National Collaborating Centre for Cancer

Bladder cancer:

diagnosis and management

NICE Guideline 2

Needs Assessment - full report

February 2015

Final version

Commissioned by the National Institute for Health and Care Excellence

Disclaimer
Healthcare professionals are expected to take NICE clinical guidelines fully into account when exercising their clinical judgement. However, the guidance does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each patient, in consultation with the patient and/or their guardian or carer.

Funding
Funded to produce guidelines for the NHS by NICE

Contents

1 Introduction

Bladder cancer is the seventh most common cancer in the UK, with just over 10,000 cases diagnosed each year (CRUK, 2013a). These are unevenly split between men (fourth most common cancer) and women (11th most common cancer).

Around 5,000 people each year die from bladder cancer, making it the seventh most common cause of cancer death (CRUK, 2013b). As with new diagnoses these are unevenly split between men (sixth most common cancer death) and women (12th most common cancer death).

There are a number of well-known risk factors for bladder cancer. The main risk is age, with the highest risk in those aged 80 and over (see section below). Aside from this, sex is a major factor; with men having an age-standardised rate over three times higher than women. This difference is strongly linked to historical differences in smoking rates, with more men smoking than women. The risk of developing bladder cancer is about three times higher in smokers, and 1 in 3 bladder cancers can be attributed to smoking (Parkin, 2011a). Men are also more likely to have worked in certain industries (leather tanning, rubber manufacture) which once used chemicals which increase the risk of bladder cancer. These chemicals are now controlled but it is estimated that about 7% of men and 2% of women get bladder cancer because of these industrial links (Parkin, 2011b). A very small amount of bladder cancers can be attributed to exposure to medical radiation: just over 2% of all cases (Parkin, 2011c). This must be taken in context of the benefits of medical imaging and therapies which use ionizing radiation.

1.1 Methods

New cases of bladder cancer (incidence) in England are registered by the National Cancer Registration Service (NCRS), which is part of Public Health England (PHE). Recurrences of the same type of cancer in the same part of the body are not recorded, nor are sites to which the cancer has spread (metastasised).

New cases of bladder cancer (incidence) in Wales are registered by the Welsh Cancer Intelligence and Surveillance Unit (WCISU), using the same rules as the NCRS and other UK countries.

All deaths in England and Wales are certified by a medical professional and then processed by the Office for National Statistics (ONS). The ONS derive a single underlying cause of death – this is what is counted for official statistics.

The number of new cases diagnosed each year were extracted from the NCRS and WCISU database using the following ICD-10 codes:

- C67 ‘Malignant neoplasm of bladder’
- D09.0 ‘Carcinoma in situ of bladder ’
- D41.4 ‘Neoplasm uncertain/unknown behaviour of bladder’

The number of deaths were extracted from the ONS deaths database where the underlying cause was one of the above ICD-10 codes, or the following ICD-9 codes :

- 188 ‘Malignant neoplasm of bladder’
- 2337 ‘Carcinoma in situ of bladder ’
- 2367 ‘Neoplasm of uncertain behaviour of bladder’

Populations used to calculate rates are supplied by ONS at LSOA level (see below), split by sex, year and five-year age band.

Cancer can be categorised based on how far it has spread at diagnosis, this is called the stage. Bladder cancer is grouped using the TNM staging system, but this only applies to Transitional Cell Carcinoma (TCC) so only these cancers are counted in analyses by stage.

The TNM system is based on the spread of the primary tumour (T), whether regional lymph nodes are involved (N) and whether there are distant metastases (M). Papillary noninvasive tumours are TNM stage 0a and are counted under the ICD-10 D41.4 code. Carcinoma in situ are TNM stage 0is and generally counted under ICD-10 code D09.0. Malignant tumours are split into four groups:

- Stage I: tumour invades subepithelial connective tissue (T1); no lymph node involvement (N0); no distant metastases (M0)
- Stage II: tumours invades muscle (T2); no lymph node involvement (N0); no distant metastases (M0)
- Stage III: tumour invades perivesical tissue (T3); no lymph node involvement (N0); no distant metastases (M0)
- Stage IV: tumour invades prosate, uterus, vagina, pelvic wall or abdominal wall (T4); or regional lymph nodes show metastasis (N1-N3); or there are distant metastases (M1).

In principle T4 can be split in two groups based on which organ(s) are involved, and one of these T groups is stage III and one stage IV. The NCRS and WCISU data does not hold this information, so all T4 tumours are grouped in stage IV.

The postcode of residence at diagnosis/death is recorded in the NCRS, WCISU and ONS data and this can be used to assign people to different geographies (e.g. Local Authority). It can also be used to link people in England to the Indices of Deprivation published by the Department of Communities and Local Government (DCLG, 2012). In this analysis a person is assigned the income deprivation score of the Lower Super Output Area (LSOA) they live in when they are diagnosed/die. LSOAs are a small geography designed for statistical analysis (ONS, 2014). Income deprivation is defined as the proportion of the population who are:

- Adults and children in Income Support families
- Adults and children in income-based Jobseeker's Allowance families
- Adults and children in Pension Credit (Guarantee) families
- Adults and children in Child Tax Credit families (who are not claiming Income Support, income-based Jobseeker's Allowance or Pension Credit) whose equivalised income (excluding housing benefits) is below 60% of the median before housing costs
- Asylum seekers in England in receipt of subsistence support, accommodation support, or both.

Once assigned an income deprivation score, LSOAs are grouped into five groups (quintiles) of equal population. These groups are then used to assign each person into a deprivation quintile.

A similar method is used for people living in Wales, except the Welsh Index of Multiple Deprivation (WIMD) is used (Welsh Government, 2014). The WIMD is constructed from eight different types of deprivation:

- income
- housing
- employment
- access to services
- education
- health
- community safety

- physical environment.

As noted above, the risk of cancer increases with age. Therefore the rate of cancer in a given area can be higher than average if there is an older population living there. To allow fair comparisons to be made between areas, and over time, rates are directly age-standardised. Direct age-standardisation uses the rates at every age in a population to calculate what the rate would be in a fixed (standard) population. If all areas/times use the same standard population the rates can be fairly compared. Here the European Standard Population 1976 is used. The direct age-standardisation technique also takes into account differing ratios of men and women.

In a complex biological process like cancer there is a certain amount of normal variation across groups that does not indicate any real difference in risk. To take this into account when rates are compared, statistical tests are performed which give the chance of a difference in rates being normal variation. This change is expressed as a p-value. If a p-value is less than 0.05 (a 5% chance) then this is accepted as evidence the differences between groups are due to a true underlying difference.

Treatments are identified from Hospital Episode Statistics (HES) and the English Radiotherapy Dataset (RTDS).

Cystectomies are identified from inpatient HES using the following OPCS codes:

- M341 Cystoprostatectomy
- M342 Cystourethrectomy
- M343 Cystectomy NEC
- M344 Simple cystectomy
- M348 Other specified total excision of bladder
- M349 Unspecified total excision of bladder

Chemotherapy is identified from both inpatient and outpatient HES using the following OPCS codes:

- X352 Intravenous chemotherapy
- X373 Intramuscular chemotherapy
- X384 Subcutaneous chemotherapy
- X721 Delivery of complex chemotherapy for neoplasm including prolonged infusional treatment at first attendance
- X722 Delivery of complex parenteral chemotherapy for neoplasm at first attendance
- X723 Delivery of simple parenteral chemotherapy for neoplasm at first attendance
- X724 Delivery of subsequent element of cycle of chemotherapy for neoplasm
- X728 Other specified delivery of chemotherapy for neoplasm
- X729 Unspecified delivery of chemotherapy for neoplasm
- X731 Delivery of exclusively oral chemotherapy for neoplasm
- X738 Other specified delivery of oral chemotherapy for neoplasm
- X739 Unspecified delivery of oral chemotherapy for neoplasm

Radiotherapy treatments are classified as palliative or curative based on the number of fractions (doses) and the power of those fractions. This is done before the data are supplied to Public Health England.

2 Incidence

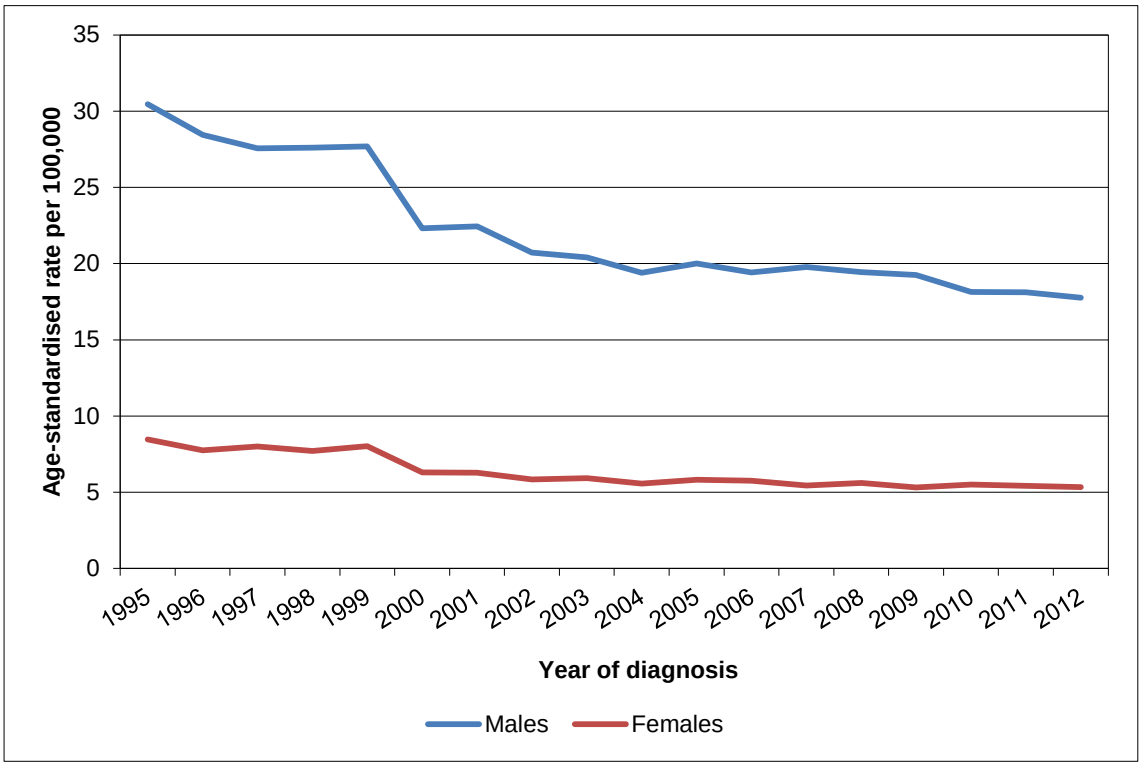
Analysis of trends in bladder cancer incidence is complicated by a coding change which was implemented around the year 2000 in England and in 2007 in Wales. Under this change papilliary tumours of uncertain behaviour and *carcinoma in situ* were assigned separate codes from fully-malignant bladder cancers. This causes an apparent drop in incidence clearly visible in the following graphs. It is not appropriate to compare rates from before the year 2000 or 2007 with more recent data.

Since the coding change bladder cancers have been coded under the ICD-10 system (WHO, 2014) as C67, papilliary tumours of uncertain behaviour have been coded as D41.4 and *carcinoma in situ* have been coded as D09.0. Throughout this document 'bladder cancer' is used to refer to C67 cases only.

Bladder cancer incidence rates in men are over three times higher than in women ($p<0.001$). In 2012, the age-standardised rate (ASR) in men in England was 17.8 per 100,000 and in women it was 5.3 per 100,000 (Figure 1). In Wales the ASR in 2012 was 16.8 per 100,000 in men and 5.6 per 100,000 in women (Figure 2).

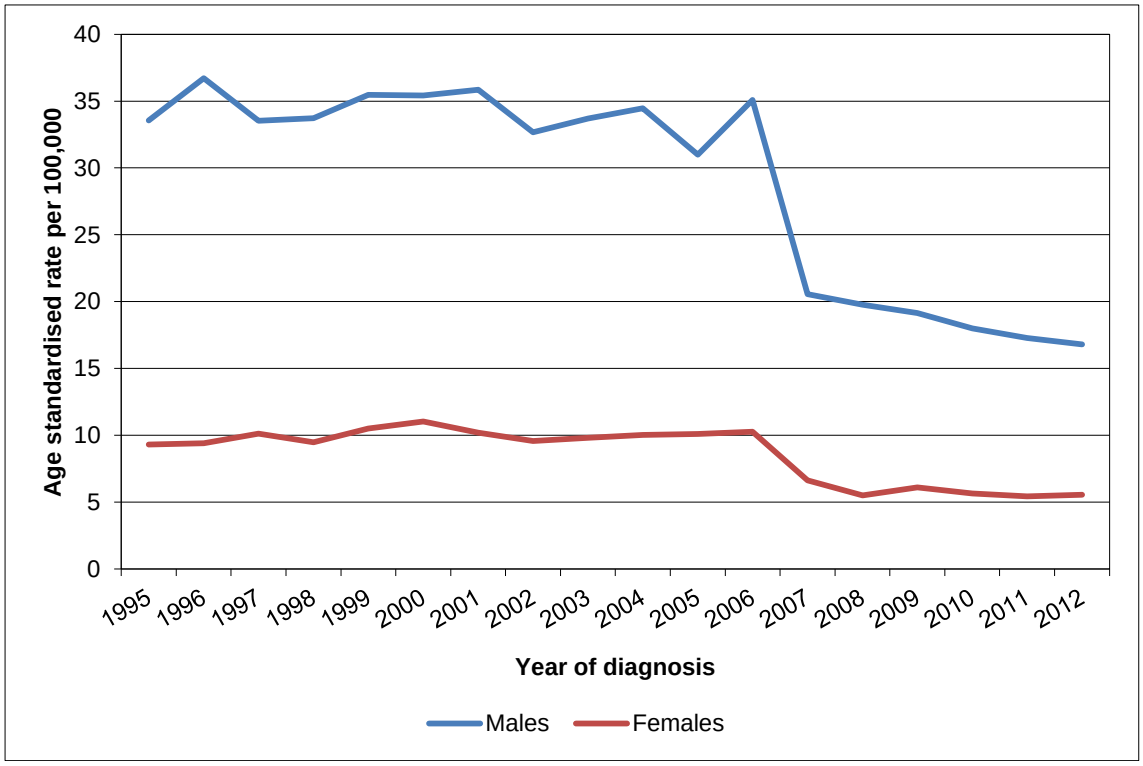
In 2012 6,457 men in England were diagnosed with bladder cancer, compared to 2,453 women. Cases have fluctuated only slightly each year, with no trend. However ASRs have fallen consistently since the year 2000. In men, rates decreased at an average of 1.7% each year from 2000 to 2012. In women the rate has fallen steadily from 2000 to 2012 at 1.3% each year.

Figure 1: Incidence of bladder cancer (ICD-10 code C67), age-standardised rate per 100,000 by sex, England 1995-2012.



Source: NCRS; ONS

Figure 2: Incidence of bladder cancer (ICD-10 code C67), age-standardised rate per 100,000 by sex, Wales 1995-2012



Source: WCISU; ONS

In 2012 393 men in Wales were diagnosed with bladder cancer, compared to 160 women. Since 2007 – after the coding change – ASRs have fallen for men at an average of 4.1% each year. In women there was insufficient evidence for a change in incidence rate, as there are fewer cases.

The majority of bladder cancers are urothelial carcinomas, but there are differences by sex (Table 1 and 2). In both England and Wales urothelial carinomas are more common in men ($p<0.001$ for both) and squamous cell cancers more common in women ($p<0.001$ for both). In England sarcomas are more common in women ($p=0.003$), however there are very few cases so the magnitude of the difference is small.

Analysis of differences in trends with age between sexes is not possible due to smaller numbers in young age groups.

Table 1: Diagnosis of bladder cancer (ICD-10 code C67), by histological type, age and sex, England 2008-2012

	Males							Females						
	Under 40	40-49	50-59	60-69	70-79	80+	All ages	Under 40	40-49	50-59	60-69	70-79	80+	All ages
Sarcoma	7%	3%	7%	17%	31%	36%	1%	9%	3%	14%	15%	28%	32%	1%
SCC	0%	3%	7%	27%	34%	28%	1%	2%	2%	5%	17%	30%	44%	1%
Squamous	1%	4%	9%	23%	33%	30%	2%	2%	6%	10%	18%	30%	33%	5%
TCC	0%	2%	7%	23%	36%	31%	84%	0%	2%	7%	19%	32%	39%	73%
Other	1%	2%	6%	16%	29%	46%	13%	1%	2%	5%	10%	21%	61%	20%

TCC – Transitional Cell Carcinoma; SCC – Small Cell Carcinoma.
Percentages by age are as a proportion of that histological type. Percentages for all ages are as a proportion of all diagnoses.

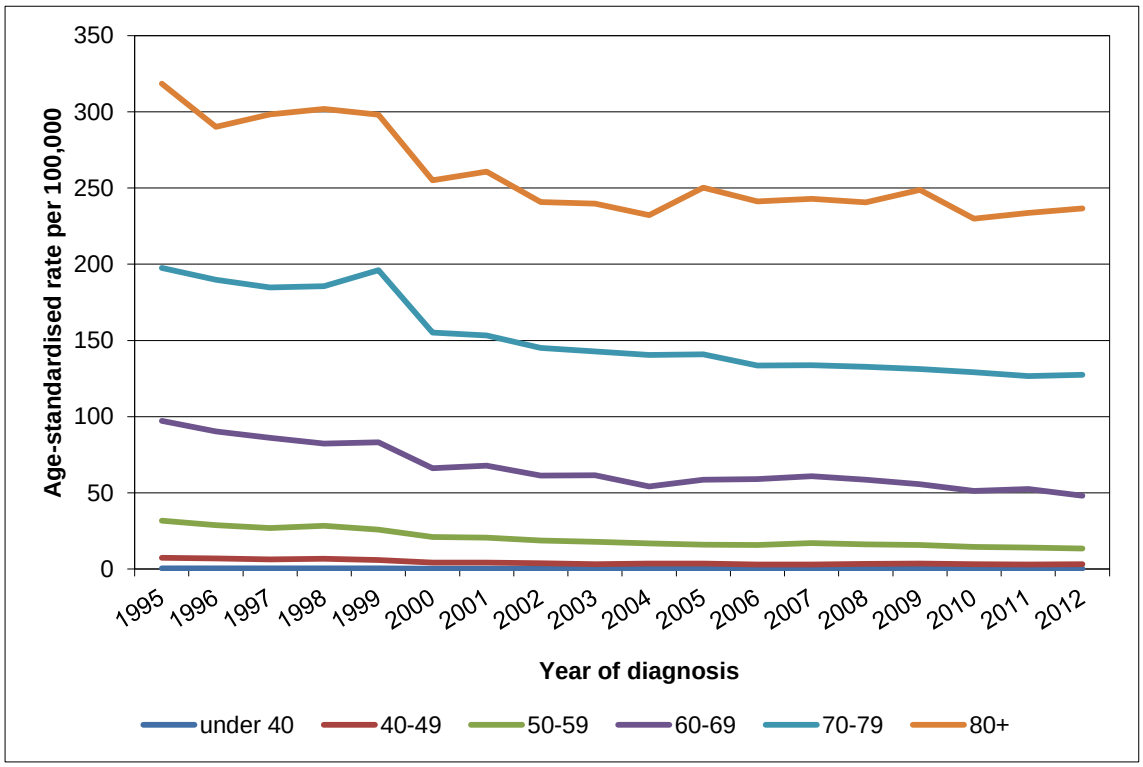
Table 2: Diagnosis of bladder cancer (ICD-10 code C67), by histological type, age and sex, Wales 2008-2012

	Males							Females						
	Under 40	40-49	50-59	60-69	70-79	80+	All ages	Under 40	40-49	50-59	60-69	70-79	80+	All ages
Sarcoma	10%	0%	10%	24%	24%	33%	0%	20%	0%	13%	7%	40%	20%	0%
SCC	0%	0%	5%	35%	45%	15%	0%	0%	14%	0%	29%	43%	14%	0%
Squamous	2%	4%	10%	16%	35%	33%	1%	2%	8%	8%	20%	26%	35%	3%
TCC	1%	3%	10%	27%	36%	23%	84%	1%	3%	10%	23%	34%	28%	75%
Other	2%	3%	8%	22%	35%	30%	15%	2%	4%	7%	15%	29%	43%	21%

TCC – Transitional Cell Carcinoma; SCC – Small Cell Carcinoma.
Percentages by age are as a proportion of that histological type. Percentages for all ages are as a proportion of all diagnoses.

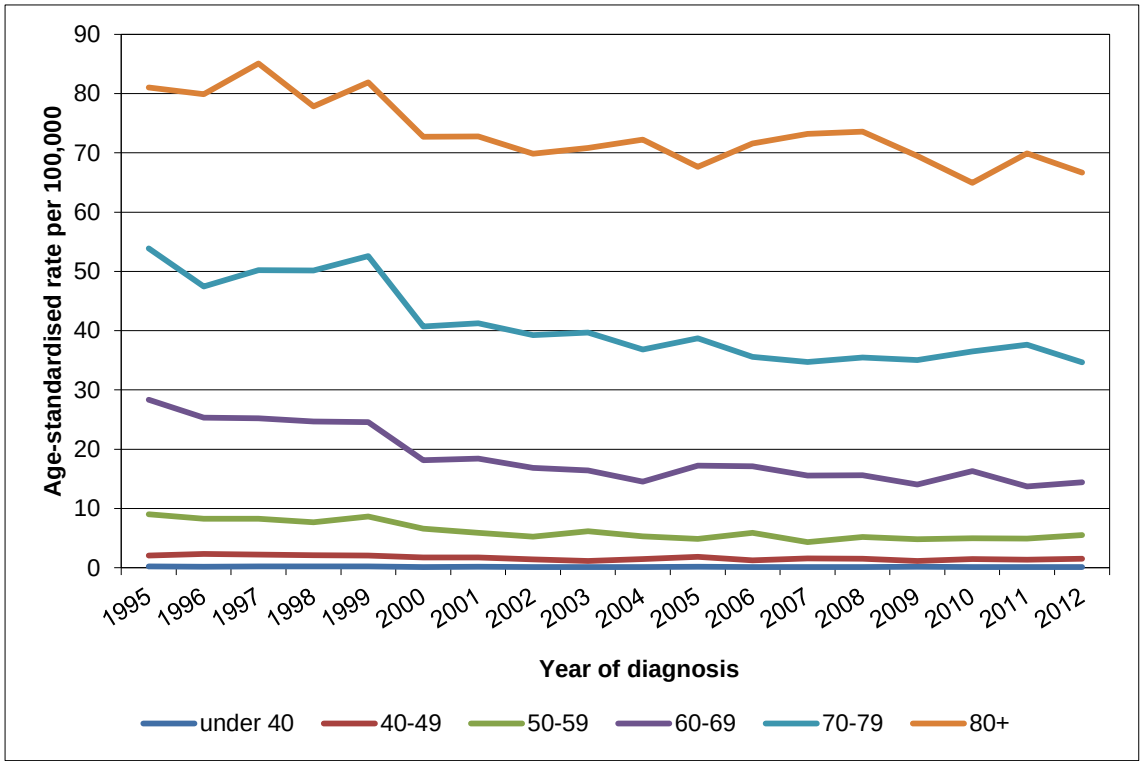
The rate of bladder cancer incidence increases with age in both males and females, with the highest rates occurring in those aged 80 and over. In England in 2012 34% of cases in men were diagnosed in those aged 80+ (2,200 cases) and 43% of cases in women were diagnosed in those aged 80+ (1,048 cases) (Figures 3 and 4). This proportion has increased steadily since the year 2000, when 25% of cases in men and 38% of cases in women were in those aged 80 and over. This is likely to be a result of an aging population, but also a cohort effect of those who may have been exposed via industry in the 1950s/60s or had higher smoking prevalence.

Figure 3: Incidence of bladder cancer (ICD-10 code C67) in men, age-specific rate per 100,000, England 1995-2012



Source: NCRS; ONS

Figure 4: Incidence of bladder cancer (ICD-10 code C67) in women, age-specific rate per 100,000, England 1995-2012

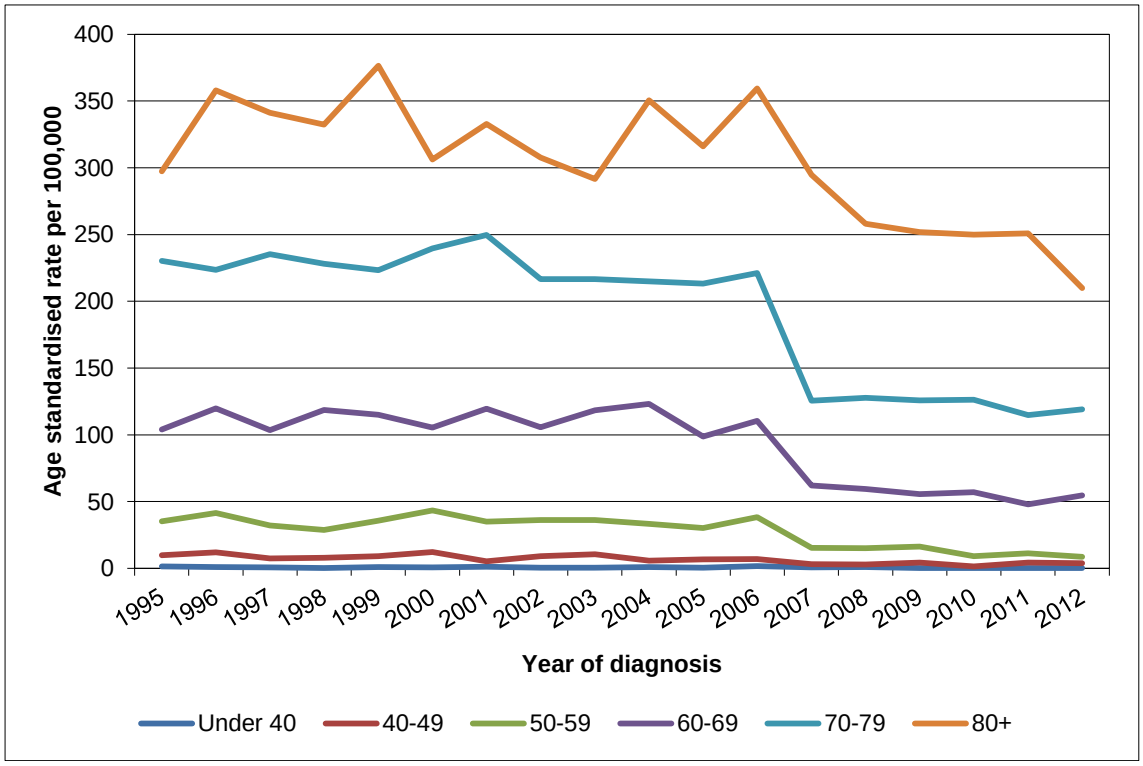


Source: NCRS; ONS

There have not been decreases in ASRs in all age groups in England since 2000, but numbers or cases are low in those aged under 50 (224 in total for 2012) so it is rarely possible to be sure of a trend. In men there has been a decreasing trend in incidence in those aged 50-59 (2.6% each year); those aged 60-69 (2.8% each year); and those aged 70-79 (2.8% each year). In women the only significant decreasing trends were in those aged 60-69 (2.3% each year); and those aged 70-79 (2.5% each year).

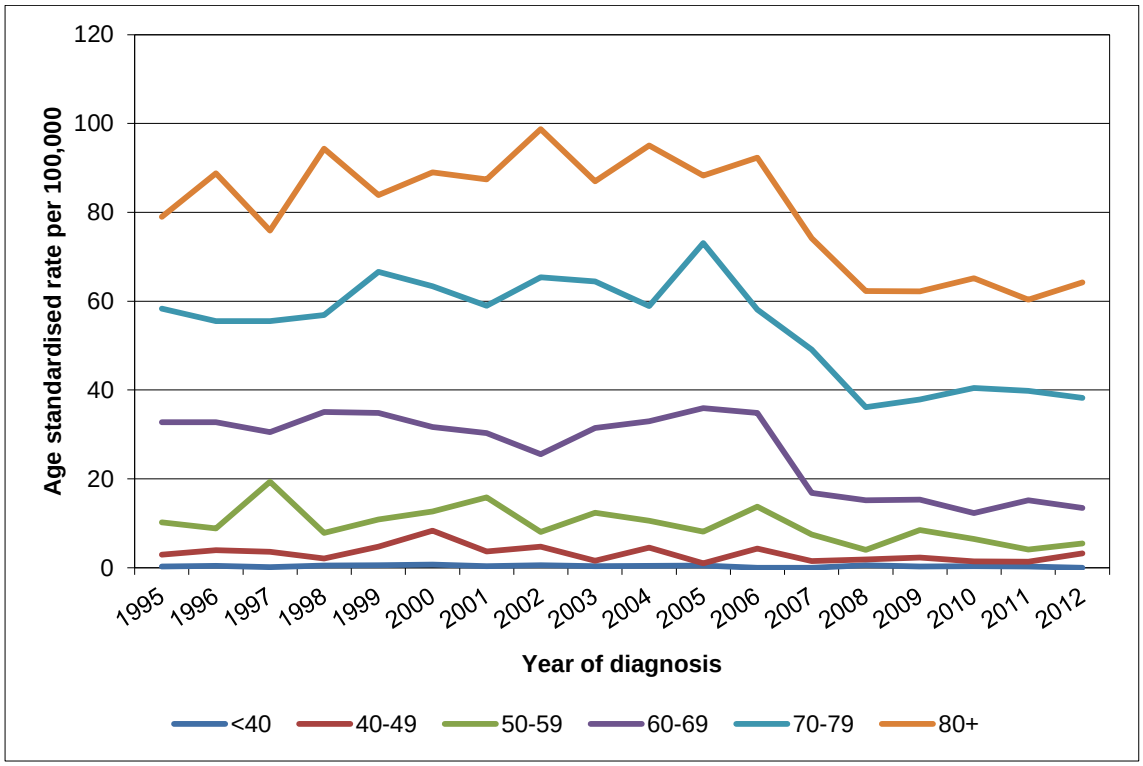
In Wales the highest age-specific rates are also in those aged 80 and over. In 2012 31% of cases in men were diagnosed in those aged 80+ (123 cases) and 40% of cases in women were diagnosed in those aged 80+ (64 cases) (Figures 5 and 6). This proportion is largely unchanged since 2007. The only age group in Wales in which there is enough evidence for a decreasing trend is in men aged 80 and over. Since 2007 the rate has decreased by 4.9% each year.

