


CANCER INCIDENCE IN  
WALES, 2002 – 2018  
TECHNICAL GUIDE



This document is part of the Cancer Incidence in Wales, 2002 to 2018 Official Statistics publication.

The full publication is available at: <http://www.phw.nhs.wales/services-and-teams/welsh-cancer-intelligence-and-surveillance-unit-wcisu/cancer-incidence-in-wales-2002-2018>

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Date: March 2021

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# Contents

1. Introduction .....	3
2. Methodology .....	3
2.1 Overview .....	3
2.2 Reported characteristics .....	4
2.2.1 Geographical area .....	4
2.2.2 Area deprivation .....	5
2.2.3 Staging .....	5
2.3 Reported measures .....	6
2.3.1 Count .....	6
2.3.2 Crude rates .....	6
2.3.3 Age-standardised rates .....	6
2.3.4 Proportions .....	7
2.3.5 Confidence intervals .....	8
2.3.6 Populations .....	9
3. Relevance .....	9
4. Accuracy .....	10
5. Timeliness and punctuality .....	11
6. Accessibility and clarity .....	11
7. Comparability and coherence .....	12
8. Legislation .....	12
9. Further details .....	14
10. Glossary .....	14
10.1 Abbreviations .....	14
10.2 Definitions .....	15
11. Appendix A – Cancer types map .....	17
12. Appendix B – 2013 European Standard Population .....	18

# 1. Introduction

The Welsh Cancer Intelligence and Surveillance Unit's (WCISU) core function is to discharge one of the statutory duties of Public Health Wales:

- "To undertake the systematic collection, analysis and dissemination of information about the health of the people of Wales, in particular cancer incidence, mortality, and survival..."

Critical to this duty is the continuous compilation of the national cancer registry of Wales and the production of legal annual official statistics on cancer incidence and survival, in addition to reporting on cancer mortality in the resident population of Wales.

The national cancer registry of Wales is a live and dynamic database of cancer incidence data from 1972 onwards, with approximately 20,000 patients diagnosed each year in Wales (excluding non-melanoma skin cancer). WCISU has been responsible for publishing cancer incidence, mortality and survival in Wales since 1997. Prior to this cancer incidence figures were published by the Office for National Statistics for both England and Wales. In 2009, WCISU became part of the Health Intelligence Division of the newly created Public Health Wales (PHW), and more recently, the Health Intelligence Division became part of the new Knowledge Directorate within PHW (1st April 2019).

Historically, official statistics publications by the WCISU have been released in an interactive dashboard, allowing users to make selections based on their requirements. However, there has been a reduced capacity of analysts due to the prioritisation of the response to Covid-19 in PHW. As a result, this particular publication is released in table format in a Microsoft Excel workbook only.

This publication is produced by using a snapshot of the dynamic cancer registration database, which is populated and quality assured with data supplied by multiple data providers from NHS Wales Health Boards and Trusts, NHS Wales Informatics Service, Public Health England, and elsewhere within Public Health Wales, such as its Screening Division.

Our statistics are produced to high professional standards set out in the [Code of Practice](#) for Official Statistics. They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference.

This document provides an overview of the data collection process, data quality and the methodology applied. It also provides definitions, notes for interpretation, and details of where to find further information on cancer statistics in Wales.

## 2. Methodology

### 2.1 Overview

An incident case of cancer is a newly diagnosed case of primary cancer, counted once when the cancer is diagnosed. 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.

This publication reports on malignant primary neoplasms (cancer tumours) diagnosed between 2002 and 2018.

Data are submitted to the WCISU from a range of health care providers and other services (for example, pathology laboratories, multi-disciplinary team meetings, inpatient activity data, radiology, radiotherapy data, death certificates, and other cancer registries in the UK). As the data come from different sources, the quality and accuracy of the data submitted may vary.

The WCISU collate and validate the data for each patient, defined as the cancer registration minimum dataset.

The snapshot of the cancer registration database for this publication was taken in October 2020 for patients diagnosed from the year 2002 to the most current registration year, 2018.

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 publication.

This publication presents cancer incidence by single and three-year rolling periods for men, women and persons from 2002 to 2018 for:

- Wales
- Health Boards
- Local Authorities
- Area deprivation fifths (2016-2018 only)

Counts, crude rates and European age-standardised rates (EASR) are presented for each of the above breakdowns for all Malignancies excluding non-melanoma skin cancer (NMSC), along with 36 other cancer sites.

