73·4)	55·4 (51·9–59·0)	35·6 (32·9–38·4)	73·9 (71·0–76·8)	54·5 (49·5–59·4)	75·0 (64·3–85·8)
Lithuania*											
1995–99	24·4 (22·7–26·1)	48·0 (45·2–50·7)	40·3 (37·4–43·2)	5·4§ (2·3–8·4)	10·0 (8·7–11·3)	65·3 (62·6–68·0)	53·2 (50·5–55·9)	33·2 (29·7–36·8)	51·8 (48·5–55·2)	36·6 (33·6–39·7)	59·5 (49·4–69·6)
2000–04	25·6 (24·0–27·2)	51·6 (49·4–53·9)	44·7 (42·2–47·2)	9·5§ (6·2–12·9)	8·3 (7·4–9·2)	70·3 (68·3–72·3)	57·0 (54·5–59·5)	33·0 (30·5–35·6)	81·2 (79·0–83·4)	39·5 (36·8–42·2)	72·6 (63·5–81·7)
2005–09	26·0 (24·3–27·7)	51·5 (49·4–53·7)	48·3 (45·8–50·9)	11·3§ (7·3–15·2)	7·7 (6·8–8·7)	72·1 (70·2–74·1)	61·3 (58·8–63·8)	35·8 (33·1–38·6)	92·4 (90·6–94·1)	44·7 (41·9–47·4)	69·6 (59·1–80·1)
Malta*											
1995–99	17·5 (11·9–23·1)	49·3 (43·1–55·4)	49·8 (40·9–58·8)	..	10·9 (8·0–13·8)	71·3 (67·1–75·5)	58·8 (44·7–72·9)	34·2 (25·9–42·6)	68·6 (61·0–76·1)	38·6 (30·7–46·4)	..
2000–04	15·5 (10·7–20·2)	57·6 (52·4–62·7)	51·4 (43·9–59·0)	10·8 (4·5–17·1)	9·3 (6·3–12·3)	76·3 (72·4–80·2)	52·8 (37·9–67·6)	37·9 (30·2–45·5)	82·7 (76·9–88·6)	24·2 (16·8–31·7)	..
2005–09	18·0 (12·8–23·2)	56·0 (51·2–60·8)	48·1 (41·0–55·2)	9·5 (6·5–12·4)	10·8 (8·0–13·6)	76·3 (72·7–79·9)	63·1 (49·3–76·9)	33·1 (27·2–39·0)	84·8 (79·9–89·7)	19·0 (12·8–25·3)	72·5 (59·5–85·4)
Netherlands*											
1995–99	19·0 (18·1–19·8)	55·4 (54·7–56·1)	55·5 (54·3–56·6)	8·2 (6·7–9·8)	12·4 (12·1–12·8)	80·0 (79·4–80·6)	63·9 (62·0–65·7)	38·7 (37·5–39·9)	77·4 (76·5–78·3)	46·9 (45·4–48·3)	..
2000–04	19·5 (18·6–20·4)	57·7 (57·0–58·3)	57·7 (56·7–58·8)	9·7 (8·2–11·3)	12·2 (11·9–12·6)	83·5 (83·0–84·1)	65·7 (63·8–67·6)	37·3 (36·0–38·5)	82·7 (82·0–83·4)	48·4 (47·1–49·8)	84·5 (80·8–88·1)
2005–09	21·4 (20·5–22·4)	60·1 (59·5–60·7)	62·0 (61·0–63·0)	12·6 (10·8–14·3)	14·8 (14·4–15·1)	85·0 (84·5–85·5)	66·5 (64·6–68·4)	38·1 (36·8–39·3)	85·8 (85·2–86·4)	51·8 (50·5–53·1)	85·9 (82·7–89·2)
Norway*											
1995–99	21·1 (19·4–22·9)	55·9 (54·6–57·2)	57·8 (56·1–59·5)	5·6 (3·4–7·8)	10·7 (10·0–11·5)	81·5 (80·3–82·6)	66·7 (64·1–69·4)	36·7 (34·7–38·8)	73·8 (72·5–75·1)	44·6 (41·9–47·3)	79·1 (71·4–86·8)
2000–04	22·0 (20·2–23·9)	58·4 (57·2–59·6)	61·7 (60·1–63·3)	7·4 (5·1–9·7)	11·7 (10·9–12·4)	84·1 (83·0–85·1)	70·6 (67·8–73·5)	40·2 (38·2–42·3)	82·4 (81·4–83·5)	48·9 (46·3–51·5)	87·7 (82·3–93·1)
2005–09	24·1 (22·1–26·1)	61·8 (60·6–62·9)	64·6 (63·0–66·2)	9·5 (6·9–12·2)	15·0 (14·1–15·8)	85·9 (84·9–87·0)	71·4 (68·6–74·3)	40·3 (38·3–42·4)	86·3 (85·4–87·2)	53·6 (51·0–56·2)	89·7 (84·4–94·9)
Poland*											
1995–99	14·2 (13·2–15·1)	40·0 (38·7–41·3)	36·7 (35·3–38·2)	7·9§ (6·5–9·3)	11·4 (10·9–11·9)	66·9 (65·4–68·3)	50·0 (48·4–51·5)	30·6 (28·8–32·4)	54·3 (52·1–56·5)	44·1 (38·9–49·4)	..
2000–04	15·7 (15·1–16·2)	45·7 (45·1–46·4)	42·8 (42·0–43·5)	9·2§ (8·4–10·1)	11·7 (11·4–12·0)	72·3 (71·6–72·9)	51·7 (50·9–52·6)	32·8 (31·9–33·7)	68·5 (67·6–69·4)	44·5 (40·4–48·5)	..
2005–09	18·6 (18·0–19·2)	50·1 (49·5–50·7)	46·9 (46·1–47·6)	10·4§ (9·5–11·3)	13·4 (13·1–13·7)	74·1 (73·5–74·7)	53·0 (52·1–53·9)	34·3 (33·5–35·2)	74·1 (73·4–74·9)	49·0 (45·2–52·7)	..
Portugal*											
1995–99	26·6 (24·5–28·7)	48·8 (46·7–50·9)	46·0 (43·2–48·8)	7·7 (4·7–10·7)	10·4 (9·1–11·7)	74·9 (72·8–76·9)	54·0 (50·0–58·0)	33·9 (29·8–38·1)	81·3 (79·2–83·4)	40·0 (35·3–44·7)	66·5 (51·5–81·4)
2000–04	29·7 (28·8–30·6)	56·3 (55·4–57·3)	54·2 (52·9–55·5)	13·4 (11·5–15·2)	10·4 (9·8–11·0)	81·4 (80·5–82·4)	60·3 (58·4–62·1)	39·4 (37·2–41·7)	87·2 (86·2–88·1)	41·2 (38·9–43·5)	80·6 (74·7–86·5)
2005–09	32·6 (31·6–33·5)	60·3 (59·4–61·2)	58·2 (57·0–59·5)	15·6 (13·6–17·5)	12·8 (12·1–13·4)	83·4 (82·5–84·3)	61·5 (59·7–63·2)	40·6 (38·4–42·9)	89·4 (88·5–90·2)	43·6 (41·3–45·8)	86·8 (80·7–92·9)
Romania (Cluj)											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	..	..	..	..	..	..	..	..	..	..	..
2005–09	22·1§ (17·6–26·5)	58·4§ (52·1–64·7)	46·8 (38·7–55·0)	2·3§ (0·3–4·4)	16·2§ (13·5–19·0)	75·0 (69·1–80·9)	69·1 (63·1–75·1)	40·5§ (30·9–50·1)	79·5 (72·7–86·4)	41·2 (32·7–49·8)	..

