Non-invasive brain tumours

1993-2021

(ICD10 codes: D32-D33, D35.2-D35.4, D42-D43, D44.3-D44.5)

Northern Ireland Cancer Registry, 2024

An official statistics publication

ABOUT THIS REPORT

Contents

This report includes information on incidence of non-invasive brain tumours as recorded by the Northern Ireland Cancer Registry (NICR). Incidence data is available annually from 1993 to 2021, however in order to provide stable and robust figures the majority of information presented in this report is based upon the average number of cases diagnosed in the last five years.

Methodology

The methodology used in producing the statistics presented in this report, including details of data sources, classifications and coding are available in the accompanying methodology report available at: www.qub.ac.uk/research-centres/nicr/CancerInformation/official-statistics.

Official statistics

The incidence, prevalence and survival statistics in this publication are designated as official statistics signifying that they comply with the Code of Practice for Official Statistics. Further information on this code is available at code.statisticsauthority.gov.uk.

Cancer mortality data

The NI Statistics and Research Agency (NISRA) is the official statistics provider of cancer mortality data in Northern Ireland. However, for completeness, data on cancer mortality is also provided in this report. While analysis is conducted by NICR staff, the original data is provided courtesy of the General Register Office (NI) via the Department of Health.

Reuse of information

The information in this report (and any supplementary material) is available for reuse free of charge and without the need to contact NICR. However, we request that NICR is acknowledged as the source of any reused information. The following reference is recommended:
Northern Ireland Cancer Registry 2024. Non-invasive brain tumours: 1993-2021. Available at: www.qub.ac.uk/research-centres/nicr

Further information

Further information is available at: www.qub.ac.uk/research-centres/nicr

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Acknowledgements

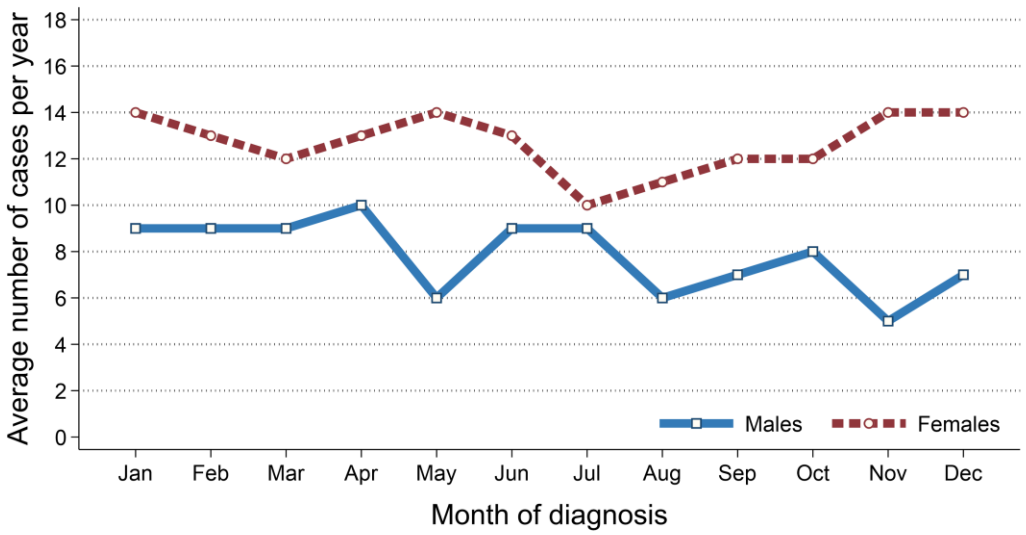
The Northern Ireland Cancer Registry (NICR) uses data provided by patients and collected by the health service as part of their care and support.

NICR is funded by the Public Health Agency and is based in Queen's University, Belfast.

INCIDENCE

- There were 1,234 cases of non-invasive brain tumours diagnosed during 2017-2021 in Northern Ireland. On average this was 247 cases per year.
- During this period 61.3% of non-invasive brain tumour cases were among women (Male cases: 477, Female cases: 757). On average there were 95 male and 151 female cases of non-invasive brain tumours per year.
- The most common diagnosis month during 2017-2021 was April among males with 10 cases per year and January, May, November and December among females with 14 cases per year.

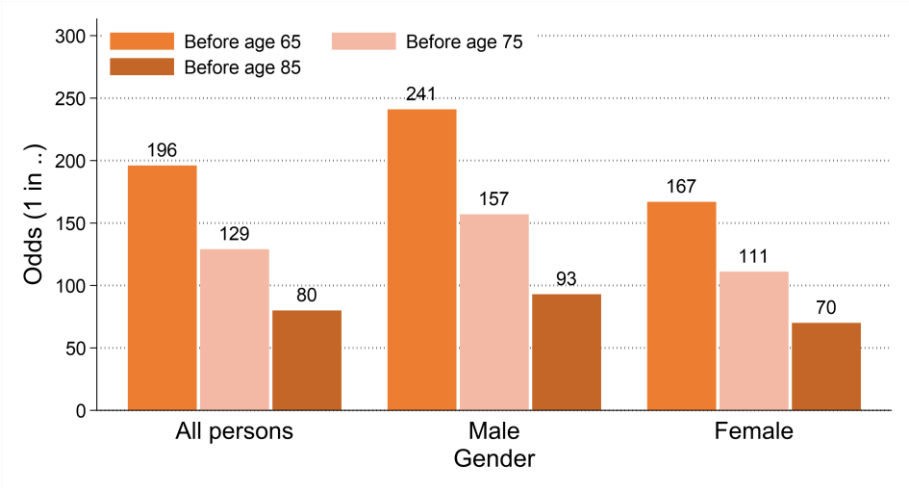
Figure 1: Average number of cases of non-invasive brain tumours per year in 2017-2021 by month of diagnosis



Month of diagnosis	Average number of cases per year	
	Males	Females
January	9	14
February	9	13
March	9	12
April	10	13
May	6	14
June	9	13
July	9	10
August	6	11
September	7	12
October	8	12
November	5	14
December	7	14

- The non-invasive brain tumour incidence rates for each gender were 10.3 cases per 100,000 males and 15.8 cases per 100,000 females.
- The odds of developing a non-invasive brain tumour before age 85 was 1 in 93 for men and 1 in 70 for women.

