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Original Paper

Survival of Patients with Oesophageal and Gastric Cancers in Europe

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The EURO CARE study is a European Union project to collect survival data from population-based cancer registries and analyse them according to standardised procedures. We investigated and compared oesophageal and gastric cancer survival in 17 countries between 1985 and 1989. Time trends in survival over the 1978–1989 period were also investigated in 13 countries. The overall European 1-year relative survival rates were 33% for oesophageal cancer and 40% for gastric cancer. The corresponding 5-year relative survival rates were 10 and 21%, respectively. Important intercountry survival differences exist within Europe for oesophageal and gastric cancer. Taking the European average as the reference, the relative risk (RR) of death at 5 years was at least 30% higher in Denmark, Poland, Estonia and Slovenia for oesophageal cancer and in Denmark, England, Scotland and Poland for gastric cancer. In the other countries survival figures were close to the European average. Gender had little influence on survival, whilst age at diagnosis was inversely related to prognosis. There was a slight improvement between 1978 and 1989 in 5-year overall relative survival rates for both oesophageal cancer (RR = 0.80, 95% confidence interval (CI) 0.72–0.90) and gastric cancer (RR = 0.88, 95% CI 0.82–0.94). Differences in quality of care and stage at diagnosis can explain in part the differences in survival found in the EURO CARE countries. Significant improvement in prognosis has still to be achieved. © 1998 Elsevier Science Ltd. All rights reserved.

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INTRODUCTION

OESOPHAGEAL AND gastric cancers remain common and serious diseases. Data on survival from these cancers have mostly been provided by specialised hospital units or from clinical trial series, with unavoidable selection bias, particularly with respect to elderly and those with comorbidity. Population-based series recording all cases diagnosed in a well-defined population allow the assessment of the real prognosis of oesophageal and gastric cancers. International comparisons of survival estimates after cancer diagnosis are now possible with the data collected by cancer registries over

recent years [1]. These data can address questions of whether survival rates differ between countries and whether they are improving with time. The first EURO CARE study based on combined data from 11 countries provided survival rates for cancer patients diagnosed during the 1978–1985 period. The collaboration across Europe in the EURO CARE study has now been extended to 17 countries. The aim of this study was to review, within the framework of this programme, the prognosis of oesophageal and gastric cancers diagnosed between 1985 and 1989 in different countries with a special interest in intercountry comparison and to determine time trends in survival over the 1978–1989 period.

PATIENTS AND METHODS

This study included oesophageal cancers (ICD-9 150) and gastric cancers (ICD-9 151) registered during the 1978–1989

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period in areas covered by cancer registries in 17 European countries. Only primary newly diagnosed malignant invasive tumours were considered. *In situ* cancers or tumours of uncertain malignancy were excluded as well as lymphomas. Cases known by death certificates only (DCO) or discovered incidentally at autopsy were excluded from the survival

analysis. Description of the cancer registries, their data gathering methods and the standardised procedures for ensuring data comparability were published in the first and second EUROCARE monographs [1, 2].

Table 1 provides a breakdown of oesophageal and gastric cancers by country, proportion of males, patients over

Table 1. Data quality for oesophageal cancer and gastric cancer cases by country (EUROCARE II)