(Table 4 continues on next page)

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
Russia (Arkhangelsk)											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	21·8 (19·2–24·4)	35·5 (32·3–38·8)	27·8 (23·8–31·7)	7·4 (3·1–11·8)	14·7 (12·6–16·9)	62·4 (58·1–66·6)	56·6 (51·1–62·2)	37·2 (31·2–43·2)	63·9 (54·9–73·0)	34·1 (25·6–42·6)	..
2005–09	19·9 (17·5–22·3)	40·6 (37·3–43·8)	30·4 (26·2–34·5)	9·4 (4·3–14·5)	15·7 (13·6–17·9)	70·6 (66·4–74·9)	54·9 (49·1–60·6)	40·4 (34·2–46·6)	69·6 (62·1–77·2)	42·0 (31·9–52·2)	..
Slovakia*											
1995–99	..	..	..	..	..	..	..	..	..	..	..
2000–04	20·2 (18·8–21·6)	49·7 (48·5–51·0)	43·4 (41·6–45·2)	5·1§ (3·4–6·8)	9·6§ (8·9–10·4)	74·0 (72·5–75·6)	61·6 (59·2–64·0)	34·8 (32·3–37·4)	62·6 (60·3–64·9)	41·1 (38·3–43·8)	78·9 (71·6–86·2)
2005–09	19·7 (17·9–21·4)	49·9 (48·3–51·5)	44·0 (41·6–46·3)	5·3§ (3·1–7·4)	10·7§ (9·7–11·7)	72·1 (70·3–73·9)	58·8 (56·0–61·6)	33·9 (30·9–36·9)	66·0 (63·2–68·8)	37·2 (34·1–40·3)	78·2 (69·5–87·0)
Slovenia*											
1995–99	20·1 (18·3–22·0)	45·1 (42·9–47·3)	40·5 (37·7–43·3)	3·0 (1·4–4·6)	8·5 (7·6–9·4)	71·3 (69·2–73·5)	62·9 (59·5–66·4)	33·4 (29·8–36·9)	61·1 (57·7–64·4)	44·3 (39·8–48·8)	83·1 (72·5–93·8)
2000–04	25·6 (23·6–27·7)	53·1 (51·2–55·1)	48·4 (45·9–50·9)	3·8 (2·2–5·3)	9·7 (8·9–10·6)	78·3 (76·5–80·2)	67·3 (63·8–70·7)	37·8 (34·4–41·2)	72·7 (70·2–75·3)	39·9 (36·2–43·6)	86·1 (74·5–97·6)
2005–09	26·7 (24·6–28·8)	56·0 (53·9–58·0)	55·2 (52·7–57·7)	5·2 (3·3–7·0)	11·4 (10·4–12·3)	80·2 (78·5–82·0)	68·9 (65·4–72·5)	37·5 (34·4–40·6)	78·1 (76·1–80·2)	37·9 (34·4–41·4)	75·7 (63·8–87·6)
Spanish registries†											
1995–99	25·1 (24·0–26·2)	52·0 (51·1–53·0)	49·0 (47·4–50·5)	10·2 (9·0–11·4)	10·2 (9·7–10·7)	77·8 (76·8–78·7)	61·7 (59·4–64·0)	35·3 (33·4–37·1)	73·7 (72·3–75·0)	48·5 (46·5–50·5)	73·8 (68·3–79·3)
2000–04	25·3 (24·2–26·4)	56·1 (55·2–56·9)	55·2 (53·8–56·6)	14·3 (13·1–15·4)	11·5 (11·0–12·0)	82·2 (81·3–83·0)	63·4 (61·1–65·7)	38·1 (36·2–39·9)	84·6 (83·8–85·5)	50·7 (48·9–52·5)	81·5 (76·9–86·1)
2005–09	27·3 (26·1–28·5)	59·3 (58·4–60·1)	57·6 (56·2–59·0)	15·8 (14·6–17·1)	12·6 (12·1–13·1)	83·7 (82·8–84·5)	65·2 (62·9–67·6)	38·4 (36·6–40·2)	87·1 (86·3–87·9)	52·0 (50·2–53·9)	83·3 (79·1–87·4)
Sweden*											
1995–99	21·2 (19·9–22·5)	55·4 (54·4–56·5)	57·9 (56·6–59·2)	5·3 (4·3–6·4)	12·2 (11·6–12·9)	83·8 (83·1–84·5)	65·0 (62·9–67·1)	40·8 (39·2–42·4)	75·4 (74·5–76·2)	48·5 (46·8–50·3)	85·0 (80·5–89·5)
2000–04	21·0 (19·6–22·3)	59·4 (58·5–60·4)	59·6 (58·4–60·8)	6·8 (5·6–8·0)	13·3 (12·7–14·0)	85·6 (84·9–86·3)	66·6 (64·4–68·8)	42·8 (41·2–44·4)	86·1 (85·5–86·7)	55·0 (53·3–56·7)	86·8 (82·6–90·9)
2005–09	23·2 (21·7–24·6)	62·5 (61·6–63·5)	62·0 (60·9–63·2)	11·1 (9·5–12·7)	15·6 (14·9–16·4)	86·2 (85·5–86·9)	67·8 (65·6–70·0)	43·5 (41·9–45·1)	89·2 (88·7–89·8)	59·2 (57·5–60·8)	85·5 (80·9–90·1)
Swiss registries†											
1995–99	23·6 (21·4–25·8)	54·5 (52·8–56·3)	53·8 (51·2–56·4)	9·0 (7·0–11·1)	13·0 (12·1–13·9)	78·7 (77·4–80·0)	63·5 (59·5–67·5)	35·0 (32·4–37·6)	76·0 (74·2–77·7)	51·7 (48·7–54·7)	85·6 (80·3–90·8)
2000–04	28·2 (25·9–30·6)	61·4 (59·9–62·9)	58·9 (56·6–61·3)	11·8 (9·9–13·7)	14·5 (13·6–15·5)	84·0 (82·8–85·1)	63·8 (59·7–68·0)	35·7 (33·1–38·3)	85·9 (84·7–87·0)	56·0 (53·3–58·8)	87·3 (82·5–92·2)
2005–09	30·4 (28·0–32·9)	63·3 (61·9–64·8)	63·8 (61·5–66·1)	13·6 (11·6–15·7)	16·5 (15·6–17·5)	85·5 (84·4–86·6)	65·4 (61·1–69·6)	37·7 (35·3–40·2)	88·0 (87·0–89·0)	58·1 (55·6–60·7)	88·4 (83·8–93·0)
UK*											
1995–99	14·5 (14·1–14·9)	48·1 (47·7–48·5)	49·1 (48·6–49·7)	6·7 (6·1–7·4)	7·3 (7·2–7·5)	74·2 (73·9–74·5)	58·0 (57·1–58·8)	32·8 (32·2–33·3)	68·2 (67·7–68·7)	42·4 (41·7–43·1)	79·1 (77·0–81·2)
2000–04	16·5 (16·0–16·9)	51·4 (51·1–51·8)	53·9 (53·4–54·5)	8·1 (7·5–8·7)	8·5 (8·4–8·7)	78·7 (78·4–78·9)	59·1 (58·2–60·0)	34·5 (34·0–35·0)	80·3 (80·0–80·7)	45·3 (44·6–45·9)	85·9 (84·2–87·7)
2005–09	18·5 (18·0–19·0)	53·8 (53·5–54·2)	56·6 (56·1–57·1)	9·3 (8·7–9·9)	9·6 (9·4–9·8)	81·1 (80·9–81·4)	60·2 (59·3–61·1)	36·4 (35·9–37·0)	83·2 (82·9–83·5)	47·4 (46·7–48·0)	89·1 (87·6–90·7)