Figure 5: Incidence of bladder cancer (ICD-10 code C67) in men, age-specific rate per 100,000, Wales 1995-2012



Source: WCISU; ONS

Figure 6: Incidence of bladder cancer (ICD-10 code C67) in women, age-specific rate per 100,000, Wales 1995-2012

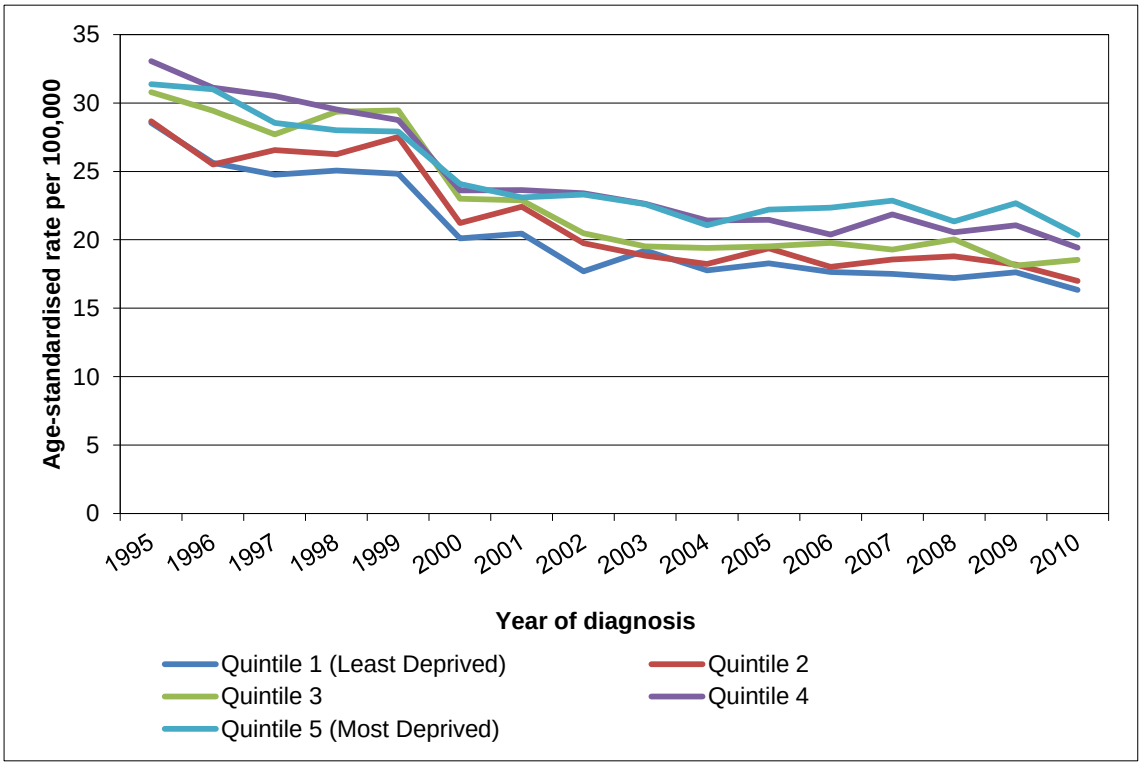


Source: WCISU; ONS

The incidence of bladder cancer in England is higher in the most deprived population compared to the least deprived population (p<0.001) (Figures 7 and 8). This was true in 2000

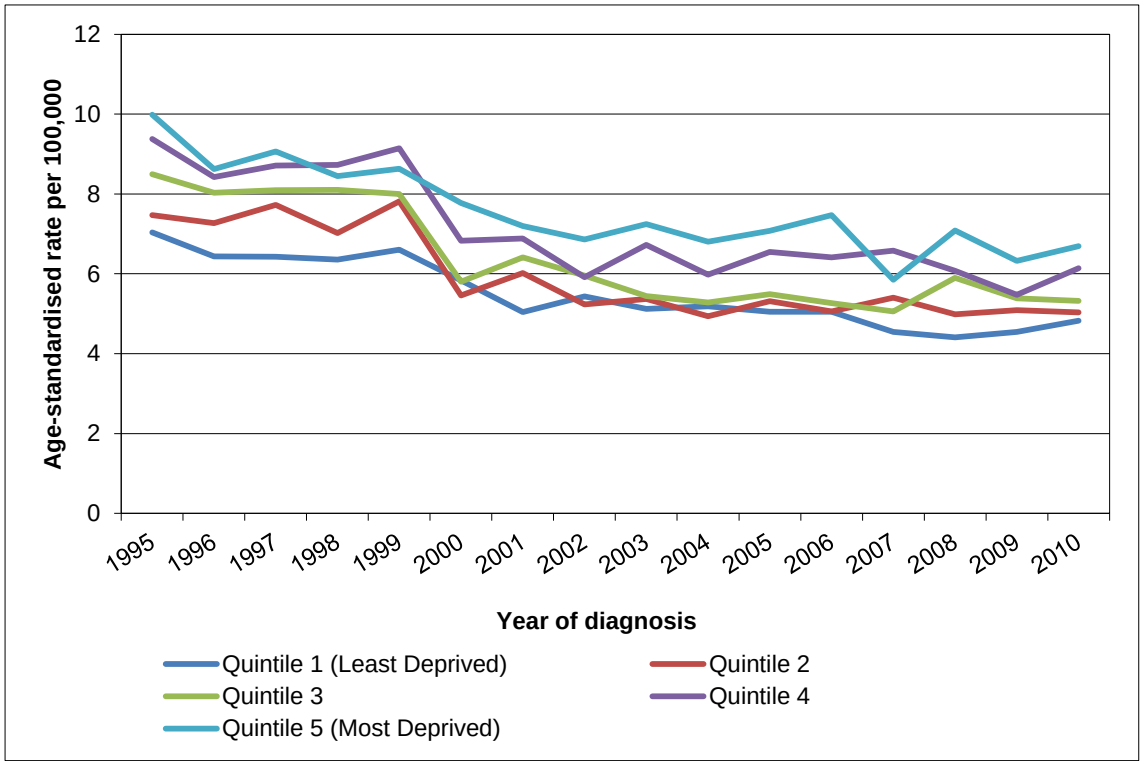
as well as in 2010, but the ratio of the age-standardised incidence rate in the least deprived compared to the most deprived has decreased over time. In 2000 the ratio was 0.84 in men (i.e. lower in the least deprived) and 0.75 in women. In 2010 it was 0.80 for men and 0.72 for women. This is supported by the analysis of trends in the ASR for each deprivation quintile, shown in Table 2. It can be seen that the decreasing trend is smallest in the most deprived population for men, and for women that only the two least deprived quintiles show a statistically significant decrease. Therefore the deprivation gap is widening.

Figure 7: Incidence of bladder cancer (ICD-10 code C67) in men, age-standardised rate per 100,000 by deprivation quintile, England 1995-2010



Source: NCRS; ONS; DCLG

Figure 8: Incidence of bladder cancer (ICD-10 code C67) in women, age-standardised rate per 100,000 by deprivation quintile, England 1995-2010



Source: NCRS; ONS; DCLG

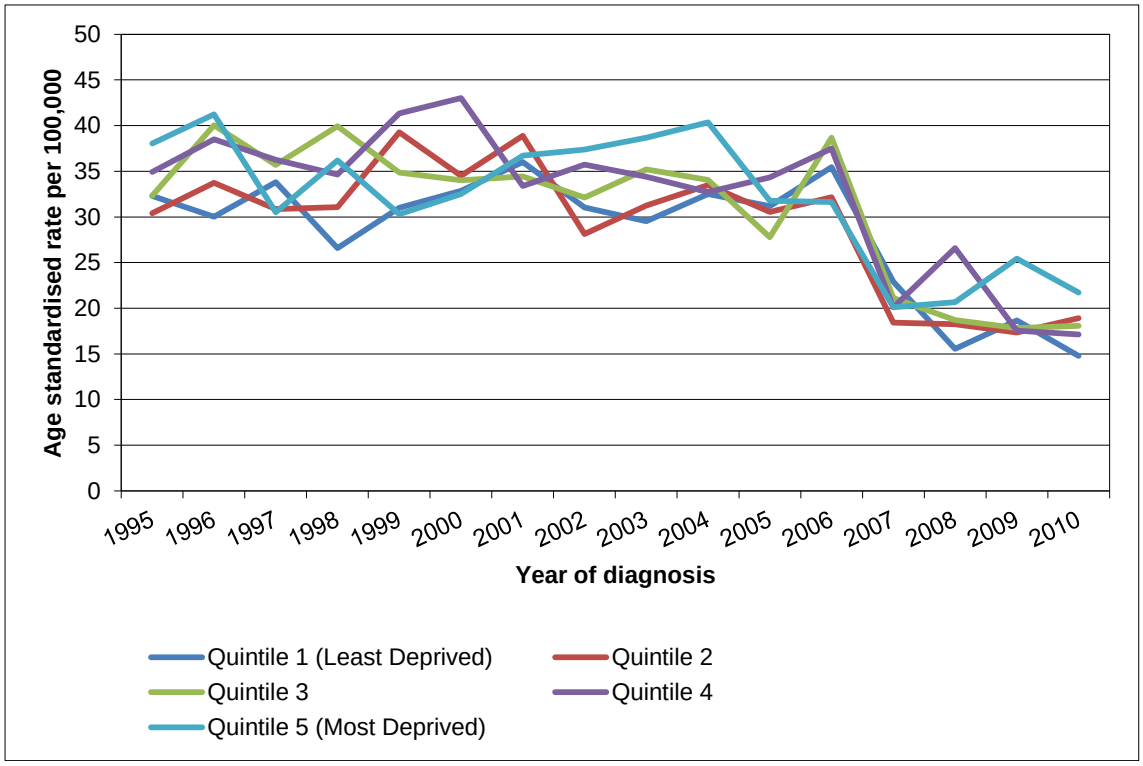
Table 3: Trends of age-standardised incidence of bladder cancer (ICD-10 code C67) in England 2000 to 2010, by deprivation and sex

	Men		Women	
	Annual average change	Significance	Annual average change	Significance
Quintile 1 (Least Deprived)	-1.7%	<0.05	-2.0%	<0.05
Quintile 2	-1.9%	<0.05	-1.1%	<0.05
Quintile 3	-1.9%	<0.05	-1.2%	Not significant
Quintile 4	-1.7%	<0.05	-1.2%	Not significant
Quintile 5 (Most Deprived)	-1.0%	<0.05	-1.3%	Not significant

Source: NCRS; ONS; DCLG

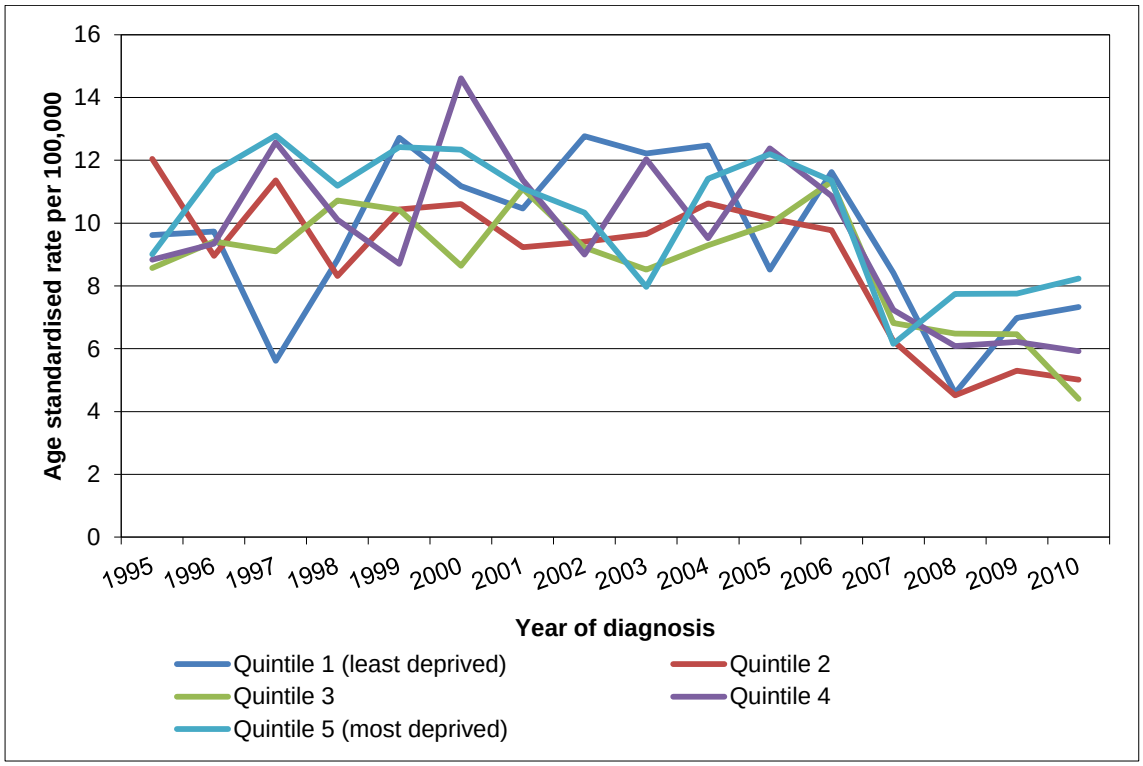
The numbers of cases in each deprivation quintile in Wales is small, and there are fewer years available for analysis (Figures 9 and 10). Therefore we cannot be sure of any trends by deprivation quintile, or if rates are truly higher in the most deprived areas.

Figure 9: Incidence of bladder cancer (ICD-10 code C67) in men, age-standardised rate per 100,000 by deprivation quintile, Wales 1995-2010



Source: WCISU; ONS

Figure 10: Incidence of bladder cancer (ICD-10 code C67) in women, age-standardised rate per 100,000 by deprivation quintile, Wales 1995-2010



Source: WCISU; ONS

The recording of stage in the NCRS data has historically been poor. There has been a concerted effort to improve this situation in recent years. In 2000 only 11% of diagnoses

(ICD-10 C67 only) had a valid TNM stage recorded. Of these 36% were stage I, 25% stage II, 14% stage III and 25% stage IV. In 2012 the situation was slightly better with 35% of diagnoses with a valid TNM stage recorded. Of these 34% were stage I, 29% stage II, 6% stage III and 30% stage IV.

Recording of stage in data from Wales is better. 11% of diagnoses in 2000 had a stage recorded (this includes D09.0 and D41.4 tumours), which had risen to 78% in 2012. In 2012 the proportion of cases with stage information which were stage I was 46%; stage II was 34%; stage III was 12% and stage IV was 9%.

Stage at diagnosis is related to sex, age and deprivation. This was investigated by use of logistic regression models to generate the odds of diagnosis with muscle-invasive bladder cancer (MIBC) compared to non-muscle-invasive bladder cancer (NMIBC), and to generate the odds of diagnosis with TNM stage IV bladder cancer compared to TNM stage I-III bladder cancer.

The results of the logistic regression for bladder cancer (C67) only are shown in Tables 4 and 5 and 6 and 7. The same analysis including non-malignant bladder tumours (D09.0 and D41.4) in the totals are shown in Tables 8 and 9 and 10 and 11.

Table 4: Odds of diagnosis with MIBC compared to NMIBC by age, sex and deprivation, England 2000-2012. Bladder cancer (C67) only

Variable	Odds ratio of MIBC vs NMIBC	p-value	95% confidence intervals on OR	
50-59 years old*	0.76	0.012	0.61	0.94
60-69 years old*	0.68	0.000	0.56	0.83
70-79 years old*	0.69	0.000	0.57	0.84
80+ years old*	0.69	0.000	0.57	0.85
Increasing deprivation quintile	1.06	0.000	1.04	1.09
Sex	1.39	0.000	1.30	1.49

Source: NCRS; ONS; DCLG

**All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men.*

Table 5: Odds of diagnosis with TNM stage IV cancer compared to other bladder cancer by age, sex and deprivation, England 2000-2012. Bladder cancer (C67) only.

Variable	Odds ratio of IV vs I-III	p-value	95% confidence intervals on OR	
50-59 years old*	0.70	0.000	0.58	0.85
60-69 years old*	0.61	0.000	0.51	0.73
70-79 years old*	0.57	0.000	0.48	0.68
80+ years old*	0.42	0.000	0.35	0.50
Increasing deprivation quintile	1.01	0.650	0.98	1.03
Sex	1.30	0.000	1.22	1.39

Source: NCRS; ONS; DCLG

** All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men. A p-value of less than 0.05 is considered as indicating statistical significance.*

Table 6: Odds of diagnosis with MIBC compared to NMIBC by age, sex and deprivation, Wales 2000-2012. Bladder cancer (C67) only

Variable	Odds ratio of MIBC vs NMIBC	p-value	95% confidence intervals on OR	
50-59 years old*	0.82	0.459	0.48	1.39
60-69 years old*	0.75	0.246	0.46	1.22
70-79 years old*	0.82	0.418	0.51	1.33
80+ years old*	0.83	0.455	0.51	1.35
Increasing deprivation quintile	1.02	0.546	0.97	1.07
Sex	1.45	0.000	1.25	1.69

Source: WCISU; ONS; DCLG

**All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men.*

Table 7: Odds of diagnosis with TNM stage IV cancer compared to other bladder cancer by age, sex and deprivation, Wales 2000-2012. Bladder cancer (C67) only

Variable	Odds ratio of IV vs I-III	p-value	95% confidence intervals on OR	
50-59 years old*	0.41	0.047	0.17	0.99
60-69 years old*	0.39	0.015	0.18	0.83
70-79 years old*	0.22	0.000	0.10	0.48
80+ years old*	0.17	0.000	0.08	0.39
Increasing deprivation quintile	0.84	0.007	0.74	0.95
Sex	1.17	0.442	0.79	1.72

Source: WCISU; ONS; DCLG

All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men. A p-value of less than 0.05 is considered as indicating statistical significance.

Table 8: Odds of diagnosis with MIBC compared to NMIBC by age, sex and deprivation, England 2000-2012. All bladder cancer and non-malignant bladder tumours (C67, D09.0, D41.4)

Variable	Odds ratio of MIBC vs NMIBC	p-value	95% confidence intervals on OR	
50-59 years old*	1.13	0.032	1.01	1.27
60-69 years old*	1.21	0.000	1.09	1.34
70-79 years old*	1.23	0.000	1.11	1.37
80+ years old*	1.19	0.001	1.07	1.32
Increasing deprivation quintile	1.02	0.000	1.01	1.04
Sex	1.15	0.000	1.11	1.20

Source: NCRS; ONS; DCLG

**All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men.*

Table 9: Odds of diagnosis with TNM stage IV cancer compared to other bladder cancer by age, sex and deprivation, England 2000-2012. All bladder cancer and non-malignant bladder tumours (C67, D09.0, D41.4)

Variable	Odds ratio of IV vs I-III	p-value	95% confidence intervals on OR	
50-59 years old*	0.98	0.772	0.84	1.14
60-69 years old*	0.98	0.821	0.86	1.13
70-79 years old*	0.95	0.445	0.83	1.08
80+ years old*	0.74	0.000	0.64	0.85
Increasing deprivation quintile	1.01	0.360	0.99	1.03
Sex	1.24	0.000	1.17	1.31

Source: NCRS; ONS; DCLG

All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men. A p-value of less than 0.05 is considered as indicating statistical significance.

Table 10: Odds of diagnosis with MIBC compared to NMIBC by age, sex and deprivation, Wales 2000-2012. All bladder cancer and non-malignant bladder tumours (C67, D09.0, D41.4)

Variable	Odds ratio of MIBC vs NMIBC	p-value	95% confidence intervals on OR	
50-59 years old*	1.24	0.279	0.84	1.83
60-69 years old*	1.38	0.076	0.97	1.97
70-79 years old*	1.81	0.001	1.27	2.56
80+ years old*	2.10	0.000	1.48	3.00
Increasing deprivation quintile	1.03	0.094	0.99	1.08
Sex	1.35	0.000	1.20	1.53

Source: WCISU; ONS; DCLG

**All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men.*

Table 11: Odds of diagnosis with TNM stage IV cancer compared to other bladder cancer by age, sex and deprivation, Wales 2000-2012. All bladder cancer and non-malignant bladder tumours (C67, D09.0, D41.4)

Variable	Odds ratio of IV vs I-III	p-value	95% confidence intervals on OR	
50-59 years old*	0.57	0.199	0.24	1.34
60-69 years old*	0.63	0.214	0.30	1.31
70-79 years old*	0.42	0.023	0.20	0.89
80+ years old*	0.37	0.011	0.17	0.80
Increasing deprivation quintile	0.86	0.020	0.76	0.98
Sex	1.21	0.338	0.82	1.77

Source: WCISU; ONS; DCLG

All ages are compared to those aged under 50. The OR for deprivation is for each increase in quintile compared to the previous. The OR for sex is women compared to men. A p-value of less than 0.05 is considered as indicating statistical significance.

It is apparent from Tables 4 to 11 that the greatest difference in odds for being diagnosed with more advanced cancer is between men and women. This difference is apparent for both measures of advanced cancer (MIBC or TNM stage IV) and either including or excluding D-code bladder tumours. Women have between 15% and 45% higher odds depending on the exact measure and country. Increasing age decreases the odds of being diagnosed with both MIBC and stage IV disease when considering bladder cancer (C67) diagnoses alone. When all bladder tumours are included in the analysis the odds of being diagnosed with MIBC

increases with age, however the odds of stage IV disease continue to be lower with increasing age.

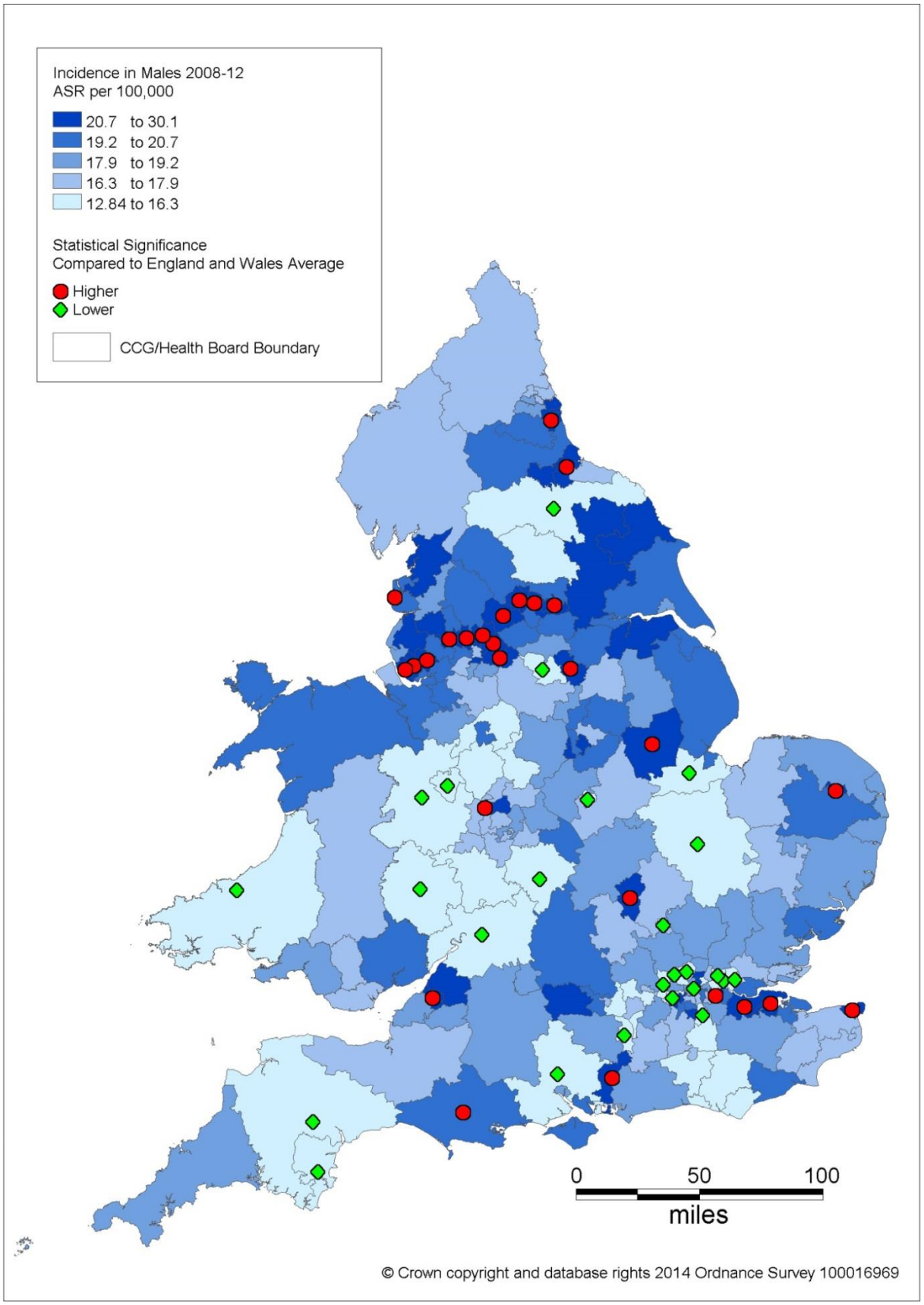
There are some interactions with deprivation, with the odds of MIBC increasing with increasing deprivation. In Wales the odds of TNM IV disease decreases with increasing deprivation. The magnitude of the change in odds with deprivation is generally small compared to the effect of sex or age.

The differences between the results depending on the inclusion of D-code tumours and the definition of advanced cancer suggest the following explanation. With increasing age there is a steady number of cases diagnosed at TNM stage IV, and an increasing number of cases diagnosed at TNM stage II and III (muscle-invasive). There is also an increase in numbers of cases at TNM stage I and a corresponding decrease in pre-cancerous D-code tumours. At any age or in any deprivation group, women are more likely to be diagnosed with MIBC than men.

Figures 11 and 12 show the incidence ASR by CCGs in England and Health Boards in Wales. Those CCGs/Health Boards which have an incidence rate higher or lower than the England and Wales average are marked.

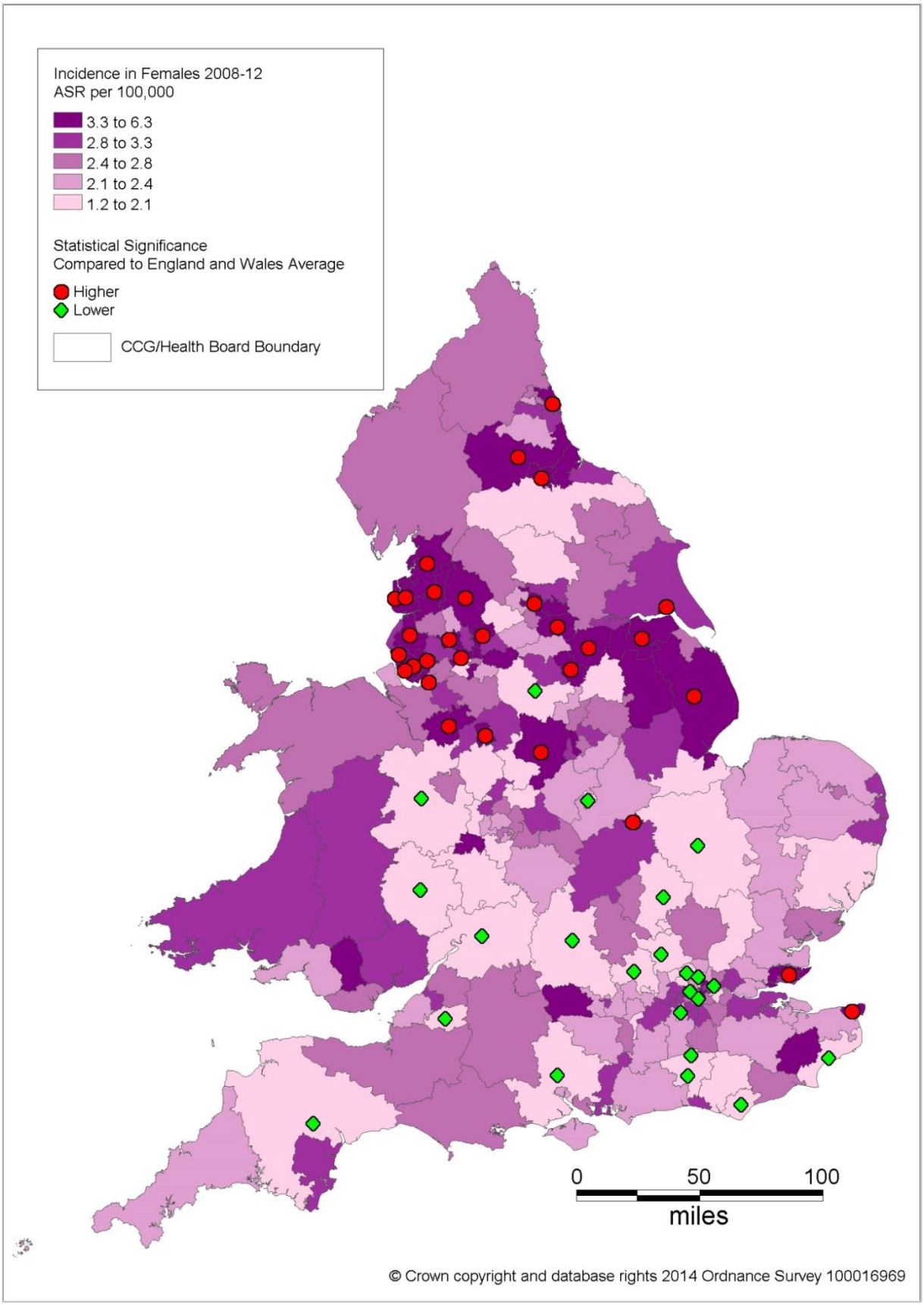
CCGs with higher than average rates are located in all areas of the country but there is a distinct group around Liverpool, Manchester and Leeds. London has a number of CCGs with lower than average ASRs, plus there are several areas in the Midlands.

Figure 11: Incidence of bladder cancer (ICD-10 code C67) in men, age-standardised rate per 100,000, Clinical Commissioning Groups (England) and Health Boards (Wales) 2008-2012



Source: NCRS; WCISU; ONS

Figure 12: Incidence of bladder cancer (ICD-10 code C67) in women, age-standardised rate per 100,000, Clinical Commissioning Groups (England) and Health Boards (Wales) 2008-2012



Source: NCRS; WCISU; ONS

The National Cancer Intelligence Network (NCIN) ran a project to analyse how cancer patients came to be diagnosed with cancer. This project was called 'Routes to Diagnosis' (NCIN, 2013). Tables 12 and 13 show the proportion of cases diagnosed by each route in age-groups and deprivation quintiles. The full meaning of each route can be found on the NCIN website.

Table 12: Route to diagnosis for bladder cancer (ICD-10 code C67) by age and sex, England 2006-10.

	Age	Death Certificate Only	Emergency	GP referral	Inpatient elective	Other outpatient	Two Week Wait	Unknown
Males	Under 40	0%	16%	35%	8%	16%	19%	7%
	40-49	0%	11%	27%	6%	13%	35%	6%
	50-59	0%	10%	30%	6%	12%	35%	6%
	60-69	0%	11%	30%	5%	13%	36%	6%
	70-79	0%	14%	29%	4%	14%	32%	6%
	80+	1%	23%	26%	4%	14%	26%	6%
	Total	**0%**	**16%**	**28%**	**5%**	**14%**	**31%**	**6%**
Females	Under 40	0%	26%	38%	5%	16%	9%	6%
	40-49	1%	17%	32%	3%	16%	22%	8%
	50-59	0%	14%	32%	5%	11%	30%	7%
	60-69	0%	14%	30%	4%	11%	35%	6%
	70-79	0%	18%	29%	3%	12%	32%	5%
	80+	1%	34%	23%	4%	10%	24%	5%
	Total	**1%**	**24%**	**27%**	**4%**	**11%**	**29%**	**5%**

Source: NCIN

Table 13: Route to diagnosis for bladder cancer (ICD-10 code C67) by quintile of income deprivation, England 2006-10

Deprivation quintile	Death Certificate Only	Emergency	GP referral	Inpatient elective	Other outpatient	Two Week Wait	Unknown
1 - Least deprived	0%	15%	27%	5%	13%	31%	8%
2	0%	16%	28%	4%	12%	33%	7%
3	0%	18%	27%	5%	12%	32%	6%
4	0%	20%	28%	4%	13%	29%	5%
5 - Most deprived	0%	23%	29%	4%	13%	27%	4%
Total	**0%**	**18%**	**28%**	**4%**	**13%**	**31%**	**6%**

Source: NCIN

The proportion of cases diagnosed as an emergency is lower than the all-age average for both men and women aged 40-79 ($p<0.05$), but higher for men and women aged 80 and over ($p<0.001$). Conversely the proportion of cases who were diagnosed after a Two Week Wait referral is lower than average in both men and women aged under 40 and over 80 ($p<0.001$) but also in women aged under 40-49 ($p=0.02$). Overall, a greater proportion of women are diagnosed by an emergency presentation than men ($p<0.001$).

Emergency presentation is more common in the most deprived quintiles (4 and 5) of the population ($p<0.01$), with proportionally fewer cases in these groups diagnosed after Two Week Wait referral ($p<0.05$).

The route to diagnosis is important as data calculated by NCIN show poorer one-year survival for emergency presentations (Table 14).