Figure 2: Odds of developing a non-invasive brain tumour in 2017-2021



INCIDENCE BY AGE

- The median age of patients diagnosed with a non-invasive brain tumour during 2017-2021 was 65 years (Males: 64, Females: 65).
- The risk of developing a non-invasive brain tumour varied by age, with 28.7% of men and 33.3% of women diagnosed with a non-invasive brain tumour aged 75 and over at diagnosis.
- In contrast, 32.8% of patients diagnosed with a non-invasive brain tumour were aged 0 to 54 at diagnosis.

Figure 3: Average number of cases of non-invasive brain tumours diagnosed per year in 2017-2021 by age at diagnosis

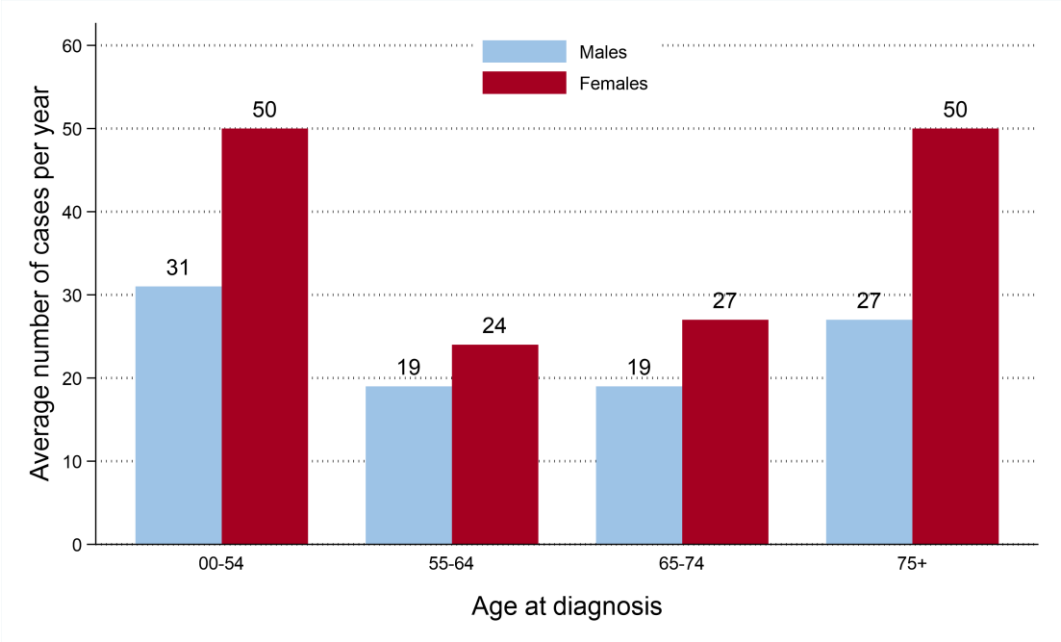
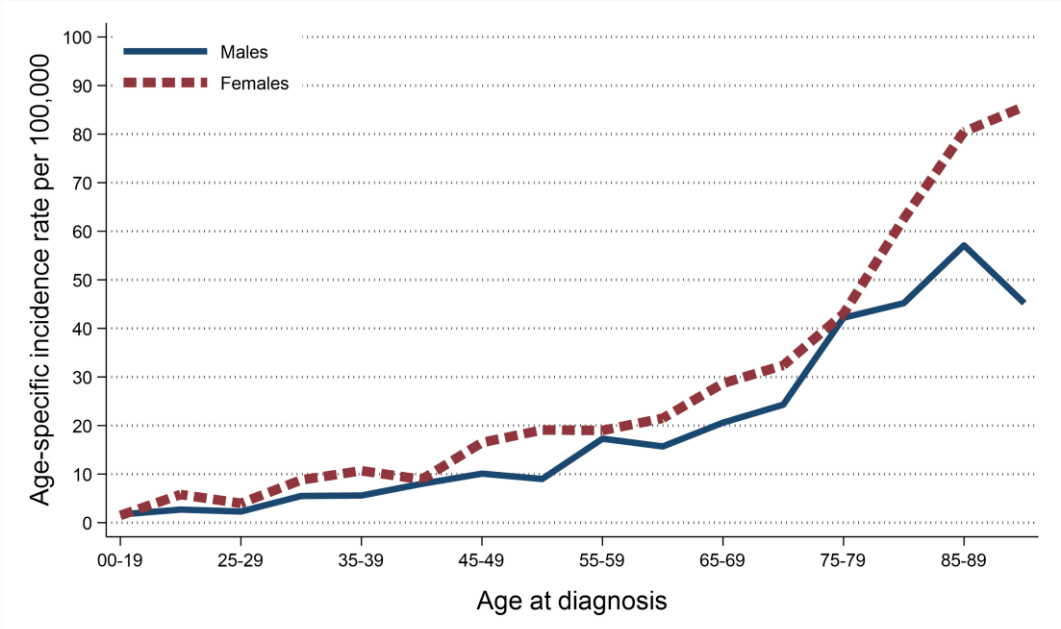


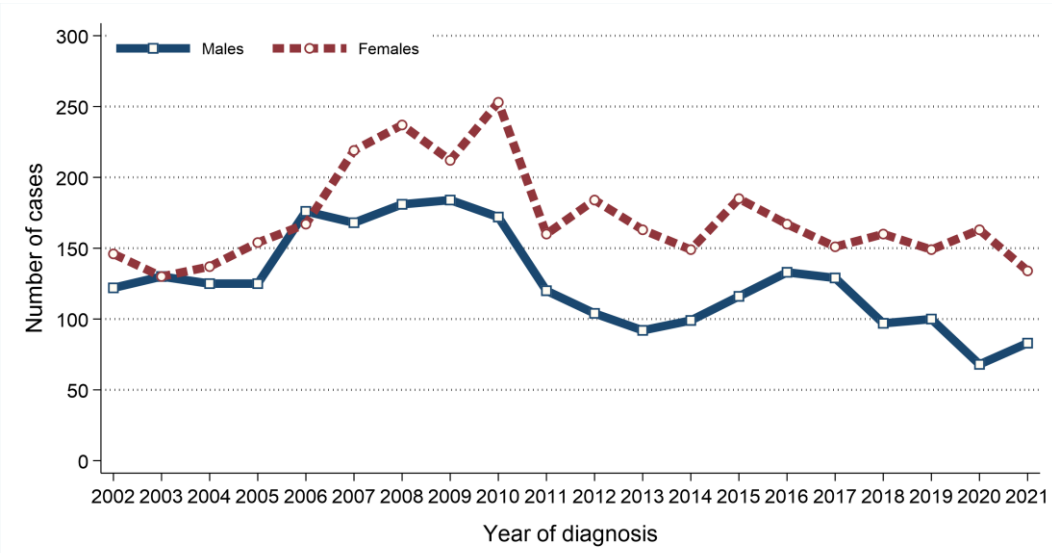
Figure 4: Age-specific incidence rates of non-invasive brain tumours in 2017-2021



