

Profile of Cervical Cancer in England

Incidence, Mortality and Survival

February 2011



Trent Cancer Registry



Using information to improve quality & choice



Cancer Screening Programmes

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Authors

This report has been produced by Trent Cancer Registry, the National Cancer Intelligence Network's lead registry in England for gynaecological cancers, in collaboration with the NHS Cervical Screening Programme.

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Further information on the work of the National Cancer Intelligence Network (NCIN) can be found at www.ncin.org.uk

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FOREWORD

This is the first report resulting from the collaboration between the NHS Cervical Screening Programme and Trent Cancer Registry, the National Cancer Intelligence Network's lead registry for gynaecological cancers. It uses data extracted from the UK Cancer Information Service in November 2010 to highlight interesting and important findings about time trends, trends by age and deprivation, and regional variations in incidence, mortality and survival for invasive cervical cancer in England. It should be of interest to all those involved in the commissioning and delivery of services to prevent and treat cervical cancer.

This report is part of a suite of information that is available about cervical cancer. Every year the Information Centre publishes the Cervical Screening Programme Statistical Bulletin, providing invaluable, detailed information about the screening programme. It is intended that this document, by reporting on trends in cervical cancer, will complement the screening bulletin and will also be produced annually. To allow commissioners, providers, academics and other interested parties to put the two sets of data together and manipulate them, an e-atlas of cervical screening and cancer has been developed. This is now available on www.empho.org.uk/tcr/cervicalEatlas.aspx. This will also be updated as the data themselves are updated.

We hope that you find this report useful. Any feedback would be most welcome and should be sent to Jason Poole. Suggestions for further work would be particularly well received.

Professor Julietta Patnick CBE

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EXECUTIVE SUMMARY

The key findings are:

- Over the last 20 years the incidence of cervical cancer in England has halved whilst mortality has reduced by almost two-thirds. The reduction in incidence has levelled off in recent years.
- Incidence and mortality rates tend to be highest for those Strategic Health Authorities (SHAs) and Cancer Networks (CNs) in the north of England, and lowest in the south and east. At CN level, the highest incidence rate is more than double that of the lowest rate.
- Between 1998 and 2008, incidence in women aged 25–29 increased by 77%. Similarly, incidence in women aged 30–34 increased by 29%. During this period mortality rates in these age groups have stabilised.
- There is strong evidence that both incidence and mortality are worse in patients living in the more deprived Primary Care Trusts (PCTs). For example, the average mortality rate among the 30 most deprived PCTs is 3.3 per 100,000 female population compared with 1.9 in the 30 most affluent PCTs.
- Survival following a diagnosis of cervical cancer has improved in England since the mid-1980s, from 82% to 86% for one-year relative survival and from 62% to 68% for five-year relative survival.
- There is some variation between CNs in recent survival. One-year relative survival varies from 73% to 90%, and five-year relative survival from 55% to 82%.
- There is strong evidence that cervical cancer survival is worse in older women. For example, one-year relative survival in those aged 15–39 is 96% compared with 52% in those aged 80 or older. Similarly, five-year survival in those aged 15–39 is 86% compared with 27% in those aged 80 or older.

OVERALL TRENDS IN CERVICAL CANCER INCIDENCE AND MORTALITY

Further details on the definition of cervical cancer used and the age standardisation of incidence and mortality rates can be found in Appendix 1.

Trends in incidence and mortality, England, 1988–2008

Incidence and mortality rates in England have fallen considerably over the past 20 years. During this period, incidence rates almost halved (from 16.2 to 8.3 per 100,000 female population) and mortality rates reduced by almost two-thirds (from 6.4 to 2.2 per 100,000). Incidence fell sharply following the establishment of the Cervical Screening Programme in 1988, but this reduction has slowed in recent years (see Figure 1).

Table 1 Trends in incidence and mortality, England, 1988–2008

Year	England – incidence			England – mortality		
	Total cases	ASIR	95% confidence limits	Total cases	ASMR	95% confidence limits
1988	4,132	16.2	(15.7, 16.7)	1,813	6.4	(6.1, 6.7)
1989	3,889	15.0	(14.5, 15.5)	1,690	5.9	(5.6, 6.2)
1990	4,029	15.7	(15.2, 16.2)	1,652	5.7	(5.4, 6.0)
1991	3,418	13.0	(12.5, 13.4)	1,526	5.2	(5.0, 5.5)
1992	3,214	12.0	(11.6, 12.4)	1,529	5.2	(4.9, 5.4)
1993	3,141	11.7	(11.3, 12.2)	1,376	4.7	(4.4, 4.9)
1994	3,014	11.1	(10.7, 11.6)	1,264	4.1	(3.9, 4.3)
1995	2,920	10.6	(10.2, 11.1)	1,256	4.2	(3.9, 4.4)
1996	2,810	10.2	(9.8, 10.6)	1,225	4.0	(3.8, 4.3)
1997	2,704	9.8	(9.4, 10.2)	1,150	3.7	(3.5, 3.9)
1998	2,620	9.3	(9.0, 9.7)	1,078	3.5	(3.3, 3.7)
1999	2,635	9.4	(9.0, 9.7)	1,034	3.2	(3.0, 3.5)
2000	2,480	8.8	(8.5, 9.2)	1,035	3.3	(3.1, 3.5)
2001	2,491	8.8	(8.5, 9.2)	947	3.0	(2.8, 3.2)
2002	2,365	8.3	(7.9, 8.6)	928	2.8	(2.6, 3.0)
2003	2,386	8.3	(8.0, 8.7)	886	2.7	(2.5, 2.9)
2004	2,273	8.0	(7.6, 8.3)	899	2.7	(2.5, 2.9)
2005	2,300	8.2	(7.8, 8.5)	837	2.5	(2.3, 2.7)
2006	2,405	8.5	(8.1, 8.8)	773	2.3	(2.1, 2.5)
2007	2,355	8.3	(8.0, 8.7)	755	2.3	(2.1, 2.5)
2008	2,369	8.3	(8.0, 8.7)	753	2.2	(2.1, 2.4)

ASIR is (directly) age-standardised incidence rate per 100,000 female population.

ASMR is (directly) age-standardised mortality rate per 100,000 female population.

Source: UK Cancer Information Service.

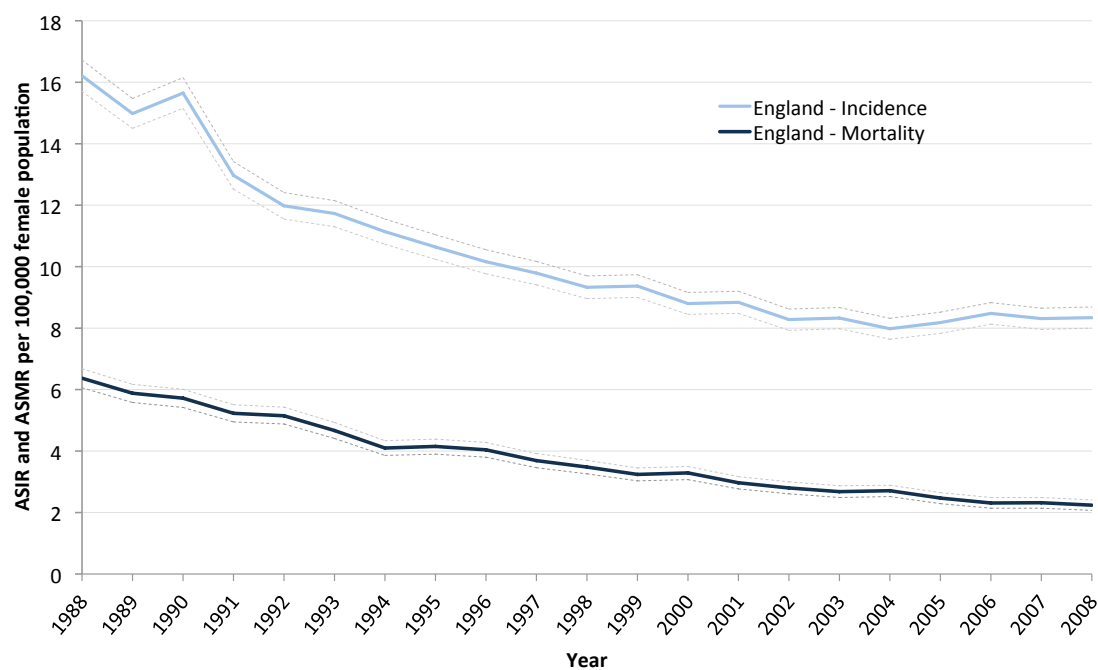


Figure 1 Trends in incidence and mortality, England, 1988–2008.

Dotted line is 95% confidence interval for calculated rates.

Source: UK Cancer Information Service.

CERVICAL CANCER INCIDENCE

The results in this section must be interpreted cautiously. As well as variations in the underlying risk of disease, regional variations in the incidence of invasive cervical cancer may result partly from differences in diagnostic and coding practice.

In addition to the tables giving 95% confidence intervals, funnel plots are also presented in the following sections. These funnel plots are visual tools that allow an interpretation of data points falling outside of the 95% (two standard deviations [SD]) and 99.8% (three SD) control limits around the national average, represented by the horizontal line. Only SHAs and CNs that are outside the three SD control limits are labelled. Further details on funnel plots are provided in Appendix 1.

Incidence by Strategic Health Authority, 2004–2008

Cervical cancer incidence rates tend to be lower in the south and east of England but higher in the north and the Midlands. There is strong evidence that rates are lower than the national average for residents of three SHAs (East of England, South East Coast and London), and likewise higher than nationally for five SHAs (Yorkshire and the Humber, East Midlands, North East, North West and West Midlands), varying from 6.5 to 10.4 per 100,000 female population.

Table 2 Incidence by SHA, 2004–2008

SHA	Total cases	ASIR	95% confidence limits
England	11,700	8.3	(8.1, 8.4)
North East	730	10.3	(9.5, 11.1)
North West	1,735	9.0	(8.6, 9.5)
Yorkshire and the Humber	1,450	10.4	(9.9, 11.0)
East Midlands	1,160	9.9	(9.3, 10.5)
West Midlands	1,345	9.3	(8.8, 9.8)
East of England	1,025	6.5	(6.1, 6.9)
London	1,365	6.7	(6.4, 7.1)
South East Coast	790	6.6	(6.1, 7.0)
South Central	840	7.6	(7.1, 8.1)
South West	1,265	9.0	(8.5, 9.5)

ASIR is (directly) age-standardised incidence rate per 100,000 female population.

Source: UK Cancer Information Service.

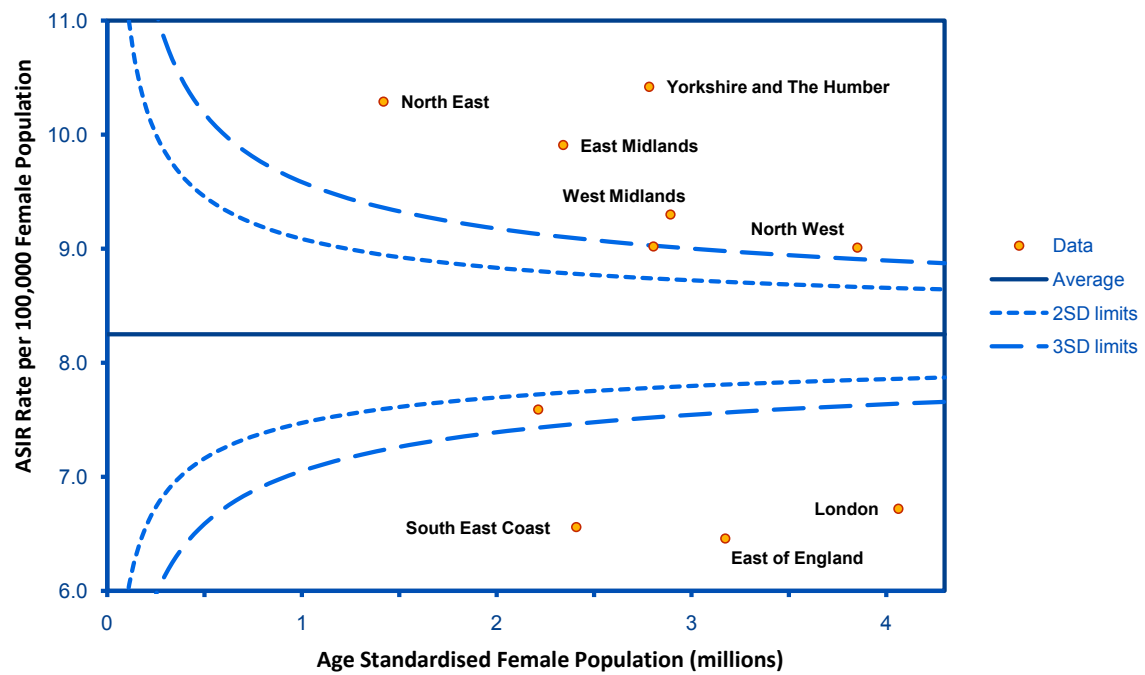


Figure 2 Funnel plot of incidence by SHA, 2004–2008.

