Brain tumours

1993-2021

(Malignant and non-invasive)

(ICD10 codes: C70-C72, C75.1-C75.3, 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 brain tumours (malignant and non-invasive) 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 and prevalence 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. 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

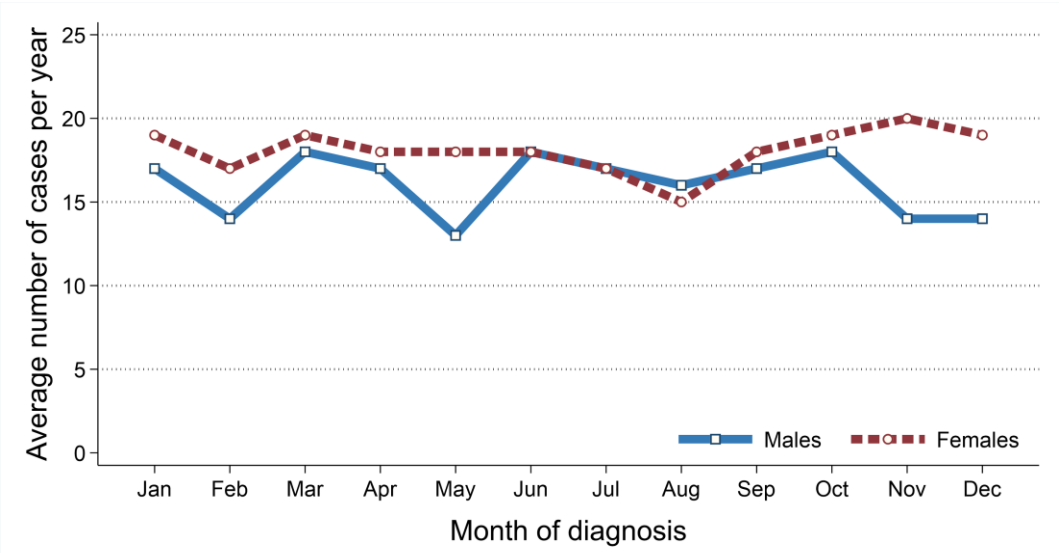
The Northern Ireland Cancer Registry (NICR) uses data provided by patients and collected by the health service as part of their care and support.

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

INCIDENCE

- There were 2,043 cases of brain tumours (malignant and non-invasive) diagnosed during 2017-2021 in Northern Ireland. On average this was 409 cases per year.
- During this period 53.2% of brain tumour cases were among women (Male cases: 956, Female cases: 1,087). On average there were 191 male and 217 female cases of brain tumours per year.
- The most common diagnosis month during 2017-2021 was March, June and October among males with 18 cases per year and November among females with 20 cases per year.

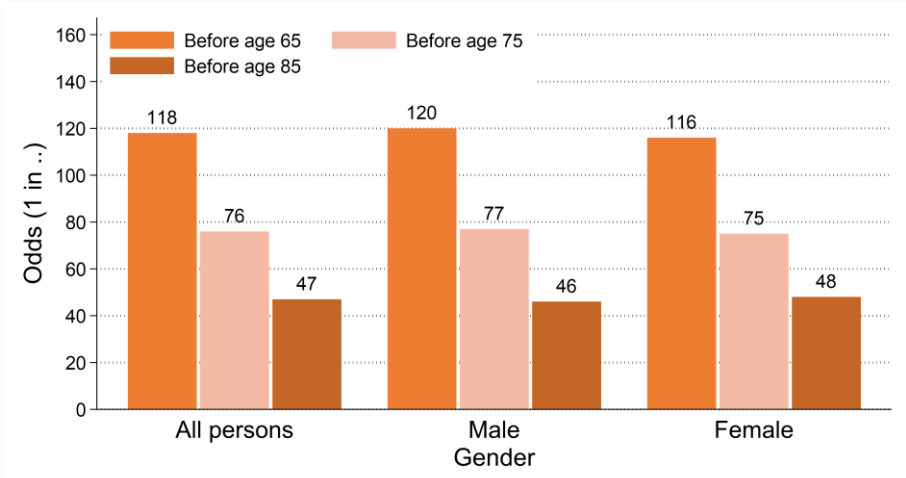
Figure 1: Average number of cases of brain tumours per year in 2017-2021 by month of diagnosis



Month of diagnosis	Average number of cases per year	
	Males	Females
January	17	19
February	14	17
March	18	19
April	17	18
May	13	18
June	18	18
July	17	17
August	16	15
September	17	18
October	18	19
November	14	20
December	14	19

- The brain tumour incidence rates for each gender were 20.6 cases per 100,000 males and 22.7 cases per 100,000 females.
- The odds of developing a brain tumour before age 85 was 1 in 46 for men and 1 in 48 for women.