INCIDENCE TRENDS

- The number of cases of non-invasive brain tumours among males decreased between 2012-2016 and 2017-2021 by 12.3% from 544 cases (109 cases per year) to 477 cases (95 cases per year).
- The number of cases of non-invasive brain tumours among females decreased between 2012-2016 and 2017-2021 by 10.7% from 848 cases (170 cases per year) to 757 cases (151 cases per year).

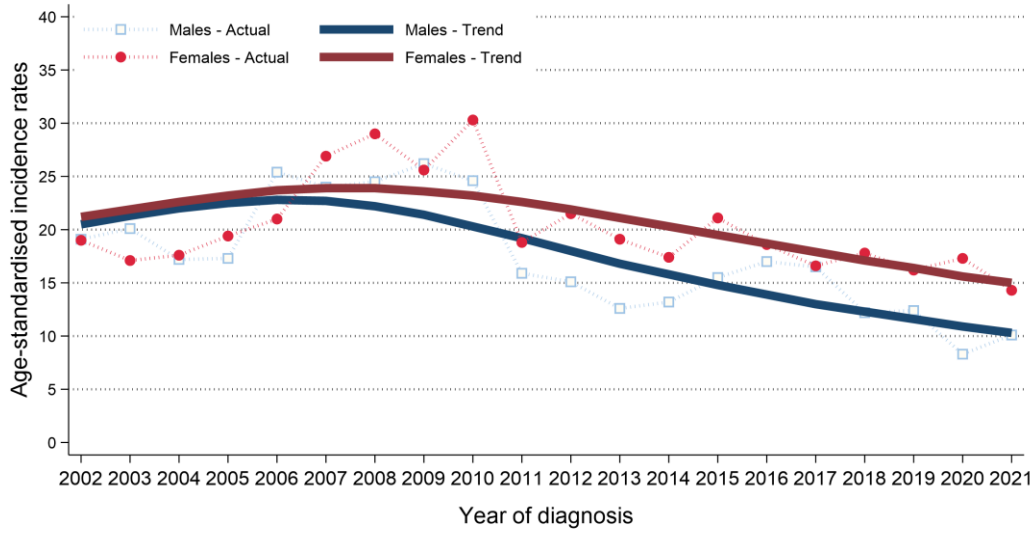
Figure 5: Trends in number of cases of non-invasive brain tumours diagnosed from 2002 to 2021



Year of diagnosis	Number of cases	
	Males	Females
2012	104	184
2013	92	163
2014	99	149
2015	116	185
2016	133	167
2017	129	151
2018	97	160
2019	100	149
2020	68	163
2021	83	134

- Male age-standardised non-invasive brain tumour incidence rates decreased between 2012-2016 and 2017-2021 by 19.0% from 14.7 to 11.9 cases per 100,000 males. This change was statistically significant.
- Female age-standardised non-invasive brain tumour incidence rates decreased between 2012-2016 and 2017-2021 by 15.9% from 19.5 to 16.4 cases per 100,000 females. This change was statistically significant.

Figure 6: Trends in incidence rates of non-invasive brain tumours from 2002 to 2021



Age-standardised incidence rates illustrate the change in the number of cases within a population of a fixed size and age structure (2013 European Standard).

They thus represent changes other than those caused by population growth and/or ageing.

Trends can also be influenced by changes in how cancer is classified and coded. (e.g. the move from ICD-0-2 to ICD-0-3 in 2019).

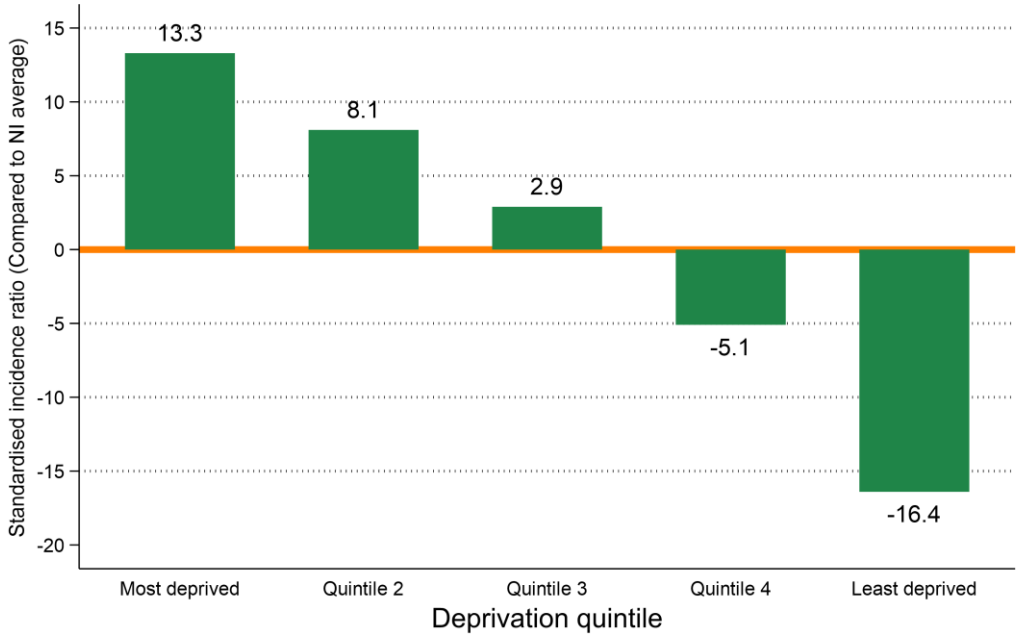
INCIDENCE BY DEPRIVATION

- The number of cases of non-invasive brain tumours diagnosed during 2017-2021 varied in each deprivation quintile due to variations in population size and age.
- After accounting for these factors, incidence rates:
  - in the most socio-economically deprived areas did not vary significantly from the NI average.
  - in the least socio-economically deprived areas were 16.4% lower than the NI average.

