

# Trends in Cancer Survival in Scotland, 1977-2001

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## Summary

This section provides a summary of the data available for analysis and highlights some of the differences in survival trends for different cancers in relation to period of diagnosis, age and sex.

For more detailed information about each cancer, readers should refer to the individual cancer pages which can be found on our web site ([www.isdscotland.org/cancer\\_information](http://www.isdscotland.org/cancer_information)).

## Data and Methods

Data and methods are described in detail in Trends in Cancer Survival in Scotland 1971-1995, ISD 2000 ([http://www.isdscotland.org/isd/files/trends\\_1971-95.pdf](http://www.isdscotland.org/isd/files/trends_1971-95.pdf)).

However in brief, observed survival is an estimate of the probability that a group of patients with a given disease will be alive at a specified time-point after diagnosis, irrespective of cause of death. Observed survival is always likely to be lower in older patients because they are at a greater risk of dying from other causes and therefore makes it difficult to compare survival between age groups or between populations with different age distributions.

Relative survival is an estimate of the observed survival divided by the expected probability of survival in the general population. This can be thought of as a measure of the net survival expectation after contracting cancer, or the probability of survival from cancer in the absence of other causes of death.

## Data available for analysis

The numbers of cases included in the analyses, by cancer and period of diagnosis, are shown in table 1. The highest numbers were seen for lung, colorectal, breast, prostate and bladder cancer, accounting for 58% of all malignancies in the period 1997-2001. Even with this large data set, covering the whole of Scotland, the number of cases available for analysis was small for some cancers, for example cancer of the thyroid, particularly when broken down by age and sex.

**Table 1**  
**Number of patients entered into survival analysis**  
by cancer and period of diagnosis

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by cancer and period of diagnosis

Cancer	Period of diagnosis					Total
	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001	
Oral Cavity (ICD-9 141, 143-145; ICD-10 C01-C06)	756	928	1,142	1,301	1,452	5,579
Head and Neck (ICD-9 140-149, 160-161, ICD-10 C00-C14; C30-C32)	3,072	3,297	3,585	4,047	4,345	18,346
Oesophagus (ICD-9 150; ICD-10 C15)	2,344	2,466	2,788	3,450	3,459	14,507
Stomach (ICD-9 151; ICD-10 C16)	5,696	5,692	5,171	4,606	4,269	25,434
Colorectal (ICD-9 153-154; ICD-10 C18-C21)	12,032	12,604	13,465	14,835	15,131	68,067
Colon (ICD-9 153; ICD-10 C18)	7,874	8,332	9,006	9,852	9,838	44,902
Rectum (ICD-9 154; ICD-10 C19-C21)	4,158	4,272	4,459	4,983	5,293	23,165
Pancreas (ICD-9 157; ICD-10 C25)	2,777	2,853	2,654	2,601	2,735	13,620
Larynx (ICD-9 161; ICD-10 C32)	906	1,093	1,175	1,379	1,382	5,935
Trachea, Bronchus and Lung (ICD-9 162; ICD-10 C33-C34)	19,758	20,978	20,412	20,957	20,124	102,229
Malignant Melanoma of the Skin (ICD-9 172; ICD-10 C43)	1,219	1,741	2,222	2,741	2,997	10,920
Breast (ICD-9 174; ICD-10 C50)	10,836	11,714	13,095	14,750	16,065	66,460
Cervix Uteri (ICD-9 180; ICD-10 C53)	1,939	2,066	2,137	1,787	1,569	9,498
Corpus Uteri (ICD-9 182; ICD-10 C54)	1,350	1,477	1,477	1,651	1,946	7,901
Ovary (ICD-9 183.0, 236.2(M8440-M8490); ICD-10 C56)	2,038	2,378	2,557	2,696	2,768	12,437
Prostate (ICD-9 185; ICD-10 C61)	4,000	4,859	5,810	8,242	9,023	31,934
Testis (ICD-9 186; ICD-10 C62)	535	634	749	834	972	3,724
Bladder (ICD-9 188, 233.7, 236.7, 239.4; ICD-10 C67, D090, D414)	4,856	5,408	5,817	6,362	6,230	29,488
Kidney (ICD-9 189.0-189.1; ICD-10 C64-C65)	1,555	1,861	2,067	2,343	2,480	10,306
Brain and Other CNS (ICD-9 191-192; ICD-10 C70-C72)	1,297	1,333	1,363	1,580	1,673	7,246
Thyroid (ICD-9 193; ICD-10 C73)	420	466	439	542	598	2,465
Non-Hodgkin's Lymphoma (ICD-9 200, 202.0-202.2, 202.8; ICD-10 C82-C85)	2,048	2,543	3,005	3,564	3,685	14,845
Hodgkin's disease (ICD-9 201; ICD-10 C81)	678	677	590	646	568	3,159
Multiple Myeloma (ICD-9 203.0-203.1, 238.6; ICD-10 C90)	1,028	1,131	1,292	1,380	1,366	6,197
Leukaemias (ICD-9 202.4, 204-208; ICD-10 C91-C95)	1,736	2,076	2,225	2,472	2,625	11,134
All Malignant Neoplasms <sup>1</sup>	89,433	96,978	103,019	112,813	114,264	516,440

