Office for National Statistics

Statistical bulletin

Cancer survival in England: adult, stage at diagnosis and childhood – patients followed up to 2016

Cancer survival in England for specific cancer sites by age, sex and stage at diagnosis.

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Correction

31 July 2017 09:10

A correction has been made to 5-year adult survival estimates contained in Figures 3 and 4. This was due to a small error in the suppression of non-robust estimates. We apologise for any inconvenience.

Notice

10 October 2018

While preparing for the cancer survival in England bulletin, quality assurance checks revealed an issue affecting the adult 5-year and 10-year survival estimates. Although this issue may have an impact on the time series, the main comparisons and trends should continue to be the same. Public Health England and Office for National Statistics are working together to resolve the issue. Adult and stage of diagnosis survival estimates for 2017 and the back series will be published between December 2018 and January 2019. We are aiming to announce an updated release date in November.

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1 . Main points

- Among the 25 cancers forming the National Statistics, 1-year survival was highest for melanoma of the skin in both men (97.1%) and women (98.5%) and 5-year survival was highest for melanoma of the skin in both men (89.3%) and women (93.9%).
- Pancreatic cancer had the lowest 1-year survival for men (22.9%) and women (24.7%) and similarly 5-year survival was lowest for pancreatic cancer in both men (6.4%) and women (7.4%)
- Adults diagnosed with late cancer (stage 4) in 2015, which had already spread to other parts of the body, have lower 1-year survival compared with those diagnosed in the earliest stage (stage 1), with the lowest survival in lung cancer in men (17.1%) and women (21.6%).
- Adults diagnosed with melanoma of the skin, prostate and breast cancer (women only) in the earliest stage (stage 1) now have 1-year survival that is comparable to the general population of the same age who have not been diagnosed with cancer.
- For all childhood cancers combined, the general trend of increasing 5-year survival has continued for children (0 to 14 years), from 67.2% for those diagnosed in 1990 to 85.1% predicted for those children diagnosed in 2016; a similar increasing trend has been observed for 10-year survival.

2 . Collaboration

The cancer registration and survival data in this bulletin has been collected and calculated by the National Cancer Registration and Analysis Service (NCRAS); within Public Health England (PHE) and published in partnership with Office for National Statistics (ONS).

Public Health England

3 . Summary

Office for National Statistics (ONS) and Public Health England (PHE) are working in partnership to produce England survival estimates for the following national and experimental statistics:

- **Adult cancer survival (National Statistics)**

  The national adult cancer survival section presents 1-year, 5-year and 10-year age-standardised net cancer survival for tumours diagnosed in England during 2011 to 2015 and followed up for at least one whole calendar year (to 31 December 2016), for the 25 most common cancers.

- **Adult cancer survival by stage at diagnosis (Experimental Statistics)**

  The survival by stage section presents 1-year age-standardised net cancer survival for tumours diagnosed in England in 2015 and followed up for at least one whole calendar year (to 31 December 2016), with an estimate of survival from nine common cancers separately; bladder, breast (women only), colorectal, kidney, lung, melanoma, ovary, prostate and uterus.

- **Cancer survival for children (Experimental Statistics)**

  The national childhood cancer survival section presents 1-year, 5-year and 10-year overall survival for tumours diagnosed in England from 1990 onwards and followed up to the end of the most recently completed calendar year (to 31 December 2016) for all cancers diagnosed.

  Cancer survival by stage at diagnosis and childhood cancer survival estimates are designated as Experimental Statistics. Experimental Statistics are published in order to involve customers and stakeholders in their development and as a means of building in quality at an early stage.

  This is the first time these previously separate statistical bulletins have been produced together, which is a result of working directly with the National Cancer Registration and Analysis Service (NCRAS) for England within PHE.

  As part of this new partnership the methods were reviewed, which has led to a change in using the International Classification of Survival Standard (ICSS) for age standardisation of adult cancer survival. Further details of these methodology changes can be found in the impact of updating cancer survival methodologies for national estimates paper. The method changes outlined in this paper only impact on the adult cancer survival estimates and an updated back series for adult cancer survival has been published to enable comparisons over time based on the updated methodology.

  This combined publication contains largely the same analysis as previously published in the historic publications but, by bringing all the national level estimates together for the first time, the results are timelier and easier to compare.

  This bulletin of national survival statistics enables the monitoring of changes in cancer survival over time, to assess progress in achieving the aims set out by the Independent Cancer Taskforce as outlined in Achieving world-class cancer outcomes: a strategy for England 2015 to 2020.

Interpretation of these statistics

The national survival estimates presented in the individual sections of this bulletin should not be directly compared as they are based on different cohorts:

- adult 1-year and 5-year survival estimates are presented for a 5-year cohort (2011 to 2015) with predicted 1-year, 5-year and 10-year survival estimates available for 2016
- estimates of 1-year survival estimates by stage for 2015 are presented in the bulletin; similar data are available for single year cohorts since 2012 in the reference tables
- for children, 1-year, 5-year and 10-year survival estimates are available for individual years from 1990 to 2015 with predicted 1-year, 5-year and 10-year survival estimates for 2016

The impact of updating cancer survival methodologies for national estimates paper presented the new age-standardisation method for adult cancer survival, which outlined the minimal differences in these estimates compared with the previous methodology. As a result of this change in methodology, an updated back series for adult cancer survival has been published to enable comparisons over time.

Despite the availability of estimates over time, year-on-year comparisons should not be made. Instead, the overall trend in the analysis of cancer survival should be considered. The latest version of childhood cancer estimates allows cancer survival trends in children to be viewed across time from 1990 to 2015. Survival by stage estimates for 2015 are presented in this bulletin, with similar data available for 2012 to 2014 in the reference tables. However, it is not recommended to look at the data as representing the trends in survival over the 4 years due to improvements in the completeness of stage data over this time period.

The following important differences should be noted when interpreting national cancer survival estimates.

Cancer in adults is defined using the International Statistical Classification of Diseases 10th Revision (ICD-10) and by morphology and behaviour codes in the International Classification of Diseases for Oncology, Second Edition (ICD-O-2). The third edition of the International Classification of Childhood Cancer is used to define cancer in children (aged 0 to 14 years). These classification systems are needed due to the different distributions of cancer in children and adults but they are broadly equivalent.

Adult survival estimates are based on net survival, which is calculated by comparing the survival of cancer patients with that of the general population. Whilst for children, overall survival is considered a reliable estimator of cancer survival because, unlike in adults, death within 10 years of diagnosis is almost always due to the cancer.

Confidence intervals (at the 95% level) are included in the datasets, to give an indication of the precision of the survival estimates.

Age-standardised estimates for adult, stage and childhood cancer are available to allow comparability between population groups and over time. Age-standardised estimates for adults have been calculated using the International Cancer Survival Standard (ICSS) age-weightings. For childhood cancer, the estimates are conventionally age-standardised by giving equal weight to all three age-groups (0 to 4 years, 5 to 9 years, and 10 to 14 years).

More detailed information on the methods used to estimate national cancer survival in England can be found in the Cancer survival Quality and Methodology Information report.

4 . Cancer survival in England: patients diagnosed between 2011 and 2015 and followed up to 2016 (National Statistics)

Things you need to know about cancer survival in adults

In this section we present estimates of 1-year and 5-year net survival (%) for all adults (aged 15 to 99 years) diagnosed between 2011 and 2015, and followed up to 31 December 2016. The data is presented as 5-year aggregates. Predicted estimates of 10-year net survival are also presented for patients who would be diagnosed in 2016. The estimates of 1-year, 5-year and 10-year survival are based on patients diagnosed with 1 of 25 common cancers in England. Taken together, these cancers comprise 91.4% of all newly diagnosed cancers (based on the number of cancer diagnoses in England reported for 2015).

Survival estimates are presented for men, women and both sexes combined. Six of the cancers occur for a single sex (cervix, ovary, uterus, vulva, testis and prostate). We present survival for cancer of the larynx only in men and for breast cancer only in women, because those cancers are relatively uncommon in the opposite sex. We report survival by age group and for all ages combined. To allow the comparison of survival between cancers with a different age profile, all-ages survival estimates are age-standardised using the International Cancer Survival Standard (ICSS). Confidence intervals are provided in the reference tables, to indicate the precision of the survival estimates.

1-year and 5-year survival has been estimated using the cohort approach and this is the second time that 10-year survival estimates have been presented using the hybrid approach. The cohort approach is used when follow-up information is available for each patient for at least 1 year. The hybrid approach combines the most recent follow-up data for up to 10 years. Results are only presented if sufficient data were available to make robust estimates of survival. Further information on the methods can be found in the “Quality and methodology” section.

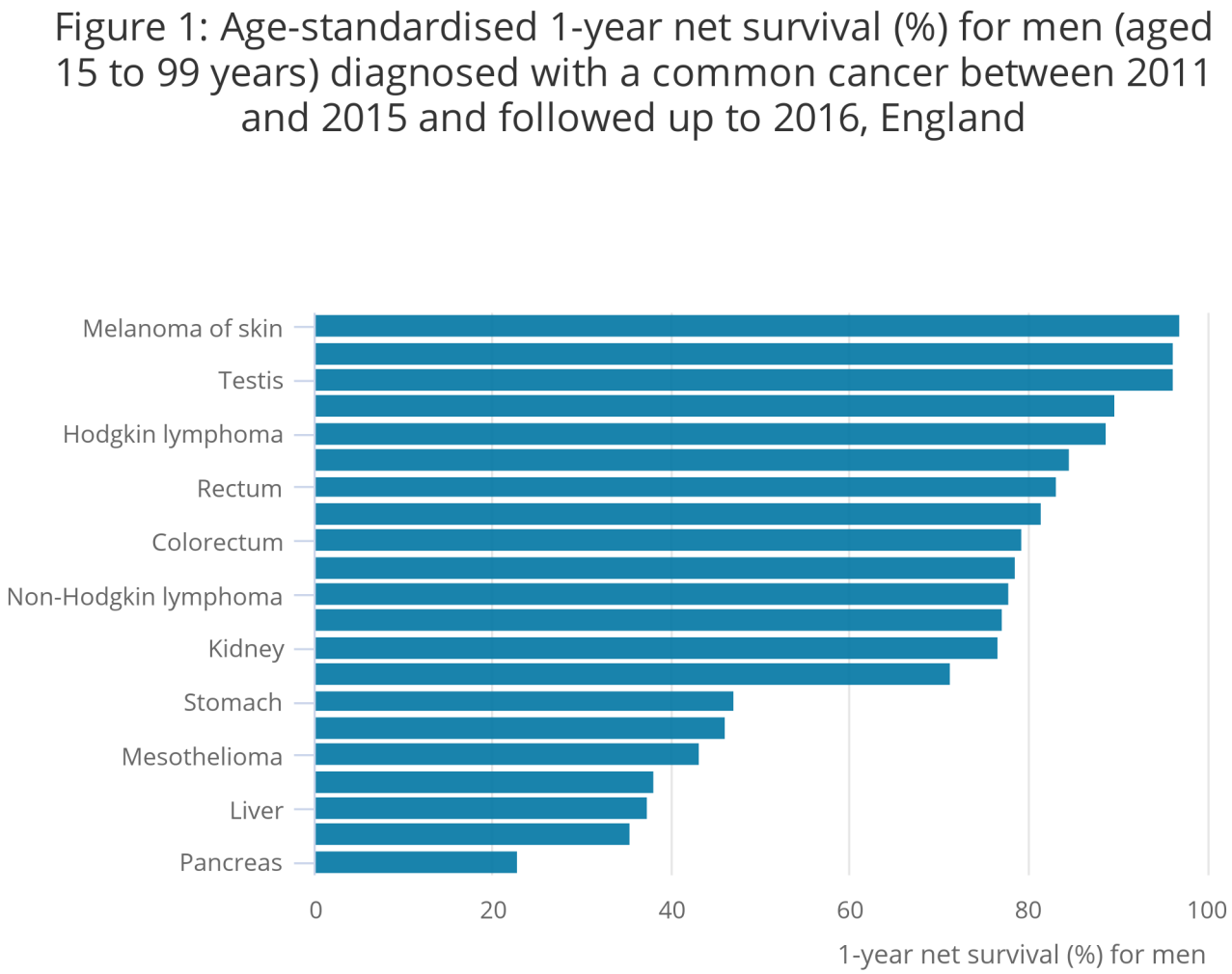
These adult cancer survival estimates are designated as National Statistics. National statistics are a subset of official statistics, which have been certified by the UK Statistics Authority as compliant with its Code of Practice for Official Statistics.

1-year survival for adults

Age-standardised estimates of 1-year net survival are presented in Figure 1 for men and Figure 2 for women. The highest 1-year survival estimates were for melanoma of the skin in both sexes, at 97.1% for men and 98.5% for women. The estimate of 1-year survival was lowest for pancreatic cancer in both sexes, at 22.9% for men and 24.7% for women.

