Office for National Statistics

Statistical bulletin

Cancer survival in England: adult, stage at diagnosis and childhood - patients followed up to 2018

1-year, 5-year, and 10-year net-survival estimates for adults and children diagnosed with cancer between 2013 and 2017 and followed up to 2018, and by stage at diagnosis.

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Next release:
See collaboration section

Table of contents

1 . Main points

- Melanoma of the skin had the highest net survival for 1-year in both men (97.5%) and women (98.7%) and for 5-year in women (93.4%) for diagnoses between 2013 and 2017, which is the same as previously for diagnoses between 2012 and 2016. For men, the highest 5-year survival is in testicular cancer (95.3%).

- Pancreatic cancer had the lowest net survival for 1-year in men (24.8%) and women (26.2%), and for 5-year in both men (6.5%) and women (8.1%). This is a similar pattern to last year's publication.

- For 24 cancer sites we provide survival by stage estimates, there is now stage data for 85.3% of diagnoses between 2013 to 2017; this means that we can now offer a further 35 survival by stage estimates than when we produced this publication for 2012 to 2016.

- Childhood cancer survival has continued to improve for 1-, 5- and 10-years, with the 5-year survival seeing the greatest improvement over time; an increase of 8.4 percentage points, from 77.1% in 2001 to 85.5% predicted for children diagnosed in 2018.

2 . Collaboration

Future publications published by Public Health England

The Office for National Statistics (ONS) and Public Health England (PHE) currently work in collaboration to publish the Cancer National Statistics (registrations and survival). From 2020 the Cancer National Statistics will be published solely by PHE. As part of the transition for this, the next release, which will be the Index of Cancer Survival for Clinical Commissioning Groups in England, will be published by PHE on the gov.uk website.

The cancer registration and survival data in this bulletin have been collected and calculated by the National Cancer Registration and Analysis Service (NCRAS) within Public Health England (PHE). We collect and provide the mortality data that PHE include in the survival analysis, as well as the life tables used to construct the survival outputs, and work with PHE to quality assure the outputs. We independently produce the bulletin based on the survival analysis produced by PHE, including determining the focus, content, commentary, illustration and interpretation of the survival analysis presented.

To ensure timely and accurate data delivery, we have agreed with PHE on what data we expect and require, outlining quality, timing, definitions and format of data supply, and explaining how and why the data will be used.

3 . Things you need to know about this release

Data are presented for patients diagnosed with cancer between 2013 and 2017 and followed up to 2018. Estimates are available for 1-year and 5-year net cancer survival in adults for 29 common cancers. They are tabulated for men, women and both sexes combined (persons), by age group and for all ages combined and stage at diagnosis where appropriate. Predictive estimates are presented for 1-, 5- and 10-year survival estimates for the 29 common cancers.

Six cancers occur for a single sex (cervix, ovary, uterus, vulva, testis and prostate). Survival for cancer of the larynx is presented only for men, and for breast cancer is presented only for women since these cancers are relatively uncommon in the opposite sex.

Data are presented on 1-, 5- and 10-year overall survival for all children diagnosed with cancer in England during the period 2001 to 2018. There may be small differences between the estimates for 2001 to 2017 published in this bulletin when compared with the previous bulletin. These changes reflect new, updated or late reported registration information.

To allow comparisons to be made between population groups and over time, we provide age-standardised estimates for all ages combined. Survival estimates are only presented if sufficient data were available to make robust estimates of survival.

Information on the contents and uses of all the cancer publications can be found in the article Cancer statistics explained: different data sources and when they should be used. Descriptions of the methods used to calculate these estimates can be found in the Interpretation of these statistics and Quality and methodology sections.

If you wish to give us any feedback regarding how you use the cancer publications, a survey is available for you to complete.

The Cancer survival in England statistics were designated as National Statistics in a letter published on 26 July 2019. This followed an assessment report by the Office for Statistics Regulation published in February 2019 which stated that the series would be designated as National Statistics, subject to meeting certain requirements.