Oesophageal cancer						
Country	<i>n</i> of cases	% Males	% \geq 75 years of age	% DCO	% HV	% Lost to follow-up
Northern Europe						
Iceland	47	66	32	0	94	0
Finland	919	48	44	1	92	0
Sweden*	299	73	33	0	99	0
Denmark	1129	69	34	0	94	0
U.K.						
Scotland	2650	55	37	4	84	0
England	10 342	58	39	9	74	0
Western and Central Europe						
The Netherlands*	105	71	19	0	94	0
Germany*	243	81	18	9	96	0
Austria*	32	87	22	15	85	0
Switzerland*	168	75	26	1	99	0
France*	1239	92	18	0	96	0.1
Southern Europe						
Spain*	646	91	15	10	96	0.1
Italy*	790	78	28	5	82	0.2
Eastern Europe						
Slovenia	403	88	18	7	85	0.5
Slovakia	836	90	15	8	75	0
Poland*	219	75	25	9	59	0
Estonia	243	85	23	1	78	0.8
Europe	20 231	65	34	7	81	0.1
Gastric cancer						
Country	<i>n</i> of cases	% Males	% \geq 75 years of age	% DCO	% HV	% Lost to follow-up
Northern Europe						
Iceland	250	66	40	1	93	0
Finland	4810	53	39	1	94	0
Sweden*	1276	64	49	0	98	0
Denmark	3545	60	43	0	92	0
U.K.						
Scotland	5597	59	40	5	80	0
England	23 292	63	43	12	68	0
Western and Central Europe						
The Netherlands*	1026	62	38	0	97	0.7
Germany*	1307	52	40	9	99	0
Austria*	362	48	45	14	93	0
Switzerland*	555	61	46	1	85	3
France*	1480	62	44	0	97	0.1
Southern Europe						
Spain*	3015	64	32	13	94	1
Italy*	8518	59	42	5	81	0.4
Eastern Europe						
Slovenia	2383	59	31	8	83	0.5
Slovakia	5201	63	29	9	75	0
Poland*	1180	64	34	9	59	1
Estonia	2539	54	24	0	79	0.7
Europe	66 336	55	35	7	78	0.2

* < 20% of the national population covered. DCO, death certificate only; HV, histologically verified.

74 years of age, microscopically verified cases, DCO and cases lost to follow-up. The registries of Finland, Denmark, Iceland, Estonia, Slovenia and Slovakia cover the entire population of these countries. U.K. registries cover approximately 50% of the whole population. Other countries are represented by regional registries. The male predominance for oesophageal cancer was particularly marked in Southern European countries, in Eastern European countries and in France and Germany, where more than 75% of the cases were diagnosed in men. The male excess was less pronounced in the other countries. For gastric cancer the proportion of males ranged from 48% (Austria) to 66% (Iceland). The proportion of cases over 74 years of age was slightly higher for gastric cancer than for oesophageal cancer. In most countries the proportion of histologically verified cases ranged between 80 and 99%, but it was lower in England, Estonia, Poland and Slovakia. The proportion of cases lost to follow-up was low everywhere, but the proportion of DCOs was around 10% in England, Spain, Germany, Austria, Slovakia, Slovenia and Poland.

Survival rates were calculated for the most recent 5-year period i.e. 1985–1989 by sex, age group and country including all participating registries. Data on oesophageal cancer in Austria and Iceland are not shown because of the small number of cases. Variation in survival according to the period of diagnosis (four 3-year periods) is also provided for 21 registries from 13 countries represented for the entire study period. Relative survival rates were computed using the Hakulinen programme [3], defined as the ratio of the observed to the expected survival rate calculated from regional mortality tables. Age-standardised survival rates were computed from age-specific rates directly, taking the age distribution of the whole European sample as the standard. A weighted estimate of overall European survival was computed from age- and registry-specific relative survival rates. These were extended to all the cases in each country by applying a weighting which, for countries with national coverage, was the average of cases observed annually and, for counties represented by local registries, the estimated number of such cases annually. In order to provide an immediate comparison of survival differences and trends, the relative risk of death is given, calculated as the ratio of the logarithms for relative survival compared with the reference category.

RESULTS

Oesophageal cancer

Inter-country differences in survival. Overall survival rates were poor. The European weighted survival, calculated from the pool of all cancer registries was 33% at 1 year and 10% at 5 years. Even though survival rates were low, there were important differences between countries in the relative survival rates (Table 2). The highest 1-year relative survival rates (more than 35%) were reported in The Netherlands, France and Switzerland, and the lowest (less than 25%) in Slovakia and Denmark. Five-year relative survival rates were significantly poorer than the European average in Denmark and Estonia. In these countries the relative risk of death was at least 40% higher than the European average. In the other countries the relative risk of death was close to the European average.

The effect of age and gender on survival. Age-standardised 5-year relative survival was usually slightly better for women

than for men (Figure 1), except in Switzerland where the rates were the same. Five-year relative survival rates were higher in the 15–44 year age group, with an overall rate for Europe of 19% compared with 10% for the 45–54 year age group, 9% for the 55–64 year age group, 9% for the 65–74 year age group and 6% for the ≥ 75 year age group (Table 3).

