Brain cancer

1993-2021

(Including central nervous system)

(ICD10 codes: C70-C72, C75.1-C75.3)

Northern Ireland Cancer Registry, 2024

An official statistics publication

ABOUT THIS REPORT

Contents

This report includes information on incidence of brain cancer (including central nervous system) 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. Brain cancer: 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

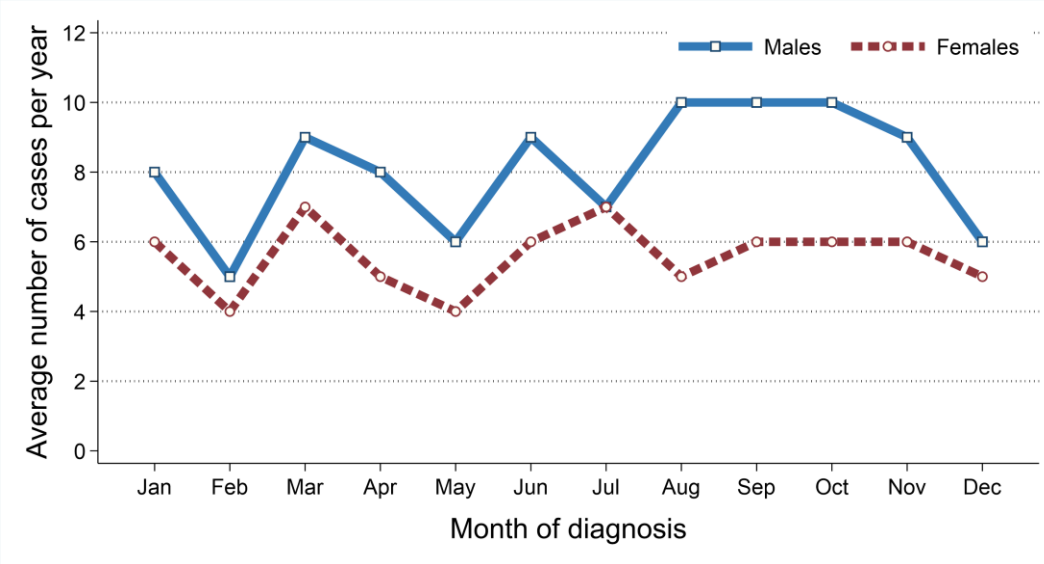
The Northern Ireland Cancer Registry (NICR) uses data provided by patients and collected by the health service as part of their care and support.

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

INCIDENCE

- There were 809 cases of brain cancer (including central nervous system) diagnosed during 2017-2021 in Northern Ireland. On average this was 162 cases per year.
- During this period 40.8% of brain cancer cases were among women (Male cases: 479, Female cases: 330). On average there were 96 male and 66 female cases of brain cancer per year.
- The most common diagnosis month during 2017-2021 was August, September and October among males with 10 cases per year and March and July among females with 7 cases per year.

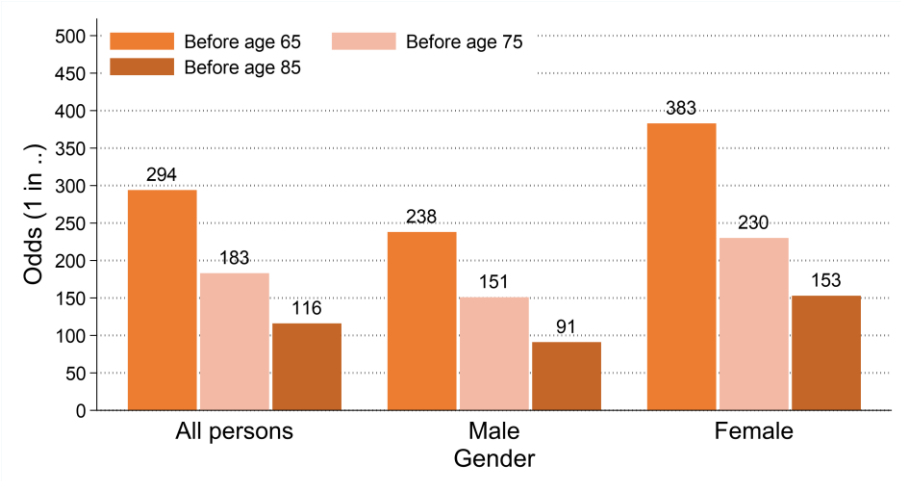
Figure 1: Average number of cases of brain cancer per year in 2017-2021 by month of diagnosis