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



INCIDENCE BY AGE

- The median age of patients diagnosed with a brain tumour during 2017-2021 was 64 years (Males: 63, Females: 65).
- The risk of developing a brain tumour varied by age, with 27.3% of men and 31.9% of women diagnosed with a brain tumour aged 75 and over at diagnosis.
- In contrast, 32.8% of patients diagnosed with a brain tumour were aged 0 to 54 at diagnosis.

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

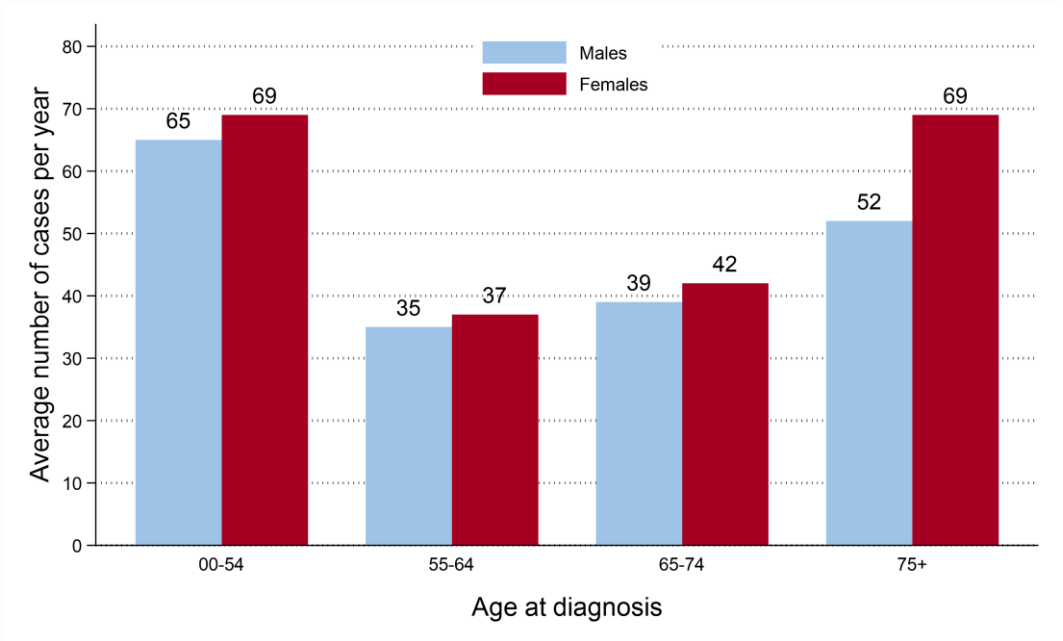
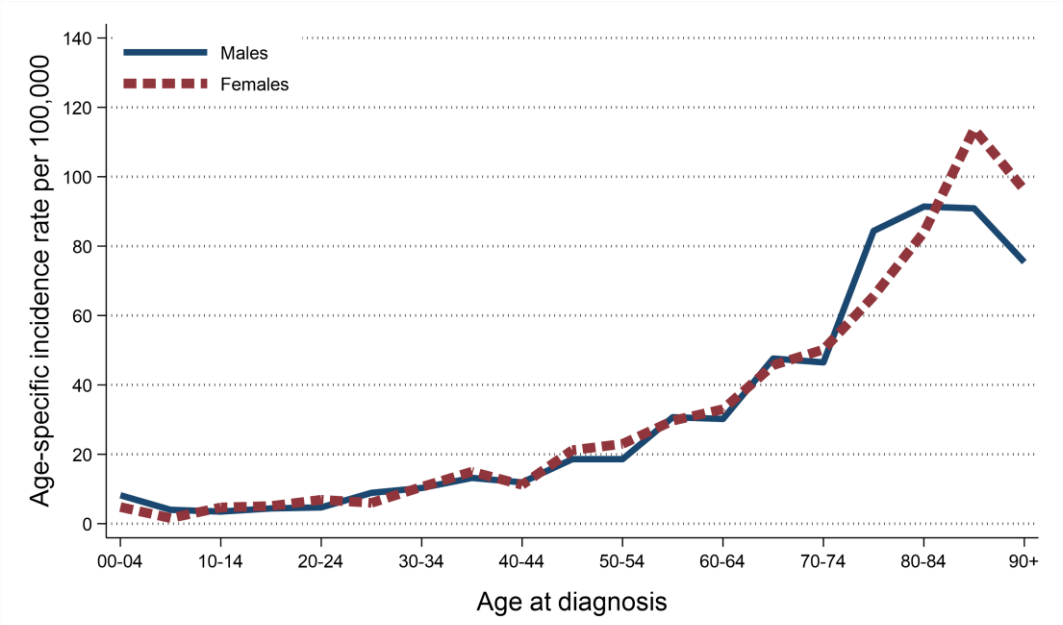