Time trends in survival. When considering data from 1978–1989, there was a small improvement in overall 5-year relative survival rates. The relative risk of death between the

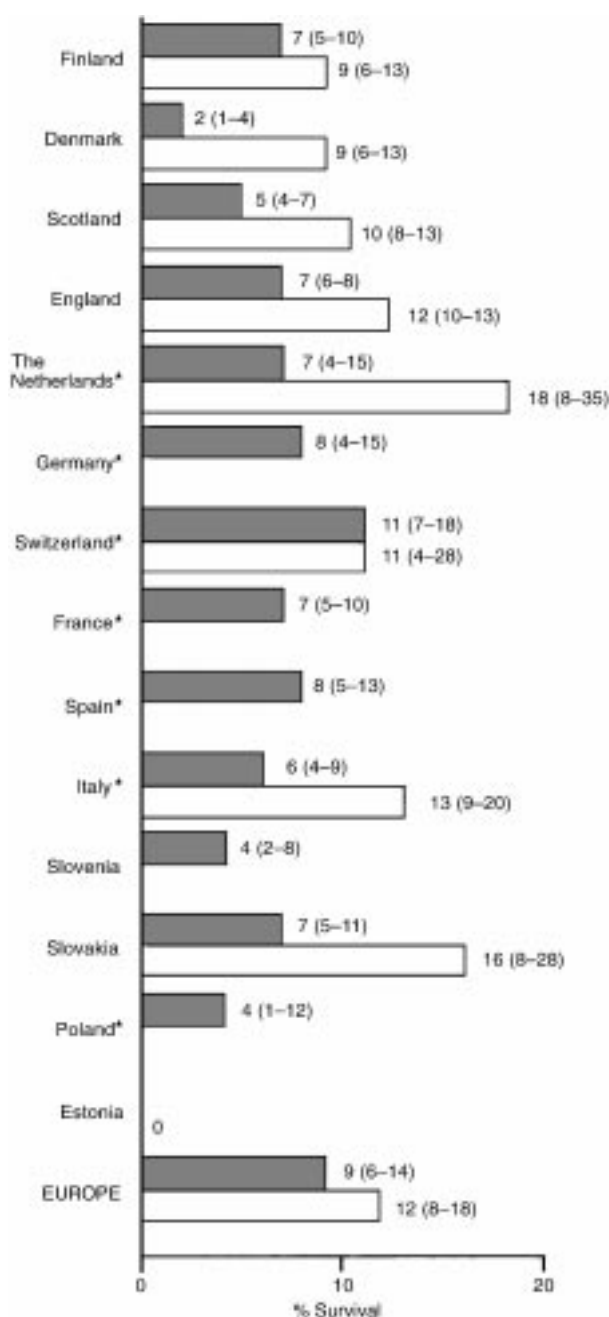


Figure 1. % age-standardised relative 5-year survival (95% confidence interval) for oesophageal cancer patients according to sex for each country (1985–1989) (EUROCARE II). * < 20% of the national population covered. Data not shown for countries which had a small number of cases, insufficient to calculate age-standardised rates. ■ men, □ women.

two periods 1978–1980 and 1987–1989 was 0.80 (0.72–0.90). It was more apparent in the 15–44 years and 45–54 year age groups (Table 4). These slight trends towards improvement were observed in most countries in men (Table 5) and in women (data not shown). It was significant in England and Italy.