Month of diagnosis	Average number of cases per year	
	Males	Females
January	8	6
February	5	4
March	9	7
April	8	5
May	6	4
June	9	6
July	7	7
August	10	5
September	10	6
October	10	6
November	9	6
December	6	5

- Brain cancer made up 1.9% of all male and 1.3% of all female cancer cases (excluding non-melanoma skin cancer).
- The brain cancer incidence rates for each gender were 10.3 cases per 100,000 males and 6.9 cases per 100,000 females.
- The odds of developing brain cancer before age 85 was 1 in 91 for men and 1 in 153 for women.

Figure 2: Odds of developing brain cancer in 2017-2021



INCIDENCE BY AGE

- The median age of patients diagnosed with brain cancer during 2017-2021 was 64 years (Males: 63, Females: 65).
- The risk of developing brain cancer varied by age, with 25.9% of men and 28.8% of women diagnosed with brain cancer aged 75 and over at diagnosis.
- In contrast, 32.9% of patients diagnosed with brain cancer were aged 0 to 54 at diagnosis.

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

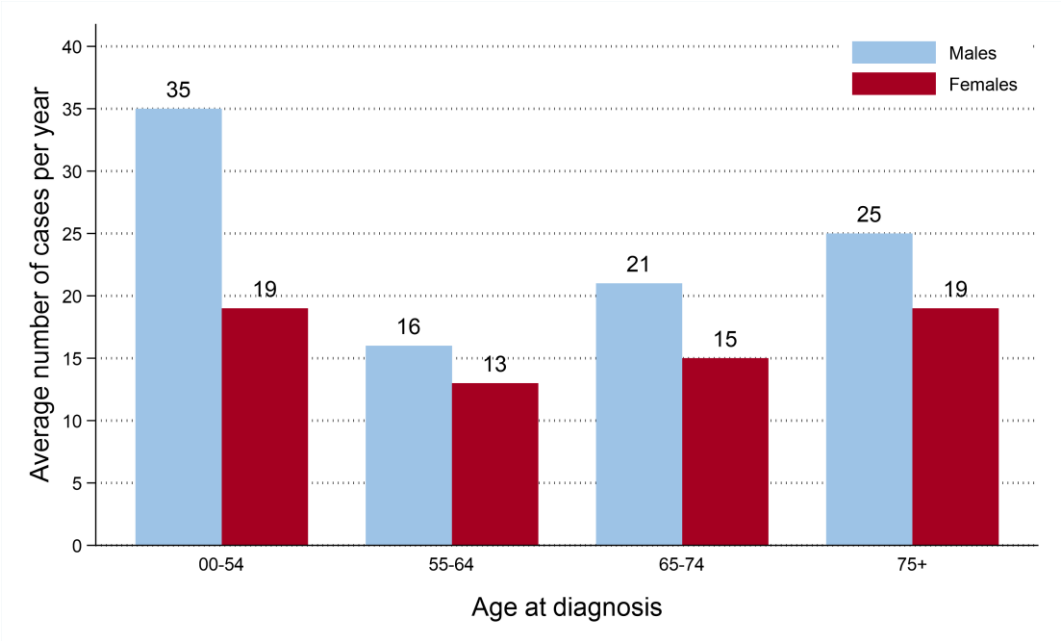
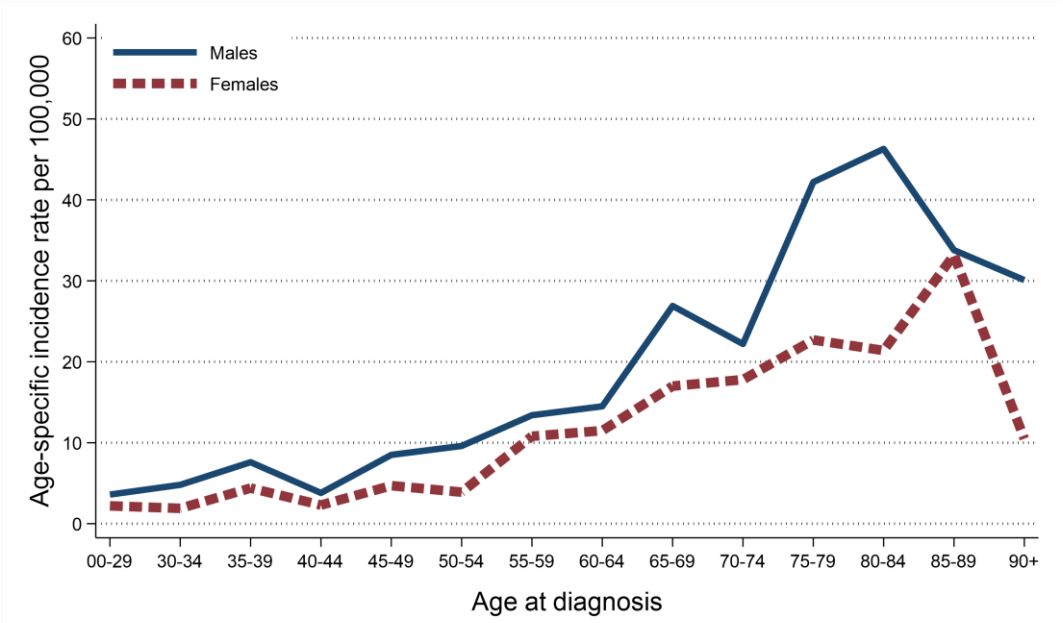


