Office for National Statistics

Statistical bulletin

Cancer registration statistics, England: 2017

Cancer diagnoses and age-standardised incidence rates for all types of cancer by age, sex and region including breast, prostate, lung and colorectal cancer.

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1 . Main points

- In 2017, the number of new cancer diagnoses in England continued to increase from 303,135 in 2016 to 305,683 new cancer diagnoses (excluding diagnoses for non-melanoma skin cancers).

- The five most common cancers for males and females make up the majority of all cancers diagnosed in males (60.5%) and females (63.3%).

- The North East had the highest rate of cancer incidence at 646.1 patients diagnosed per 100,000 people, whilst London had the lowest rate at 567.6 patients diagnosed per 100,000 people.

- The rate of people dying from cancer in England has decreased from 275.2 deaths per 100,000 in 2016 to 270.1 deaths per 100,000 in 2017.

- Mortality rates from cancer in 2017 remain higher for males than females.

2 . Collaboration

This publication is produced in partnership with Public Health England (PHE). The cancer registration data in this bulletin have been collected by the National Cancer Registration and Analysis Service (NCRAS) in Public Health England. The Office for National Statistics (ONS) collects the mortality data used in this bulletin. The ONS works with PHE to quality-assure the outputs. The ONS independently produces the bulletin based on the cancer registrations data provided by PHE, including determining the focus, content, commentary, illustration and interpretation of the analysis presented.

To ensure timely and accurate data delivery, the ONS and PHE have agreed on what data we expect and require from PHE, 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

This bulletin reports on newly-diagnosed malignant primary neoplasms (cancer tumours) registered in the 2017 calendar year and does not include secondary tumours.

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. Therefore, published figures for 2017 are likely to increase in future publications when late registrations are included. Refreshed data for 2013 to 2016 are shown in our time series (covering 1995 to 2017) in the datasets. Section 11 contains further details on how the data are processed and refreshed.

It is important to note the following about the cancer registrations included in this analysis:

- only malignant neoplasms (cancers as described by the [World Health Organisation](#) (WHO) International Classification of Diseases: ICD-10 codes C00 to C97 excluding C44) have been included in this bulletin, however, the datasets contain certain in-situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behaviour for completeness

- incident cases of cancer are counted for each separate primary tumour; one person may be diagnosed with more than one primary tumour and would then appear twice in the incidence statistics; secondary tumours and recurrences of a previous cancer are not counted as new incident cases

- unless stated otherwise, analysis in this bulletin excludes cancer registrations of non-melanoma skin cancer (NMSC); this is common practice in cancer analysis due to the unreliability in estimates caused by variation in policies and practices for the recording of NMSC (see Section 11 for more detail)

- the published 2017 data have been estimated as 98.5% complete and there are likely to be late registrations provided after this publication (see Section 11 for more detail); due to refreshes to the historic data and differences in the level of completeness, care should be taken when making comparisons between the historic and latest available data; the published figures for 2017 are likely to increase in future publications (when late registrations are included)

4 . Cancer diagnoses continue to increase

In 2017, there was a continued increase in the numbers of cancer diagnoses in England from 303,135 in 2016 ([as published in 2018](#)) to 305,683 new cancer diagnoses (excluding diagnoses for non-melanoma skin cancers).

As in previous years, more cancers were diagnosed in males (156,444) than females (149,239).

Just over half (52.6%) of all diagnoses were either breast (female only), prostate, lung or colorectal cancer, this remains the same as last year (Figure 1).

Figure 1: Explore cancer diagnoses by site

The number of cancer diagnoses by site registered in England, 2017

[Download the data](#)

Figure 1 groups cancers by site with further breakdowns available when clicking on the site heading. Breast cancer was the most common cancer diagnosed in 2017, with 46,109 cases diagnosed; 45,790 of which were diagnosed in females.