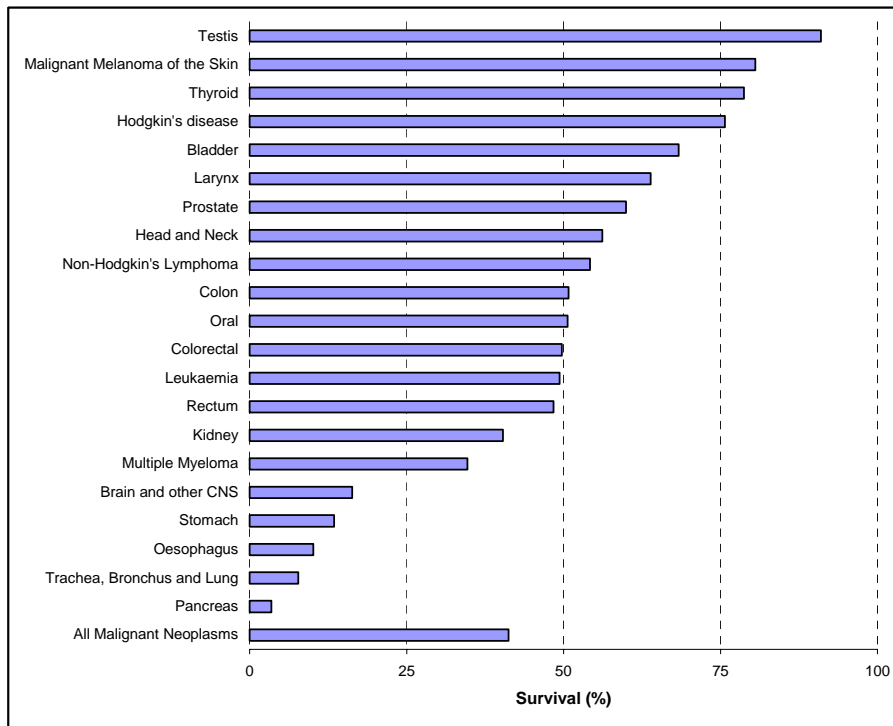
<sup>1</sup> ICD-9 140-208; ICD-10 C00-C97 excluding non-melanoma skin cancer (ICD-9 173; ICD-10 C44)

Improvements in diagnostic techniques, or the introduction of screening tests, can lead to the artificial appearance of an increase in risk, with cancers being diagnosed earlier, at a less advanced stage. It is possible that some of these cancers with a favourable prognosis would have never presented clinically during the patient's lifetime. This can impact on the assessment of trends in cancer survival over time so that significant trends in incidence should be taken into account when interpreting cancer survival trends.

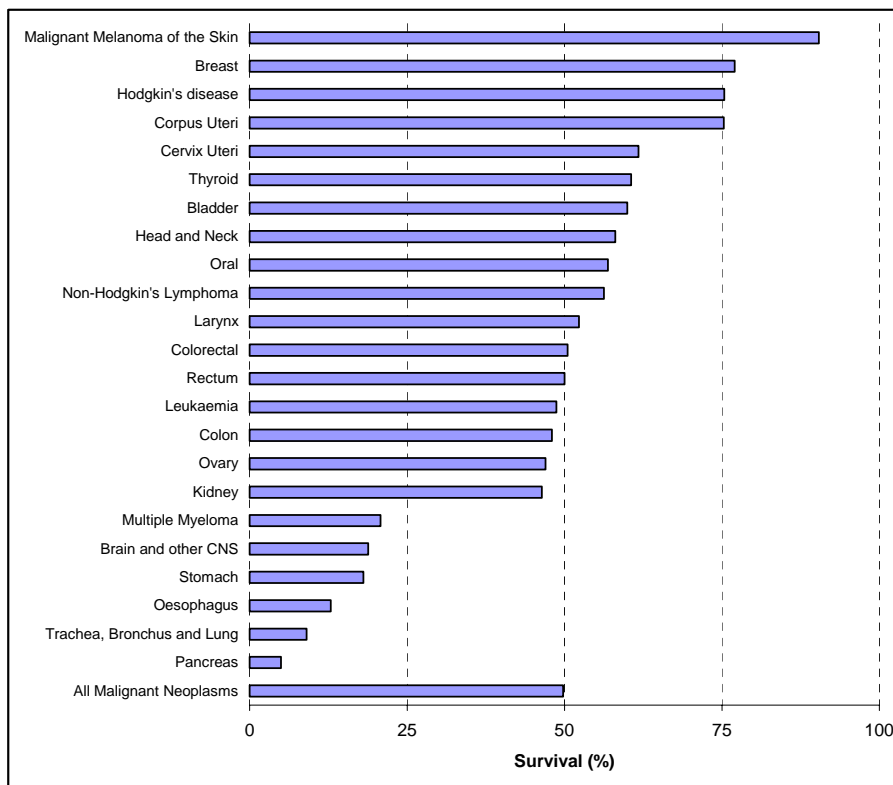
# Cancer survival trends

**Figure 1**  
**Relative survival (%) at five years after diagnosis by cancer and sex**  
 patients diagnosed 1997-2001 <sup>1,2</sup>

## Males



## Females



<sup>1</sup> These rates are directly standardised to the 'World Standard Cancer Patient Population'.