Since the report we have:

- published an updated Quality and Methodology Information Report which clearly outlines quality checks administered, the strengths and limitations of our statistics
- produced a short guide that summarises the different contents and uses of the cancer bulletins
- published an accompanying Quality assurance of administrative data report for cancer survival statistics, which underpins all the cancer publications
- improved signposting between publications, and the readability of our publications
- engaged with users through our survey and user event which will be held in September 2019

We will continue to improve the statistics in the future, in line with the recommendations of the report.

4 . Melanoma has the highest net-survival estimates

Figure 1: Explore 1-year and 5-year cancer survival by sex

Age-standardised net survival for men and women (aged 15 to 99 years) diagnosed with cancer in 2013 to 2017 and followed up to 2018, England

Notes:

1. The asterisk (*) denotes that a 5-year age-standardised estimate is not available.

Figure 1 is ordered by 1-year net survival. The pattern of cancers from high to low 5-year net-survival estimates are not always the same as for 1-year net survival; for example, testis 5-year survival (95.3%) is higher than for prostate (86.6%), whereas 1-year survival for prostate is marginally higher than for testis (96.6% and 96.5%, respectively). There are also differences in the ordering of cancer sites between men and women.

The five cancer sites with the highest 1-year survival for both men (melanoma, prostate, testis, Hodgkin lymphoma and thyroid, from highest to lowest) and women (melanoma, breast, thyroid, Hodgkin lymphoma and uterus) are the same as last year. The five cancer sites with lowest survival for both men (mesothelioma, brain, liver, lung and pancreas) and women (oesophagus, lung, brain, liver and pancreas) are also the same as last year.

In terms of 5-year net survival, the cancer sites with the highest survival were testis (95.3%) for men, and melanoma (93.4%) for women. Pancreatic cancer had the lowest survival for both men and women (6.5% and 8.1% respectively).

Survival for bladder cancer in men has shown a statistically significant decrease (56.1% 5-year net survival compared to 58.6% for men diagnosed between 2012 and 2016). A possible reason for this decrease is that during the period under observation, there have been periods of worldwide shortage of the therapeutic treatment Bacille Calmette-Guérin (BCG) used to treat higher-risk bladder cancer patients diagnosed at an early stage of disease progression (about one in five bladder cancer patients).

5 . Improving completeness of stage at diagnosis leads to better estimates of survival by stage

Diagnosis in the early stages of cancer offers patients a range of treatments that have a greater chance of being curative than if their cancer is diagnosed at a later stage. Many cancers have a system of classifying how far their cancer has progressed called a “stage” and these range from stage 1 (earliest possible) to stage 4 (latest possible). A stage at diagnosis may not be recorded for a cancer if there is missing or inconsistent diagnostic information, or if there is no appropriate staging system for the specific tumour type.

Net-survival estimates by stage at diagnosis for 1- and 5-years are presented following diagnosis for 24 cancer sites. Estimates by stage at diagnosis are not available for brain, non-Hodgkin lymphoma, kidney and urinary tract, pancreas, and leukaemia. This is because of complexities within different subtypes of a cancer site or because staging systems do not exist for all or some subtypes of the cancer.

For the 24 cancer sites with reported survival by stage estimates, there is a known stage for 85.3% of diagnoses in 2013 to 2017. This is 3.2 percentage points higher than in the diagnosis years 2012 to 2016, and reflects the increases in the proportion of known stage at diagnosis for each of the 24 cancer sites.

As the number of diagnoses with a known stage increases, the survival estimates for each stage captures a more accurate and wider range of patients’ survival experiences.

It is possible for the improvements in the quality of the stage data to lead to survival estimates for some stages decreasing slightly, but the all-stages combined survival estimate increasing. This can happen where the increase in the proportion of early stage diagnoses (which typically have higher survival than late stage diagnoses) more than compensates for small falls in individual survival by stage estimates.