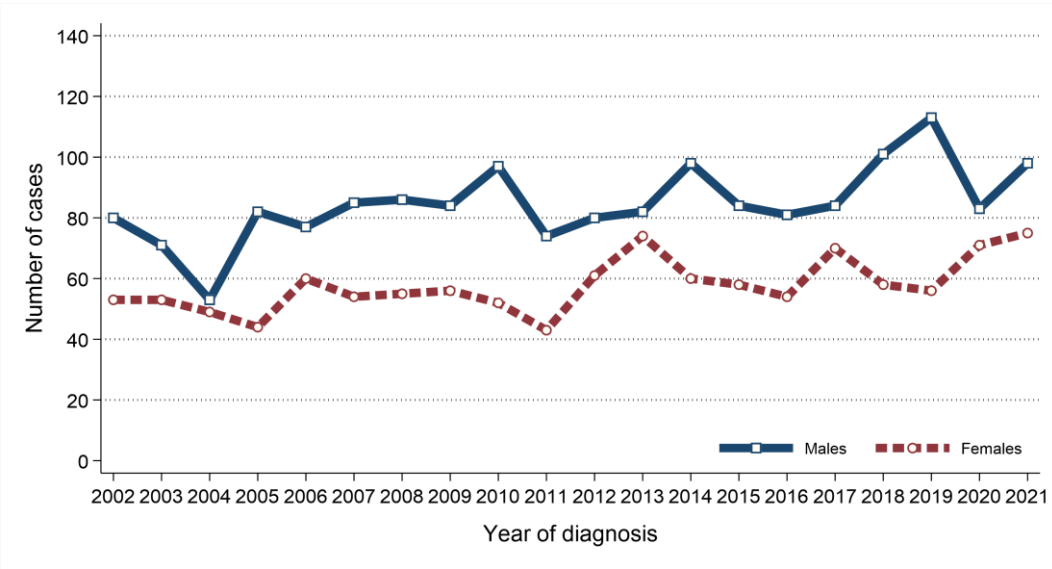
Figure 4: Age-specific incidence rates of brain cancer in 2017-2021