Table 14: One-year relative survival from bladder cancer (ICD-10 code C67) by route to diagnosis, England 2006-10

All routes	Emergency	GP referral	Inpatient elective	Other outpatient	Two Week Wait	Unknown
72%	34%	79%	82%	76%	84%	76%

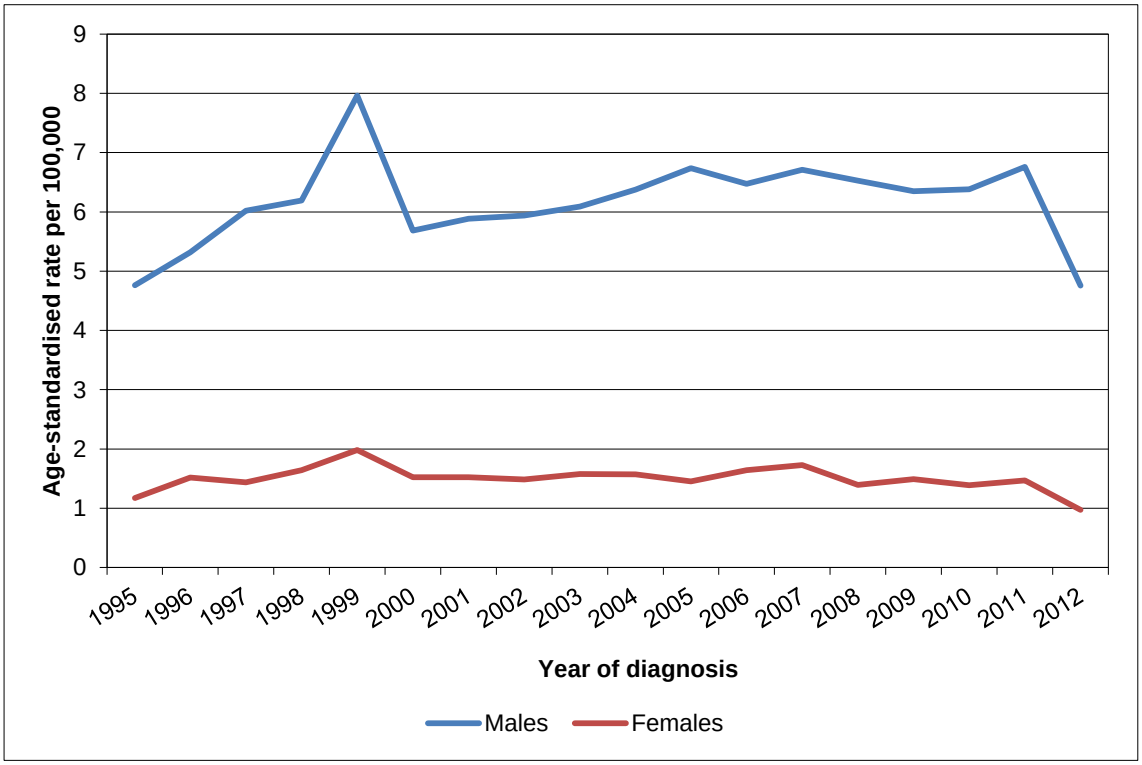
Source: NCIN

This is likely to be linked to the data shown in tables 4 to 11 which show that women are more likely to have advanced disease, and the data on survival below which show poorer survival in women.

2.1 Non-malignant bladder tumours

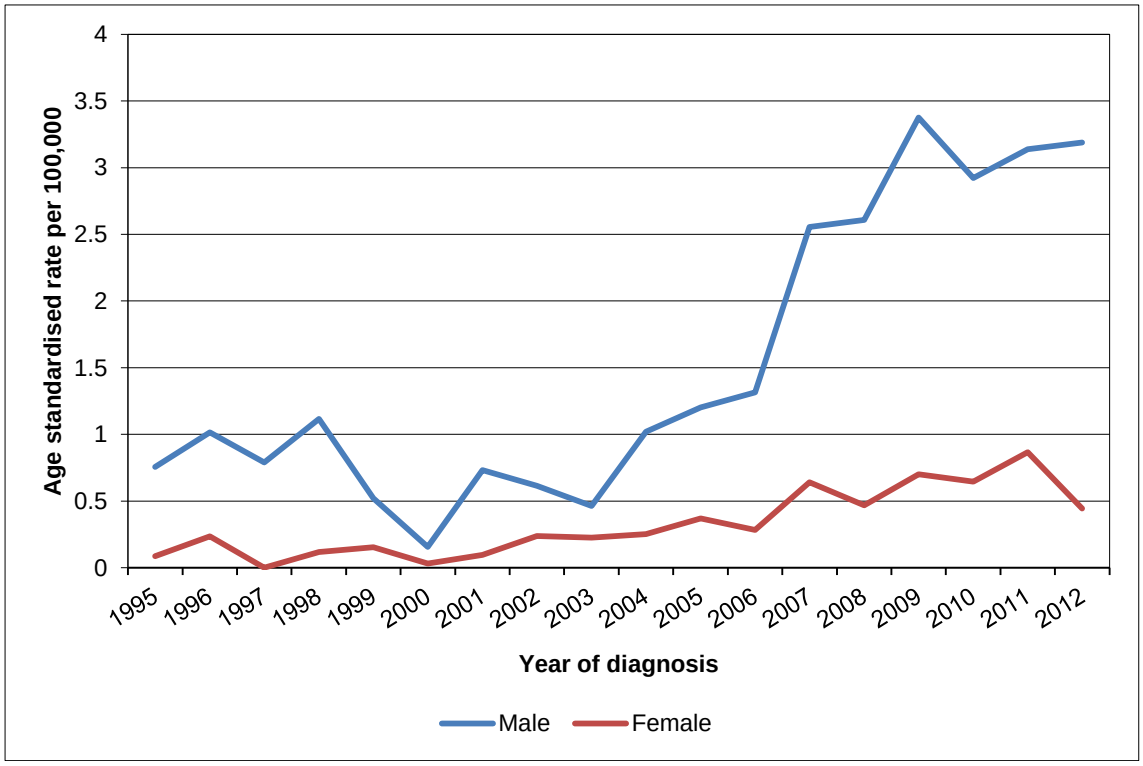
The effect of recoding papillary tumours and carcinoma in situ around the year 2000 (England) and 2007 (Wales) is visible in the incidence trend graphs for 'Neoplasm of uncertain behaviour of bladder' and ‘carcinoma in situ of bladder’ (Figures 13 to 16).

Figure 13: Incidence of carcinoma in situ of bladder (ICD-10 code D09.0), age-standardised rate per 100,000 by sex, England 1995-2012



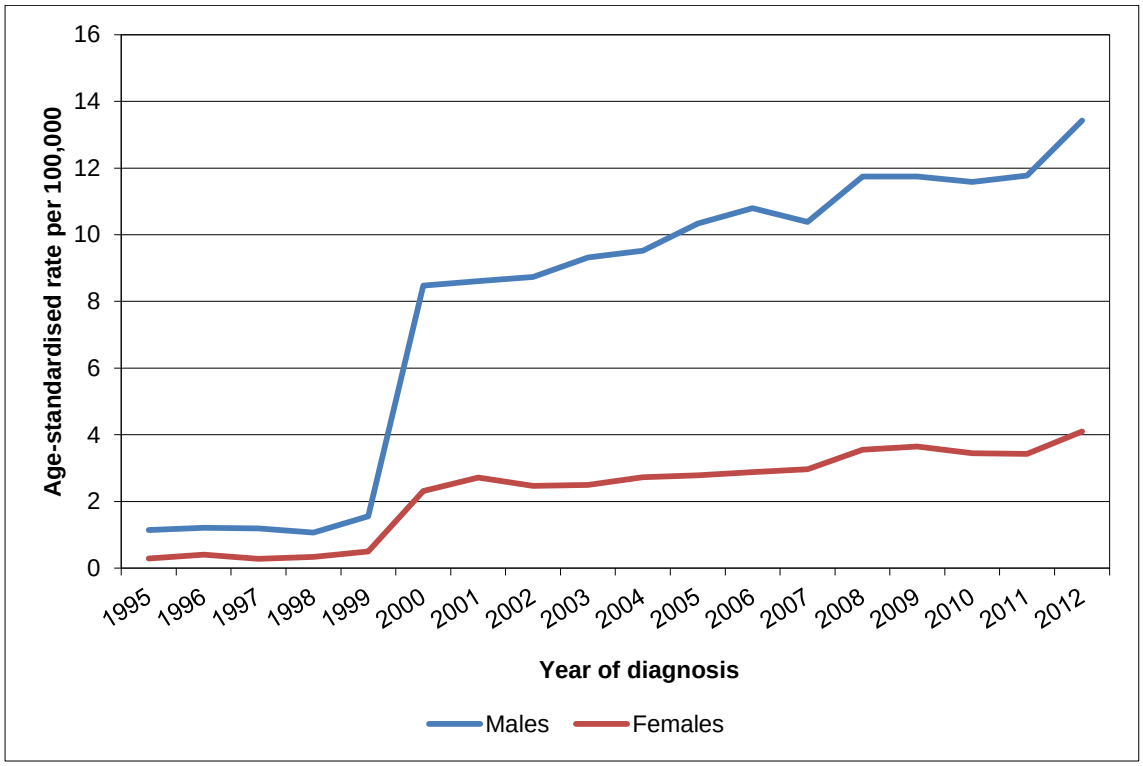
Source: NCRS; ONS

Figure 14: Incidence of carcinoma in situ of bladder (ICD-10 code D09.0), age-standardised rate per 100,000 by sex, Wales 1995-2012



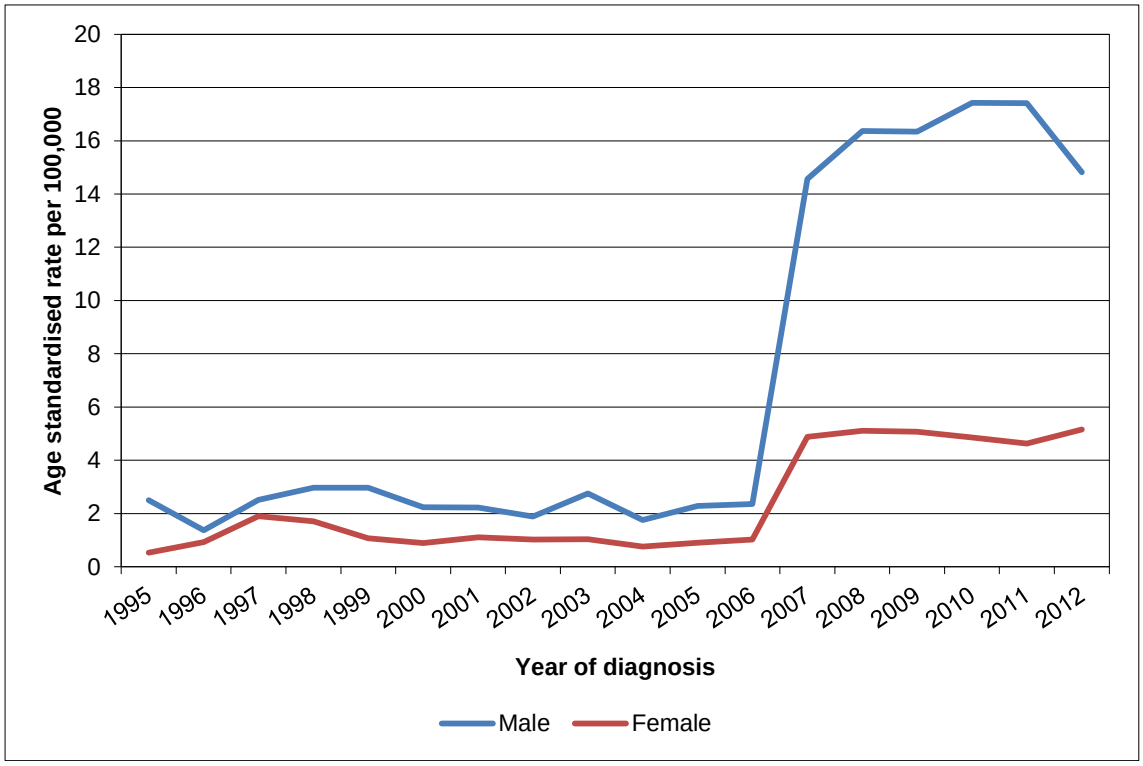
Source: NCRS; WCISU; ONS

Figure 15: Incidence of neoplasm of uncertain behaviour of bladder (ICD-10 code D41.4), age-standardised rate per 100,000 by sex, England 1995-2012



Source: NCRS; ONS

Figure 16: Incidence of neoplasm of uncertain behaviour of bladder (ICD-10 code D41.4), age-standardised rate per 100,000 by sex, Wales 1995-2012



Source: NCRS; WCISU; ONS

The pattern of recording before and after coding changes differs between England and Wales. In England the age-standardised rate of carcinoma in situ rose prior to 2000 but was similar to the rate after 2000. In Wales the rate of carcinoma in situ rose before, during and after 2007. For uncertain behaviour tumours there was a distinct increase in both England and Wales at the time of the coding change, but the proportional change in Wales was larger, with around a six-fold increase in age-standardised rate ($p<0.001$).

As with bladder cancer, uncertain behaviour tumours and carcinoma in situ are more common in men. In England in 2012 the age-standardised rate of carcinoma in situ was 4.8 times higher in men than women ($p<0.001$). The age-standardised rate of uncertain behaviour tumours (papilliary tumours) was 3.3 times higher in men than women ($p<0.001$). In Wales in 2012 the the age-standardised rate of carcinoma in situ was 7.2 times higher in men than women ($p<0.001$) and the age-standardised rate of uncertain behaviour tumours was 2.9 times higher in men than women ($p<0.001$).

In England there were 1,701 diagnoses of carcinoma in situ in men in 2012, and 420 in women. The corresponding number of uncertain behaviour tumours was 4,601 and 1,611. In Wales in 2012 there were 74 diagnoses of carcinoma in situ in men and 10 in women, and 319 diagnoses of uncertain behaviour tumours in men and 123 in women.

Between 2000 and 2012 there was no increase or decrease in the ASR of carcinoma in situ in either men or women in England. The ASR of uncertain behaviour tumours increased by 3.7% each year in men and by 4.45 each year in women over the same time period. The was no evidence of an increase or decrease in the ASR of carcinoma in situ or uncertain behaviour tumour in Wales post 2007.

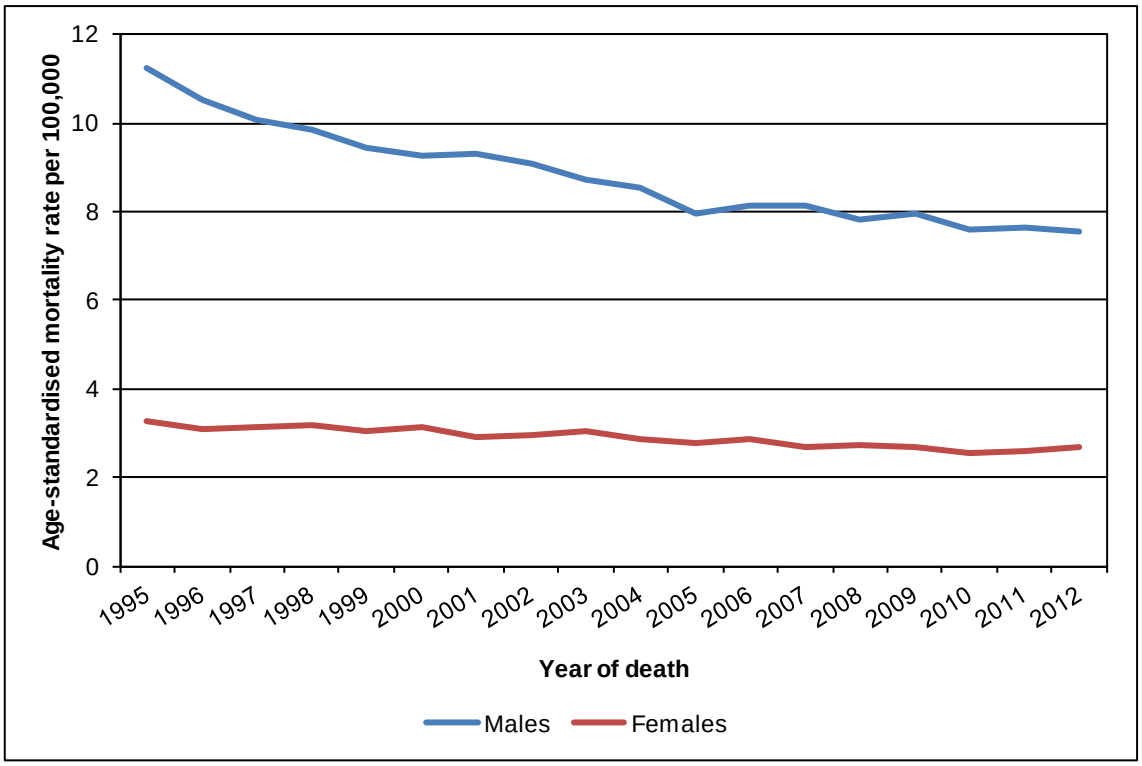
3 Mortality

The code change which affects bladder cancer incidence data around the year 2000 does not have an effect on deaths data because virtually no people were registered as dying from non-malignant bladder tumours. Therefore it is possible to compare mortality rates over a longer time period.

Deaths from bladder cancer are more common in men – reflective of the higher incidence rates. In 2012, age-standardised mortality rates (ASMRs) were nearly three times higher in men then in women ($p<0.001$). In English men the ASMR was 7.6 per 100,000 and in English women it was 2.8 per 100,000 (Figure 17). In Welsh men the ASMR was 6.8 per 100,000 and in Welsh women it was 2.5 per 100,000 (Figure 18).

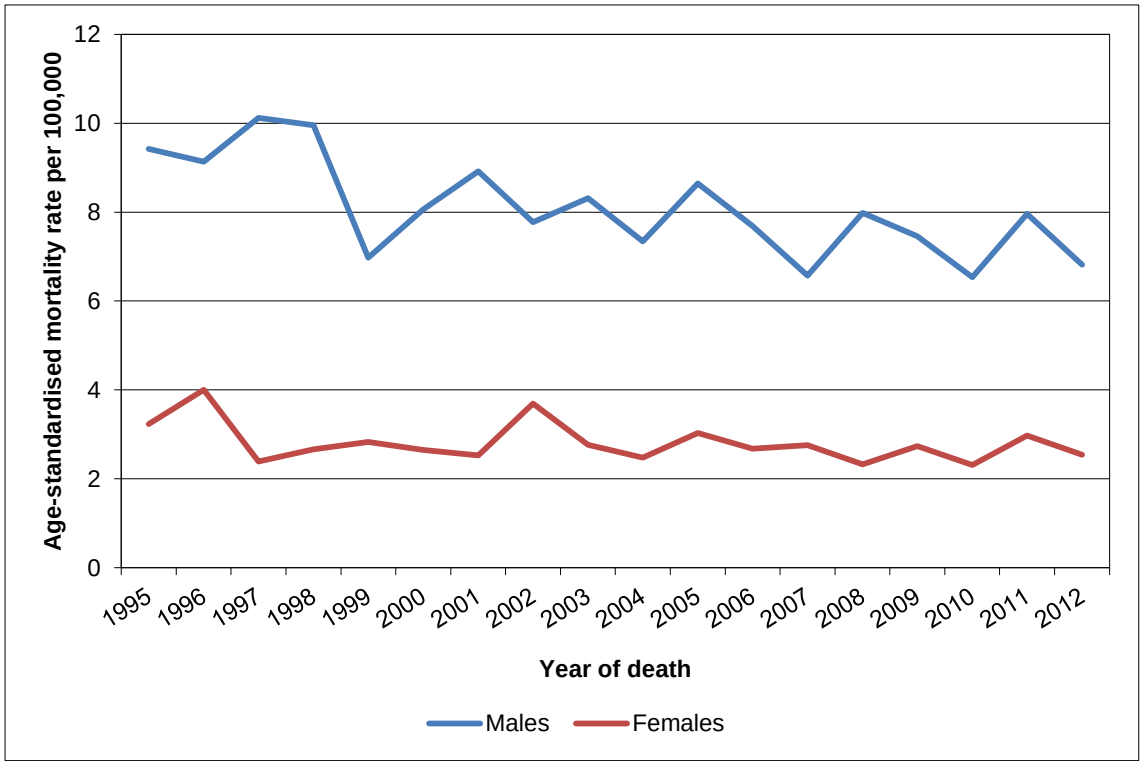
In 2012 2,918 men in England died from bladder cancer, compared to 1,399 women. The equivalent figures in 1995 were 3,075 and 1,488. In Wales in 2012 172 men died from bladder cancer compared to 88 women. The equivalent figures in 1995 were 166 and 93.

Figure 17: Mortality from bladder cancer (ICD-10 code C67), age-standardised rate per 100,000 by sex, England 1995-2012



Source: ONS

Figure 18: Mortality from bladder cancer (ICD-10 code C67), age-standardised rate per 100,000 by sex, Wales 1995-2012

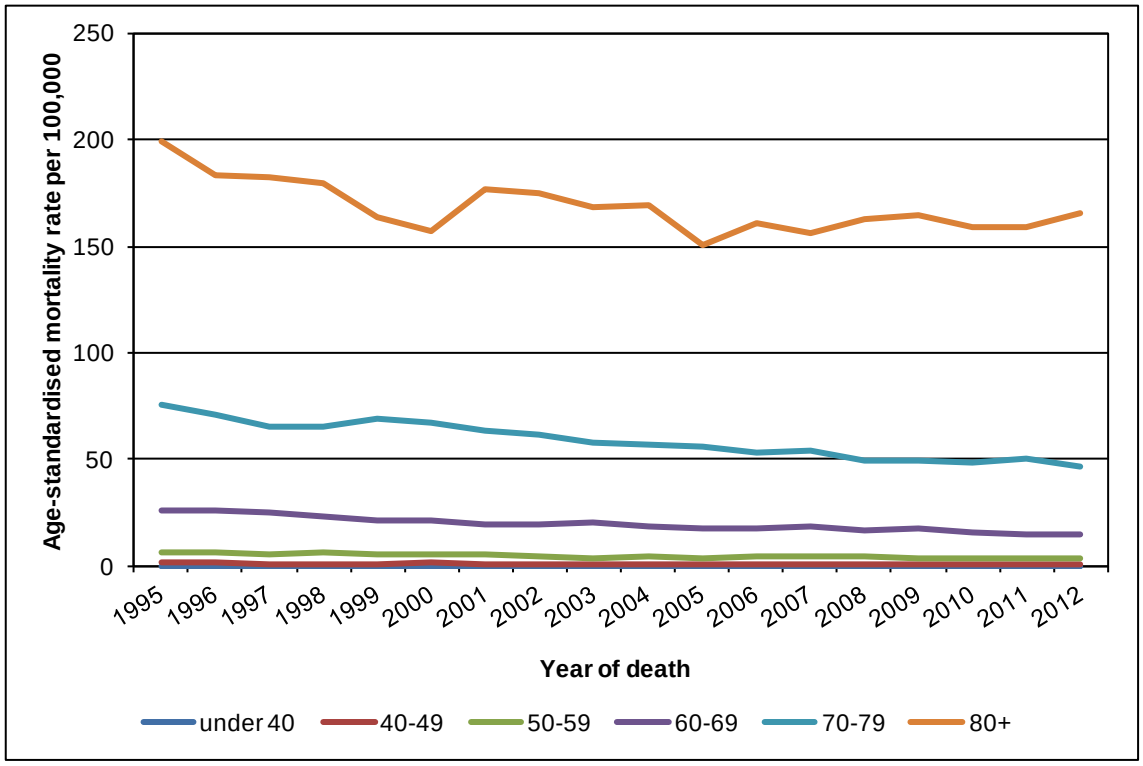


Source: ONS

Although the number of deaths has only varied slightly, the ASMRs have fallen consistently over the time studied. In English men, rates decreased more quickly from 1997 to 2005 (2.5% each year) than from 2005 to 2012 (1.3% per year). In English women the rate has fallen steadily from 1995 to 2012 at 1.3% each year. In men in Wales the ASMR has decreased steadily at 1.8% from 1995 to 2012, but in women there was not enough evidence to say that the rate has fallen. This will be affected by the smaller number of deaths.

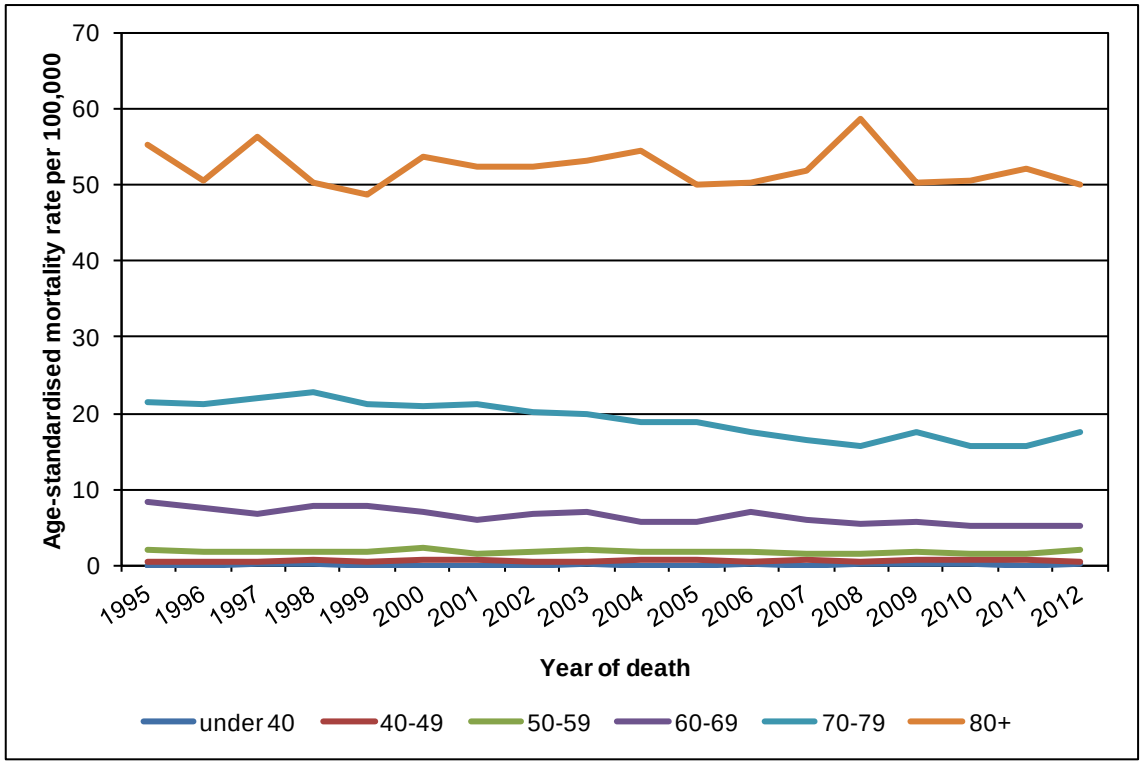
Both the number of deaths and the ASMR is highest in those aged 80 and over (Figures 19 - 22). In men the rate in those aged 80 and over is 3.5 times (England) or 4.3 times (Wales) the rate in those aged 70-79. In women it is 2.8 times (England) or 3.3 times (Wales) higher ($p<0.001$ for all).

Figure 19: Mortality from bladder cancer (ICD-10 code C67) in men, age-specific rate per 100,000, England 1995-2012



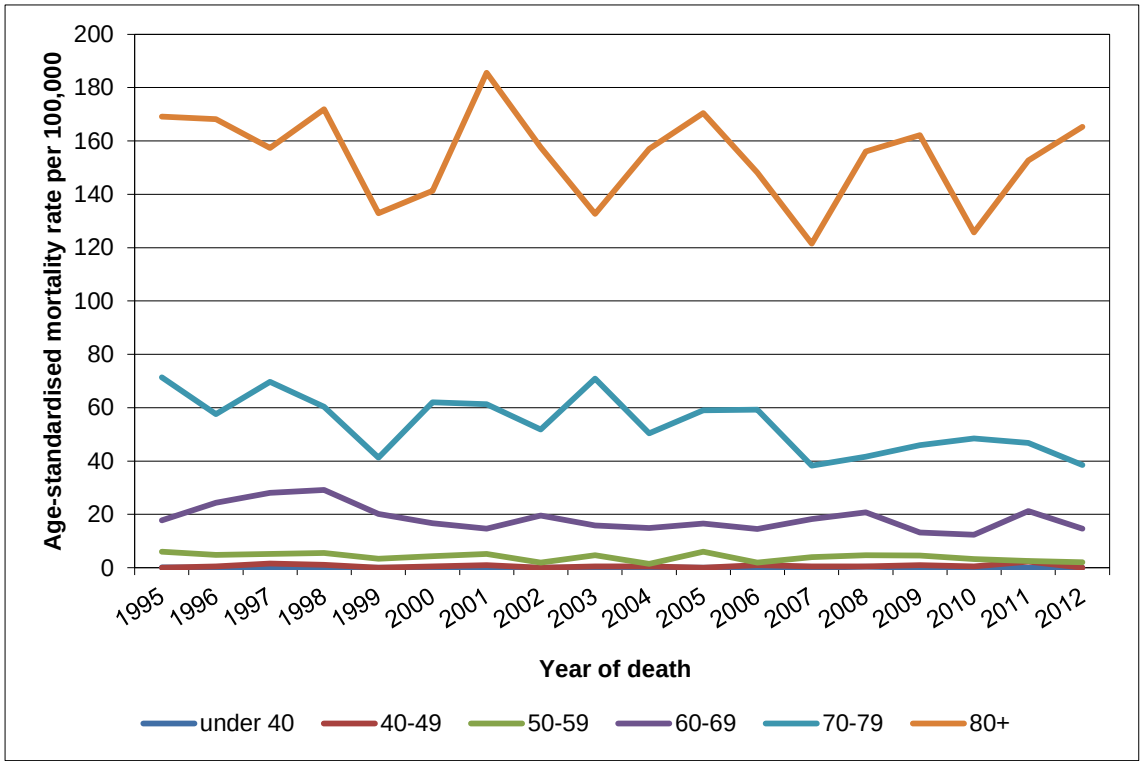
Source: ONS

Figure 20: Mortality from bladder cancer (ICD-10 code C67) in women, age-specific rate per 100,000, England 1995-2012



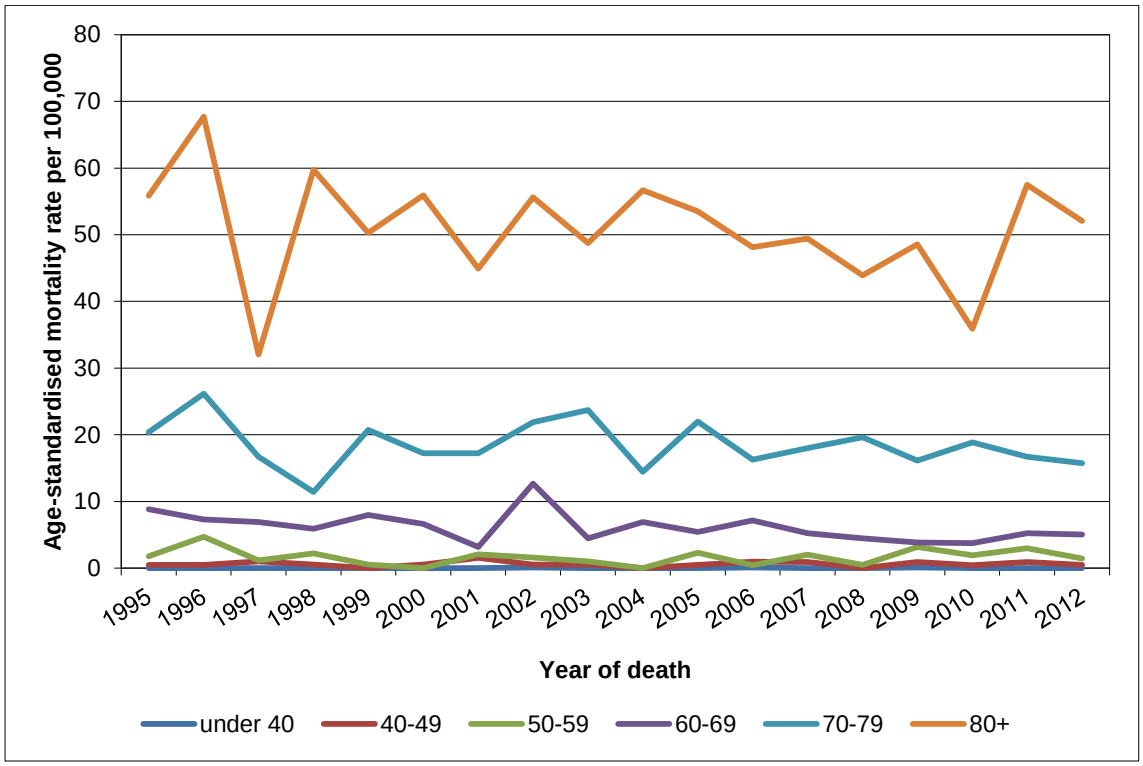
Source: ONS

Figure 21: Mortality from bladder cancer (ICD-10 code C67) in men, age-specific rate per 100,000, Wales 1995-2012



Source: ONS

Figure 22: Mortality from bladder cancer (ICD-10 code C67) in women, age-specific rate per 100,000, Wales 1995-2012



Source: ONS

In men in England, there has been a decreasing trend in age-specific mortality at all ages 40 and over. The largest proportional decrease has been in those men aged 60-69, where the

age-specific rate has decreased by 3.3% yearly from 1995 to 2012. In some age groups the decrease has not been consistent; in those aged 70-79 there was no evidence for a decrease before 2003, but there has been a 2.2% decrease each year since.