<sup>2</sup> For some cancers (Testis, Brain and other CNS, Thyroid and Hodgkin's disease in males, Larynx in Females) there were less than 9 cases in the 85-99 age group in any time period. For these sites the comparison was made using standardised rates for the 15-74 age group.

Percentage survival at five years after diagnosis varied from under 4% for cancer of the pancreas in males, to over 90% for testis cancer (figure 1 and table 2). Percentage survival was lowest in patients with cancers which often present at an advanced stage and are less amenable to treatment (examples being cancers of the pancreas, the lung and the oesophagus). Percentage survival tended to be better for cancers with which patients are more likely to present at an early stage (for example, cancers of the corpus uteri, bladder, thyroid, and malignant melanoma of the skin), for cancers which can be detected early by screening programmes (for example, cancers of the cervix uteri and breast), and for cancers for which there have been major advances in treatment (for example, cancer of the testis and Hodgkin's disease).

**Table 2**

**Trends in survival by cancer, sex and period of diagnosis**

Relative survival (%) at one and five years<sup>1</sup>; patients aged 15-99, diagnosed 1977-1981 to 1997-2001

Cancer	Sex	Relative survival (%) at 1 year					Relative survival (%) at 5 years					Change in relative survival at 5 years	
		1977-1981	1982-1986	1987-1991	1992-1996	1997-2001	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001	Whole period	between periods
Oral cavity (ICD-9 141, 143-145; ICD-10 C01-C06)	Male	65.9	67.9	65.9	71.8	76.2	35.1	41.4	38.1	42.0	50.6	15.5	3.2
	Female	60.0	76.3	73.7	77.3	80.5	41.6	55.2	50.8	50.5	56.9	15.3	2.6
Head and Neck (ICD-9 140-149, 160-161, ICD-10 C00-C14; C30-C32)	Male	78.3	78.1	75.7	75.5	79.9	57.6	54.5	48.4	47.7	56.2	-1.4	-1.0
	Female	72.0	72.0	74.4	76.1	77.2	52.6	52.2	53.8	52.2	58.1	5.5	1.1
Oesophagus (ICD-9 150; ICD-10 C15)	Male	18.3	22.1	25.2	30.4	36.4	4.0	5.3	5.9	9.2	10.1	6.2	1.6
	Female	22.7	27.7	32.5	30.8	39.1	7.4	9.6	11.7	9.8	12.9	5.5	1.1
Stomach (ICD-9 151; ICD-10 C16)	Male	20.5	26.7	28.2	33.7	38.5	6.4	8.8	9.1	13.1	13.4	7.0	1.8
	Female	24.3	29.2	31.5	33.6	36.9	9.1	12.0	15.2	13.9	18.1	9.0	2.0
Colorectal (ICD-9 153-154; ICD-10 C18-C21)	Male	41.5	57.1	64.0	53.3	72.0	23.4	35.0	38.4	31.8	49.7	26.3	4.9
	Female	41.7	58.1	63.6	59.4	72.4	24.2	34.9	41.3	41.0	50.5	26.3	5.9
Colon (ICD-9 153; ICD-10 C18)	Male	54.0	59.5	65.0	69.3	72.8	34.6	38.5	41.5	45.4	50.8	16.2	3.9
	Female	36.9	54.9	60.1	65.1	70.6	18.1	34.4	37.9	43.7	48.0	29.9	6.9
Rectum (ICD-9 154; ICD-10 C19-C21)	Male	57.4	62.7	68.1	72.7	74.5	29.2	35.2	35.0	42.8	48.4	19.2	4.6
	Female	62.0	65.0	69.0	74.2	76.8	33.7	35.9	41.7	47.7	50.0	16.3	4.4
Pancreas (ICD-9 157; ICD-10 C25)	Male	9.4	12.5	14.4	12.4	15.7	3.5	3.5	3.8	3.6	3.5	-0.1	0.0
	Female	9.0	13.7	12.1	12.8	17.0	4.1	4.5	3.5	2.7	5.0	0.9	0.0
Larynx <sup>3</sup> (ICD-9 161; ICD-10 C32)	Male	84.4	86.5	86.9	87.0	87.3	65.2	65.1	62.6	62.0	67.0	1.8	0.0
	Female	71.7	70.2	72.9	73.8	71.8	53.9	49.0	55.5	49.9	52.3	-1.6	-0.2
Trachea, Bronchus and Lung (ICD-9 162; ICD-10 C33-C34)	Male	19.3	20.8	22.3	20.7	26.0	5.8	6.0	6.5	5.7	7.7	1.9	0.4