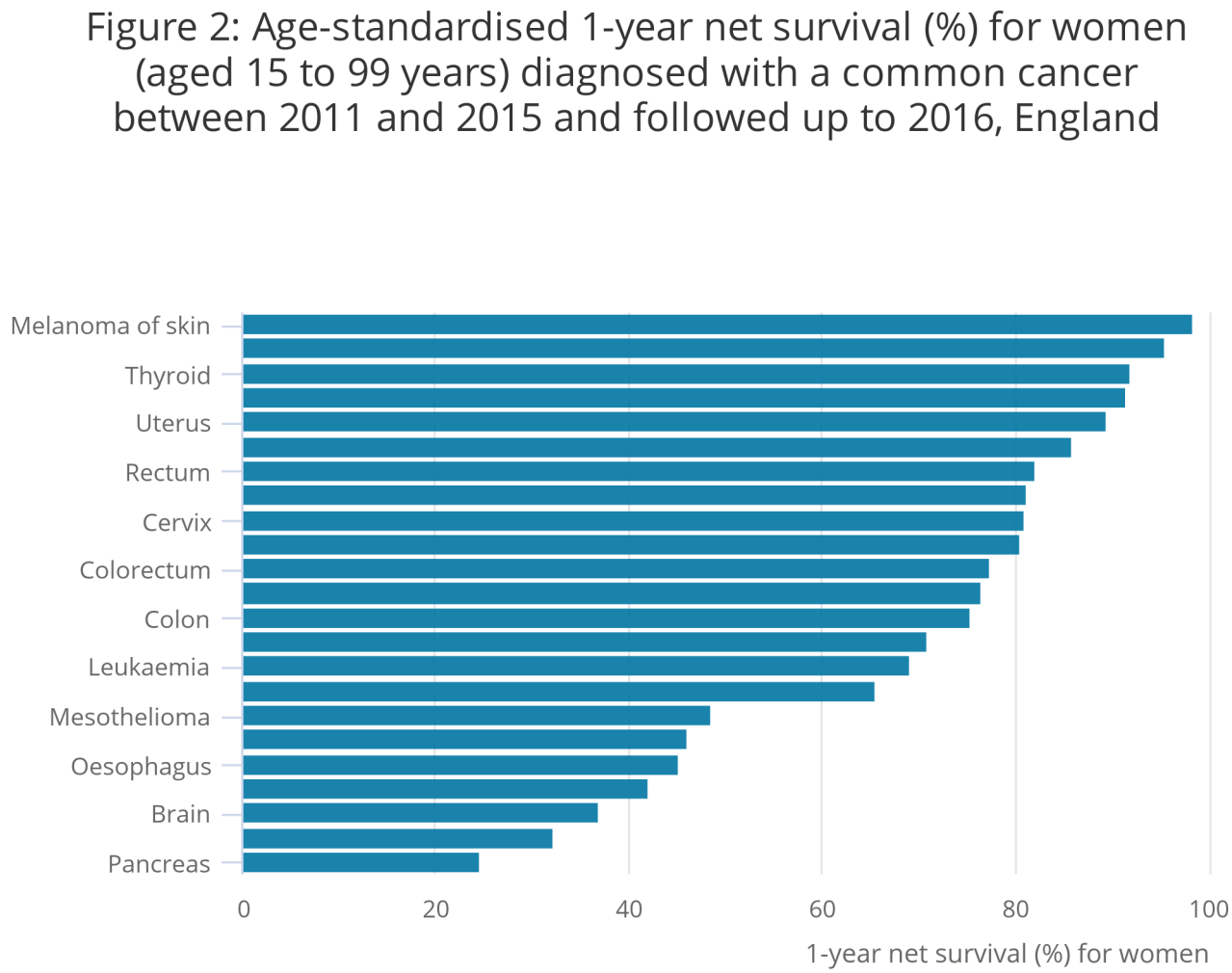
The largest difference in 1-year survival between men and women was for bladder cancer (13.1%): at 78.7% for men and 65.6% for women. This sex difference in bladder cancer survival has been reported worldwide and a number of reasons such as tumour biology, sex hormones and earlier diagnosis in men have been suggested to explain the difference. Further details can be found in the following research: disparity in bladder cancer outcomes and gender inequalities in the promptness of diagnosis of bladder and renal cancer after symptomatic presentation.

Figure 1: Age-standardised 1-year net survival (%) for men (aged 15 to 99 years) diagnosed with a common cancer between 2011 and 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Figure 2: Age-standardised 1-year net survival (%) for women (aged 15 to 99 years) diagnosed with a common cancer between 2011 and 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

In a number of sites the 1-year survival estimates for 2011 to 2015 increased by more than 1% from the corresponding figure for 2010 to 2014. In men, the largest difference was seen in liver cancer, which increased from 36.1% to 37.3% during this period. The largest difference between 2010 to 2014 and 2011 to 2015 for women was for lung cancer, which increased from 40.5% to 42.0%.

Please note differences between survival estimates for the two periods are taken as the arithmetic difference: for example, an increase from 10% to 12% is shown as 2% (not 20%) higher. Survival figures are rounded to one decimal place, but the differences are based on the exact underlying figures.

5-year survival for adults

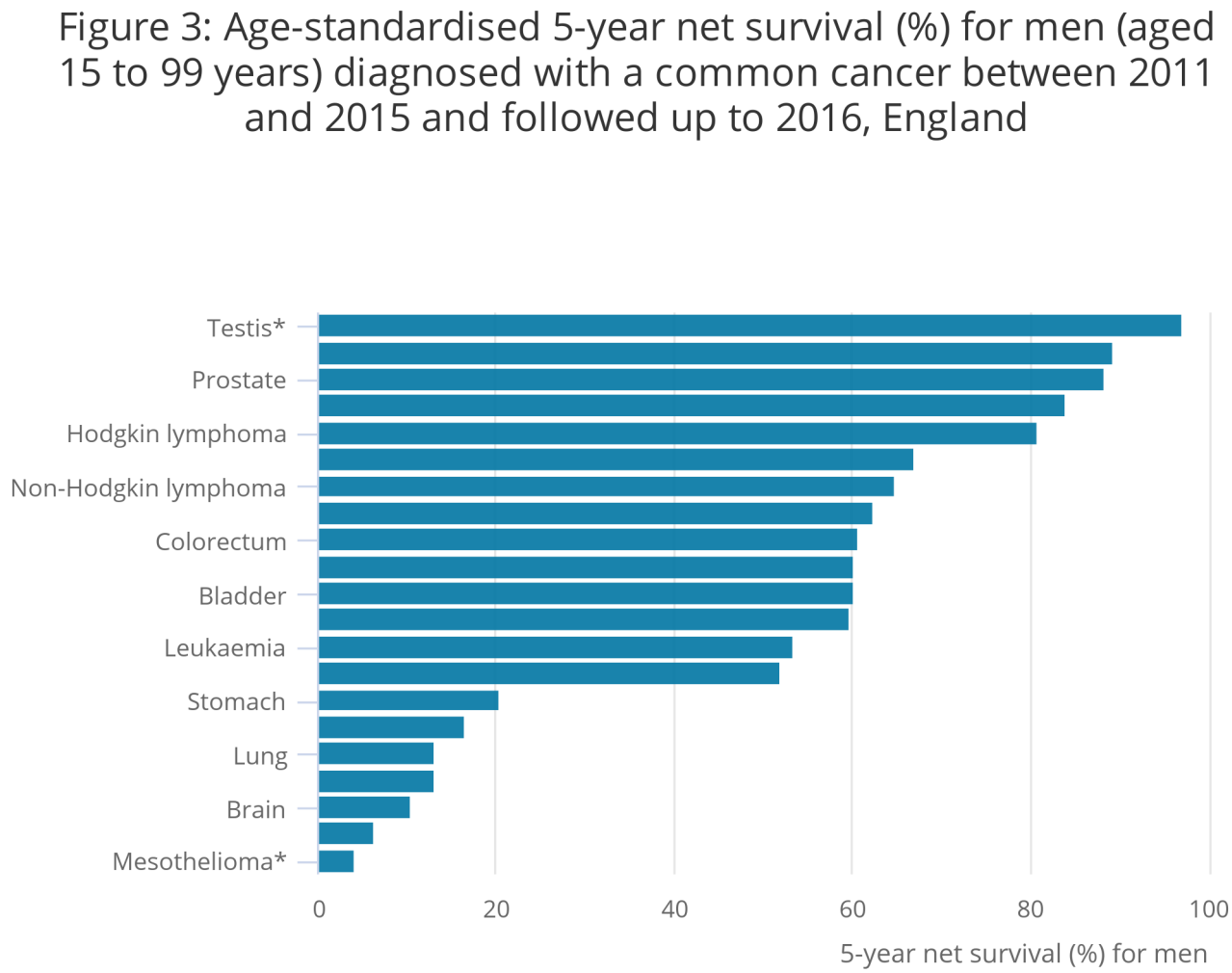
Figure 3 (men) and Figure 4 (women) show age-standardised 5-year net survival estimates, for adults diagnosed with one of the most common cancers between 2011 and 2015. There were five cancer sites where 5-year age-standardised survival was above 80% in adults (Hodgkin lymphoma, melanoma of skin and thyroid) as well as including breast cancer in women and prostate cancer in men. Survival was below 25% for cancers of the brain, liver, lung, oesophagus, pancreas and stomach in men and women.

5-year age-standardised survival was highest for melanoma of the skin in both men (83.9%) and women (93.9%) and lowest for pancreatic cancer in both men (6.4%) and women (7.4%).

There was insufficient data to produce robust age-standardised estimates of 5-year survival for patients diagnosed with mesothelioma or with testicular cancer. Therefore, unstandardised estimates for mesothelioma and testicular cancer have been presented in Figures 3 and 4 to allow comparison across the top 25 cancers. When including these sites, mesothelioma had the lowest 5-year survival for both men (4.1%) and women (6.8%) whilst testicular cancer had the highest 5-year survival for men (97.0%).

In general, 5-year survival was higher for women than men – with the notable exception of bladder cancer, which had a 12.8% difference between men (60.1%) and women (47.3%).

Figure 3: Age-standardised 5-year net survival (%) for men (aged 15 to 99 years) diagnosed with a common cancer between 2011 and 2015 and followed up to 2016, England

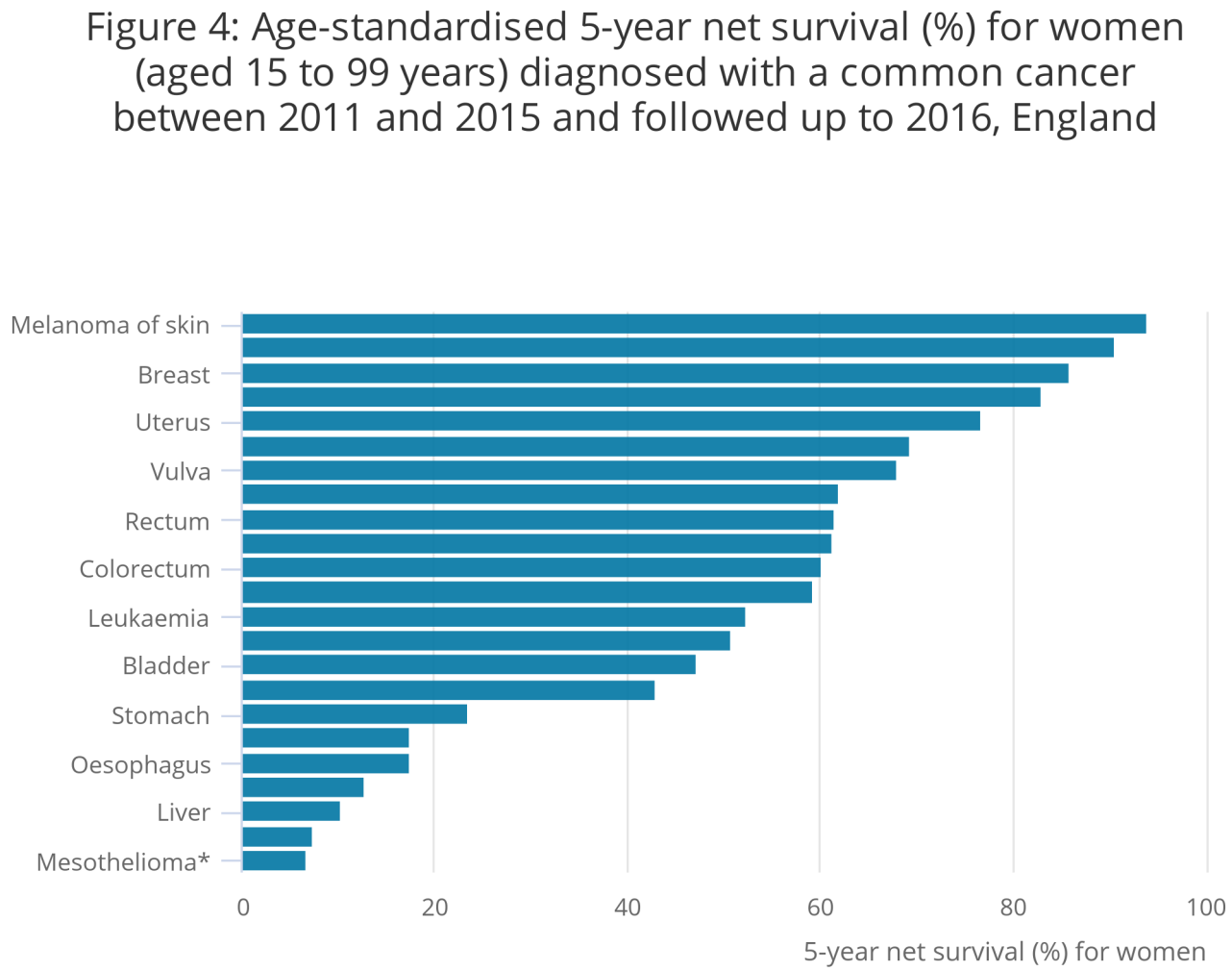


Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. The '*' symbol denotes that the age-standardised estimate is not available and the unstandardised estimate has been presented.