Table 1: Number of cases of non-invasive brain tumours diagnosed in 2017-2021 by deprivation quintile

Deprivation quintile	All persons		Male		Female	
	Total cases in period	Average cases per year	Total cases in period	Average cases per year	Total cases in period	Average cases per year
Northern Ireland	**1,234**	**247**	**477**	**95**	**757**	**151**
	.	.	.	.	.	.
Most deprived	237	47	99	20	138	28
Quintile 2	268	54	99	20	169	34
Quintile 3	267	53	99	20	168	34
Quintile 4	248	50	98	20	150	30
Least deprived	214	43	82	16	132	26
Unknown	0	0	0	0	0	0

Figure 7: Standardised incidence ratio comparing deprivation quintile to Northern Ireland for non-invasive brain tumours diagnosed in 2017-2021



Standardised incidence ratios compare incidence rates in each deprivation quintile with the Northern Ireland incidence rate.

A value above 0 means that incidence rates in that deprivation quintile are greater than the NI average.

This measure takes account of population size and age structure. Differences are thus not a result of these factors.

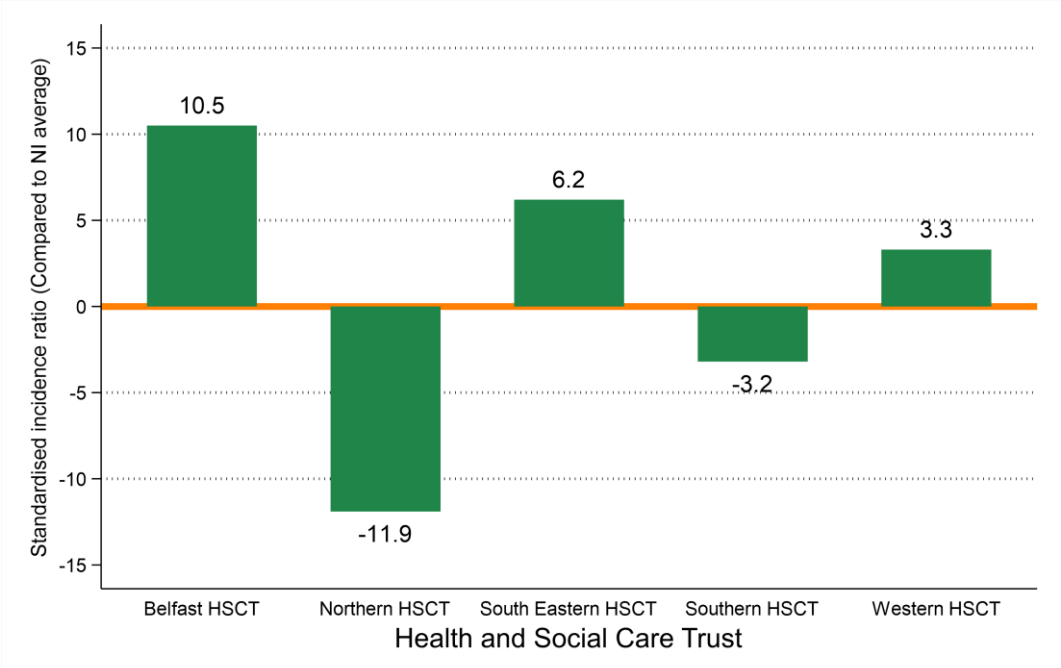
INCIDENCE BY HEALTH AND SOCIAL CARE TRUST

- The number of cases of non-invasive brain tumours diagnosed during 2017-2021 varied in each Health and Social Care Trust due to variations in population size and age.
- After accounting for these factors, incidence rates:
  - in Belfast HSCT did not vary significantly from the NI average.
  - in Northern HSCT were 11.9% lower than the NI average.
  - in South Eastern HSCT did not vary significantly from the NI average.
  - in Southern HSCT did not vary significantly from the NI average.
  - in Western HSCT did not vary significantly from the NI average.

Table 2: Number of cases of non-invasive brain tumours diagnosed in 2017-2021 by Health and Social Care Trust

Health and Social Care Trust	All persons		Male		Female	
	Total cases in period	Average cases per year	Total cases in period	Average cases per year	Total cases in period	Average cases per year
Northern Ireland	**1,234**	**247**	**477**	**95**	**757**	**151**
	.	.	.	.	.	.
Belfast HSCT	253	51	99	20	154	31
Northern HSCT	285	57	119	24	166	33
South Eastern HSCT	268	54	97	19	171	34
Southern HSCT	229	46	78	16	151	30
Western HSCT	199	40	84	17	115	23
Unknown	0	0	0	0	0	0

Figure 8: Standardised incidence ratio comparing Health and Social Care Trust to Northern Ireland for non-invasive brain tumours diagnosed in 2017-2021