Cancer incidence by stage at diagnosis is presented from 2011 to 2018 for:

- Wales for men, women and persons by single and three-year rolling periods
- Health Boards for persons by three-year rolling periods

Counts and proportion of cancer diagnosed by stage are presented for the above for 30 cancer sites. Staging analysis for leukaemia and brain & central nervous system cancers are not available due to limited information, with analysis for Hodgkin lymphoma, Non-Hodgkin lymphoma and Myeloma only shown for 2016 onwards due to improvement in staging for these sites in recent years. Consequently, staging analysis for all malignancies excluding NMSC is not provided.

A list of the cancer types, with accompanying ICD-10 codes, used in this publication along with the breakdowns they are available by can be found in [Appendix A](#).

## 2.2 Reported characteristics

### 2.2.1 Geographical area

Analysis presented by geographical area, namely local authority, health board and at an all-Wales level, is based on an individual's area of residence at time of diagnosis.

There are seven health boards within Wales. As of 1st April 2019, these are: Aneurin Bevan University Health Board, Betsi Cadwaladr University Health Board, Cwm Taf Morgannwg University Health Board, Cardiff and Vale University Health Board, Hywel Dda University Health Board, Powys Teaching Health Board and Swansea Bay University Health Board.

Prior to 1st April 2019, the seven health boards were: Abertawe Bro Morgannwg University Health Board, Aneurin Bevan University Health Board, Betsi Cadwaladr University Health Board, Cwm Taf University Health Board, Cardiff and Vale University Health Board, Hywel Dda University Health Board and Powys Teaching Health Board.

On 1st April 2019 the responsibility for healthcare services in Bridgend County Borough Council area transferred to Cwm Taf University Health Board (now renamed Cwm Taf Morgannwg University Health Board) from Abertawe Bro Morgannwg University Health Board (now renamed Swansea Bay University Health Board), with the health board boundary moving accordingly.

As such, the names of the health boards changed to reflect the new geographical boundaries.

All analysis in this publication are reported using the current health board boundaries, including years prior to 1<sup>st</sup> April 2019.

There are 22 local authority areas in Wales. They were established in 1996 and are nested within the health board areas.

### 2.2.2 Area deprivation

Analysis by deprivation is presented by deprivation fifths. The Welsh Index of Multiple Deprivation (WIMD) is the official measure of relative deprivation at small area level in Wales. WIMD is made up of eight separate domains of deprivation: income; employment; health; education; housing; access to services; environment; and community safety.

WIMD is used to give an overall deprivation rank for each of the 1,909 Lower Super Output Areas (LSOA) in Wales and to give ranks for the separate deprivation domains for each of the LSOAs.

Deprivation ranks are calculated for each LSOA in Wales. One area has a higher deprivation rank than another if the proportion of people living there that are classed as deprived is higher. The most deprived area is ranked as one and the least deprived area is ranked as 1,909. WIMD is an ecological measure whereas individuals within an area (LSOA in this instance) may vary. Not everyone living in a deprived area is deprived and not all deprived people live in deprived areas. An area itself is not deprived, it is the circumstances and lifestyle of people who are living there that affects its deprivation ranks.

Each of the eight domains are based on a range of different indicators. The domain indices are weighted and combined into an overall index of multiple deprivation.

The income domain is used for all the WCISU's Official Statistics publication. The deprivation fifths (1 = least deprived; 5 = most deprived) are based on the population, with an equal number of residents in each fifth, rather than equal number of LSOAs in each fifth. This publication uses 2014 mid-year population estimates to assign an equal number of residents in each fifth, with LSOA deprivation ranks from WIMD 2019.

Further details on WIMD can be found [here](#).

### 2.2.3 Staging

Great strides have been made to improve the completeness of cancer staging data, allowing cancer incidence by stage in Wales to be presented from 2011. This publication reports on the counts and proportion of cancers diagnosed at stage 1, stage 2, stage 3, stage 4 and unknown stage for 30 cancer types, by health board and at an all-Wales level.

Stage at diagnosis refers to the size of a tumour and how far it has spread from where it originated. Stage is measured from 1 to 4; stage 1 indicates that the cancer is small and

has not spread anywhere, whereas stage 4 indicates the cancer has spread to at least one other body organ. Stage 1 and stage 2 are usually referred to as early stage, whereas stage 3 and stage 4 are referred to as late stage at diagnosis.

Stage grouping in this report refers to overall TNM stage grouping. From 2018, the majority of cancer types are staged in TNM version 8. Female genital tract also use FIGO staging which can usually be mapped directly to TNM stage.