Gastric cancer

Inter-country differences in survival. The European weighted survival rates were 40% at 1 year and 21% at 5 years. Important differences were observed between countries. One year relative survival was $\geq 40\%$ in ten countries and around

Table 2. One and 5-year age-standardised relative survival rates (% and 95% CI) for patients with oesophageal and gastric cancer by country (1985–1989) (EUROCARE II)

Oesophageal cancer				
	1-year	RR†	5-year	RR†
Northern Europe				
Iceland	–	–	–	–
Finland	33 (30–37)	1 (0.88–1.13)	8 (6–19)	1.1 (0.92–1.32)
Sweden*	–	–	–	–
Denmark	23 (21–26)	1.33 (1.19–1.48)	4 (3–6)	1.40 (1.17–1.70)
U.K.				
Scotland	26 (24–28)	1.22 (1.10–1.35)	7 (6–9)	1.15 (0.98–1.38)
England	27 (26–28)	1.18 (1.09–1.29)	9 (8–10)	1.05 (0.90–1.24)
Western and Central Europe				
The Netherlands*	39 (29–51)	0.85 (0.59–1.12)	10 (6–18)	1 (0.74–1.31)
Germany*	–	–	–	–
Austria*	–	–	–	–
Switzerland*	36 (29–44)	0.92 (0.72–1.13)	11 (7–17)	0.96 (0.74–1.22)
France*	37 (34–40)	0.90 (0.80–1.00)	9 (5–14)	1.05 (0.79–1.35)
Southern Europe				
Spain*	32 (28–37)	1.03 (0.88–1.19)	–	–
Italy*	28 (17–44)	1.15 (0.72–1.60)	8 (6–10)	1.10 (0.92–1.32)
Eastern Europe				
Slovenia	–	–	–	–
Slovakia	17 (14–20)	1.60 (1.40–1.82)	8 (6–12)	1.10 (0.89–1.35)
Poland*	–	–	–	–
Estonia	–	–	3 (0.5–13)	1.52 (0.85–2.26)
Europe	33 (30–36)	Reference	10 (7–14)	Reference
Gastric cancer				
	1-year	RR†	5-year	RR†
Northern Europe				
Iceland	45 (38–51)	0.87 (0.71–1.03)	23 (18–30)	0.94 (0.78–1.11)
Finland	40 (38–41)	1 (0.98–1.05)	20 (18–21)	1.03 (0.97–1.09)
Sweden*	41 (38–44)	0.97 (0.89–1.06)	17 (15–20)	1.13 (1.04–1.23)
Denmark	31 (29–33)	1.28 (1.20–1.36)	13 (12–15)	1.31 (1.23–1.39)
U.K.				
Scotland	27 (26–29)	1.43 (1.36–1.50)	11 (10–12)	1.41 (1.34–1.49)
England	28 (27–29)	1.39 (1.34–1.44)	12 (11–12)	1.36 (1.31–1.41)
Western and Central Europe				
The Netherlands*	40 (37–43)	1 (0.91–1.09)	19 (17–23)	1.06 (0.96–1.17)
Germany*	43 (40–46)	0.92 (0.84–1.09)	26 (23–29)	0.86 (0.78–0.94)
Austria*	51 (45–56)	0.71 (0.59–0.83)	27 (22–33)	0.84 (0.71–0.97)
Switzerland*	43 (40–47)	0.92 (0.83–1.01)	23 (19–28)	0.94 (0.81–1.07)
France*	48 (45–50)	0.80 (0.74–0.86)	25 (22–28)	0.89 (0.81–0.97)
Southern Europe				
Spain*	43 (41–45)	0.92 (0.86–0.98)	26 (24–28)	0.86 (0.81–0.92)
Italy*	44 (43–45)	0.90 (0.86–0.93)	23 (22–24)	0.94 (0.90–0.98)
Eastern Europe				
Slovenia	31 (29–33)	1.28 (1.20–1.36)	14 (9–22)	1.26 (0.97–1.55)
Slovakia	33 (32–34)	1.21 (1.16–1.26)	19 (17–20)	1.06 (1.00–1.13)
Poland*	24 (22–27)	1.56 (1.44–1.68)	9 (7–11)	1.54 (1.39–1.70)
Estonia	33 (31–35)	1.21 (1.14–1.28)	16 (14–18)	1.17 (1.09–1.26)
Europe	40 (39–41)	Reference	21 (20–22)	Reference

* < 20% of the national population covered. †Relative risk of death of each country versus Europe. Confidence intervals (CIs) have not been calculated when there were no cases in an age group.

30% or less in seven other countries (Table 2b). Five year relative survival rates were significantly better than the European average in Austria, Germany, Spain, France and Italy.