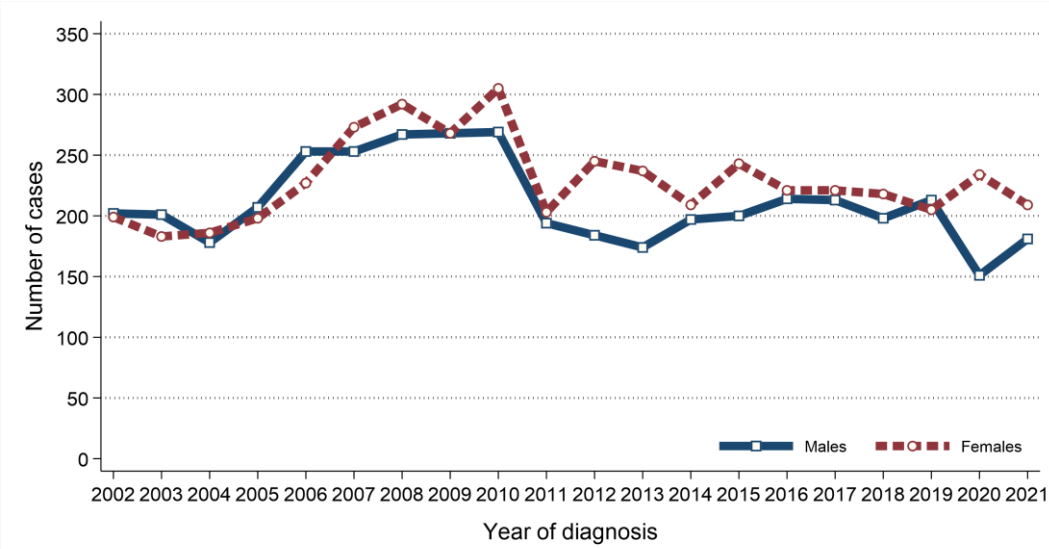
Figure 4: Age-specific incidence rates of brain tumours in 2017-2021



INCIDENCE TRENDS

- The number of cases of brain tumours among males decreased between 2012-2016 and 2017-2021 by 1.3% from 969 cases (194 cases per year) to 956 cases (191 cases per year).
- The number of cases of brain tumours among females decreased between 2012-2016 and 2017-2021 by 5.9% from 1,155 cases (231 cases per year) to 1,087 cases (217 cases per year).

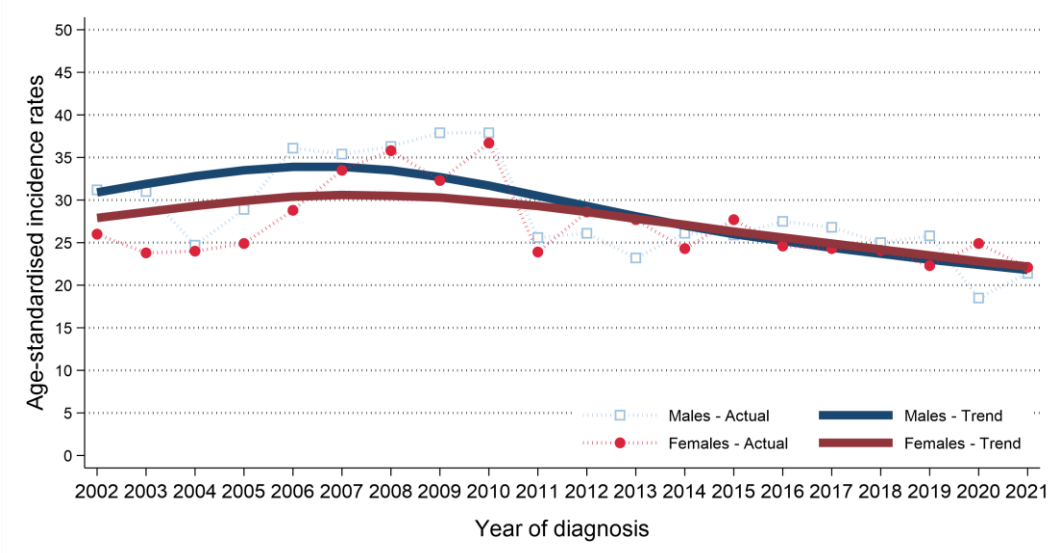
Figure 5: Trends in number of cases of brain tumours diagnosed from 2002 to 2021



Year of diagnosis	Number of cases	
	Males	Females
2012	184	245
2013	174	237
2014	197	209
2015	200	243
2016	214	221
2017	213	221
2018	198	218
2019	213	205
2020	151	234
2021	181	209

- Male age-standardised brain tumour incidence rates decreased between 2012-2016 and 2017-2021 by 9.3% from 25.8 to 23.4 cases per 100,000 males. This change was not statistically significant.
- Female age-standardised brain tumour incidence rates decreased between 2012-2016 and 2017-2021 by 10.9% from 26.5 to 23.6 cases per 100,000 females. This change was not statistically significant.