Figure 4: Age-standardised 5-year net survival (%) for women (aged 15 to 99 years) diagnosed with a common cancer between 2011 and 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. The '*' symbol denotes that the age-standardised estimate is not available and the unstandardised estimate has been presented.

More than half (23 from 45) of the 5-year survival estimates for 2011 to 2015 increased by more than 1.0% from the corresponding figure for 2010 to 2014. The largest differences in both men and women were seen in kidney cancer, which increased from 57.9% to 60.2% in men and from 60.1% to 62.0% in women.

10-year survival for adults

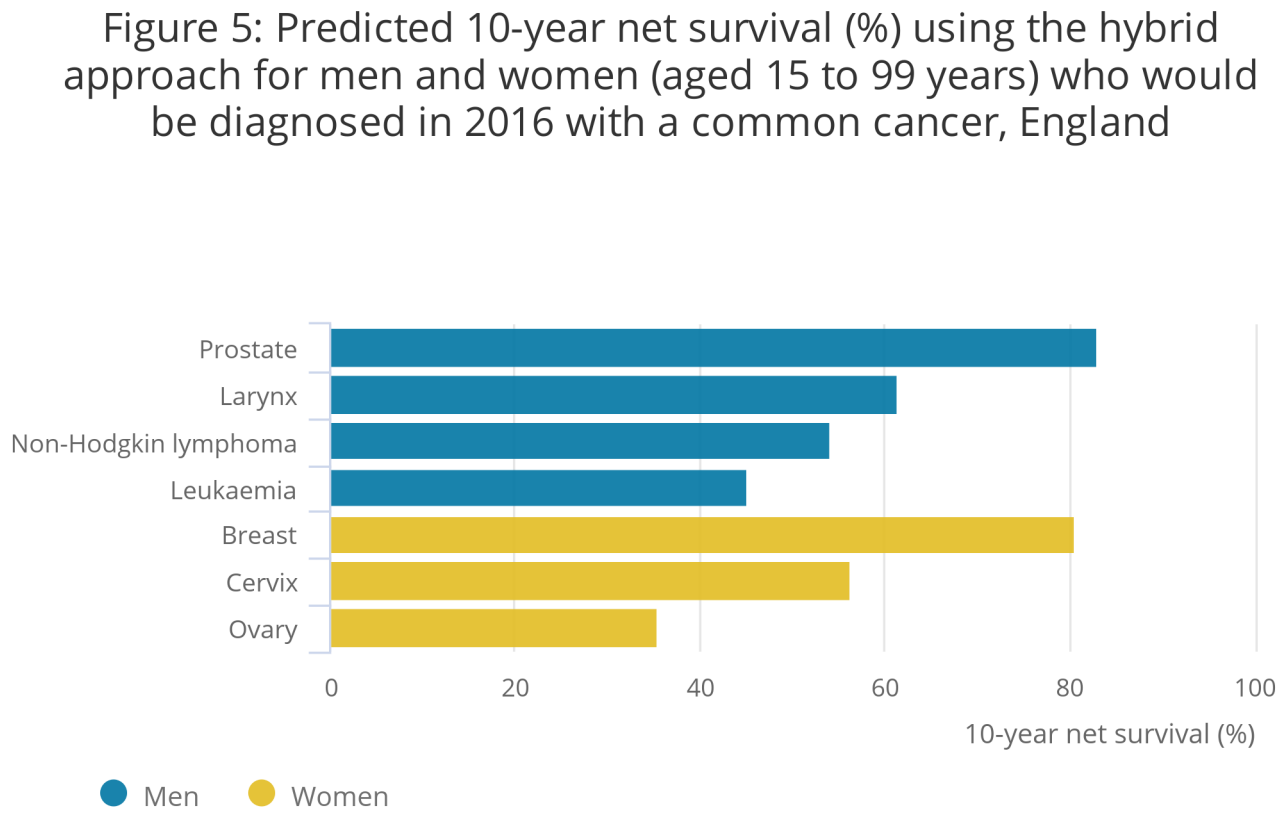
To respond to policy needs for estimates of long-term survival, 10-year survival estimates have been produced for the second time. To ensure that the 10-year estimates are timely they have been calculated using a predictive survival method (see the Cancer survival Quality and Methodology Information report). To complement and provide context for the 10-year estimates we have also provided 1-year and 5- year survival estimates using the same method. Due to the predicted nature of these estimates, only cancer sites that produce robust results are included.

Figure 5 shows predicted age-standardised net survival at 10-years for men and women who would be diagnosed in 2016. Survival is predicted for these patients because cancer incidence data for 2016 were not available at the time of the analysis. This is done using the hybrid approach (see the Cancer survival Quality and Methodology Information report). The predicted estimate is conservative in a situation where survival is improving.

For men, 10-year survival is above 50% for 3 out of the 4 cancers for which sufficient data were available (Figure 5). Prostate cancer has the highest 10-year survival in men (82.9%) whilst leukaemia has the lowest at 45.2%.

In women, we see a similar pattern to men, with 2 of the 3 cancers for which sufficient data were available. Breast (women only) and cervical cancer survival is above 50% while ovarian is 35.4%.

Figure 5: Predicted 10-year net survival (%) using the hybrid approach for men and women (aged 15 to 99 years) who would be diagnosed in 2016 with a common cancer, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

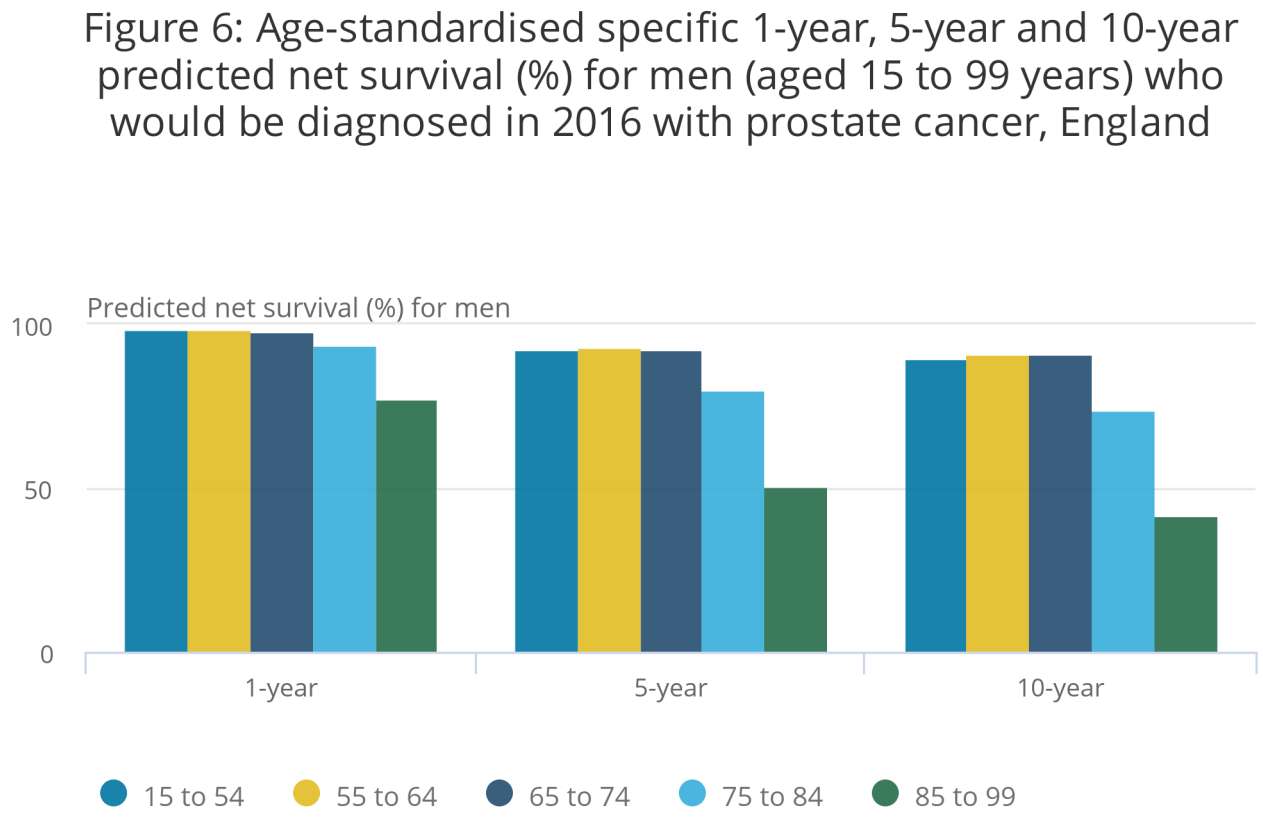
1. Age-standardised survival estimates are only available for prostate, larynx, non-Hodgkin lymphoma, leukaemia, breast, cervical and ovarian cancer. Predicted 10-year net survival estimates are displayed where there is sufficient data available to make robust estimates of survival.

Predicted survival in each age group for adults diagnosed in 2016

Age-specific predicted net survival at 1-year, 5-years and 10-years after diagnosis for each of the most common cancers are available. There are distinct patterns in survival by age group, with generally lower survival estimates among older patients, even after taking into account the fact that the elderly are also more likely to die of other causes.

Figure 6 shows similar 5-year and 10-year prostate cancer survival estimates, particularly in those diagnosed between the ages of 15 and 74. This suggests only a small additional risk of dying from cancer compared with the general population between 5 and10 years following diagnosis for patients diagnosed at these ages.

Figure 6: Age-standardised specific 1-year, 5-year and 10-year predicted net survival (%) for men (aged 15 to 99 years) who would be diagnosed in 2016 with prostate cancer, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

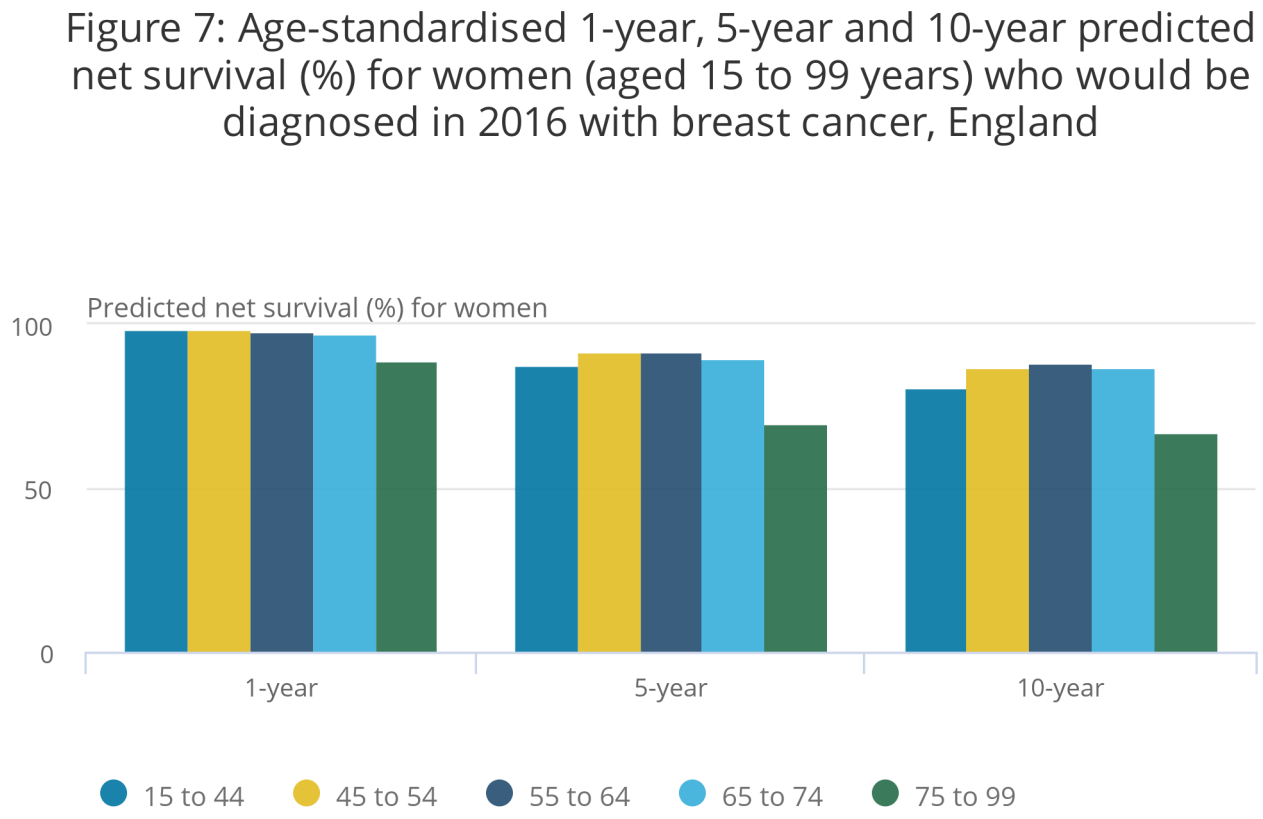
Notes:

1. The hybrid approach was used to calculate 1-year, 5-year and 10-year net survival.

Figure 7 shows that for breast cancer, 5-year and 10-year survival estimates are higher for women aged 45 to 54 than for their younger peers (aged 15 to 44 years). For example, 5-year survival is lower for women aged 15 to 44 years at diagnosis (87.5%) than for women aged 45 to 74 years (ranging from 89.8% to 91.7%).