Cases of cancer recorded on the cancer registry may have an unknown stage for many reasons. Firstly, not all types of cancers can be staged (a minority). Of those cancer sites that can be staged, then the stage at diagnosis may be unknown for some of the following reasons: patients might be too ill or turn down diagnostic tests to allow clinical staging. In addition, there might be insufficient clinical data received to be able to derive cancer registry stage.

## 2.3 Reported measures

### 2.3.1 Count

In this publication, this refers to the number of cancers diagnosed over a particular period of time. 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.

### 2.3.2 Crude rates

A crude rate is the number of events occurring in a population over a specific time period, often expressed as the number of events per 100,000 of the population. Both the numerator (number of events) and denominator (mid-year population estimate) are based on the same geographical area and time period.

The crude rate is defined as total registrations per 100,000 population, or:  
$$\left(\frac{\text{Total registrations}}{\text{Total population}}\right) \times 100,000$$

Crude rates were not calculated where there were fewer than three events.

### 2.3.3 Age-standardised rates

The incidence of cancer varies greatly with age. Differences in the age structure of populations between geographical areas or over time therefore need to be controlled to give unbiased comparisons of incidence. Age-standardisation allows comparison of rates across different populations while taking account of the different age structures of those populations.

This is achieved by applying the observed age- and sex-specific incidence rates for each population to a standard population. These are then summed to give an overall rate per 100,000 population. The standard population used here is the European Standard Population (ESP). The first version of the ESP was introduced in 1976, with the second version in 2013. This publication, along with all the WCISU publications since June 2014 have used the 2013 ESP. Age-standardised rates using differing standard populations are not comparable.

Although the 2013 ESP has separate categories for 90-94 and 95+, the WCISU combines these into a single category for 90+. This is because population data is not consistently available for the 95+ age group for all years or geographies. The Office for National

Statistics (ONS) carried out a study<sup>1</sup> looking at the impact of using an 85+, 90+ or 95+ upper age limit for calculating age-standardised mortality rates and found no significant differences between rates calculated with upper age limits of 90+ and 95+. As there is currently not widespread availability of population estimates for the 95+ group, they recommend the use of an upper age limit of 90+ for the 2013 ESP.

A lower age limit of 0-4 years is used for all European age-standardised rates in this publication. This is in line with the other cancer registries in the UK and Ireland.

Age-standardised rates were not calculated where there were fewer than 10 events.

Thus, the directly standardised incidence rate using the European Standard Population is given by:

$$I (ASR/E) = \{ \sum k ASR_k P_k \} / \sum P_k$$

where  $ASR_k = (r_k/p_k) \times 100,000$  – the observed incidence rate in age group k

$r_k$  = registrations in age group k

$p_k$  = population in age group k

k = 0-4, 5-9, ... , 85-89, and 90 and over

$P_k$  = European standard population in age group k

The 2013 European Standard Population distribution can be found in [Appendix B](#).

### 2.3.4 Proportions

Proportions are calculated when reporting on staging. The sum of all stages should sum to 1 for all cancer sites reported.

Proportions can take values between 0 and 1, and are defined by having

- A numerator in which every individual known to be in the denominator is counted once or not at all.

AND

- A denominator which is exactly defined and known, and in which every individual is counted only once.

In such instances, the denominator is considered to be a 'closed' population.

Analysis by staging are displayed as percentages in the output, with proportions simply multiplied by 100 to convert to percentage.

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1. Office for National Statistics (ONS): Implementing the 2013 European Standard Population: the impact of selected upper age limits on mortality statistics: available on the [ONS website](#).



### 2.3.5 Confidence intervals

Confidence intervals are produced alongside both EASRs and proportions.

Confidence intervals are indications of the natural variation that would be expected around an estimate and they should be considered when assessing or interpreting an estimate. The size of the confidence interval is dependent on the number of events occurring and the size of the population from which the events came. Generally, estimates based on small numbers of events and small populations are likely to have wider confidence intervals. Conversely, estimates based on large populations are likely to have narrower confidence intervals.