In Welsh men, there is no evidence of a decrease outside ages 60-79. In both men aged 60-69 and men aged 70-79 the rate has steadily decreased by 2.5% each year from 1995 top 2012.

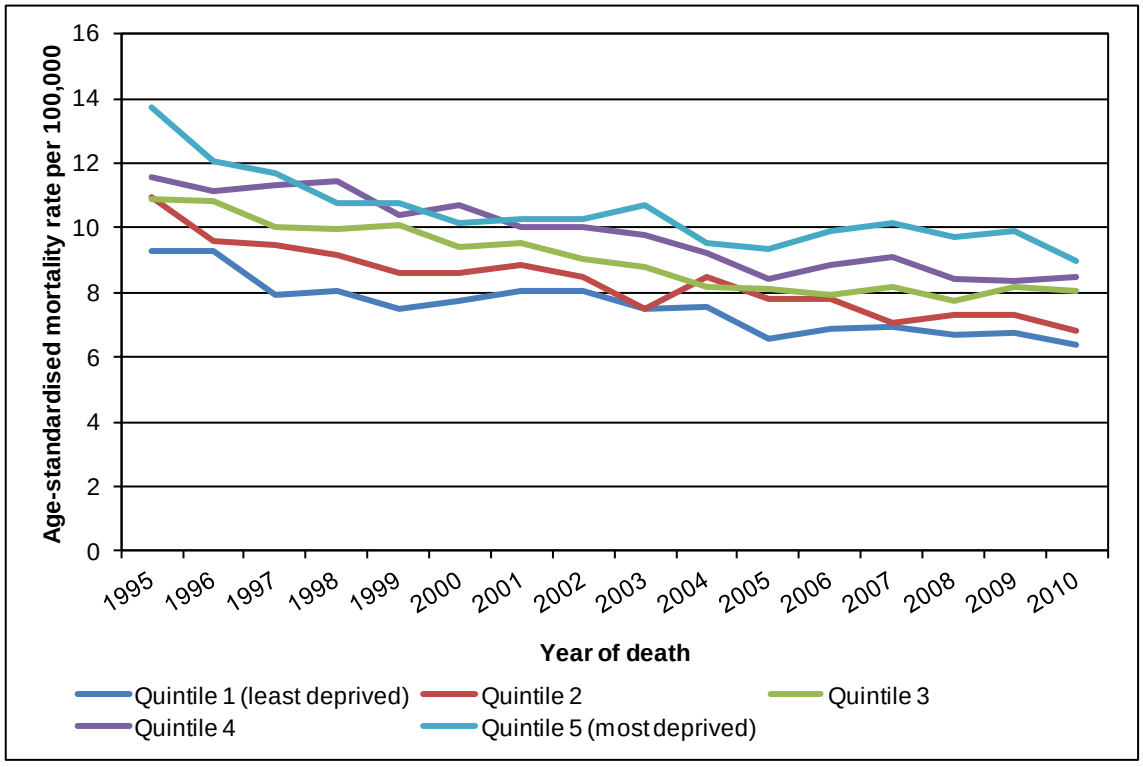
The number of deaths in women is smaller so there is less power to detect trends in age-specific rates. In England only those women aged 60-69 and 70-79 show statistically significant decreases. In those aged 60-69 the rate has decreased by 2.6% each year from 1995 to 2012, and in those aged 70-79 the rate has decreased by 2.5% each year from 1998 to 2012.

In women in Wales there was a statistically significant decrease only in those aged 60-69, with an annual average decrease of 3.4% from 1995 to 2012.

As described in the methods section, ASMRs by deprivation are only available until 2010.

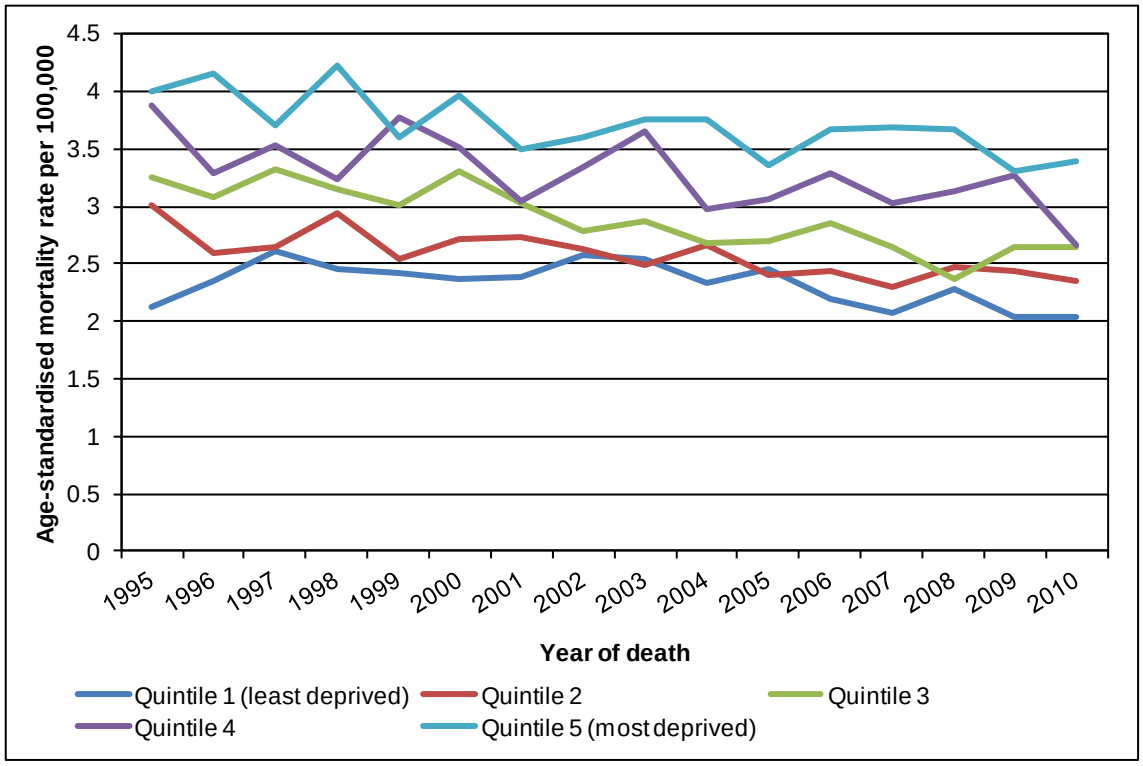
There is a consistent pattern across England of higher mortality rates in people living in more deprived areas. In 2012 the ASMR in men in the most deprived quintile was 40% higher than in the least deprived; the ASMR in quintile 5 was 9.0 per 100,000 and in quintile 1 was 6.4 per 100,000 ($p<0.001$) (Figure 23). In women the ASMR in the most deprived quintile was 65% higher than in the least deprived; the ASMR in quintile 5 was 3.4 per 100,000 and in quintile 1 was 2.0 per 100,000 ($p<0.001$) (Figure 24).

Figure 23: Mortality from bladder cancer (ICD-10 code C67) in men by quintile of income deprivation, age-standardised rate per 100,000, England 1995-2010



Source: ONS, DCLG

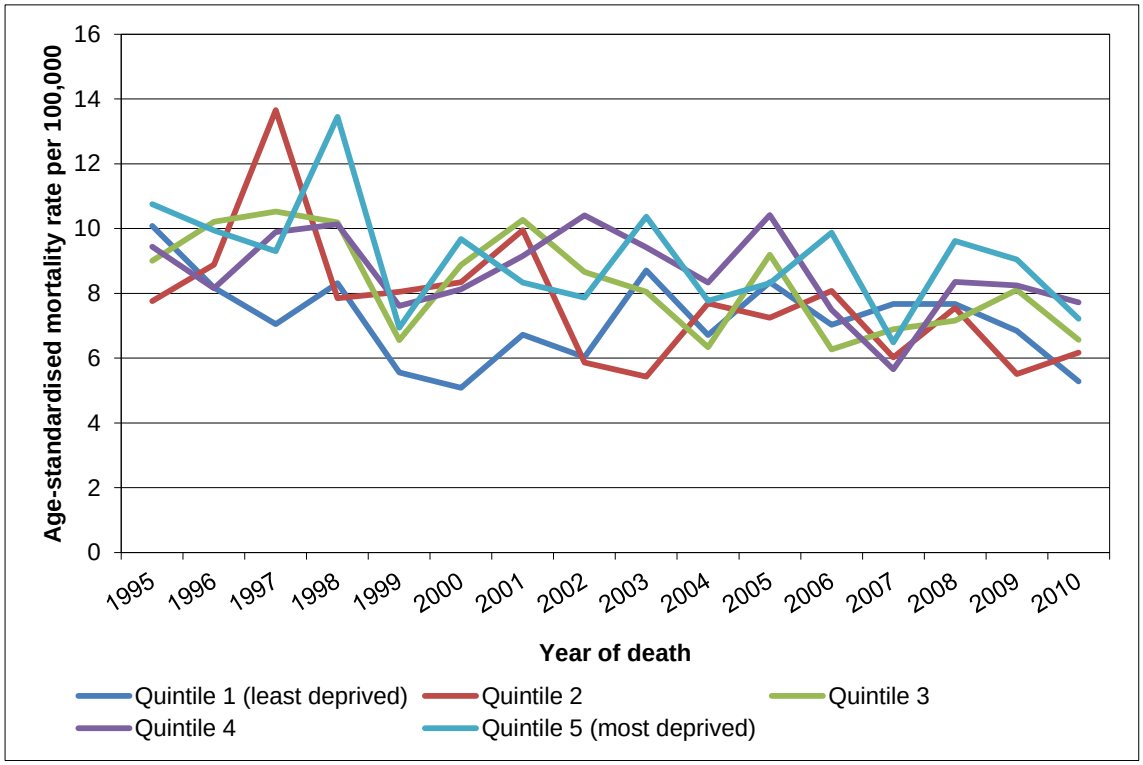
Figure 24: Mortality from bladder cancer (ICD-10 code C67) in women by quintile of income deprivation, age-standardised rate per 100,000, England 1995-2010



Source: ONS, DCLG

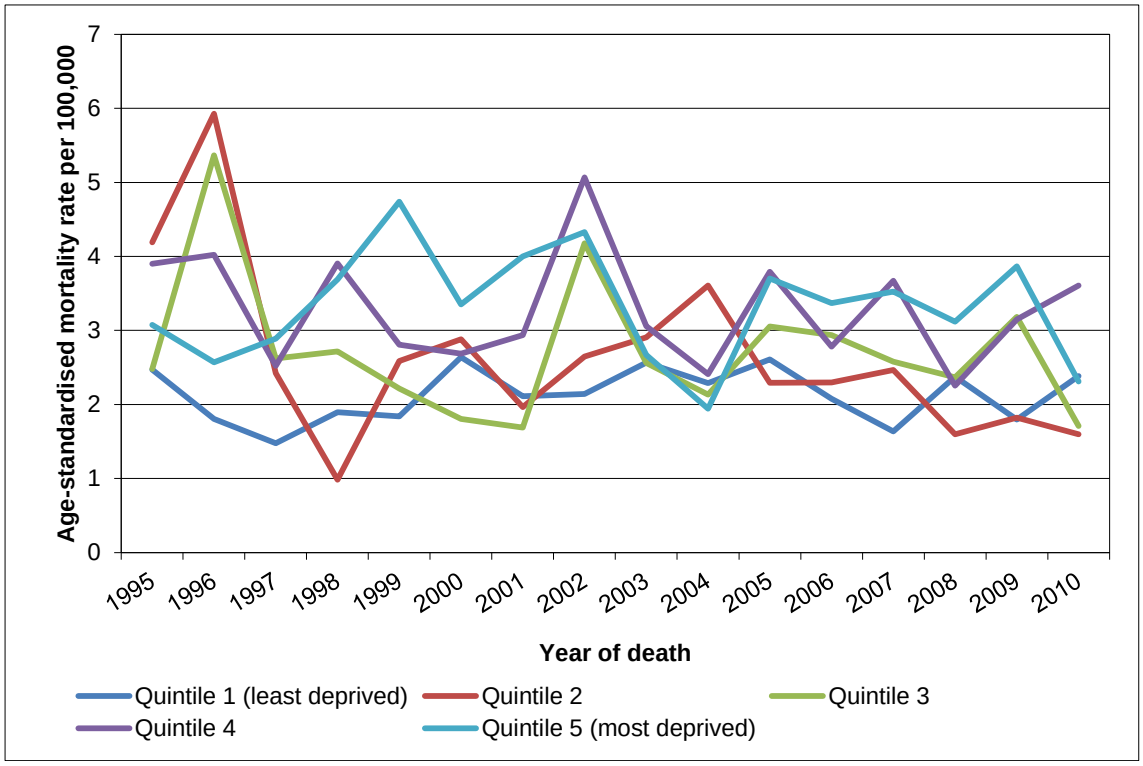
In Wales this pattern is not apparent and there is no statistically significant difference between the most and least deprived groups (Figures 25 and 26).

Figure 25: Mortality from bladder cancer (ICD-10 code C67) in men by quintile of income deprivation, age-standardised rate per 100,000, Wales 1995-2010



Source: ONS, WIMD

Figure 26: Mortality from bladder cancer (ICD-10 code C67) in women by quintile of income deprivation, age-standardised rate per 100,000, Wales 1995-2010



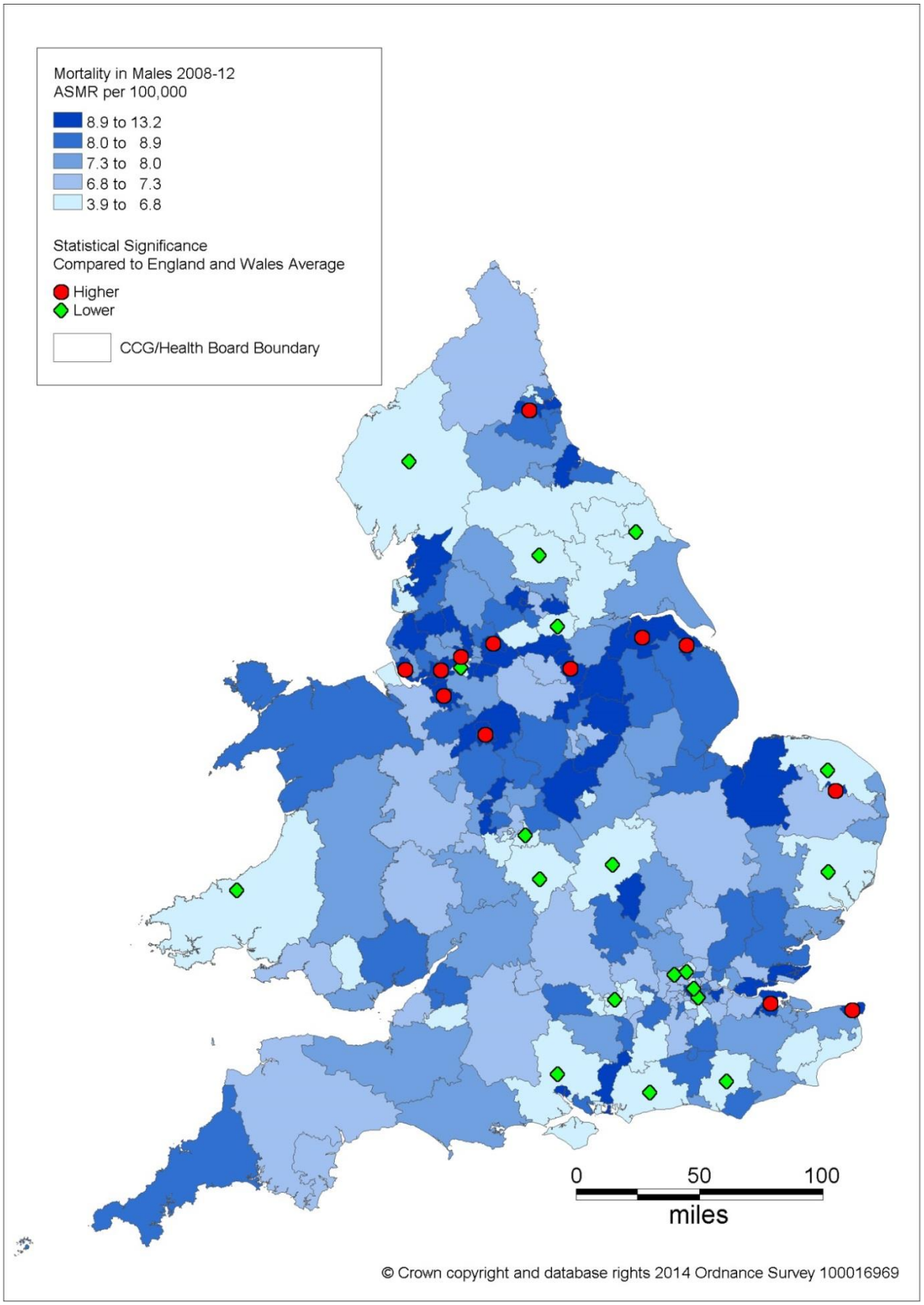
Source: ONS, WIMD

ASMRs have fallen in all deprivation groups in England, but there is evidence that the decrease has been larger in the least deprived populations. In men the ASMR in the least deprived quintile decreased by 2.2% each year between 1995 and 2010, compared to 1.1% each year in the most deprived quintile between 1998 and 2010. In women the ASMR in the least deprived quintile decreased by 1.6% each year between 1997 and 2010, compared to 1.1% each year in the most deprived quintile between 1995 and 2010

In Wales, statistically significant changes in ASMRs by deprivation are only seen for men in quintiles 2 and 3. In quintile 2 the annual average decrease was 3.3% and in quintile 3 the decrease was 2.5% annually.

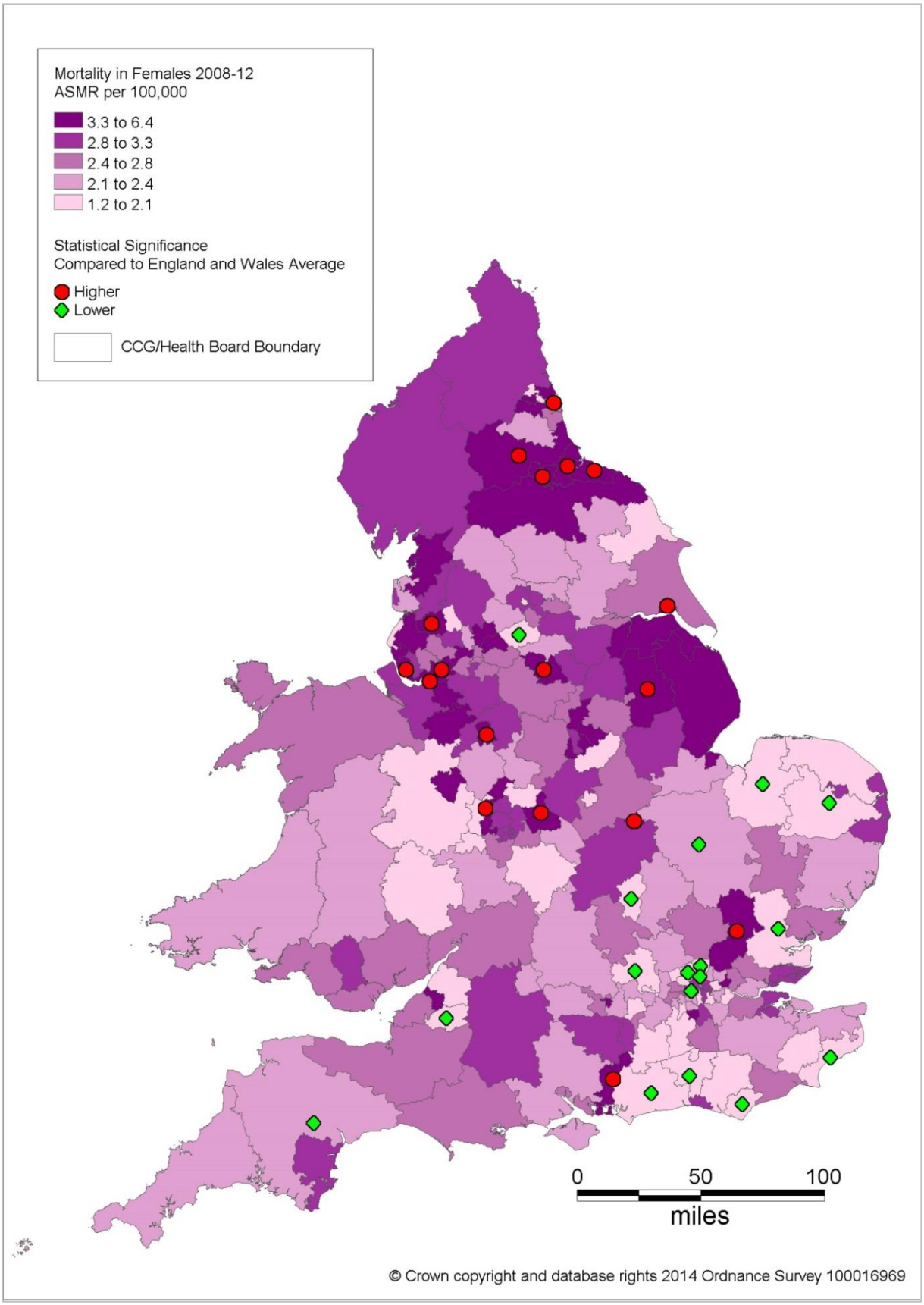
It is clear from Figures 27 and 28 that those Clinical Commissioning Groups (CCGs) which have a bladder cancer ASMR higher than the England and Wales average tend to be in the north and north-west of England. In contrast the CCGs with lower ASMRs tend to be in the south and south-east of England. Six out of seven Health Boards (HBs) in Wales have a bladder cancer ASMR higher than the England and Wales average for both men and women.

Figure 27: Mortality from bladder cancer (ICD-10 code C67) in men, age-standardised rate per 100,000, Clinical Commissioning Groups (England) and Health Boards (Wales) 2008-2012



Source: ONS

Figure 28: Mortality from bladder cancer (ICD-10 code C67) in women, age-standardised rate per 100,000, Clinical Commissioning Groups (England) and Health Boards (Wales) 2008-2012



Source: ONS

4 Survival trends

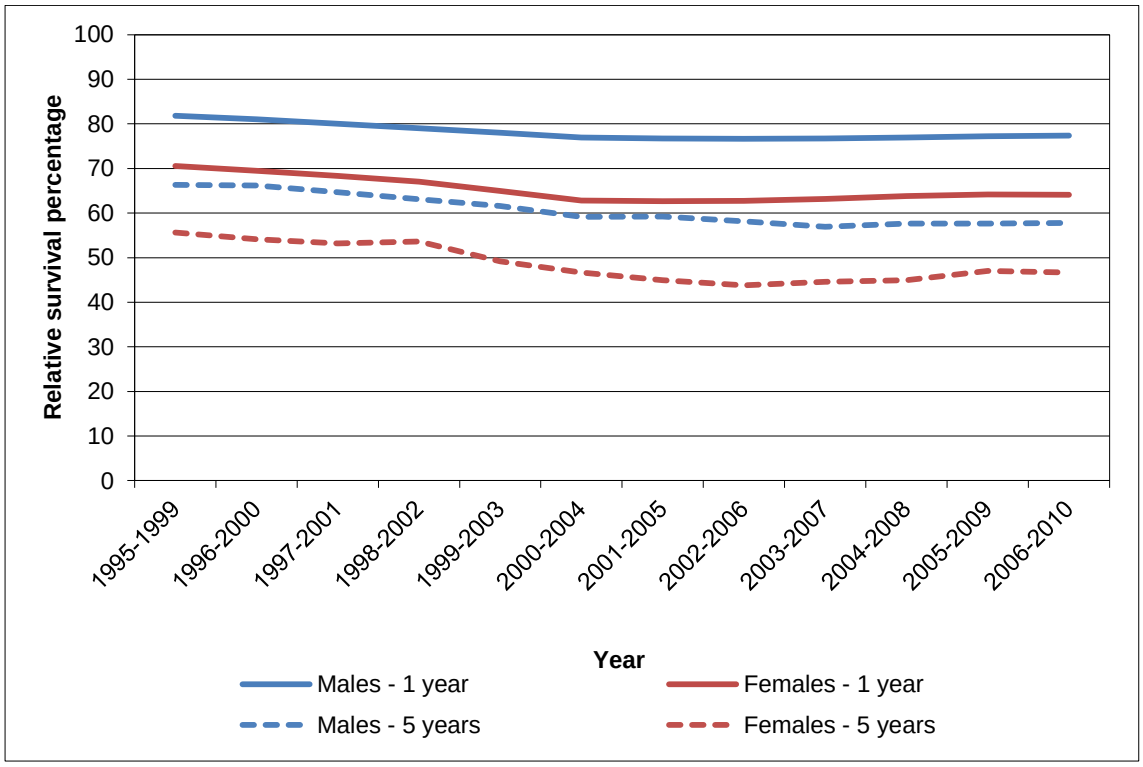
Data presented here are for five-year rolling averages as this is necessary for the period survival calculations. This also means that Joinpoint cannot be used to detect trends and so for England data a straightforward comparison between 2000-04 and 2006-10 survival is undertaken. This is less powerful than a regression analysis.

Survival data are also affected by the recoding of tumours in the year 2000/2007. As this recoding reduced incidence but had little effect on mortality there was a corresponding reduction in survival. Therefore in England only survival data post-2000 should be assessed. In Wales only one time-period (2007-2011) is after the coding change so no trends can be analysed.

Survival at both one and five years is higher in men than in women; which goes against the general trend for cancer. In England in 2006-10 one-year survival in men was 77% compared to 64% in women. In 2006-10 five-year survival in men was 58% compared to 47% (Figure 29). In Wales in 2007-11 one-year survival in men was 76% compared to 60% in women, and in 2007-11 five-year survival in men was 54% compared to 50% (Figure 30).

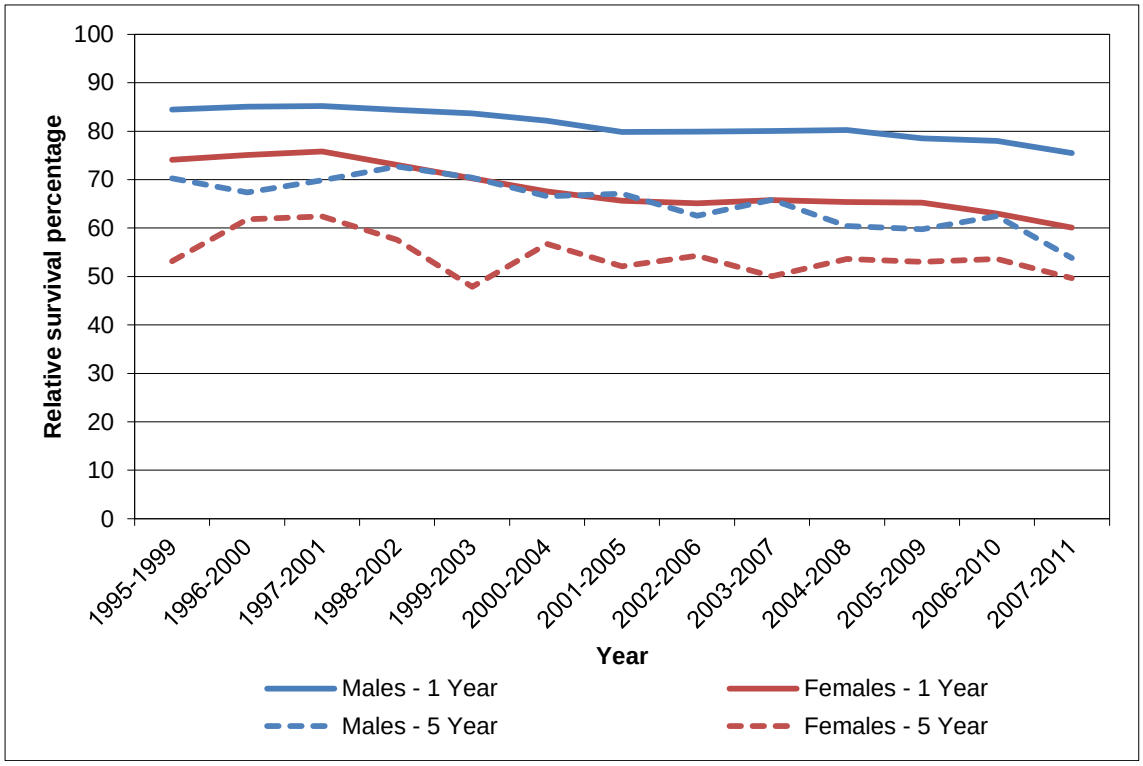
In England - for both men and women - there was no difference in survival when comparing 2000-04 and 2006-10, and this is true for all subsequent analysis by separate groups.

Figure 29: Relative survival from bladder cancer (ICD-10 code C67) by sex, England 1995-2010



Source: NCRS

Figure 30: Relative survival from bladder cancer (ICD-10 code C67) by sex, Wales 1995-2011



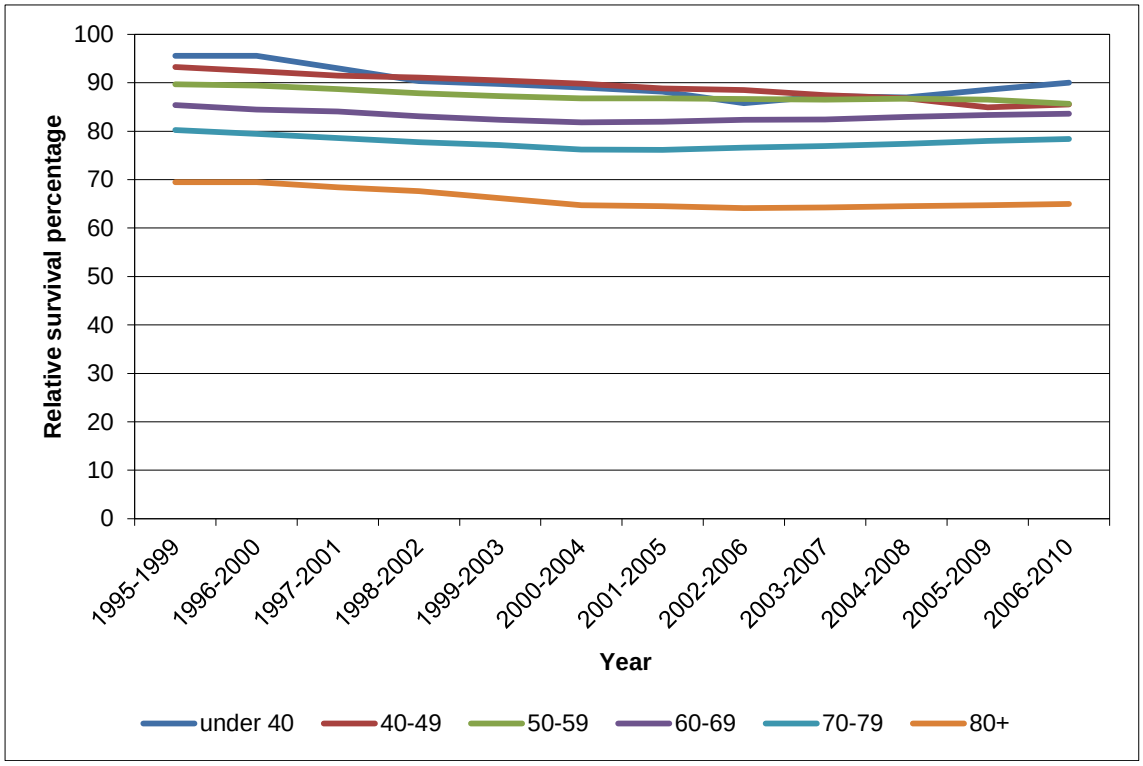
Source: NCRS; WCISU

Survival decreases with age for both men and women, even though relative survival takes into account increased overall mortality rates at older ages. This means that older people have proportionally worse survival as well as worse survival in absolute terms.

In the analysis by age it was not always possible to calculate survival for the youngest patients due to small numbers. This is indicated by gaps in the data.