Figure 2: Breast and prostate are the two most common cancers

The number of cancer diagnoses by site registered in England, 2017

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The number of cancer diagnoses by site registered in England, 2017
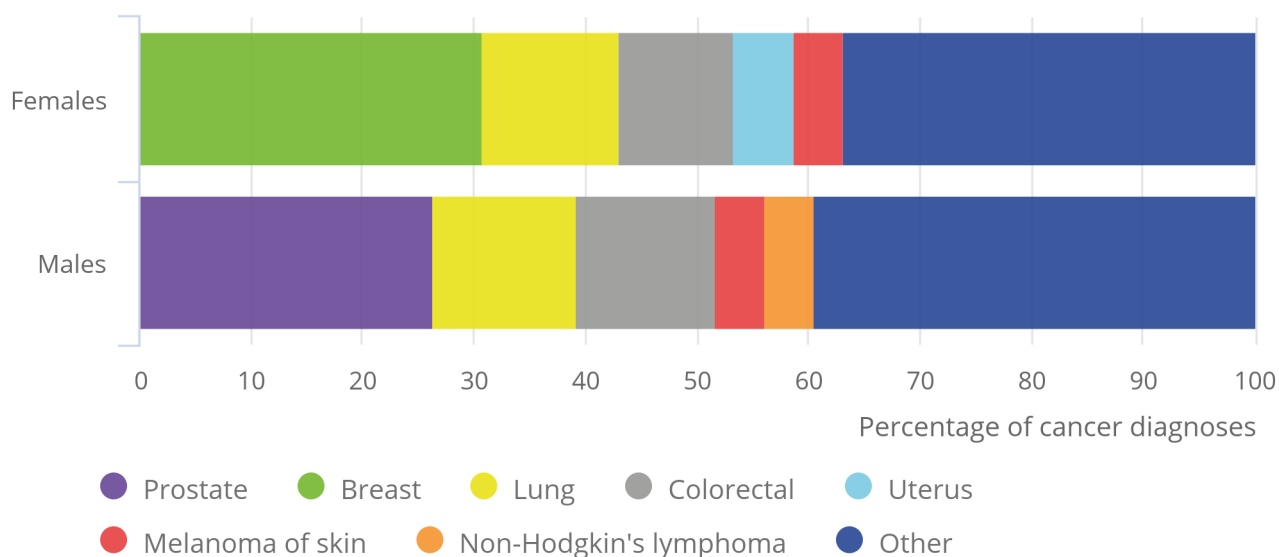
Source: Public Health England – National Cancer Registration and Analysis Service, Office for National Statistics

Notes:

1. Non-Hodgkin's lymphoma for females and breast cancer for males are not in the five most common cancers by sex. As such they are included within all other cancers.

The five most common cancers for males and females comprise the majority of all cancers diagnosed to males (60.5%) and females (63.3%) (Figure 2).

Prostate cancer continues to be the most common cancer diagnosed in males in 2017 with 41,201 cases diagnosed, which accounted for one in four (26.3%) male cancer diagnoses.

Lung, colorectal and melanoma of the skin remain common cancers for both males and females. Cancer of the uterus is also a common cancer in females accounting for 7,862 diagnoses whilst non-Hodgkin's lymphoma for males accounts for 6,654 diagnoses.

5 . Similar pattern in age-standardised incidence rates

Over the last decade, the age-standardised cancer incidence rate for females has increased from 531.6 per 100,000 in 2008 to 538.0 in 2017. In contrast, for males, cancer incidence has decreased from 678.6 per 100,000 in 2008 to 655.7 in 2017.

The cancer incidence rate has decreased for both males and females when comparing with 2013. For more information on age-standardised incidence rates please refer to the datasets.