Until the proportion of unknown stage is stable, we would caution against comparing the proportions of individual stages at diagnosis or their survival estimates over time.

6 . Cancer survival by stage for less common cancers

Cancer survival varies widely by cancer site and by stage at diagnosis. Focusing on less common cancers (excluding breast, prostate, lung and colorectal), there is a range in 5-year net survival for all stages combined, from 6.5% (mesothelioma for persons) to 95.3% (testicular cancer), with survival by stage reaching up to 99.6% for stage 1 melanoma of skin (persons).

Net survival for all stages combined is affected by the proportion of cases diagnosed at each stage, which varies considerably by cancer site.

For some cancer sites the survival for all stages combined is much closer to that for early stages, for example uterine cancer, while for other cancer sites it is closer to that for later stages, for example kidney cancer.

Figure 2: For uterine cancer, 5-year net survival for all stages combined is higher than survival for stage 2, with a large proportion of cases being diagnosed at stage 1

For uterine cancer 5-year net survival for all stages combined (75.6%) falls between survival for stages 1 (92.2%) and 2 (74.1%) (Figure 2). This is largely influenced by the fact that two thirds of women with a staged tumour were diagnosed at stage 1 (66.2%). In comparison, fewer than 12% of women were diagnosed at each of the other three known stages.

Figure 3: However, for kidney cancer, 5-year net survival for all stages combined is lower than survival for stage 3 with a larger proportion of cases diagnosed at stage 4 and low survival for stage 4

In contrast, all stage combined 5-year net survival (63.8%) for kidney cancer falls between survival for stages 3 (74.2%) and 4 (12.4%) (Figure 3). While a large proportion of staged kidney cancer cases are diagnosed at stage 1 (40.2%), the proportion diagnosed at stage 4 (20.5%) is much higher than for uterine cancer (6.8%). Additionally, kidney cancer survival for stages 1 to 3 is relatively high with a large drop for stage 4, whereas there is a more even decrease in uterine cancer survival by stage.

7 . 10-year predicted survival estimates

In line with the 5-year net survival estimates, the highest predicted net survival at 10 years was for testicular cancer for men (91.3%) and melanoma of the skin for women (91.2%). Predicted net survival at 10 years for men was also high in melanoma of skin (83.4%), prostate cancer (77.6%) and Hodgkin lymphoma (75.0%). For women, 10-year net survival was also high for thyroid (88.7%), breast (75.9%) and uterine (71.6%) cancers.

Predicted 10-year net survival was lowest for lung cancer for both men and women, at 7.6% and 11.3% respectively. It was also low for oesophageal cancer for men (12.5%) and stomach cancer for both men (15.5%) and women (19.5%).

8 . Childhood cancer survival continues to improve

Childhood cancer survival is estimated using a different method, without reference to the mortality in the general population. This allows annual estimates to be calculated, although interpretation should focus on trends rather than the individual estimates. Please see the Cancer survival statistical bulletins QMI report for more details.

For children (aged 0 to 14 years) diagnosed with cancer, estimates of 1-year, 5-year and 10-year survival have continued to improve throughout the period 2001 to 2018. This increasing trend is also reflected in each age group: 0 to 4 years, 5 to 9 years and 10 to 14 years.

Childhood cancers accounted for 0.5% of all new cancer diagnoses registered in 2017, with leukaemia and brain cancers being the most commonly diagnosed cancers in children.