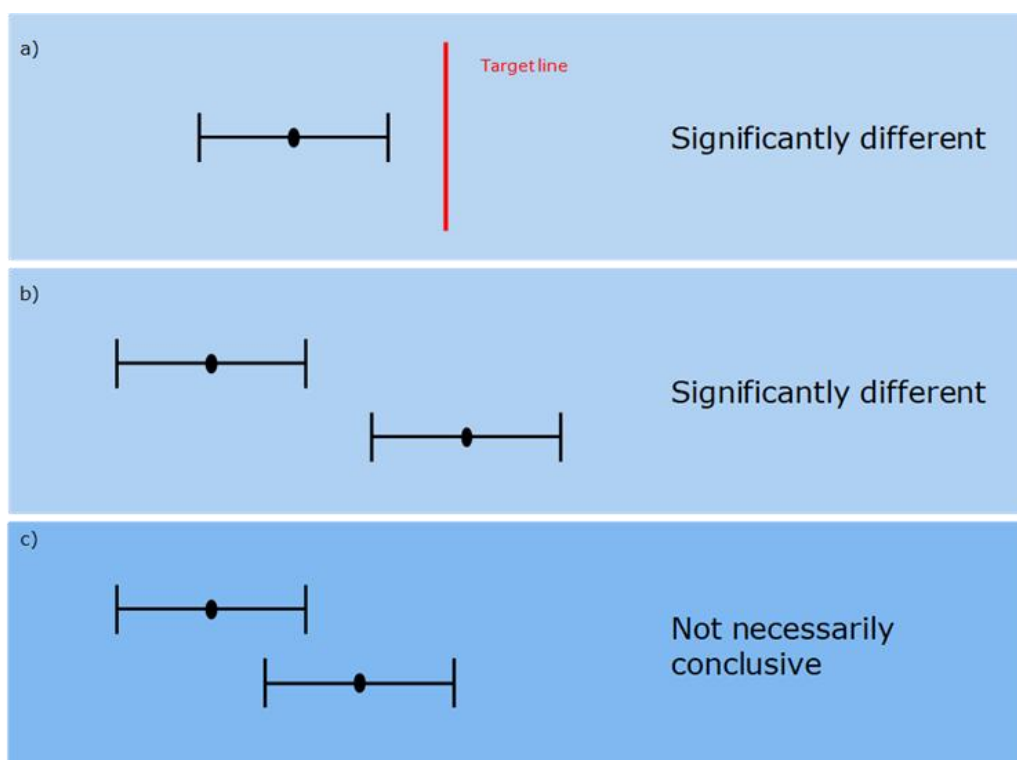
In this publication, we calculate 95 per cent confidence intervals. This represents a range of values that we can be 95 per cent confident contains the 'true' underlying estimate.

Confidence intervals calculated alongside EASRs use the modified gamma distribution method by Tiwari, R.C. et al<sup>1</sup>. This is a modification of the formula for the upper confidence limit of the original confidence intervals for directly standardised rates based on the gamma distribution, as proposed by Fay and Feuer<sup>2</sup>. Confidence intervals are presented alongside proportions using a method proposed by Wilson, E.B. et al<sup>3</sup>.

Comparisons are often made between two or more estimates, for example between different areas or time periods (Figure 1). Sometimes in such cases statistical testing is undertaken by comparing the confidence intervals of the estimates to see if they overlap. Non-overlapping confidence intervals are considered as statistically significantly different (Figures 1a & 1b). Whilst it is safe to assume that non-overlapping confidence intervals indicate a statistically significant difference, it is not always the case that overlapping confidence intervals do not (Figure 1c). A more exact approach is to calculate the ratio of the two estimates, or the difference between them, and construct a test or confidence interval based on that statistic. Such methods are not covered in this technical guide, but can be found in a standard textbook.

Geographical analysis in this publication indicate whether the EASRs is significantly different compared to the Wales rate for the area, cancer site and time period. In this instance, significant difference is indicated by whether the confidence intervals for the particular area overlaps or not with the confidence intervals around the Wales estimate for the cancer site and time period.

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1. Tiwari, Clegg and Zou (2006); Efficient interval estimation for age-adjusted cancer rates; *Statistical Methods in Medical Research* 15: 547-569
  2. Fay and Feuer (1997); Confidence intervals for directly standardized rates: A method based on the gamma distribution; *Statistics in Medicine* 16: 791-801
  3. Wilson, E.B. Probable inference, the law of succession, and statistical inference. *J Am Stat Assoc.* 1927; 22:09-212. Cited in Altman D.G. et al *Statistics with Confidence* (2nd edn). 2000. BMJ Books: UK (page 46)



**Figure 1. Using confidence intervals for making comparisons**

a) & b) Non- overlapping confidence intervals are considered as statistically significant

c) Overlapping confidence intervals do not always indicate a difference that is not statistically significant

### 2.3.6 Populations

ONS mid-year population estimates from the relevant time periods are used as the denominator for rates calculations.