	Female	18.0	20.7	22.2	22.3	29.3	5.5	6.1	7.1	6.0	9.0	3.5	0.7
Malignant melanoma of the skin (ICD-9 172; ICD-10 C43)	Male	81.7	83.4	93.2	94.3	94.6	52.7	59.0	73.1	77.2	80.5	27.8	7.4
	Female	90.8	93.7	96.5	97.2	97.7	72.0	76.3	87.0	85.7	90.4	18.4	4.6
Breast (ICD-9 174; ICD-10 C50)	Female	88.5	89.3	90.7	92.3	94.5	59.6	62.6	67.6	72.8	77.0	17.4	4.5
Cervix Uteri (ICD-9 180; ICD-10 C53)	Female	75.0	77.2	79.7	80.3	83.8	51.4	53.9	57.4	57.6	61.8	10.4	2.4
Corpus Uteri (ICD-9 182; ICD-10 C54)	Female	83.8	81.2	83.6	86.5	88.8	61.8	65.7	68.2	70.6	75.3	13.5	3.2
Ovary (ICD-9 183.0, 236.2(M8440-M8490); ICD-10 C56)	Female	54.2	57.2	62.0	66.1	72.9	30.8	34.5	36.2	40.2	47.0	16.1	3.8
Prostate (ICD-9 185; ICD-10 C61)	Male	69.7	73.1	77.4	79.9	86.1	36.7	36.2	44.8	50.5	59.9	23.3	6.1
Testis (ICD-9 186; ICD-10 C62)	Male	86.8	92.4	93.5	90.6	92.0	76.4	87.1	89.9	88.3	91.0	14.6	3.1
Bladder (ICD-9 188, 233.7, 236.7, 239.4; ICD-10 C67, D090, D414)	Male	73.6	78.6	80.2	83.6	84.4	52.4	58.9	59.9	65.9	68.3	15.9	3.9
	Female	63.7	70.4	70.5	73.9	76.5	46.3	54.1	54.4	57.1	60.0	13.7	3.0
Kidney (ICD-9 189.0-189.1; ICD-10 C64-C65)	Male	47.6	48.6	54.6	56.3	59.1	30.0	30.2	35.4	37.9	40.3	10.3	2.8
	Female	48.1	49.7	53.9	57.8	63.9	31.3	30.2	37.3	40.2	46.4	15.1	4.0
Brain and other CNS <sup>3</sup> (ICD-9 191-192; ICD-10 C70-C72)	Male	23.7	23.9	29.5	36.9	37.7	11.9	10.5	11.8	16.3	16.3	4.4	1.5
	Female	26.4	26.6	31.6	36.2	39.5	15.3	14.4	15.4	21.2	18.8	3.5	1.4
Thyroid <sup>3</sup> (ICD-9 193; ICD-10 C73)	Male	47.8	51.5	56.4	82.5	85.3	38.3	44.9	46.4	73.0	78.7	40.4	10.9
	Female	58.1	79.3	81.1	89.2	82.7	51.0	72.0	73.6	81.7	72.7	21.7	5.3
Non-Hodgkin's lymphoma (ICD-9 200, 202.0-202.2, 202.8; ICD-10 C82-C85)	Male	56.5	36.2	62.8	66.4	72.9	36.1	21.8	44.0	46.1	54.2	18.1	6.1
	Female	60.4	64.8	67.6	70.9	73.5	40.5	44.8	48.6	51.4	56.2	15.7	3.8
Hodgkin's disease <sup>3</sup> (ICD-9 201; ICD-10 C81)	Male	72.3	78.6	73.4	80.1	92.6	51.3	61.1	57.3	69.3	75.7	24.4	5.7
	Female	68.4	77.8	76.9	84.1	86.9	52.7	58.7	56.4	66.3	75.4	22.7	5.3
Multiple Myeloma (ICD-9 203.0-203.1, 238.6; ICD-10 C90)	Male	60.5	58.9	63.0	71.9	76.4	13.4	12.2	16.1	30.9	34.7	21.3	6.1
	Female	58.5	50.0	53.6	43.4	46.3	22.7	18.2	22.8	20.4	20.8	-1.9	-0.2
Leukaemia (ICD-9 202.4, 204-208; ICD-10 C91-C95)	Male	49.9	56.0	59.4	67.1	73.0	19.7	27.2	35.4	42.4	49.4	29.7	7.5
	Female	50.1	50.9	58.4	66.4	69.8	22.8	26.3	35.5	45.4	48.7	26.0	7.1
All Malignant neoplasms <sup>4</sup> (ICD-9 140-208 (excl. 173); ICD-10 C00-C97 (excl. C44))	Male	43.3	47.1	51.4	56.5	60.9	25.1	28.2	31.8	36.4	41.2	16.2	4.1
	Female	55.9	58.6	61.3	64.4	67.5	36.0	38.6	42.6	46.1	49.8	13.8	3.5

<sup>1</sup> These rates are directly standardised to the 'World Standard Cancer Patient Population'

<sup>2</sup> The absolute change over the whole period is calculated as the difference between relative survival at 5 years in 1977-1981 and in 1997-2001, which for Oral Cavity cancer in males gave an increase of 15.5%. The absolute rate of change between periods has been estimated by regression, and for males with cancer of the Oral Cavity this was equivalent to a 3.2% increase per period.