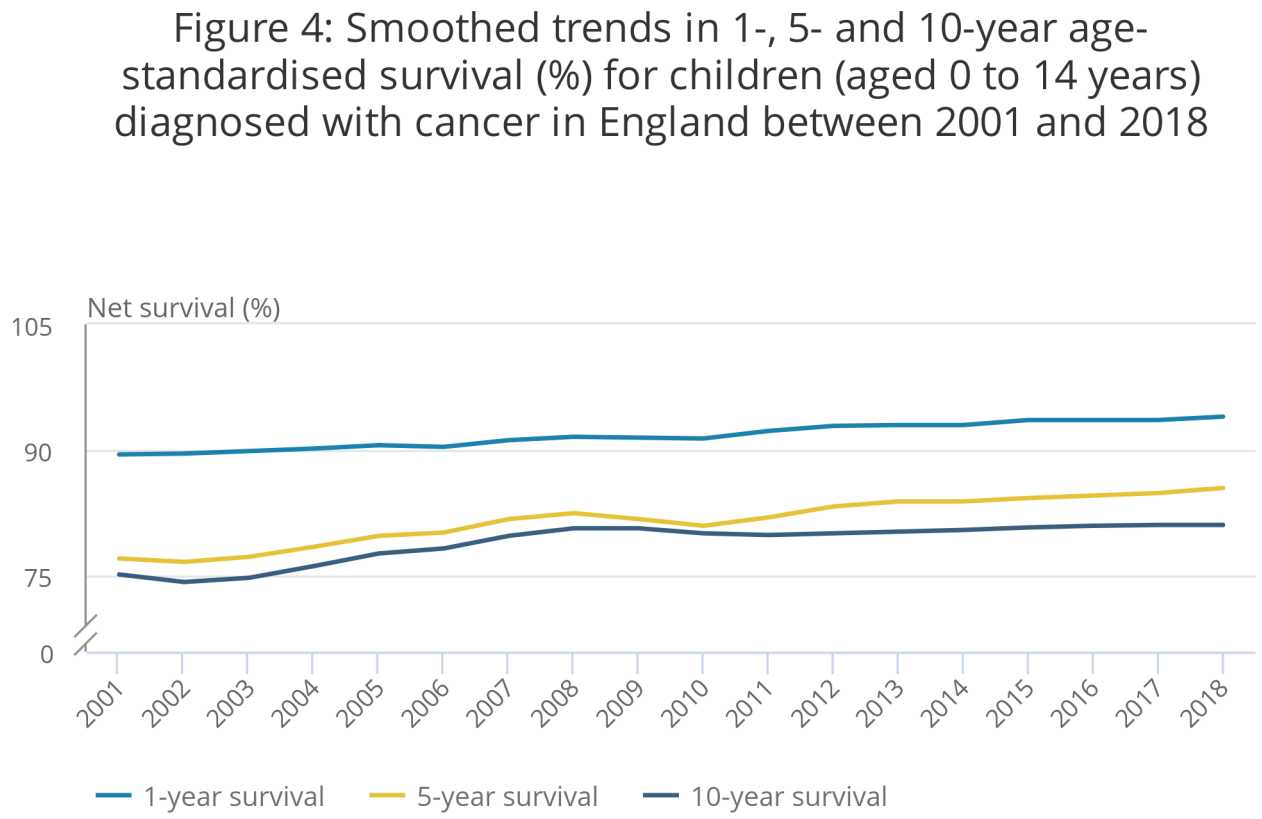
5-year survival has seen the greatest improvement over time

When comparing unsmoothed estimates, for children (aged 0 to 14 years) diagnosed with cancer, the 1-year age-standardised survival estimate was 89.5% in 2001 and is predicted to be 94.0% in 2018, a difference of 4.5 percentage points. Between 2001 and 2018, 5-year survival increased by 8.4 percentage points, from 77.1% in 2001 to 85.5% predicted for children diagnosed in 2018. For children diagnosed in 2018, 10-year survival is predicted to be 81.1%, 5.9 percentage points higher than for children diagnosed 17 years earlier (75.2%).

Differences between smoothed 1-, 5- and 10-year survival

In 2018, the 1-year cancer survival estimate is predicted to be 8.5 percentage points higher than the 5-year survival estimate, which is predicted to be 4.4 percentage points higher than the 10-year survival estimate, for all ages combined. The small difference between 5-year and 10-year survival means that children who survive for five years often live at least a further five years after diagnosis.