(Table 4 continues on next page)

5-year survival was in the range 60–69%. In general, cervical cancer survival was 50% or higher in all other countries, except for Libya (Benghazi, 39%) and India (Karunagappally, 46%). Survival estimates for northeast India (Guwahati, 32%; Sikkim, 53%) are flagged as less reliable because up to 30% of women could not be traced despite active follow-up (appendix pp 39–43). Survival for cervical cancer is stable or has increased slightly in most countries (appendix p 158). For example, in Central and South America, survival was stable at around 60% in Brazil, Cuba, Ecuador, and Puerto Rico. In the 10 years between 1995–99 and 2005–09, 5-year net survival increased from 42% to 51% in Chile and from 46% to 51% in Argentina. In France, the decline in survival

	Stomach	Colon	Rectum	Liver	Lung	Breast	Cervix	Ovary	Prostate	Leukaemia (adult)	ALL (children)
(Continued from previous page)											
Oceania											
Australian registries											
1995–99	25·9 (24·8–27·0)	60·3 (59·7–61·0)	59·9 (58·9–61·0)	13·2 (11·8–14·6)	13·7 (13·3–14·2)	84·6 (84·0–85·2)	69·9 (68·3–71·6)	36·1 (34·8–37·4)	83·7 (83·1–84·2)	47·5 (46·2–48·7)	82·6 (79·5–85·7)
2000–04	27·8 (26·8–28·9)	63·1 (62·5–63·7)	63·8 (62·9–64·7)	14·3 (13·1–15·4)	14·8 (14·4–15·2)	86·4 (85·9–86·9)	68·4 (66·6–70·3)	37·0 (35·7–38·3)	86·8 (86·3–87·2)	51·0 (49·8–52·1)	86·0 (83·3–88·6)
2005–09	27·9 (26·7–29·0)	64·2 (63·6–64·8)	64·2 (63·3–65·1)	14·7 (13·5–16·0)	15·0 (14·6–15·5)	86·2 (85·6–86·8)	67·1 (65·1–69·1)	37·5 (36·2–38·8)	88·5 (88·1–88·9)	51·1 (50·0–52·3)	88·6 (85·9–91·4)
New Zealand*											
1995–99	22·2 (20·0–24·3)	60·8 (59·5–62·1)	57·0 (54·8–59·3)	11·6 (8·5–14·6)	12·2 (11·3–13·1)	79·5 (78·2–80·8)	64·3 (60·8–67·9)	35·8 (33·0–38·5)	80·8 (79·6–82·0)	47·7 (45·0–50·4)	82·6 (76·0–89·2)
2000–04	24·6 (22·4–26·8)	60·9 (59·6–62·1)	59·8 (57·8–61·9)	12·9 (10·3–15·5)	11·4 (10·6–12·2)	82·3 (81·1–83·5)	67·6 (64·0–71·2)	38·7 (36·0–41·3)	88·5 (87·6–89·4)	60·2 (57·9–62·4)	85·8 (79·9–91·7)
2005–09	26·7 (24·3–29·0)	61·6 (60·4–62·8)	60·8 (58·8–62·8)	17·4 (14·6–20·2)	12·4 (11·6–13·3)	83·7 (82·5–84·9)	63·9 (60·2–67·6)	33·8 (31·3–36·2)	88·7 (87·7–89·6)	58·0 (55·6–60·3)	89·3 (83·8–94·8)

Data are net survival estimates (%) with 95% CI. Italics denote survival estimates that are not age-standardised. When too few patients were available for analysis in any calendar period, data were merged and the survival estimates are underlined. Follow-up was shorter than 5 years for six registries: Libya (Benghazi); The Gambia; Argentina (Mendoza); China (Lianyungang); Indonesia (Jakarta); and Colombia (Manizales: stomach, colon, breast, cervix, and prostate). ALL=acute lymphoblastic leukaemia. *100% coverage of the national population. †100% coverage of the national population for childhood leukaemia only. ‡South Korea. §Survival estimate considered less reliable.