Source: UK Cancer Information Service.

Incidence by Cancer Network, 2004–2008

Incidence rate patterns among the CNs broadly reflect those seen for the SHAs, with rates also notably low in and around London (see Figure 4). At CN level, the highest incidence rate is more than double that of the lowest rate. Incidence rates are statistically significantly higher than the England average in several CNs, but most notably high in the Humber & Yorkshire Coast CN (see Figure 3). Rates are also statistically significantly lower than nationally in several CNs.

Table 3 Incidence by CN, 2004–2008

CN	Total cases	ASIR	95% confidence limits
England	11,700	8.3	(8.1, 8.4)
3 Counties	195	6.6	(5.6, 7.6)
Anglia	505	6.7	(6.1, 7.4)
Arden	235	9.1	(7.9, 10.3)
Avon, Somerset & Wiltshire	515	10.2	(9.3, 11.1)
Central South Coast	430	8.0	(7.2, 8.8)
Dorset	155	7.9	(6.6, 9.2)
East Midlands	1,075	10.1	(9.5, 10.7)
Essex	235	5.7	(4.9, 6.5)
Greater Manchester & Cheshire	725	8.5	(7.8, 9.1)
Greater Midlands	495	9.7	(8.8, 10.6)
Humber & Yorkshire Coast	390	14.1	(12.7, 15.6)
Kent & Medway	320	7.1	(6.3, 7.9)
Lancashire & South Cumbria	380	9.0	(8.1, 10.0)
Merseyside & Cheshire	525	9.5	(8.6, 10.3)
Mount Vernon	225	6.4	(5.6, 7.3)
North East London	270	6.8	(5.9, 7.6)
North London	260	6.0	(5.3, 6.8)
North of England	855	10.3	(9.6, 11.0)
North Trent	445	9.2	(8.3, 10.0)
North West London	305	6.1	(5.4, 6.8)
Pan Birmingham	505	9.9	(9.0, 10.8)
Peninsula	415	9.2	(8.2, 10.1)
South East London	345	8.3	(7.4, 9.2)
South West London	295	6.6	(5.9, 7.4)
Surrey, West Sussex & Hampshire	220	6.3	(5.5, 7.1)
Sussex	220	6.7	(5.7, 7.6)
Thames Valley	465	7.2	(6.5, 7.9)
Yorkshire	700	9.6	(8.9, 10.3)

ASIR is (directly) age-standardised incidence rate per 100,000 female population.

Source: UK Cancer Information Service.

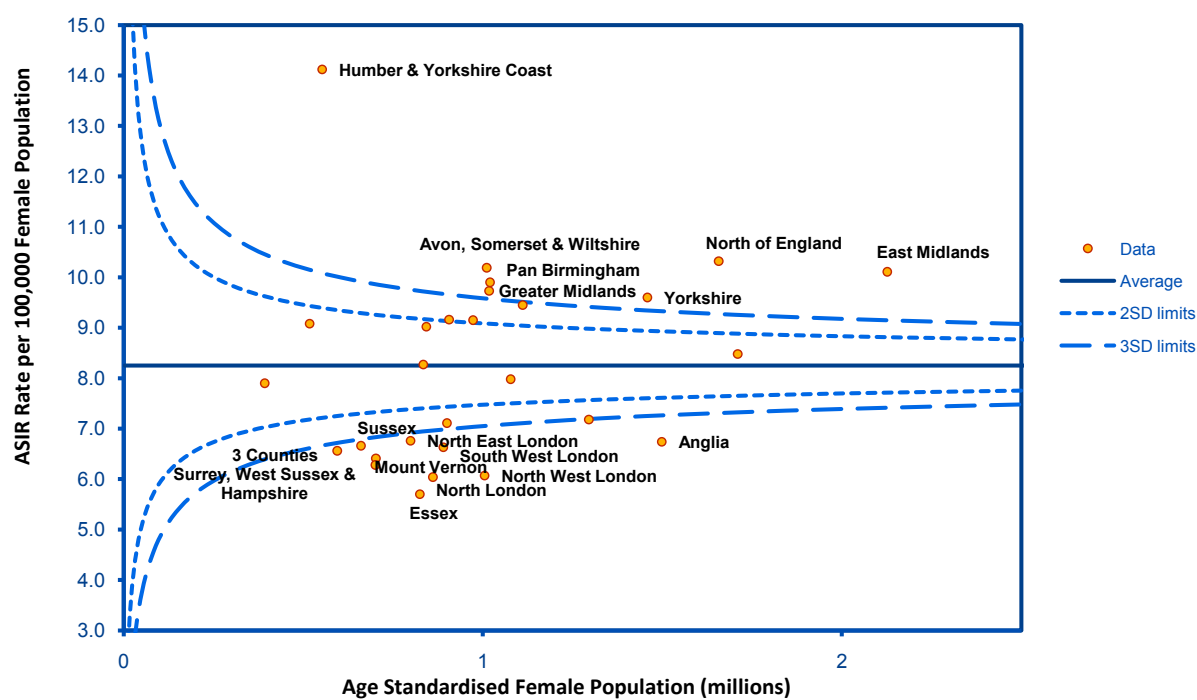


Figure 3 Funnel plot of incidence by CN, 2004–2008.

Source: UK Cancer Information Service.

Age standardised rate per 100,000 population

5.7 to 6.5	(5)
6.6 to 7.1	(6)
7.2 to 8.5	(5)
8.6 to 9.6	(6)
9.7 to 14.1	(6)

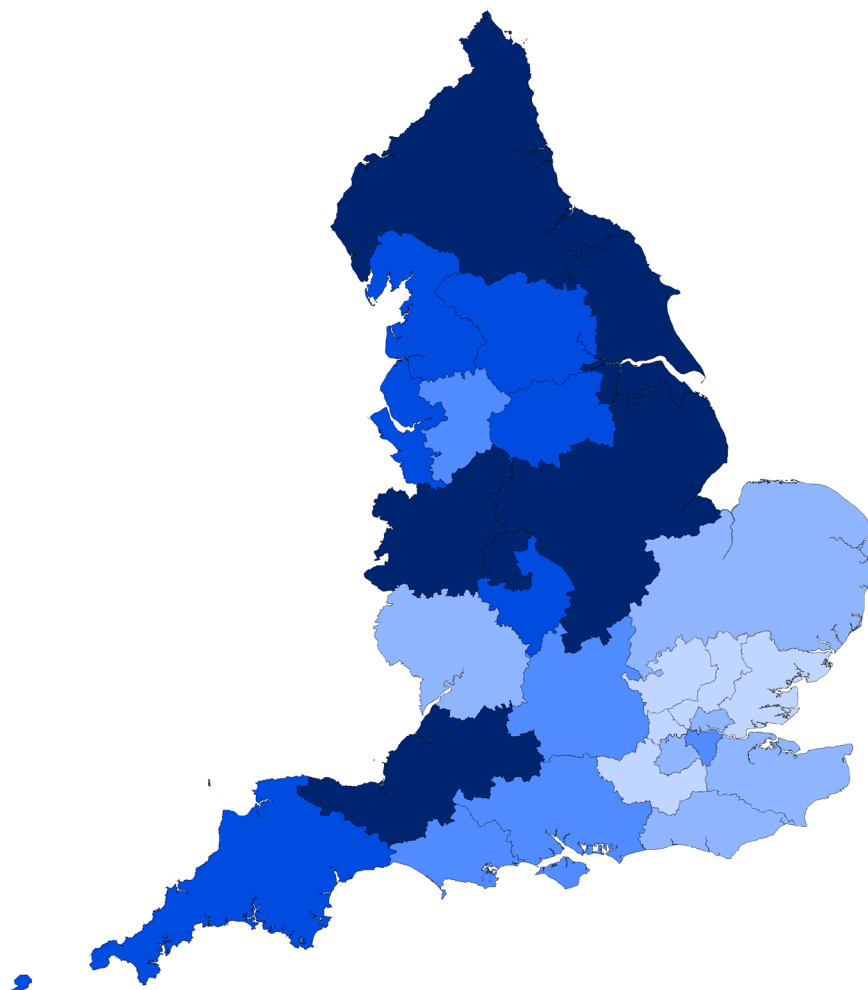


Figure 4 Map of incidence by CN, 2004–2008.

The bracketed numbers in the key above are the number of CNs included in each quintile.

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Incidence by age, 2008

The age-specific incidence rates peak among women in their early 30s. Following a gradual reduction in the rate in women in their 40s, rates then rise again in women in their 70s and early 80s. The number of cases is highest in those aged 25–49, accounting for over half of all diagnoses.

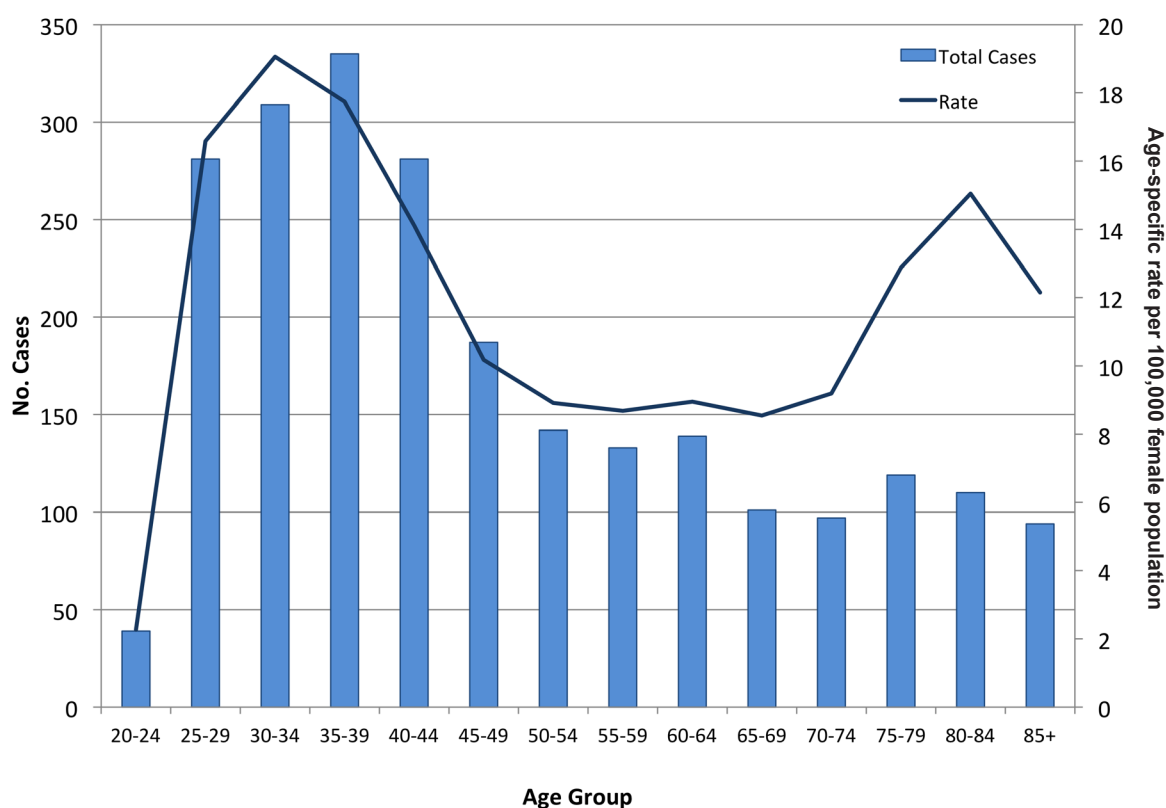


Figure 5 Age-specific incidence rates and number of cases diagnosed by five-year age group, England, 2008.

Trends in incidence by age, England, 1988–2008

Compared with 20 years ago, the incidence of cervical cancer in 2008 has fallen in all age groups except in those aged 20–24 or 25–29. Between 1998 and 2008, incidence in women aged 25–29 increased by 77%. Similarly, the incidence in women aged 30–34 increased by 29%.