Figure 6: Trends in incidence rates of 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).

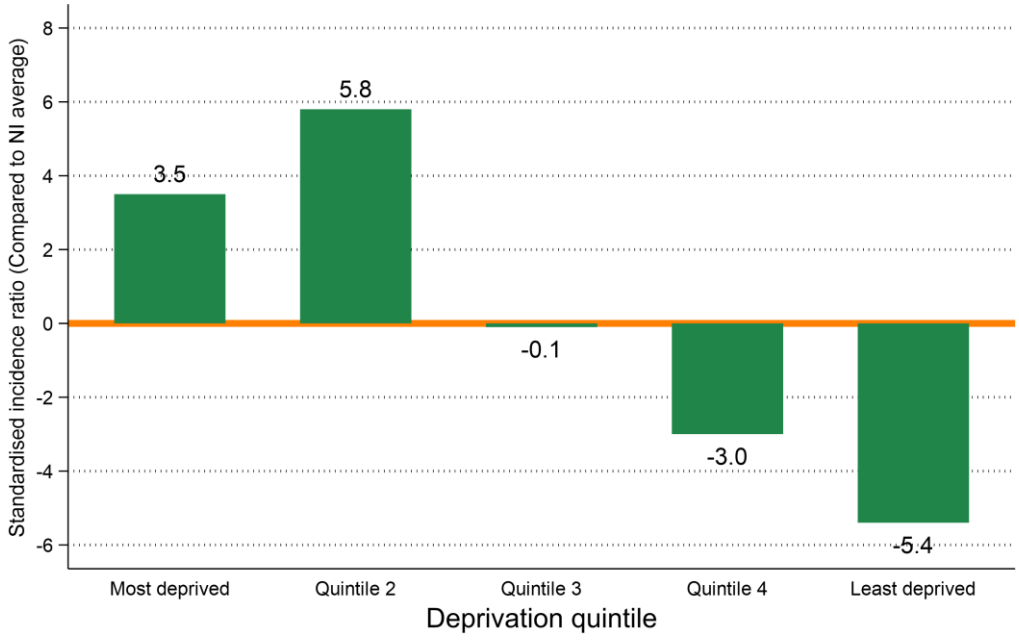
INCIDENCE BY DEPRIVATION

- The number of cases of 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 did not vary significantly from the NI average.

Table 1: Number of cases of 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	**2,043**	**409**	**956**	**191**	**1,087**	**217**
	.	.	.	.	.	.
Most deprived	361	72	177	35	184	37
Quintile 2	435	87	200	40	235	47
Quintile 3	429	86	191	38	238	48
Quintile 4	419	84	196	39	223	45
Least deprived	399	80	192	38	207	41
Unknown	0	0	0	0	0	0

Figure 7: Standardised incidence ratio comparing deprivation quintile to Northern Ireland for 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.

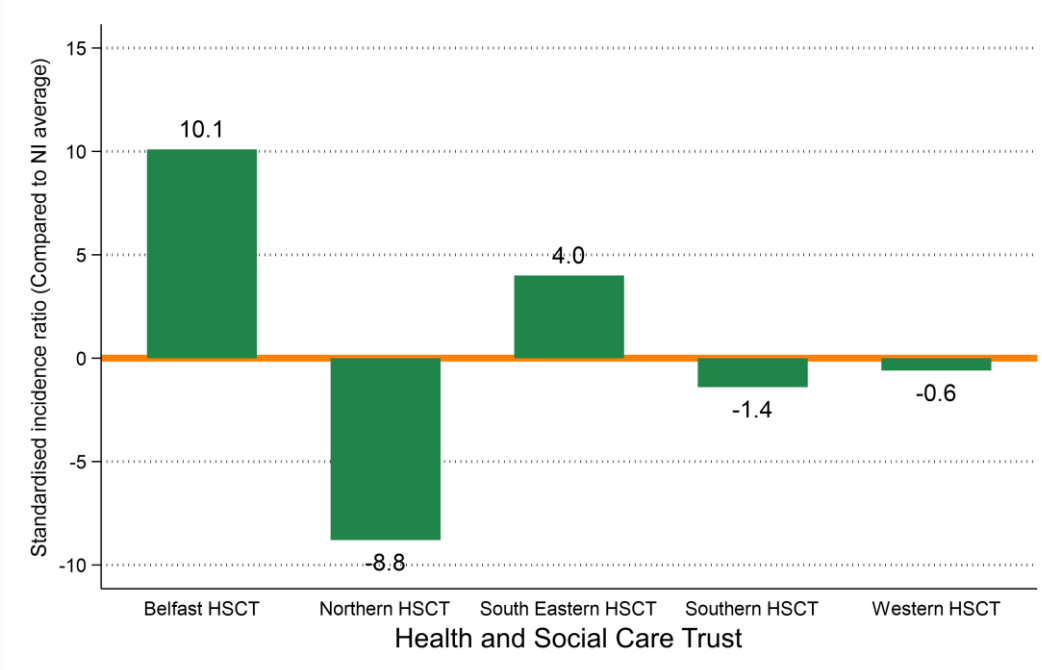
INCIDENCE BY HEALTH AND SOCIAL CARE TRUST