Table 3. Relative 1- and 5-year survival rates (%) for oesophageal cancer patients according to selected age group and country (1985–1989) (EUROCARE II)

	15–44		55–64		≥ 75	
	1 year	5 years	1 year	5 years	1 year	5 years
Northern Europe						
Finland	31	13	37	8	27	4
Sweden*	–	–	42	16	27	7
Denmark	22	4	25	3	18	3
U.K.						
Scotland	39	16	30	9	15	5
England	42	15	32	10	19	7
Western and Central Europe						
The Netherlands*	–	–	33	8	38	0
Germany*	42	17	37	5	21	0
Switzerland*	–	–	49	19	18	4
France*	57	16	43	9	34	10
Southern Europe						
Spain*	33	14	37	11	28	10
Italy*	42	21	29	7	23	7
Eastern Europe						
Slovenia	25	0	25	5	13	3
Slovakia	19	6	17	8	14	12
Poland*	–	–	21	3	23	7
Estonia	–	–	30	3	30	4
Europe†	45	19	35	9	25	6

* < 20% of the national population covered. † European estimates include cases not shown in the table because of small numbers.

They were significantly lower than the European average in Estonia, Poland, Denmark, England and Scotland. In these last four countries, the relative risk of death at 1 year and at 5 years was at least 28% higher than the European average. In the other countries survival figures were close to the European average. There were few differences in relative risk of death at 1 year and at 5 years.

The effect of age and gender on survival. Age-standardised 5-year relative survival rates were usually similar in men and women, except for Austria, Iceland and Italy where they were higher for women than for men (Figure 2). Survival rates decreased with increasing age in all countries (Table 6). The European weighted 5-year relative survival rate was 38% in the 15–44 year age group, 31% in the 45–54 year age group, 25% in the 55–64 year age group, 21% in the 65–74 year age group and 15% in the ≥ 75 years age group. In general, differences across Europe in age-related 5-year relative survival rates were of the same magnitude in all age groups (Table 6), varying by up to 2-fold between the countries with the highest survival rates and those with the lowest.

Time trends in survival. Minor variations in survival were seen between 1978 and 1989 (Table 4). When comparing survival in 1978–1980 with that in 1987–1989, the overall relative risk of death was 0.88 (0.82–0.94). Five-year survival rates improved modestly for both men and women and in all age groups except those between the ages of 45–54 years. The improvement was slightly higher in the elderly (≥ 75 years). Five-year relative survival between 1978 and 1989 improved slightly in most countries, except Sweden. (Table 5). The greatest increase in survival was seen in the areas covered by registries in France and Italy, the relative risk of death being, respectively, 0.71 (0.57–0.89) and 0.72 (0.62–0.84).

Table 4. Time trends in 5-year relative survival rate for oesophageal cancer and gastric cancer patients by sex and age group (EUROCARE II)

Oesophageal cancer					
	1978–1980	1981–1983	1984–1986	1987–1989	RR*
All	5 (4–7)	7	8	9 (8–11)	0.80 (0.72–0.90)
15–44	9	14	15	24	0.59
45–54	5	18	7	12	0.71
55–64	6	7	8	11	0.79
65–74	6	8	11	10	0.82
≥ 75	4	2	7	6	0.87
Males	5 (4–7)	6	7	8 (7–10)	0.84
Females	7 (4–10)	7	9	12 (9–16)	0.80
Gastric cancer					
	1978–1980	1981–1983	1984–1986	1987–1989	RR*
All	17 (16–18)	18	21	21 (19–23)	0.88 (0.82–0.94)
15–44	30	33	33	37	0.83
45–54	27	28	32	26	1.09
55–64	20	20	24	23	0.91
65–74	15	17	20	20	0.85
≥ 75	10	11	14	16	0.80
Males	16 (15–18)	18	20	20 (18–22)	0.88
Females	18 (15–19)	19	22	22 (19–25)	0.88

*Relative risk of death 1987–1989 versus 1978–1980. In parenthesis 95% confidence interval (not available for gender or age groups). 12 countries were included in this analysis which had data for the entire study period (countries excluded were The Netherlands, Austria, Spain, Slovenia and Slovakia).