These differences are probably explained at least in part by breast screening for women aged 50 to 70 years and by the NHS introducing an age extension trial in 2009, where some younger women (aged 47 to 49 years) and some older women (aged 71 to 73 years) are invited for screening. The National Breast Cancer Screening Programme identifies cancer patients before they have come forward with symptoms, which means patients may be diagnosed at an earlier stage than would otherwise have occurred. Detecting a tumour at an earlier stage of the cancer reduces the chance of a patient dying from their tumour within a given time period (see section 5).

Figure 7: Age-standardised 1-year, 5-year and 10-year predicted net survival (%) for women (aged 15 to 99 years) who would be diagnosed in 2016 with breast cancer, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. The hybrid approach was used to calculate 1-year, 5-year and 10-year net survival.

5 . Cancer survival by stage at diagnosis for England: adults diagnosed in 2015 and followed up to 2016 (Experimental Statistics)

Things you need to know about cancer survival by stage

The main purpose of this section of the statistical bulletin is to show how cancer survival varies at different stages of diagnosis for a variety of cancers.

It is important to note that these survival by stage estimates and the National Statistics in section 4 are not directly comparable. The reason for this is because the survival by stage estimates only use one of the five diagnosis years (2015) that the National Statistics are based on (2011 to 2015).

This section presents estimates of 1-year net survival (%) for adults (aged 15 to 99 years) diagnosed in 2015 and followed up to 31 December 2016. Since 2012, cancer registration data started recording stage in a clear majority of tumours. Data are available for single year cohorts since 2012 in the reference tables.

The analysis includes data on nine different cancer sites (bladder, breast, colorectal, kidney, lung, melanoma of skin, ovarian, prostate and uterus). These cancers were chosen as they are the cancers included in the Public Health Outcomes Framework (PHOF) measure of cancer stage. The PHOF measure defines some of the cancers differently to the National Statistics (section 4) and we are consulting on how these cancers should be defined in future. We have not produced data for non-Hodgkin lymphoma (NHL) because this covers a broad group of cancers where the association of stage with treatments and outcomes is very variable.

Survival estimates are presented for men, women and both sexes combined. We report survival by stage for all ages combined. To allow the comparison of survival between cancers with a different age profile, all-ages survival estimates are age-standardised. Confidence intervals are provided in the reference tables, to indicate the precision of the survival estimates. We present survival for breast cancer only in women, because it is relatively uncommon in the opposite sex. Survival estimates have been calculated using the cohort approach, (see the Cancer survival Quality and Methodology Information report) when follow-up information is available for each patient for at least 1 year.

Survival by stage at diagnosis is a measure of how advanced the cancer is. Generally speaking, a higher stage category (number) means the cancer is bigger or has spread to other parts of the body (metastasis). This is sometimes referred to as “later” stage cancer and often there are fewer treatment options. The staging system used is TNM (tumour, node, metastasis) staging. This system puts cancers in a group from 1 to 4 depending on the tumour size (T); whether the lymph nodes have cancer cells (N); or if the cancer has spread to other parts of the body (M). For uterine and ovarian cancer the FIGO (International Federation of Gynecology and Obstetrics) system is also used, which matches the TNM system and allows for better data completeness for these specific sites.

Because of improvements in cancer registration and the completeness of stage data during the 4-year period covered (2012 to 2015), we do not recommend looking at the data in the reference tables as representing the trends in survival over the 4 years, equally year-on-year comparisons should not be made. Such analyses will be undertaken in the future, when enough comparable data are available.

These cancer survival by stage statistics are designated as Experimental Statistics. Experimental Statistics are published to involve customers and stakeholders in their development and as a means of building in quality at an early stage.

Survival by stage

The proportion and number of cases diagnosed at each stage varies between different cancers and between men and women (Table 1). Generally the data show that women are diagnosed at an earlier stage.

Table 1: Number of patient diagnoses and proportion diagnosed at each stage, adults (aged 15 to 99), England, diagnosed in 2015

Cancer site	Sex	Number of diagnoses	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage not known
Bladder (C67)	Men	6,091	44	24	6	14	11
	Women	2,283	34	25	7	18	16
Breast (C50)	Women	42,076	40	39	9	5	7
Colorectal	Men	18,415	17	24	28	24	8
(C18 - C20)	Women	14,917	15	24	27	24	10
Kidney (C64)	Men	5,479	40	8	17	24	12
	Women	3,182	45	8	15	20	13
Lung	Men	19,565	14	8	20	51	7
(C33 - C34)	Women	17,171	18	7	19	49	7
Melanoma (C43)	Men	6,452	61	22	7	3	7
	Women	6,208	69	18	5	2	6
Ovary (C56 - C57)	Women	6,069	29	5	32	19	15
Prostate (C61)	Men	40,025	31	20	20	19	10
Uterus (C54 - C55)	Women	7,397	68	7	11	7	7

Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

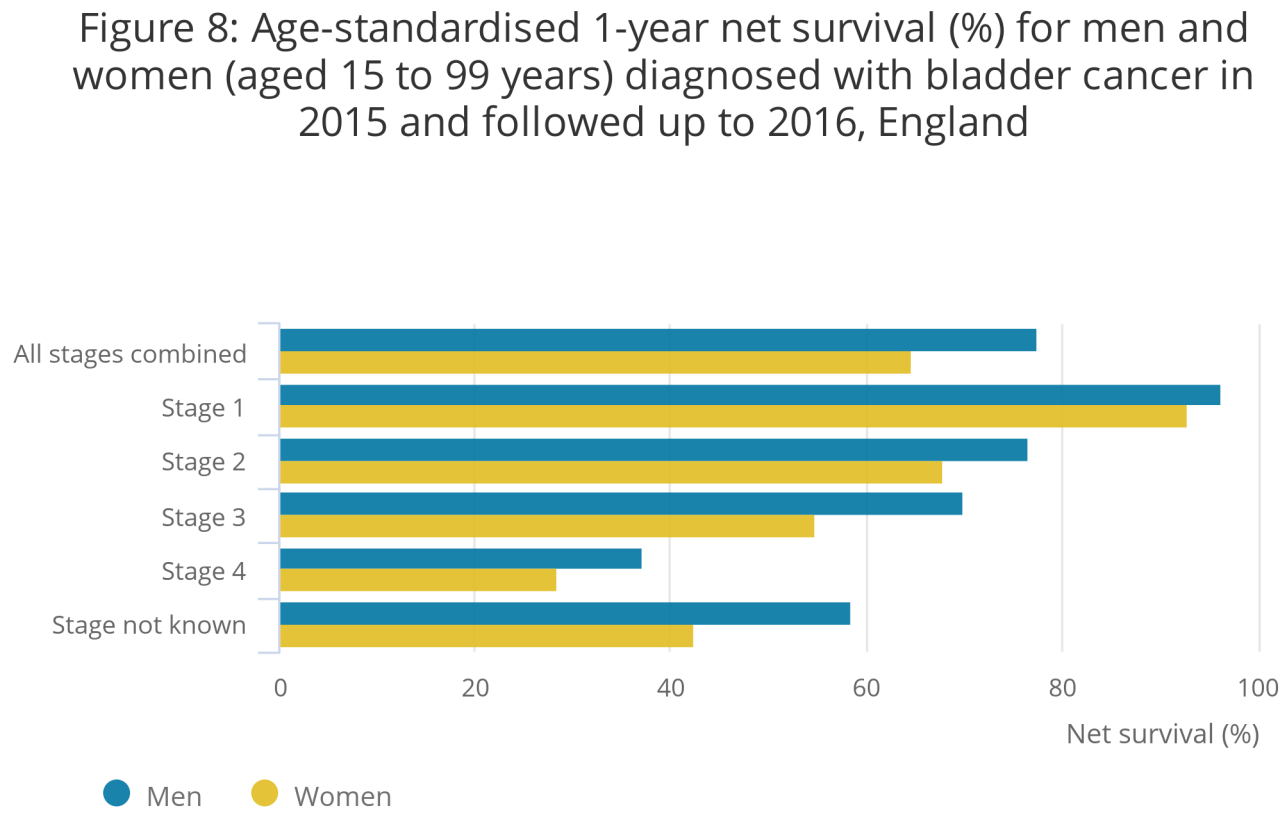
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Bladder cancer

Bladder cancer was unusual compared with the other cancers studied because women had much lower stage survival (64.7% for all stages combined in 2015) than men (77.6%). This is likely to be due to a complex mix of reasons as discussed in Gender and bladder cancer: a collaborative review of etiology, biology and outcomes. In 2015, women with a given stage of bladder cancer had worse survival compared with men with the same disease stage (Figure 8). This suggests that there are some gender differences in bladder cancer survival, probably due to differences in biology. Women with bladder cancer were also diagnosed at a later stage than men (Table 1), which contributed to the overall differences in survival. Longer waits for diagnosis and higher proportions of emergency diagnoses in women with bladder cancer may also have contributed.

Figure 8: Age-standardised 1-year net survival (%) for men and women (aged 15 to 99 years) diagnosed with bladder cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

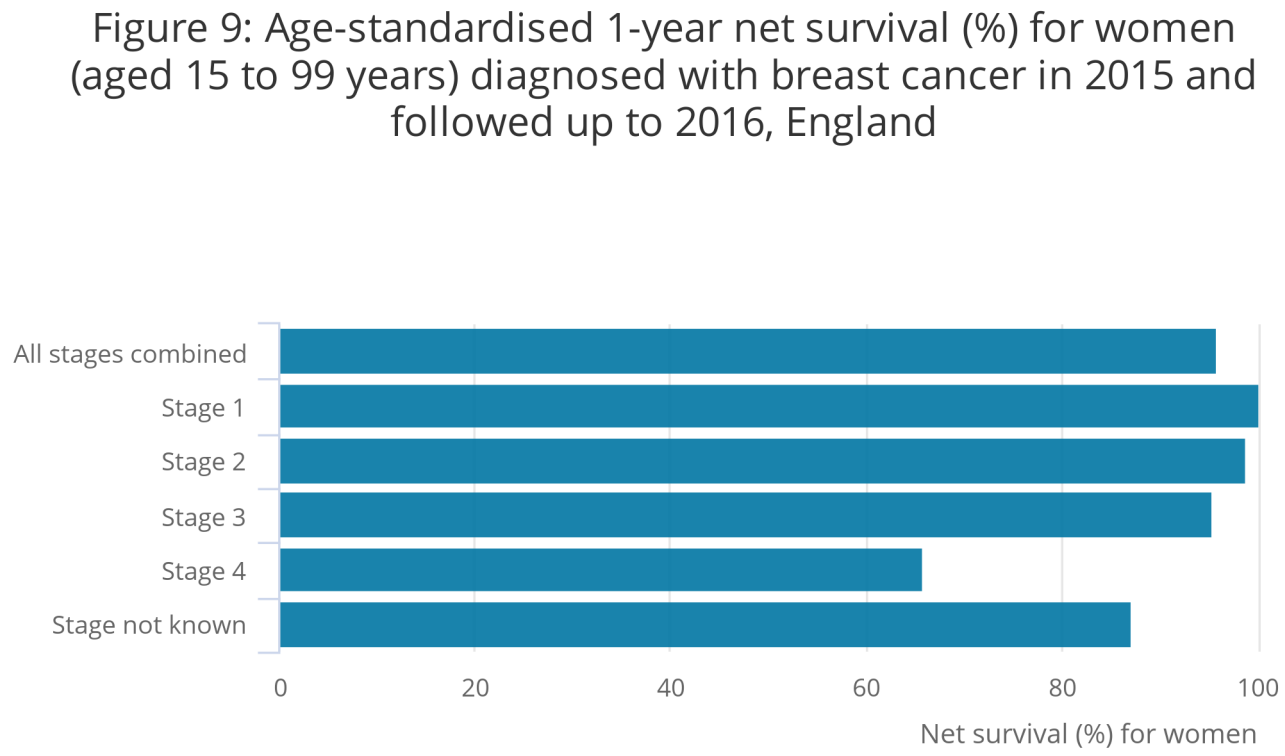
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Breast cancer (women only)

Survival from breast cancer was amongst the highest of all cancers (95.9% for all stages combined in 2015). This was probably due to a combination of factors including a higher number of cancers detected through screening (1 in 3 tumours are detected through screening), well-understood symptoms and the increasing availability of effective treatments for most cases. For those diagnosed at stage 1 or stage 2 there were very few excess deaths from breast cancer, compared with the general population, in the first year after diagnosis. For those diagnosed at stage 4 there was a much lower survival of 65.8% (for all stages combined in 2015).