- The number of cases of 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 8.8% 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 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	**2,043**	**409**	**956**	**191**	**1,087**	**217**
	.	.	.	.	.	.
Belfast HSCT	415	83	202	40	213	43
Northern HSCT	488	98	237	47	251	50
South Eastern HSCT	434	87	193	39	241	48
Southern HSCT	388	78	169	34	219	44
Western HSCT	318	64	155	31	163	33
Unknown	0	0	0	0	0	0

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

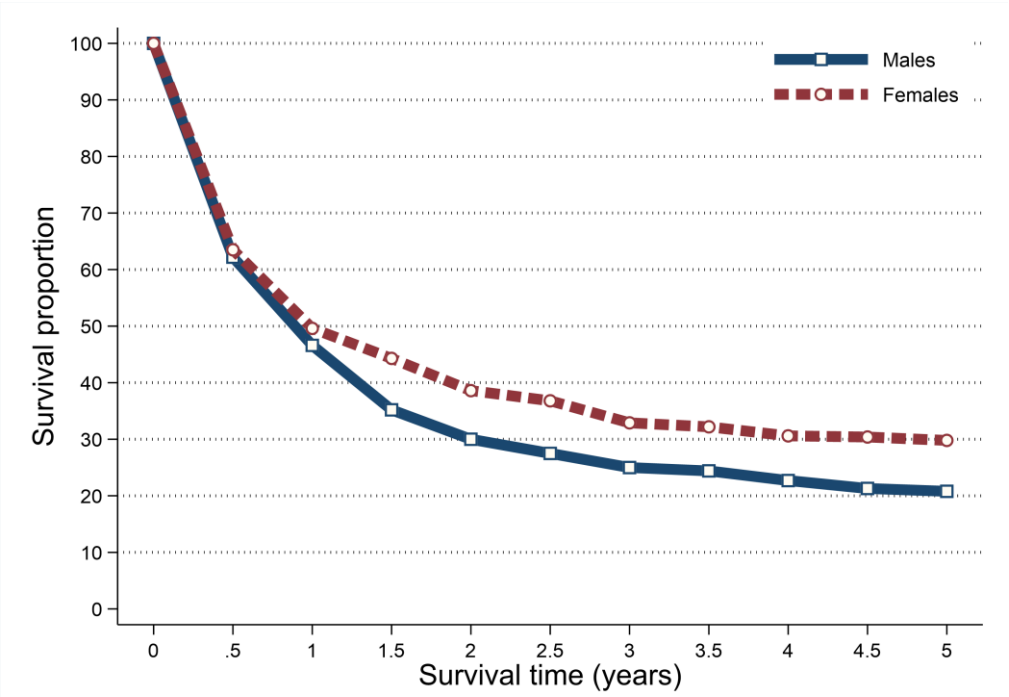


SURVIVAL BY TUMOUR TYPE

- 40.1% of patients were alive one year and 18.8% were alive five years from a malignant brain tumour diagnosis in 2012-2016, while 91.4% of non-invasive brain tumour patients were alive one year and 77.3% were alive five years from diagnosis. (observed survival)
- Age-standardised net survival (ASNS), which removes the effect of deaths from causes unrelated to cancer, was 47.8% one year and 24.5% five years from a malignant brain tumour diagnosis in 2012-2016.
- In contrast for non-invasive brain tumour patients, age-standardised net survival was 94.8% one year and 88.3% five years from diagnosis.

