

## Cancer incidence and mortality in Europe, 2004

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**Background:** There are no recent estimates of the incidence and mortality from cancer at a European level. Those data that are available generally refer to the mid-1990s and are of limited use for cancer control planning. We present estimates of the cancer burden in Europe in 2004, including data for the (25 Member States) European Union.

**Methods:** The most recent sources of incidence and mortality data available in the Descriptive Epidemiology Group at IARC were applied to population projections to derive the best estimates of the burden of cancer, in terms of incidence and mortality, for Europe in 2004.

**Results:** In 2004 in Europe, there were an estimated 2 886 800 incident cases of cancer diagnosed and 1 711 000 cancer deaths. The most common incident form of cancer was lung cancer (13.3% of all incident cases), followed by colorectal cancer (13.2%) and breast cancer (13%). Lung cancer was also the most common cause of cancer death (341 800 deaths), followed by colorectal (203 700), stomach (137 900) and breast (129 900).

**Conclusions:** With an estimated 2.9 million new cases (54% occurring in men, 46% in women) and 1.7 million deaths (56% in men, 44% in women) each year, cancer remains an important public health problem in Europe, and the ageing of the European population will cause these numbers to continue to increase even if age-specific rates remain constant. To make great progress quickly against cancer in Europe, the need is evident to make a concerted attack on the big killers: lung, colorectal, breast and stomach cancer. Stomach cancer rates are falling everywhere in Europe and public health measures are available to reduce the incidence and mortality of lung cancer, colorectal cancer and breast cancer.

**Key words:** cancer, deaths, Europe, European Union, incidence

### Introduction

Currently, the most recent comprehensive estimates of the incidence and mortality from cancer at a European level can be extracted from the GLOBOCAN 2002 project of IARC [1], but there is still no way of monitoring the evolution of the burden at the European level. In 1989, the European Network of Cancer Registries (ENCR) was established within the framework of the Europe Against Cancer programme of the European Commission. One of the objectives was to provide regular information on the burden of cancer in the European Union. Starting from 1995 [2], the ENCR published regular estimates of the incidence and prevalence of, and mortality from, cancer in the European Union using the EUCAN software [3]. The ENCR activities have, however, been interrupted, so that the latest estimates available are not sufficiently recent for today's cancer control and planning.

An attempt has been made to monitor the evolution of cancer mortality in the European Union, where it was observed that the expected number of cancer deaths in the 15 Member State European Union fell by over 9% between 1985 and 2000 [4]. During the lifetime of the Europe Against Cancer programme, favourable trends in cancer mortality were established for several common forms of cancer death in many countries [4], which appear likely to continue in the near future [5], although there were notable exceptions including lung cancer in women and most forms of cancer in Spain and Portugal [4].

In the year 2000, there were 1 122 000 deaths from cancer recorded in the 25 Member States that now constitute the European Union [5]. Even if the age-specific cancer mortality rates remain constant at year 2000 levels, there will be large increases in the absolute numbers of cancer cases and deaths into the foreseeable future. Although the total population will remain fairly constant, compared with 2000, by 2015 there will be a 22% increase in the population aged >65 years and a 50% increase in the number of persons aged >80 years. Given the strong association between cancer risk and age, this will lead to a major increase in the cancer burden. Using population projections, if

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the age-specific death rates remain constant, the absolute numbers of cancer deaths in 2015 will increase to 1 405 000. Even if the forecast trends are taken into account, it is still expected that there will be an increase, but this will be smaller and result in an estimated figure of 1 249 000 cancer deaths [5].

Estimates of the numbers of cancer cases and deaths in Europe for 2004 have been calculated to provide information on the cancer burden in Europe and to allow monitoring of the evolution of the impact of the ageing of the European population.