Figure 9: Age-standardised 1-year net survival (%) for women (aged 15 to 99 years) diagnosed with breast cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

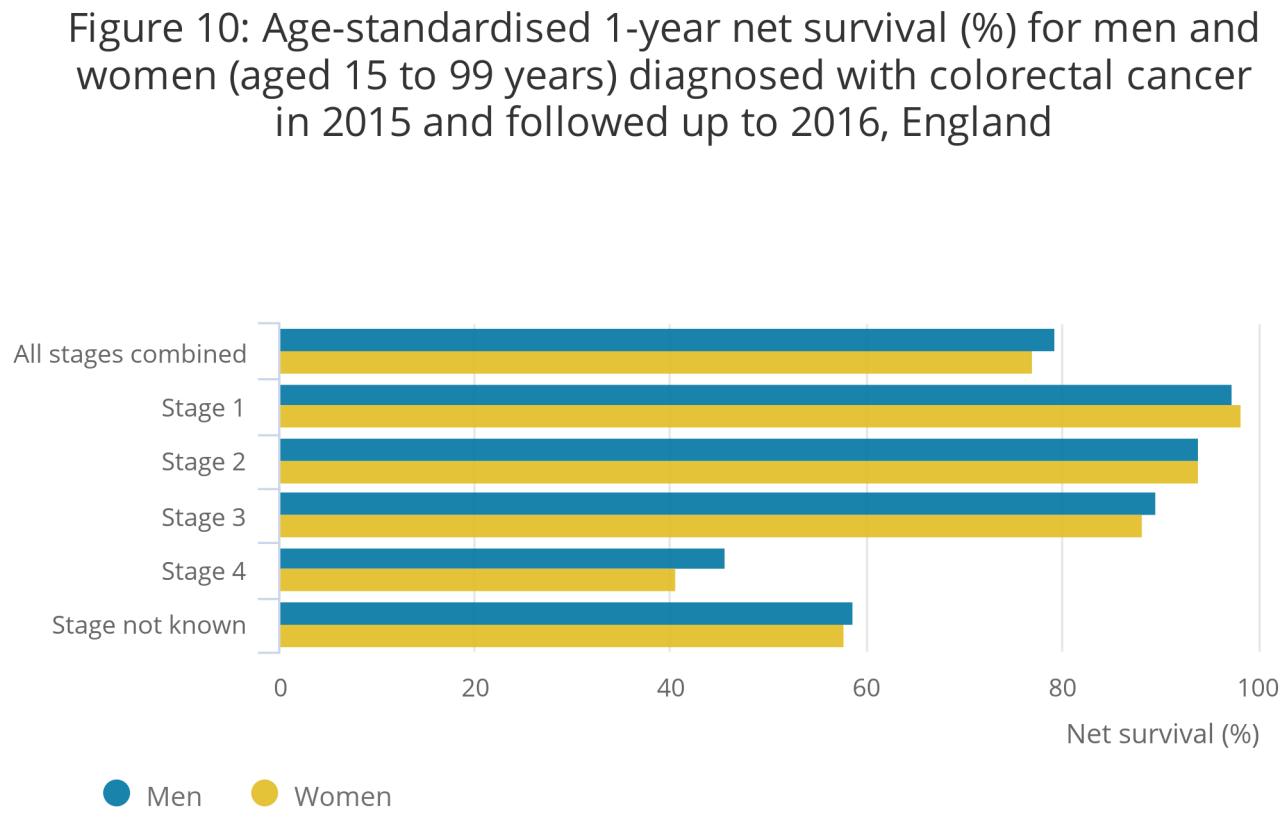
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Colorectal Cancer

Colorectal cancer survival was slightly higher in men (79.3% for all stages combined in 2015) than women (77.1%). There was a gradual decrease in survival from stage 1 to 3, with a larger step down between stages 3 and 4. In 2015, the survival at stage 4 was 40.5% for women and 45.6% for men, which shows that people diagnosed at this stage died at more than twice the rate of the general population. There is a national screening programme for colorectal cancer but only about 1 in 10 cases are currently diagnosed via this route.

Figure 10: Age-standardised 1-year net survival (%) for men and women (aged 15 to 99 years) diagnosed with colorectal cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

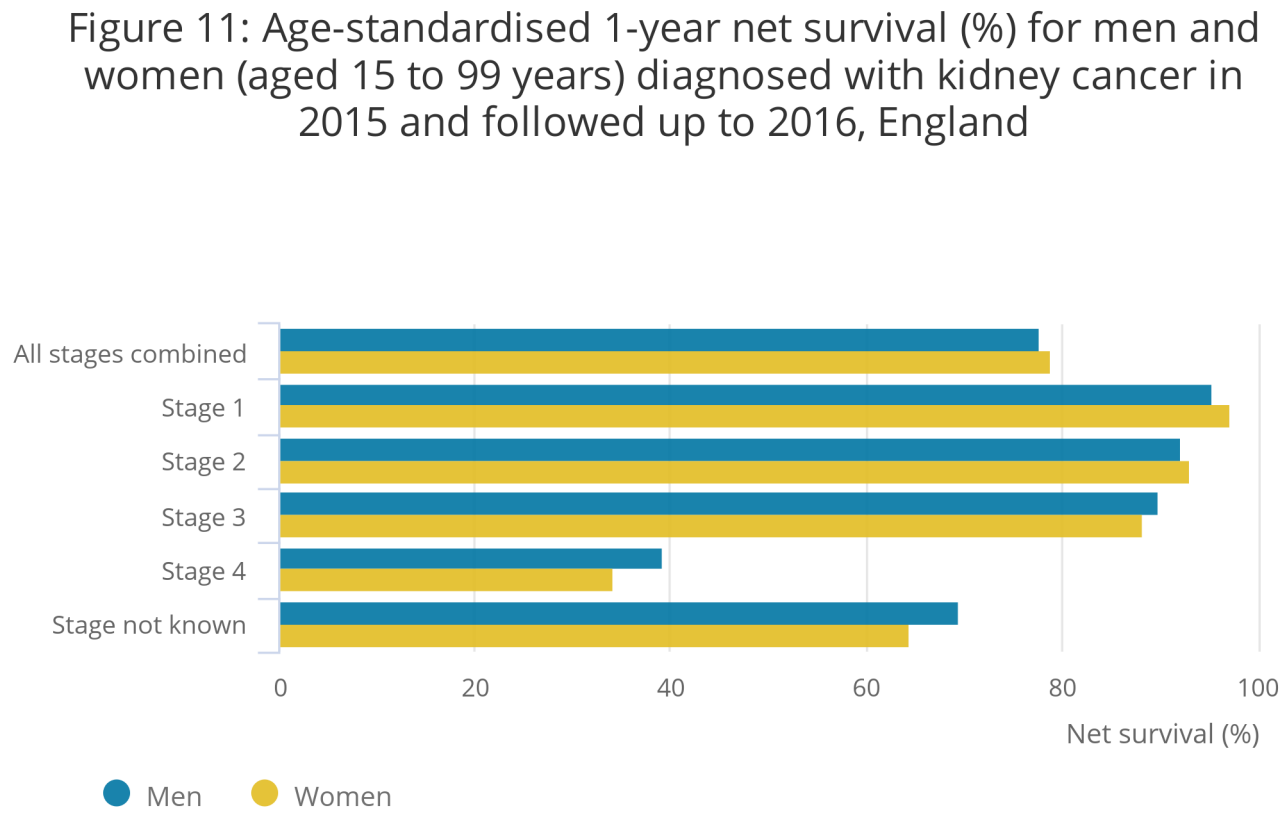
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Kidney cancer

The proportion of men and women diagnosed with kidney cancer at each stage was similar and the overall survival was nearly the same (77.7% for men and 78.8% for women in 2015). There was not much difference in survival between stages 1 to 3, but much worse survival for those diagnosed at stage 4, which shows that people diagnosed at this stage died at more than twice the rate of the general population. The numbers of new kidney cancers have been rising, which may be because they are picked up when people have scans for other illnesses. These cancers are often small and can be effectively treated, so the overall survival has been rising steadily over time.

Figure 11: Age-standardised 1-year net survival (%) for men and women (aged 15 to 99 years) diagnosed with kidney cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

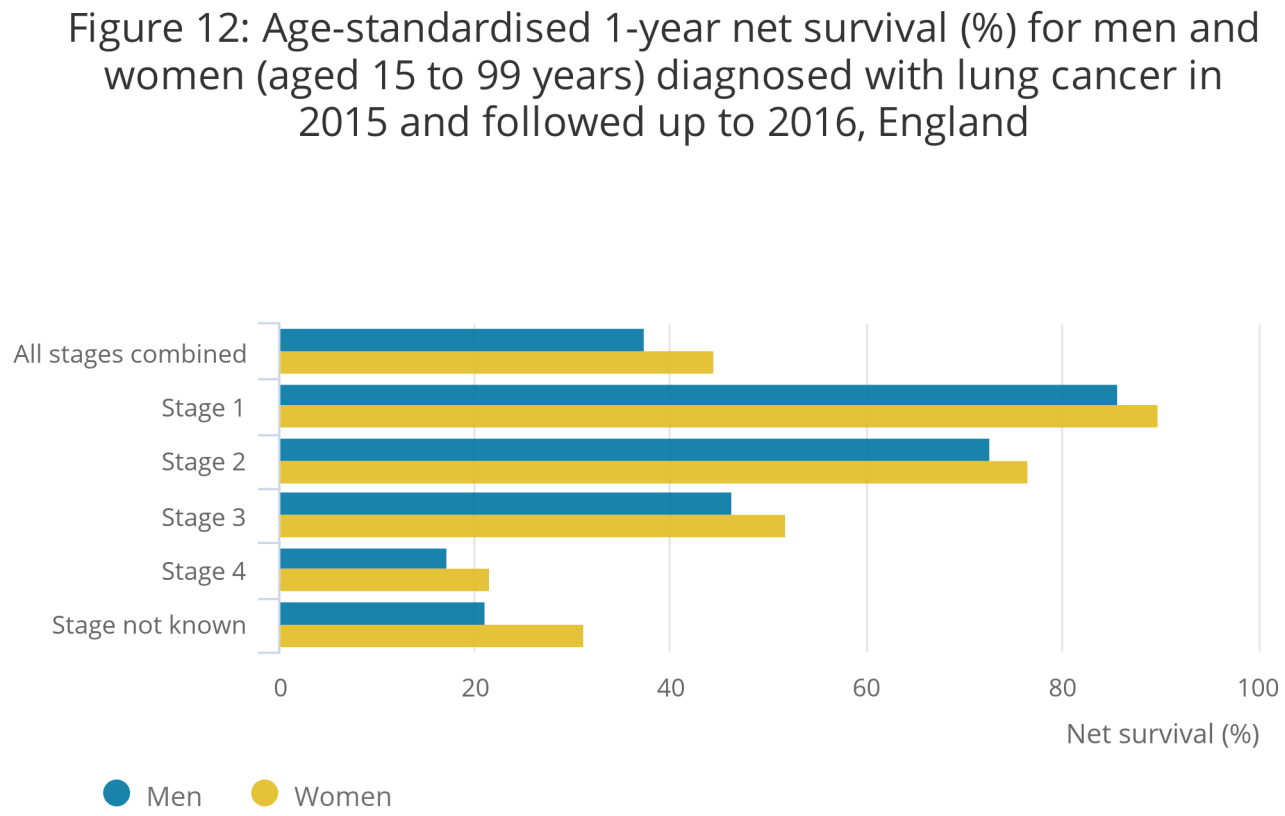
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Lung cancer

Overall, survival from lung cancer was the lowest of the cancers observed (37.3% for men and 44.6% for women in 2015) and this reflects the larger proportion of cases that were diagnosed at late stage (Table 1). Many patients with lung cancer have symptoms that are similar to other illnesses so it can be difficult to spot. Survival at stage 1 in 2015 was 85.8% for men and 90.0% for women, but only around 1 in 6 lung cancers were diagnosed at this stage. In 2015, about half of lung cancers were diagnosed at stage 4. Survival estimates steadily decreased with advanced stages. At all stages women had higher survival than men.