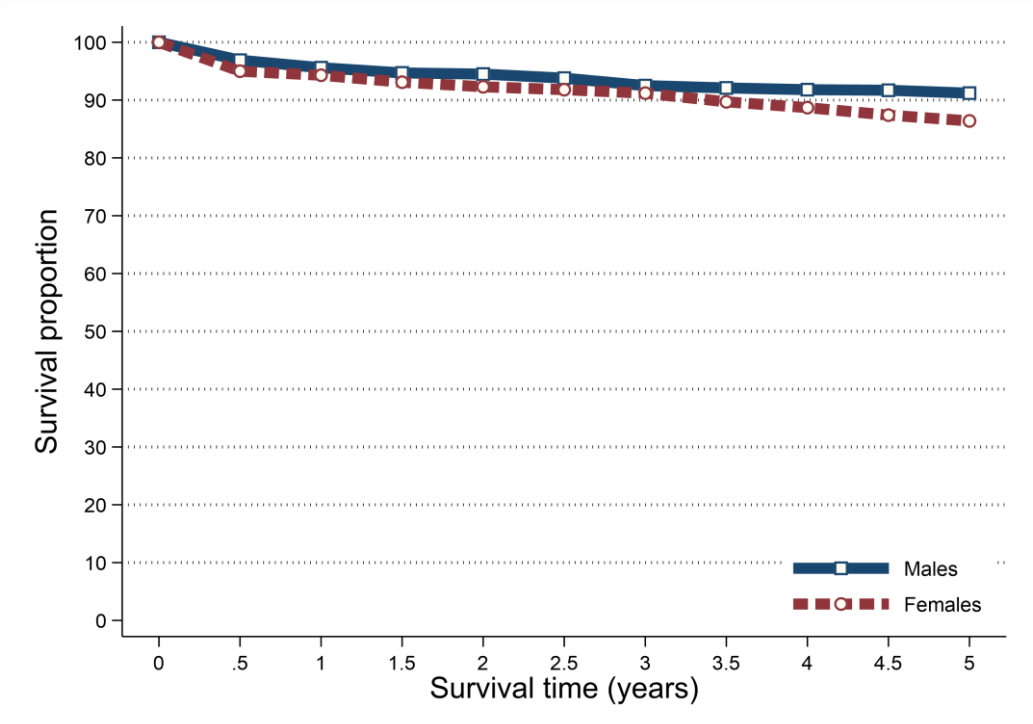
SURVIVAL

- 91.4% of patients were alive one year and 77.3% were alive five years from a non-invasive brain tumour diagnosis in 2012-2016. (observed survival)
- Age-standardised net survival (ASNS), which removes the effect of deaths from causes unrelated to cancer, was 94.8% one year and 88.3% five years from a non-invasive brain tumour diagnosis in 2012-2016.
- Five-year survival (ASNS) for non-invasive brain tumour patients diagnosed in 2012-2016 was 91.2% among men and 86.4% among women.

Table 3: Survival from non-invasive brain tumours for patients diagnosed in 2012-2016

Time since diagnosis	All persons		Male		Female	
	Observed survival	Age-standardised net survival	Observed survival	Age-standardised net survival	Observed survival	Age-standardised net survival
6 months	93.6%	95.7%	94.9%	96.9%	92.8%	95.0%
One year	91.4%	94.8%	92.2%	95.6%	91.0%	94.3%
Two years	87.8%	93.2%	89.0%	94.5%	87.0%	92.3%
Five years	77.3%	88.3%	79.4%	91.2%	76.0%	86.4%

Figure 9: Age-standardised net survival from non-invasive brain tumours for patients diagnosed in 2012-2016



Observed survival examines the time between diagnosis and death from any cause, however, due to the inclusion of non-cancer deaths it may not fully reflect how changes in cancer care impact survival from cancer.

Age-standardised net survival provides an estimate of patient survival which has been adjusted to take account of deaths unrelated to cancer. It is more widely used to assess the impact of changes in cancer care on patient survival.

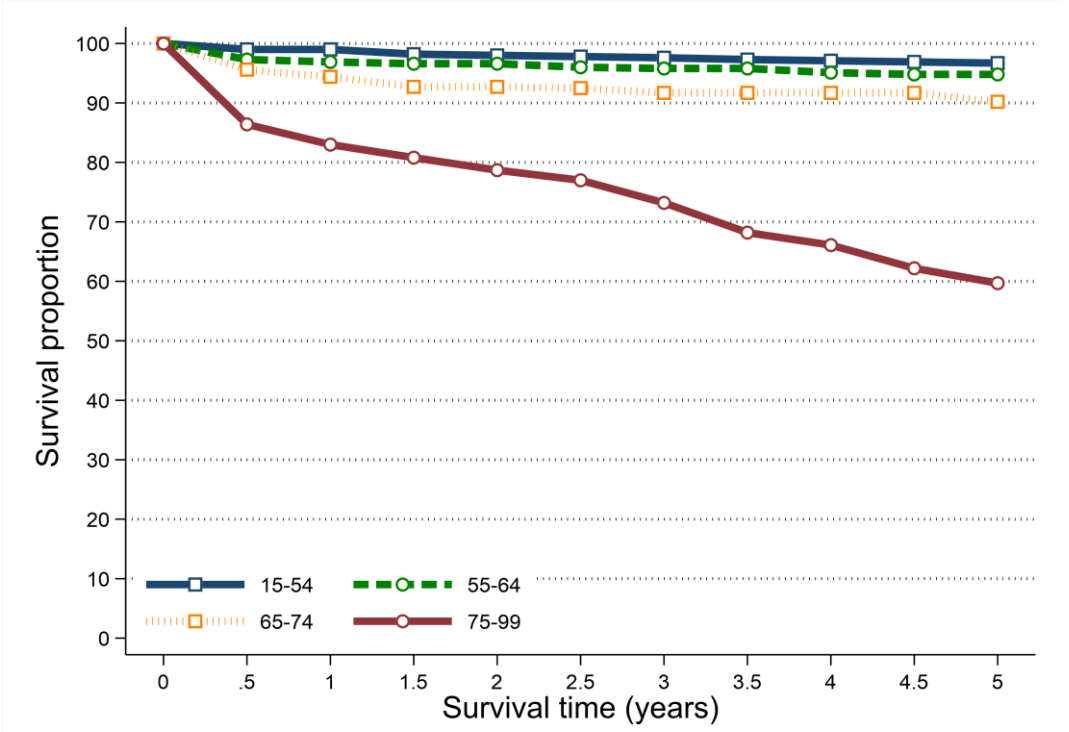
SURVIVAL BY AGE

- Survival from non-invasive brain tumours among patients diagnosed during 2012-2016 was related to age with better five-year survival among younger age groups.
- Five-year net survival ranged from 96.7% among patients aged 15 to 54 at diagnosis to 59.7% among those aged 75 to 99.