6 . The three most common cancers vary by sex and age group

Figures 3 and 4 show how the most common cancers in England vary by sex and the age groups that are used to produce the cancer survival statistical bulletins. For instance:
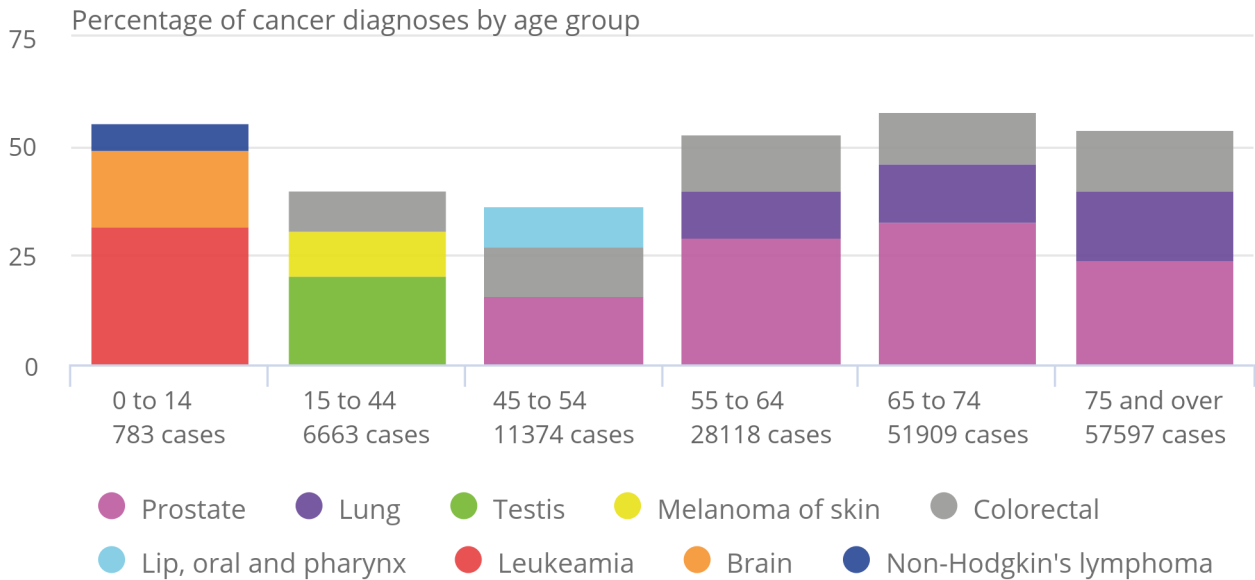
- the most common cancers diagnosed in children (aged 0 to 14 years) were leukaemia, brain, non-Hodgkin's lymphoma (males) and kidney (females); these cancers accounted for over half (56.4%) of the 1,459 cancer diagnoses of children in England

- in those aged 15 to 44 years, 5,290 more females (11,953) were diagnosed with cancer than males (6,663)

- for males aged 15 to 44 years, testicular cancer was the most common cancer with 1,369 cases; for females, breast cancer was the most common cancer with 4,221 diagnoses

- for males aged 45 years and over, prostate cancer was the most common cancer, peaking at 32.8% of all cancers in the 65 to 74 years age group

- for females aged 45 years and over, breast cancer was the most common cancer, which gradually decreased from 50.2% of all cancer cases for women aged 45 to 54 years, to 21.3% of all cancer cases in women aged 75 years and over

Figure 3: Prostate cancer is the most common cancer for adult males, except in young adults where testicular is most common

The three most common cancers for males by age group, England, 2017

Figure 3: Prostate cancer is the most common cancer for adult males, except in young adults where testicular is most common

The three most common cancers for males by age group, England, 2017

Percentage of cancer diagnoses by age group

Age group	Cases
0 to 14	783 cases
15 to 44	6663 cases
45 to 54	11374 cases
55 to 64	28118 cases
65 to 74	51909 cases
75 and over	57597 cases

Legend: Prostate, Lung, Testis, Melanoma of skin, Colorectal, Lip, oral and pharynx, Leukeamia, Brain, Non-Hodgkin's lymphoma
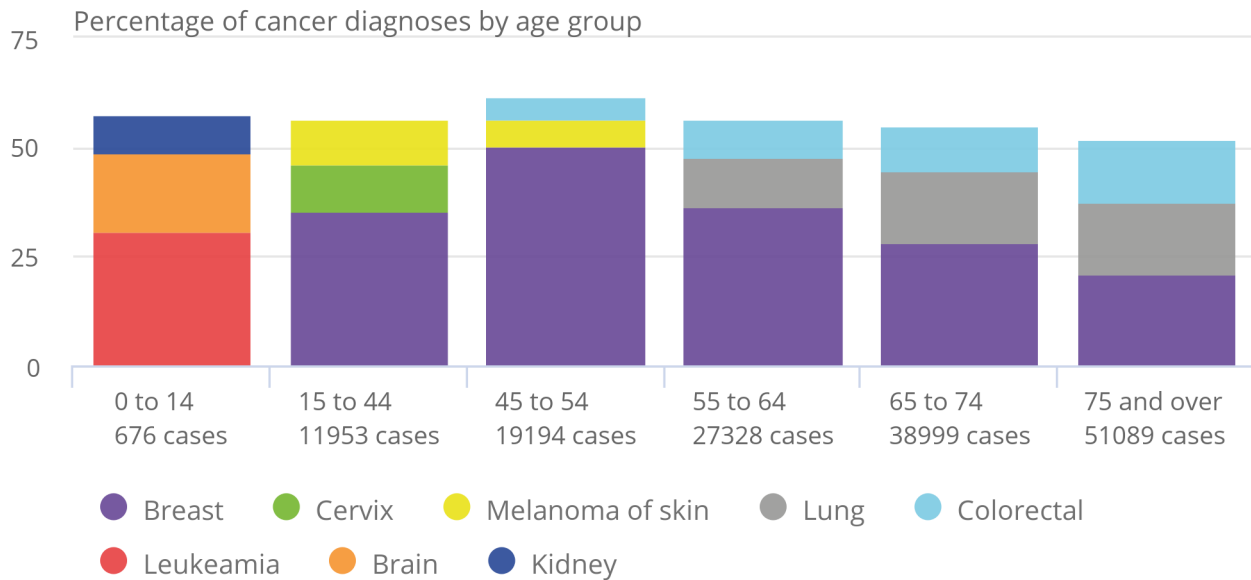
Source: Public Health England – National Cancer Registration and Analysis Service, Office for National Statistics