<sup>3</sup> Because of small numbers in the older age groups these rates are standardised to the age group 15-74 rather than 15-99.

<sup>4</sup> ICD-9 140-208; ICD-10 C00-C96 excluding non-melanoma skin cancer (ICD-9 173; ICD-10 C44)

For the majority of cancers, survival at one year after diagnosis has improved over the period surveyed (table 2), with the most improvement being seen in some of the lympho-haematopoietic malignancies, probably due to the development and implementation of increasingly effective therapies; in cancers of the large bowel; and in thyroid cancer in males.

Over the period surveyed, most cancers showed some improvement in survival at five years after diagnosis (table 2), and for some cancers this improvement was large: for malignant melanoma of the skin, percentage survival at five years after diagnosis in males increased from 53% in the period 1977-81 to 81% in the period 1997-2001, an absolute increase of 28%. Over the same period the increase for females was 18%, from 72% (1977-81) to 90% (1997-2001). These increases may reflect an increase in diagnosis of early stage disease following health education programmes aimed at encouraging earlier presentation and referral. Large absolute increases in percentage survival at five years were also seen for colorectal cancer (26% for males and females), colon (30% for females), thyroid (40% for males and 22% for females) and leukaemia (30% for males and 26% for females). The improvement observed for prostate cancer in the most recent two periods is likely to reflect the introduction of prostate-specific antigen (PSA) testing, resulting in the diagnosis of some less 'aggressive' tumours (Brewster *et al*, 2000).

However, improvements in survival at five years were in many cases, smaller than at one year indicating that, although survival is improving, either because of earlier diagnosis or improved treatment, the majority of cancer patients are not being 'cured'. This is a common finding in studies of cancer survival (Clinical Outcomes Working Group, 1999). Cancers which were exceptions to this rule, and for which the increase over the period surveyed in percentage survival was greater at five years than at one year were malignant melanoma of the skin, Hodgkin's disease, breast cancer, corpus uteri, prostate, bladder and testicular cancer. The improvement in survival for malignant melanoma of the skin seems to be only partly explained by an increasing proportion of thinner tumours (MacKie *et al*, 1997). In Hodgkin's disease, there have been major improvements in treatment using combination chemotherapy and radiotherapy (Boyle *et al*, 1988). The improvement in survival for breast cancer is mainly likely to reflect the introduction and increasing use of systemic adjuvant therapy (Scottish Breast Cancer Focus Group *et al*, 1996) as well as the national breast screening programme. Likewise, survival has improved in testis cancer largely because of the advent of effective chemotherapy (Coleman *et al*, 1999).

At the other end of the scale there was either no improvement or a slight decrease over the period surveyed in survival at five years after diagnosis for cancer of the pancreas, for multiple myeloma and larynx in females, and cancers of the head and neck in males. Survival in male patients from cancers of the head and neck declined over the period, possibly because of changes over time to a less favourable case-mix, both in terms of the distribution of anatomical subsites and in terms of the proportion of patients from deprived areas (Macfarlane *et al*, 1996) who tend to have a poorer prognosis.

For 'all malignant neoplasms', percentage survival at one year after diagnosis for males increased from 43% in the period 1977-81 to 61% in the period 1997-2001, an absolute increase of 18%. The corresponding increase for females was from 56% to 68%, an absolute increase of 12%. This is less than the increase in males because there was a comparatively small improvement in survival over the period for breast and gynaecological cancers, which contribute a large proportion of the cancers in females, and for most of which survival is already relatively high, rather than because cancer survival has improved more in males than in females for specific cancers. Meanwhile, survival at five years improved by 16% in males and 14% in females, that is, a proportional increase of 4.1% between periods in males and 3.5% between periods in females. 'All malignant neoplasms' includes a wide mix of cancers with different survival patterns and the improvement may mask a change in the proportions of cancers as well as representing a genuine improvement in survival over time.

**Table 3**  
**Median observed survival<sup>1</sup> in years, by cancer and period of diagnosis**  
 patients aged 15-74