Full guidance on the methodology used by ONS to calculate population estimates can be accessed [here](#).

## 3. Relevance

The release of official statistics by the WCISU is authorised in law by:

- The Pre-release Access to Official Statistics (Wales) Order 2009
- Official Statistics (Wales) Order 2013 made under section 65(7) of the Statistics and Registration Service Act 2007

We believe the key users of statistics regarding cancer incidence are:

- The public and community groups
- NHS Wales as a whole, and Health Boards, Trusts, and the NHS Wales Cancer Implementation Group and Wales Cancer Network, as well as other teams in Public Health Wales and other national and local public bodies
- Professional bodies, clinicians of all disciplines, and policy makers
- Cabinet secretary, Ministers and their civil servants

- Other government departments
- Senedd Members and the Members Research Service
- Third sector and charities
- Media
- Students, academics and universities - to provide valuable reference data for academics and researchers to engage in cancer related research, including the WCISU's direct participation in research collaborations
- The private sector

We encourage users of the statistics to contact us to let us know how they use the data, please see the contact details on page 1 of this document. Acknowledgement to Public Health Wales NHS Trust to be stated if reproducing material in this document or accompanying outputs.

## 4. Accuracy

The registration of cancer cases is a dynamic process in the sense that the database is always open and changing. The database is dynamic in a number of ways:

- new cancer cases will be registered: this can include new "late" registrations, where a case is registered after the cancer registry have published what were thought at the time to be virtually complete results for a particular year
- cancer records can be amended: for example the site code would be modified should later and more accurate information become available
- cancer records can be deleted, although this is relatively unusual

In common with cancer registries in other countries, cancer registrations in Wales 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, amendments and deletions.

Wales implemented a new cancer registration system named CATRIN in 2015. This is the same as the ENCORE system used in Public Health England, which has inbuilt registration validations. This modernisation programme has improved cross border data sharing in particular. The data migration process placed a particular emphasis on reducing duplicate registrations existing in both Wales and England registry databases. A quality assurance and de-duplication exercise was undertaken to rationalise the cancer registrations across the two countries. Therefore, this may reflect in a reduction of incidence.

Cancer registrations comply with a quality assurance framework comprising of a suite of quality checks performed at various time points during the registration year e.g. quarterly and end of year checks. These check the data consistency of the cancer site, sex and associated histology as well as validity checks on dates, for example, to check invalid combinations for behaviour and site/histology; check that the incidence date is not after the date of death. These checks align to those published in 2018 by the European Network of Cancer Registries (ENCR)<sup>1</sup>.

All our outputs include information on coverage, timing and geography.

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<sup>1</sup> <https://www.encreu.eu/sites/default/files/inline-files/Cancer%20Data%20Quality%20Checks%20Procedure%20Report%20online.pdf>

For this output, cancers are coded using ICD-10 from 1st January 2001 to 30th June 2012 and coded using ICD-10v4<sup>2</sup> thereafter. ICD-10 coding for cancer is based on the nature and anatomical site of the cancer.

Once the expected cancer records for any registration year have been validated, a snapshot of the data is taken to ensure that there is a consistent set of data behind the official statistics for a period of 12 months. Subsequent snapshots of data are taken monthly and can be used in further cancer publications, queries and parliamentary questions.

When the WCISU submits registrations for the next reporting year, they can also submit "late registrations" for previous years. If any new "late" registrations for earlier years passed all quality checks, they would be included in the subsequent refreshed dataset. This results in small differences in the underlying number of cancer registrations for previous reports, although these changes are unlikely to have a meaningful impact on cancer incidence.

The snapshot of the cancer registration database for this publication was taken in October 2020.

In the unlikely event of incorrect data being published, revisions would be made and users informed in conjunction with the Code of Practice.

## 5. Timeliness and punctuality

Historically, the WCISU has routinely published data on new cancer diagnoses (incidence) within 18 months of the end of the calendar year. The lapse in time is due to the source data being completed and becoming available, the time taken to process and merge all cancer registrations for those patients resident in Wales into one record for each tumour using the data sources provided to the WCISU, according to strict international rules and guidelines of coding, classification and staging.

This particular publication is delayed further by six months as the WCISU address the backlog of cancer registrations due to the implementation of CATRIN and the registry moving to use the ICDO3 coding classification. In addition, this year both the registration and analysis teams in the WCISU have been further affected by Covid-19 with resources redeployed to support PHW response to the pandemic.