Table 4: **5-year age-standardised net survival for adults (aged 15–99 years) diagnosed with one of ten common malignant diseases and children (aged 0–14 years) with ALL, by continent, country, and calendar period of diagnosis**

between 1995–99 and 2000–04 (from 66% to 61%) was based on around 1700 women in each period; the survival estimate for women diagnosed during 2005–09 (59%) includes data for only 139 women from two registries (Calvados, 76%; Loire-Atlantique, 49%); the other registries could not provide follow-up data for women diagnosed with cervical cancer after 2004 (appendix pp 64–80). The striking increase in 5-year survival from cervical cancer in China (from 40% to 60%) should be interpreted with caution: the estimate for 1995–99 is based on data for only 71 women in Changle, Jiashan, and Zhongshan, whereas the estimates for 2000–04 (56%) and 2005–09 (60%) are based on data for more than 1200 women (18 registries) and 3900 women (21 registries), respectively (appendix pp 64–111).

Data for ovarian cancer are available for 779 302 women (table 3). 191 registries in 48 countries contributed data for 1995–99, 243 registries in 57 countries had data available for 2000–04, and 241 registries in 61 countries provided data for 2005–09 (appendix pp 64–80). For women diagnosed with ovarian cancer during 2005–09, age-standardised 5-year net survival was 40% or higher in Ecuador, the USA, nine countries in Asia, and eight countries in Europe (table 4; appendix p 148). Survival in other countries was mostly in the range 30–40%, except for Libya (22%). The high survival estimate for Gibraltar (59%) is based on data for only 13 women; it is not age-standardised and the CI is wide (table 4); similarly, the very high estimate for Mauritius (83%) is based on 52 women diagnosed in 2005. 5-year survival for ovarian cancer rose by more than 10% between 1995–99 and 2005–09 in Ecuador (from 35% to 47%), Estonia (from 28% to 39%), and Japan (from 26% to 37%), and by 5–10% in Bulgaria, Denmark, France, Hong Kong, Iceland, Latvia, and Portugal (appendix p 159). More modest increases (2–4%) were seen in several countries in South America, Asia, and Europe. We were unable to assess any trend in Africa because of scant reliable data covering the entire period 1995–2009. For women diagnosed with ovarian cancer since 2000, data were available from 60 registries in Asia and Central and South America (appendix p 170). The range in 5-year survival was very wide. The range is much narrower for the 160 registries in Europe, North America, and Oceania that provided data for the same period.

Data for prostate cancer are available for 4 999 267 men (table 3). 189 registries in 48 countries contributed data for 1995–99, 241 registries in 57 countries provided data for 2000–04, and 240 registries in 60 countries had data for 2005–09 (appendix pp 64–80). Among the 61 countries that provided data on prostate cancer, the range in age-standardised 5-year net survival is very wide, from less than 40% to greater than 95%. For men diagnosed during 2005–09, survival was 90% or higher in Austria, Belgium, Brazil, Canada, Cyprus, Ecuador, Finland, France, Germany, Israel, Italy, Lithuania, Puerto Rico, and the USA (table 4; appendix p 149). In the USA, where widespread prostate-specific antigen (PSA) testing was introduced around 1990, 5-year survival has been higher than 90% since 1995–99. Prostate cancer survival was 80–89% in 19 countries in Central and South America, Asia, Europe, and Oceania. In 18 other countries, survival ranged widely (50–79%), but in Libya and Mongolia it was 40–41%. Striking and persistent

increases in prostate cancer survival were seen in many countries between 1995–99 and 2005–09 (appendix p 160). Survival rose by 10–20% in 22 countries in Central and South America, Asia, and Europe; smaller increases (less than 10%) were seen in 15 countries.

Data for leukaemia in adults are available for 873 588 patients (table 3). 185 registries in 47 countries provided data for 1995–99, 234 registries in 56 countries contributed data for 2000–04, and 232 registries in 60 countries provided data for 2005–09 (appendix pp 64–80). For adults diagnosed with leukaemia during 2005–09, age-standardised 5-year net survival was 50–60% in 21 countries in North America, west Asia, Europe, and Oceania (table 4; appendix p 150). The estimate in Mauritius (57%) is based on 31 patients diagnosed in 2005; it is not age-standardised and has a wide CI. Similarly, the estimate for Cuba (60%) is based on only 97 patients diagnosed during 1998–2006. 5-year net survival from adult leukaemia is generally much lower in the 15 participating Asian countries than in other regions of the world (appendix pp 163–73). With a few exceptions, survival seems to be low in east Asia (eg, from 19% in Japan to 23% in South Korea and Taiwan), high in west Asia (eg, from 33% in Turkey to 53% in Qatar), with a mixed picture in other Asian countries (eg, from 7% in Jordan to 40% in Indonesia). Survival estimates for adult leukaemia from Jordan, India, and Saudi Arabia might be less reliable for international comparison, but the overall pattern of leukaemia survival in Asia is still informative. Survival increases of 10–16% for adult leukaemia were seen in China, Denmark, Germany, Iceland, Latvia, Sweden, and New Zealand. Smaller rises of 5–9% were noted in North America, Israel, Japan, South Korea, and ten European countries. In Malta, 5-year survival fell from 39% in 1995–99 (based on 142 adults) to 19% for 2005–09 (128 adults; appendix p 161). This pattern is surprising, because data quality is very high (appendix pp 54–58) and survival trends for all solid tumours seem to be normal. Smaller declines were seen in several countries, such as Slovakia (from 41% to 37%) and Slovenia (from 44% to 38%).