Figure 9: Age-standardised net survival from brain tumours for patients diagnosed in 2012-2016 by tumour type

(a) Malignant



(b) Non-invasive

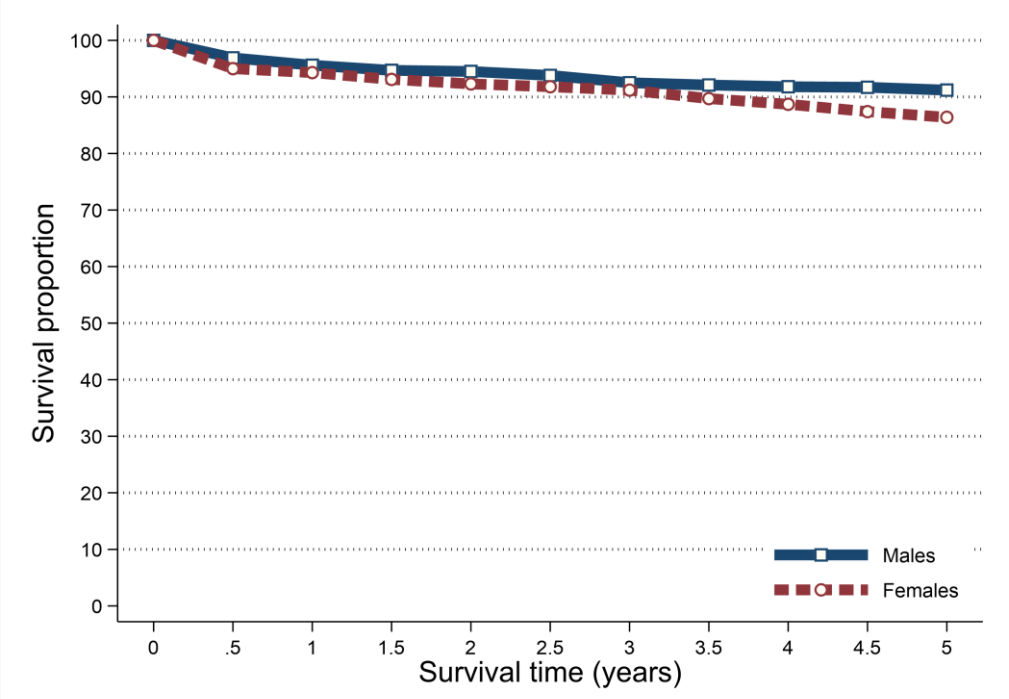


Table 3: Survival from brain tumours for patients diagnosed in 2012-2016 by tumour type

(a) Malignant

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	56.0%	62.7%	55.7%	62.2%	56.4%	63.5%
One year	40.1%	47.8%	39.3%	46.6%	41.2%	49.6%
Two years	26.9%	33.6%	24.0%	30.0%	31.0%	38.6%
Five years	18.8%	24.5%	15.9%	20.8%	22.8%	29.8%

(b) Non-invasive

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%

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.

PREVALENCE

- At the end of 2021, there were 5,465 people (Males: 2,384; Females: 3,081) living with a brain tumour who had been diagnosed with the disease during 1997-2021.
- Of these 5.5% had been diagnosed in the previous year (one-year prevalence) and 43.4% in the previous 10 years (ten-year prevalence).
- 22.8% of brain tumour survivors were aged 75 and over at the end of 2021.

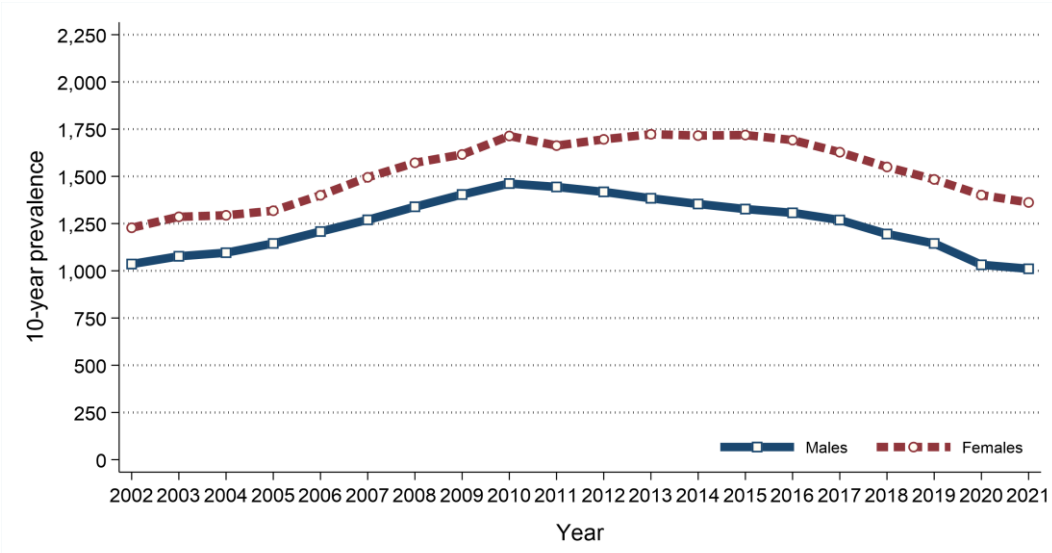
Table 4: 25-year prevalence of brain tumours by age at end of 2021

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	5,465	299	972	1,102	3,092
	0 to 74	4,219	226	763	858	2,372
	75 and over	1,246	73	209	244	720
Male	All ages	2,384	136	412	463	1,373
	0 to 74	1,865	106	338	359	1,062
	75 and over	519	30	74	104	311
Female	All ages	3,081	163	560	639	1,719
	0 to 74	2,354	120	425	499	1,310
	75 and over	727	43	135	140	409

PREVALENCE TRENDS

- 10-year prevalence of brain tumours among males decreased between 2016 and 2021 by 22.6% from 1,307 survivors to 1,011 survivors.
- 10-year prevalence of brain tumours among females decreased between 2016 and 2021 by 19.5% from 1,692 survivors to 1,362 survivors.