Table 4 Trends in age-specific incidence rates by five-year age group, England, 1988–2008

Age group	1988		1993		1998		2003		2008	
	Total cases	Rate	Total cases	Rate	Total cases	Rate	Total cases	Rate	Total cases	Rate
20–24	42	2.2	32	1.8	34	2.4	58	3.8	39	2.3
25–29	188	10.1	160	8.2	169	9.4	172	11.0	281	16.6
30–34	425	26.2	345	18.6	291	14.7	306	16.3	309	19.1
35–39	511	31.7	372	22.8	361	19.5	279	14.0	335	17.7
40–44	401	23.9	363	22.6	272	16.7	263	14.2	281	14.1
45–49	334	25.2	314	18.8	223	14.0	178	11.0	187	10.2
50–54	324	25.6	219	16.7	193	11.7	173	11.0	142	8.9
55–59	337	26.6	209	16.9	160	12.4	186	11.6	133	8.7
60–64	358	28.1	191	15.7	161	13.5	132	10.6	139	9.0
65–69	404	31.0	218	18.3	140	12.2	109	9.6	101	8.5
70–74	310	29.5	271	23.2	158	14.7	119	11.3	97	9.2
75–79	244	25.5	201	22.9	200	20.1	145	15.7	119	12.9
80–84	145	21.5	147	20.6	131	19.9	149	19.3	110	15.1
85+	105	20.9	98	16.3	125	18.7	114	17.0	94	12.2

Rate is age-specific rate per 100,000 female population.

Source: UK Cancer Information Service.

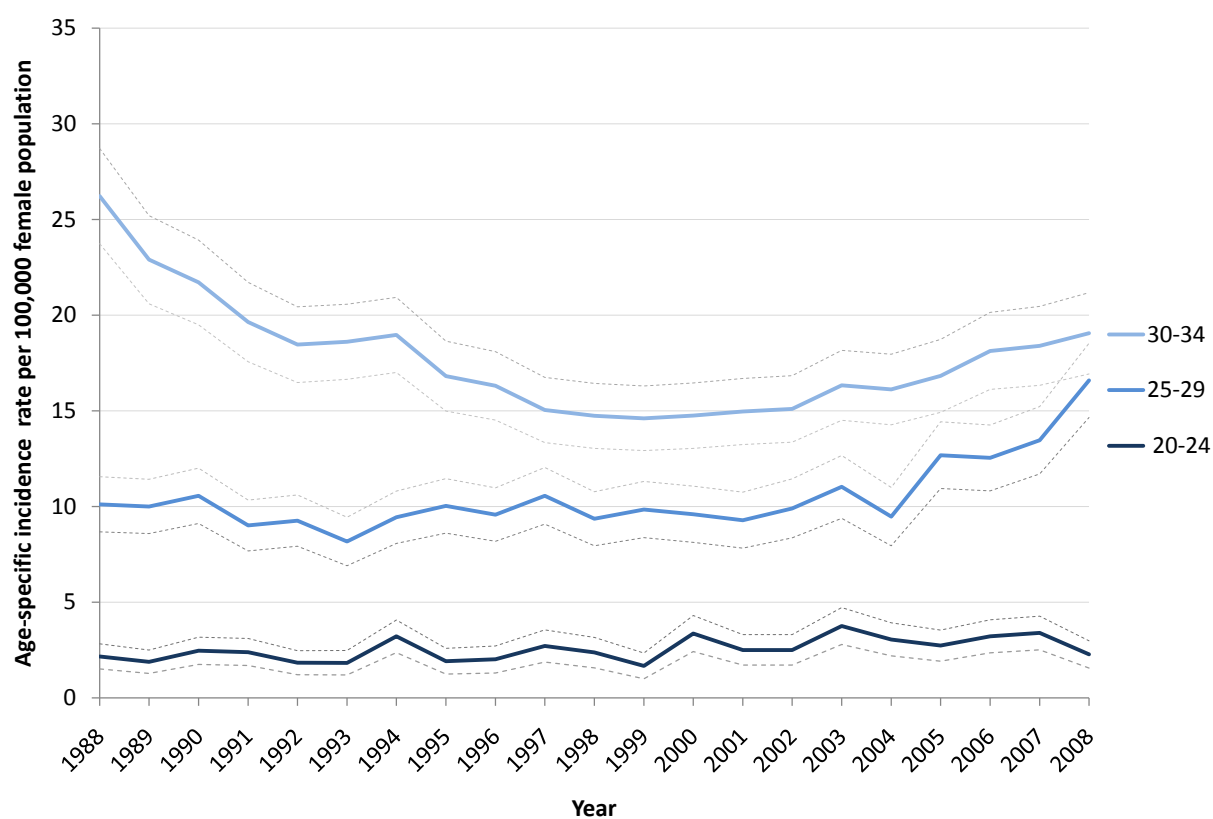


Figure 6 Trends in incidence in women under 35, England, 1988–2008.

Dotted line is 95% confidence interval for calculated rates.

Source: UK Cancer Information Service.

Comparing incidence and deprivation by Primary Care Trust, 2004–2008

There is strong evidence of a relationship between deprivation (as measured by the income score of the Index of Multiple Deprivation – see Appendix 1 for further details) and incidence of cervical cancer among the 152 PCTs in England (see Figure 7), with a correlation coefficient of 0.34. For example, the average incidence rate in the 30 most deprived PCTs is 10.0 per 100,000 females compared with 7.5 per 100,000 in the 30 most affluent PCTs.

It has been suggested by Blanks et al that an association between the Townsend Index of Deprivation and incidence of cervical cancer may be underestimated by the inclusion of low risk, high ethnic mix PCT populations¹. When 22 such PCTs are removed from the scatter plot the relationship also strengthens, with an increased correlation coefficient of 0.39.

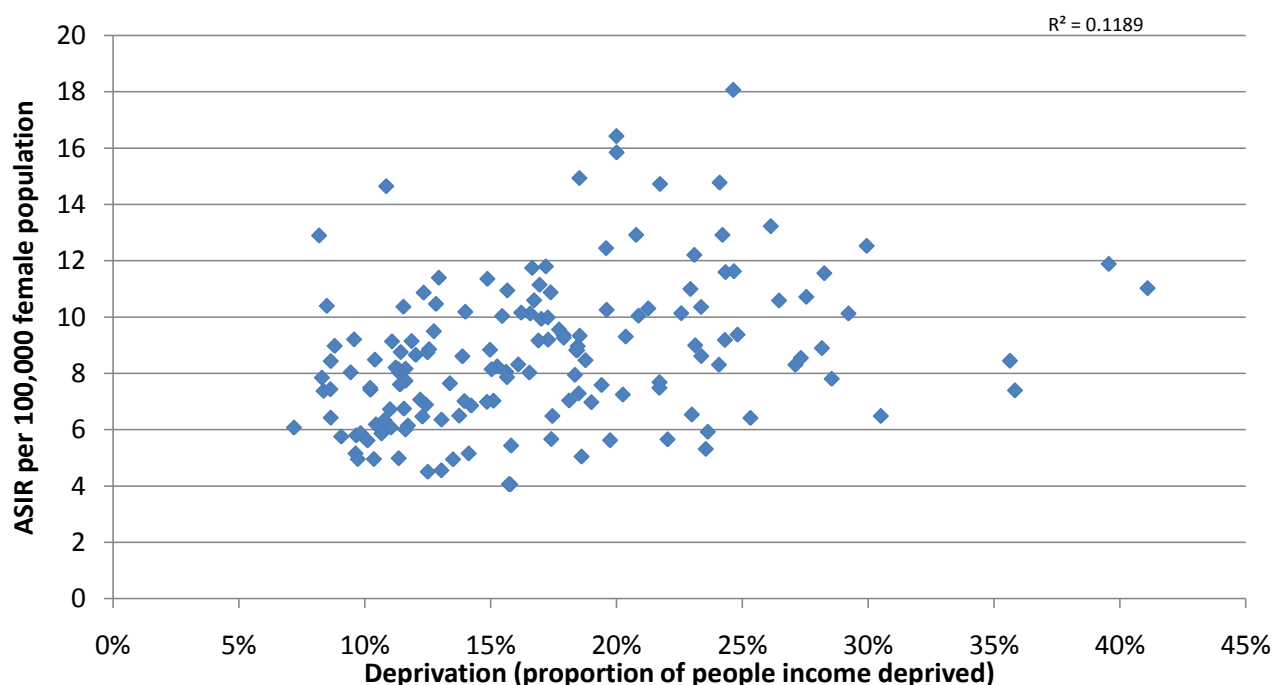


Figure 7 Scatter plot of incidence against measure of deprivation by PCT, 2004–2008.

Source: UK Cancer Information Service.

CERVICAL CANCER MORTALITY

Mortality by Strategic Health Authority, 2004–2008

As with incidence, cervical cancer mortality rates tend to be lower in the south and east of England and higher in the north. There is strong evidence that rates are lower than the national average for residents of three SHAs (East of England, South Central and South East Coast) and higher than nationally for two SHAs (North East and North West), varying from 1.9 to 3.1 per 100,000 female population.

Table 5 Mortality by SHA, 2004–2008

SHA	Total cases	ASMR	95% confidence limits
England	4,015	2.4	(2.3, 2.5)
North East	265	3.1	(2.7, 3.5)
North West	680	3.1	(2.8, 3.3)
Yorkshire & the Humber	460	2.8	(2.5, 3.0)
East Midlands	315	2.2	(1.9, 2.4)
West Midlands	465	2.7	(2.4, 2.9)
East of England	370	1.9	(1.7, 2.1)
London	470	2.3	(2.1, 2.5)
South East Coast	305	2.0	(1.8, 2.3)
South Central	265	2.0	(1.8, 2.3)
South West	425	2.4	(2.1, 2.6)

ASMR is (directly) age-standardised mortality rate per 100,000 female population.

Source: UK Cancer Information Service.

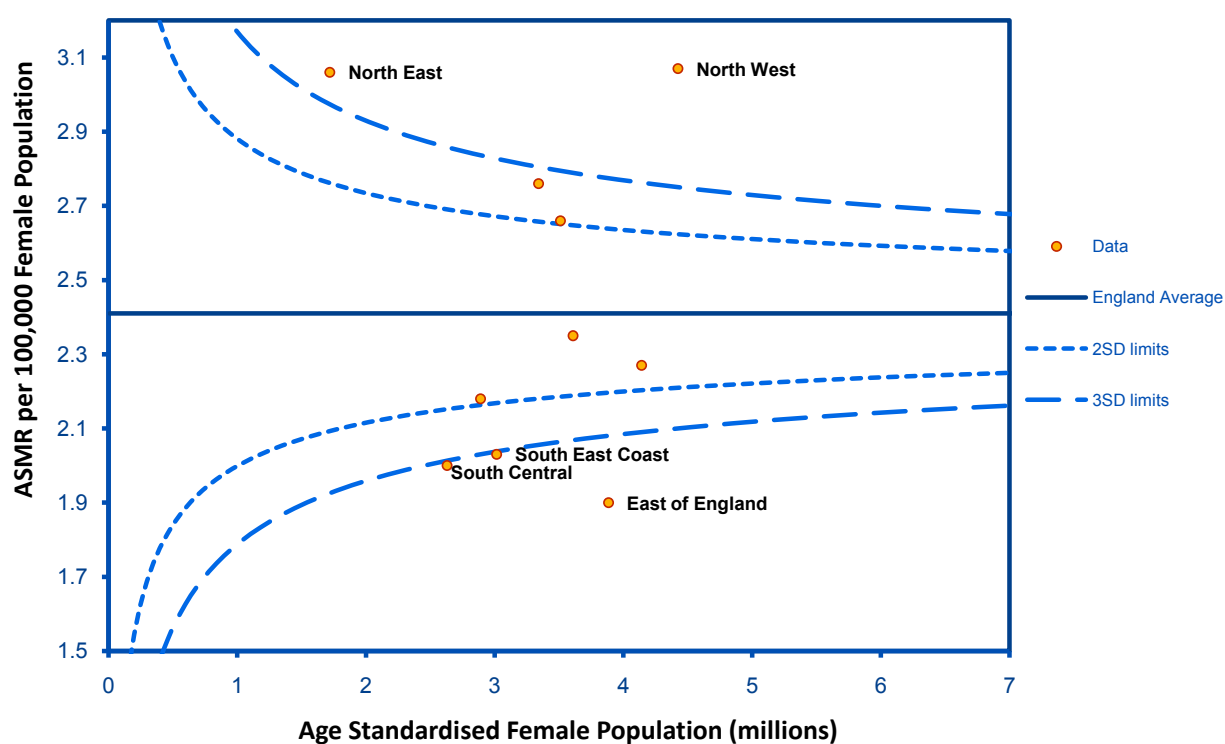


Figure 8 Funnel plot of mortality by SHA, 2004–2008.

Source: UK Cancer Information Service.