Table 4: Net survival from non-invasive brain tumours for patients diagnosed in 2012-2016 by age at diagnosis

Age group	All persons	
	One-year	Five-years
15 to 54	99.0%	96.7%
55 to 64	96.9%	94.8%
65 to 74	94.4%	90.2%
75 to 99	83.0%	59.7%

Figure 10: Net survival from non-invasive brain tumours for patients diagnosed in 2012-2016 by age at diagnosis

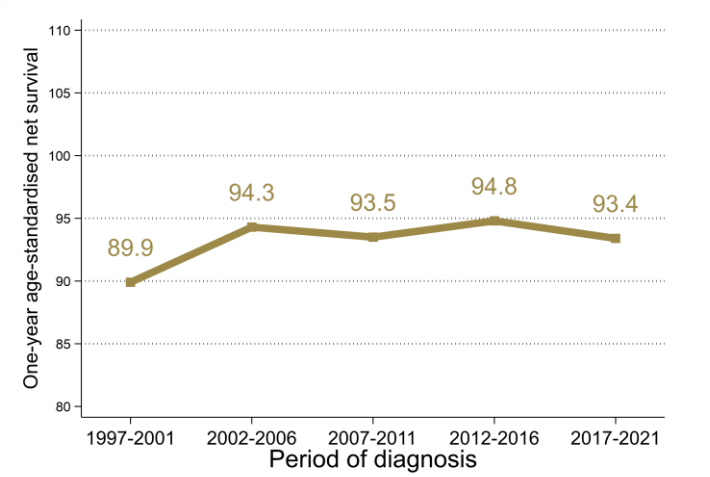


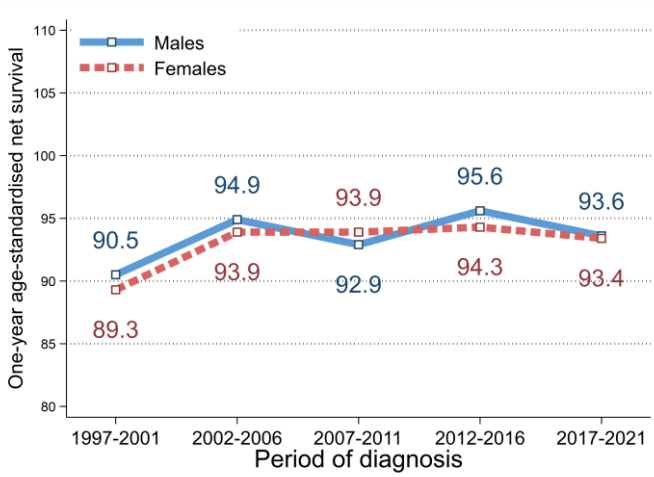
SURVIVAL TRENDS

ONE-YEAR NET SURVIVAL

- Between 2012-2016 and 2017-2021 there was no significant change in one-year survival (ASNS) from non-invasive brain tumours.
- Compared to 1997-2001 one-year survival (ASNS) from non-invasive brain tumours in 2017-2021 did not change significantly.

Figure 11: Trends in one-year age-standardised net survival from non-invasive brain tumours in 1997-2021

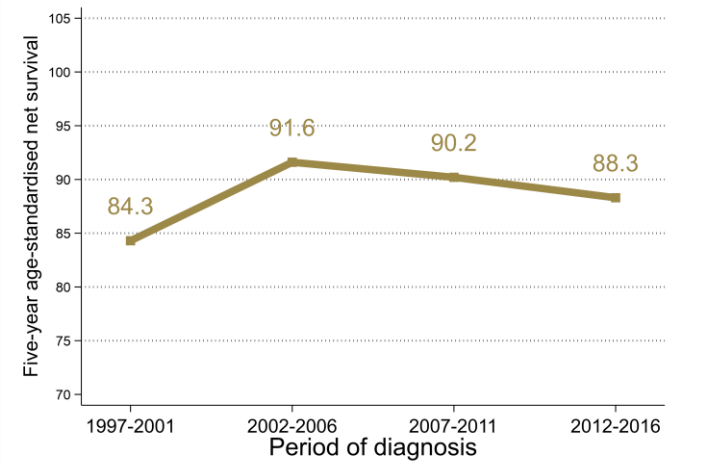


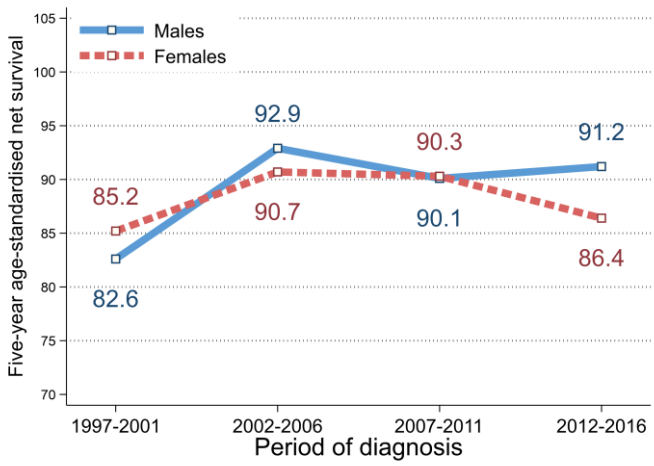


FIVE-YEAR NET SURVIVAL

- Between 2007-2011 and 2012-2016 there was no significant change in five-year survival (ASNS) from non-invasive brain tumours.
- Compared to 1997-2001 five-year survival (ASNS) from non-invasive brain tumours in 2012-2016 did not change significantly.

Figure 12: Trends in five-year age-standardised net survival from non-invasive brain tumours in 1997-2016





PREVALENCE

- At the end of 2021, there were 4,822 people (Males: 2,012; Females: 2,810) living with a non-invasive brain tumour who had been diagnosed with the disease during 1997-2021.
- Of these 4.1% had been diagnosed in the previous year (one-year prevalence) and 40.9% in the previous 10 years (ten-year prevalence).
- 25.1% of non-invasive brain tumour survivors were aged 75 and over at the end of 2021.