Figure 12: Age-standardised 1-year net survival (%) for men and women (aged 15 to 99 years) diagnosed with lung cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

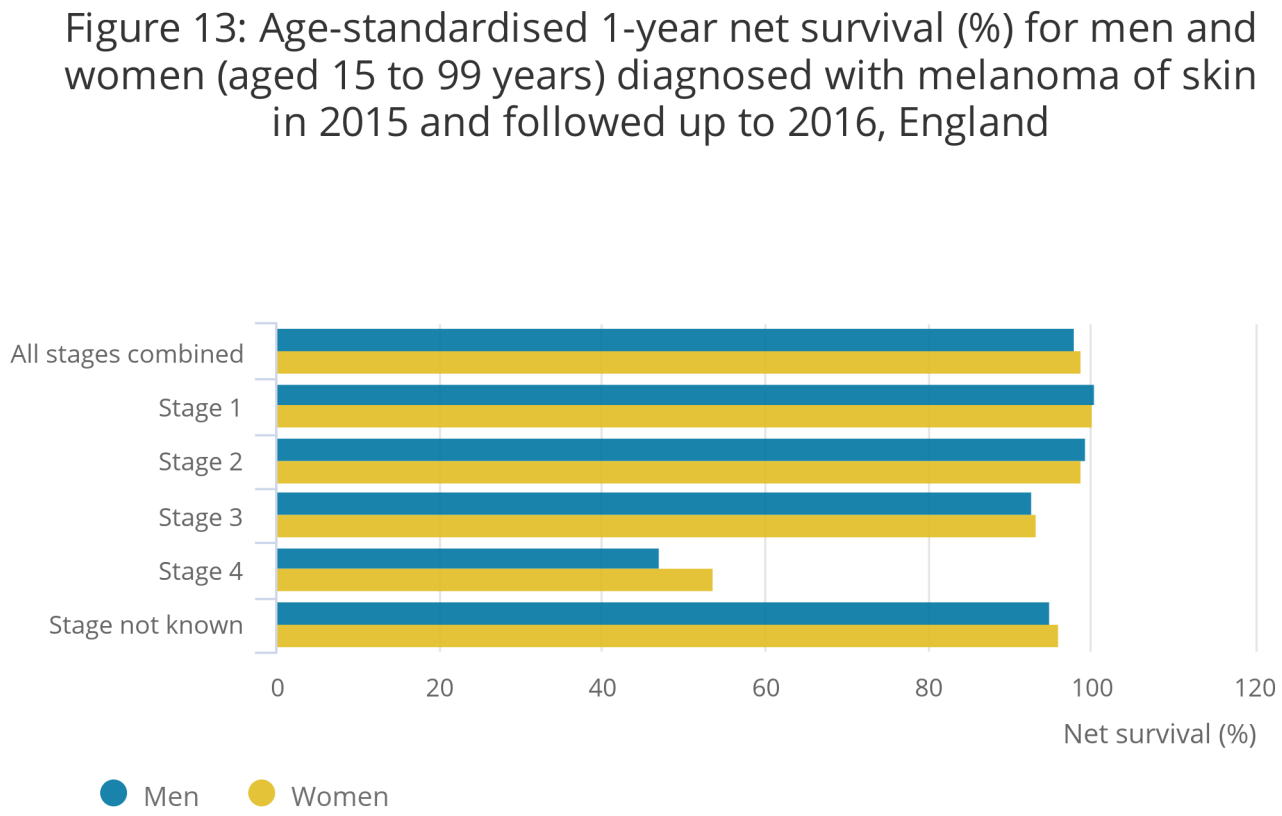
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Melanoma of skin

Melanoma of skin is a type of skin cancer that is most likely to cause death than other types of skin cancer. It affects all ages, but is one of the more common cancers in people aged under 40. Survival was very high because more than 60% of skin cancers were diagnosed at stage 1, where the survival was over 100%; the survival greater than 100% means that fewer persons died than expected. This high stage 1 proportion (see Table 1) may be due to increased awareness, or because of the fact the cancer is on the skin and is easier to detect.

Figure 13: Age-standardised 1-year net survival (%) for men and women (aged 15 to 99 years) diagnosed with melanoma of skin in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

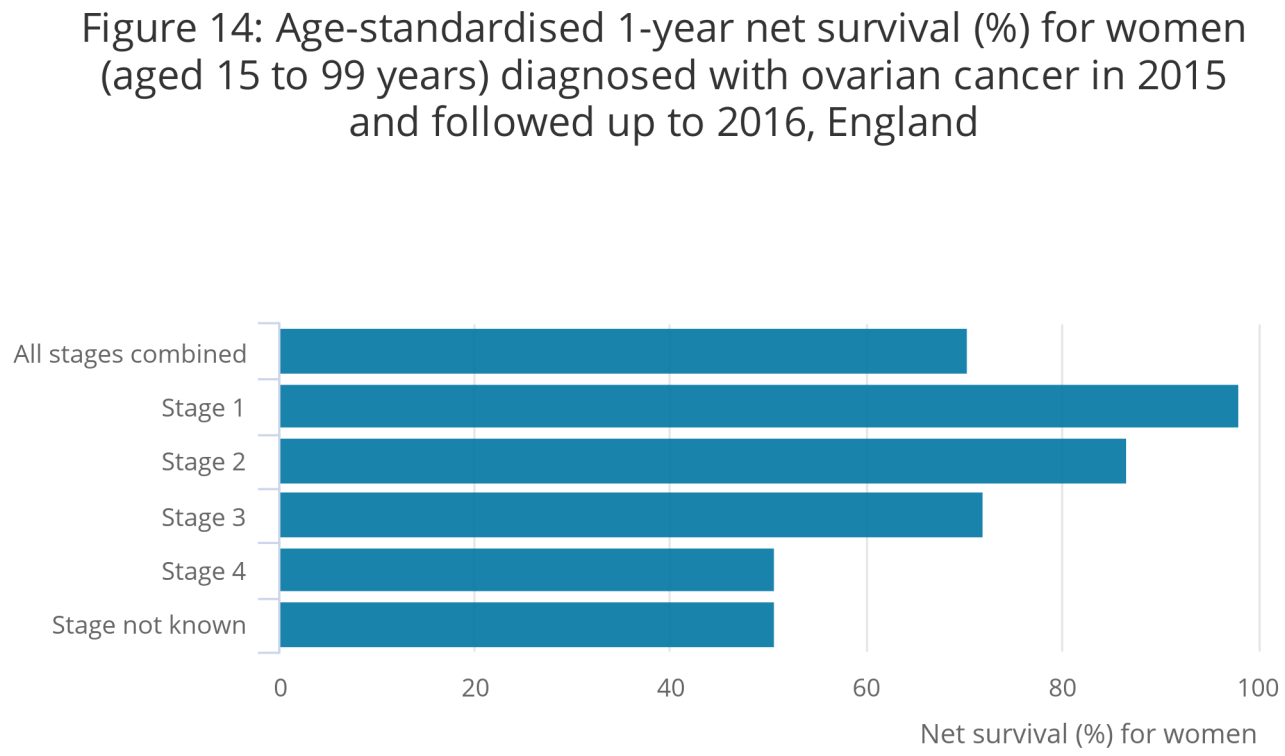
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Ovarian cancer

Overall survival for women diagnosed with ovarian cancer was 70.4% in 2015. This was the third lowest overall survival for women for the cancers when calculated by stage at diagnosis, with lung and bladder being worse. In 2015, half of women diagnosed with ovarian cancer were diagnosed at stages 3 and 4. Like lung cancer, the symptoms of ovarian cancer can be similar to lots of other illnesses, which makes it difficult to diagnose. There was a steadily decreasing survival with increasing stage, but survival for those diagnosed at stage 1 was high (98.1% for 2015).

Figure 14: Age-standardised 1-year net survival (%) for women (aged 15 to 99 years) diagnosed with ovarian cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

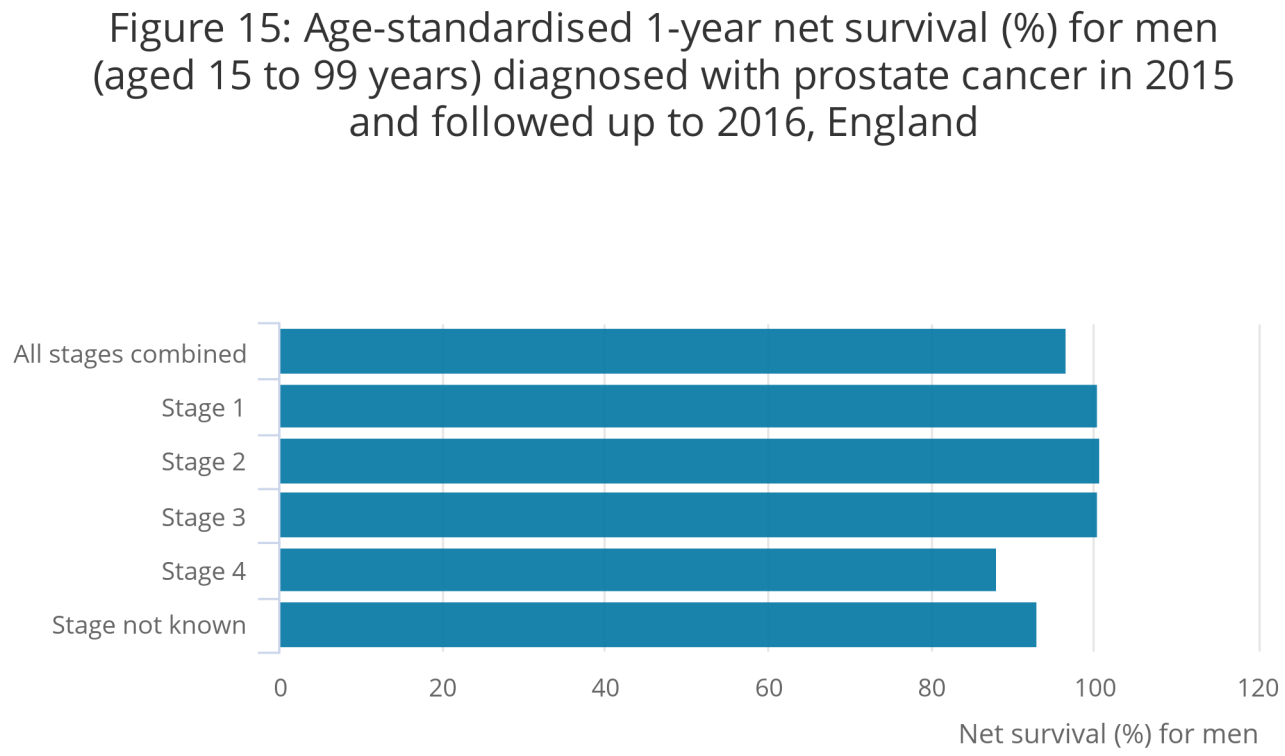
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Prostate cancer

Survival from prostate cancer was also very high (96.6% for all stages combined in 2015). There is no national screening programme for prostate cancer but some men have a Prostate Specific Antigen (PSA) test at their GPs. There were no differences in 1-year survival between stages 1, 2 and 3 (over 100% for 2015); the survival greater than 100% means that fewer men died compared with the general population. A lower survival was seen for stage 4 cancers (88.2% for 2015), but this was still higher than many other cancers diagnosed at earlier stages.

Figure 15: Age-standardised 1-year net survival (%) for men (aged 15 to 99 years) diagnosed with prostate cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

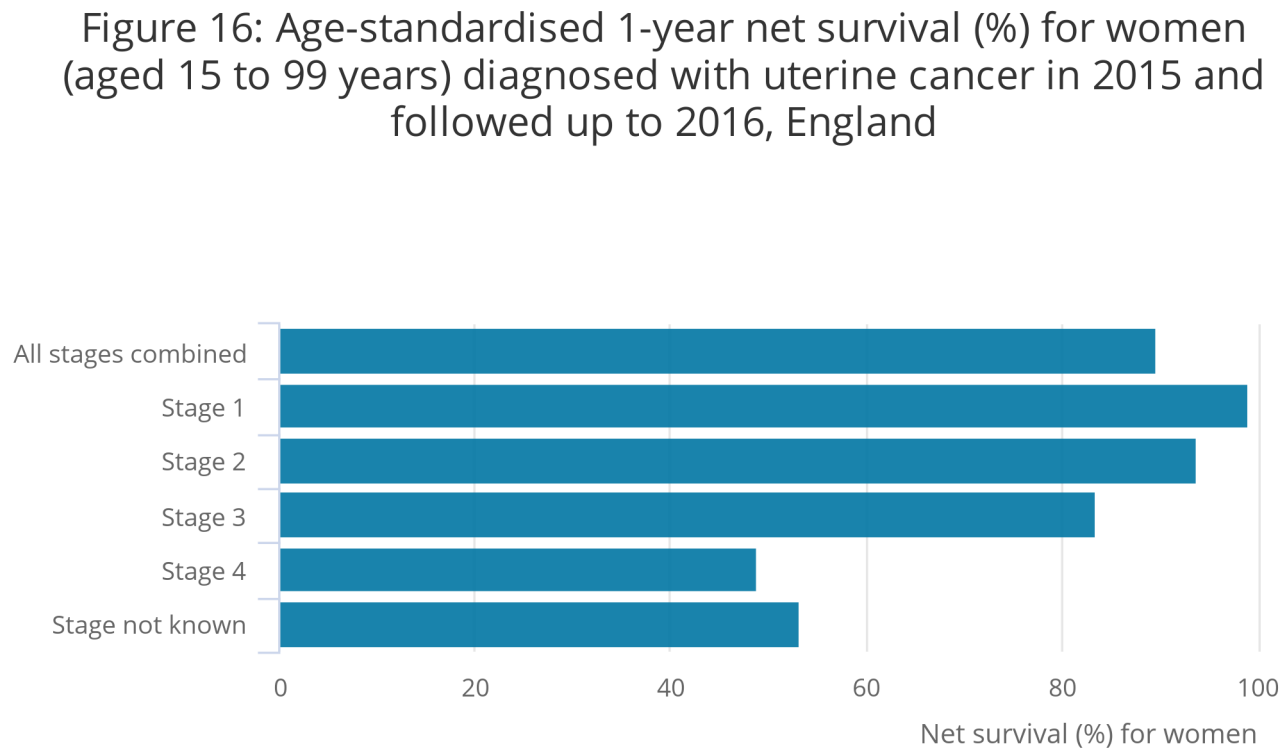
Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

Uterine cancer

Survival for women diagnosed with cancer of the uterus was 89.6% overall for 2015. This was related to the very high proportion of cases diagnosed at stage 1; just over 2 out of 3 cases. For those diagnosed at stage 4, the proportion that died was still twice as high as the general population.