Figure 4: Breast is the most common cancer for adult females

The three most common cancers for females by age group, England, 2017

Percentage of cancer diagnoses by age group

Age group	Cases
0 to 14	676 cases
15 to 44	11953 cases
45 to 54	19194 cases
55 to 64	27328 cases
65 to 74	38999 cases
75 and over	51089 cases

Legend: Breast, Cervix, Melanoma of skin, Lung, Colorectal, Leukeamia, Brain, Kidney

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

7 . Cancer incidence varies by region of England

For all cancers diagnosed in 2017, there was geographical variation in the age-sex-standardised rate of cancer incidence across England. The North East had the highest rate of cancer incidence at 646.1 patients diagnosed per 100,000 people, whilst London had the lowest rate at 567.6 patients diagnosed per 100,000 people.

In Figure 5, age-sex-standardised incidence rates vary across cancer site by region. In 2017, the highest rate of lung cancer registrations occurred in the North East with 107.9 per 100,000 people, compared with the lowest in the South East with 65.2 per 100,000 people.

Other specific cancer sites whose regional cancer incidence rates varied across England include: oesophagus, stomach, melanoma of the skin and cervical cancer.

Figure 5: Explore regional cancer diagnoses by site

Age-sex-standardised cancer incidence rates by region of England in 2017

8 . The rate of people dying from cancer in England has decreased

The number of males dying from cancer has slightly increased from 72,091 in 2016 to 72,678 in 2017. In contrast, the number of females dying from cancer has slightly decreased from 63,684 in 2016 to 63,207 in 2017.

For males, despite an increase in the number of deaths, the age-standardised mortality rate from cancer has decreased from 323.7 per 100,000 in 2016 to 318.9 in 2017. Similarly, for females, the rate of deaths from cancer has decreased from 226.6 per 100,000 to 221.2 between 2016 and 2017.

Despite this decrease in mortality rates from cancer, in 2017 lung cancer remained the fifth most common cause of death in England and Wales. When looking at male causes of death, lung cancer was the third most common cause accounting for 6.2% of all male deaths. This is supported by the National Statistics on cancer survival in England estimates, which showed that lung cancer had some of the lowest 1- and 5-year net survival estimates compared with other common cancers.

Table 1: Age-standardised mortality and incidence rates per 100,000 for the four most common cancers in males and females, England, 2008 and 2017

Description	Sex	2008		2017	
		Mortality rate	Incidence rate	Mortality rate	Incidence rate
Breast cancer	Females	39.9	165.5	33.3	166.7
Prostate cancer	Males	51.1	170.3	47.7	173.1
Lung cancer	Males	84.1	100.2	65.8	86.9
Lung cancer	Females	49.5	61.5	46.1	67.0
Colorectal cancer	Males	38.0	93.2	32.9	81.9
Colorectal cancer	Females	23.3	58.7	20.8	54.9

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

The three most common cancers for females in 2017 were breast, lung and colorectal cancer. Between 2008 and 2017, the incidence rates have increased for breast and lung cancer but decreased for colorectal cancer. The mortality rates per 100,000 of all three of these cancers have decreased in the last decade, as seen in Table 1.

The three cancers with the highest incidence rates per 100,000 in 2017 for males were prostate, lung and colorectal cancer. The incidence rates have increased between 2008 and 2017 for prostate cancer but have decreased for both lung and colorectal cancer. Following the same trend for females, Table 1 illustrates that the mortality rates for all three of these cancers have decreased in the last decade.