Data for acute lymphoblastic leukaemia in children are available for 74 343 patients (table 3). 173 registries in 42 countries contributed data for 1995–99, 215 registries in 50 countries provided data for 2000–04, and 213 registries in 53 countries provided data for 2005–09. In Romania (Cluj), data were only available for eight children and survival was not estimated. Of 53 countries, 32 provided data with 100% national population coverage. The geographic range in survival for acute lymphoblastic leukaemia in children was very wide. For patients diagnosed during 2005–09, age-standardised 5-year net survival was 90% or higher in Austria, Belgium, Canada, Germany, and Norway and 80–89% in 21 countries on various continents (table 4; appendix p 151). In many countries, however, 5-year net survival is still lower than 60%, even after adjustment for the very high background mortality in childhood. Survival was less than 50% in Indonesia, Mongolia, and Lesotho, although these estimates are based on very small numbers. The range of survival estimates for childhood acute lymphoblastic leukaemia in Central and South America (16 registries) and Asia (23 registries) is much lower than the range in North America (48 registries), Europe (83 registries), and Oceania (seven registries; appendix p 173). 5-year survival for childhood acute lymphoblastic leukaemia rose by 10% or more between 1995–99 and 2005–09 in Belarus, Belgium, Bulgaria, China, Colombia, Lithuania, Norway, Portugal, South Korea, Spain, Taiwan, and the UK. The estimate of 11% from China for 1995–99 is based on only 23 children, but the increase from 50% for 2000–04 to 61% for 2005–09 is more reliable. Increases in survival of up to 9% were seen in 16 other countries. 5-year survival in Argentina, Ecuador, and Slovakia was in the range 60–79%, with little or no change over time. Survival seemed to fall in Brazil (from 72% to 66%), Malaysia (from 77% to 69%), and Slovenia (from 83–86% in 1995–2004 to 76% for 2005–09). Survival trends could not be assessed in Africa.

Discussion

With CONCORD-2, we have initiated worldwide surveillance of trends in cancer survival. In the first CONCORD study,[6] comparable estimates of cancer survival worldwide were provided: the study included 1·9 million patients diagnosed with breast, colorectal, or prostate cancer during 1990–94 and followed up to 1999 in 31 countries (panel). CONCORD-2 extends coverage to 25·7 million patients diagnosed with an invasive primary cancer during the 15-year period 1995–2009 in 67 countries. The ten index cancers represent about two-thirds of the overall cancer burden in both low-income and high-income countries.[4] Individual patient data provided by 279 population-based cancer registries were prepared with standardised quality-control procedures and subjected to centralised analysis with the latest statistical methods.

The findings do not cover all countries, but they provide at least some population-based cancer survival estimates for 67 countries (26 of low or middle income) that are home to two-thirds of the world's population, including national data for 40 countries. The estimates are derived from analysis of raw data on the survival of individual cancer patients up to 5 years after diagnosis. Until now, for comparison of global or continental survival, researchers generally needed to interpret scattered reports produced with diverse cancer definitions, quality-control criteria, and survival estimators, for different calendar periods, and age-standardised to different sets of weights.[46] More speculative comparisons have been based on modelling of mortality-incidence ratios, sometimes with data from neighbouring regions or countries,[47] with all the attendant assumptions.[48]

Even after adjustment for the wide international variation in levels of mortality from other causes, and with due allowance for variation in quality of data, the

global range in 5-year survival from ten cancers in adults and acute lymphoblastic leukaemia in children is very wide. For most cancers, survival in Africa, Asia, and Central and South America is lower, and the range in survival much wider, than in Europe, North America, and Oceania. The wider range is only partly attributable to the fact that not all cancer registries could provide data covering the 15 years from 1995 to 2009; for example, many of the Chinese registries contributed data for 2000–04 but not 2005–09. In North America and Oceania, population coverage was higher than 80% and the same registries generally provided data for the entire period 1995–2009 (figure 4; appendix pp 163–73): survival for most cancers was high on a global scale, with a fairly narrow range in estimates between registries.

5-year net survival from stomach cancer is generally in the range 25–30%, but it is very high (50–60%) in Japan, South Korea, and, to a lesser extent, Taiwan. High survival from stomach cancer in Japan,[49] South Korea,[50] and Taiwan[51] is well known, and is likely to be attributable to intensive diagnostic activity, early stage at diagnosis, and radical surgery. Survival varies according to sub-site, morphological type, and stage. Types of cancer with better prognosis might also be more common in Japan and South Korea, but the striking worldwide differences in survival suggest important lessons could be learnt from these countries about diagnosis and treatment.

5-year survival has risen for colon and rectal cancers in most developed countries and regions, including North America, Europe, Oceania, and parts of east Asia (South Korea and urban areas in China); increases in breast cancer survival have also been noted in these regions and in parts of Central and South America. These trends are likely to be attributable to earlier diagnosis, reduction in postoperative mortality,[52] and more effective treatment.[53,54] For rectal cancer, preoperative radiotherapy and total mesorectal excision reduce local recurrence and extend survival,[55–57] which could account for improvements noted in Canada, Finland, the Netherlands, Norway, Sweden, and the USA, where survival was already high (55–60%) for patients diagnosed in 1995–99 and rose further for those diagnosed during 2005–09 (62–65%). These trends accord with those reported from the Netherlands,[58] Scotland, the Nordic countries,[59] and elsewhere in Europe.[60]

Liver and lung cancer remain lethal in both developing and developed countries, with 5-year survival generally lower than 20%, indicating that most patients are still diagnosed when they are inoperable. Primary prevention aimed at reducing tobacco and alcohol consumption, and prevention of chronic hepatitis, will be especially important for these cancers. The very low survival estimate for liver cancer in The Gambia (5%) is based on a sample of only 85 patients diagnosed during 1995–97 who were followed up for less than 5 years, to the end of 1998; it is not age-standardised, but it is unlikely to be far wrong: patients in The Gambia tend to present with very advanced disease and cirrhosis and are not amenable to surgery.[61] Overall completeness of registration is low, but the incidence of liver cancer is comparable with that of other west African populations.[62] Data from the national cancer registry for The Gambia, set up in 1986 to support the IARC's Gambia Hepatitis Intervention Study,[63] have been analysed previously,[64] but more recent data were unavailable, so we cleaned and analysed them here alongside all other datasets, with permission from IARC.