Mortality by Cancer Network, 2004–2008

Mortality rate patterns among the CNs broadly reflect those seen for the SHAs. At CN level, the highest incidence rate is almost double that of the lowest rate. Mortality rates are statistically significantly higher than the England average in four CNs; Pan Birmingham and, most notably, outside the three SD control limit, Merseyside & Cheshire, Greater Manchester & Cheshire and North of England (see Figure 9). Rates are statistically significantly lower than nationally in four CNs: Mount Vernon; Surrey, West Sussex & Hampshire; and, most notably, Anglia and Thames Valley.

Table 6 Mortality by CN, 2004–2008

CN	Total cases	ASMR	95% confidence limits
England	4,015	2.4	(2.3, 2.5)
3 Counties	65	1.9	(1.4, 2.4)
Anglia	165	1.7	(1.4, 2.0)
Arden	75	2.3	(1.8, 2.9)
Avon, Somerset & Wiltshire	140	2.3	(1.9, 2.7)
Central South Coast	155	2.1	(1.8, 2.5)
Dorset	65	2.4	(1.7, 3.0)
East Midlands	290	2.3	(2.0, 2.6)
Essex	110	2.2	(1.8, 2.7)
Greater Manchester & Cheshire	300	3.1	(2.7, 3.5)
Greater Midlands	175	2.7	(2.3, 3.2)
Humber & Yorkshire Coast	100	2.8	(2.2, 3.4)
Kent & Medway	130	2.4	(2.0, 2.8)
Lancashire & South Cumbria	130	2.6	(2.1, 3.1)
Merseyside & Cheshire	215	3.3	(2.9, 3.8)
Mount Vernon	70	1.8	(1.3, 2.2)
North East London	110	2.7	(2.2, 3.2)
North London	95	2.2	(1.8, 2.7)
North of England	300	3.0	(2.6, 3.3)
North Trent	165	2.7	(2.3, 3.1)
North West London	105	2.0	(1.6, 2.4)
Pan Birmingham	180	3.0	(2.6, 3.5)
Peninsula	160	2.6	(2.2, 3.1)
South East London	105	2.4	(1.9, 2.9)
South West London	90	1.9	(1.5, 2.4)
Surrey, West Sussex & Hampshire	70	1.8	(1.3, 2.2)
Sussex	95	2.1	(1.6, 2.6)
Thames Valley	130	1.8	(1.5, 2.2)
Yorkshire	225	2.7	(2.3, 3.0)

ASMR is (directly) age-standardised mortality rate per 100,000 female population.

Source: UK Cancer Information Service.

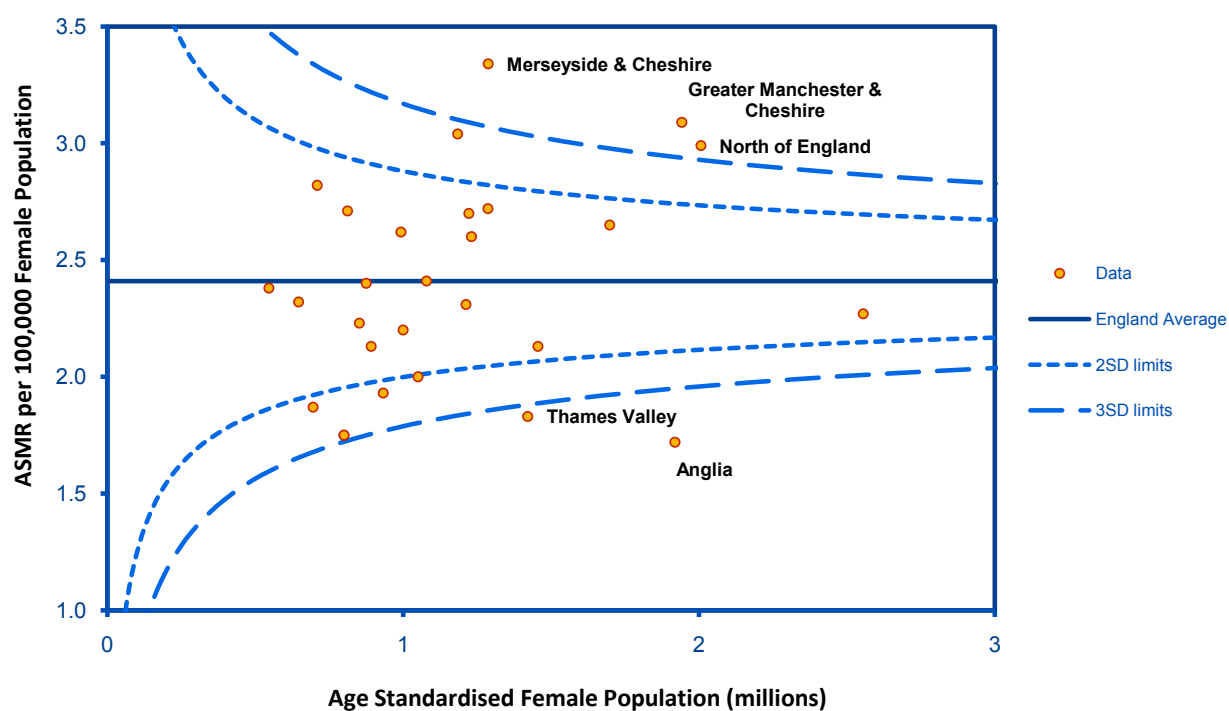


Figure 9 Funnel plot of mortality by CN, 2004–2008.

Source: UK Cancer Information Service.

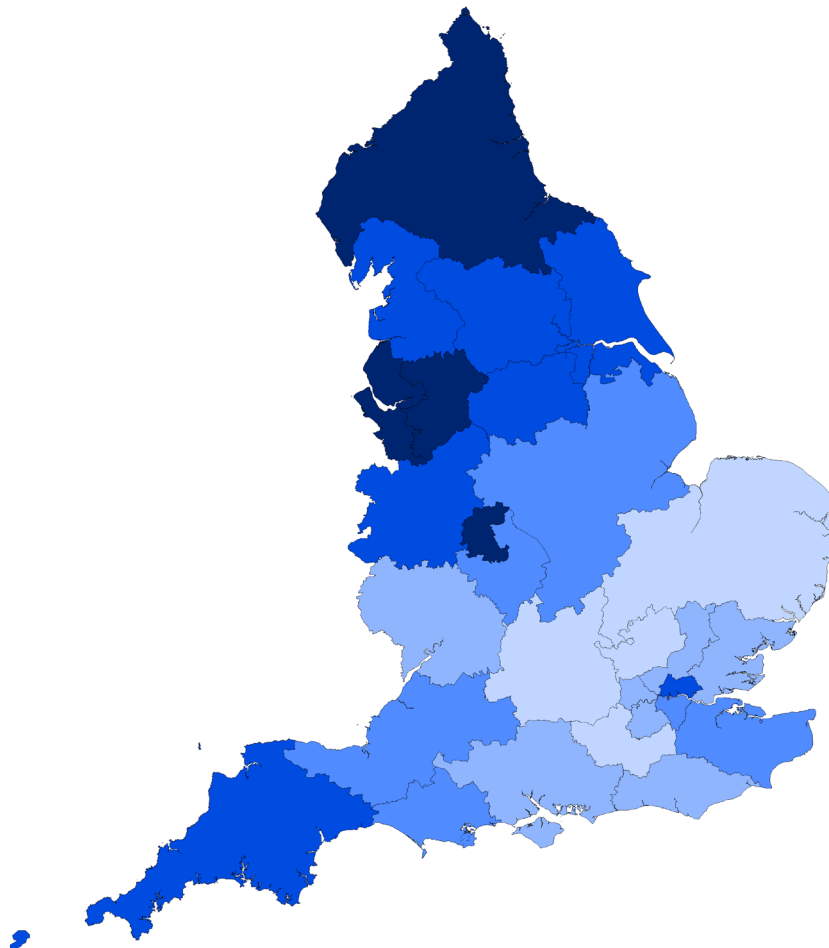
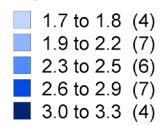
Age standardised rate per 100,000 population

Figure 10 Map of mortality by CN, 2004–2008.

The bracketed numbers in the key above are the number of CNs included in each quintile.

Produced by Trent Cancer Registry on behalf of Department of Health. Based on Ordnance Survey material.
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Mortality by age, England, 2006–2008

For patients who died from cervical cancer between 2006 and 2008, the age-specific mortality rate increases with age. There is a gradual increase in the number of deaths for women aged in their early 20s to those in their late 40s. The number of deaths then appears to level off, beginning to increase again in women in their late 70s and above.

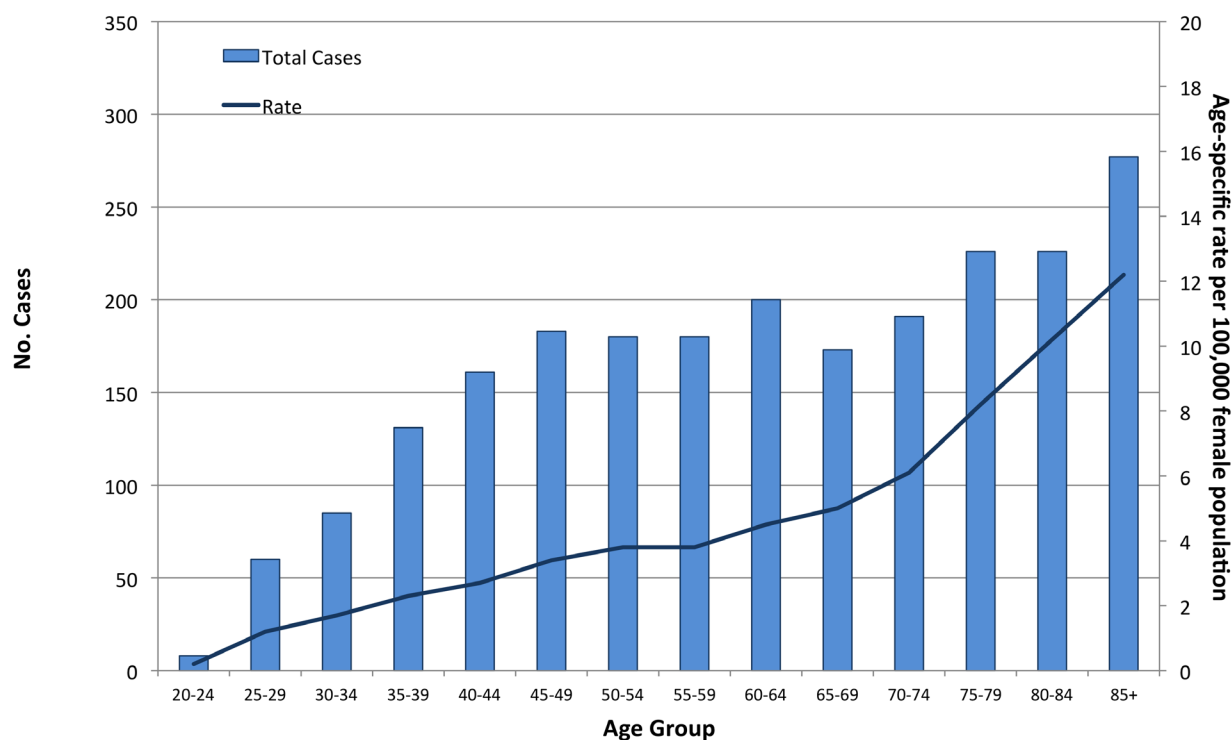


Figure 11 Age-specific mortality rates and number of deaths by five-year age group, England, 2006–2008.

Source: UK Cancer Information Service.

Trends in mortality by age, England, 1986–1988 to 2006–2008

Compared with 20 years ago, cervical cancer mortality (for patient deaths between 2006 and 2008) is lower in all age groups. During this time, the numbers of deaths in those aged 20–24 have remained consistently low, with eight deaths in this most recent three-year period. Over the last 10 years, rates in those aged 30–34 seemed to have stabilised, whereas recent rates in those aged 25–29 appear to have risen (see Figure 12).