These decreases in mortality have occurred despite some increases in the incidence, which suggests that more patients may be living longer following a diagnosis of breast, prostate and female lung cancer.
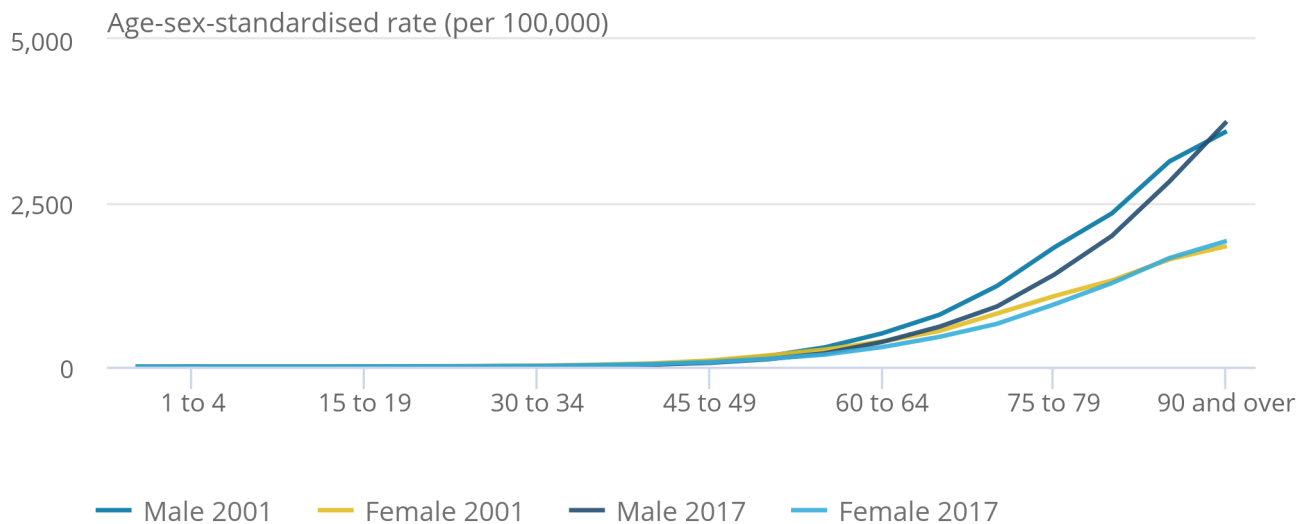
9 . Deaths from cancer increase with age

Figure 6: Deaths from cancer increase with age

Mortality rates from cancer, by age group for males and females, England, 2001 and 2017

Figure 6: Deaths from cancer increase with age

Mortality rates from cancer, by age group for males and females, England, 2001 and 2017

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

Figure 6 shows that the mortality rate for cancer increases with age and mortality rates were higher for males than females in 2001 and 2017 in most ages. The biggest gap between males and females in 2017 was in the over 90 years age group where the mortality rate was 3,744.7 per 100,000 for males and 1,921.3 for females.

For all age groups above 10 to 14 years, the mortality rate was higher in 2001 than in 2017, except for males over 90 years and females over 85 years.

Among females aged 85 to 89 years, there were 20.0 more deaths per 100,000 in 2017 than in 2001 and in females over 90 years there were 79.5 more deaths per 100,000 in 2017 compared with 2001.

The mortality rate for males over 90 years also increased over time with the rate in 2001 being 148.0 per 100,000 lower than in 2017. This trend may be due to more people living past 90 years of age.

10 . Reported measures

Cancer incidence rate

The number of new cancer registrations in a specific population during a particular time period per 100,000 people. This is calculated using the following equation:

Cancer incidence rate equals (total number of cancer registrations divided by total population) multiplied by 100,000.

A cancer incidence rate can be calculated for specific age groups; this is referred to as an age-specific cancer incidence rate. We calculate incidence rates for International Classification of Diseases: ICD-10 codes C00 to C97 and D00 to D48 (excluding D04, D10 to D31, D34 to D35.1, and D35.5 to D36), all of which can be found in the associated datasets.

Age-standardised cancer incidence rate

A weighted average of the age-specific cancer incidence rates, the weights used are age-specific proportions of a standardised population European Standard Population 2013 (ESP 2013). By standardising cancer incidence rates with the ESP, geographical and time comparisons can be made, as the differing age structure of a particular population has been accounted for. Age-sex-standardised rates have been used to standardise the population for an even gender split in addition to using the ESP structure.