The global range in 5-year survival from cervical cancer is very wide, from less than 40% to more than 70%. The overall decline in survival from 66% to 61% in France between 1995–99 and 2000–04 was seen in all nine registries (appendix p 105). The decrease might be attributable to removal of less aggressive tumours by more intensive cervical screening for preinvasive lesions.[65,66] Survival from cervical cancer in the Nordic countries was stable or rose slightly over the same period.[67] By comparison, lower survival in low-income and middle-income countries is striking, since invasive cervical cancer is potentially curable with early detection by screening and appropriate surgery.[68]

5-year survival from ovarian cancer is generally in the range 30–40% in most parts of the world, but the overall range is much wider. Diversity in international survival might be attributable partly to variations in the proportion of tumours classified as type I (typically early-stage and slow-growing) and type II (typically late-stage and aggressive).[69] Differences in stage at diagnosis and treatment are also likely to be important.[70] Differential

***Panel:* Research in context**

Systematic review

In the first global comparison of population-based cancer survival (CONCORD),[6] wide variations in survival from cancers of the breast (women), colon, rectum, and prostate were reported among 1·9 million adults diagnosed during 1990–94 and followed up to 1999 in 31 countries (16 countries had national coverage). More recent studies have differed with respect to geographic and population coverage, calendar period, and analytical methods, and they do not enable worldwide comparison of survival trends.[7–9] With CONCORD-2, we have extended coverage to 25·7 million cancer patients diagnosed during the 15-year period 1995–2009 in one of 67 countries (26 of low or middle income), of which 40 countries had national coverage.

Interpretation

The ten index cancers we selected for analysis represent two-thirds of the overall cancer burden in both low-income and high-income countries. 5-year survival from colon, rectal, and breast cancers has increased in most developed countries. Liver and lung cancer remain lethal in both developing and developed countries. Striking increases in prostate cancer survival have occurred in many countries, but trends vary widely. The range in cervical and ovarian cancer survival is very wide, but improvements have been slight. In east Asia, stomach cancer survival is very high, suggesting lessons could be learnt, whereas survival for adult and childhood leukaemia is remarkably low. The global range in survival from precursor-cell acute lymphoblastic leukaemia in children is very wide, suggesting major deficiencies in the management of what is now a largely curable disease. The findings of our study can be used to assess the extent to which investment in health-care systems is improving their effectiveness.

classification of borderline and invasive tumours might also contribute. Overall, however, worldwide survival trends show very little improvement between 1995–99 and 2005–09 (appendix p 158). This finding accords with the absence of improvement reported from many developed countries.[7,9]

Striking increases in 5-year survival from prostate cancer have occurred in many countries, but global trends varied widely. Examples include three northern European countries, all with nationwide cancer registration. 5-year survival in Lithuania jumped from 52% for men diagnosed during 1995–99 to 92% for those diagnosed during 2005–09. The rise in Latvia was from 52% to 74%: access to health care in these countries has improved, and opportunistic PSA screening began in 2000.[71] In Denmark, survival rose from 46% to 77% over the same period, having been stable at 40% throughout the period 1982–94,[72] during which time survival increased rapidly in the other four Nordic countries.[73] The Danish Urology Society advised against PSA testing in asymptomatic men in the early 1990s,[74] but this advice is now followed less widely. By contrast, survival in North America and Oceania was already very high in the late 1990s, and increases since then have been much smaller. In Africa, we were unable to assess a trend.

Survival from both adult and childhood leukaemia in east Asia is surprisingly low. The low survival for adult leukaemia in Japan, South Korea, and Taiwan is especially surprising, because survival from solid tumours is generally high. Could ethnic or genetic factors play a part? This possibility has been suggested in a recent comparison of survival from chronic lymphocytic leukaemia between Taiwan and the USA.[75] Leukaemia survival is also low in China, but haematological malignant diseases have received low priority in cancer control there, with limited access to health insurance and chemotherapy,[76] and medical resources in rural areas are poor.[77]

The global range in 5-year survival from acute lymphoblastic leukaemia in children is very wide, from less than 60% in several countries to 90% or higher in Austria, Belgium, Canada, Germany, and Norway. This finding confirms that major deficiencies are present in the management of what is now a largely curable disease.[78] Failure to start or complete treatment, usually for financial reasons, is an important contributor to the survival deficit in developing countries.[79]

Standardised quality controls were applied systematically to all datasets. Detailed discussions were held with every registry to identify and correct any errors or artifacts in the data. Many registries resubmitted their data after correction, which greatly improved data quality and comparability. The overall proportion of eligible tumours excluded from analysis was low (3·6%), but it was much higher for some registries and varied widely between cancers. For some populations, mostly in low-income and middle-income countries, these exclusions will have biased survival estimates upwards. Thus, the proportion of cancer registrations from a death certificate only was typically higher in countries where survival is low. This leads to exclusion from analysis of a group of patients who tend to have low survival,[80] leading to overestimation of the level of survival in that population. This bias would tend to reduce international differences.

Various indications suggest that the data submitted by some registries were not exhaustive, either because there were fewer cancer patients than expected or because the full range of haemopoietic malignant diseases was not represented in some of the leukaemia datasets. The smaller number of cancer registrations in Poland for 1995–99 reflects a national strike of doctors in 1997, but we have little reason to suppose this type of incompleteness would bias survival estimates.

Pathological confirmation of diagnosis was available for more than 90% of cancers included in the analyses (98·5% for childhood acute lymphoblastic leukaemia), and less than 4% of malignant diseases were assigned to a non-specific morphology code. Nevertheless, considerable variation was noted, and pathological evidence was much less complete for some populations in low-income and middle-income countries (table 2; appendix pp 3–63).

Several registries reported high proportions of intestinal-type adenocarcinoma in the colon and rectum: this morphological type was originally described (in 1965) for carcinoma of the stomach[81] and is included in ICD-O-3 (M8144). A similar issue arose with cholangiocarcinoma (M8160) coded as arising in the liver (ICD-O-3 site code C22.0) rather than the intrahepatic bile duct (C22.1). If we were told that pathologists frequently use these terms for malignant disease of the large bowel or liver, respectively, we included the patients in our analyses.

The distribution of cancers within an organ by anatomic sub-site or morphological type can differ between populations, so any differences in survival by sub-site or morphological features could affect comparisons of overall survival. We will address the effect on survival of these differences in biology with more detailed analyses, particularly for cancers of the stomach, lung, and ovary. Leukaemia comprises a broad and heterogeneous group of diseases. We excluded chronic myeloid leukaemia; survival for other major groups will be investigated in more detail.