Figure 4: Smoothed trends in 1-, 5- and 10-year age-standardised survival (%) for children (aged 0 to 14 years) diagnosed with cancer in England between 2001 and 2018



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

Notes:

1. Age-standardised survival estimates are presented for all children (aged 0 to 14 years).
2. The survival estimates were smoothed by applying the “lowess” technique (locally weighted scatterplot smoothing) because of wide year-to-year variation (due to sparse data) in childhood survival. The smoothed data are used to highlight temporal trends in survival.
3. 1-year survival estimates from 2001 to 2018 are based on the following methods: cohort from 2001 to 2017 and hybrid for 2018.
4. 5-year survival estimates from 2001 to 2018 are based on the following methods: cohort from 2001 to 2013, period from 2014 to 2017 and hybrid for 2018.
5. 10-year survival estimates from 2001 to 2018 are based on the following methods: cohort from 2001 to 2008, period from 2009 to 2017 and hybrid for 2018.

9 . Interpretation of these statistics

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 because of the different distributions of cancer in children and adults, but they are broadly equivalent.

Adult cancer survival estimates are based on net survival, which is calculated by comparing the survival of cancer patients with that of the general population. While 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 cancer.

Confidence intervals (at the 95% level) are included in the datasets, which are a measure of the statistical precision of a rate and shows the range of uncertainty around the calculated estimate.

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).

Where, for one or more, age bands did not fully meet the quality criteria due to lack of robustness, the age standardisation for the affected cancer site was calculated by combining the affected age range with a neighbouring age band. This may be in cases where, for the survival period being estimated, there were low numbers of patients (less than 10) alive at the estimation time or there were few deaths (less than two) in a surrounding period.

Where two or more non-adjacent age ranges are affected or estimates for a combined age range fail one of the robustness criteria, there are insufficient robust estimates to calculate the age standardisation meaning an age-standardised estimate cannot be provided.

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.

10 . International comparisons

Overall, cancer survival has been improving steadily in England and cancer mortality continues to decrease. Despite this, cancer survival in England remains lower than similar countries in Europe and around the world according to recent studies. These international comparisons have been reported by International Cancer Benchmarking Partnership (ICBP), EUROCARE-5 and CONCORD-3.

While we do not hold cancer data for Northern Ireland, Scotland or Wales, survival figures are published by the Northern Ireland Cancer Registry, the Scottish Cancer Registry and the Welsh Cancer Intelligence and Surveillance Unit, respectively.

11 . Policy context

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

- monitor the implementation of the NHS long term plan, including the target to diagnose 75% of cancers at stages 1 or 2 by 2028 and a variety of services aiming to improve cancer prevention, earlier detection and treatment

- feed in to national cancer plans, such as Achieving world-class cancer outcomes: A Strategy for England 2015 to 2020 (PDF, 4.90MB), which recommends six strategic priorities (PDF 240.45KB) 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 2016 to 2017 introduced a cancer survival indicator for children and in the NHS Outcomes Framework 2015 to 2016 indicators were set for 1-year and 5-year survival from colorectal, breast and lung cancers

- demonstrate the pattern of survival by stage at diagnosis, to help show where earlier diagnosis could lead to improvements in survival

- 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

12 . Quality and methodology

The Cancer survival Quality and Methodology Information (QMI) and Quality assurance of administrative data used in cancer registrations and cancer survival statistics reports contain 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

Cancer registrations in England can take up to five years after the end of a given calendar year to reach 100% completeness, due to the continuing accrual of late registrations. We do not revise the back series to account for late registrations (except in childhood when previous years are estimated annually). Please see the Cancer Registrations Statistics bulletin for more information.

13 . Authors

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For queries relating to this bulletin, please contact us via email at cancer.newport@ons.gov.uk.

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14 . Acknowledgements

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