11 . Cancer registration data

Data collection

Cancer registration is the systematic collection of data about cancer and tumour diseases. In England, this data collection is managed by the National Cancer Registration and Analysis Service (NCRAS) in Public Health England. Every year, the NCRAS collects information on over 300,000 cases of cancer, including patient details, as well as detailed data about the type of cancer, how advanced it is and the treatment the patient receives.

Data are submitted to the NCRAS from a range of healthcare providers and other services (for example, histopathology and haematology services, radiotherapy departments, screening services, general practitioners and so on). By obtaining data from multiple sources and then matching and merging them as required, the NCRAS can build a complete picture of the incidence of cancer in England, as well as understanding how cancer patients are diagnosed, treated and their outcomes. As the data come from different sources, the data are validated and processed to ensure the quality and accuracy of the data are consistent and to a high standard.

The NCRAS collate and validate all the data for each patient including carrying out quality assurance checks, which have, from registration year 2016, completely transferred from the Office for National Statistics (ONS). Once all the expected records for any one incidence year have been received and validated, the NCRAS take a snapshot of the dataset, which provides a single, consistent source of cancer registrations.

Cancer incidence tables for this release were created from a snapshot taken in February 2019 for the period January to December 2017. It is important to understand that the snapshot of cancer registration data will vary year-on-year due to the dynamic nature of the registration data.

The collected cancer data are dynamic in a number of ways, such as:

- new cancer cases will be registered; this can include new "late" registrations, where a case is registered after the ONS has published for a particular year

- cancer records can be amended: for example, the site code of a record would be modified if later, more accurate information became available

- cancer records can be cancelled, although this is unusual

We receive a subset of registration data from the NCRAS, which once we have carried out a series of final validation and quality assurance checks, enables us to publish the numbers and rates of all types of cancer by age, sex and region of residence in this National Statistic release.

The final checks run by the ONS include the compatibility of the cancer site and the associated histology and are closely based on those promoted by the International Agency for Research on Cancer.

Taking a new snapshot of the NCRAS dynamic database usually results in a difference between what was previously published and what is published from this latest snapshot dataset. The balance between ensuring completeness of the data but publishing cancer incidence figures in a timely manner is a necessary compromise.

For this release, we have published refreshed data back to the start of 2013, where previously we have included updated records from 1995 onwards. As we would expect, there are fewer changes or additional diagnoses added each year, due to late registration, the further back you go. Given the small number of changes taking place after five years, we have focused on updating from 2013 onwards.

The gap between the diagnosis counts that were first published for a registration year and the most recent cancer incidence figures has varied considerably over time, as shown in Figure 7. Over the 44-year period reported, differences between what has previously been published and the current number of registrations (refreshed in 2019) for each year average less than 5%.

Figure 7: Since 2013, the number of late registrations have been small

Number of neoplasm registrations previously published in the annual report and currently on the ONS National Cancer Registry database, England, 1971 to 2016

Figure 7: Since 2013, the number of late registrations have been small

Number of neoplasm registrations previously published in the annual report and currently on the ONS National Cancer Registry database, England, 1971 to 2016

Number of neoplasm registrations

Legend: Previously published — Frozen data — Frozen data by 2018 — Refreshed by 2019
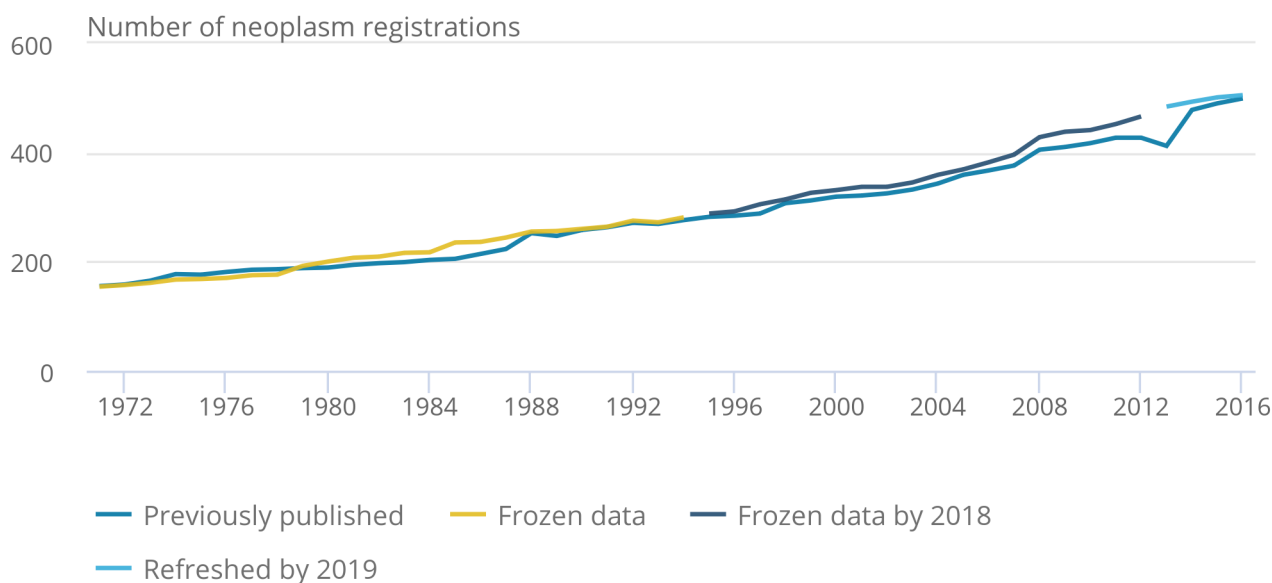
Source: Public Health England – National Cancer Registration and Analysis Service, Office for National Statistics