All outputs adhere to the Code of Practice by pre-announcing the date of publication through the upcoming calendar on the Welsh Government [Statistics and research page](#). Furthermore, if publication needs to be postponed this will be announced and the reason for the change fully explained, as set out in the Code of Practice.

## 6. Accessibility and clarity

The statistics will be published in an accessible, orderly, pre-announced manner on the Welsh Cancer Intelligence and Surveillance Unit's website at 9:30am on the day of publication. We also publicise the outputs on Twitter and Facebook and to our stakeholders via email. All outputs are available and free to download.

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<sup>2</sup><http://www.who.int/classifications/icd/en/>

The Official Statistics for "Cancer incidence in Wales, 2002-2018" are sent to a number of individual people on the pre-release list five working days prior to the announcement in accordance with the Pre-publication Official Statistics Order Access (Wales) 2009. The individuals on the pre-release list can be found on the publication webpage.

We aim to use plain English in our outputs and they adhere to the Public Health Wales's accessibility policy. Furthermore, all our statistics are published in Welsh and English. Further information regarding the statistics can be obtained by emailing [WCU.stats@wales.nhs.uk](mailto:WCU.stats@wales.nhs.uk).

## 7. Comparability and coherence

While the WCISU does not hold cancer incidence data about residents in Northern Ireland, Scotland, and England, comparable data can be located from the following:

- [Northern Ireland Cancer Registry](#)
- [Scottish Cancer Registry](#)
- [Office for National Statistics](#)
- [National Cancer Registration and Analysis Service \(NCRAS\), Public Health England](#)

Details of cancer registries in the United Kingdom and Ireland can be found on the [United Kingdom and Ireland Association of Cancer Registries](#) website.

For comparable incidence data the latest international comparisons are available from [Cancer in Five Continents](#).

The WCISU are currently compiling their 2018 UKIACR performance indicators. Further information regarding the data completeness and quality of cancer registry data is detailed in the [UKIACR performance indicators reports](#).

## 8. Legislation

The WCISU adhere to the ENCR cancer guidelines for registering cancer diagnoses in Welsh residents.

Under the Data Protection Act, the lawful processing of patient/service user data for purposes other than that necessary for the direct provision of care requires one of the following conditions to be met:

- Explicit patient/service user consent for processing
- Explicit authorisation by statute
- Approval under Section 251 of the NHS Act 2006

Public Health Wales undertakes a number of activities that cannot be classed as direct care, but where the obtaining explicit consent would be impractical or would compromise the integrity of the relevant activity. Examples include:

- Evaluation of screening programmes
- Cancer registration

- Registration of congenital anomalies

So called 'Section 251' approval, therefore, remains the most appropriate means of ensuring that Public Health Wales complies with the Data Protection Act when undertaking such processing. Such approval needs to be obtained for new activities and renewed annually for existing activities.

Section 251 was established to provide a secure legal basis for the disclosure and processing of confidential information in the NHS where it is not possible to use anonymised information or to obtain explicit consent. A mechanism was established to enable the Secretary of State for Health to exercise powers of approval under Section 251, advised by the National Information Governance Board (NIGB) and its Ethics and Confidentiality Committee (ECC). The mechanisms operated by NIGB and its ECC also applied to Wales.

Under General Data Protection Regulation (GDPR), we follow:

Article 6 (1) e - processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller;

And

Article 9 (2) h - processing is necessary for the purposes of preventive or occupational medicine, for the assessment of the working capacity of the employee, medical diagnosis, the provision of health or social care or treatment or the management of health or social care systems and services on the basis of Union or Member State law or pursuant to contract with a health professional and subject to the conditions and safeguards referred to in paragraph 3.

The key policy on cancer in Wales is set out in the Welsh Government's [Cancer Delivery Plan 2016-2020](#).

The Well-being of Future Generations Act 2015 is about improving the social, economic, environmental and cultural well-being of Wales. The Act puts in place seven well-being goals for Wales. These are for a more equal, prosperous, resilient, healthier and globally responsible Wales, with cohesive communities and a vibrant culture and thriving Welsh language. Under section (10) (1) of the Act, the Welsh Ministers must:

- publish indicators ("national indicators") that must be applied for the purpose of measuring progress towards the achievement of the Well-being goals
- lay a copy of the national indicators before the National Assembly. The 46 national indicators were laid in March 2016

[Information on indicators and associated technical information - How do you measure a nation's progress? - National Indicators](#)

Further information on the [Well-being of Future Generations \(Wales\) Act 2015](#).