INCIDENCE TRENDS

- The number of cases of brain cancer among males increased between 2012-2016 and 2017-2021 by 12.7% from 425 cases (85 cases per year) to 479 cases (96 cases per year).
- The number of cases of brain cancer among females increased between 2012-2016 and 2017-2021 by 7.5% from 307 cases (61 cases per year) to 330 cases (66 cases per year).

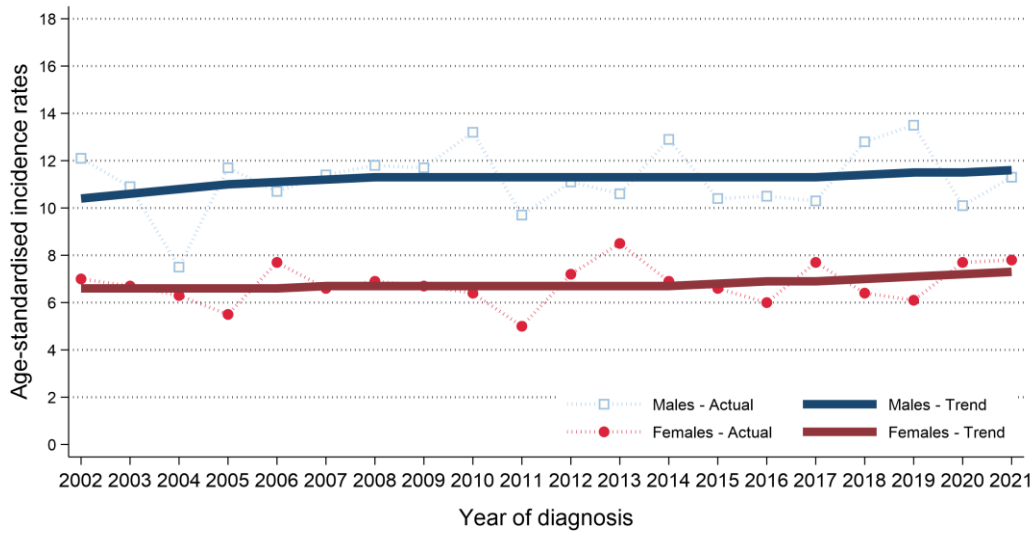
Figure 5: Trends in number of cases of brain cancer diagnosed from 2002 to 2021



Year of diagnosis	Number of cases	
	Males	Females
2012	80	61
2013	82	74
2014	98	60
2015	84	58
2016	81	54
2017	84	70
2018	101	58
2019	113	56
2020	83	71
2021	98	75

- Male age-standardised brain cancer incidence rates increased between 2012-2016 and 2017-2021 by 4.5% from 11.1 to 11.6 cases per 100,000 males. This change was not statistically significant.
- Female age-standardised brain cancer incidence rates increased between 2012-2016 and 2017-2021 by 2.9% from 7.0 to 7.2 cases per 100,000 females. This change was not statistically significant.

Figure 6: Trends in incidence rates of brain cancer 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).