Notes:

1. Figures for 1971 to 1994 have been extracted from the "frozen" historical dataset.

2. The published figures for 1971 to 1978 correspond to all malignancies, not all registrations. From 1979 the numbers refer to all malignant and benign cancer registrations including non-melanoma skin cancer (C44).

3. Successful work has been completed to code a backlog of cases for non-melanoma skin cancer (C44) since 2013, which will show an increase in the published data in 2014.

4. Figures for 2013 to 2016 were refreshed by February 2019, whereas figures for 1995 to 2011 were frozen in January 2018. Previously published figures are taken from the corresponding cancer registration report.

Data quality

The figures for numbers and rates of "all cancers" in this release refer to all malignant neoplasms (International Classification of Diseases: ICD-10 C00 to C97), excluding non-melanoma skin cancer (ICD-10 C44). Although non-melanoma skin cancer (NMSC) is very common, the available figures are known to be underestimates and unreliable for comparison purposes. This is because the policies and practices for the recording of NMSC have varied among the cancer registries. Although the numbers of newly-diagnosed cases of NMSC are reported within the accompanying datasets, NMSC registrations have been excluded from the figures for "all cancers" in this publication.

Known data quality matters this year:

- any regional differences in benign, uncertain and unknown neoplasms should be interpreted with caution; there is known historic variation in the way cancer registries recorded these tumours across the country and they do not receive as much analytical attention and scrutiny as the invasive cancers

- the last five years of cancer registrations are more likely to be subject to change as we refresh the dataset in future publications, as most changes will occur within the latest five years; any commentary based on these last few years is less reliable as we estimate (based on 2014 to 2016) it to be only 98.5% complete and commentaries relating to less than the last five years are meant as current observations of the data and should not be taken as long-term estimates on cancer trends

- approximately 80% of cause of death coding is complete by the IRIS (version 2013) software package; it was identified that IRIS was incorrectly coding "squamous cell carcinoma"; following discussions with topic experts, it was agreed that "squamous cell carcinoma" should be coded to ICD-10 C44, which has resulted in an increase in deaths coded to C44 in 2016

Further details about the cancer registration data can be found in the Cancer registration statistics Quality and Methodology Information report and in previous annual publications.

12 . Policy context

Users of cancer registration statistics include government organisations, health policy-makers, cancer charities, academics and researchers, cancer registries, the general public and the media.

Cancer registration statistics are used to:

- provide an evidence base to inform cancer policy and programmes, and allow policy-makers to measure the occurrence of cancer within the population in England; cancer incidence data are used alongside cancer prevalence, mortality and survival to determine the overall burden of cancer

- inform cancer research

- feed into cancer information leaflets, web pages and campaigns to raise cancer awareness

- produce National Statistics on cancer survival (in conjunction with mortality data), which is used to support policy on prevention and treatment, and to monitor a number of performance indicators for the healthcare system; the indicators set for the NHS Outcomes Framework include 1-year and 5-year cancer survival for all cancers combined and separately for colorectal, breast and lung cancer

- brief Parliamentary ministers and respond to Parliamentary questions

- provide bespoke, aggregated tables in response to customer enquiries

Linked to the need for information on the stage of cancer diagnosis, the National Cancer Registration and Analysis Service (NCRAS) in Public Health England published the Cancer Outcomes: Stage at Diagnosis February 2019 release. That release contained the proportion of emergency presentations of cancer and the proportion of cancers diagnosed at early stage for 10 cancer sites combined, in each quarter for 2017. In this series, early stage is defined as stage one or stage two cancer, as opposed to stage three, stage four, or unknown stage at diagnosis.