Figure 16: Age-standardised 1-year net survival (%) for women (aged 15 to 99 years) diagnosed with uterine cancer in 2015 and followed up to 2016, England



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. "Stage not known" includes all cases with insufficient clinical or pathology information on stage.

6 . Childhood cancer survival in England: children diagnosed from 1990 to 2015 and followed up to 2016 (Experimental Statistics)

Things you need to know about childhood cancer survival

This section presents estimates of 1-year, 5-year and 10-year overall survival (%) for all childhood cancers combined, by 5-year age groups and for all ages combined (0 to 14 years), both unstandardised and age-standardised. The 1-year cancer survival estimates are presented for the first time.

Data are presented on survival for all children diagnosed with cancer in England during the period 1990 to 2015. A predictive survival method has been employed to provide estimates for survival as if patients were diagnosed in 2016, which is similar to the 10-year survival presented earlier for adults (section 4). The analyses were carried out using the cohort approach where 1, 5 or 10 years of follow-up data were available. Period or hybrid approaches were used to provide short-term predictions of survival for children diagnosed more recently.

All children (aged 0 to 14 years) resident in England who were diagnosed between 1990 and 2015 with a primary malignant neoplasm of any organ, or a non-malignant neoplasm of the brain and central nervous system (CNS), as defined in the third edition of the International Classification of Childhood Cancer, were considered eligible for inclusion in the survival analyses. Cancers of the skin other than melanoma and secondary and unspecified malignant neoplasms were excluded. Children whose tumour was only reported on a death certificate were excluded, because their duration of survival is unknown, however, they only represent 0.5% of all childhood tumours in the period covered.

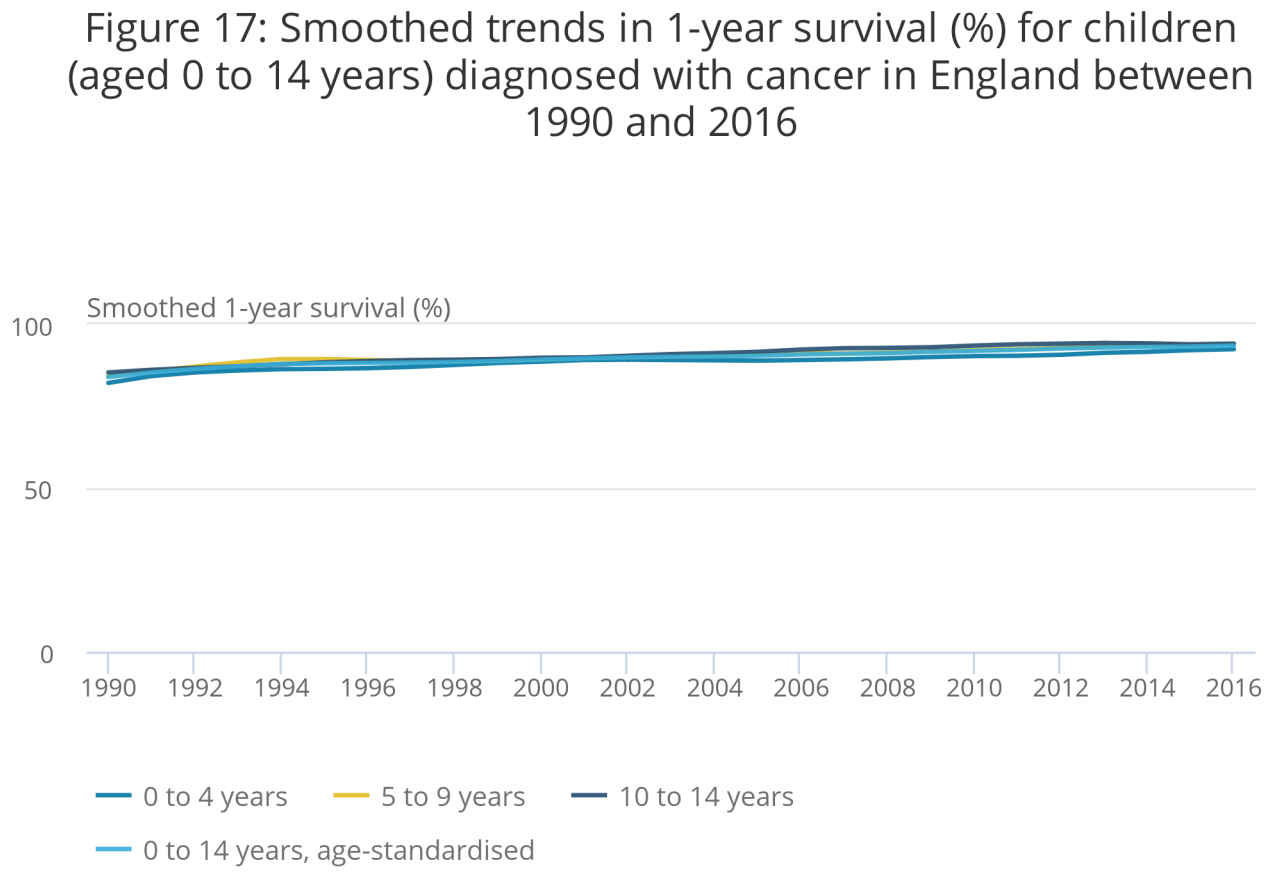
These childhood cancer survival statistics are designated as Experimental Statistics. Experimental Statistics are published to involve customers and stakeholders in their development and as a means of building in quality at an early stage.

1-year survival for children

For children (aged 0 to 14 years) diagnosed with cancer in 1990, age-standardised 1-year survival was 84.2%, whilst 1-year survival is predicted to be 93.4% for children diagnosed in 2016.

Throughout the period 1990 to 2016, 1-year survival for children with cancer has improved (Figure 17). From 1990 to 1999, 1-year survival was below 90%, but it has consistently been above 90% since 2006. The increase in 1-year survival is reflected in improvements in each of the age groups 0 to 4 years, 5 to 9 years and 10 to 14 years.

Figure 17: Smoothed trends in 1-year survival (%) for children (aged 0 to 14 years) diagnosed with cancer in England between 1990 and 2016



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. Age-group specific survival estimates are presented for children aged 0 to 4 years, 5 to 9 years and 10 to 14 years. Age-standardised survival estimates are also presented for all children.

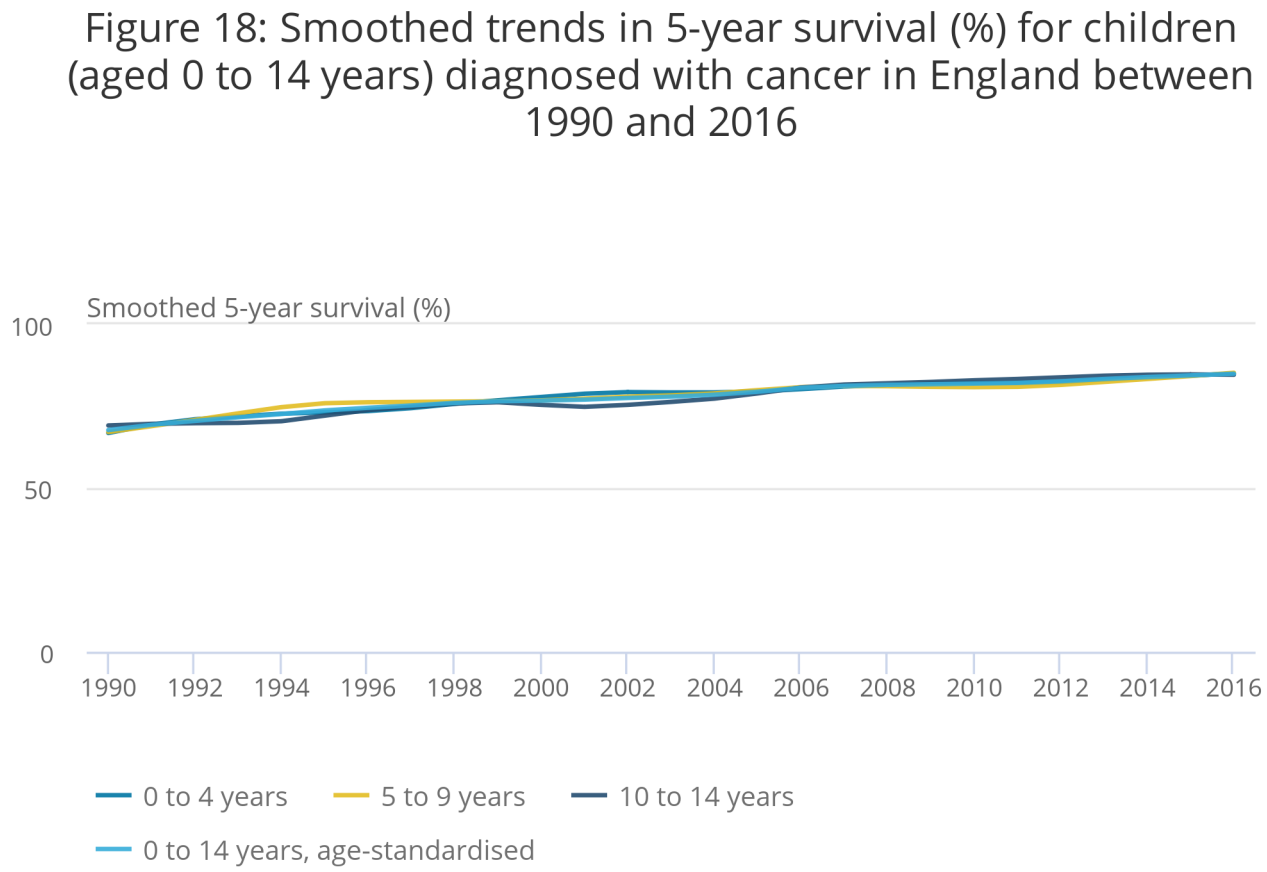
2. These data have been smoothed using the “lowess” technique (locally weighted scatter plot smoothing) because of the year-to-year variation in the survival estimates.

5-year survival for children

For children (aged 0 to 14 years) diagnosed with cancer in 1990, age-standardised 5-year survival was 67.2%, whilst 5-year survival is predicted to be 85.1% for children diagnosed in 2016.

Throughout the period 1990 to 2016, 5-year survival for children with cancer has improved (Figure 18). From 1990 to 1995, 5-year survival was below 75%, but it has consistently been above 80% since 2006. The increase in 5-year survival is reflected in improvements in each of the age groups 0 to 4 years, 5 to 9 years and 10 to 14 years.

Figure 18: Smoothed trends in 5-year survival (%) for children (aged 0 to 14 years) diagnosed with cancer in England between 1990 and 2016



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. Age-group specific survival estimates are presented for children aged 0 to 4 years, 5 to 9 years, and 10 to 14 years. Age-standardised survival estimates are also presented for all children.

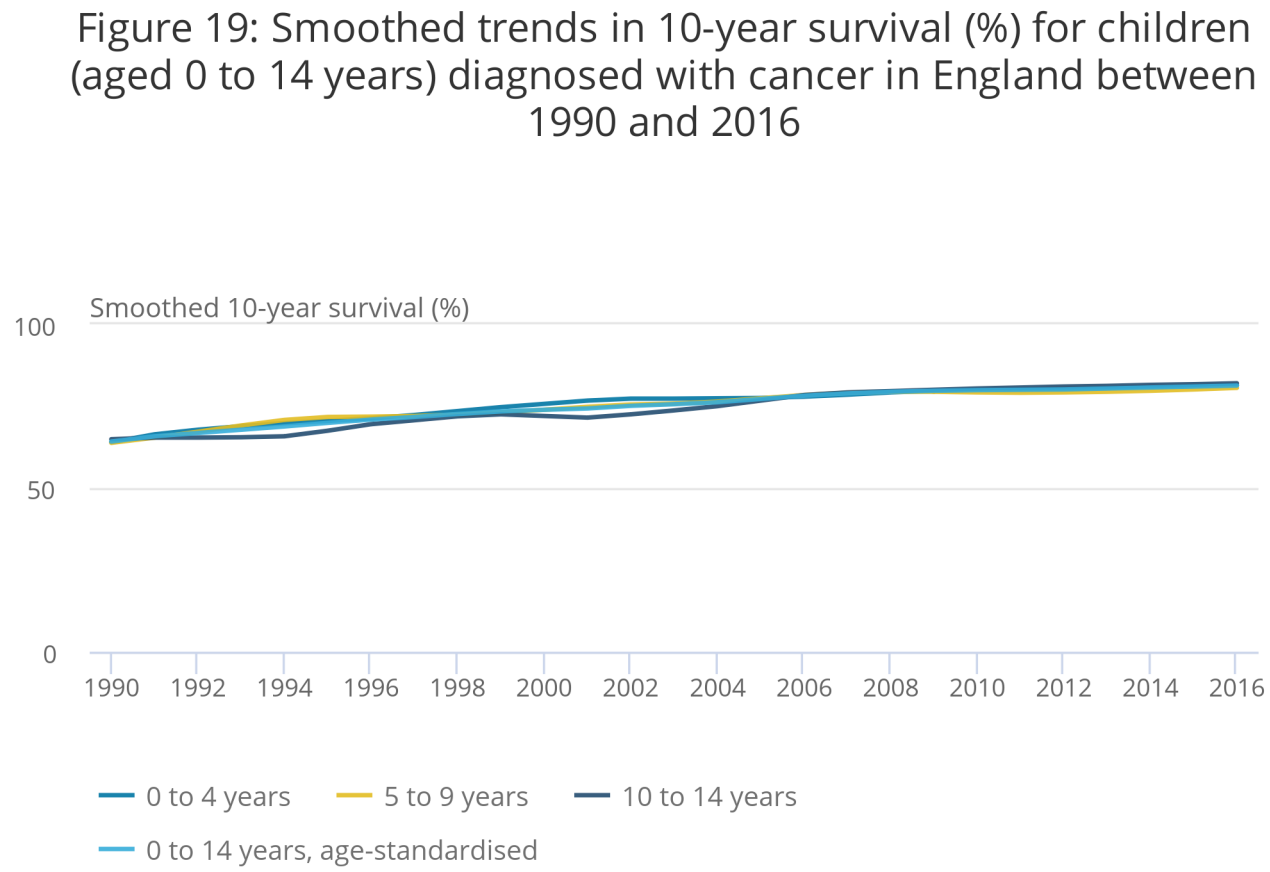
2. These data have been smoothed using the “lowess” technique (locally weighted scatter plot smoothing) because of the year-to-year variation in the survival estimates.