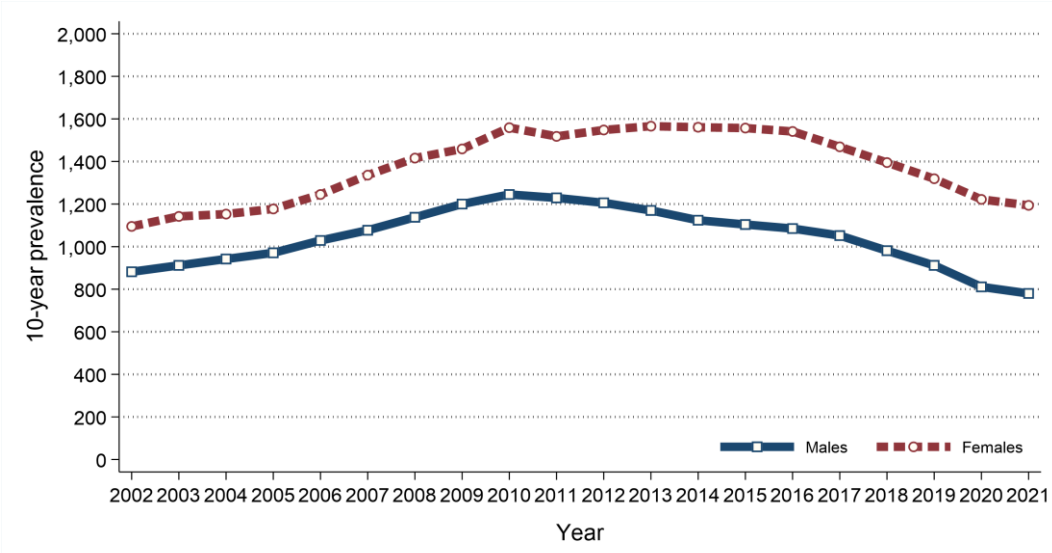
Table 5: 25-year prevalence of non-invasive brain tumours by age at end of 2021

Gender	Age at end of 2021	25-year prevalence	Time since diagnosis			
			0 to 1 year	1 to 5 years	5 to 10 years	10 to 25 years
All persons	All ages	4,822	199	806	969	2,848
	0 to 74	3,610	141	601	731	2,137
	75 and over	1,212	58	205	238	711
Male	All ages	2,012	74	312	394	1,232
Female	All ages	2,810	125	494	575	1,616

PREVALENCE TRENDS

- 10-year prevalence of non-invasive brain tumours among males decreased between 2016 and 2021 by 28.1% from 1,085 survivors to 780 survivors.
- 10-year prevalence of non-invasive brain tumours among females decreased between 2016 and 2021 by 22.5% from 1,541 survivors to 1,194 survivors.

Figure 13: Trends in 10-year prevalence of non-invasive brain tumours in 2002-2021



Year	10-year prevalence	
	Males	Females
2012	1,206	1,548
2013	1,170	1,566
2014	1,124	1,561
2015	1,104	1,557
2016	1,085	1,541
2017	1,052	1,469
2018	981	1,395
2019	912	1,319
2020	811	1,222
2021	780	1,194

MORTALITY

- There were 123 deaths from non-invasive brain tumours during 2017-2021 in Northern Ireland. On average this was 25 deaths per year.
- During this period 57.7% of non-invasive brain tumour deaths were among women (Male deaths: 52, Female deaths: 71). On average there were 10 male and 14 female deaths from non-invasive brain tumours per year.
- The median age of patients who died from a non-invasive brain tumour during 2017-2021 was 78 years (Males: 74, Females: 81).
- The risk of dying from a non-invasive brain tumour varied by age, with 60.2% of those who died from a non-invasive brain tumour aged 75 and over at death.
- In contrast, 13.0% of patients who died from a non-invasive brain tumour were aged 0 to 54 at death.

Figure 14: Average number of deaths from non-invasive brain tumours per year in 2017-2021 by age at death

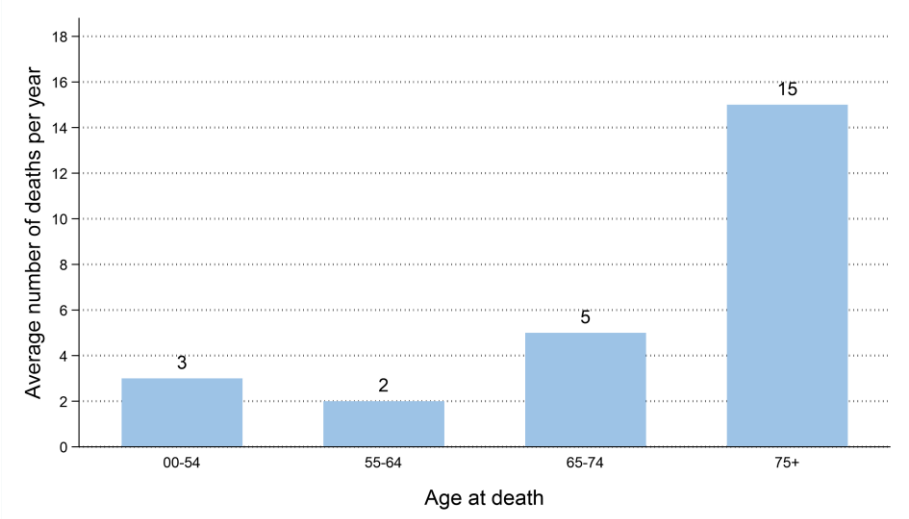
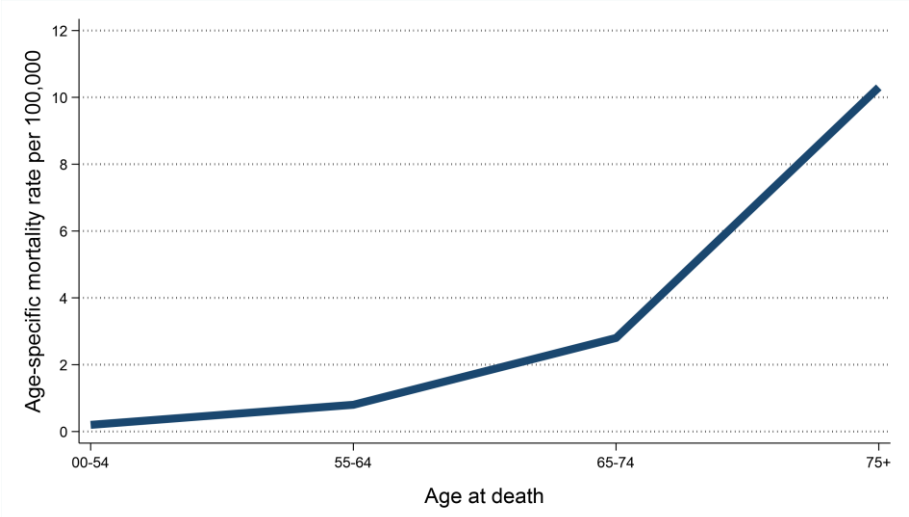


Figure 15: Age-specific mortality rates of non-invasive brain tumours in 2017-2021