13 . Links to related statistics

Other statistics related to cancer are available:

- if you are interested in adult cancer survival, split out by stage of diagnosis please refer to Cancer survival in England statistical bulletins

- if you are interested in childhood cancer survival please refer to Cancer survival in England – childhood

- if you are interested in trends in 1- and 5-year cancer survival by NHS Region, Cancer Alliance, Sustainability and Transformation Partnerships please refer to Geographic patterns of cancer survival in England statistical bulletins

- if you are interested in cancer survival by Cancer Alliance, Sustainability and Transformation Partnerships and Clinical Commissioning Groups please refer to Index of cancer survival for Clinical Commissioning Groups in England.

Cancer incidence statistics across the UK can be accessed from the following individual cancer registries:

Welsh Cancer Intelligence Surveillance Unit
wcu.stats@wales.nhs.uk

Scottish Cancer Registry
nss.isdcancerstats@nhs.net

Northern Ireland Cancer Registry
nicr@qub.ac.uk

PHE, the ONS and the cancer registries (including the National Cancer Registry Ireland, along with specialist registries and cancer charities) are members of the UK and Ireland Association of Cancer Registries (UKIACR), which aims to promote and develop cancer registration in England, Wales, Scotland, the Republic of Ireland and Northern Ireland.

The UKIACR specifically provides a:

- focus for national initiatives in cancer registration

- coherent voice for representation of cancer registries in the UK and Ireland

- channel for liaison between registries and for agreeing policy on matters connected with cancer registration

- framework to facilitate the operation of special-interest groups and regional registries

- means of stimulating the development of cancer registration, information procedures and practices, and research based on cancer registry data

UK-wide statistics on cancer incidence can also be accessed through [Cancer Research UK](#).

14 . Quality and methodology

The [Cancer Registration Statistics 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

The age-standardised rates in this release are expressed per 100,000 population and are standardised to the [European Standard Population 2013](#) (ESP 2013). They are standardised to allow for more robust comparisons between males and females, years and geographical areas. Previously published rates for 1995 to 2011, based on ESP 1976, have been recalculated using the ESP 2013. Rates will therefore differ from those previously published. More information is available in [The impact of using 2013 European Standard Population to calculate mortality and cancer incidence rates](#).

Cancer incidence rates are based on the latest mid-year population estimates for the reference year at the time of publication.

By most common, we mean the cancer sites with the greatest number of cases registered per year. Furthermore, we look at only cancers, which are coded in the [International Statistical Classification of Diseases 10th Revision (PDF, 2.1MB)](#) (ICD-10) as C00 to C97, excluding C44 (non-melanoma skin cancer) and therefore exclude non-malignant codes D00 to D48.

In common with cancer registries in other countries, 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. The figure of 98.5% is an estimate of completeness based on the figures published for three previous years' data (2014 to 2016), compared with the number of late registrations subsequently received for these years in the refreshed time series, from 2013 to 2016, published in 2019. It is therefore the difference between what figures have been published in all Office for National Statistics (ONS) cancer incidence publications within a given reporting year, versus late registrations received after the publication date cut-off and updated in a subsequent year. It is not an estimate of the number of cancers that never get recorded.

The cancer registries follow agreed procedures when submitting data. These are summarised by three levels of quality status, where levels one and two can be included in tables. It is a requirement that when a registry's data for a particular year are complete, no more than 0.5% of records should have a quality recorded as Status 3 and over the past 15 years the proportion of records with serious errors has consistently been 0.1% or less. The quality status of all the records on the ONS cancer registration database from 1971 to 2017 is shown in Table 10 of the datasets associated with this publication.

Bespoke tabulations of cancer data for England can be requested (subject to legal frameworks, disclosure control, resources and agreement of costs, where appropriate). Such enquiries should be made to the Cancer Analysis Team via email at cancer.newport@ons.gov.uk.

For other data requests, we may have to refer enquires to the Office of Data Release (ODR) within Public Health England, as well as details about the mortality information at [Mortality statistics in England and Wales QMI](#).

Details of [the policy governing the release of new data](#) are available from the [UK Statistics Authority](#).

15 . Acknowledgements