Table 7 Trends in age-specific mortality rates by five-year age group, England, 1986–1988 to 2006–2008

Age group	1986–1988		1991–1993		1996–1998		2001–2003		2006–2008	
	Total cases	Rate	Total cases	Rate	Total cases	Rate	Total cases	Rate	Total cases	Rate
20–24	19	0.3	12	0.2	14	0.3	16	0.4	8	0.2
25–29	105	1.9	81	1.4	59	1.1	39	0.8	60	1.2
30–34	220	4.6	168	3.1	132	2.2	103	1.8	85	1.7
35–39	343	6.8	256	5.3	205	3.8	145	2.4	131	2.3
40–44	373	7.8	328	6.6	273	5.7	151	2.8	161	2.7
45–49	365	9.3	326	6.9	244	4.9	215	4.5	183	3.4
50–54	383	10.2	322	8.3	269	5.8	210	4.3	180	3.8
55–59	450	11.7	331	9.0	254	6.7	231	5.0	180	3.8
60–64	622	15.9	362	9.8	263	7.4	209	5.7	200	4.5
65–69	722	19.2	484	13.3	282	8.1	224	6.6	173	5.0
70–74	663	20.1	565	16.8	381	11.6	267	8.4	191	6.1
75–79	530	18.5	515	18.7	446	15.6	337	12.0	226	8.2
80–84	341	17.2	370	17.4	317	15.4	344	15.6	226	10.2
85+	296	20.4	311	17.9	314	16.0	268	13.1	277	12.2

Rate is age-specific rate per 100,000 female population.

Source: UK Cancer Information Service.

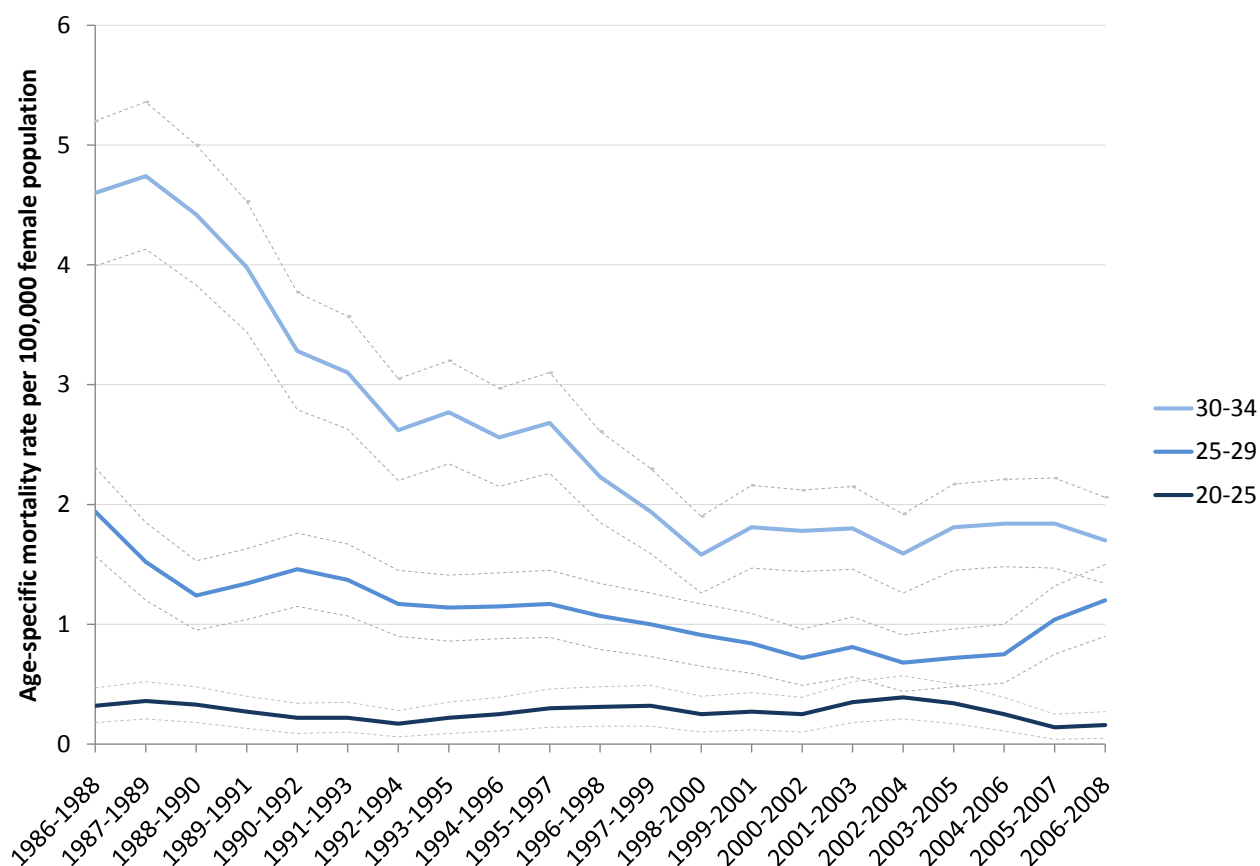


Figure 12 Trends in mortality in women under 35, England, 1986–1988 to 2006–2008.

Dotted line is 95% confidence interval for calculated rates.

Source: UK Cancer Information Service.

Comparing mortality and deprivation by Primary Care Trust, 2004–2008

There is strong evidence of a relationship between deprivation (as measured by the income score of the Index of Multiple Deprivation – see Appendix 1 for further details) and mortality from cervical cancer among the 152 PCTs in England (see Figure 13), with a correlation coefficient of 0.57. For example, the average mortality rate in the 30 most deprived PCTs is 3.3 per 100,000 females compared with 1.9 per 100,000 in the 30 most affluent PCTs.

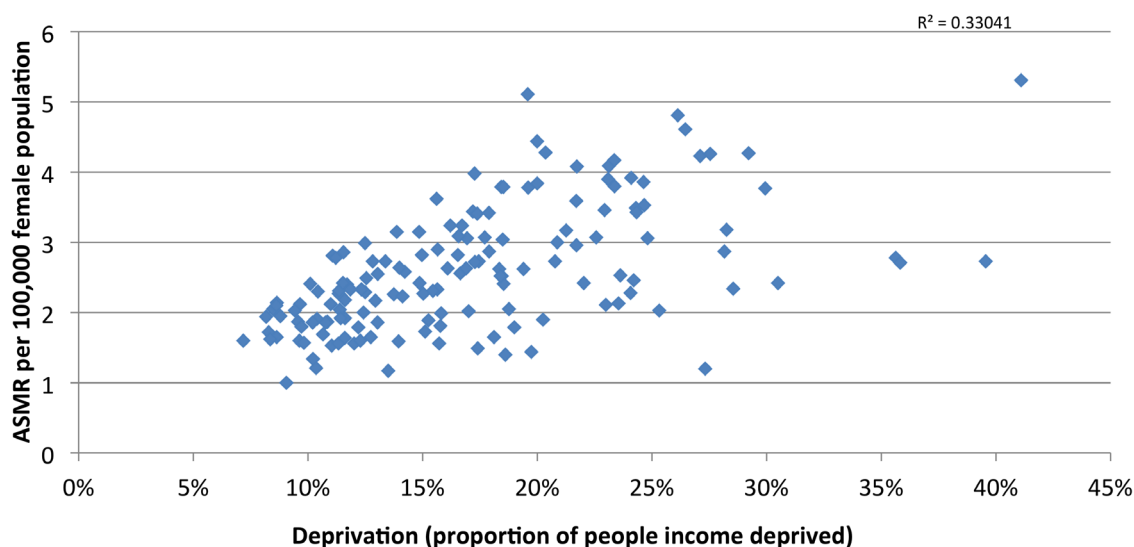


Figure 13 Scatter plot of mortality against measure of deprivation by PCT, 2004–2008.

Source: UK Cancer Information Service.

CERVICAL CANCER SURVIVAL

Details of the definition of relative survival used here can be found in Appendix 1.

Trends in one- and five-year relative survival, England, 1985–1987 to 2005–2007/2001–2003

In England, cervical cancer survival has improved since the mid-1980s. One-year relative survival has improved from 82.2% to 86.2% (for patients diagnosed between 2005 and 2007) and five-year relative survival from 62.3% to 68.3% (for patients diagnosed between 2001 and 2003).

Table 8 Trends in one- and five-year relative survival, England, 1985–1987 to 2005–2007/2001–2003

Time period	Total cases	One-year relative survival			Five-year relative survival		
		Cumulative deaths	%	95% confidence limits	Cumulative deaths	%	95% confidence limits
1985–1987	11,504	2,189	82.2	(81.4, 82.9)	4,883	62.3	(61.3, 63.3)
1986–1988	11,531	2,138	82.7	(81.9, 83.4)	4,807	63.0	(62.0, 64.0)
1987–1989	11,329	2,041	83.2	(82.4, 83.9)	4,599	64.2	(63.2, 65.2)
1988–1990	11,308	1,926	84.2	(82.5, 84.9)	4,389	66.0	(65.0, 67.0)
1989–1991	10,611	1,772	84.5	(83.8, 85.2)	4,023	67.0	(66.0, 68.0)
1990–1992	9,949	1,674	84.4	(83.6, 85.1)	3,807	66.6	(65.6, 67.7)
1991–1993	9,073	1,601	83.6	(82.8, 84.4)	3,578	65.5	(64.4, 66.6)
1992–1994	8,680	1,534	83.6	(82.7, 84.4)	3,420	65.6	(64.4, 66.7)
1993–1995	8,364	1,457	83.8	(83.0, 84.7)	3,255	66.1	(64.9, 67.2)
1994–1996	8,030	1,415	83.6	(82.8, 84.5)	3,124	66.2	(65.0, 67.4)
1995–1997	7,721	1,406	83.1	(82.2, 83.9)	3,046	65.6	(64.4, 66.8)
1996–1998	7,487	1,337	83.4	(82.5, 84.3)	2,896	66.5	(65.3, 67.7)
1997–1999	7,312	1,301	83.5	(82.6, 84.4)	2,798	66.8	(65.6, 68.1)
1998–2000	7,133	1,243	83.8	(82.9, 84.8)	2,669	67.7	(66.5, 69.0)
1999–2001	7,014	1,204	84.0	(83.1, 84.9)	2,562	68.3	(67.1, 69.6)
2000–2002	6,770	1,160	84.0	(83.1, 85.0)	2,435	68.8	(67.6, 70.1)
2001–2003	6,666	1,166	83.7	(82.7, 84.6)	2,433	68.3	(67.1, 69.6)
2002–2004	6,457	1,126	83.8	(82.8, 84.7)			
2003–2005	6,426	1,051	84.8	(83.9, 85.7)			
2004–2006	6,470	994	85.7	(84.8, 86.6)			
2005–2007	6,533	972	86.2	(85.3, 87.1)			

Source: UK Cancer Information Service.

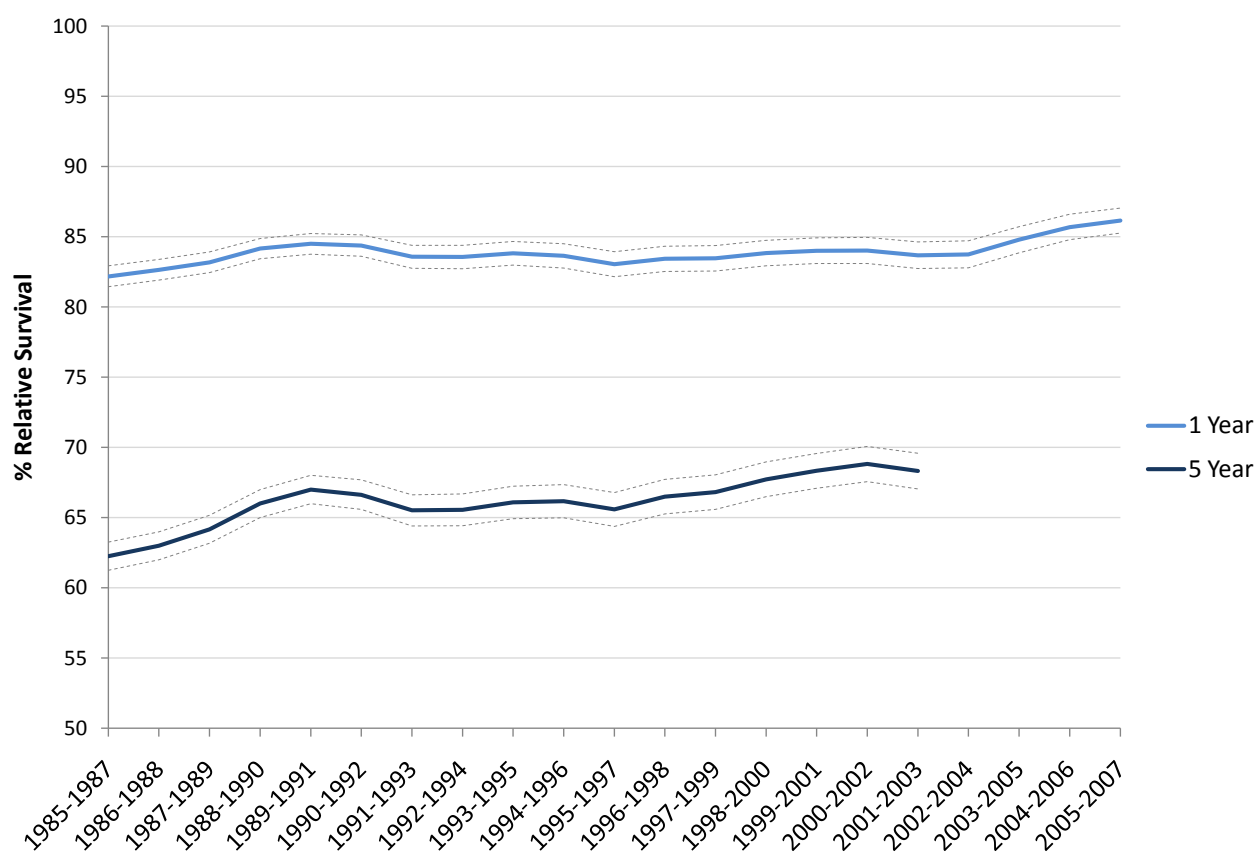


Figure 14 Trends in one- and five-year relative survival, England, 1985–1987 to 2005–2007/2001–2003.