**Table 1.** Data availability and methods of estimation

Country	Mortality	Incidence
Albania	Corrected WHO mortality (2001)	Corrected mortality (2001) data and modelling
Austria	WHO mortality (2002)	Mortality (2002) data and modelling
Belarus	WHO mortality (2001) <sup>a</sup>	National Incidence (1997)
Belgium	WHO mortality (1997)	Mortality (1997) data and modelling
Bosnia and Herzegovina	Average of neighbouring countries	Average of neighbouring countries
Bulgaria	WHO mortality (2002)	National incidence (1998)
Croatia	WHO mortality (2002)	National incidence (2000)
Cyprus	Incidence and survival	National incidence (1999)
Czech Republic	WHO mortality (2002)	National incidence (1999)
Denmark	WHO mortality (2000)	National incidence (1999)
Estonia	WHO mortality (2002)	National incidence (2000)
Finland	WHO mortality (2002)	National incidence (2002)
France	WHO mortality (2000)	Mortality (2000) data and modelling
Germany	WHO mortality (2001)	Mortality (2001) data and modelling
Greece	WHO mortality (2001)	Mortality (2001) data and modelling
Hungary	WHO mortality (2002)	Mortality (2002) data and modelling
Iceland	WHO mortality (2001)	National incidence (2000)
Ireland	WHO mortality (2001)	National incidence (1999)
Italy	WHO mortality (2001)	Mortality (2001) data and modelling
Latvia	WHO mortality (2002)	National incidence (1997)
Liechtenstein	Average of neighbouring countries	Average of neighbouring countries
Lithuania	WHO mortality (2002)	National incidence (1997)
Luxembourg	WHO mortality (2002)	Mortality (2002) data and modelling
FYROM (Macedonia)	WHO mortality (2000)	Mortality (2000) data and modelling
Malta	WHO mortality (2002)	National incidence (2000)
The Netherlands	WHO mortality (2000)	National incidence (2000)
Norway	WHO mortality (2001)	National incidence (2001)
Poland	WHO mortality (2002)	Mortality (2002) data and modelling
Portugal	WHO mortality (2002)	Mortality (2002) data and modelling
Republic of Moldova	WHO mortality (2002)	Mortality (2002) data and modelling
Romania	WHO mortality (2002)	Mortality (2002) data and modelling
Russian Federation	WHO mortality (2002) <sup>a</sup>	Mortality (2002) data and modelling
Serbia and Montenegro	WHO mortality (2002) <sup>a</sup>	Average of Vojvodina (1999) and Central Serbia (1999)
Slovakia	WHO mortality (2001)	National incidence (1997)
Slovenia	WHO mortality (2002)	National incidence (2001)
Spain	WHO mortality (2001)	Mortality (2001) data and modelling
Sweden	WHO mortality (2001)	National incidence (2002)
Switzerland	WHO mortality (2001)	Mortality (2001) data and modelling
Ukraine	WHO mortality (2002) <sup>a</sup>	National incidence (2000)
UK	WHO mortality (2002)	National incidence (2000)

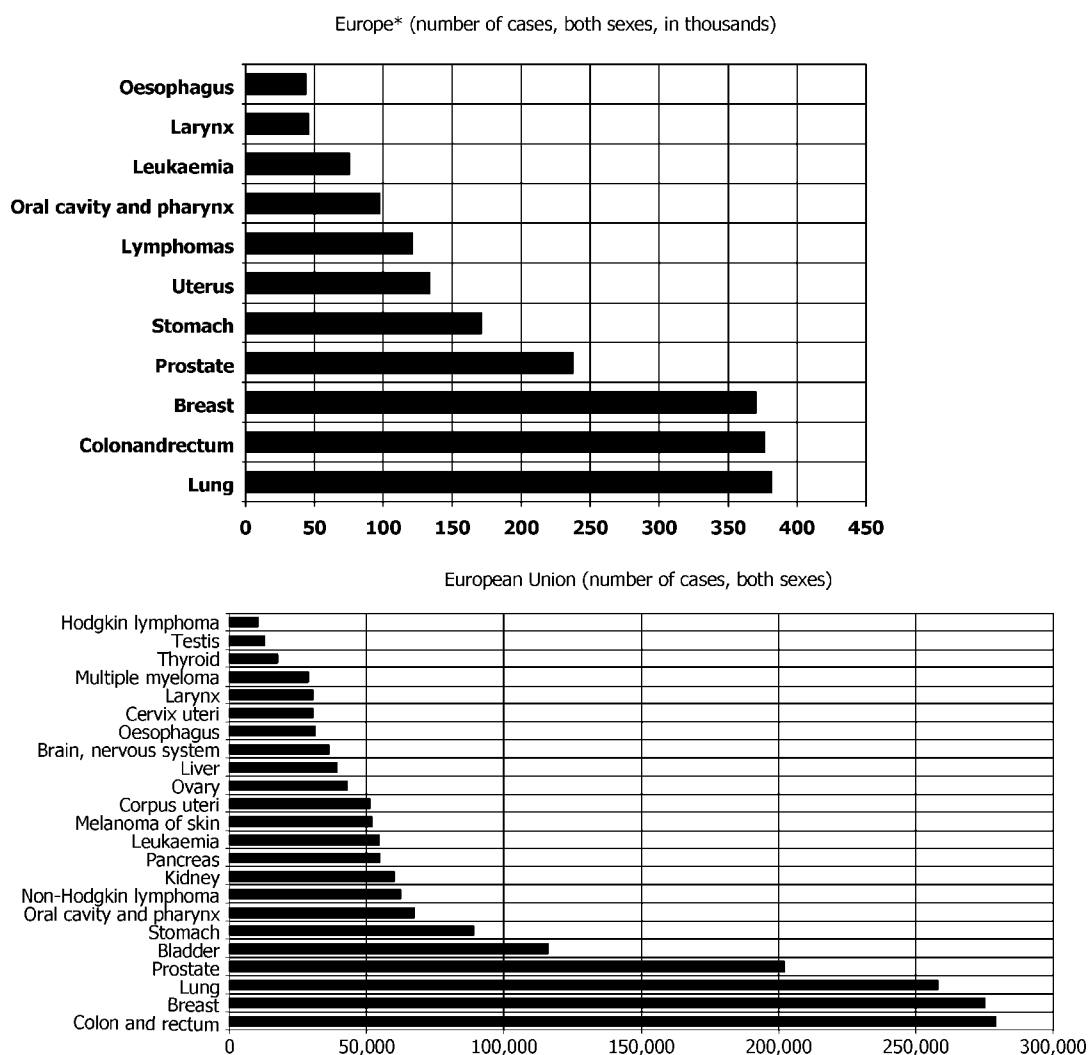
<sup>a</sup>Main category (ICD-9 'Special Coding').