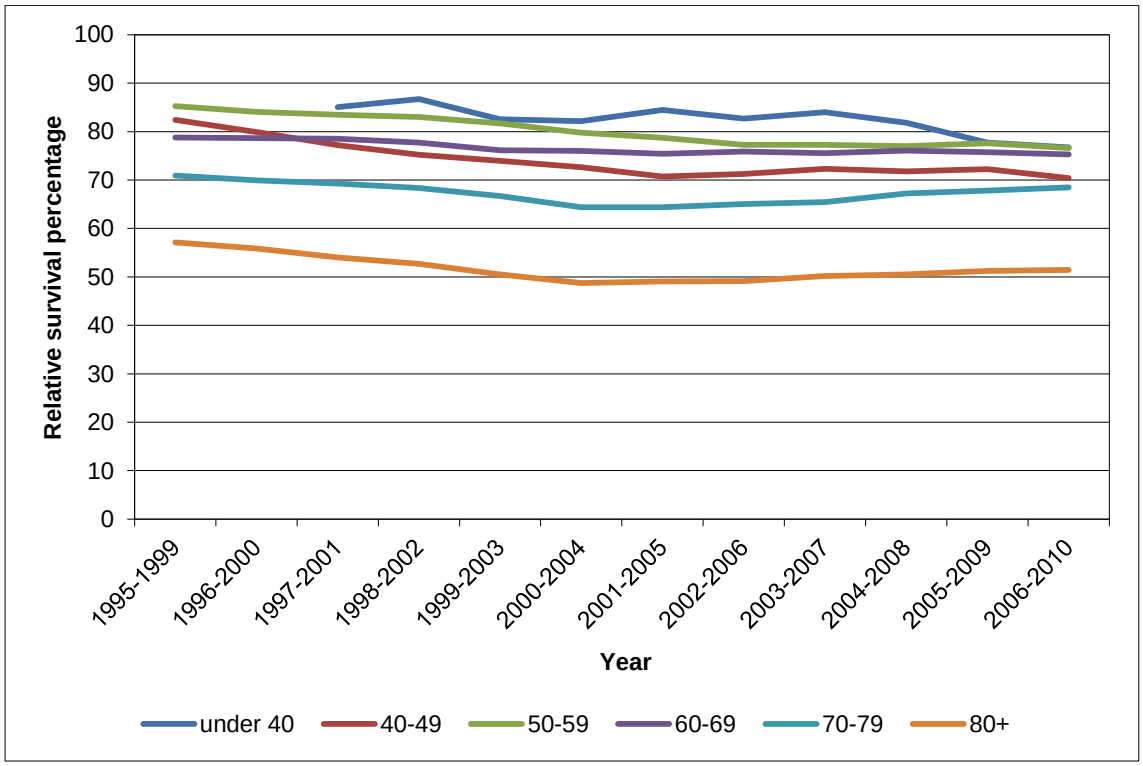
In men in England in 2006-10 the highest one-year survival was in those aged under 40 at diagnosis at 90% (Figure 31), although the confidence intervals of the four youngest age groups (up to 69 years old) overlap indicating that observed variation is likely to be chance. Survival was worst in those aged 80 and over at diagnosis; where the relative survival was 65%. A similar pattern was seen in women (Figure 32) where the one-year survival in under 40s was 77% but 51% in those aged 80 and over.

Figure 31: One-year relative survival from bladder cancer (ICD-10 code C67) by age, in men, England 1995-2010



Source: NCRS

Figure 32: One-year relative survival from bladder cancer (ICD-10 code C67) by age, in women, England 1995-2010

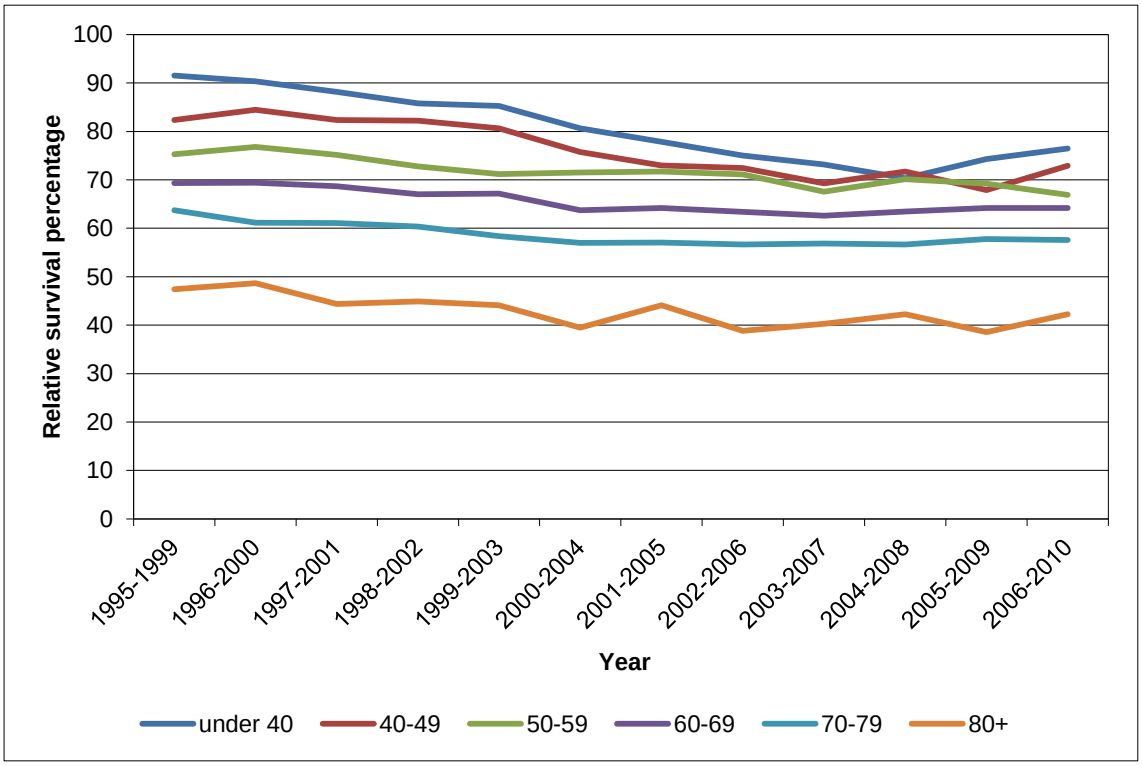


Source: NCRS

Five-year survival for men was highest in the under 40s at 76%, compared to 42% in those aged 80 and over (Figure 33). As with one-year survival the rate in those aged under 70 was similar.

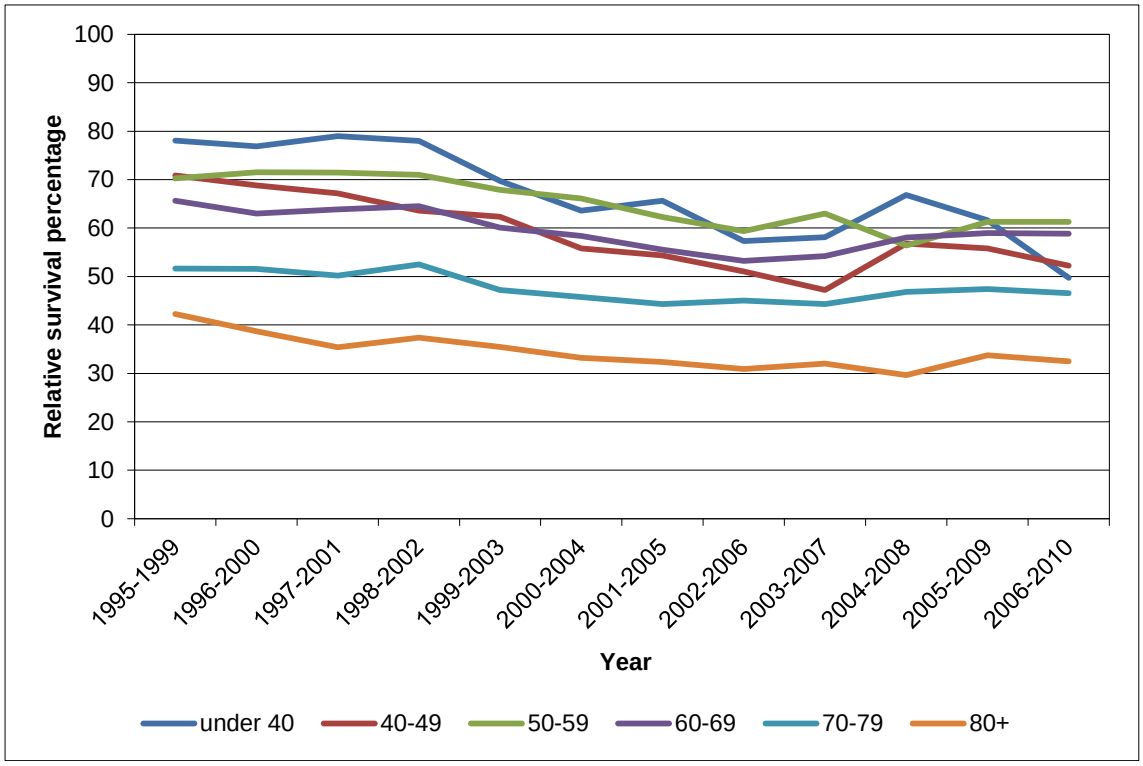
In women a different pattern is seen, with the highest five-year survival in those aged 50-59 at diagnosis at 61% (Figure 34). The lowest survival was still in the 80+ age group at 32%. The confidence intervals on the youngest age groups overlap all others, likely due to small numbers of diagnoses.

Figure 33: Five-year relative survival from bladder cancer (ICD-10 code C67) by age, in men, England 1995-2010



Source: NCRS

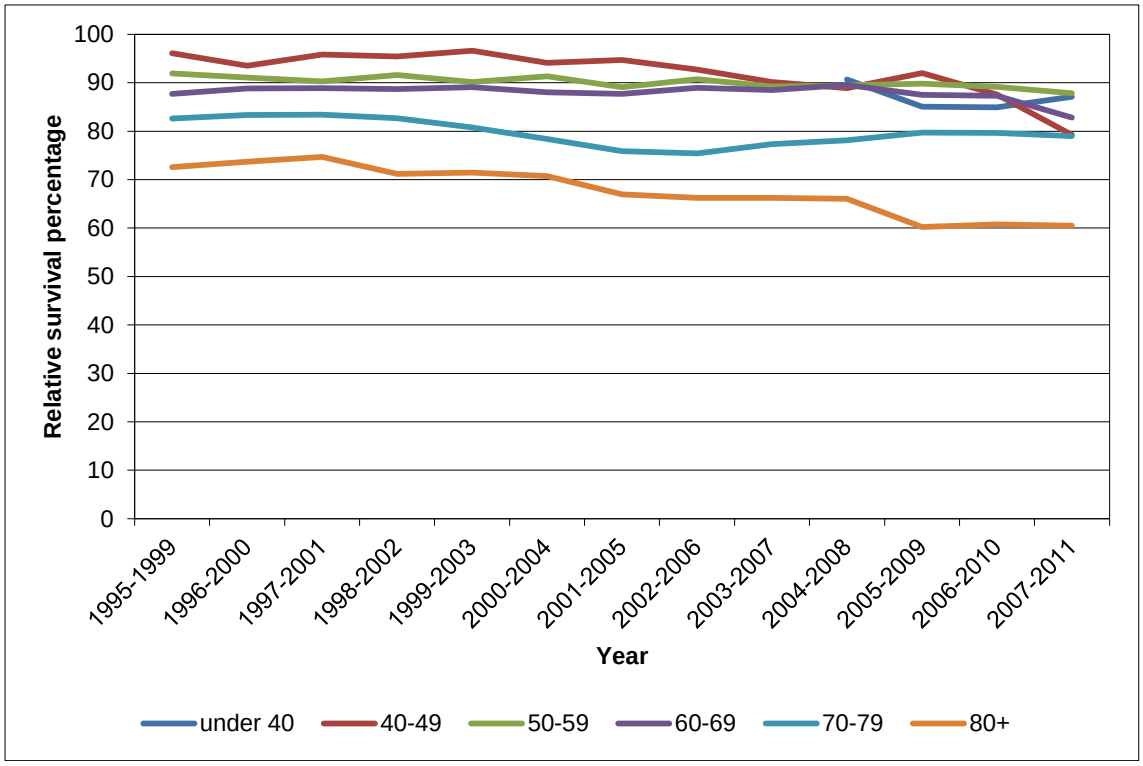
Figure 34: Five-year relative survival from bladder cancer (ICD-10 code C67) by age, in women, England 1995-2010



Source: NCRS

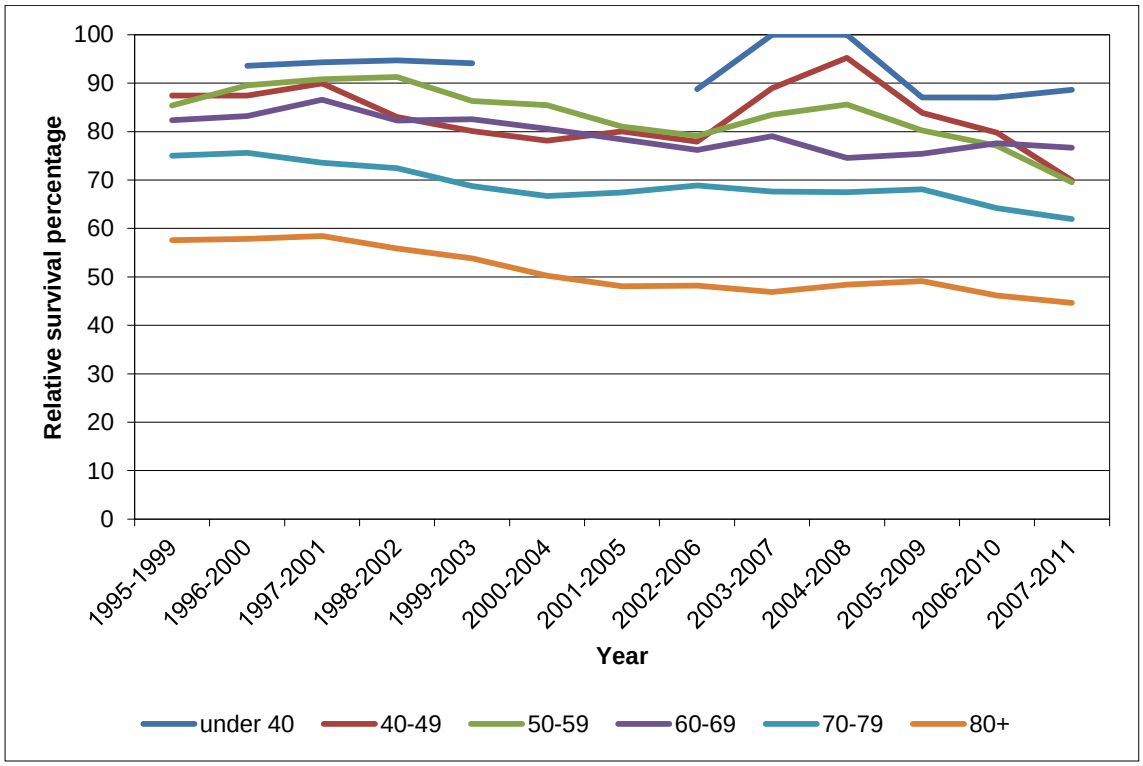
In Wales in 2007-11 one-year survival was highest in men aged under 40, at 87% (Figure 35). As with England data the confidence intervals on this rate overlap all others. Survival in those aged 80 and over is significantly lower than for those aged 50-79, at 60%. For women survival was also lowest in those aged 80 and over and was lower than men of the same age, at 45% (Figure 36).

Figure 35: One-year relative survival from bladder cancer (ICD-10 code C67) by age, in men, Wales 1995-2011



Source: WCISU

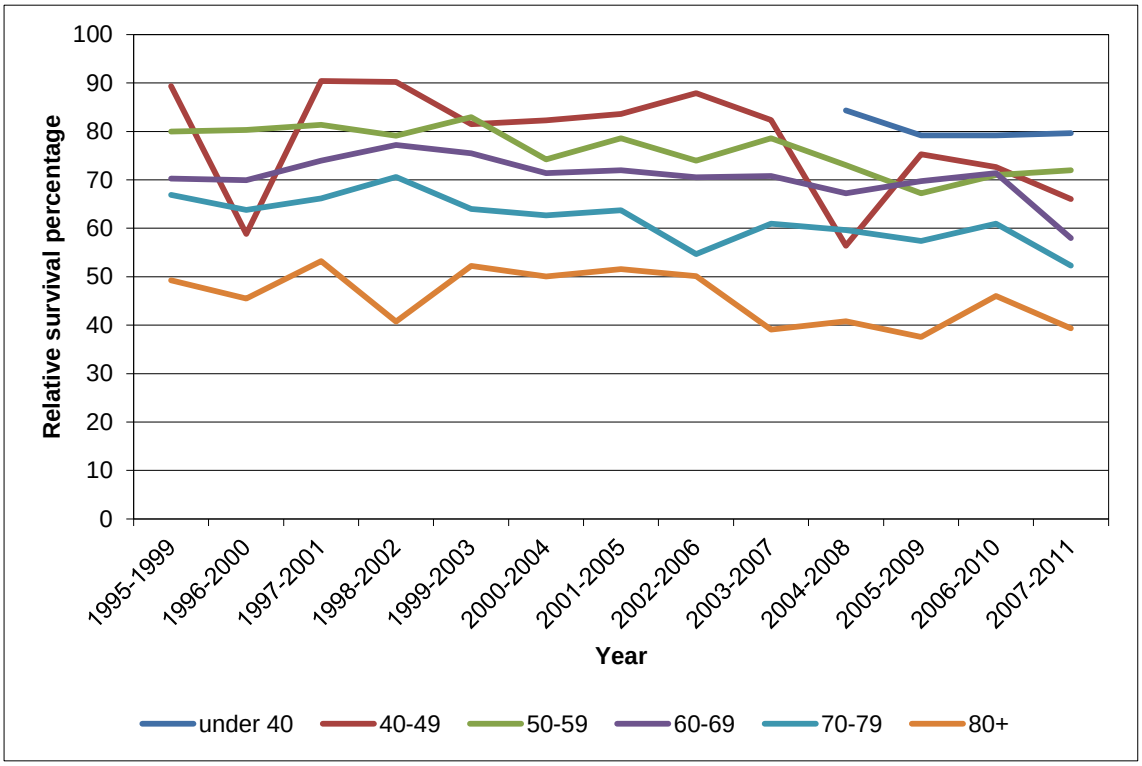
Figure 36: One-year relative survival from bladder cancer (ICD-10 code C67) by age, in women, Wales 1995-2011



Source: WCISU

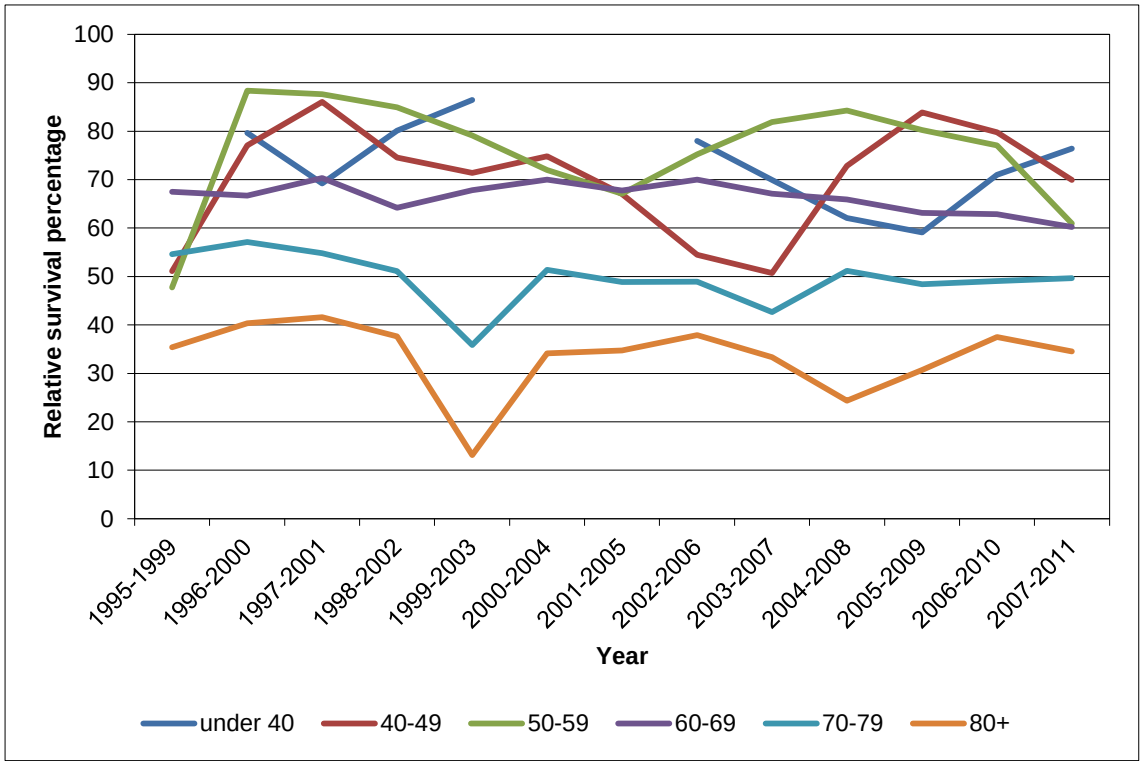
Five-year survival in Wales is lowest in those aged 80+. In men the rate was 40% (Figure 37) and for women the rate was 35% (Figure 38). This is lower than the rate in 60-69 year olds, but confidence intervals in the oldest ages overlap.

Figure 37: Five-year relative survival from bladder cancer (ICD-10 code C67) by age, in men, Wales 1995-2011



Source: WCISU

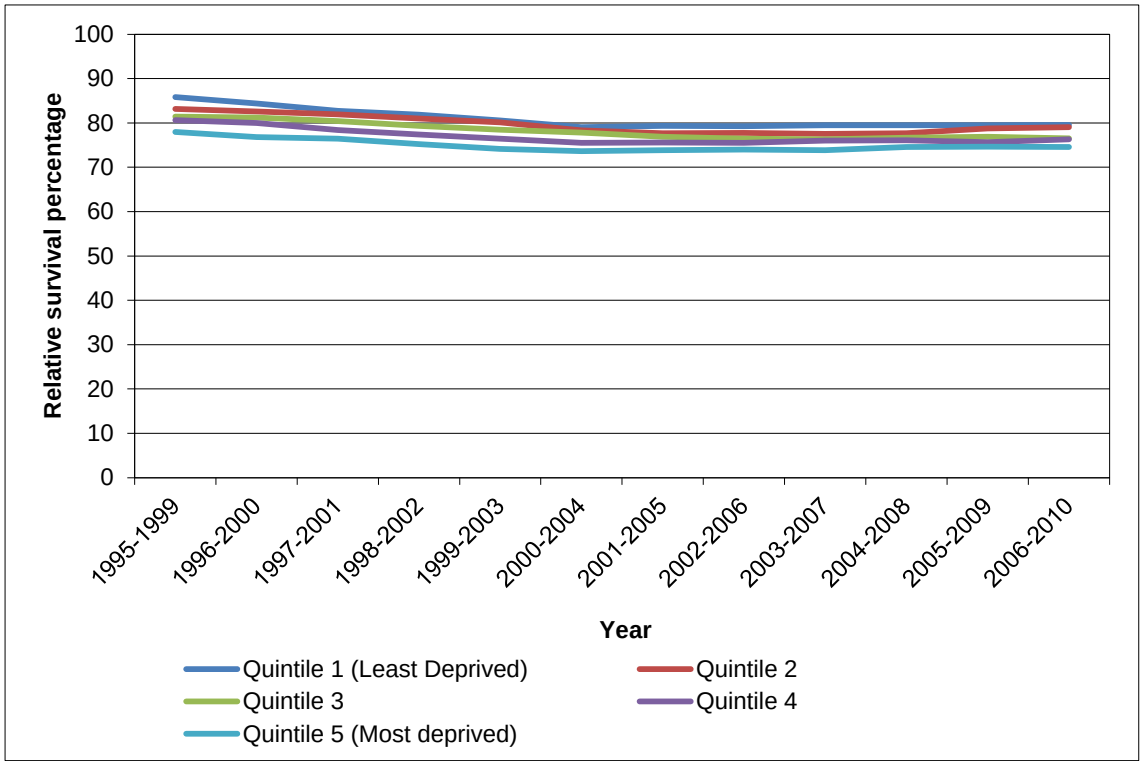
Figure 38: Five-year relative survival from bladder cancer (ICD-10 code C67) by age, in women, Wales 1995-2011



Source: WCISU

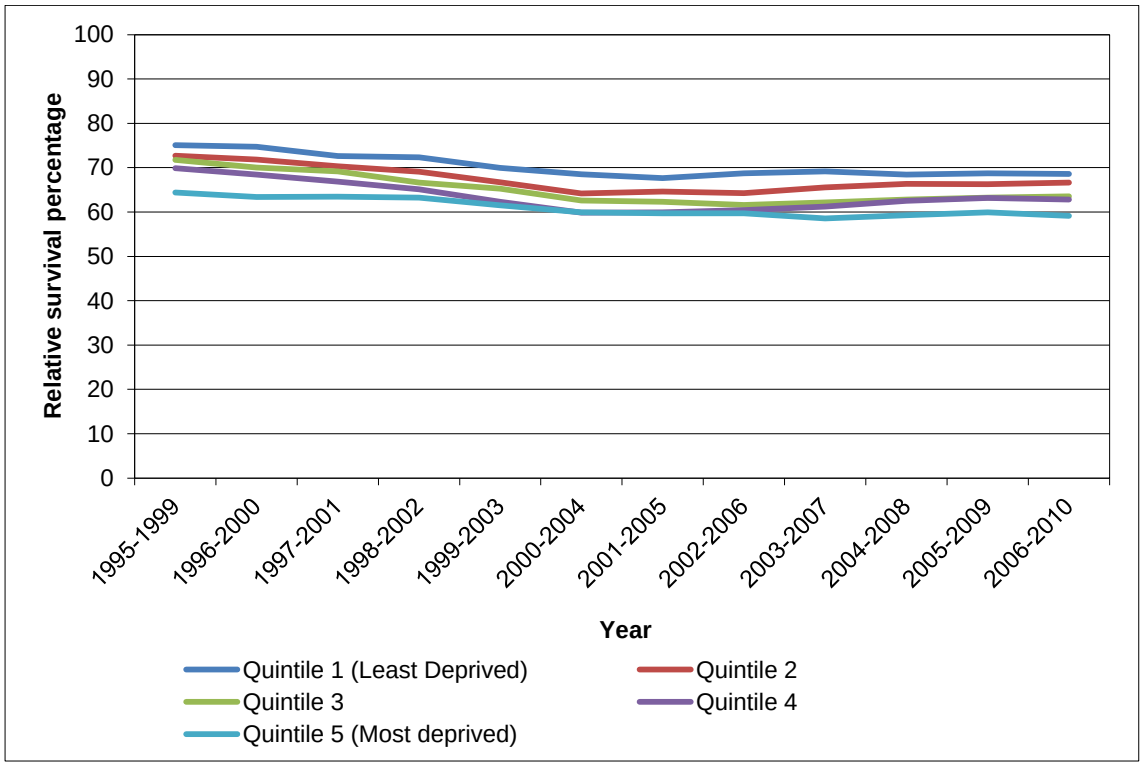
In England there is a consistent pattern of decreasing relative survival with increasing quintile of income deprivation. In men, one-year survival in 2006-10 was 78% in the least deprived quintile and 75% in the most deprived (Figure 39). In women, one-year survival in 2006-10 was 69% in the least deprived and 59% in the most deprived (Figure 40). Confidence intervals on these rates do not overlap, indicating that the differences are due to more than chance variation.

Figure 39: One-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in men, England 1995-2010



Source: NCRS; DCLG

Figure 40: One-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in women, England 1995-2010

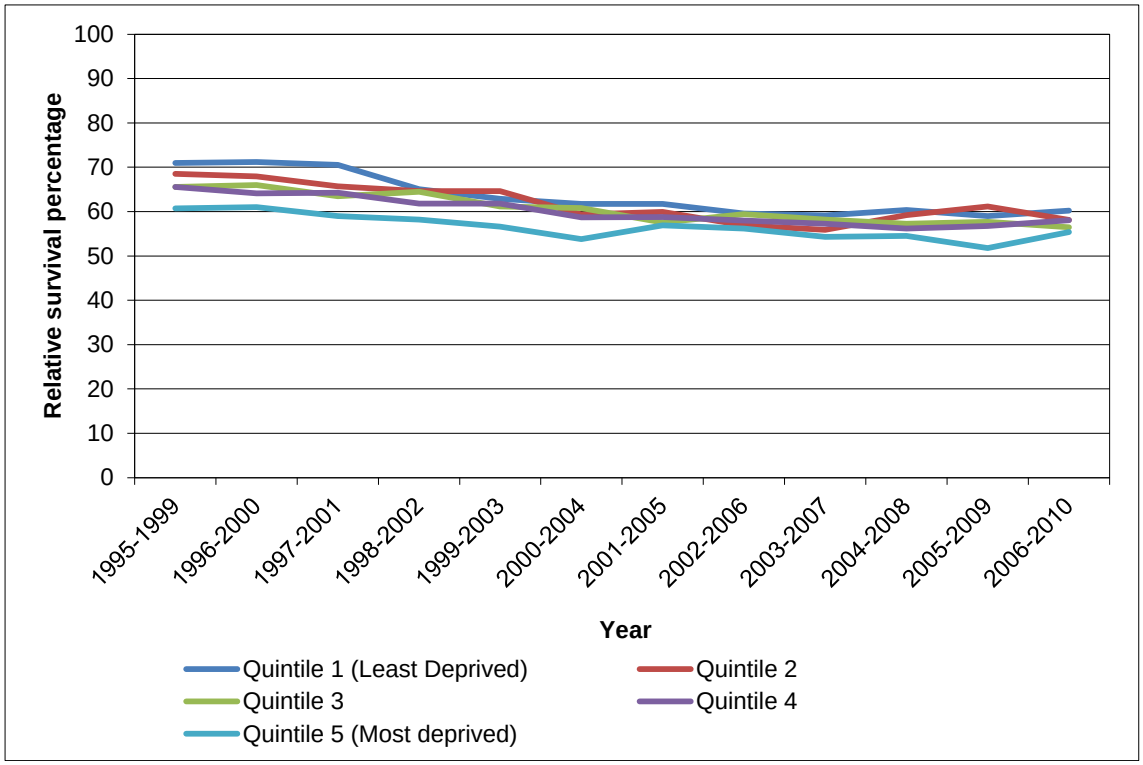


Source: NCRS; DCLG

In men, five-year survival in 2006-10 was 60% in the least deprived quintile and 55% in the most deprived (Figure 41). However the confidence intervals overlap so we cannot be sure

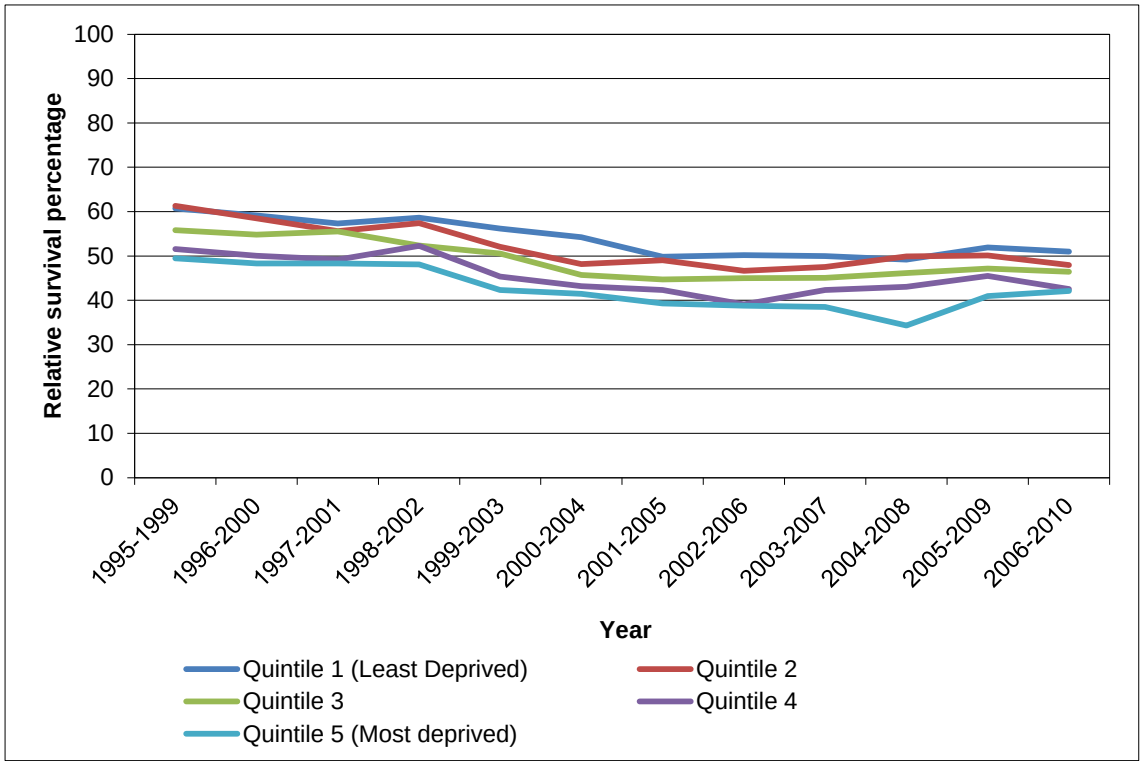
that this difference is not just chance variation. In women, five-year survival in 2006-10 was 51% in the least deprived and 42% in the most deprived (Figure 42). Here confidence intervals do not overlap, indicating that the differences are due to a true underlying difference.