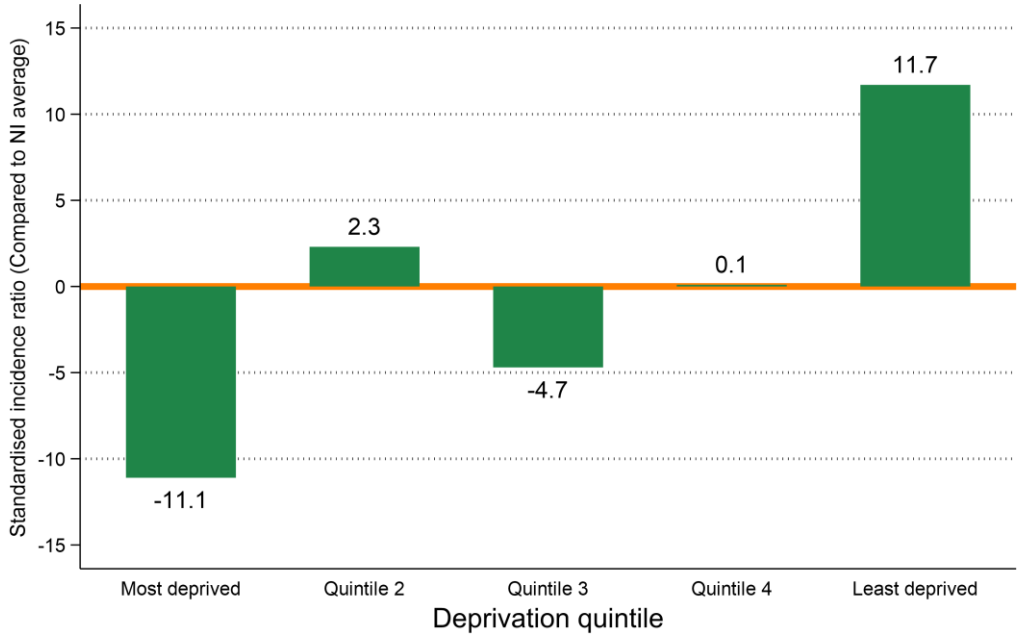
INCIDENCE BY DEPRIVATION

- The number of cases of brain cancer 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 cancer 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	**809**	**162**	**479**	**96**	**330**	**66**
	.	.	.	.	.	.
Most deprived	124	25	78	16	46	9
Quintile 2	167	33	101	20	66	13
Quintile 3	162	32	92	18	70	14
Quintile 4	171	34	98	20	73	15
Least deprived	185	37	110	22	75	15
Unknown	0	0	0	0	0	0

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

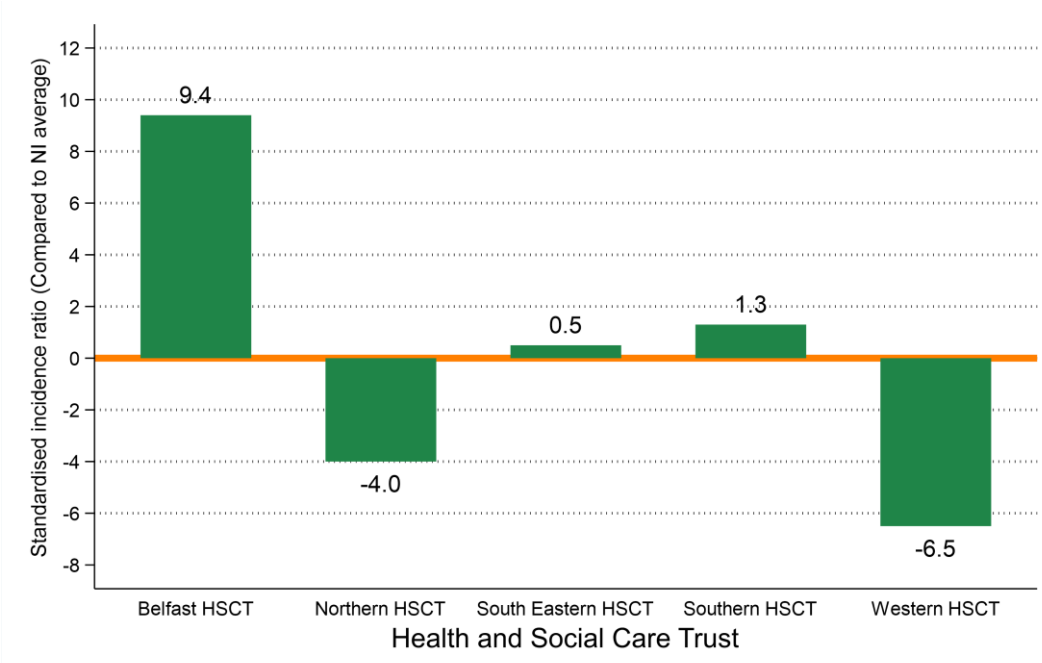
INCIDENCE BY HEALTH AND SOCIAL CARE TRUST