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



Year	10-year prevalence	
	Males	Females
2012	1,418	1,696
2013	1,384	1,723
2014	1,354	1,716
2015	1,327	1,719
2016	1,307	1,692
2017	1,269	1,628
2018	1,195	1,550
2019	1,145	1,484
2020	1,032	1,401
2021	1,011	1,362

MORTALITY

- There were 764 deaths from brain tumours (malignant and non-invasive) during 2017-2021 in Northern Ireland. On average this was 153 deaths per year.
- During this period 44.2% of brain tumour deaths were among women (Male deaths: 426, Female deaths: 338). On average there were 85 male and 68 female deaths from brain tumours per year.
- The median age of patients who died from a brain tumour during 2017-2021 was 70 years (Males: 68, Females: 73).
- The risk of dying from a brain tumour varied by age, with 38.4% of those who died from a brain tumour aged 75 and over at death.
- In contrast, 19.1% of patients who died from a brain tumour were aged 0 to 54 at death.

Figure 11: Average number of deaths from brain tumours per year in 2017-2021 by age at death

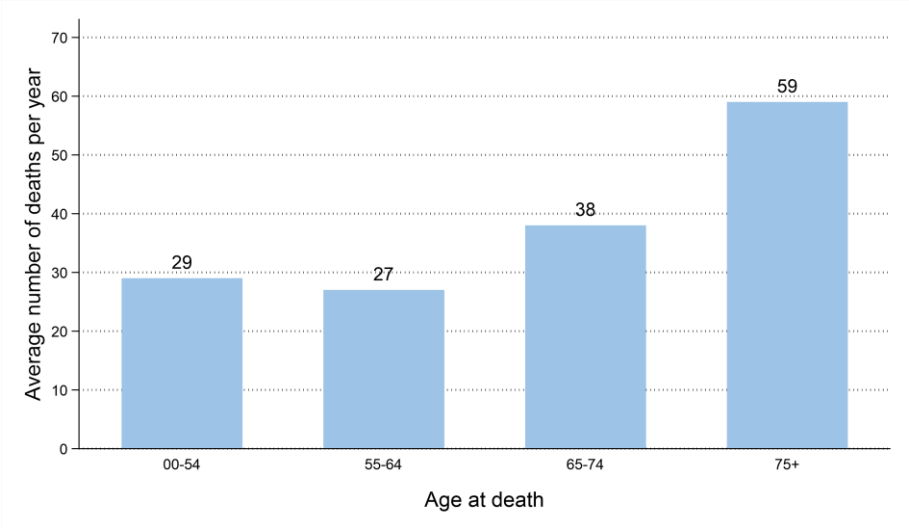
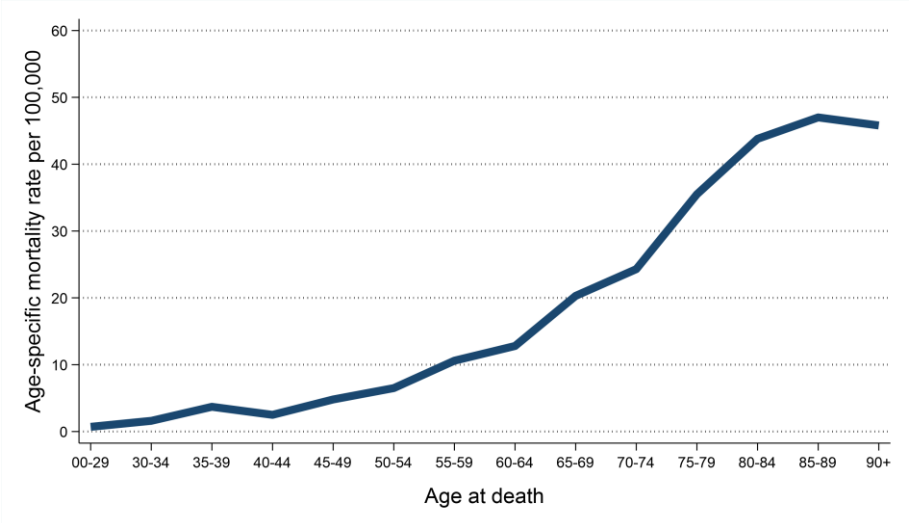