Figure 41: Five-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in men, England 1995-2010



Source: NCRS; DCLG

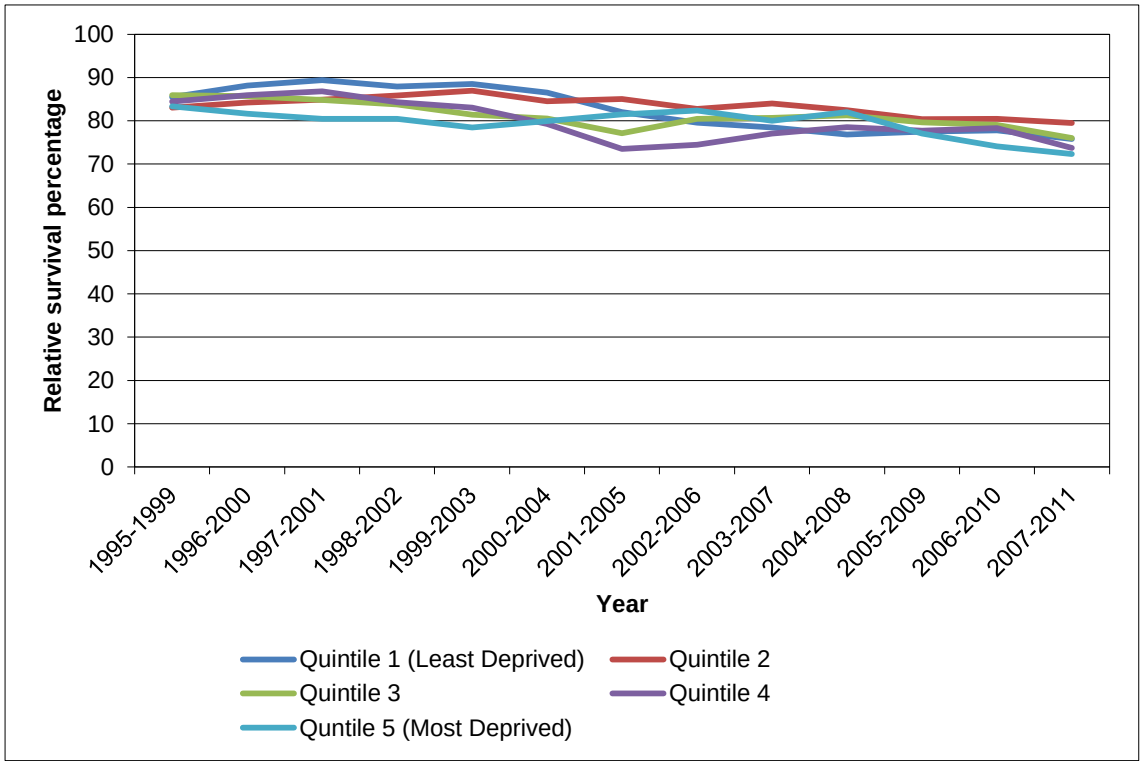
Figure 42: Five-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in women, England 1995-2010



Source: NCRS; DCLG

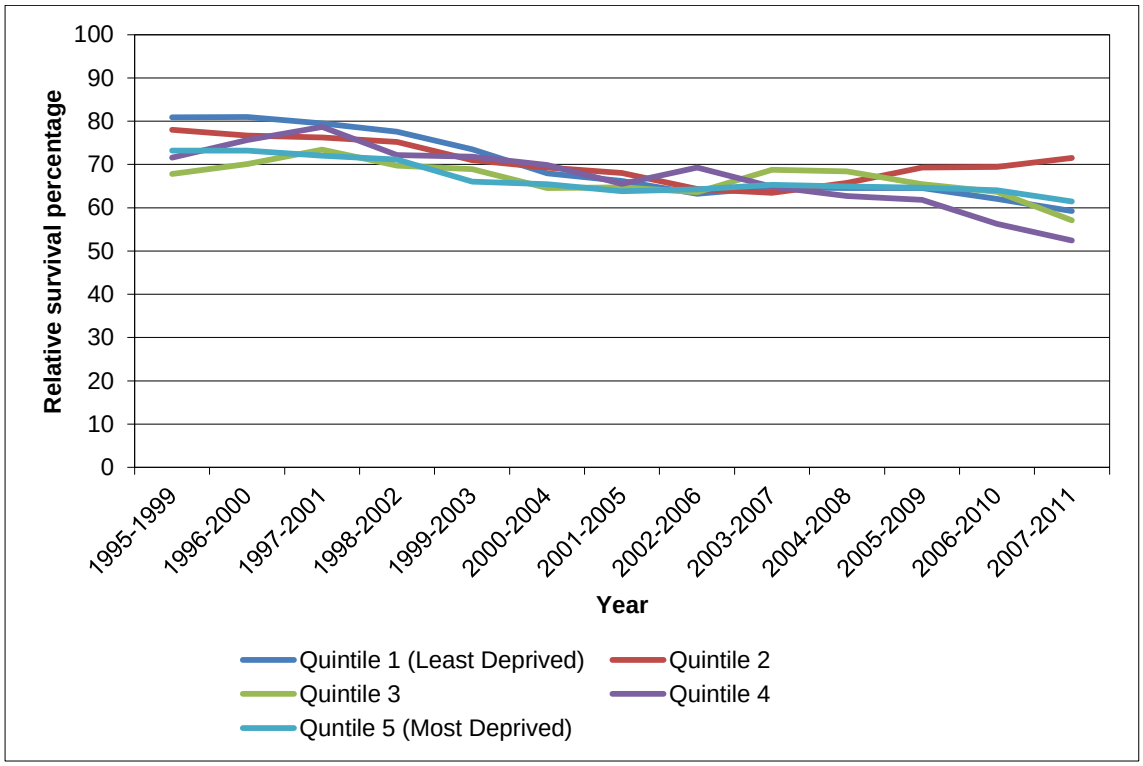
In Wales in 2007-11 there is not a pattern of survival by deprivation; in contrast to England. The highest one-year survival for men was 79% in quintile 2, compared to 73% in the most deprived quintile (Figure 43). However, confidence intervals overlap on all quintiles. Survival for women was highest in quintile 2 at 72%, and lowest in quintile 4 at 52% (Figure 44). The confidence intervals do not overlap so this is likely to be a true difference.

Figure 43: One-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in men, Wales 1995-2011



Source: WCISU

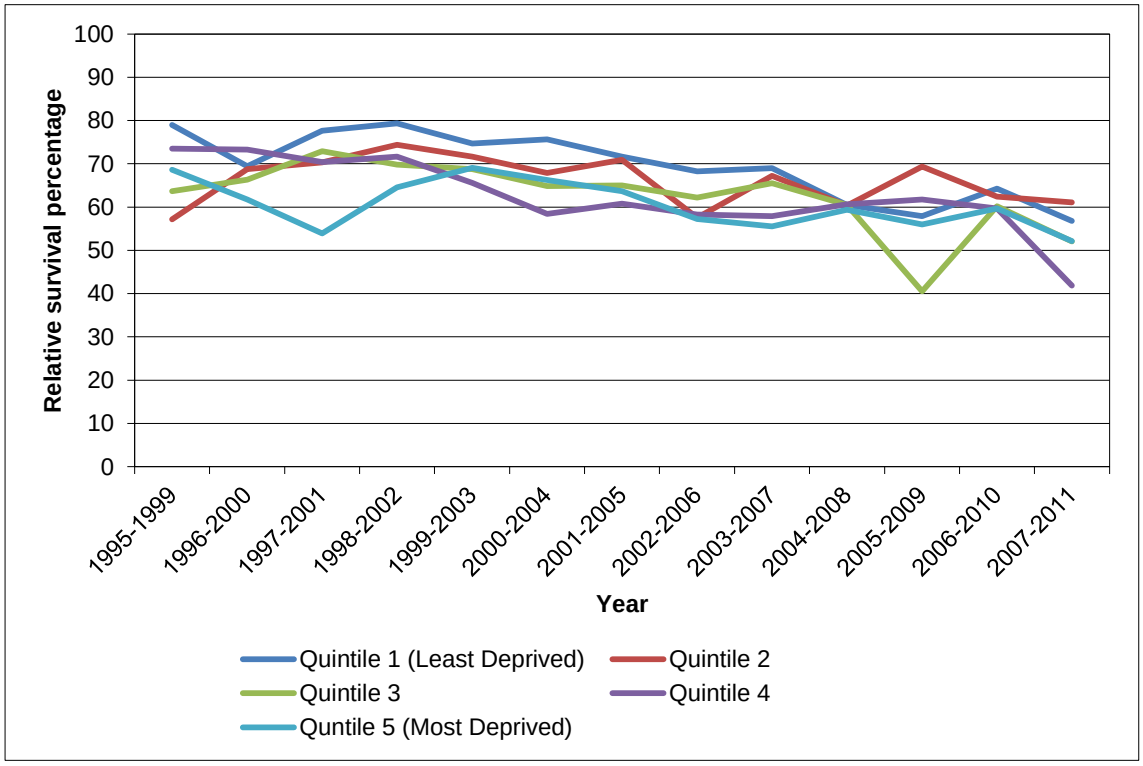
Figure 44: One-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in women, Wales 1995-2011



Source: WCISU

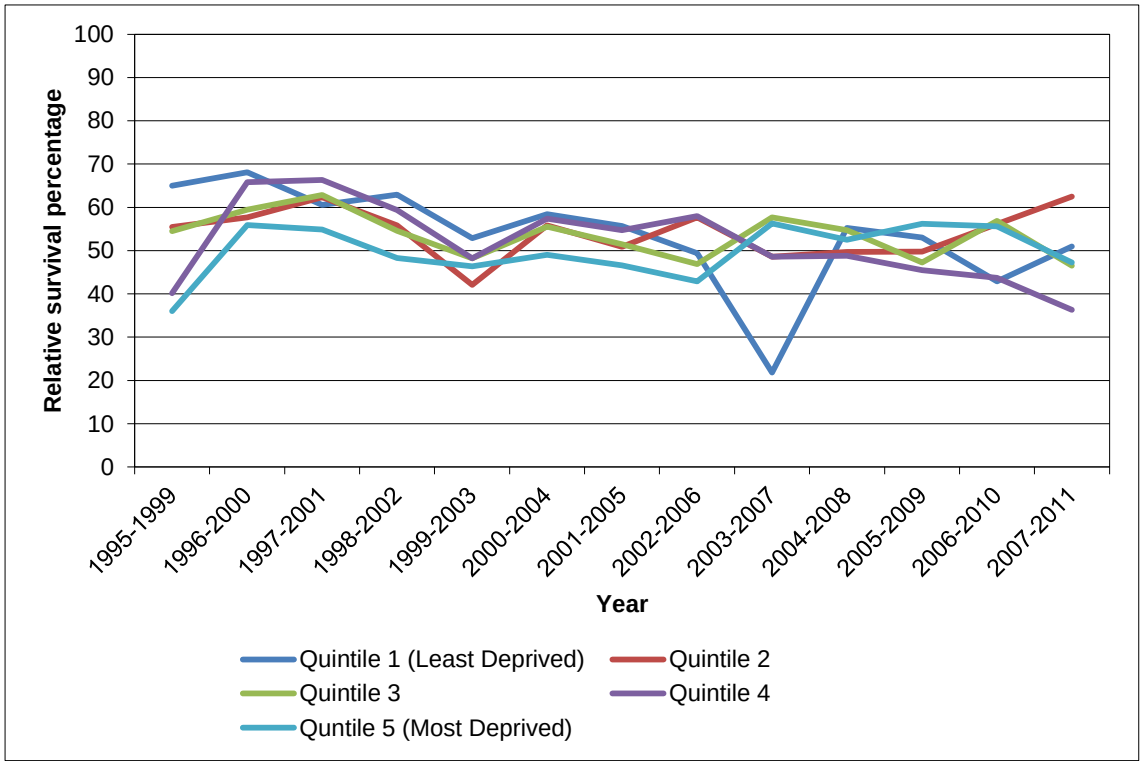
Patterns are similar for five-year survival in Wales. Men in quintile 2 have the highest survival at 61% and men in quintile 4 the lowest at 42% (Figure 45), but confidence intervals overlap. Women in quintile 2 have the highest survival at 62% and women in quintile 4 the lowest at 36% (Figure 46). As with one-year survival the confidence intervals do not overlap so this is likely to be a true difference.

Figure 45: Five-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in men, Wales 1995-2011



Source: WCISU

Figure 46: Five-year relative survival from bladder cancer (ICD-10 code C67) by deprivation quintile, in women, Wales 1995-2011

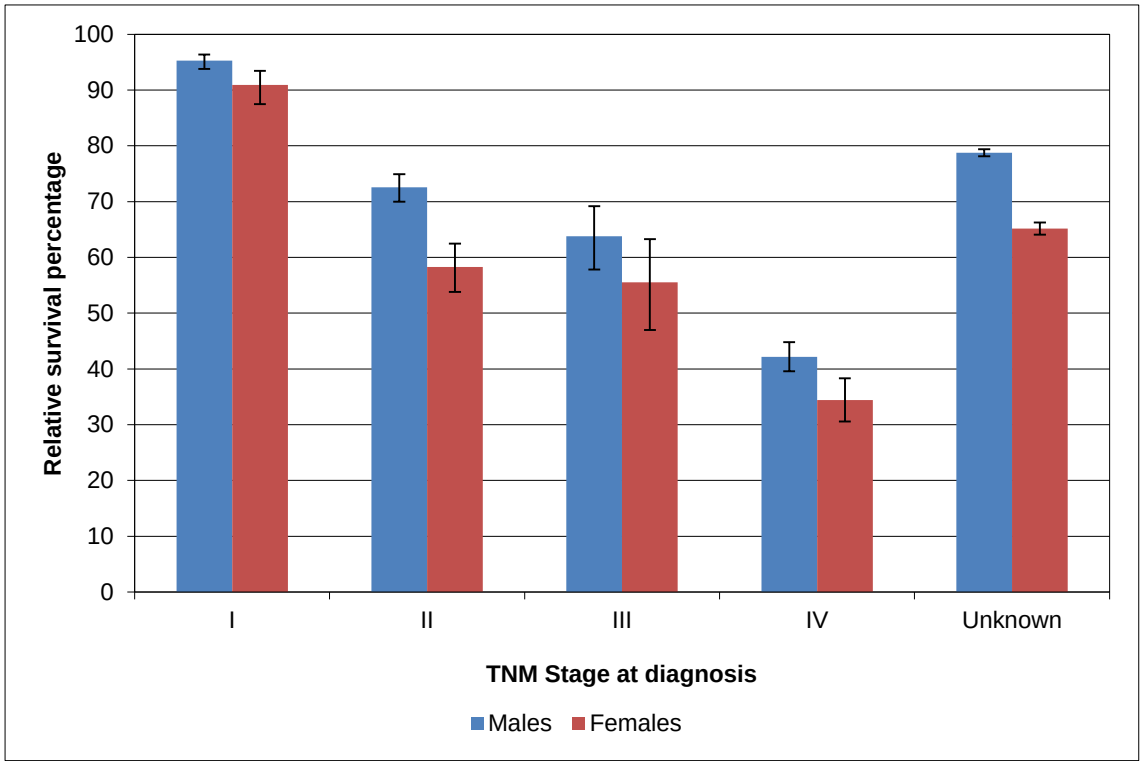


Source: WCISU

Survival decreases with increasing stage at diagnosis. This may help explain the poorer survival in women, as they are more likely to be diagnosed at an advanced stage (see Tables 4 and 5). As described in the incidence section around nearly 1 in 3 bladder cancer diagnoses in England and 1 in 10 in Wales are made at stage IV, which has poor outcomes.

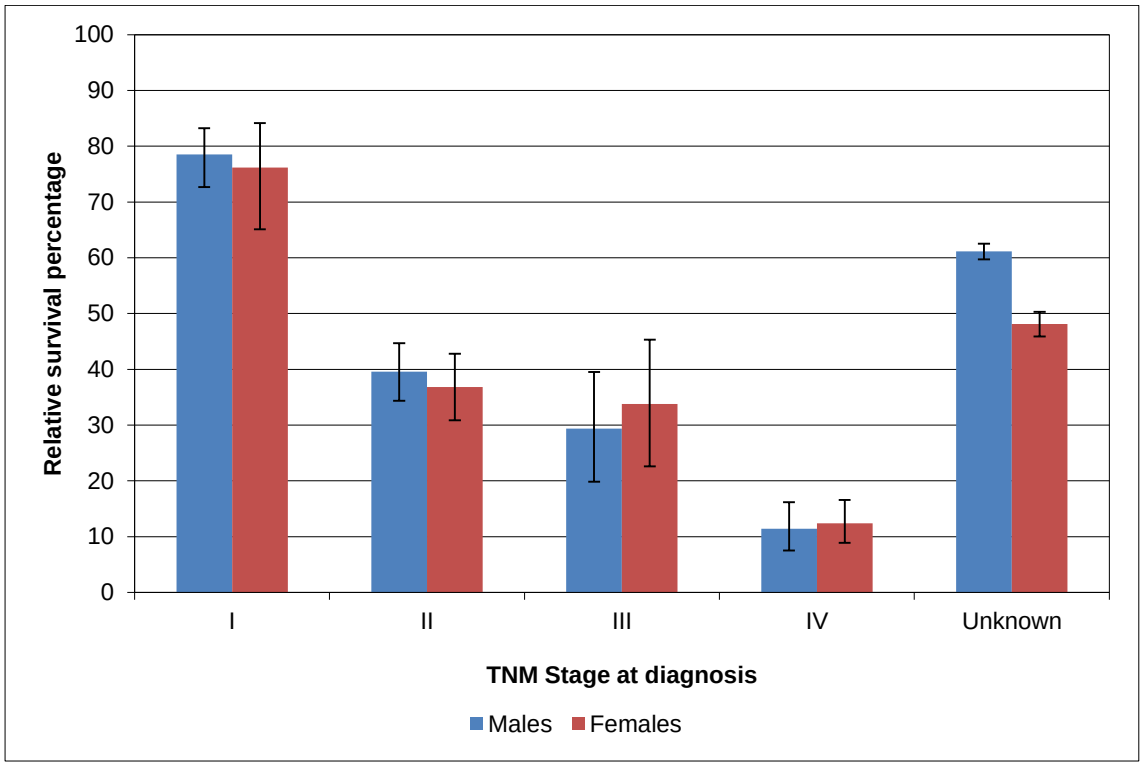
In England in 2006-10 the relative survival at one year for stage IV disease was 42% in men and 34% in women (Figure 47), whilst five-year survival was 11% in men and 12% in women (Figure 48).

Figure 47: One-year relative survival from bladder cancer (ICD-10 code C67) by stage at diagnosis, England 2006-2010



Source: NCRS

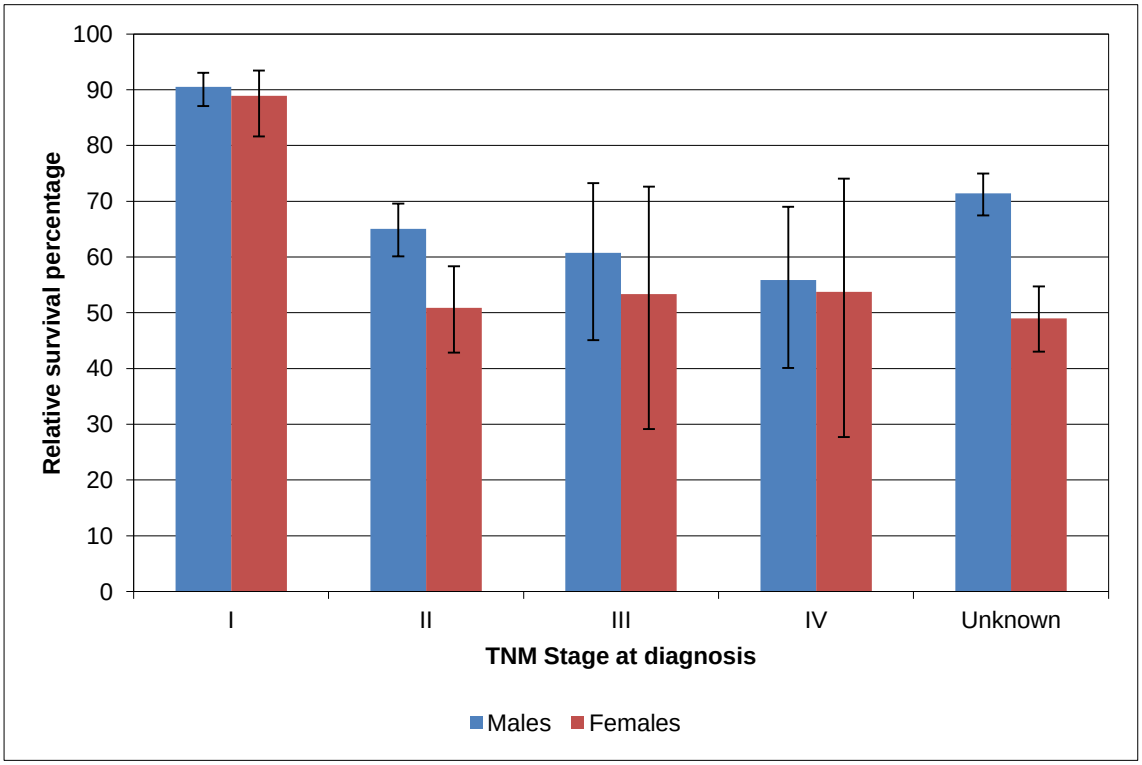
Figure 48: Five-year relative survival from bladder cancer (ICD-10 code C67) by stage at diagnosis, England 2006-2010



Source: NCRS

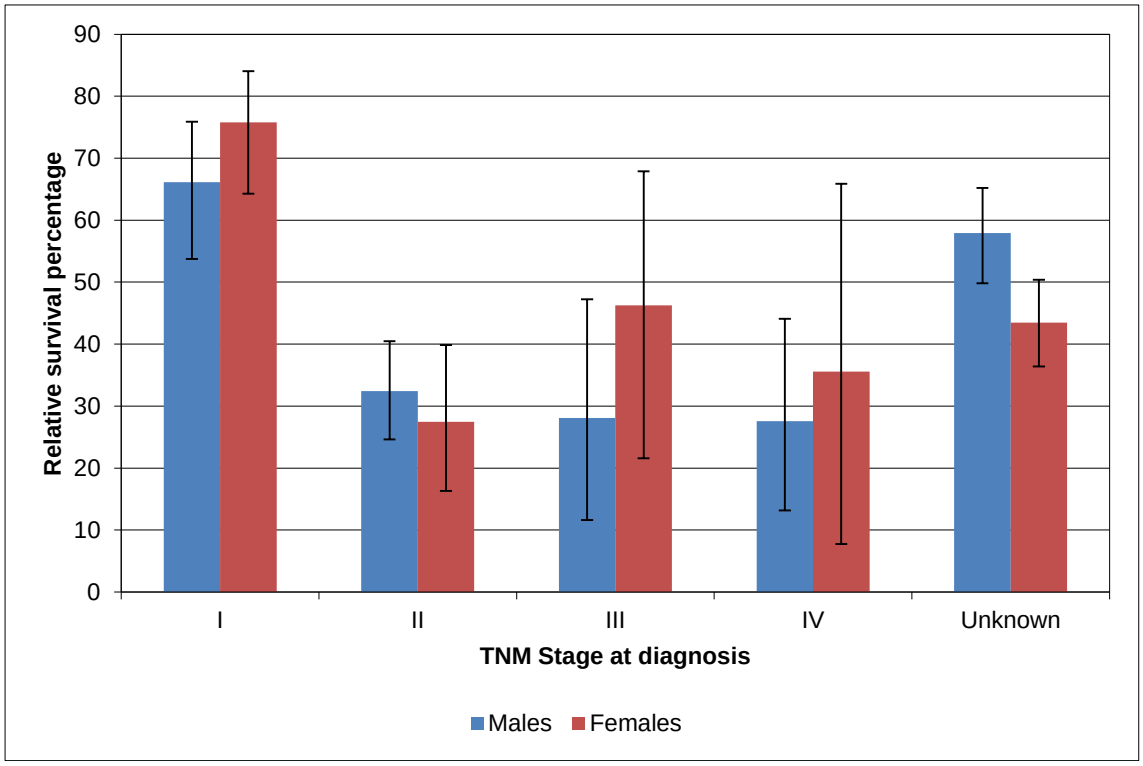
In Wales in 2007-11 one-year survival for stage IV disease was 56% for men and 54% for women (Figure 49). Five-year survival was 28% for men and 36% for women (Figure 50). The confidence intervals in these calculations are large, indicating a higher degree of uncertainty, and it is not possible to be sure that there is a survival difference between England and Wales.

Figure 49: One-year relative survival from bladder cancer (ICD-10 code C67) by stage at diagnosis, Wales 2007-2011



Source: WCISU

Figure 50: Five-year relative survival from bladder cancer (ICD-10 code C67) by stage at diagnosis, Wales 2007-2011.



Source: WCISU

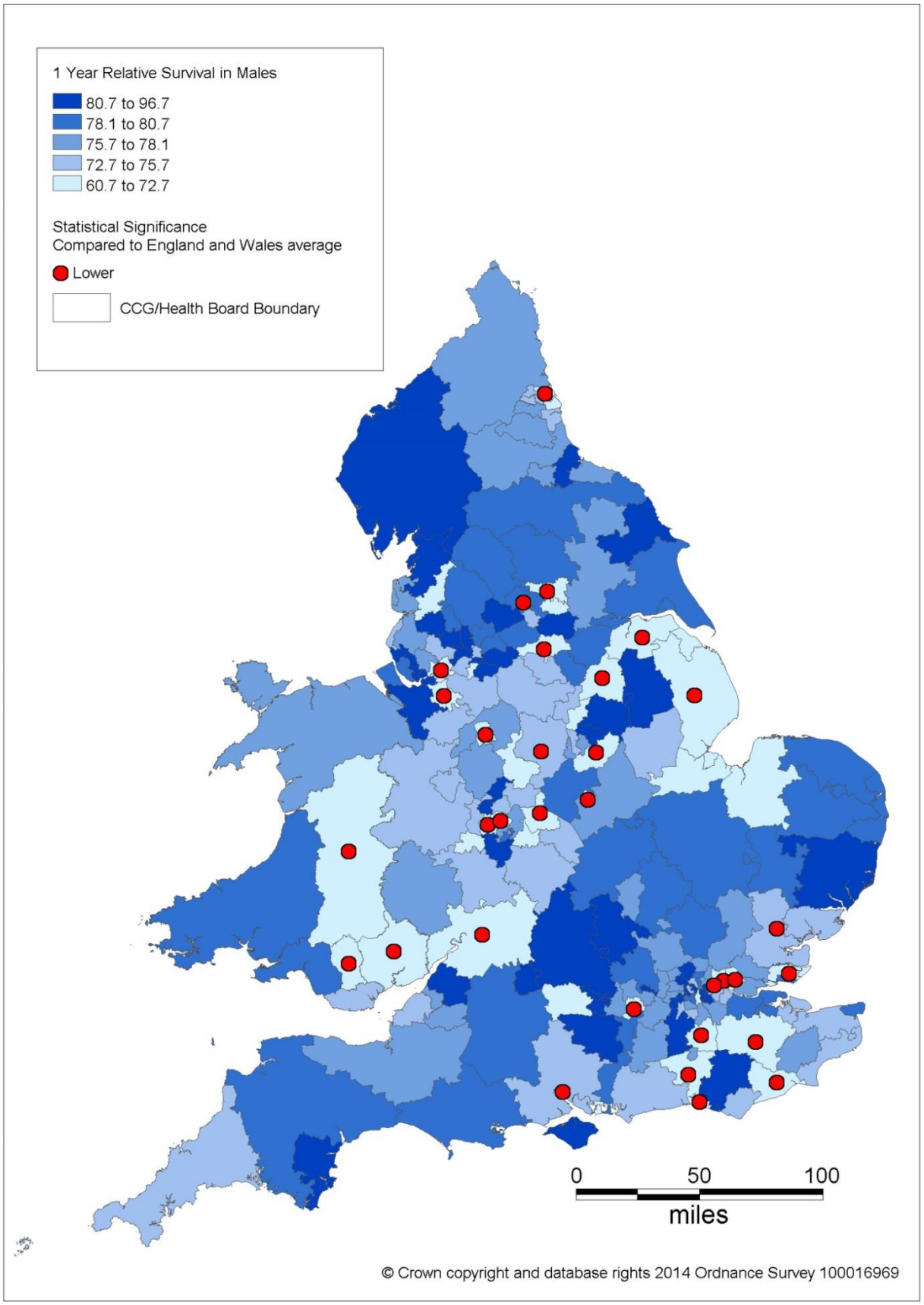
Non muscle-invasive disease (stage I) shows better outcomes then muscle-invasive disease (stage II-IV), with one-year survival of 95% in men and 91% in women in England. Five-year survival was 79% and 76%. The difference between NMIBC and MIBC is particularly apparent at five years of follow-up where the survival for stage II bladder cancer is nearly half that of stage I. In Wales one-year survival for stage I disease was 91% in men and 89% in women; five-year survival was 66% and 76% respectively.

One-year relative survival in men at CCG level varies from 60% to 96% (Figure 51), with the range for women 28% to 87% (Figure 52). There is greater uncertainty with survival calculations so fewer CCGs are statistically significantly different from the England average than with incidence or mortality data.

Five-year relative survival in men at CCG level varies from 21% to 87% (Figure 53), with the range for women 0% to 76% (Figure 54).