**Table 2.** Estimates of numbers of incident cases of cancer in Europe, both sexes combined (2004) (in thousands)

Site	Cases	%
All sites except non-melanoma skin	2886.8	100.0
Lung	381.5	13.2
Colon and rectum	376.4	13.0
Breast	370.1	12.8
Prostate	237.8	8.2
Stomach	171.0	5.9
Uterus	133.8	4.6
Lymphomas	121.2	4.2
Oral cavity and pharynx	97.8	3.4
Leukaemia	75.6	2.6
Larynx	46.1	1.6
Oesophagus	43.7	1.5

**Table 3.** Estimates of numbers of cancer deaths in Europe, both sexes combined (2004) (in thousands)

Site	Deaths	%
All sites except non-melanoma skin	1711.0	100.0
Lung	341.8	20.0
Colon and rectum	203.7	11.9
Stomach	137.9	8.1
Breast	129.9	7.6
Prostate	85.2	5.0
Lymphomas	65.2	3.8
Leukaemia	52.6	3.1
Uterus	49.3	2.9
Oral cavity and pharynx	40.1	2.3
Oesophagus	39.5	2.3
Larynx	24.5	1.4

**Figure 1.** Estimated incidence of cancer in Europe and European Union, 2004. \*No data for Europe for all the individual sites due to limitations of coding scheme employed.

## Materials and methods

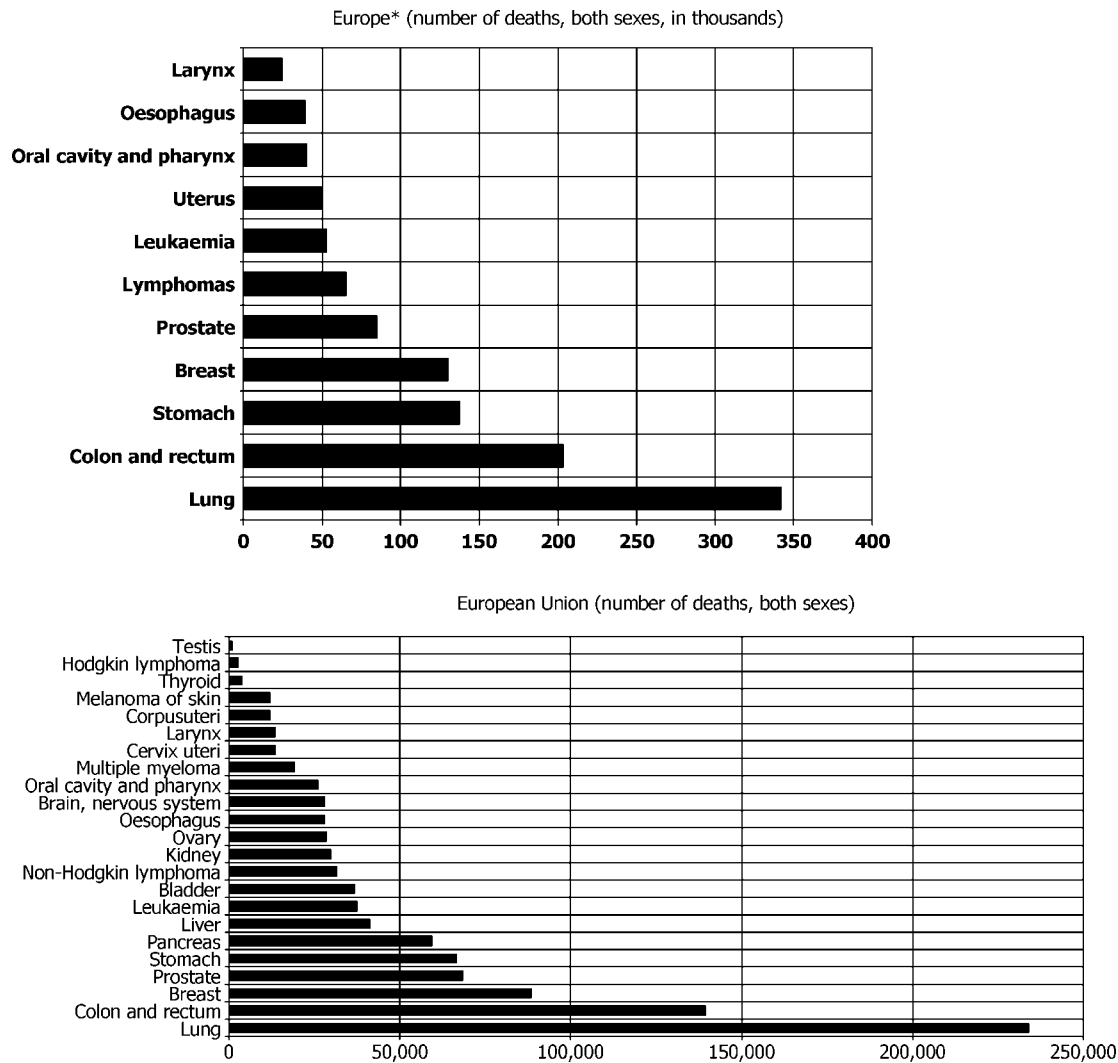
The methods used to compute the estimates for major cancers are described in detail in GLOBOCAN 2002 [1]. In summary, we estimated incidence and mortality rates (number of cases or deaths per 100000 persons per year) for 40 European countries, by sex and cancer site, for eight age groups (0–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74 and 75+ years) using the most recent data collected by the Descriptive Epidemiology Group at IARC. The numbers of cases and deaths were computed by multiplying these estimated rates by the year 2004 population estimates for the corresponding country [6]. The results are presented for three areas: the 25 Member States of the European Union (Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, The Netherlands and the UK), the European Economic Area (the 25 European Union countries plus Iceland, Liechtenstein and Norway) plus Switzerland; and Europe (European Economic Area plus Bulgaria, Belarus, Moldova, Romania, Russian Federation, Ukraine, Albania, Bosnia and Herzegovina,