Dotted lines are 95% confidence intervals for survival estimates.

Source: UK Cancer Information Service.

Trends in one-year relative survival by Cancer Network, 1985–1987 to 2005–2007

For women diagnosed in the 20-year period between 1985–1987 and 2005–2007, one-year relative survival improved nationally and in all but five of the 28 CNs. The strongest evidence of an increase is in the East Midlands and Lancashire & South Cumbria CNs. In the areas where relative survival decreased, this change is not statistically significant.

Table 9 Trends in one-year relative survival by CN, 1985–1987 to 2005–2007

CN	1985–1987	1995–1997	2005–2007	Change
England	82.2	83.1	86.2	4.0*
3 Counties	79.5	87.7	76.3	–3.2
Anglia	82.5	80.9	84.3	1.8
Arden	87.4	86.1	88.4	1.0
Avon, Somerset & Wiltshire	82.6	82.2	88.8	6.2
Central South Coast	85.3	85.2	86.6	1.3
Dorset	82.7	77.4	86.5	3.8
East Midlands	79.2	82.7	86.8	7.6*
Essex	82.3	84.9	84.2	1.9
Greater Manchester & Cheshire	81.0	82.7	86.8	5.7
Greater Midlands	83.9	81.0	86.0	2.1
Humber & Yorkshire Coast	87.1	84.0	82.3	–4.9
Kent & Medway	80.2	83.1	85.8	5.7
Lancashire & South Cumbria	75.9	78.7	87.6	11.7*
Merseyside & Cheshire	79.5	82.5	85.3	5.8
Mount Vernon	82.7	90.0	84.4	1.7
North East London	84.1	83.4	72.9	–11.2
North London	83.3	85.4	86.5	3.2
North of England	79.1	83.1	85.4	6.2
North Trent	80.0	75.8	86.4	6.4
North West London	82.6	81.9	88.5	5.9
Pan Birmingham	83.2	83.6	86.0	2.8
Peninsula	83.2	79.3	89.7	6.5
South East London	81.4	83.7	87.7	6.4
South West London	85.8	85.6	88.0	2.2
Surrey, West Sussex & Hampshire	88.7	86.5	83.4	–5.3
Sussex	84.2	76.6	83.7	–0.5
Thames Valley	86.2	89.3	90.2	4.0
Yorkshire	83.7	86.7	88.5	4.7

‘Change’ is absolute change between 1985–1987 and 2005–2007.

*Statistically significant difference over this time period.

Source: UK Cancer Information Service

One-year relative survival by Cancer Network, 2005–2007

For those patients diagnosed between 2005 and 2007, there is evidence that relative survival up to one year from diagnosis is higher than the national average in the Thames Valley CN. Likewise, there is evidence that one-year survival is lower than the national average in the 3 Counties CN, and most notably low in the North East London CN.

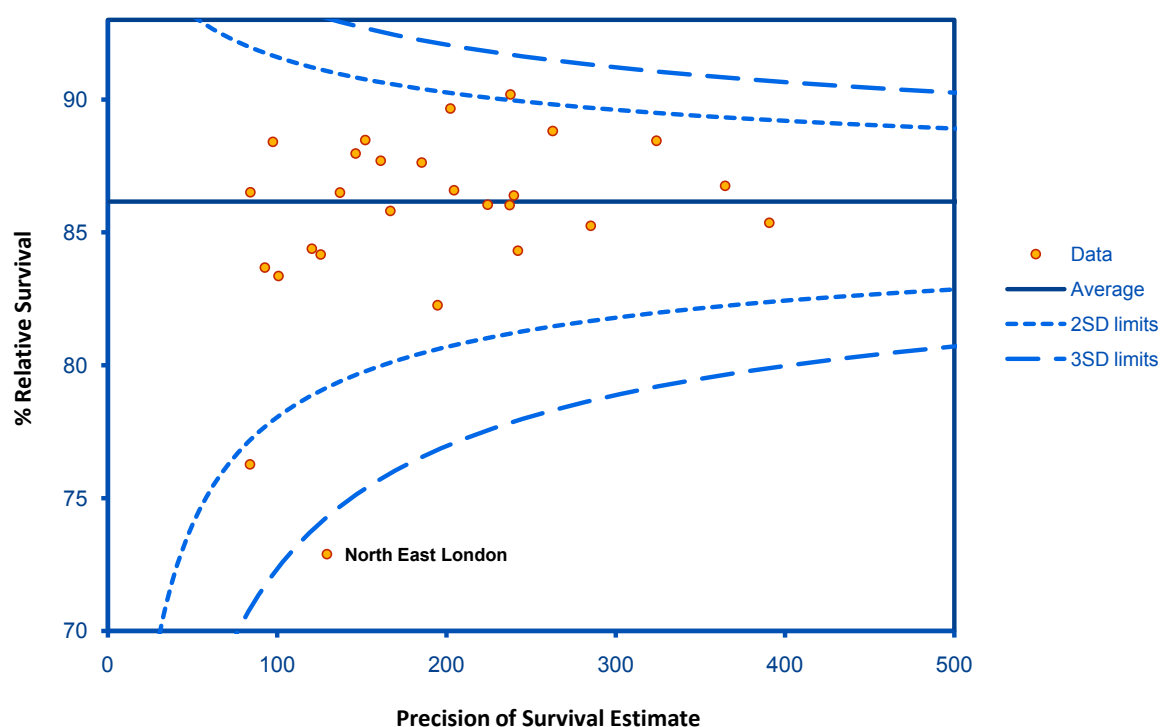


Figure 15 Funnel plot of one-year relative survival by CN, 2005–2007.

Source: UK Cancer Information Service.

Trends in five-year relative survival by Cancer Network, 1986–1988 to 2001–2003

For women diagnosed in the 15-year period between 1986–1988 and 2001–2003, five-year relative survival improved nationally and in all but five of the 28 CNs. The strongest evidence of an increase is in the East Midlands and North of England CNs. In the areas where relative survival decreased, this change is not statistically significant.

Table 10 Trends in five-year relative survival by CN, 1986–1988 to 2001–2003

CN	1986–1988	2001–2003	Change
England	63.0	68.3	5.3*
3 Counties	64.4	72.5	8.1
Anglia	63.9	67.1	3.3
Arden	71.7	77.8	6.1
Avon, Somerset & Wiltshire	64.2	74.0	9.8
Central South Coast	65.4	67.4	2.0
Dorset	65.6	55.0	–10.7
East Midlands	61.5	71.3	9.8*
Essex	56.4	64.5	8.1
Greater Manchester & Cheshire	59.9	66.4	6.6
Greater Midlands	67.5	67.6	0.1
Humber & Yorkshire Coast	71.3	82.0	10.7
Kent & Medway	51.8	65.1	13.2
Lancashire & South Cumbria	58.4	67.8	9.4
Merseyside & Cheshire	65.4	62.7	–2.7
Mount Vernon	55.6	65.0	9.4
North East London	61.4	64.0	2.6
North London	67.8	67.3	–0.5
North of England	58.9	69.9	11.0*
North Trent	61.3	64.3	3.0
North West London	59.8	63.4	3.6
Pan Birmingham	60.9	68.3	7.4
Peninsula	63.1	64.8	1.6
South East London	58.7	68.0	9.3
South West London	62.6	69.7	7.0
Surrey, West Sussex & Hampshire	65.7	63.7	–1.9
Sussex	66.9	65.0	–1.9
Thames Valley	71.5	75.4	3.8
Yorkshire	64.7	67.8	3.1

‘Change’ is absolute change between 1986–1988 and 2001–2003.

*Statistically significant difference over this time period.

Source: UK Cancer Information Service.

Five-year relative survival by Cancer Network, 2001–2003

For those patients diagnosed between 2001 and 2003, there is evidence that relative survival up to five years from diagnosis is higher than the national average in the Arden, Thames Valley and Avon, Somerset & Wiltshire CNs, and most notably high in the Humber & Yorkshire Coast CN. Likewise, there is evidence that five-year survival is lower than the national average in the Dorset CN.

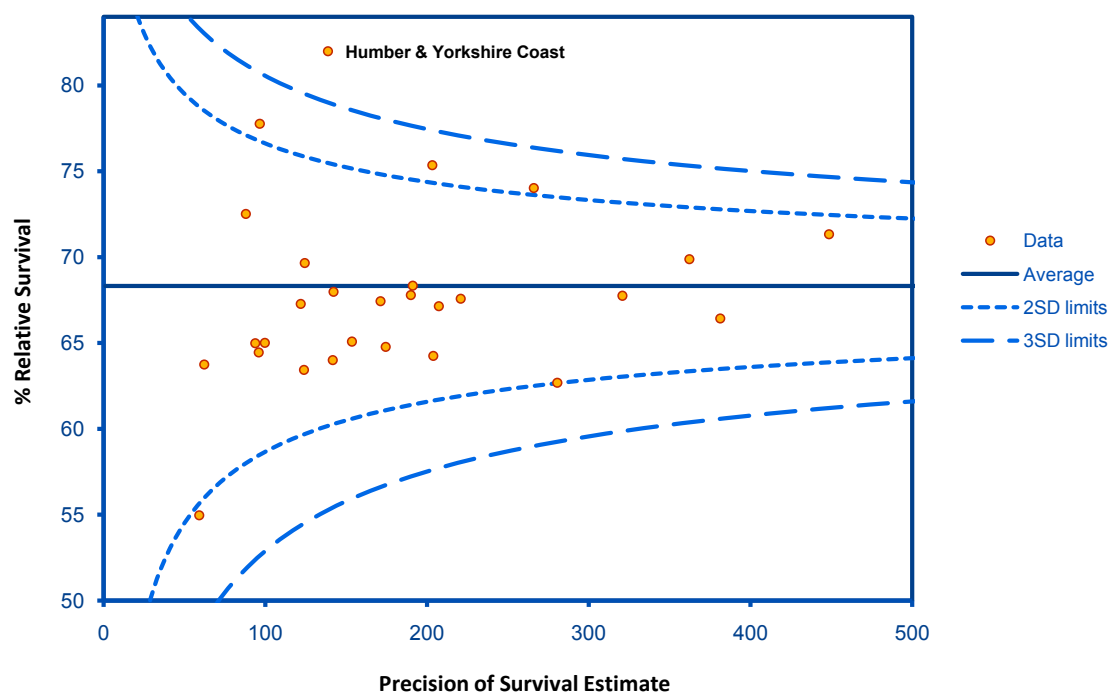


Figure 16 Funnel plot of five-year relative survival by CN, 2001–2003.

Source: UK Cancer Information Service.

Relative survival by age, England, 2005–2007 and 2001–2003

There is strong evidence that cervical cancer survival is worse in older women. For example, one-year relative survival in those aged 15–39 was 96.0% compared with 52.1% in those aged 80 or older. Similarly, five-year survival in those aged 15–39 was 86.4% compared with 26.9% in those aged 80 or older.

Table 11 Age-specific relative survival, England, 2005–2007 and 2001–2003

Age group	One-year relative survival				Five-year relative survival			
	Cases	Deaths	%	95% confidence limits	Cases	Deaths	%	95% confidence limits
All females	6,533	972	86.2	(85.3, 87.1)	6,666	2,433	68.3	(67.1, 69.6)
15–39	2,565	105	96.0	(95.2, 96.7)	2,349	325	86.4	(85.0, 87.9)
40–49	1,341	110	91.9	(90.4, 93.4)	1,314	307	77.3	(75.0, 79.7)
50–59	900	121	86.9	(84.6, 89.2)	950	375	61.9	(58.7, 65.2)
60–69	647	151	77.4	(74.0, 80.7)	704	375	49.7	(45.7, 53.7)
70–79	557	209	64.5	(60.3, 68.7)	765	556	33.0	(29.1, 36.9)
80+	523	272	52.1	(47.3, 56.9)	583	495	26.9	(21.6, 32.2)

Source: UK Cancer Information Service.