Table 5. Time trends in 5-year standardised relative survival rate (95% CI) for oesophageal cancer and gastric cancer patients in men by period of diagnosis and country (EUROCARE II)

Oesophageal cancer					
	1978–1980	1981–1983	1984–1986	1987–1989	RR†
Northern Europe					
Finland	5 (2–9)	9	6	7 (4–12)	0.89 (0.64–1.25)
Sweden*	6 (2–16)	12	–	9 (5–18)	0.85 (0.55–1.43)
Denmark	6 (3–10)	6	2	2 (1–4)	1.39 (1.06–1.39)
U.K.					
Scotland	5 (3–7)	4	5	6 (4–8)	0.94 (0.78–1.14)
England	5 (4–6)	6	6	8 (7–9)	0.84 (0.78–0.92)
Western and Central Europe					
Switzerland*	9 (2–32)	1	12	9 (4–17)	1 (0.56–2.43)
France*	5 (3–9)	4	7	9 (5–14)	0.80 (0.6–1.06)
Southern Europe					
Italy*	2 (0–6)	–	6	12 (6–24)	0.54 (0.32–0.97)
Eastern Europe					
Poland*	0	–	0	13 (3–40)	–
Europe	5 (3–7)	7	8	9 (6–12)	0.80 (0.66–0.99)
Gastric cancer					
	1978–1980	1981–1983	1984–1986	1987–1989	RR†
Northern Europe					
Finland	14 (12–16)	16	20	19 (17–20)	0.84 (0.78–0.92)
Sweden*	17 (14–21)	19	20	17 (13–21)	1 (0.83–1.19)
Denmark	10 (8–11)	11	11	13 (11–16)	0.89 (0.90–1.98)
U.K.					
Scotland	7 (5–8)	8	8	11 (9–13)	0.83 (0.74–0.94)
England	8 (7–9)	10	10	11 (10–12)	0.87 (0.82–0.93)
Western and Central Europe					
The Netherlands*	15 (10–20)	18	21	17 (12–24)	0.93 (0.71–1.22)
Germany*	20 (15–25)	19	25	23 (18–29)	0.91 (0.73–1.15)
Switzerland*	23 (13–37)	27	–	25 (16–37)	0.94 (0.59–1.57)
France*	15 (11–20)	19	20	26 (21–32)	0.71 (0.57–0.89)
Southern Europe					
Italy*	3 (11–16)	16	20	23 (19–27)	0.72 (0.62–0.84)
Eastern Europe					
Poland*	9 (5–14)	3	9	10 (6–16)	0.96 (0.68–1.37)
Estonia	12 (10–16)	13	16	15 (12–19)	0.90 (0.76–1.05)
Europe	14 (13–16)	15	18	19 (17–21)	0.84 (0.77–0.92)

* < 20% of the national population covered. †Relative risk of death 1987–1989 versus 1978–1980.

DISCUSSION

In European countries the prognosis of patients with oesophageal and gastric cancers remains poor. In this study, the 5-year relative European weighted survival for the 1985–1989 period was 10% for oesophageal cancers and 21% for gastric cancer. Hospital series often provide more optimistic data [4]. They are of limited value because of unavoidable selection bias, in particular in case selection and patient's characteristics [5].

One of the main findings of this study was the extensive variation in the 5-year survival rates for both these cancers between countries. They varied 3-fold for oesophageal cancer and 2-fold for gastric cancer. Taking the European average as the reference, the relative risk of death at 5 years was at least 40% higher in Denmark and Estonia for oesophageal cancer

and in England, Scotland and Poland for gastric cancer. Five countries had a significantly better survival for gastric cancer: Germany, Austria, France, Spain and Italy. In the other countries survival figures were close to the European average. Survival differences between countries were already present at 1 year, suggesting differences in operative mortality and/or stage at presentation. There was little intercountry variation in survival over the next 4 years in patients who survived for 1 year.