Macedonia, Serbia and Montenegro and Switzerland). Because of the lack of information on cancer mortality in Eastern European countries, the results for Europe can only be presented for a limited number of cancer sites or group of sites.

### Mortality data

WHO mortality data [7] are available by sex and cancer site up to 2002 for all countries in Europe, except Cyprus, Liechtenstein, and Bosnia and Herzegovina. For some Eastern European countries (Belarus, Russian Federation, Serbia and Montenegro, and Ukraine), mortality statistics are only available by an ICD-9 ‘Special Coding List’.

We estimated mortality in Cyprus using incidence and survival [8] (pooled European survival from the EURO CARE-3 study), and as the simple average of the mortality rates of neighbouring countries for Bosnia and Herzegovina, and for Liechtenstein (Table 1). For Albania, mortality rates are known to be under-estimates of the true mortality, so the rates have been corrected (multiplied by the estimated percentage of under-registration).



**Figure 2.** Estimated mortality from cancer in Europe and European Union, 2004. \*No data for Europe for all the individual sites due to limitations of coding scheme employed.

**Table 4A.** Estimated number of incident cancer cases in 2004 (thousands) and cumulative risk (age 0–74 years) (percent) in men

	Europe		EEA <sup>a</sup>		European Union	
	Cases	Risk	Cases	Risk	Cases	Risk
Oral cavity and pharynx	76.6	1.82	53.8	1.84	52.5	1.85
Oesophagus	33.6	0.77	24.3	0.79	23.7	0.79
Stomach	102.8	2.26	54.9	1.61	53.8	1.62
Colon and rectum	197.2	4.18	153.9	4.54	149.4	4.53
Liver	<sup>b</sup>	<sup>b</sup>	27.0	0.86	26.5	0.87
Pancreas	<sup>b</sup>	<sup>b</sup>	29.0	0.88	28.2	0.88
Larynx	42.0	1.03	27.5	0.97	27.2	0.99
Lung	298.6	6.88	200.4	6.43	196.1	6.47
Melanoma of skin	<sup>b</sup>	<sup>b</sup>	23.6	0.76	22.5	0.74
Prostate	237.8	4.80	210.6	5.99	202.1	5.91
Testis	<sup>b</sup>	<sup>b</sup>	13.2	0.43	12.5	0.42
Bladder	<sup>b</sup>	<sup>b</sup>	93.4	2.81	91.0	2.82
Kidney	<sup>b</sup>	<sup>b</sup>	38.9	1.29	37.9	1.29
Brain, central nervous system	<sup>b</sup>	<sup>b</sup>	20.3	0.68	19.5	0.68
Thyroid	<sup>b</sup>	<sup>b</sup>	5.0	0.17	4.8	0.17
Lymphomas	65.0	1.40	56.3	1.77	54.6	1.76
Non-Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	34.9	1.10	33.8	1.09
Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	5.9	0.20	5.8	0.19
Multiple myeloma	<sup>b</sup>	<sup>b</sup>	15.5	0.47	15.0	0.47
Leukaemia	42.1	0.89	31.6	0.94	30.8	0.94
All sites except non-melanoma skin	1534.7	28.98	1146.4	30.11	1114.0	30.10

<sup>a</sup>European Economic Area (EEA) plus Switzerland: 25 European Union countries plus Iceland, Liechtenstein and Norway.