Cancer	Period of diagnosis				
	1977-1981	1982-1986	1987-1991	1992-1996	1997-2001
Oral Cavity <sup>2</sup> (ICD-9 141, 143-145; ICD-10 C01-C06)	3.3	2.9	3.3	3.3	-
Head and Neck <sup>2</sup> (ICD-9 140-149, 160-161; ICD-10 C00-C14; C30-C32)	5.7	4.4	4.2	3.8	-
Oesophagus (ICD-9 150; ICD-10 C15)	0.3	0.4	0.5	0.5	0.7
Stomach (ICD-9 151; ICD-10 C16)	0.3	0.4	0.4	0.6	0.7
Colorectal <sup>2</sup> (ICD-9 153-154; ICD-10 C18-C21)	1.7	2.1	2.6	3.3	-
Colon <sup>2</sup> (ICD-9 153; ICD-10 C18)	1.6	2.0	2.6	3.3	-
Rectum <sup>2</sup> (ICD-9 154; ICD-10 C19-C21)	2.0	2.2	2.7	3.4	-
Pancreas (ICD-9 157; ICD-10 C25)	0.2	0.2	0.2	0.3	0.3
Larynx <sup>2</sup> (ICD-9 161; ICD-10 C32)	6.3	6.4	5.6	5.7	-
Trachea, Bronchus and Lung (ICD-9 162; ICD-10 C33-C34)	0.3	0.3	0.4	0.4	0.5
Malignant Melanoma of the Skin <sup>2</sup> (ICD-9 172; ICD-10 C43)	15.6	-	-	-	-
Breast <sup>2</sup> (ICD-9 174; ICD-10 C50)	7.1	8.1	10.8	-	-
Cervix Uteri <sup>2</sup> (ICD-9 180; ICD-10 C53)	6.2	9.4	12.3	-	-
Corpus Uteri <sup>2</sup> (ICD-9 182; ICD-10 C54)	12.6	15.3	-	-	-
Ovary (ICD-9 183.0, 236.2(M8440-M8490); ICD-10 C56)	1.2	1.5	1.9	2.2	2.6
Prostate (ICD-9 185; ICD-10 C61)	3.0	3.3	4.0	5.4	-
Testis <sup>2</sup> (ICD-9 186; ICD-10 C62)	-	-	-	-	-
Bladder (ICD-9 188, 233.7, 236.7, 239.4; ICD-10 C67, D090, D414)	4.9	7.2	7.3	7.4	-
Kidney (ICD-9 189.0-189.1; ICD-10 C64-C65)	1.3	1.3	2.0	2.1	2.5
Brain and other CNS (ICD-9 191-192; ICD-10 C70-C72)	0.3	0.4	0.5	0.6	0.7
Thyroid <sup>2</sup> (ICD-9 193; ICD-10 C73)	19.9	-	-	-	-
Non-Hodgkin's Lymphoma (ICD-9 200, 202.0-202.2, 202.8; ICD-10 C82-C85)	2.2	2.3	4.0	4.6	3.0
Hodgkin's disease <sup>2</sup> (ICD-9 201; ICD-10 C81)	11.2	17.1	-	-	-
Multiple Myeloma (ICD-9 203.0-203.1, 238.6; ICD-10 C90)	1.4	1.5	1.9	2.3	2.3
Leukaemias (ICD-9 202.4, 204-208; ICD-10 C91-C95)	1.1	1.6	2.2	3.0	2.7
All Malignant Neoplasms <sup>3</sup>	1.1	1.3	1.7	2.3	2.4

<sup>1</sup> The median observed survival time is the length of time after diagnosis until half the patients have died, irrespective of the cause of death.

<sup>2</sup> Where less than half the patients had died by the end of the period of follow-up (31st December 2003) the median survival could not be calculated and is shown as missing ('-')

<sup>3</sup> ICD-9 140-208 (ICD-10 C00-C97) excluding non-melanoma skin cancer (ICD-9 173; ICD-10 C44)

The numbers of deaths due to cancer decrease exponentially as time from diagnosis increases. Thus, for example, if the median survival is two years, half the patients will have died within two years of diagnosis, but many of the remainder will survive substantially longer than a further two years. Median survival is highest in those cancers which have a good prognosis and/or are often diagnosed in younger people (for example, cancers of the testis, thyroid, corpus uteri, and Hodgkin's disease) (table 3). Estimates of the median observed survival broadly support the results shown in table 2. Over the period surveyed, median survival has increased by three years or more for cancers of the breast, cervix uteri, and Hodgkin's disease, and for many cancers median survival has been extended by a year or more. For cancers with a very favourable prognosis, more than half the patients were still alive at the end of the period of follow-up for this analysis and so median survival could not be calculated. For 'all malignant neoplasms' median survival increased from 1.1 to 2.4 years.

**Table 4**  
**Relative survival by cancer, sex, and age group**  
 Relative survival (%) at five years after diagnosis: patients diagnosed 1997-2001