The statistics included in this release could also provide supporting narrative to the national indicators and be used by public services boards in relation to their local well-being assessments and local well-being plans.

The WCISU adheres to the United Kingdom and Ireland Association of Cancer Registries (UKIACR) small numbers guidance for cancer incidence; i.e. where a cancer incidence count of less than five is observed in any cell with the population at risk being less than 1,000 then the value is suppressed. WCISU also adheres to the [Office for National Statistics](#) disclosure control guidance for mortality statistics.

## 9. Further details

Cancer incidence is one of three official statistics publications regularly produced by the WCISU. The latest cancer survival publication in Wales can be found here:

<https://phw.nhs.wales/services-and-teams/welsh-cancer-intelligence-and-surveillance-unit-wcisu/cancer-survival-in-wales-1995-2016/>

Whilst the latest cancer mortality in Wales publication can be found here:

<https://phw.nhs.wales/services-and-teams/welsh-cancer-intelligence-and-surveillance-unit-wcisu/cancer-mortality-in-wales-2001-2017/>

## 10. Glossary

### 10.1 Abbreviations

ASR	Age Specific Rate
EASR	European Age Standardised Rate
ECC	Ethics and Confidentiality Committee
ENCR	European Network of Cancer Registries
ESP	European Standard Population
GDPR	General Data Protection Regulation
HB	Health Board
ICD	International Classification of Diseases
LSOA	Lower Super Output Layer
LA	Local Authority
MYE	Mid-year Population Estimates
NMSC	Non-Melanoma Skin Cancer
NIGB	National Information Governance Board
ONS	Office for National Statistics
PHW	Public Health Wales
UKIACR	United Kingdom and Ireland Association of Cancer
WCISU	Welsh Cancer Intelligence and Surveillance Unit
WIMD	Welsh Index of Multiple Deprivation
WG	Welsh Government
WHO	World Health Organisation

## 10.2 Definitions

### Age-standardised rate

- Age-standardisation allows comparison of rates across different populations while taking account of the different age structures of those populations. Failure to take account of differing age structures can be very misleading when comparing rates in different populations.

### Cancer

- For the purposes of cancer registration the term "cancer" includes all malignant neoplasms (tumours that invade into surrounding tissues), which are conditions listed under site code numbers C00 to C97 of ICD-10v4. In addition, all in situ neoplasms (D00 to D09), certain benign neoplasms (D32 to D33, D35.2 to D35.4) and neoplasms of uncertain or unknown behaviour (D37 to D48) are registered but not routinely reported on.

### Confidence Intervals

- Confidence intervals are indications of the natural variation that would be expected around an estimate and they should be considered when assessing or interpreting a rate. The size of the confidence interval is dependent on the number of events occurring and the size of the population from which the events came. Generally speaking, rates based on small numbers of events and small populations are likely to have wider confidence intervals. Conversely, rates based on large populations are likely to have narrower confidence intervals.

### European age-standardised rate (EASR)

- The European age-standardised rate represents the overall rate you would get if the population had the same age-structure as a theoretical standard European population (direct age-standardisation). In order to calculate this we apply the rates which occur in each age band to the new (standard) population structure. The measure only allows for comparison between rates which have been standardised; it is not a proportion or risk of an event occurring and does not, of itself, involve a comparison with rates across Europe. See age-standardised rate for further details.

### Fifths of deprivation

- Geographical areas (LSOAs) are ranked from highest to lowest by deprivation score and then split into five bands of similar size, ranging from least deprived to most deprived fifth.

### Health Board (HB)

- Health Boards are the NHS bodies in Wales responsible for the health of the population within their geographical area. This includes planning, designing, developing and securing the delivery of primary, community, in-hospital care services and specialised services. There are seven health boards.

### Local Authority (LA)

- An organisation that is officially responsible for all the public services and facilities in a particular geographical area. There are 22 LAs in Wales.



### Lower Super Output Area (LSOA)

- Defined geographical area based on Census output areas with an average of 1500 persons per LSOA. There are 1909 LSOAs in Wales, and the number of LSOAs can vary widely between health boards.

### Mid-year estimates

- Annual ONS estimates of the resident population, based on the Census and taking into account population change (births, deaths and migration).