Some part of these differences in survival can be explained by uncontrolled methodological differences in cancer registration and follow-up procedures. Checks in inclusion criteria and data quality in the EUROCARE I study suggest that methodological problems can introduce only minor biases. In particular it was shown that DCO cases, which often

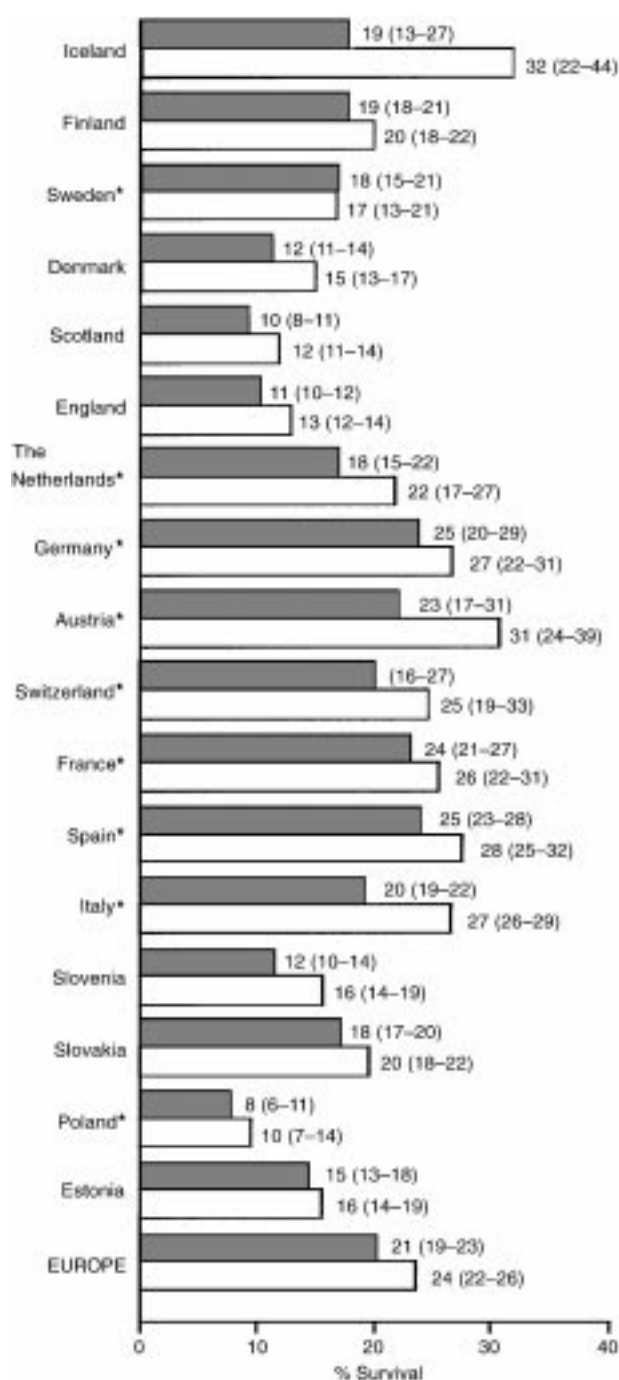


Figure 2. % relative 5-year survival. (95% confidence interval) for gastric cancer patients according to sex for each country (1985–1989) (EUROCARE II). * <20% of the national population covered; ■ men, □ women.

correspond to unfavourable cases and are excluded from the analysis have only a slight effect on survival estimates particularly for cancers with poor prognosis [6]. It can be concluded that there are likely to be real and substantive differences in oesophageal and gastric cancer survival within Europe. It is widely accepted that the main prognostic factor for both of these cancers is stage at diagnosis. This determines treatment and in particular whether a patient is resected. This suggests large differences across Europe in stage at diagnosis. A special in-depth study by 19 registries from eight

Table 6. Relative 1- and 5-year survival rates for gastric cancer patients according to selected age group (years) and country (1985–1989) (EUROCARE II)