10-year survival for children

For children diagnosed with cancer in 1990, age-standardised 10-year survival was 63.7%, whilst 10-year survival is predicted to be 81.4% for children diagnosed in 2016.

Throughout the period 1990 to 2016, 10-year survival has improved (Figure 19). It was below 75% from 1990 to 1999, but has consistently been above 80% for children diagnosed since 2012. The increase in 10-year survival is reflected in improvements in each of the age groups 0 to 4 years, 5 to 9 years and 10 to 14 years.

Figure 19: Smoothed trends in 10-year survival (%) for children (aged 0 to 14 years) diagnosed with cancer in England between 1990 and 2016



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. Age-group specific survival estimates are presented for children aged 0 to 4 years, 5 to 9 years and 10 to 14 years. Age-standardised survival estimates are also presented for all children.

2. These data have been smoothed using the “lowess” technique (locally weighted scatter plot smoothing) because of the year-to-year variation in the survival estimates.

Overall survival trends for children

For children (aged 0 to 14 years) diagnosed with cancer, 1-year, 5-year and 10-year survival has continued to improve throughout the period 1990 to 2016. The trends are visible for each age group 0 to 4 years, 5 to 9 years and 10 to 14 years.

The most common cancers in children were leukaemia and malignant neoplasms of the brain. The increases in survival were likely due to improvements in treatment and supportive care. The increases in survival for many of the principal types of childhood cancer have occurred in parallel with clinical trials since the 1990s. Trends in population-based survival for a wide range of childhood cancers in Britain increased significantly during 1978 to 2005.

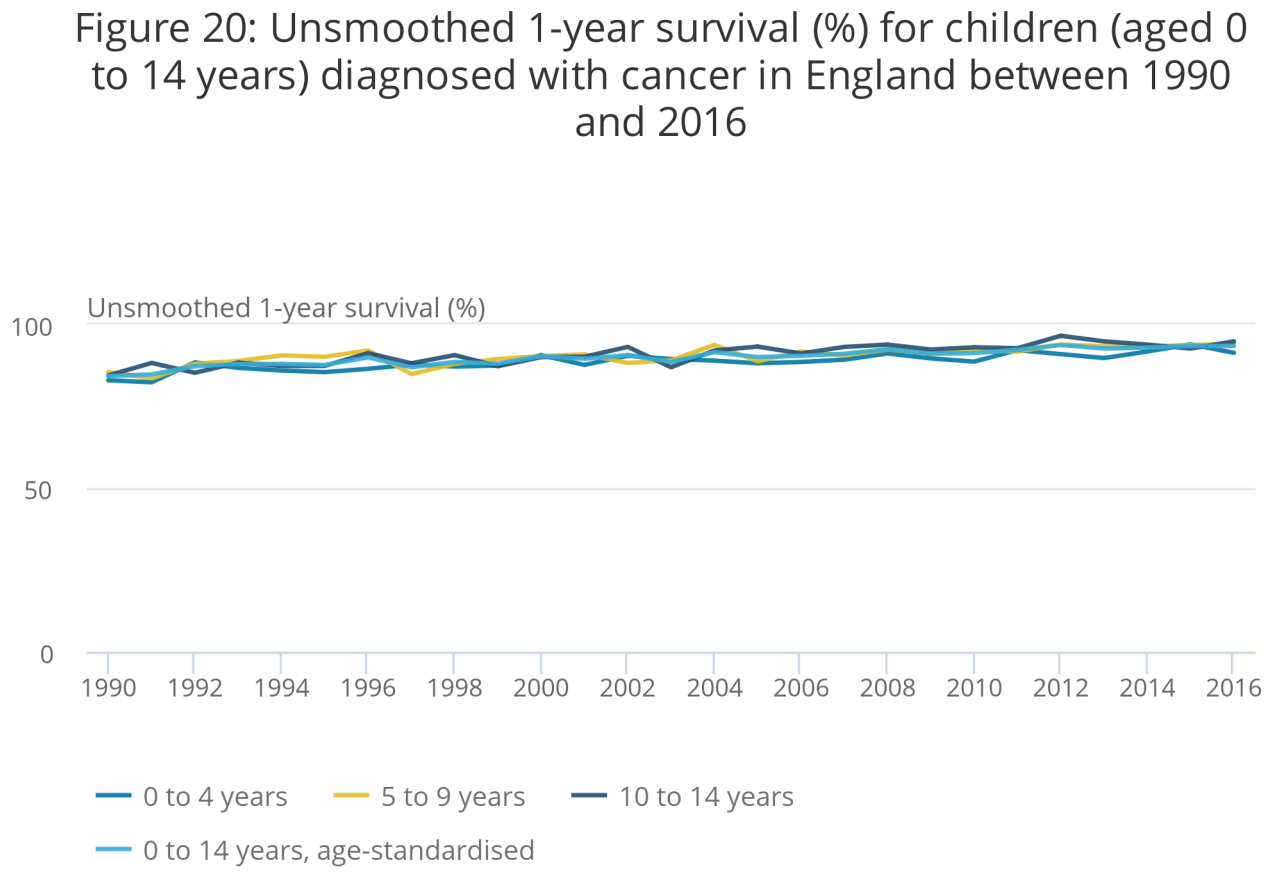
Interpretation of these statistics

Interpretation of these trends in survival should focus on the overall trends up to 2016, rather than the survival estimates in a particular year. Childhood cancer is relatively uncommon, so year-on-year fluctuations in the survival estimates arise because of the relatively small number of cancer diagnoses and deaths each year.

Figures 17 to 19 provide a smoothed trend over the entire period 1990 to 2016. The underlying year-on-year variations in 1-year, 5-year and 10-year survival have been smoothed by applying the “lowess” technique (locally weighted scatter plot smoothing) because of the year-to-year variation in the survival estimates. The “lowess” technique is one of many techniques used to smooth time series in which year-on-year fluctuation occurs, to highlight the underlying temporal trends. The smoothed curves are considered more likely to represent the underlying trend accurately.

Unsmoothed estimates for 1-year, 5-year and 10-year survival can be found in the reference tables. As an example, the unsmoothed data presented in Figure 20 provides an understanding of the wide fluctuations that were removed in Figure 17. Care should be taken when interpreting an apparent decline in survival between two successive years, because it is almost certainly due to fluctuation rather than a genuine decline in cancer survival.

Figure 20: Unsmoothed 1-year survival (%) for children (aged 0 to 14 years) diagnosed with cancer in England between 1990 and 2016



Source: National Cancer Registration and Analysis Service within Public Health England and Office for National Statistics

Notes:

1. Age-group specific survival estimates are presented for children aged 0 to 4 years, 5 to 9 years and 10 to 14 years. Age-standardised survival estimates are also presented for all children.

2. Interpretation should be focused on overall trends, rather than the survival estimates for any particular year. This is because the number of children diagnosed each year is relatively small and the survival estimates for single calendar years are therefore less stable.

7 . International comparisons

Overall, cancer survival has been improving steadily in England but is still lower than similar countries in Europe and around the world.

Comparisons of survival by stage for breast, lung, colorectal and ovarian cancer, across 30 European countries, were carried out by the International Cancer Benchmarking Partnership (ICBP) and by the Eurocare project. The work highlighted differences in survival, thought to be caused by differences in how many cases were diagnosed early and survival for those diagnosed with stage 4 disease. However, these results were based on people diagnosed 10 to 20 years ago, when there was less stage at diagnosis data collected.

Findings from the global CONCORD-2 study and an epidemiology study have shown that 5-year survival for adult patients in England, diagnosed between 2005 and 2009, with leukemia and cancers of the stomach, colon, rectum, liver, lung, breast, cervix, ovary and prostate was still lower than in Australia, Canada, Denmark, Norway and Sweden. Work is underway on CONCORD-3 to update the findings of the earlier results.

8 . Policy context

Users of cancer survival estimates include government organisations, health policy-makers, cancer charities, academics and researchers, cancer registries, the general public, and the media. Population-based cancer survival statistics are used to:

- plan services aimed at cancer prevention and treatment
- feed in to national cancer plans, such as Achieving world-class cancer outcomes: A Strategy for England 2015 to 2020, which recommends six strategic priorities to help improve cancer survival in England by 2020
- inform the NHS Outcomes Framework, which was established to monitor overall changes in performance of the NHS and the quality of health outcomes; the NHS Outcomes Framework 2013 to 2014 prompted the introduction of a cancer survival indicator for children and in the 2015 to 2016 NHS Outcomes Framework, indicators were set for 1-year and 5-year survival from colorectal, breast and lung cancers
- provide reliable and accessible information about cancer outcomes to a wide range of groups, including patients and health professionals via health awareness campaigns, cancer information leaflets and web pages
- inform cancer research

The adult cancer survival by stage at diagnosis analysis is used by the National Awareness and Early Diagnosis Initiative (NAEDI), which aims to improve cancer survival by earlier diagnosis. The data can help show the improvement in survival that could be made if more cancers were diagnosed earlier. They also show the pattern of survival and stage, which may help show where most improvement can be made.

9 . Links to other related statistics

Previous versions of our combined statistical bulletin on cancer survival are available:

1. Cancer survival in England
2. Cancer survival by stage at diagnosis for England (Experimental Statistics)
3. Childhood cancer survival in England (Experimental Statistics)

10 . Quality and methodology

The Cancer survival Quality and Methodology Information report contains important information on:

- the strengths and limitations of the data and how it compares with related data
- uses and users of the data
- how the output was created
- the quality of the output including the accuracy of the data

From June 2017, age-standardised estimates for adults have been calculated using the International Cancer Survival Standard (ICSS) age-weightings. The impact of the change to methods of adopting the ICSS international cancer patient population for age standardising survival ratios is detailed in the Impact of updating cancer survival methodologies for national estimates paper. In summary, the reasoning for this change is fourfold:

- the weights are publicly and readily available
- these weights are widely used
- it will help to enable national and international comparisons of survival estimates
- the ICSS weights continue to vary by tumour type reflecting age distributions of the different cancers

Further information regarding the applied methodology is available in the following publications:

1. Cancer Survival Group. 2004. Life tables for England and Wales by sex, calendar period, region and deprivation. London School of Hygiene and Tropical Medicine (updated 8 January 2016)
2. Kaplan E L, Meier P. 1958. Nonparametric Estimation from Incomplete Observations. Journal of the American Statistical Association. 53: pp 457 to 481.
3. Pohar Perme M, Stare J, Estève J. 2012. On estimation in relative survival. Biometrics. 68: pp 113 to 20
4. Clerc-Urmès I, Grzebyk M, Hédelin G. 2014. Net survival estimation with stns. Stata Journal. 14: pp 87 to 102
5. Corazziari I, Quinn M, Capocaccia R. 2004. Standard cancer patient population for age standardising survival ratios. European Journal of Cancer. 40: pp 2,307 to 2,316
6. Brenner H, Rachet B. 2004. Hybrid analysis for up-to-date long-term survival rates in cancer registries with delayed recording of incident cases. European Journal of Cancer. 40: pp 2,494 to 2,501
7. Li, R, and others. 2014. Control of data quality for population-based cancer survival analysis. Cancer Epidemiology. 38: pp 314 to 320
8. Brenner H, Gefeller O. 1997. Deriving more up-to-date estimates of long-term patient survival. Journal of Clinical Epidemiology. 50: pp 211 to 216
9. Cleveland, W S. 1979. Robust locally weighted regression and smoothing scatterplots. Journal of the American Statistical Association. 74(368): pp 829 to 836

11 . Authors

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Office for National Statistics: Neil Bannister; Jasveer Kaur; Leah Butler; Matthew Peet; Andy King

12 . Acknowledgements

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