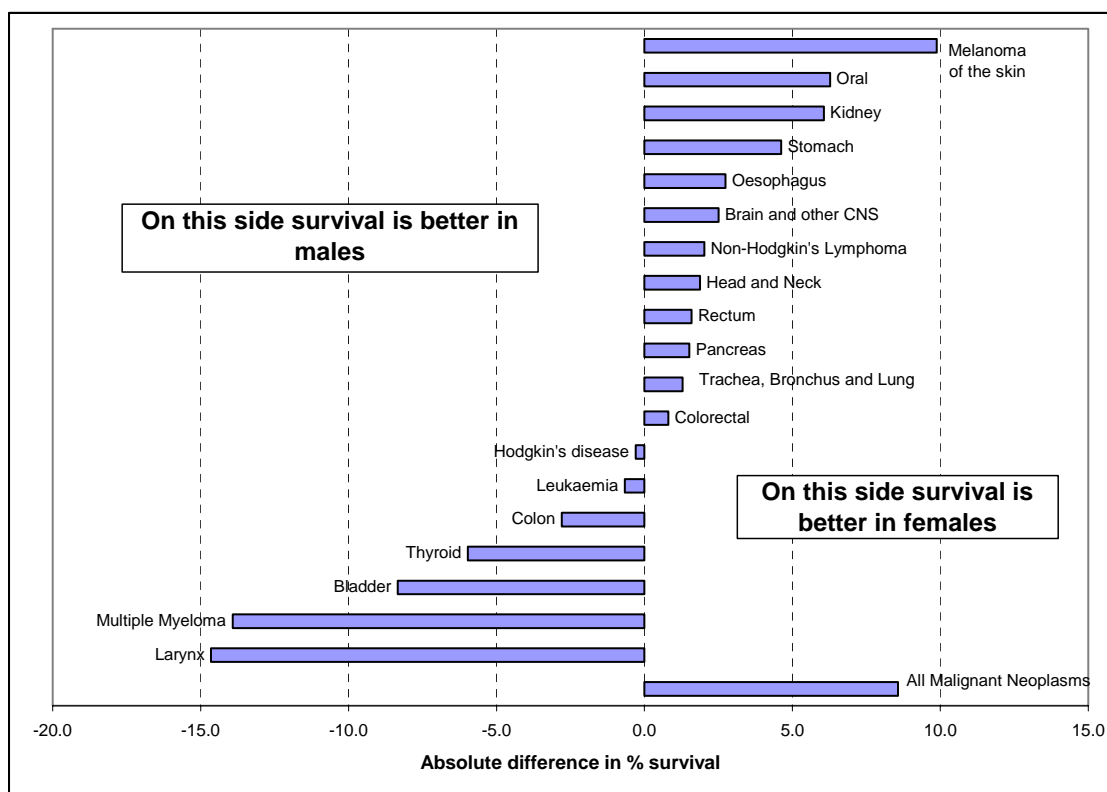
Cancer	Sex	Age group					
		15-44	45-54	55-64	65-74	75-84	85-99
Oral Cavity (ICD-9 141, 143-145; ICD-10 C01-C06)	Males	73.3	57.1	44.0	35.6	54.6	23.3
	Females	72.2	63.7	51.9	54.3	47.8	37.7
Head and Neck (ICD-9 140-149, 160-161, ICD-10 C00-C14; C30-C32)	Males	71.8	58.6	51.6	50.9	51.8	46.1
	Females	80.5	63.0	56.0	53.8	51.1	43.4
Oesophagus (ICD-9 150; ICD-10 C15)	Males	5.9	16.2	11.8	11.1	5.7	6.4
	Females	23.3	14.6	19.5	12.0	3.6	2.0
Stomach (ICD-9 151; ICD-10 C16)	Males	17.7	15.3	16.6	15.8	9.4	2.7
	Females	16.3	26.0	27.1	17.1	12.8	3.7
Colorectal (ICD-9 153-154; ICD-10 C18-C21)	Males	54.2	54.1	54.5	53.7	46.7	37.6
	Females	61.7	58.8	59.8	54.8	44.0	32.3
Colon <sup>1</sup> (ICD-9 153; ICD-10 C18)	Males	51.6	53.9	54.3	55.3	45.7	37.3
	Females	61.1	55.4	56.2	55.1	45.1	36.2
Rectum (ICD-9 154; ICD-10 C19-C21)	Males	57.9	54.8	54.8	51.7	47.9	26.4
	Females	62.2	63.6	67.2	54.5	40.8	22.5
Pancreas (ICD-9 157; ICD-10 C25)	Males	9.9	8.2	1.1	2.3	2.1	1.0
	Females	26.5	1.6	4.3	3.7	0.9	2.0
Larynx <sup>1</sup> (ICD-9 161; ICD-10 C32)	Males	78.9	66.4	64.8	63.8	54.2	51.0
	Females	-	60.1	70.1	51.5	47.5	21.2
Trachea, Bronchus and Lung (ICD-9 162; ICD-10 C33-C34)	Males	19.5	11.0	8.8	6.6	3.6	3.4
	Females	19.4	14.4	11.9	7.8	3.8	1.3
Malignant Melanoma (ICD-9 172; ICD-10 C43)	Males	88.7	81.9	85.2	85.6	70.9	40.8
	Females	96.4	92.2	94.5	89.3	80.6	76.2
Breast (ICD-9 174; ICD-10 C50)	Females	81.2	84.7	84.8	76.0	64.1	43.2
Cervix Uteri (ICD-9 180; ICD-10 C53)	Females	84.7	69.1	55.2	46.7	30.2	2.1
Corpus Uteri (ICD-9 182; ICD-10 C54)	Females	90.0	90.0	85.1	76.8	58.9	24.8
Ovary (ICD-9 183.0, 236.2(M8440-M8490); ICD-10 C56)	Females	81.2	57.5	37.9	31.8	19.2	6.6
Prostate <sup>1</sup> (ICD-9 185; ICD-10 C61)	Males	-	71.8	75.1	74.8	62.2	41.3
Testis <sup>1</sup> (ICD-9 186; ICD-10 C62)	Males	98.5	94.0	95.0	45.1	-	-
Bladder (ICD-9 188, 233.7, 236.7, 239.4; ICD-10 C67, D090, D414)	Males	90.9	83.6	79.7	72.7	61.4	38.9
	Females	57.3	75.3	77.9	69.1	44.9	42.0
Kidney (ICD-9 189.0-189.1; ICD-10 C64-C65)	Males	57.7	54.5	47.7	41.8	27.5	32.2
	Females	63.7	57.7	61.4	42.3	30.6	11.5
Brain and other CNS (ICD-9 191-192; ICD-10 C70-C72)	Males	49.2	16.5	5.3	3.8	0.2	-
	Females	50.8	19.7	6.5	7.7	5.5	3.9
Thyroid <sup>1</sup> (ICD-9 193; ICD-10 C73)	Males	96.4	87.3	72.5	66.2	70.5	-
	Females	99.5	86.9	73.6	43.4	44.6	-
Non-Hodgkin's Lymphoma (ICD-9 200, 202.0-202.2, 202.8; ICD-10 C82-C85)	Males	70.4	66.0	56.5	50.3	40.8	11.2
	Females	72.8	69.6	60.9	53.0	34.2	21.2
Hodgkin's Disease <sup>1</sup> (ICD-9 201; ICD-10 C81)	Males	95.0	89.8	54.3	58.2	1.8	-
	Females	94.8	82.3	73.5	44.4	23.9	-
Multiple Myeloma (ICD-9 203.0-203.1, 238.6; ICD-10 C90)	Males	63.1	58.3	32.0	25.2	19.2	12.3
	Females	56.3	29.4	44.1	26.1	18.7	23.4
Leukaemia (ICD-9 202.4, 204-208; ICD-10 C91-C95)	Males	62.4	65.3	59.0	44.3	22.6	18.8
	Females	60.6	51.5	48.4	50.0	33.0	26.0
All Malignant Neoplasms <sup>2</sup>	Males	72.4	44.9	38.9	36.8	30.9	22.6
	Females	78.1	68.4	57.5	40.9	29.5	21.2