MORTALITY TRENDS

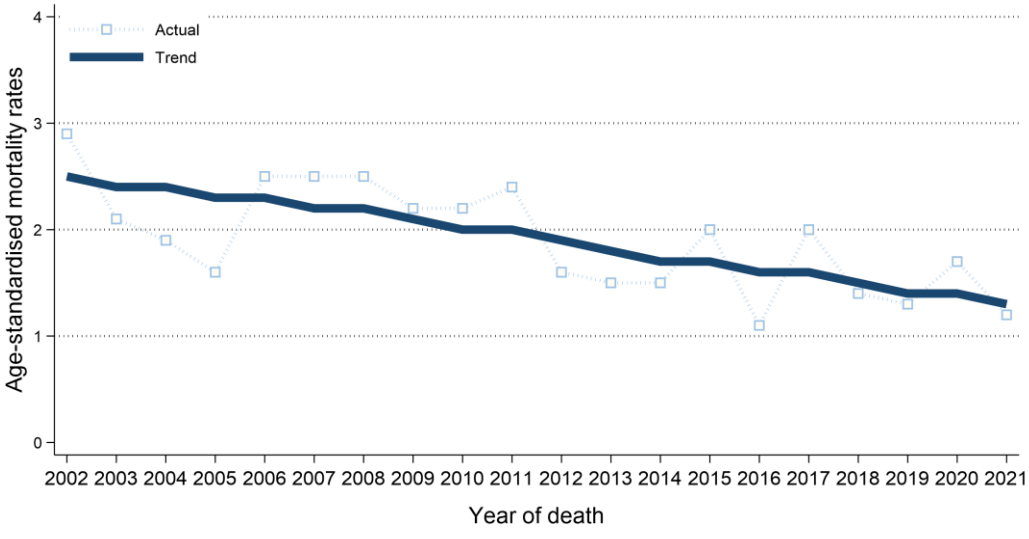
- The number of deaths from non-invasive brain tumours increased between 2012-2016 and 2017-2021 by 5.1% from 117 deaths (23 deaths per year) to 123 deaths (25 deaths per year).

Figure 16: Trends in the number of deaths from non-invasive brain tumours from 2002 to 2021

Year of death	Number of deaths
	All persons
2012	23
2013	22
2014	23
2015	31
2016	18
2017	32
2018	22
2019	20
2020	29
2021	20

- Age-standardised non-invasive brain tumour mortality rates did not change between 2012-2016 and 2017-2021 with 1.5 deaths per 100,000 persons in each period of time.

Figure 17: Trends in mortality rates of non-invasive brain tumours from 2002 to 2021



Age-standardised mortality rates illustrate the change in the number of deaths within a population of a fixed size and age structure (2013 European Standard).

They thus represent changes other than those caused by population growth and/or ageing.

Trends can also be influenced by changes in how cancer is classified and coded.

BACKGROUND NOTES

Cancer classification: Classification of tumour sites is carried out using ICD10 codes. For a listing and explanation of ICD10 codes see: World Health Organisation at http://apps.who.int/classifications/icd10/browse/2010/en#/II

Population data: Population data for Northern Ireland, and smaller geographic areas, are extracted from the NI mid-year population estimates available from the NI Statistics and Research Agency (available at www.nisra.gov.uk).

Geographic areas: Geographic areas are assigned based on a patient's postcode of usual residence at diagnosis using the Jan 2023 Central Postcode Directory (CPD) produced by the NI Statistics and Research Agency (available at www.nisra.gov.uk).

Deprivation quintiles: Super output areas (SOA) are assigned to each patient based on their postcode of usual residence at diagnosis. Using the SOA each patient is assigned a socio-economic deprivation quintile based on the 2017 Multiple Deprivation Measure. The 2017 Multiple Deprivation Measure is available from the NI Statistics and Research Agency (available at www.nisra.gov.uk).

Crude incidence/mortality rate: The number of cases/deaths per 100,000 person years in the population. Person years are the sum of the population over the number of years included.

Age-standardised incidence/mortality rates per 100,000 person years are estimates of the incidence/mortality rate if that population had a standard age structure. Throughout this report the 2013 European Standard Population has been used. Standardising to a common Standard Population allows comparisons of incidence/mortality rates to be made between different time periods and geographic areas while removing the effects of population change and ageing.

Standardised Incidence/Mortality Ratio (SIR/SMR) is the ratio of the number of cases/deaths observed in a population to the expected number of cases/deaths, based upon the age-specific rates in a reference population. This statistic is often used to compare incidence/mortality rates for geographic areas (e.g. Trusts) to the national incidence/mortality rates (i.e. Northern Ireland). An SIR/SMR of 100 indicates there is no difference between the geographic area and the national average.

Confidence intervals measure the precision of a statistic (e.g. non-invasive brain tumour incidence rate). Typically, when numbers are low, precision is poorer and confidence intervals will be wider. As a general rule, when comparing statistics (e.g. non-invasive brain tumour incidence rate in year 2012 vs year 2013), if the confidence interval around one statistic overlaps with the interval around another, it is unlikely that there is any real difference between the two. If there is no overlap, the difference is considered to be statistically significant.

Lifetime risk is estimated as the cumulative risk of getting cancer up to age 75/85, calculated directly from the age-specific incidence rates. The odds of developing the disease before age 75/85 is the inverse of the cumulative risk.

Prevalence is the number of cancer patients who are alive in the population on a specific date (31st December 2021 in this report). Since data from the NI Cancer Registry are only available since 1993, prevalence only refers to a fixed term (10 and 25 years in this report). There may be members of the population living with a diagnosis of cancer for more than 25 years.

Patient survival is evaluated using two measures. Observed survival examines the time between diagnosis and death from any cause. It thus represents what cancer patients experience, however, due to the inclusion of non-cancer deaths (e.g. heart disease), it may not reflect how changes in cancer care impact survival from cancer. Thus age-standardised net survival is also examined. This measure provides an estimate of patient survival which has been adjusted to take account of deaths unrelated to cancer. It also assumes a standard age distribution thereby removing the impact of changes in the age distribution of cancer patients on changes in survival over time. While this measure is hypothetical, as it assumes patients can only die from cancer related factors, it is a better indicator of the impact of changes in cancer care on patient survival.