	15–44		55–64		≥ 75	
	1 year	5 years	1 year	5 years	1 year	5 years
Northern Europe						
Iceland	–	–	57	32	32	16
Finland	50	27	51	27	30	14
Sweden*	55	30	45	24	35	15
Denmark	37	10	36	15	21	9
U.K.						
Scotland	41	22	33	12	19	7
England	40	22	35	15	20	8
Western and Central Europe						
The Netherlands*	67	35	50	22	31	14
Germany*	74	49	51	27	33	19
Austria*	56	44	55	31	44	24
Switzerland*	84	34	53	30	34	18
France*	59	37	51	30	39	19
Southern Europe						
Spain*	64	43	49	28	35	23
Italy*	63	42	51	27	36	17
Eastern Europe						
Slovenia	52	28	38	17	22	10
Slovakia	43	23	38	18	27	18
Poland*	47	22	29	13	17	5
Estonia	45	20	39	21	24	12
Europe	60	38	47	25	31	15

* <20% of the national population covered.

countries within the EUROCORE network of cancer registries will provide information on the stage at diagnosis and of the type of treatment of gastric cancer during the 1985–1989 period. Preliminary results indicate that the proportion of cases limited to the gastric wall or surgically resected cases correlated positively with the 5-year relative survival (data not shown). Variation in the stage at presentation seems, therefore, the most likely cause of differences in survival seen in this study. This indicates that a significant improvement in prognosis will be achieved with earlier diagnosis. In a few instances the prognosis is poorer than suggested by stage at diagnosis or the resection rate indicating that quality of care can also play a role [7].

Some comparable survival data are available from outside Europe. In the SEER programme the 5-year relative survival rate in caucasian patients for the 1983–1988 period was 9% for oesophageal cancer and 18% for gastric cancer [8], very close to the European averages. In contrast better survival rates of 15 and 47%, respectively, were reported from Osaka [9]. The difference is particularly striking for gastric cancer. Japan has the highest incidence and mortality rates for gastric cancer. Over the last 30 years great efforts have been directed at combatting this disease. More widespread use of endoscopy and development of mass screening which has been shown to be effective in the diagnosis of cancer at an early stage [10] are probably responsible for the higher 5-year survival rate. Some of the difference can also be explained by the use of different criteria for histological diagnosis of early gastric carcinoma in Japan and Western countries [11].

There were few differences in survival rates between men and women in this study, suggesting a similar distribution of stages at the time of diagnosis. Both for oesophageal and gastric cancers relative survival rates were higher in young adults under 45 years of age, when these cancers were rare. Survival then declined with age and was distinctively worse for patients over the age of 74 years. A more radical therapeutic approach is the most likely explanation for the better survival in the youngest age group.

There was a slight improvement in survival rates for oesophageal cancer from 1978–1980 to 1987–1989, except in the younger age groups (before the age of 55 years). This may be explained by a higher proportion of patients referred to potentially curative resection. Survival rates for gastric cancer improved modestly in nearly all countries. The improvement in survival was more pronounced in the oldest age group, confirming a previous observation made in France [12]. The increase in survival was more pronounced in France and in Italy than in other countries. Most of the benefit in survival was obtained at 1 year. There are population-based data from France and from The Netherlands that suggest a decrease in operative mortality could explain the small reported increase in survival for gastric cancer [13,14]. This decrease in operative mortality may be attributable to improved surgical techniques, but probably mainly to improved anaesthetic techniques and general care. Population-based studies concerning time trends in stage at diagnosis have indicated that there had been little change in the average stage at diagnosis, which would best explain the absence of a real improvement in survival [7, 13–16]. A 20-year population-based survey in the Côte-d'Or area (France) indicated that there was only a slight non significant increase of early gastric cancer from 3.4% (1976–1980) to 7.9% (1991–1995) [17]. It has also been suggested that the relative increase of tumours with the worst prognosis (cardia, diffuse tumours) can also explain, in part, the absence of improvement in overall survival [16]. Other studies have noted that the development of endoscopy *per se* has been associated with relatively minor progress in gastric cancer care [18]. This can be explained by the fact that when symptoms occur the tumour has already spread. The situation is different in Japan. The 5-year relative survival rate in Osaka has increased appreciably from 28% (1975–1977) to 47% (1987–1989) [9]. This trend is probably associated with a systematic endoscopic screening policy in asymptomatic populations at high risk of gastric cancer.

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APPENDIX

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