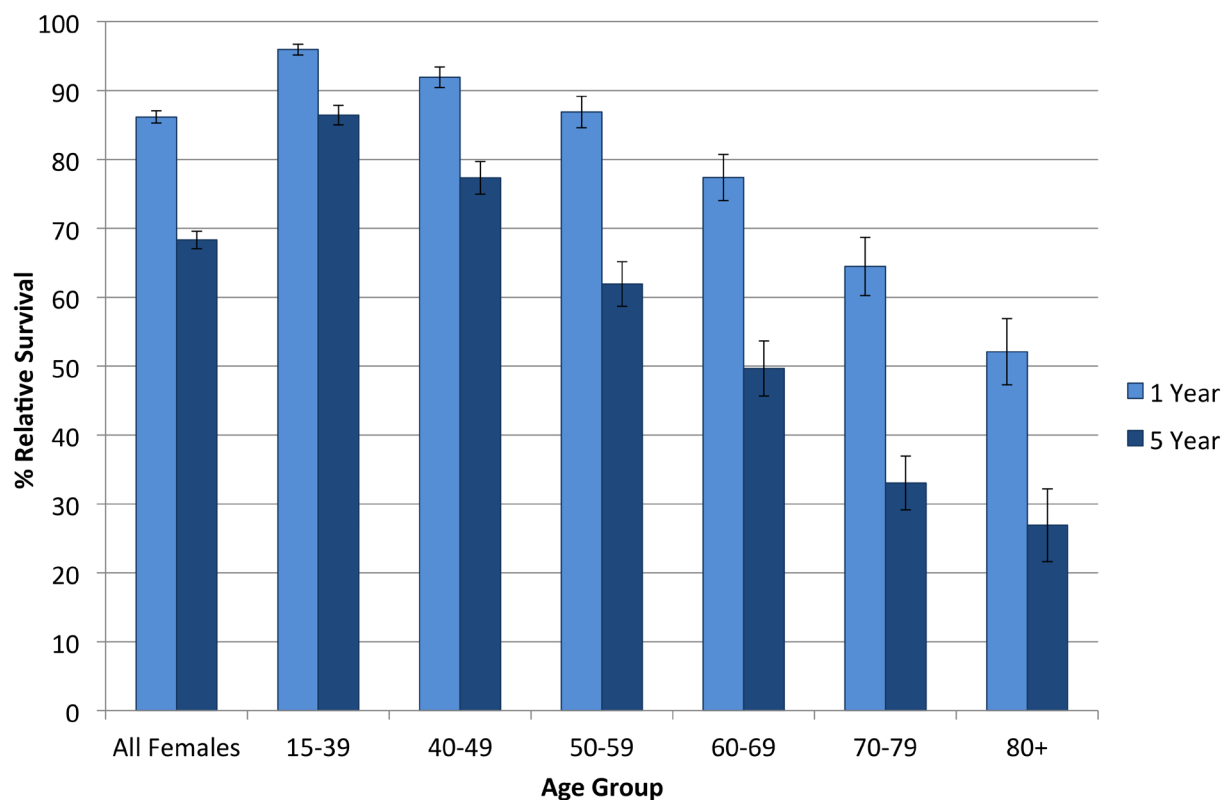


Figure 17 Age-specific relative survival, England, 2005–2007 and 2001–2003.

Error bars are 95% confidence intervals for survival estimates.

Trends in one-year relative survival by age, England, 1985–1987 to 2005–2007

Over the last 20 years, one-year relative survival has improved in women under the age of 60 and in women aged 80 and over. For women aged 15–39 there was a statistically significant improvement from 91.9% in 1985–1987 to 96.0% in 2005–2007. For women aged between 60 and 79, survival up to one year from diagnosis is slightly lower than 20 years ago.

Table 12 Trends in age-specific one-year relative survival, England, 1985–1987 to 2005–2007

Age group	1985–1987	1995–1997	2005–2007	Change
All females	82.2	83.1	86.2	4.0*
15–39	91.9	94.2	96.0	4.1*
40–49	89.4	89.7	91.9	2.5
50–59	82.9	84.4	86.9	4.0
60–69	79.4	77.7	77.4	–2.0
70–79	65.8	67.1	64.5	–1.4
80+	45.9	49.4	52.1	6.2

‘Change’ is absolute change between 1985–1987 and 2005–2007.

*Statistically significant difference over this time period.

Source: UK Cancer Information Service.

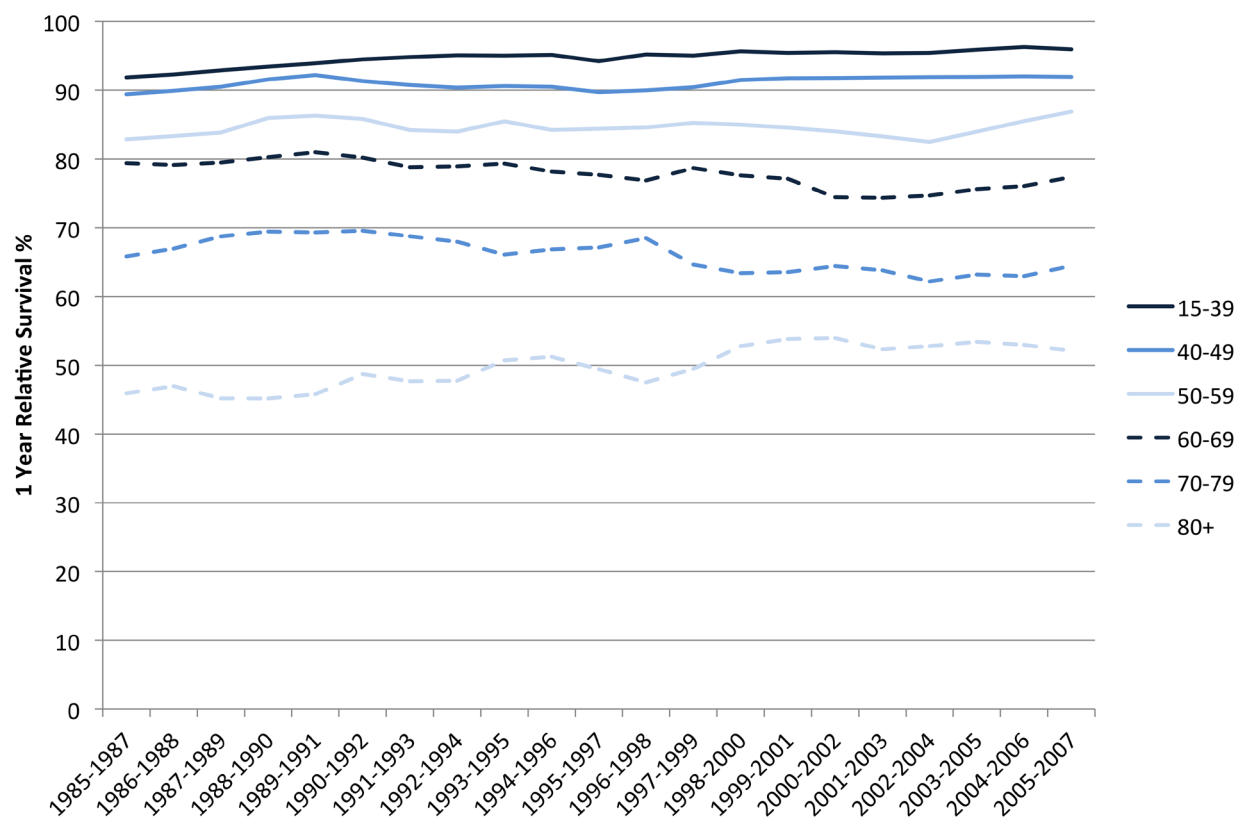


Figure 18 Trends in age-specific one-year relative survival, England, 1985–1987 to 2005–2007.

Source: UK Cancer Information Service.

Trends in five-year relative survival by age, England, 1986–1988 to 2001–2003

Over the last 15 years, five-year relative survival has improved in women under the age of 60 and also in women aged 80 and over. The greatest increase in survival is in women aged 15–39, with a statistically significant increase from 77.5% in 1986–1988 to 86.4% in 2001–2003. Survival up to five years from diagnosis has also statistically significantly increased among women aged 40–49 from 71.6% in 1986–1988 to 77.3% in 2001–2003. For women aged between 60 and 79, survival up to five years from diagnosis is slightly lower than 15 years ago.

Table 13 Trends in age-specific five-year relative survival, England, 1986–1988 to 2001–2003

Age group	1986–1988	2001–2003	Change
All females	63.0	68.3	5.3*
15–39	77.5	86.4	8.9*
40–49	71.6	77.3	5.8*
50–59	59.4	61.9	2.6
60–69	53.7	49.7	–4.0
70–79	38.4	33.0	–5.4
80+	22.1	26.9	4.8

‘Change’ is absolute change between 1986–1988 and 2001–2003.

*Statistically significant difference over this time period.

Source: UK Cancer Information Service.

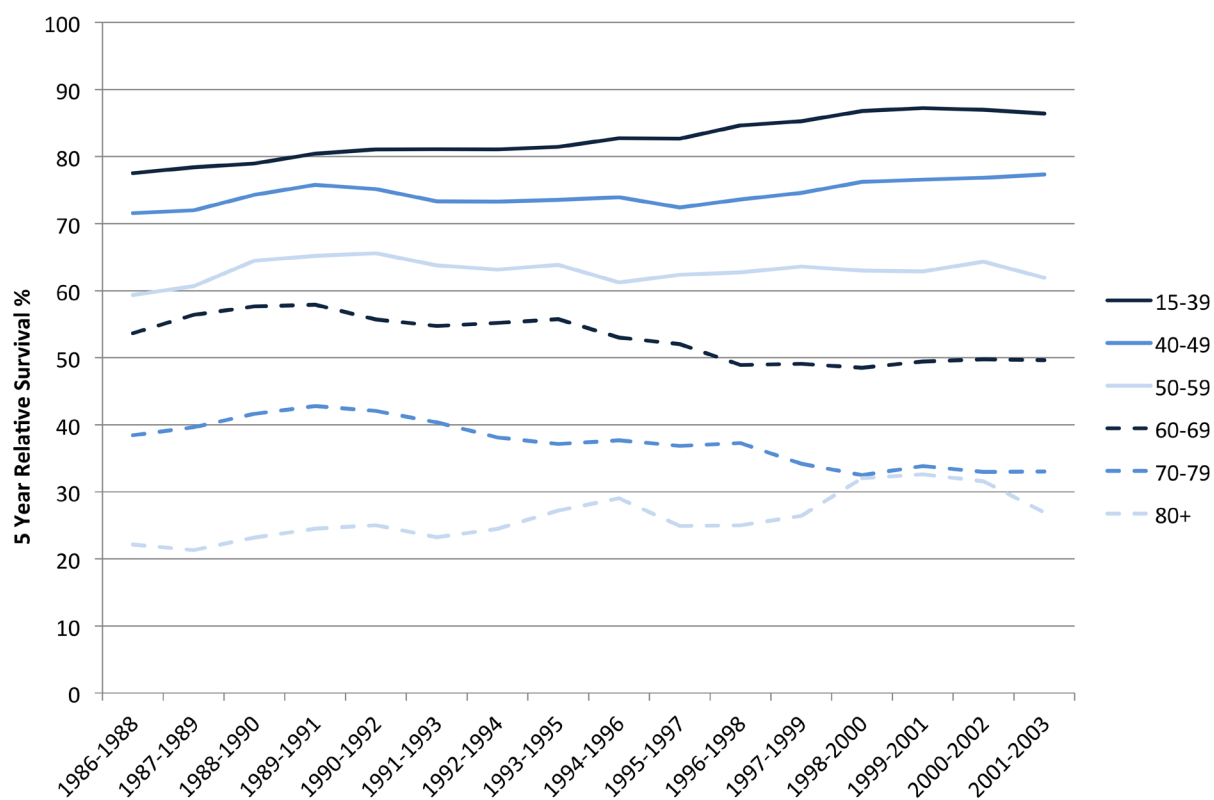


Figure 19 Trends in age-specific five-year relative survival, England, 1986–1988 to 2001–2003.

Source: UK Cancer Information Service.

Relative survival by deprivation, England, 2005–2007 and 2001–2003

Survival up to one year after diagnosis is higher in women living in the most affluent fifth of areas when compared with the most deprived fifth of areas nationally, with a one-year relative survival gap of 4.0% (87.6% vs 83.6%). Similarly, when comparing the most affluent with the most deprived fifth of areas nationally, the five-year relative survival gap is 5.0% (71.9% vs 66.9%).