<sup>b</sup>Could not be estimated with adequate precision due to coding classification used in some countries (see text).

Europe: EEA plus Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Macedonia, Moldova, Romania, Russian Federation, Serbia and Montenegro, Switzerland, and Ukraine.

### Incidence data

The methods used to estimate the sex- and age-specific incidence rates of cancer for a country fall into one of the following categories.

(i) *National incidence data.* 'Recent' national incidence rates are available for: Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Iceland, Finland, Ireland, Malta, Norway, Slovenia, Sweden, The Netherlands, Ukraine and the UK. National incidence rates for Belarus, Latvia, Lithuania and Slovakia have been published earlier in *Cancer Incidence in Five Continents Vol. VIII* [9] (Table 1). National data are also available for Austria and Poland, but have not been used as they did not meet the data quality standards required for inclusion in *Cancer Incidence in Five Continents Vol. VIII*.

(ii) *National mortality data.* For the other countries for which national mortality is available (such as France, Germany or Italy), national incidence ( $I_N$ ) can be estimated by applying a set of age-, sex- and site-specific incidence/mortality ratios ( $I_R/M_R$ ), obtained from the aggregation of representative cancer registry data, to the country's national mortality ( $M_N$ ):  $I_N = M_N \times I_R/M_R$ . The  $I_R/M_R$  ratios are obtained from a Poisson regression model of the selected registry incidence data offset by

**Table 4B.** Estimated number of incident cancer cases in 2004 (thousands) and cumulative risk (age 0–74 years) (percent) in women

	Europe		EEA <sup>a</sup>		European Union	
	Cases	Risk	Cases	Risk	Cases	Risk
Oral cavity and pharynx	21.1	0.34	15.0	0.37	14.6	0.37
Oesophagus	10.1	0.13	7.6	0.15	7.4	0.15
Stomach	68.2	0.99	35.6	0.67	35.0	0.68
Colon and rectum	179.2	2.53	133.6	2.71	129.8	2.70
Liver	<sup>b</sup>	<sup>b</sup>	12.6	0.26	12.4	0.26
Pancreas	<sup>b</sup>	<sup>b</sup>	27.7	0.55	26.8	0.55
Larynx	4.1	0.08	3.3	0.10	3.3	0.10
Lung	82.9	1.39	63.8	1.65	62.0	1.64
Melanoma of skin	<sup>b</sup>	<sup>b</sup>	30.9	0.85	29.5	0.83
Breast	370.1	6.66	283.0	7.81	275.1	7.79
Uterus	133.8	2.56	83.7	2.43	81.5	2.43
Cervix uteri	<sup>b</sup>	<sup>b</sup>	31.1	0.93	30.4	0.93
Corpus uteri	<sup>b</sup>	<sup>b</sup>	52.6	1.50	51.1	1.50
Ovary	<sup>b</sup>	<sup>b</sup>	44.0	1.22	42.7	1.21
Bladder	<sup>b</sup>	<sup>b</sup>	25.8	0.52	25.1	0.52
Kidney	<sup>b</sup>	<sup>b</sup>	22.6	0.58	22.0	0.58
Brain, central nervous system	<sup>b</sup>	<sup>b</sup>	16.9	0.49	16.2	0.49
Thyroid	<sup>b</sup>	<sup>b</sup>	12.9	0.39	12.5	0.39
Lymphomas	56.2	0.92	48.3	1.20	46.8	1.19
Non-Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	29.5	0.73	28.5	0.72
Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	4.6	0.14	4.5	0.14
Multiple myeloma	<sup>b</sup>	<sup>b</sup>	14.2	0.33	13.7	0.33
Leukaemia	33.6	0.54	24.2	0.56	23.6	0.56
All sites except non-melanoma skin	1352.1	20.36	973.9	21.79	946.4	21.74

<sup>a</sup>European Economic Area (EEA) plus Switzerland: 25 European Union countries plus Iceland, Liechtenstein and Norway.

<sup>b</sup>Could not be estimated with adequate precision due to coding classification used in some countries (see text).

Europe: EEA plus Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Macedonia, Moldova, Romania, Russian Federation, Serbia and Montenegro, Switzerland, and Ukraine.

corresponding mortality data, including terms for sex and age. Fifteen models have been established, based upon the most recent incidence and mortality data from local and national European cancer registries available in the EURO-CIM database [10] of the ENCR. This method is regularly used by the Descriptive Epidemiology Group of IARC, and has been shown to estimate cancer incidence accurately [2].

(iii) *Local (regional) incidence data.* For Serbia and Montenegro the estimates were derived from the data of two cancer registries covering a part of the country [10].

(iv) *No data.* For Bosnia and Herzegovina, and for Liechtenstein, the country-specific rates were calculated from the simple average of those of neighbouring countries (Albania, Macedonia, and Serbia and Montenegro; Austria, Belgium, France, Germany, Luxembourg and Switzerland, respectively).