Premalignant and small malignant lesions can be detected more frequently in countries with mass screening programmes or intensive early diagnostic activity, particularly for cancers of the breast, cervix, colon, rectum, and prostate. Differences in tumour stage at diagnosis can contribute to international variations in overall survival between low-income countries.[8] Wide differences in tumour stage at diagnosis and stage-specific survival have also been recorded among high-income countries.[59,70,82–84] High-resolution studies of tumour stage at diagnosis, treatment, and adherence to guidelines have helped account for international

differences in survival.[55,85–87] The comparability of data gathered routinely on cancer stage remains poor in developed countries,[88] even though the TNM classification[89] has been available for more than 60 years. We will examine in more detail the extent to which available data on tumour stage can explain the very wide global differences in survival reported by us here.

We imputed the day of diagnosis in data from registries that only record (or were only allowed to submit) the month and year of diagnosis. A few of those registries also submitted survival time in days; our imputation achieved similar results. The effect on short-term survival of minor variations in the date of diagnosis is generally small[90] and cannot account for the very wide international differences in 5-year survival.[91]

Loss to follow-up of cancer patients in registries using active follow-up varied widely, but most registries also used several passive follow-up techniques. Differences between the databases used for passive follow-up can affect survival estimates.[92,93] When information for all deaths is incomplete or inaccessible from administrative systems, active follow-up by the registry augments completeness of ascertainment of vital status, particularly in low-income and middle-income countries.[94] Some registries did not have the resources to follow up all their patients for vital status. Others could not provide follow-up data for at least 5 years after diagnosis for all their patients; for those registries, we have presented survival at 3 or 4 years if possible.

If age-specific (and thus age-standardised) survival estimates could not be produced, non-standardised estimates for all ages combined were presented. In some analyses, data had to be pooled across two or three calendar periods, restricting presentation of survival trends. For some countries or regions with very small populations, no survival estimate could be made at all for less common cancers, because very few patients were available for analysis.

We used a rigorously enforced protocol, with centralised data evaluation and analysis to enhance comparability, but international survival comparisons should still be interpreted with caution. Data quality varies widely:[95,96] we provided detailed indices of data quality at country and registry level (table 2; appendix pp 3–63), which should be taken into account. Not all countries could provide data for 2005–09. Also, the range in size between the smallest and largest populations included in this report is greater than 1000-fold, both for registries with national coverage (eg, Gibraltar includes 29 000 people and the UK covers 61·8 million people) and those with regional coverage (eg, Nunavut in Canada represents 33 000 people whereas California in the USA includes 37·0 million people). These differences are reflected in the numbers of patients and the width of CIs around survival estimates. However, lack of precision because of small numbers does not necessarily imply that the survival estimates are incorrect or unreliable: high quality and completeness of data and follow-up can be easier to achieve in small or island populations than in large urban populations.

For robust international comparison of cancer survival, differences and trends in background mortality according to age, sex, region, and ethnic origin must be taken into account. In the populations covered by these data, the range in background mortality was very wide, measured by life expectancy at birth (46–87 years in females and 45–81 years in males), and by the change in life expectancy between 1995 and 2009 (appendix p 175), and in other metrics such as the probability of death in middle age (data not shown). We created more than 6500 complete life tables of background mortality to capture these differences.

For children with cancer, usual practice is to present the observed probability of survival, including all causes of death,[97] rather than net survival, because mortality from other causes is typically very low, at least in developed countries. Here, however, we have estimated net survival for children with acute lymphoblastic leukaemia because, among the 53 countries for which data could be analysed, mortality from other causes in childhood varied very widely. In 2002, infant mortality ranged from less than one death per 1000 population to more than 120 deaths per 1000 population (in some African populations); under-5 mortality ranged from less than one death per 1000 population to more than 200 deaths per 1000 population; and the overall probability of death before age 15 years ranged from one death per 1000 population to more than 250 per 1000 population (data not shown). For a worldwide comparison of survival from childhood acute lymphoblastic leukaemia, it seemed especially important to eliminate the effect of this wide variation in background mortality between countries and over time.

Net survival was age-standardised in most estimates for both adults and children. Age standardisation minimises the risk of reporting international differences or trends in cancer survival that are attributable solely to international differences or changes over time in the age distribution of cancer patients.[42]

We included both first and higher order cancers in our analyses. The effect of multiple primary cancers on overall survival is typically only 1–2%,[98] but the proportion of such cancers in a given population is affected by the set of rules used to define them[99] and by the longevity of the registry.[100] Some participating registries began operation in the 1950s whereas others only started after 2000. In long-established registries, 10% or more of patients might be registered with more than one cancer.[101] This proportion is lower in newer registries, because a second cancer will typically be registered as the patient's first. Restriction to first primaries can also affect international comparison of survival trends, because the number of long-term survivors at high risk of another cancer is increasing, particularly in high-income countries.[102] Exclusion of second cancers would, therefore, tend to bias international survival comparisons in favour of wealthier countries.[103] The rules for defining multiple

primary cancers differ between North America and the rest of the world,[24,25] but in a novel step, data from registries in North America were first converted to IACR definitions used elsewhere, before being submitted for analysis. This alteration will have minimised any effect on international survival comparisons presented here.

To maintain the breadth of global surveillance of survival, we retained some datasets that seemed less suitable for international comparison than all other estimates, but we flagged these survival estimates to inform interpretation. The number of flagged estimates is larger than in the first CONCORD study[6] because more registries are from low-income countries and the data cover a much longer period. Residual errors and artifacts in data undoubtedly exist, but they are unlikely to account for global patterns and trends in cancer survival.

We used an unbiased estimator of net survival.[104] To our knowledge, this is the first time this estimator has been used for an international comparison. We used the period approach[33] to estimate survival up to 5 years after diagnosis for patients diagnosed during 2005–09 (appendix p 174). This approach offers reliable prediction of the eventual survival of recently diagnosed patients who have not all been followed up for 5 years.[105]

A small part of the global range in survival could be attributable to differences in the intensity of diagnostic activity. The introduction of new diagnostic techniques in wealthier countries, such as PSA testing for prostate cancer, has led to more patients being diagnosed at an early stage of disease, typically with a good prognosis, thus inflating both incidence and survival. We were not able to use the proportion of in situ cancers for international comparison of the intensity of diagnostic activity for cancers of the colon, rectum, breast, cervix, or prostate. Some registries do not collect data for in situ tumours, whereas some registries that do collect this information did not include these data in their submissions. In poorer countries, by contrast, many patients still die undiagnosed or untreated.[68]

For some cancers, both incidence and survival in countries with the most intensive diagnostic activity could be inflated slightly by overdiagnosis, but the effect on the global range of survival estimates is probably small. Equally, in the poorest countries, under-registration of cancer patients with the worst prognosis might lead to underestimation of incidence and overestimation of survival. Even though some survival estimates in low-income and middle-income countries might be too high for this reason, it is striking that for cancers of the colon, rectum, lung, and breast, and particularly for leukaemia in adults and children, the range of estimates in Africa and Central and South America for patients diagnosed during 2005–09 is still much lower than in North America and Oceania during 1995–99, 10 years earlier (figure 4; appendix pp 163–73). As reported elsewhere,[68] these patterns strongly suggest inadequate access to early diagnosis and optimum treatment.