Table 14 Relative survival by deprivation, England, 2005–2007 and 2001–2003

Deprivation group	One-year relative survival				Five-year relative survival			
	Cases	Deaths	%	95% confidence limits	Cases	Deaths	%	95% confidence limits
All females	6,533	972	86.2	(85.3, 87.1)	6,666	2,433	68.3	(67.1, 69.6)
Affluent	1,242	166	87.6	(85.7, 89.6)	1,200	394	71.9	(69.0, 74.9)
2	1,122	146	88.1	(86.0, 90.1)	1,147	422	68.8	(65.7, 71.9)
3	1,405	197	87.0	(85.2, 88.9)	1,370	510	67.8	(65.0, 70.6)
4	1,329	213	85.0	(83.0, 87.1)	1,442	547	66.9	(64.2, 69.7)
Deprived	1,435	249	83.6	(81.6, 85.7)	1,507	560	66.9	(64.2, 69.5)

Source: UK Cancer Information Service.

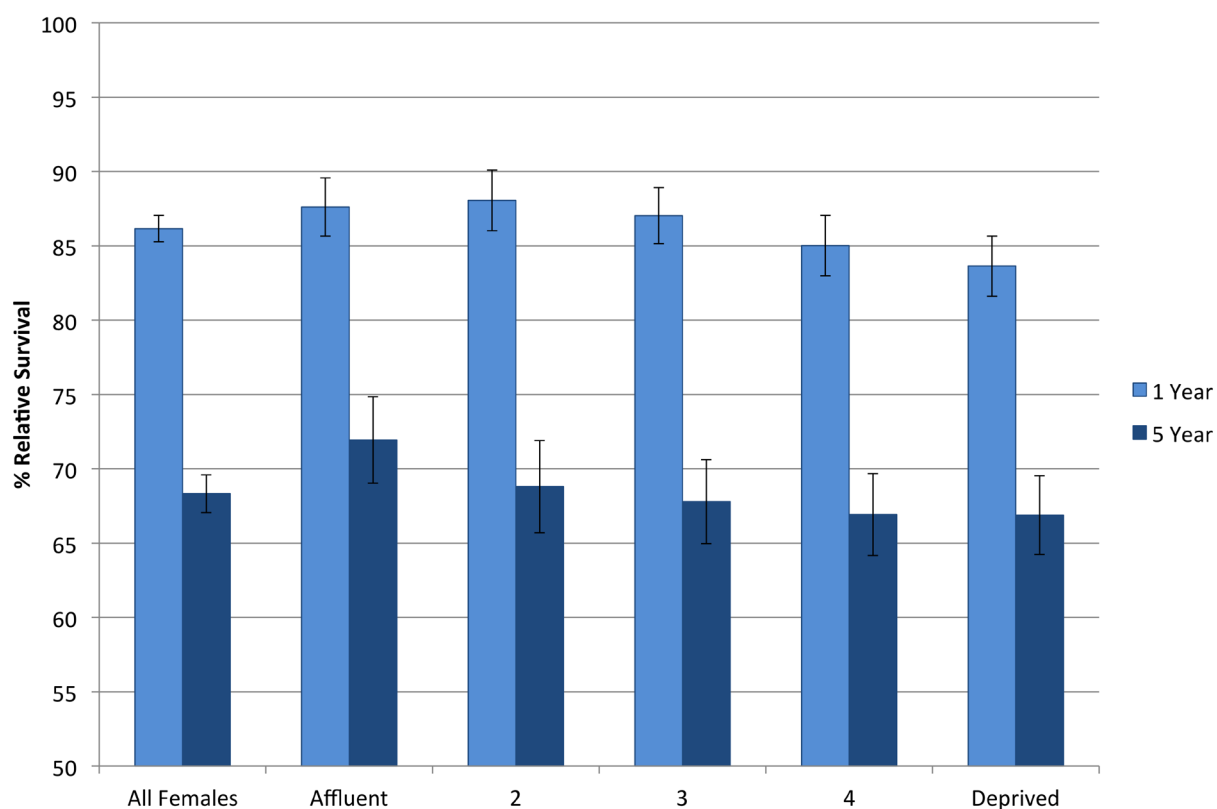


Figure 20 Relative survival by deprivation, England, 2005–2007 and 2001–2003.

Error bars are 95% confidence intervals for survival estimates.

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APPENDIX 1: METHODOLOGY

Cervical cancer

All results presented in this report are based on invasive cervical cancer, defined using the International Classification of Diseases version 10 (ICD-10) code C53 for 'Malignant neoplasm of cervix uteri'.

Age standardisation

Cervical cancer incidence and mortality vary greatly with age. Incidence and mortality rates are directly age standardised to take account of differing age profiles of cancer patients in different geographical areas over time. Comparisons between areas and years are consequently unbiased.

Rates are presented per 100,000 female population using the European standard population weights, as outlined in Table A1.

Table A1 European standard population weights

Age group	Population	Age group	Population	Age group	Population
0	1,600	30–34	7,000	65–69	4,000
1–4	6,400	35–39	7,000	70–74	3,000
5–9	7,000	40–44	7,000	75–79	2,000
10–14	7,000	45–49	7,000	80–84	1,000
15–19	7,000	50–54	7,000	85+	1,000
20–24	7,000	55–59	6,000		
25–29	7,000	60–64	5,000	Total	100,000

Confidence intervals

Confidence intervals (CIs) are a way of expressing how certain we are about a figure, such as an estimated cancer incidence rate. All CIs in this report have been calculated at the 95% level of statistical significance and thus define a range of values that we are 95% certain contains the true value.

When evaluating the rates of different groups, the CIs can be compared to determine whether the range of values overlap. If the CIs do not overlap, then the difference between the rates is said to be statistically significant.

Correlation

Correlation is the method of analysis used to quantify the association between two continuous measures. The correlation coefficient quantifies the degree of 'straight line' relationship between the two measures

and can range from -1 to $+1$. A value of -1 indicates a perfect negative association (ie as one measure increases the other decreases) and $+1$ indicates a perfect positive association. A value closer to 0 indicates that there is no linear relation between the two measures. In this way, the spread of the data points around an underlying linear trend is quantified; the greater the spread of data points, the lower the correlation coefficient.

Funnel plots

Funnel plots have become a preferred method of presenting comparisons between geographical areas or institutions in public health. This is opposed to the more conventional use of 'caterpillar' plots, which visually imply a ranking of areas based on good or bad performance. In any process or system, variation is to be expected; the funnel plot approach makes it easier to identify which data points indicate areas that may be worthy of further investigation. Simple statistical methods are used to define limits of expected variation known as control limits. The group average is used as the estimate of expected 'performance' and the best estimate of expected variation around this average is both/either \pm two standard deviations (SDs), equivalent to 95% confidence intervals, and/or \pm three SDs, equivalent to 99.8% confidence intervals. The areas that fall outside these control limits are deemed to be statistically significantly different from the group average. More information on funnel plot methodology can be found in the Association of Public Health Observatories (APHO) technical briefing no. 2, *Statistical process control methods in public health intelligence* (www.apho.org.uk/resource/item.aspx?RID=39445).²

Deprivation

The Income Domain of the Indices of Multiple Deprivation 2007 (IMD 2007) was used to assess the relationships among incidence, mortality, relative survival and deprivation nationally.³ IMD 2007 is a super output area (SOA) level measure of multiple deprivation made up of seven SOA level domain indices.

Deprivation was analysed at the smallest population level available, lower SOA, with an average population of 1,500 in England. National LSOAs were split into equally sized quintile groups according to ranked income domain scores. At PCT level the score of the income domain was used as published by Yorkshire and the Humber Public Health Observatory. These were calculated by aggregating the LSOA income scores using population weighting.

Relative survival

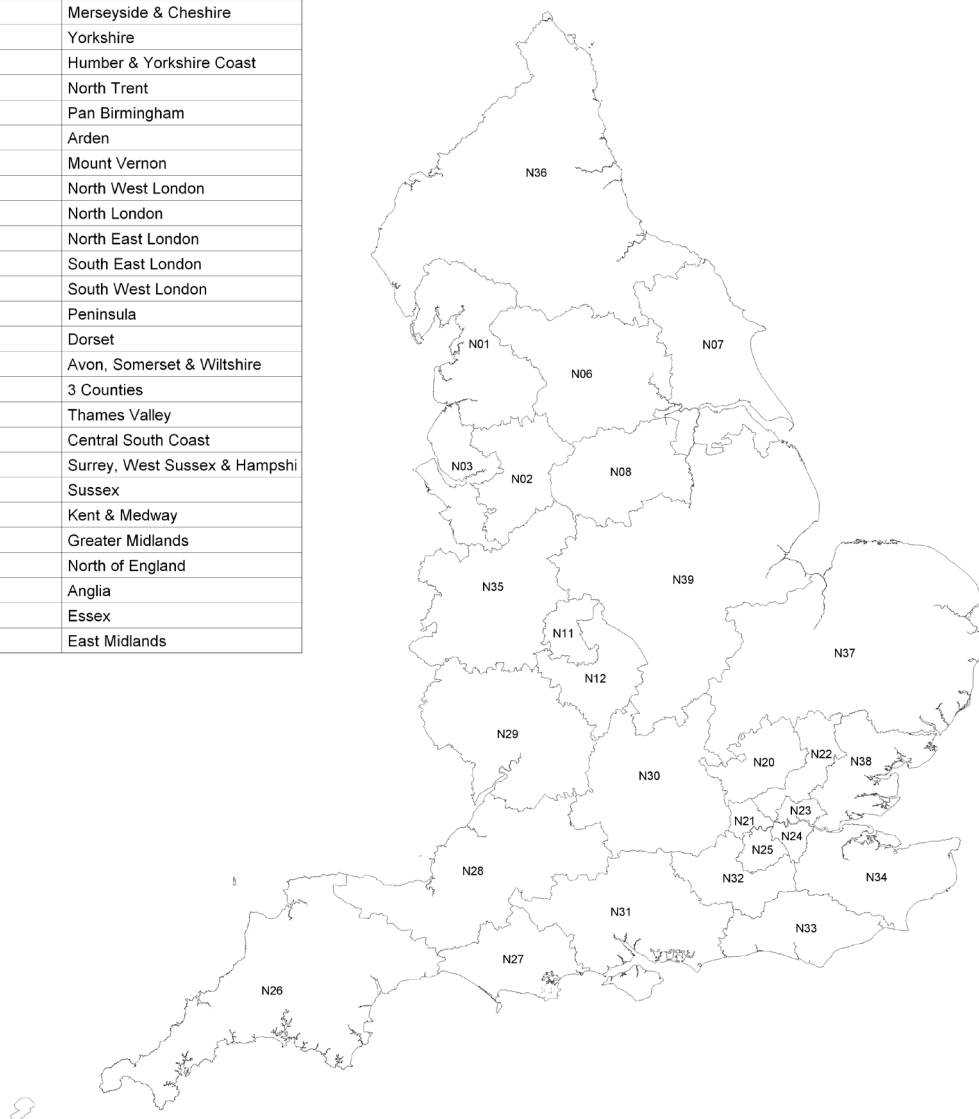
Crude survival is measured by the percentage of the original cohort of cancer patients, diagnosed in a particular period, who remain alive at a specified time after diagnosis. The relative survival rate is the ratio of the survival rate observed among the cancer patients and the survival that would have been expected had they had the same overall mortality rate as the general population, of the same sex and age, in which they live. So, relative survival can be interpreted as the survival of cancer patients relative to, or compared with, that of the population. For example, if five-year survival is 40% among a group of cancer patients of whom 80% would have been expected to survive that long, then their relative survival is $40/80$ (50%).

National life tables have been used in the calculation of relative survival to provide the recent age- and sex-specific mortality profile of the background population.

APPENDIX 2: GUIDE TO CANCER NETWORKS

Guide to Cancer Networks maps

CODE	NAME
N01	Lancashire and South Cumbria
N02	Greater Manchester & Cheshire
N03	Merseyside & Cheshire
N06	Yorkshire
N07	Humber & Yorkshire Coast
N08	North Trent
N11	Pan Birmingham
N12	Arden
N20	Mount Vernon
N21	North West London
N22	North London
N23	North East London
N24	South East London
N25	South West London
N26	Peninsula
N27	Dorset
N28	Avon, Somerset & Wiltshire
N29	3 Counties
N30	Thames Valley
N31	Central South Coast
N32	Surrey, West Sussex & Hampshi
N33	Sussex
N34	Kent & Medway
N35	Greater Midlands
N36	North of England
N37	Anglia
N38	Essex
N39	East Midlands



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