**Table 5A.** Estimated number of cancer deaths in 2004 (thousands) and cumulative risk (age 0–74 years) (percent) in men

	Europe		EEA <sup>a</sup>		European Union	
	Deaths	Risk	Deaths	Risk	Deaths	Risk
Oral cavity and pharynx	32.1	0.75	21.1	0.70	20.6	0.71
Oesophagus	30.0	0.67	21.5	0.67	21.0	0.68
Stomach	81.2	1.71	39.9	1.05	39.2	1.06
Colon and rectum	103.3	1.98	74.2	1.89	72.3	1.90
Liver	<sup>b</sup>	<sup>b</sup>	27.1	0.80	26.6	0.81
Pancreas	<sup>b</sup>	<sup>b</sup>	30.3	0.88	29.6	0.88
Larynx	22.7	0.53	12.2	0.39	12.1	0.39
Lung	268.3	5.97	181.9	5.51	178.4	5.56
Melanoma of skin	<sup>b</sup>	<sup>b</sup>	6.6	0.20	6.3	0.20
Prostate	85.2	1.08	70.9	1.13	68.2	1.12
Testis	<sup>b</sup>	<sup>b</sup>	0.9	0.03	0.9	0.03
Bladder	<sup>b</sup>	<sup>b</sup>	27.5	0.60	26.9	0.61
Kidney	<sup>b</sup>	<sup>b</sup>	19.0	0.55	18.5	0.55
Brain, central nervous system	<sup>b</sup>	<sup>b</sup>	15.7	0.52	15.2	0.52
Thyroid	<sup>b</sup>	<sup>b</sup>	1.4	0.04	1.3	0.04
Lymphomas	33.7	0.66	28.2	0.77	27.4	0.77
Non-Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	16.9	0.47	16.4	0.47
Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	1.6	0.05	1.6	0.05
Multiple myeloma	<sup>b</sup>	<sup>b</sup>	9.8	0.25	9.5	0.25
Leukaemia	28.3	0.54	20.8	0.53	20.3	0.53
All sites except non-melanoma skin	962.6	17.95	669.4	16.76	653.7	16.84

<sup>a</sup>European Economic Area (EEA) plus Switzerland: 25 European Union countries plus Iceland, Liechtenstein and Norway.

<sup>b</sup>Could not be estimated with adequate precision due to coding classification used in some countries (see text).

Europe: EEA plus Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Macedonia, Moldova, Romania, Russian Federation, Serbia and Montenegro, Switzerland, and Ukraine.

### Population data

Estimates of the population of country (by age and sex) for the years 2000 and 2005 were taken from the United Nations population division (the 2002 revision). The 2004 population figures were estimated by calculating the annual percentage change by sex and age between the year 2000 and 2005.

### Results

In 2004 in Europe, there were an estimated 2 886 800 incident cases of cancer diagnosed (Table 2) and 1 711 000 cancer deaths (Table 3). The most common incident form of cancer in Europe in 2004 was lung cancer (381 500 cases, 13.2% of all incident cases), followed by colorectal cancer (376 400, 13%) and breast cancer (370 100, 12.8%) (Figure 1). Lung cancer was also the largest cause of cancer death (341 800 deaths, 20% of all deaths), followed by colorectal (203 700, 11.9%), stomach (137 900, 8.1%) and breast (129 900, 7.6%) (Figure 2).