### Public Health Wales NHS Trust

- Public Health Wales was established as an NHS Trust on 1 October 2009. The Trust incorporates the functions and services previously provided by the National Public Health Service for Wales, the Wales Centre for Health, the Welsh Cancer Intelligence and Surveillance Unit and Screening Services Wales.

### Stage

- Stage at diagnosis refers to the size of a tumour and how far it has spread from where it originated. Stage is measured from 1 to 4; stage 1 indicates that the cancer is small and has not spread anywhere, whereas stage 4 indicates the cancer has spread to at least one other body organ. Stage 1 and stage 2 are usually referred to as early stage, whereas stage 3 and stage 4 are referred to as late stage at diagnosis.

### Statistical Significance

- A result may be deemed statistically significant if it is considered unlikely to have occurred by chance alone. The basis for such judgements is a predetermined and arbitrary cut-off, usually taken as 5% or 0.05. In some circumstances this cut-off may be lowered to 1%, for example where there is a greater need for certainty over the safety of a drug or procedure. Statistical significance must not be confused with clinical or other significance. A result may be clinically significant whilst not being statistically significant and vice versa.

### Welsh Index of Multiple Deprivation (WIMD)

- WIMD is a measure of multiple deprivation at lower super output area level. An overall WIMD deprivation score is calculated using eight domains i.e. income, employment, health, education, access to services, housing, physical environment and community safety. The WCISU use the income domain in their Official Statistics publications.

# 11. Appendix A – Cancer types map

Cancer type	ICD-10 site code	Geography	Deprivation	Stage	Counts by age
1 Acute lymphoblastic leukaemia	C910	✓	✓		✓
2 Acute myeloid leukaemia	C920	✓	✓		✓
3 All malignancies excluding NMSC	C00-C97 excluding C44	✓	✓		✓
4 Anus	C21	✓	✓	✓	✓
5 Bladder	C67	✓	✓	✓	✓
6 Bone	C40-C41	✓	✓	✓	✓
7 Brain & central nervous system	C70-C72	✓	✓		✓
8 Breast	C50	✓	✓	✓	✓
9 Cervix	C53	✓	✓	✓	✓
10 Cholangiocarcinoma	C221	✓	✓	✓	✓
11 Chronic lymphocytic leukaemia	C911	✓	✓		✓
12 Chronic myeloid leukaemia	C921	✓	✓		✓
13 Colon	C18	✓	✓	✓	✓
14 Colorectal	C18-C20	✓	✓	✓	✓
15 Head & neck	C00-C14, C30-C32	✓	✓	✓	✓
16 Hepatocellular carcinoma	C220	✓	✓	✓	✓
17 Hodgkin lymphoma	C81	✓	✓	✓	✓
18 Kidney	C64	✓	✓	✓	✓
19 Larynx	C32	✓	✓	✓	✓
20 Leukaemia	C91-C95	✓	✓		✓
21 Liver	C22	✓	✓	✓	✓
22 Lung	C33-C34	✓	✓	✓	✓
23 Melanoma of the skin	C43	✓	✓	✓	✓
24 Mesothelioma	C45	✓	✓	✓	✓
25 Myeloma	C90	✓	✓	✓	✓
26 Non-Hodgkin lymphoma	C82-C86	✓	✓	✓	✓
27 Oesophagus	C15	✓	✓	✓	✓
28 Oral & oropharynx	C00-C06, C10	✓	✓	✓	✓
29 Ovary	C56	✓	✓	✓	✓
30 Pancreas	C25	✓	✓	✓	✓
31 Prostate	C61	✓	✓	✓	✓
32 Rectum	C19-C20	✓	✓	✓	✓
33 Stomach	C16	✓	✓	✓	✓
34 Testis	C62	✓	✓	✓	✓
35 Thyroid & endocrine	C73-C75	✓	✓	✓	✓
36 Urinary tract excluding bladder	C64-C66, C68	✓	✓	✓	✓
37 Uterus	C54	✓	✓	✓	✓

## 12. Appendix B – 2013 European Standard Population

### **Distribution of the 2013 European Standard Population**

<b>Age</b>	<b>Population</b>
0-4	5,000
5-9	5,500
10-14	5,500
15-19	5,500
20-24	6,000
25-29	6,000
30-34	6,500
35-39	7,000
40-44	7,000
45-49	7,000
50-54	7,000
55-59	6,500
60-64	6,000
65-69	5,500
70-74	5,000
75-79	4,000
80-84	2,500
85-89	1,500
90 and over	1,000
<b>Total</b>	<b>100,000</b>

Source: Eurostat