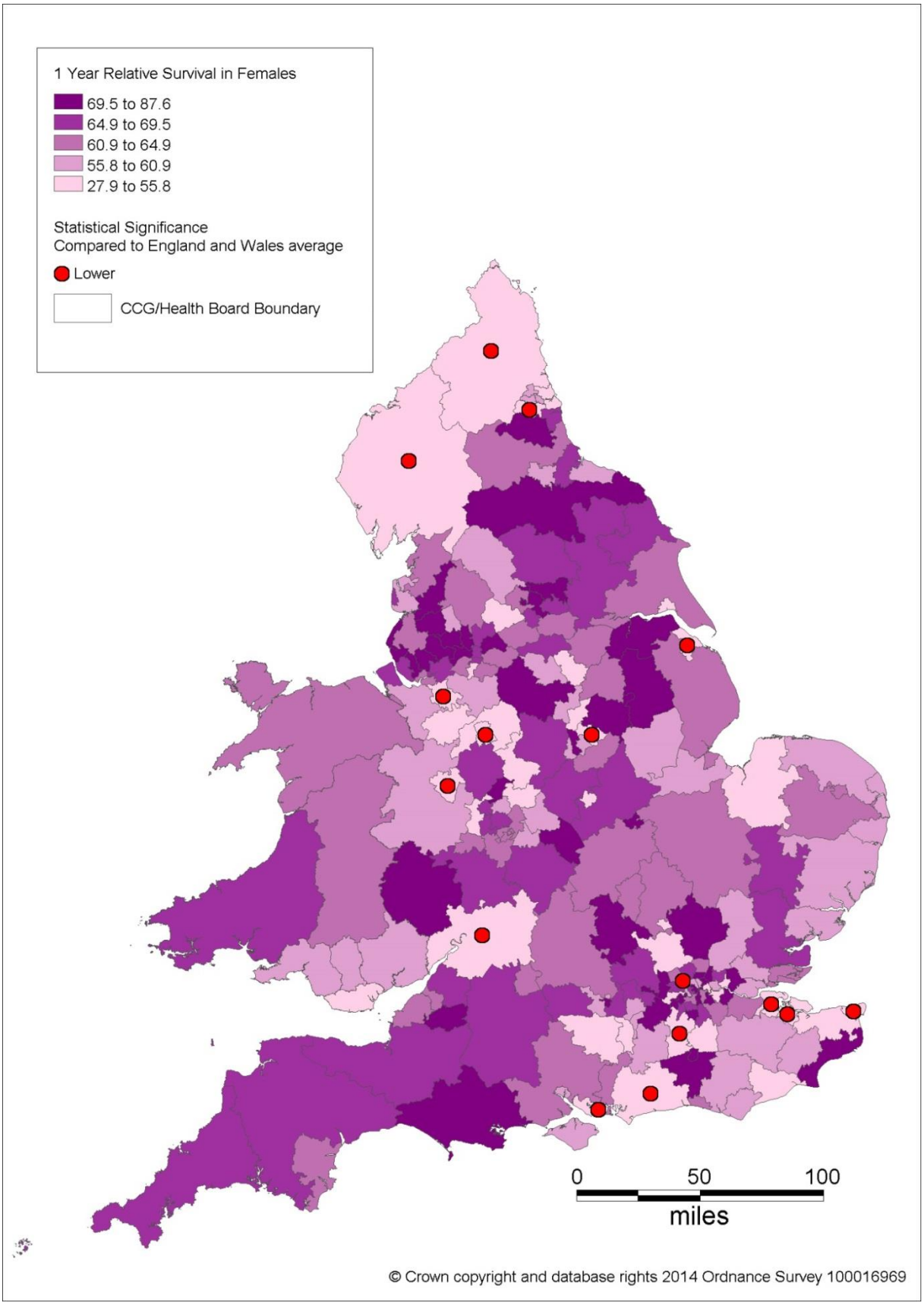
There is no obvious geographical pattern in terms of CCGs which have higher or lower survival, although some CCGs with poorer one-year survival also have poorer five-year survival; as might be expected.

Figure 51: One-year relative survival from bladder cancer (ICD-10 code C67) in men, Clinical Commissioning Groups 2006-2010 (England) and Health Boards 2007-2011 (Wales)



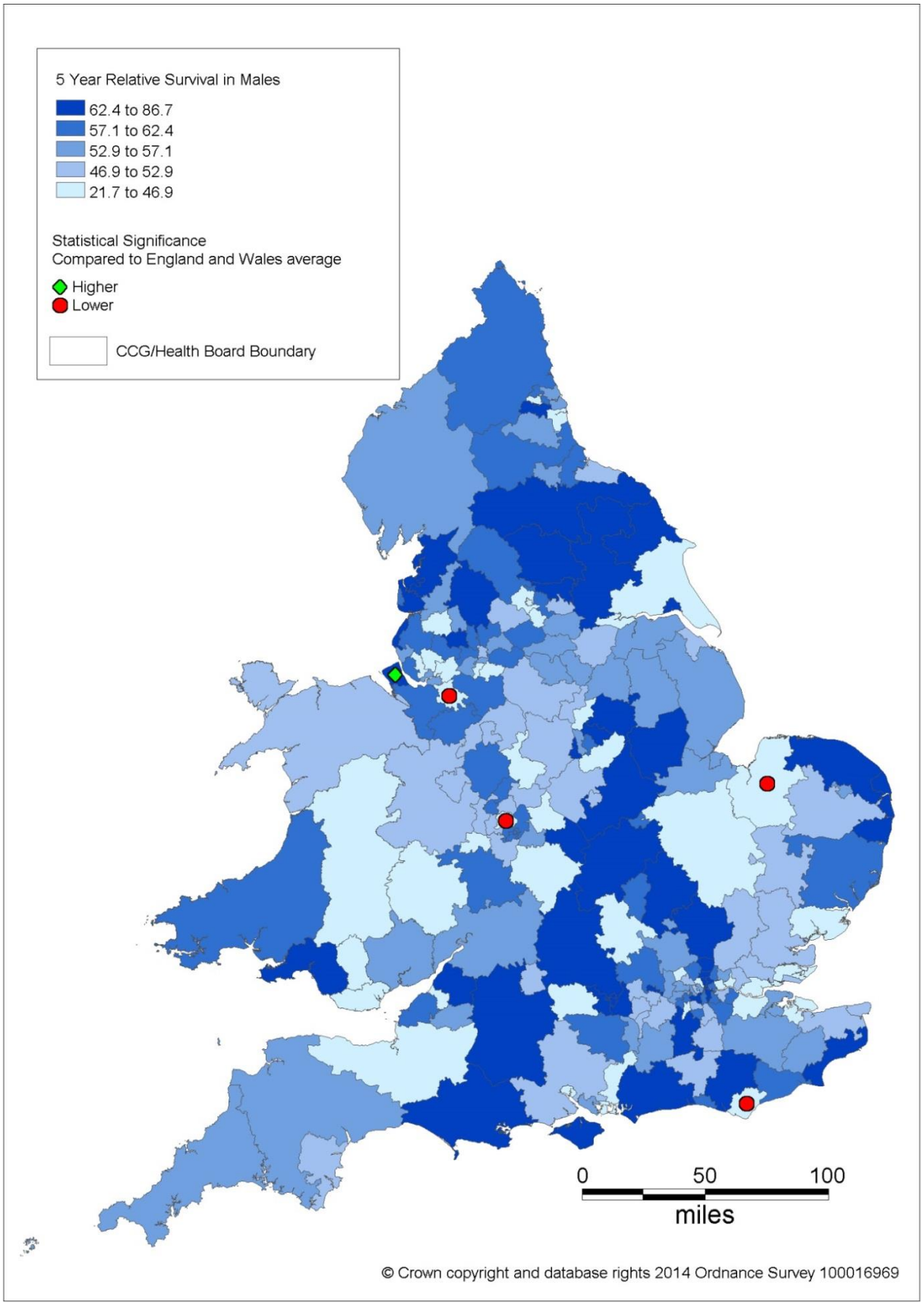
Source: NCRS; WCISU

Figure 52: One-year relative survival from bladder cancer (ICD-10 code C67) in women, Clinical Commissioning Groups 2006-2010 (England) and Health Boards 2007-2011 (Wales)



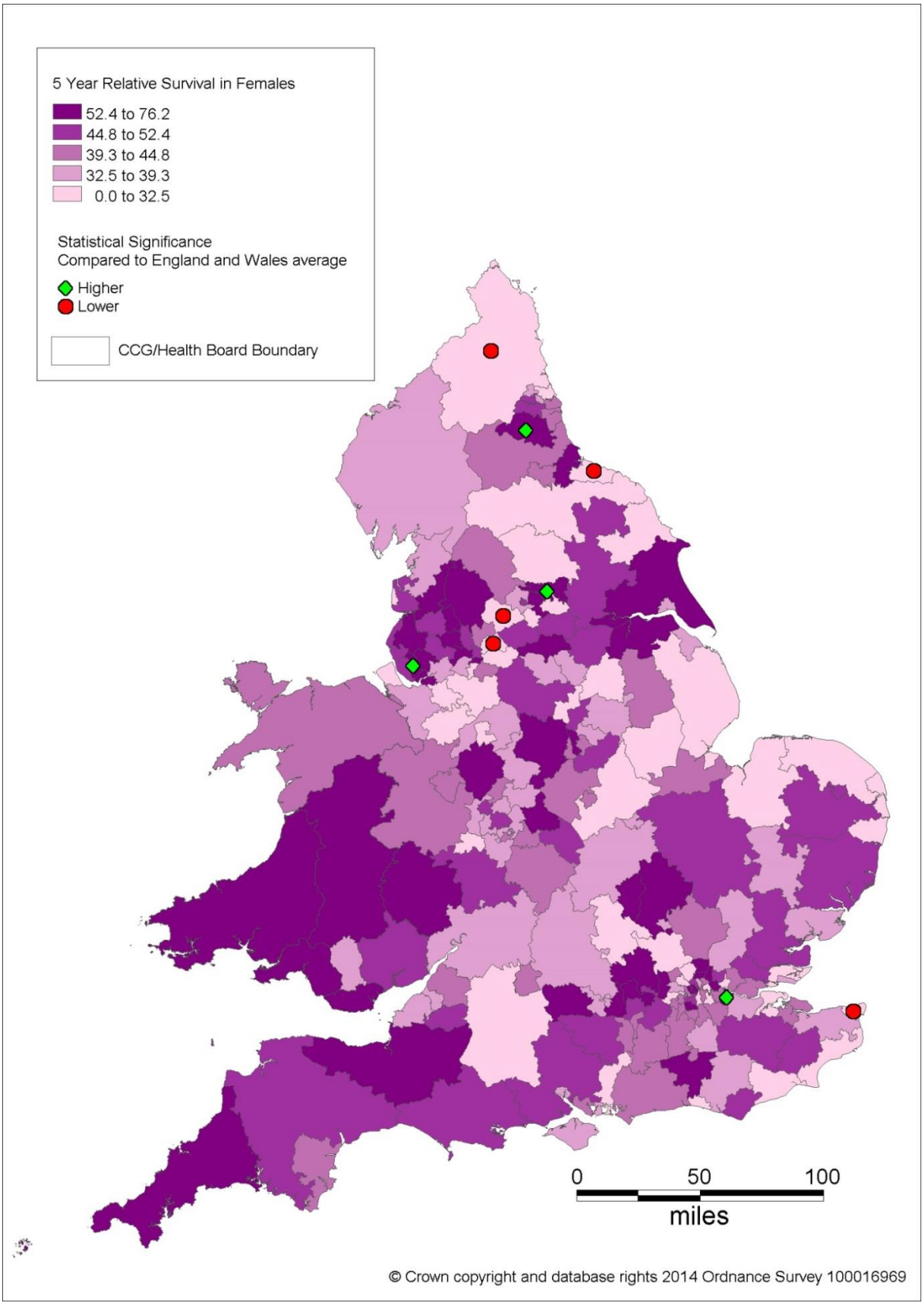
Source: NCRS; WCISU

Figure 53: Five-year relative survival from bladder cancer (ICD-10 code C67) in men, Clinical Commissioning Groups 2006-2010 (England) and Health Boards 2007-2011 (Wales)



Source: NCRS; WCISU

Figure 54: Five-year relative survival from bladder cancer (ICD-10 code C67) in women, Clinical Commissioning Groups 2006-2010 (England) and Health Boards 2007-2011 (Wales)



Source: NCRS; WCISU

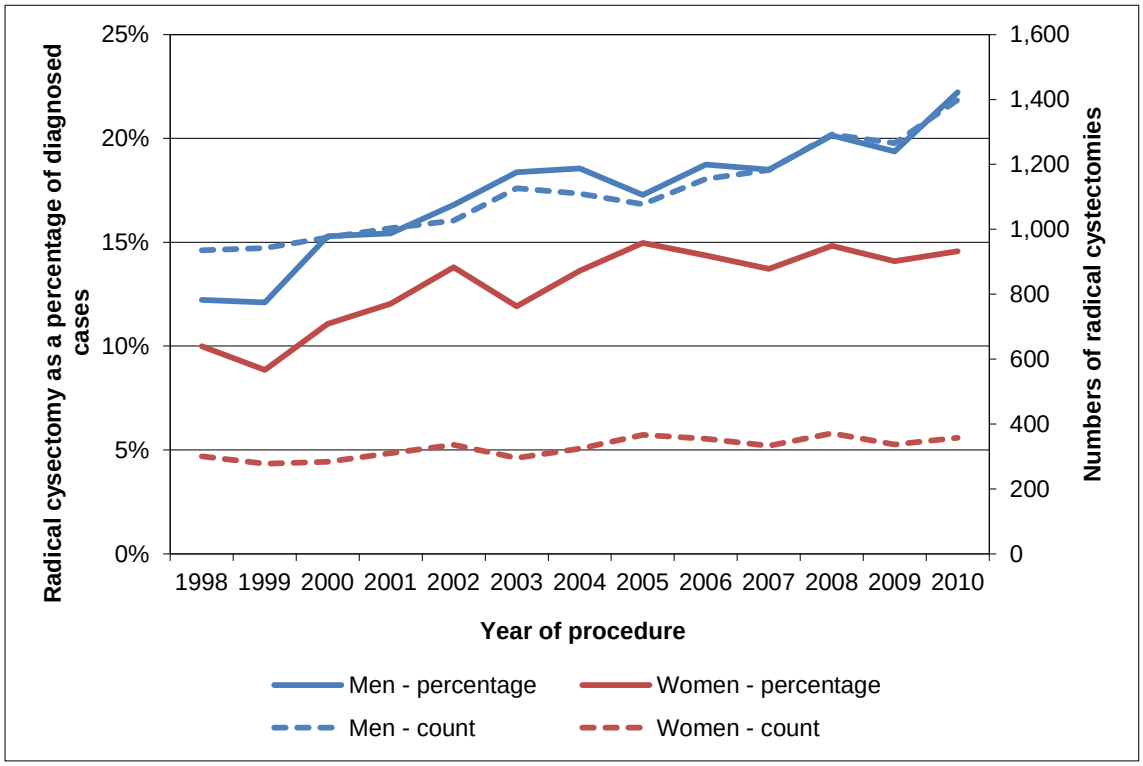
5 Treatment

5.1 Radical cystectomy

Radical cystectomy is the complete removal of the bladder. It is one of the main treatments for muscle-invasive bladder cancer.

Numbers of radical cystectomies have risen in men from 935 in 1998 to 1,399 in 2012. In women the rise in number has been smaller; 300 operations were done in 1998 compared to 357 in 2012 (Figure 55). As a proportion of cases diagnosed in that year the rate of radical cystectomy in men was 15% in 2000 compared to 22% in 2010 ($p<0.001$), with the proportion in women 11% and 15% respectively ($p<0.001$). Regression analysis indicates a linear increase in cystectomy rate of 4.2% each year for men and 3.5% for women ($p<0.05$ for both).

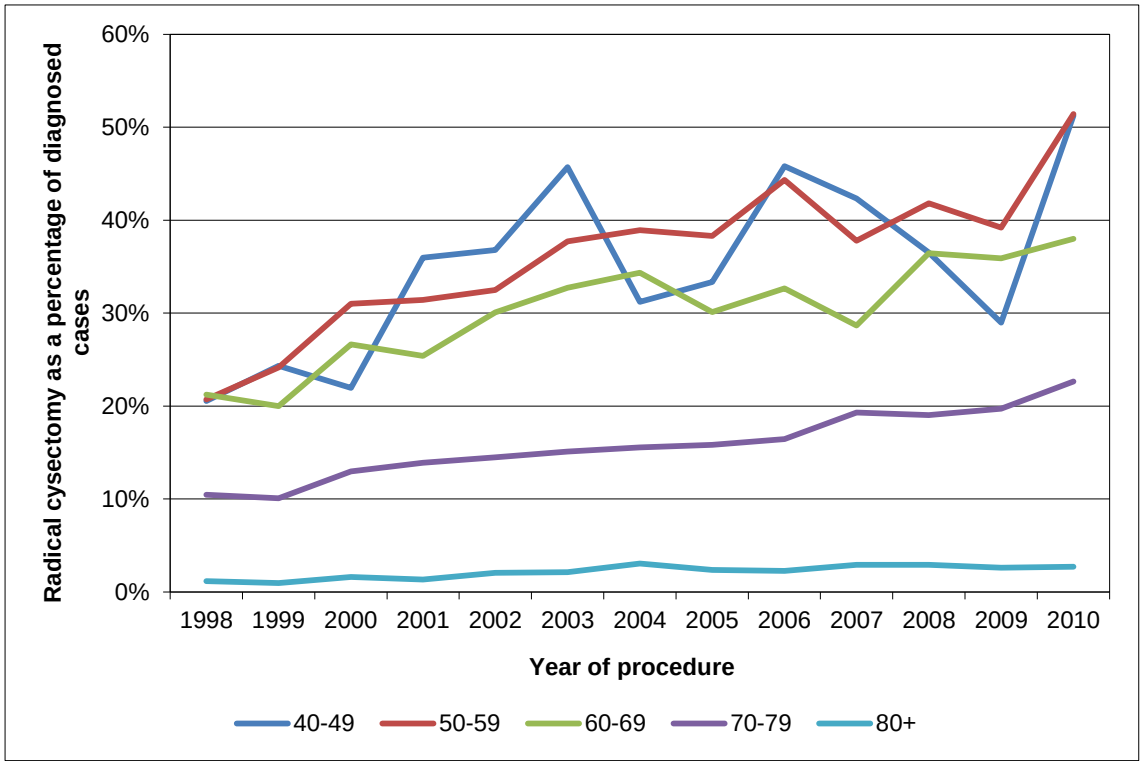
Figure 55: Radical cystectomy for bladder cancer (ICD-10 code C67), England 1998-2010



Source: HES; NCRS

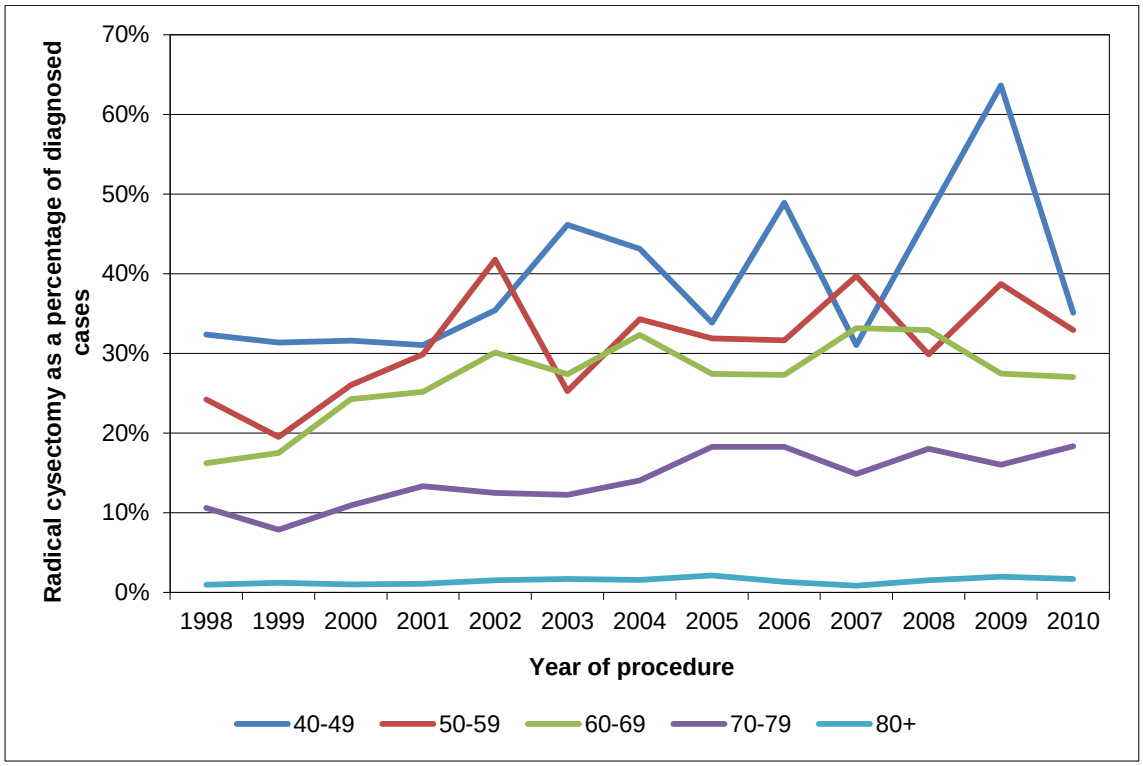
The proportion of people aged under 70 who have cystectomy is similar; given the smaller numbers there is inherent instability in the rates for younger ages. The cystectomy rate is lowest in those aged 80 and over at diagnosis: 3% of men and 2% of women (Figures 56 and 57).

Figure 56: Radical cystectomy for bladder cancer (ICD-10 code C67) by age, in men, England 1998-2010



Source: HES; NCRS

Figure 57: Radical cystectomy for bladder cancer (ICD-10 code C67) by age, in women, England 1998-2010



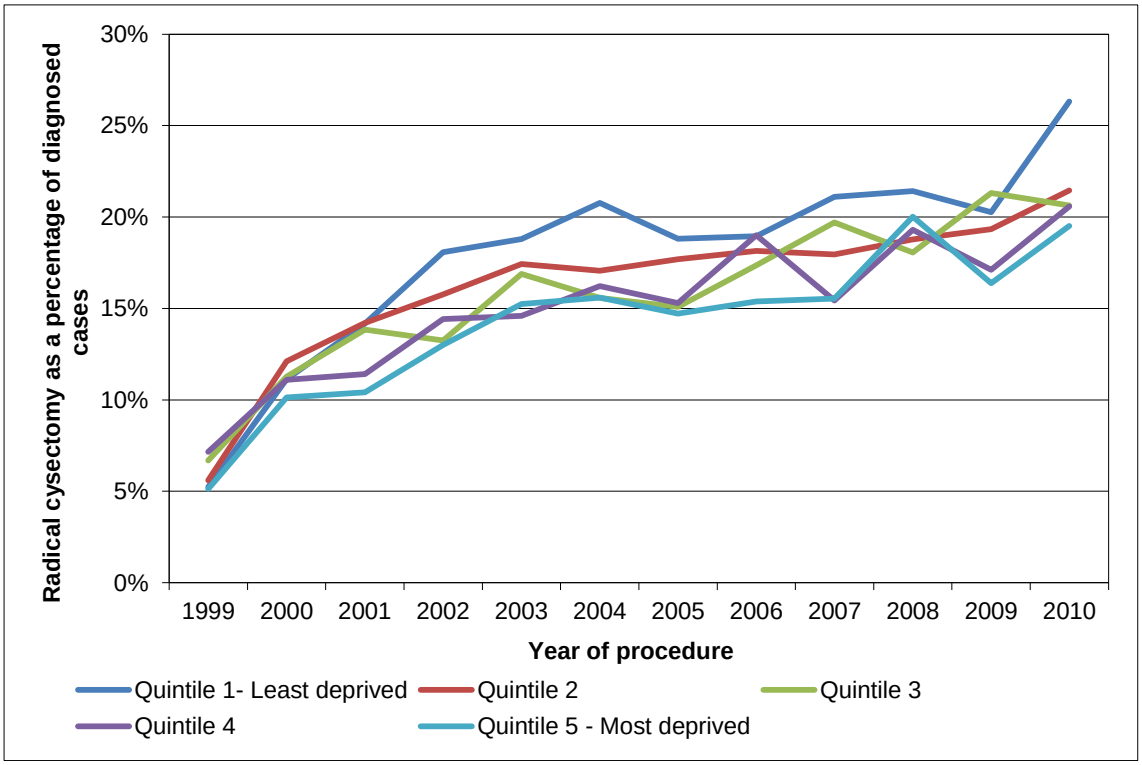
Source: HES; NCRS

In men all age groups have shown a linear increase in cystectomy rate ($p<0.05$). The annual increase in rates ranged from 4.4%-8.7% but with fairly wide confidence intervals, so it is not possible to say that one age range increased more or less than another.

In women the cystectomy rate in those aged under 40 and 80+ did not change over the time period; although numbers in the youngest age group are very small. In women aged 60-69 analysis indicated that the data was best described by an increasing rate to 2002 followed by no change until 2010. The cystectomy rate in women aged 50-59 and 70-79 showed a linear increase of 3.2% and 5.6% respectively ($p<0.05$).

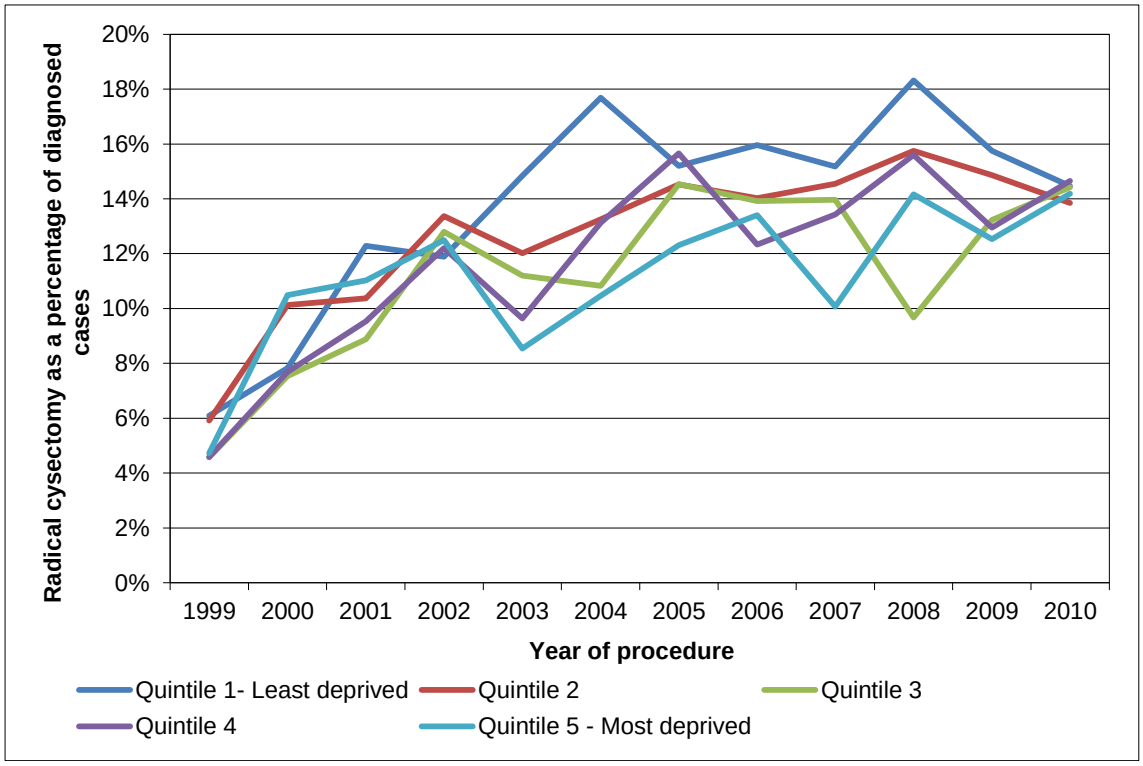
Cystectomy rates are higher in the least deprived men, compared to the most deprived ($p<0.001$). The proportion of men in the least deprived quintile who had cystectomy was 26% compared to 20% (Figure 58). However, women were equally likely to receive a cystectomy whichever deprivation group they were in (Figure 59).

Figure 58: Radical cystectomy for bladder cancer (ICD-10 code C67) by quintile of income deprivation, in men, England 1998-2010



Source: HES; NCRS

Figure 59: Radical cystectomy for bladder cancer (ICD-10 code C67) by quintile of income deprivation, in women, England 1998-2010



Source: HES; NCRS

The cystectomy rate increased linearly in each deprivation quintile for both men and women ($p<0.05$). This varied between 5.8%-7.3% in men and 4.4%-6.7% in women. There is no evidence that the rate increased more quickly or slowly with variation in deprivation.

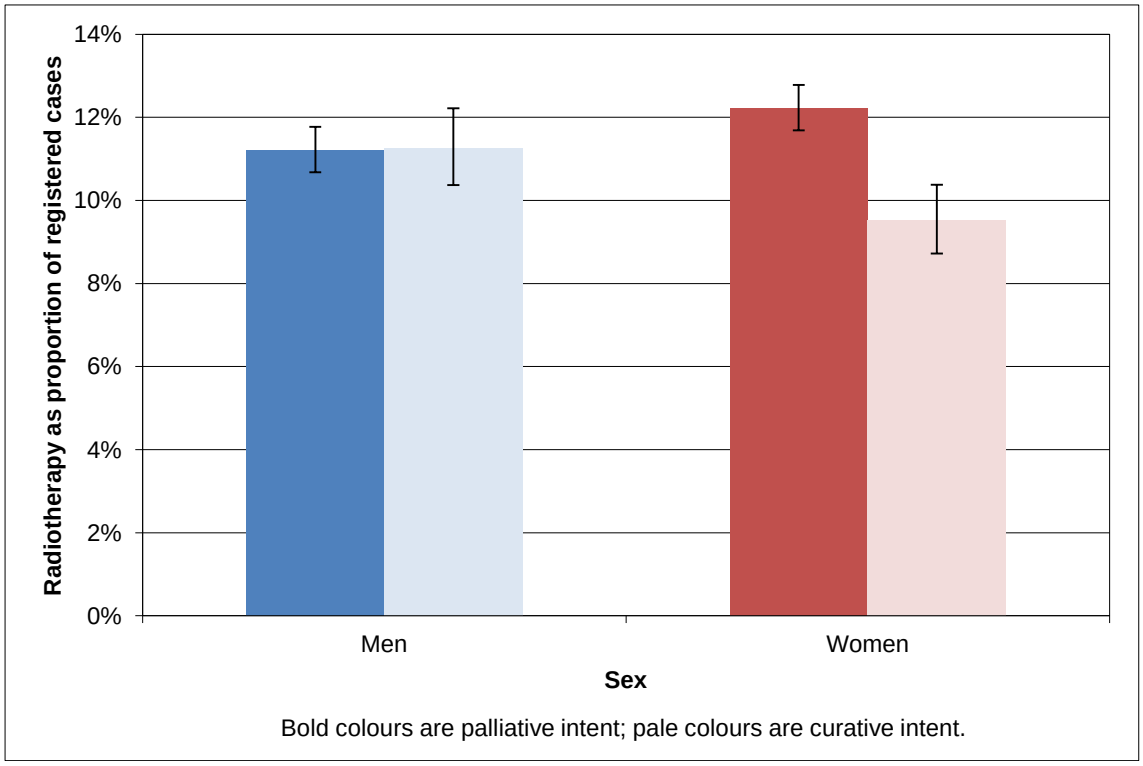
5.2 Radiotherapy

Radiotherapy is also a frequently used treatment modality for muscle-invasive bladder cancer. Radiotherapy is also used for symptomatic relief of advanced bladder cancer, so it is important to differentiate between curative and palliative intent.

Data shown here is based on the number of radiotherapy treatment courses delivered in 2009 and 2010 as a proportion of diagnoses in those same years. This means that those diagnosed prior to 2009 are not represented, nor any treatment after 2010. This restriction is required as the radiotherapy data holds little demographic detail such as age and sex, so must be linked to diagnosis data.

The proportion of men having curative radiotherapy is higher than in women, but the difference is fairly small; 11.3% in men compared to 9.5% in women ($p<0.001$) (Figure 60). The proportion having palliative radiotherapy is close to being statistically significant ($p=0.06$) but again the magnitude of any difference is small; 11.2% in men and 12.2% in women.