National health-care systems must manage all cancer patients, however they are diagnosed, even if some patients might not have been diagnosed before widespread adoption of new diagnostic techniques or screening programmes. In a given country, incidence and survival estimates reflect current approaches to prevention, diagnosis, and treatment.[6] Coherent assessment of preventive and health-care strategies, therefore, requires that all cancer patients are included, no matter how they are diagnosed, in both incidence and survival estimates. Projections of the future burden of cancer[106] are based on the same cancer incidence data.

Some cancer registries followed up their patients for the first time so they could participate in CONCORD-2. Other registries, not all of them in low-income countries, were prevented from participating by scant resources either to follow up registered patients for vital status or to prepare data for submission. This deficit underscores the continued fragility, low coverage, and scarcity of resources for cancer registries.[4,107,108] In many countries, even the basic infrastructure of a civil registration system and vital statistics is deficient.[109] This absence is especially severe in Africa, where several participating countries have also been subject to civil or military conflict within the past 10–15 years and where, with few exceptions, assessment of recent survival trends from available data was almost impossible.

Cancer registries are crucial to our understanding of the global cancer burden,[107] and they need to be funded and equipped to gather, analyse, and publish incidence and survival data at national or regional level. Worldwide monitoring of cancer incidence has been done since the 1960s, with centralised data collection and standardised methods in *Cancer Incidence in Five Continents*.[16] IARC's Global Initiative for Cancer Registry Development is an important stimulus to promote high-quality data collection and cancer registration in low-income and middle-income countries.[108]

Both WHO[3] and the UN[110] have recognised cancer as a worldwide public health issue of growing concern. However, if cancer registration is to develop further in support of the 25×25 goals and in the evaluation of clinical care,[111] WHO and the UN will need to address the growing legal and procedural difficulties in obtaining primary health data and in accessing them for research. For example, legislation now at the final stage of discussion in the European Union would make cancer registration and most forms of public health research either impossible or illegal in 28 European countries.[112,113]

The CONCORD programme at the London School of Hygiene & Tropical Medicine (LSHTM) represents the establishment of worldwide surveillance of cancer survival by centralised quality control and analysis of population-based registry data, as a comparative metric of the effectiveness of health systems. It will provide part of the evidence base for global policy on cancer control

and should contribute to the overarching goal of the World Cancer Declaration 2013[14] and, more broadly, to the "revolution in metrics for global health".[114]

At a national level, cancer outcomes are affected by the organisation and funding of access to health services.[115] Improvements in cancer survival have been reported after major political and economic changes in Estonia,[116] Lithuania,[117] and Germany.[118] In turn, low survival has affected the development of cancer strategy in countries such as Algeria,[119] Brazil,[120,121] Mexico,[122] China, India, and Russia,[123] and in many wealthier countries.[4]

Some of the conclusions drawn from these analyses are similar to those for patients diagnosed 20–25 years ago.[6] The findings of this study can be used to assess the extent to which investment in health-care systems is improving their effectiveness. We will examine survival trends and differentials in relation to health economic indicators to assess why improvements in survival are so slow and unequal.

Most of the wide global range in cancer survival is probably attributable to inequity in access to optimum diagnostic and treatment services,[6] both in rich[124–126] and poor[127,128] countries. Availability of linear accelerators varies more than ten-fold worldwide, from one machine per 500 000 population to less than one per five million people, and more than 30 countries in Africa and Asia have no radiotherapy service at all.[129] Cancer survival in Europe has been associated with gross national product, total national expenditure on health and investment in health technology (eg, CT scanners, radiotherapy units),[130] and with suboptimum allocation of available resources.[86] The global economic cost of cancer from premature death and lost productivity was estimated at US$895 billion in 2008, excluding direct treatment costs estimated at $300 billion.[131] Even in wealthy countries, the rapidly growing costs of cancer treatment have raised concerns about the growing use of tests, imaging, and treatments that are expensive but have marginal value.[132] At the same time, closing the rich–poor divide in access to cancer treatment has been described as "an equity imperative".[133,134] The findings reported here confirm the global divide in outcomes.

The first international study of cancer survival was published 50 years ago.[5] In the same year, Alexander Langmuir, founder of the US Centers for Disease Control and Prevention's epidemic intelligence service, commented on national outbreaks of infectious disease: "good surveillance does not necessarily ensure the making of the right decisions, but it reduces the chances of wrong ones".[135] His view applies today to non-communicable diseases such as cancer, for which long-term surveillance of incidence, mortality, and survival is increasingly important. Survival is a key metric of overall progress in cancer control.[4] Continuous worldwide surveillance of cancer survival should become both an indispensable source of information for cancer patients and researchers and a stimulus for politicians to improve health policy and health-care systems.

Contributors

CA, HKW, RM-G, CS, GAS, BR, HS, TCT and MPC drafted the protocol; CA, HKW, GAS, W-QC, OJO, MJS, HY, TM, MB-L, TCT, and MPC obtained statutory and ethics approvals; HKW, FB, CJJ, RM-G, CS, GAS, W-QC, OJO, MJS, HY, TM, MB-L, HS, and TCT contributed to data acquisition; CA, DS, FB, MPC and BR prepared the life tables; CA, HC, RH, DS, X-SW, FB, JVA, AB, BR, and MPC had access to all raw data; CA, HC, RH, DS, X-SW, FB, JVA, CJJ, AB, and MPC did the data preparation, quality control and analyses, and checked the results; CA and MPC drafted the report. All authors contributed to writing the final report and approved the version to be published. All members of the CONCORD Working Group had access to the results at all steps of data preparation, quality control, and analyses, and contributed to interpretation of the findings.

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