<sup>1</sup> Because of small numbers of cases in age groups it was not possible to calculate survival rates for some cancers.

<sup>2</sup> ICD-9 140-208; ICD-10 C00-C97 excluding non-melanoma skin cancer (ICD-9 173; ICD-10 C44)

Survival was generally better in younger patients for all cancers (table 4), even though adjustment was made for the higher general mortality in older age groups. This could be due to differences in tumour biology, better general health, earlier diagnosis, or better availability and effectiveness of treatment. Large variations between age groups were seen for many cancers, however, please note that in the younger age groups some of these survival estimates are based on small numbers of cases.

**Figure 2**  
**Absolute difference<sup>1</sup> in relative survival<sup>2</sup> at five years by cancer**  
 males compared to females; patients aged 15-99<sup>3</sup>, diagnosed 1997-2001.



<sup>1</sup> Absolute differences in survival between males and females have been shown: so, for example, the % survival for melanoma in females was 90.4% and in males was 80.5% by which subtraction gives a difference of 9.9%

<sup>2</sup> These rates are directly standardised to the 'World Standard Cancer Patient Population'.

<sup>3</sup> For some cancers (Larynx, Brain and other CNS, Thyroid and Hodgkin's disease) there were less than 9 cases in the 85-99 age group for weither males or females. For these sites the comparison was made using standardised rates for the age

For many cancers, survival prospects differed between males and females (figure 2). Cancers where the difference was comparatively large included melanoma of the skin, oral cavity, kidney and stomach, for all of which females had better survival than males; and larynx, and bladder cancer, where males had a higher survival rate than females. The apparent higher survival for males with multiple myeloma (figure 2) disappeared when the unstable survival estimates for the 15-44 year olds were excluded from the standardisation. Survival for 'all malignant neoplasms' was higher in females than in males, the chief reason being that lung cancer, which has low survival, is at present considerably more common in men than in women; whereas breast cancer, the most common cancer in females, has a relatively good prognosis.

## Conclusion

This was a large population-based survival analysis which included all patients diagnosed with cancer in Scotland between 1977 and 2001, about half a million patients in all. Over this period improvements in survival were seen for the majority of cancers, and for several cancers the improvement was substantial. For many cancers there were major advances in therapy over the period, but unfortunately this did not apply to all cancers. Because the mix of cancers differs between males and females, and survival prognosis is different for different cancers, overall survival was higher in females than in males, whereas the improvement in survival over the period was greater in males than in females. Younger patients generally had more favourable survival than older patients.

## References

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