**Table 5B.** Estimated number of deaths in 2004 (thousands) and cumulative risk (age 0–74 years) (percent) in women

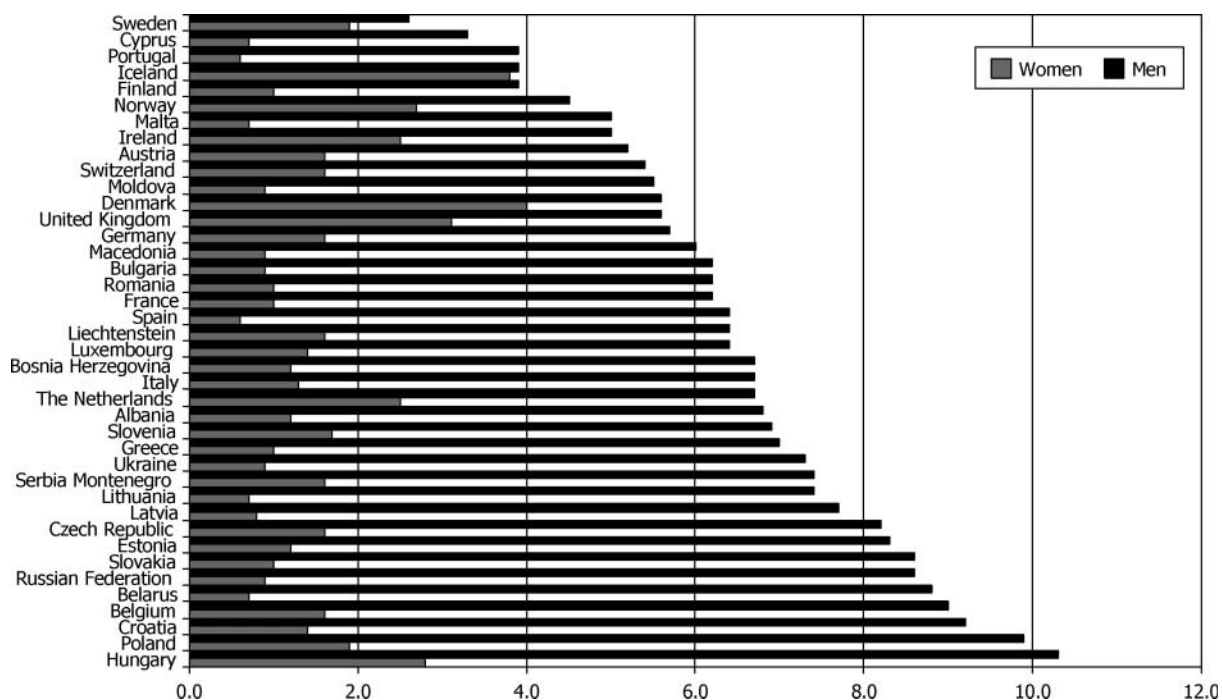
	Europe		EEA <sup>a</sup>		European Union	
	Deaths	Risk	Deaths	Risk	Deaths	Risk
Oral cavity and pharynx	8.0	0.12	5.7	0.13	5.6	0.13
Oesophagus	9.4	0.11	7.1	0.12	6.9	0.12
Stomach	56.7	0.75	28.0	0.44	27.5	0.45
Colon and rectum	100.4	1.20	68.7	1.09	67.0	1.09
Liver	<sup>b</sup>	<sup>b</sup>	14.7	0.26	14.5	0.26
Pancreas	<sup>b</sup>	<sup>b</sup>	30.8	0.56	29.9	0.56
Larynx	1.8	0.03	1.3	0.03	1.2	0.03
Lung	73.5	1.13	57.4	1.35	55.9	1.34
Melanoma of skin	<sup>b</sup>	<sup>b</sup>	5.8	0.13	5.6	0.13
Breast	129.9	2.02	90.6	2.04	88.4	2.05
Uterus	49.3	0.79	26.0	0.58	25.4	0.58
Cervix uteri	<sup>b</sup>	<sup>b</sup>	13.7	0.34	13.5	0.34
Corpus uteri	<sup>b</sup>	<sup>b</sup>	12.3	0.24	11.9	0.24
Ovary	<sup>b</sup>	<sup>b</sup>	29.0	0.69	28.3	0.69
Bladder	<sup>b</sup>	<sup>b</sup>	9.9	0.12	9.6	0.12
Kidney	<sup>b</sup>	<sup>b</sup>	11.6	0.23	11.2	0.23
Brain, central nervous system	<sup>b</sup>	<sup>b</sup>	12.9	0.36	12.6	0.36
Thyroid	<sup>b</sup>	<sup>b</sup>	2.5	0.05	2.5	0.05
Lymphomas	31.5	0.41	26.9	0.51	26.1	0.51
Non-Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	15.6	0.30	15.1	0.30
Hodgkin's lymphoma	<sup>b</sup>	<sup>b</sup>	1.3	0.03	1.3	0.03
Multiple myeloma	<sup>b</sup>	<sup>b</sup>	10.0	0.18	9.7	0.18
Leukaemia	24.3	0.33	17.5	0.32	17.1	0.32
All sites except non-melanoma skin	748.4	9.97	520.3	9.76	507.6	9.77

<sup>a</sup>European Economic Area (EEA) plus Switzerland: 25 European Union countries plus Iceland, Liechtenstein and Norway.

<sup>b</sup>Could not be estimated with adequate precision due to coding classification used in some countries (see text).

Europe: EEA plus Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Macedonia, Moldova, Romania, Russian Federation, Serbia and Montenegro, Switzerland, and Ukraine.

In men, there were an estimated 1 534 700 incident cases of cancer of all forms (except non-melanoma skin cancer) diagnosed. There were 298 600 new cases of lung cancer (19.4%), and prostate cancer was the second most frequent incident form of cancer in men with 237 800 new cases estimated (15.5%). There were 197 200 new cases of colorectal cancer (12.8%) and, despite its falling incidence and mortality, there were 102 800 new cases of stomach cancer (6.7%) (Table 4A). Mortality reflects the cancer prognosis, and in men there were 962 600 cancer deaths recorded (Table 5A), of which over one-quarter (268 300) were lung cancer, by far the most common cause of death. Colorectal cancer was the second major cancer killer in men with an estimated 103 300 deaths from



**Figure 3.** Cumulative lifetime (age 0–74 years) risk (percent) of lung cancer in men and women in Europe.

this cause (10.7%). This was followed by prostate cancer, with 85 200 deaths estimated (8.9%).