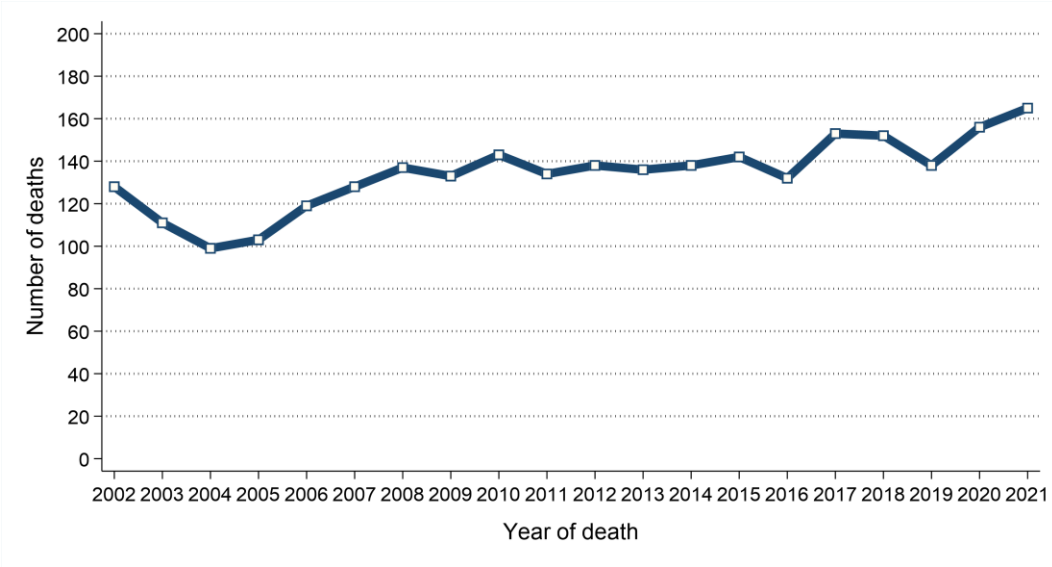
Figure 12: Age-specific mortality rates of brain tumours in 2017-2021



MORTALITY TRENDS

- The number of deaths from brain tumours increased between 2012-2016 and 2017-2021 by 11.4% from 686 deaths (137 deaths per year) to 764 deaths (153 deaths per year).

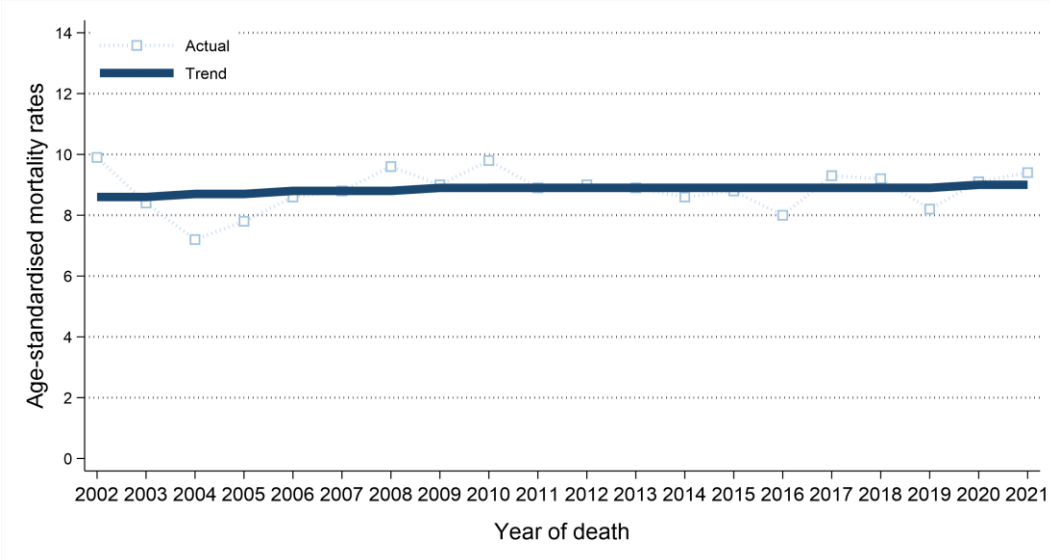
Figure 13: Trends in the number of deaths from brain tumours from 2002 to 2021



Year of death	Number of deaths All persons
2012	138
2013	136
2014	138
2015	142
2016	132
2017	153
2018	152
2019	138
2020	156
2021	165

- Age-standardised brain tumour mortality rates increased between 2012-2016 and 2017-2021 by 3.4% from 8.7 to 9.0 deaths per 100,000 persons. This change was not statistically significant.

Figure 14: Trends in mortality rates of 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. 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. 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.