Figure 60: Radiotherapy for bladder cancer (ICD-10 code C67) by sex, England 2009-2010

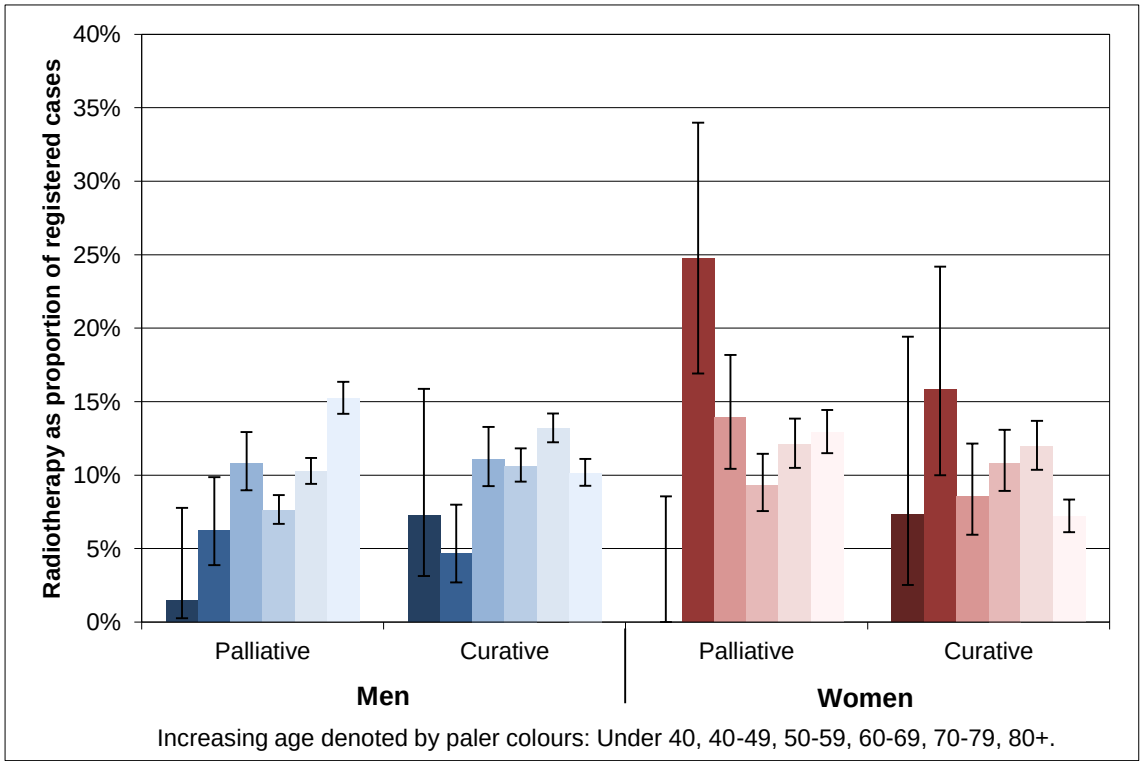


Source: RTDS; NCDR

Data for radiotherapy by age are more difficult to interpret as numbers are smaller. In both sexes palliative radiotherapy is high in those aged 80+ with a corresponding dip in curative radiotherapy. In the three older age-bands, which include the majority of cases, the usage of palliative radiotherapy increases with age (Figure 61).

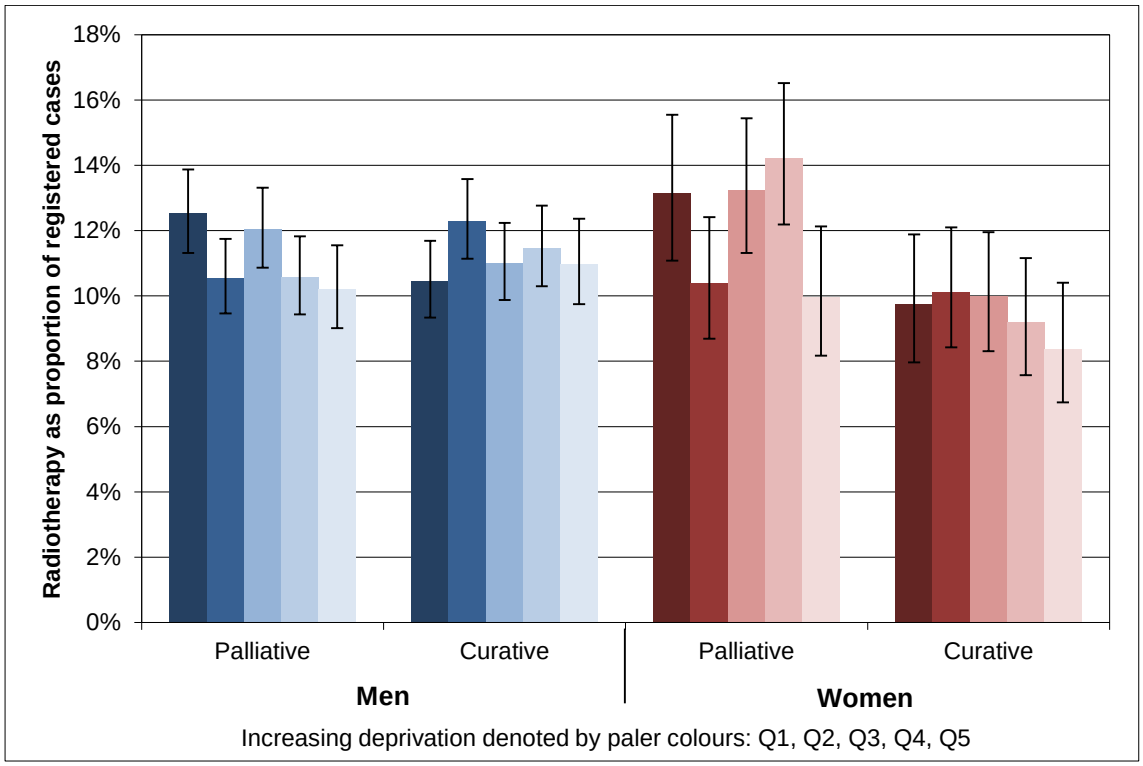
There is no strong evidence of any trend in radiotherapy use by quintile of deprivation (Figure 62).

Figure 61: Radiotherapy for bladder cancer (ICD-10 code C67) by age and sex, England 2009-2010



Source: RTDS; NCDR

Figure 62: Radiotherapy for bladder cancer (ICD-10 code C67) by deprivation and sex, England 2009-2010



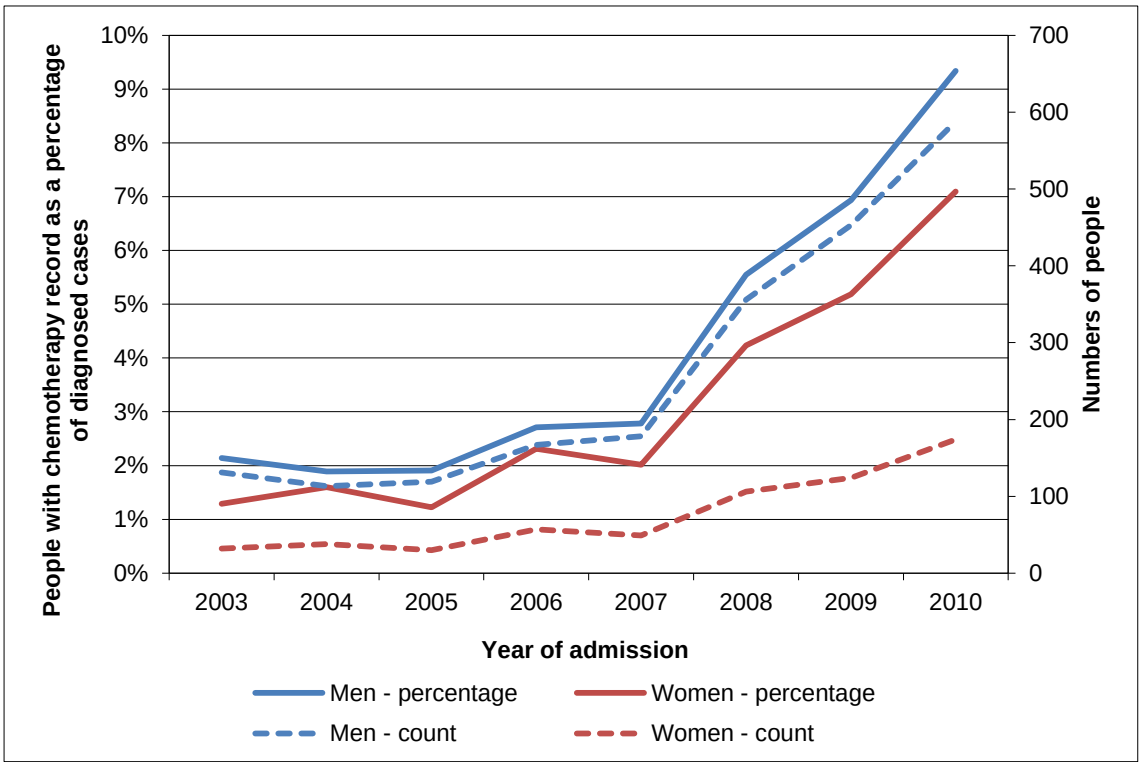
Source: RTDS; NCDR

5.3 Chemotherapy

Chemotherapy may be used for bladder cancer before surgery or radiotherapy (neo-adjuvant) or afterwards (adjuvant). It may also be used for palliative care, but unlike the radiotherapy data this is not recorded in the dataset. Chemotherapy data here comes from outpatient HES data which is only available from 2003 onwards.

The proportion of patients who receive chemotherapy has risen since 2003. In 2003 2% of men and 1% of women had any chemotherapy recorded, but in 2010 this was 9% and 7% respectively. Figure 63 suggests that the increase has been faster since 2007, but small numbers and limited time period mean that there is no statistical evidence to confirm this. The Cochrane systematic review supporting the use of neo-adjuvant chemotherapy in bladder cancer was published in 2007. It is also important to bear in mind that recording of chemotherapy in HES may have variable completeness over time, and better evidence will be available with the upcoming Systemic Anti-Cancer Therapy (SACT) dataset.

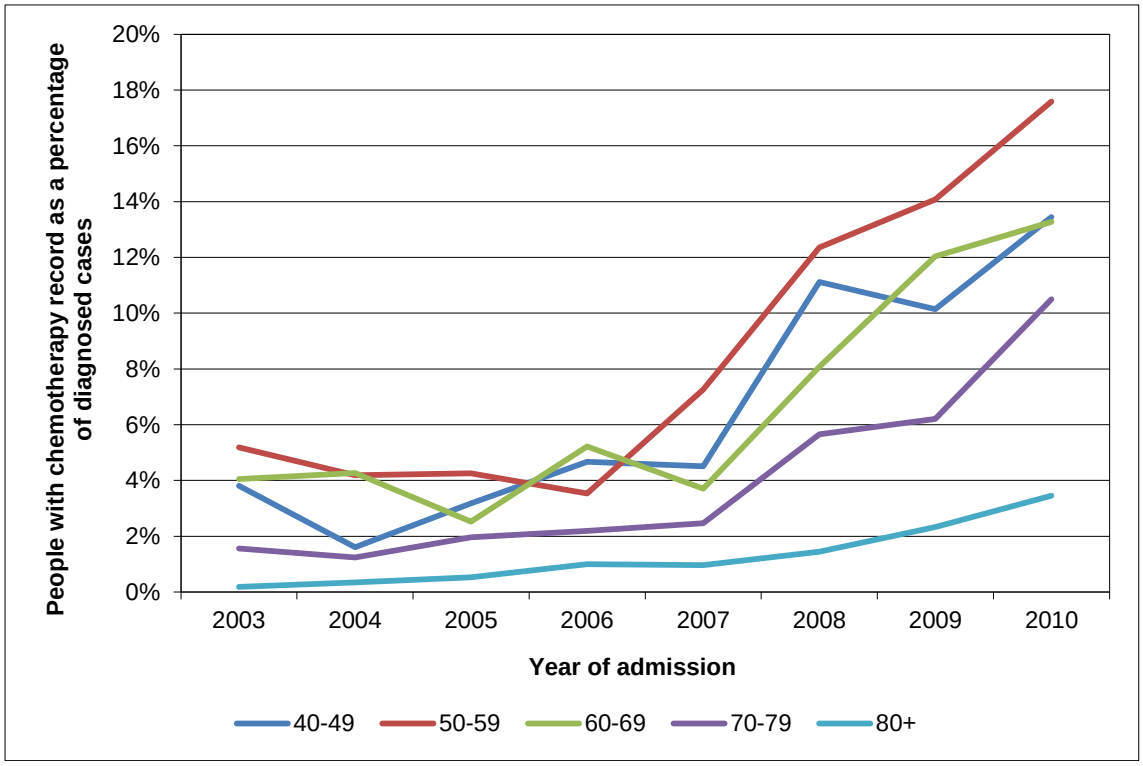
Figure 63: Chemotherapy for bladder cancer (ICD-10 code C67) by sex, England 2003-2010



Source: HES; NCDR

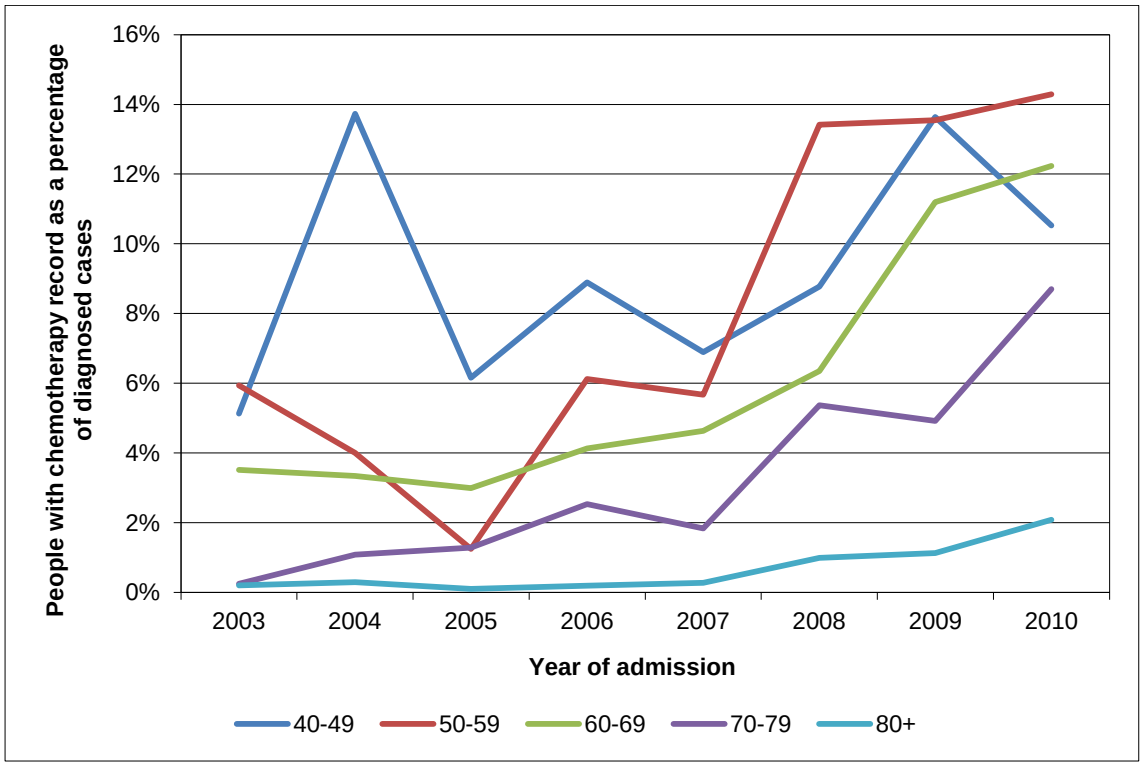
Analysis by age (Figures 64 and 65) and deprivation group (Figures 66 and 67) does not indicate a statistically significant difference in recorded chemotherapy use by these factors. Regression models indicate that all groups have shown an increase in recorded chemotherapy with time ($p<0.05$ for all). This increase has been between 24% and 45% in men by age group; 20% and 48% in women by age group; 30% and 34% in men by deprivation quintile; and, between 20% and 42% in women by deprivation quintile.

Figure 64: Chemotherapy for bladder cancer (ICD-10 code C67) by age, in men, England 2003-2010



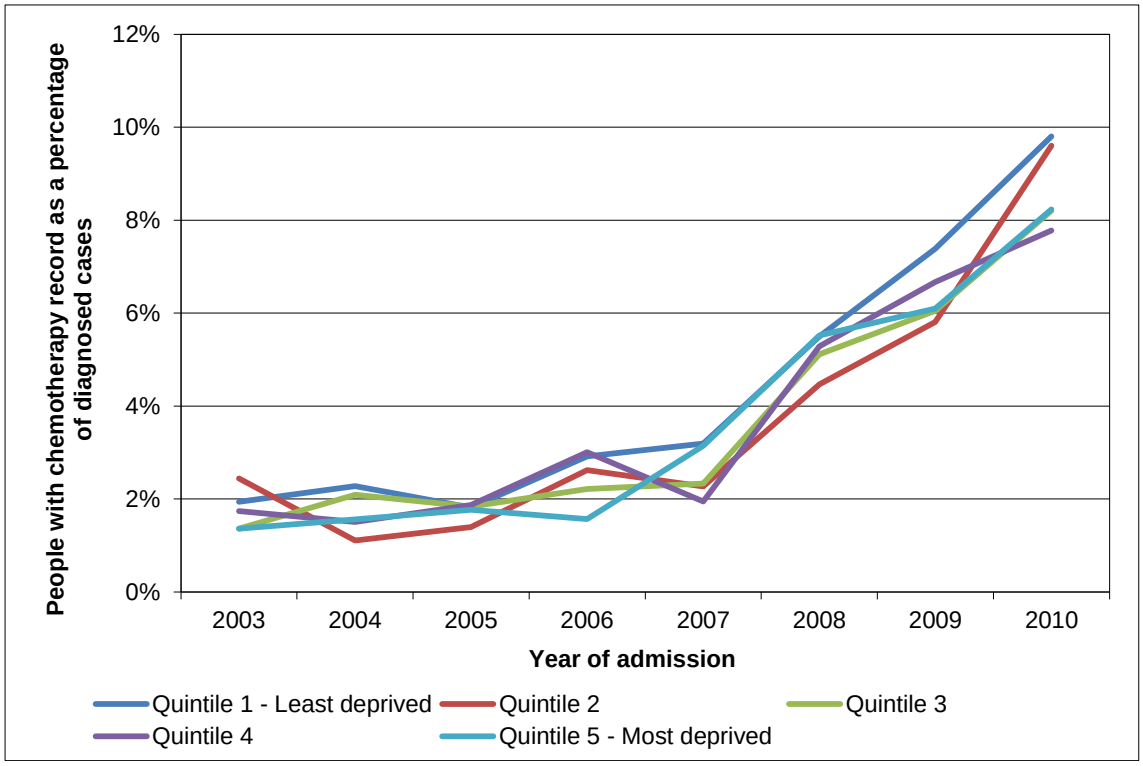
Source: HES; NCDR

Figure 65: Chemotherapy for bladder cancer (ICD-10 code C67) by age, in women, England 2003-2010



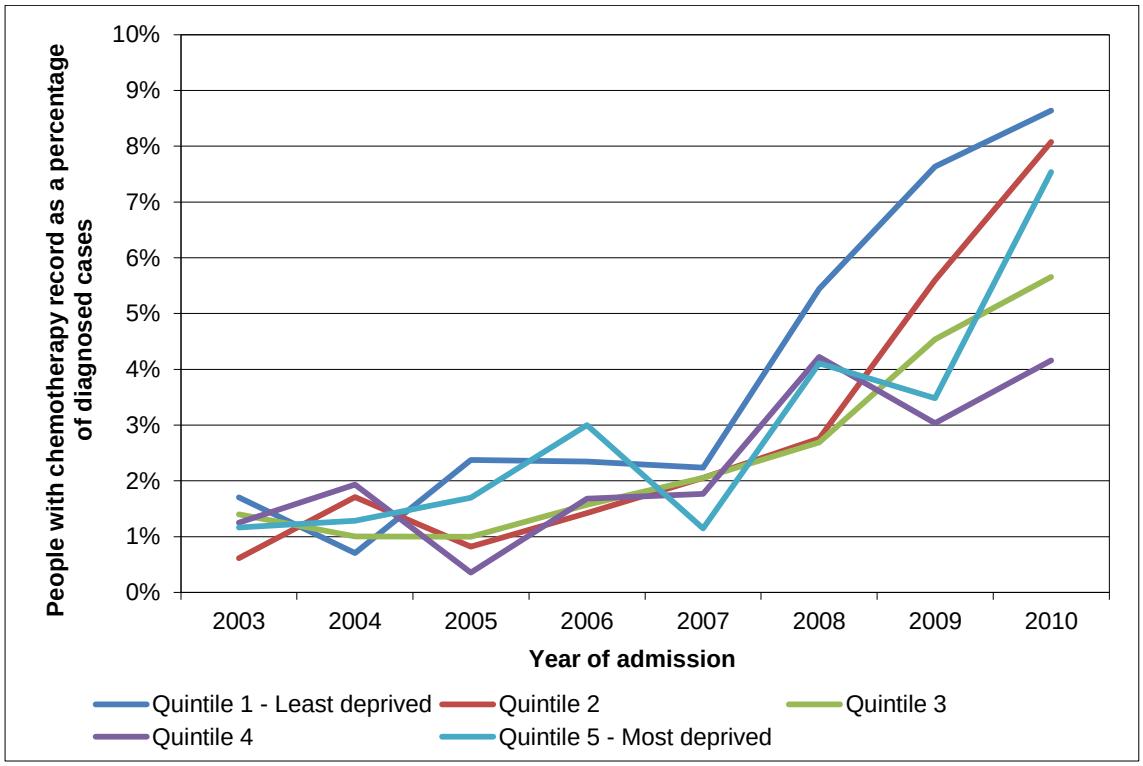
Source: HES; NCDR

Figure 66: Chemotherapy for bladder cancer (ICD-10 code C67) by deprivation, in men, England 2003-2010



Source: HES; NCDR

Figure 67: Chemotherapy for bladder cancer (ICD-10 code C67) by deprivation, in women, England 2003-2010



Source: HES; NCDR

6 Service provision survey

An online survey was sent to all hospital trusts in England and Wales, to try and obtain data which is not available from routine sources such as the cancer registry.

39 individual trusts responded, of which 17 (45%) said they were a specialist trust and 21 (54%) said they were not a specialist trust.

Number of sites for which a trust provides treatment

	Number of sites providing treatment					
	1	2	3	4	blank	Total
Number of trusts	21	11	4	1	2	39

Treatment types provided at main site

	Trusts offering treatment	
	Number	Percentage
Radical/Partial Cystectomy	16	41%
Radical Radiotherapay	10	26%
Intravesical BCG	21	54%
Reconstructive Bladder Surgery	14	36%

Treatment types provided at secondary site

	Trusts offering treatment	
	Number	Percentage
Radical/Partial Cystectomy	3	8%
Radical Radiotherapay	4	10%
Intravesical BCG	7	18%
Reconstructive Bladder Surgery	2	5%

Number of consultant urologists who treat muscle-invasive/high-risk disease

	Trusts	
Number of consultants (FTE)	Number	Percentage
0	5	13%
<=1	7	18%
2	6	15%
3	11	28%
4	4	10%
5	1	3%
10	1	3%
Blank	4	10%

Number of consultant medical oncologists with a specialist interest in bladder cancer or genitourinary malignancies

	Trusts	
Number of consultants (FTE)	Number	Percentage
0	13	33%
<=1	10	26%
>1 and <=2	5	13%

Number of consultants (FTE)	Trusts	
3	5	13%
Blank	7	18%

Number of consultant clinical oncologists with a specialist interest in bladder cancer or genitourinary malignancies

	Trusts	
Number of consultants (FTE)	Number	Percentage
0	1	3%
<=1	15	38%
2	8	21%
3	5	13%
6	1	3%
10	1	3%
Blank	7	8%

Number of consultant pathologists with a specialist interest in bladder cancer or genitourinary malignancies

	Trusts	
Number of consultants (FTE)	Number	Percentage
0	1	3%
<=1	14	36%
2	8	21%
3	8	21%
4	2	5%
10	1	3%
Blank	5	13%

Number of consultant radiologists with a specialist interest in bladder cancer or genitourinary malignancies

	Trusts	
Number of consultants (FTE)	Number	Percentage
0	1	3%
<=1	8	21%
2	12	31%
3	10	26%
>3 and <=4	2	5%
10	1	3%
Blank	5	13%

Number of urology clinical nurse specialists (CNSs)

	Trusts	
Number of CNSs (FTE)	Number	Percentage
1	2	5%
2	7	8%
>2 and <=3	9	23%
4	2	5%

Number of CNSs (FTE)	Trusts	
5	3	8%
7	5	13%
9	1	3%
Blank	10	26%

Number of nurse practitioners who support bladder cancer patients

	Trusts	
Number of nurses (FTE)	Number	Percentage
0	9	23%
<=1	7	8%
2	11	28%
3	2	5%
4	1	3%
Blank	9	23%

Number of urologists who perform radical cystectomy more than once per year

	Trusts	
Number of urologists	Number	Percentage
0	12	31%
1	4	10%
2	6	15%
3	6	15%
4	2	5%
Blank	9	23%

Do staff other than urologists perform cystoscopy?

	Trusts	
	Number	Percentage
Yes	16	41%
No	13	33%
Blank	10	26%

Staff other than urologists performing cystcoscopy

	Trusts	
Title	Number	Percentage
Cancer Nurse Specialist	2	5%
Nurse Specialist	3	8%
Nurse Practitioners	3	8%
Nurse (unspecified)	2	5%
Gynaecology	2	5%
Registrars and Speciality Doctors	1	3%
Surgical Care Practitioner	1	3%
Blank	25	64%

Number of patients attending for treatment, between January 2012 and December 2012

	Trusts	
Number of patients	**Number**	**Percentage**
<50	2	5%
50-99	6	15%
100-149	3	8%
150-299	4	10%
300-499	1	3%
500-999	4	10%
1000+	1	3%
Unknown	17	44%

Use of blue light cystoscopy

Is blue light cystoscopy offered?	Trusts	
	Number	**Percentage**
Yes	8	21%
No	20	51%
Blank	11	28%
If blue light cystoscopy is not offered, are patients referred elsewhere?		
Yes	4	10%
No	17	44%
Blank	18	46%

Use of narrow-band imaging (NBI) cystoscopy

	Trusts	
Is NBI cystoscopy offered?	**Number**	**Percentage**
Yes	5	13%
No	23	59%
Blank	11	28%
If NBI cystoscopy is not offered, are patients referred elsewhere?		
Yes	4	10%
No	21	54%
Blank	14	36%

Use of urinary biomarkers for bladder cancer diagnosis

	Trusts	
Are urinary biomarkers used?	**Number**	**Percentage**
Yes	2	5%
No	25	64%
Blank	12	31%

Use of hyperthermic mitomycin

Is hyperthermic mitomycin offered?	Trusts	
	Number	**Percentage**
Yes	2	5%
No	25	64%
Blank	12	31%

If hyperthermic mitomycin is not offered, are patients referred elsewhere?		
Yes	10	26%
No	16	41%
Blank	13	33%

Use of electromotive mitomycin

Is electromotive mitomycin offered?	Trusts	
	Number	Percentage
Yes	3	8%
No	24	61%
Blank	12	31%
If electromotive mitomycin is not offered, are patients referred elsewhere?		
Yes	6	15%
No	19	49%
Blank	14	36%

Number of patients receiving a course of induction BCG, between January 2012 and December 2012

Number of patients	Trusts	
	Number	Percentage
0-9	2	5%
10-19	2	5%
20-29	4	10%
30-39	2	5%
40-49	2	5%
50-99	2	5%
100+	2	5%
Unknown	23	59%

Number of patients receiving a course of maintenance BCG, between January 2012 and December 2012

Number of patients	Trusts	
	Number	Percentage
0-9	3	8%
10-19	4	10%
20-29	2	5%
30-39	1	3%
40-49	1	3%
50-99	3	8%
100+	2	5%
Unknown	23	59%

Use of adjuvant chemotherapy

Is adjuvant chemotherapy offered?	Trusts	
	Number	Percentage
Yes	13	33%
No	11	28%

Is adjuvant chemotherapy	Trusts	
Blank	15	38%
If adjuvant chemotherapy is not offered, are patients referred elsewhere?		
Yes	11	28%
No	5	13%
Blank	23	59%

Use of neo-adjuvant chemotherapy

Is neo-adjuvant chemotherapy offered?	Trusts	
	Number	Percentage
Yes	15	38%
No	9	23%
Blank	15	38%
If neo-adjuvant chemotherapy is not offered, are patients referred elsewhere?		
Yes	10	26%
No	4	10%
Blank	25	64%

Use of chemotherapy for metastatic control

Is chemotherapy offered for metastatic control?	Trusts	
	Number	Percentage
Yes	14	36%
No	10	26%
Blank	15	38%
If chemotherapy for metastatic control is not offered, are patients referred elsewhere?		
Yes	12	31%
No	5	13%
Blank	22	56%

Use of radical radiotherapy

Is radical radiotherapy offered?	Trusts	
	Number	Percentage
Yes	12	31%
No	12	31%
Blank	15	38%
If radical radiotherapy is not offered, are patients referred elsewhere?		
Yes	12	31%
No	2	5%
Blank	25	64%

Use of palliative radiotherapy

Is palliative radiotherapy offered?	Trusts	
	Number	Percentage
Yes	13	33%
No	11	28%
Blank	15	38%
If palliative radiotherapy is not offered, are patients referred elsewhere?		

Is palliative radiotherapy	Trusts	
Yes	12	31%
No	2	5%
Blank	25	64%

Number of patients receiving neo-adjuvant chemotherapy before radical treatment, between January 2012 and December 2012

	Trusts	
Number of patients	Number	Percentage
0-9	7	18%
10-19	4	10%
20-29	1	3%
30-39	1	3%
Unknown	26	67%

Use of radical cystectomy and ileal diversion

Is ileal diversion after radical cystectomy offered?	Trusts	
	Number	Percentage
Yes	13	33%
No	11	28%
Blank	15	38%
How many procedures took place between January 2012 and December 2012?		
0-9	2	5%
10-19	1	3%
20-29	2	5%
30-39	1	3%
40-49	2	5%
50+	4	10%
Blank	27	69%
How many patients were referred to another trust between January 2012 and December 2012?		
0-9	5	13%
10-19	5	13%
30-39	1	3%
Blank	28	72%

Use of radical cystectomy and reconstruction

Is reconstruction after radical cystectomy offered?	Trusts	
	Number	Percentage
Yes	13	33%
No	11	28%
Blank	15	38%
How many procedures took place between January 2012 and December 2012?		
0-9	8	21%
10-19	3	8%
20-29	1	3%
Blank	27	69%

How many patients were referred to another trust between January 2012 and December 2012?		
0-9	8	21%
Blank	31	79%

Number of patients receiving radiotherapy, between January 2012 and December 2012

	Trusts	
Number of patients	Number	Percentage
0-9	4	18%
10-19	1	10%
30-39	1	3%
60-69	1	3%
100+	1	3%
Unknown	31	67%
How many patients were referred to another trust between January 2012 and December 2012?		
0-9	7	18%
10-19	1	3%
20-29	2	5%
Blank	29	74%

Use of salvage cystectomy

Is reconstruction after radical cystectomy offered?	Trusts	
	Number	Percentage
Yes	12	31%
No	11	28%
Blank	16	41%
How many procedures took place between January 2012 and December 2012?		
0-4	6	15%
5-9	5	13%
10-15	1	3%
Blank	27	69%
How many patients were referred to another trust between January 2012 and December 2012?		
0-9	8	21%
Blank	31	79%

Use of reconstruction other than ileal conduit

	Trusts	
Type of reconstruction	Number	Percentage
Ileal neobladder	3	8%
Studer neobladder	5	13%
Catherisable reservoir	2	5%
Continent cutaneous diversion	1	3%
Mitroffanoff neobladder	1	3%
Indiana pouch	1	3%
Blank	29	74%

Trusts that surveyed urology patients on the quality of their care, in the last year

Was a survey undertaken?	Trusts	
	Number	Percentage
Yes	16	41%
No	8	21%
Blank	15	38%
Was bladder cancer included as a specific subject in the survey?		
Yes	8	21%
No	10	26%
Blank	21	54%

Patient support groups appropriate for bladder cancer

Does the trust liaise with support groups?	Trusts	
	Number	Percentage
Yes	15	38%
No	9	23%
Blank	15	38%
Does the trust refer patients to support groups?		
Yes	13	33%
No	10	26%
Blank	16	54%

Contact details for Cancer Nurse Specialists (CNSs)

Are all patients given CNS contact details ?	Trusts	
	Number	Percentage
Yes	22	56%
No	1	3%
Blank	16	41%
How are CNS contact details provided?		
Card	11	28%
Personal contact	6	15%
Written	2	5%
Information Leaflet	3	8%
Unknown (Blank)	18	46%

Availability of CNS team

Days of the week	Trusts	
	Number	Percentage
3	2	5%
4	1	3%
5	21	54%
Blank	15	38%

CNS membership of MDT

Is there a named CNS MDT core member?	Trusts	
	Number	Percentage
Yes	22	56%

Is there a named CNS MDT core	Trusts	
No	1	3%
Blank	16	41%
Does the CNS core member (or deputy) attend every MDT?		
Yes	23	59%
Blank	16	41%

CNS patient contact

Do all CNSs have direct patient contact?	Trusts	
	Number	Percentage
Yes	23	59%
No	16	41%

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