In women, breast cancer was by far the most common incident form of cancer, with an estimated 370 100 new cases diagnosed (27.4% of all incident cases in women). Colorectal cancer was the second most common incident form of cancer in women (179 200, 13.25%), followed by cancer of the uterus, cervix and corpus combined, of which 133 800 cases were recorded (9.9%). There were an estimated 82 900 new cases of lung cancer diagnosed in women in Europe (Table 4B).

Breast cancer was also the most common form of cancer death in women in Europe, with 129 900 deaths (17.4%). There were 100 400 deaths from colorectal cancer (13.4%) and 73 500 deaths from lung cancer (9.8%) (Table 5B).

### European Union

In the European Union, there were over two million (2 060 400) incident cases of cancer in 2004 and over one million cancer deaths (1 161 300).

Prostate cancer was the most common form of cancer in men (202 100 incident cases, 18.1% of all incident cases), closely followed by lung cancer (196 100, 17.6%). Colorectal cancer ranked third (149 400 cases, 13.4%), followed by bladder cancer, the fourth most common, with 91 000 (8.2%) new cases. However, due to differences in coding practices between European countries, the rubric ‘bladder cancer’ includes non-invasive tumours. Stomach cancer (53 800 cases) was slightly more common than oral cavity cancer (52 500) (Table 4A). In women, with an 8% lifetime risk, breast cancer was the most common incident form of cancer (275 100 cases, 29% of all incident cases), while colorectal cancer was second

(129 800, 13.7%). There were 81 500 (8.6%) cases of uterus cancer and 62 000 (6.5%) incident cases of lung cancer (Table 4B).

Lung cancer continued to be the most common cause of cancer death in men in the European Union, with 178 400 deaths estimated in 2004 (27.3% of all cancer deaths), and the lifetime risk of dying of 5.5%. Colorectal cancer ranked second (72 300 deaths, 11.1%), followed by prostate cancer (68 200, 10.4%). In women, breast cancer is the leading cause of death in the European Union (88 400 deaths, 17.4% of total). Colorectal cancer was the second most common cause of cancer death (67 000, 13.2%), with lung cancer clearly established as the third most frequent cause of cancer deaths in women (55 900 deaths, 11%) (Table 5B).

### Discussion

With 2 886 800 incident cases and 1 711 000 deaths in 2004, cancer remains an important public health problem in Europe, and the ageing of the European population will cause these numbers to continue to increase even if age-specific rates remain constant [5]. Lung, colorectal and breast cancer represent the three most common incident forms of cancer, accounting for two-fifths of the total European cancer burden (Table 2). Lung, colorectum, stomach and breast cancers account for nearly half of all cancer deaths in Europe (Table 3).

The estimates provided herein give a good indication of the burden of cancer incidence and death throughout Europe, and help clarify the priorities for cancer control action. The overwhelming majority of lung cancer is caused by tobacco smoking [11, 12] and tobacco control is clearly a number one

priority in Europe, aimed not only at men, but increasingly targeted towards women.

Although there have been recent declines in breast cancer mortality rates in some European Union countries [4], breast cancer remains of key importance to public health in Europe. Prospects for primary prevention are unclear at present and tamoxifen no longer appears to be a candidate for chemoprevention in the general population of women [13]. Population screening with mammography is effective at reducing mortality when quality control procedures are in place [14] and there are slow but continual increases taking place in treatment outcome [15], reflected by the very high ratio of the lifetime risk of getting the disease (7.8%) to that of dying from the disease (2%) observed in the European Union. However, there is still a clear need to accelerate prospects for preventing women getting breast cancer as well as dying from the disease.

Colorectal cancer is the third most common form of cancer in men and the second most common form of cancer in women in Europe, but it ranked second in frequency of deaths in both men and women. The potential to avoid many deaths from colorectal cancer has been available for several years [16, 17], although progress in implementing what is known has been remarkably slow.

What is very clear is that if we wish to make great progress quickly against cancer in Europe, then the need is evident to make a concerted attack on the big killers: lung, colorectal, breast and stomach cancer.

Thankfully, stomach cancer incidence and mortality are declining throughout Europe, in both men and women [4]. Lung cancer incidence and mortality will be reduced by effective tobacco control, and while there has been substantial progress in men in Europe, the situation in women, particularly young women, is cause for concern. Furthermore, the situation differs greatly between Northern Europe and Central and Eastern Europe (Figure 3) and the latter region should be a special target for tobacco control.

The introduction of organised mammographic screening programmes throughout Europe will lead to a reduction in breast cancer mortality. The maximum effect will be derived from programmes with effective quality control procedures in place. Similarly, screening for colorectal cancer has been shown to be effective [18] and there is a need for organised colorectal cancer screening programmes throughout Europe.

These are among the key recommendations of the recently revised *European Code Against Cancer*, which provides a public health roadmap for cancer risk reduction in Europe [18].

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