- The number of cases of brain cancer 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 did not vary significantly from 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 cancer 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	**809**	**162**	**479**	**96**	**330**	**66**
	.	.	.	.	.	.
Belfast HSCT	162	32	103	21	59	12
Northern HSCT	203	41	118	24	85	17
South Eastern HSCT	166	33	96	19	70	14
Southern HSCT	159	32	91	18	68	14
Western HSCT	119	24	71	14	48	10
Unknown	0	0	0	0	0	0

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



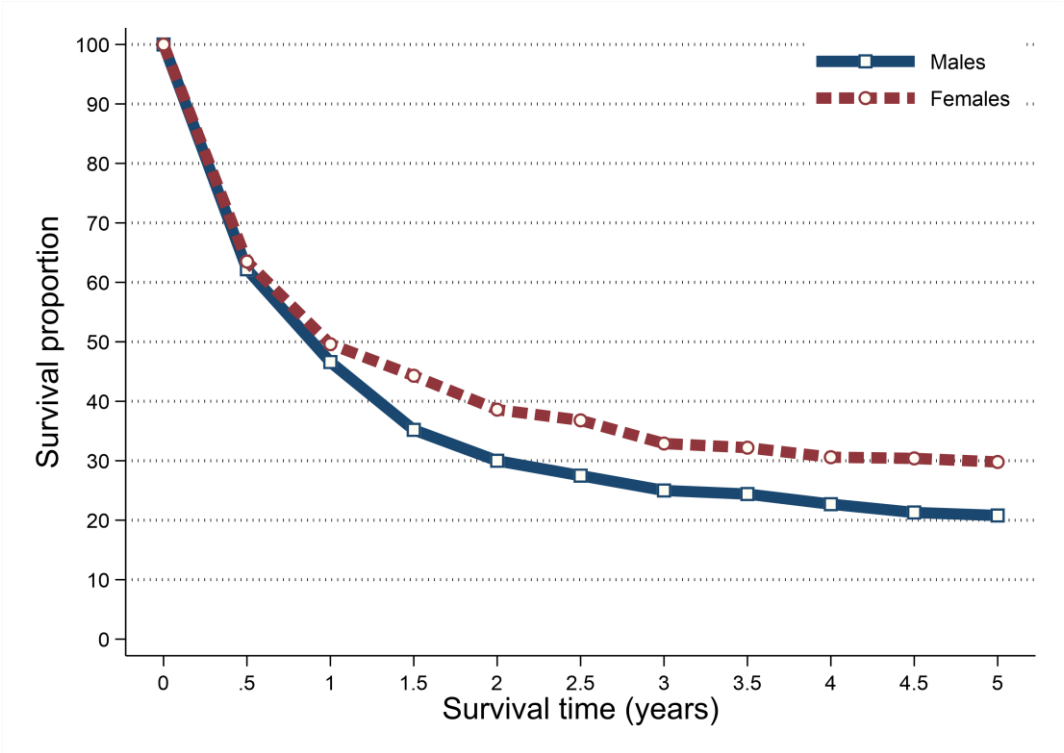
SURVIVAL

- 40.1% of patients were alive one year and 18.8% were alive five years from a brain cancer diagnosis in 2012-2016. (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 brain cancer diagnosis in 2012-2016.
- Five-year survival (ASNS) for brain cancer patients diagnosed in 2012-2016 was 20.8% among men and 29.8% among women.

Table 3: Survival from brain cancer 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	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%

Figure 9: Age-standardised net survival from brain cancer 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.

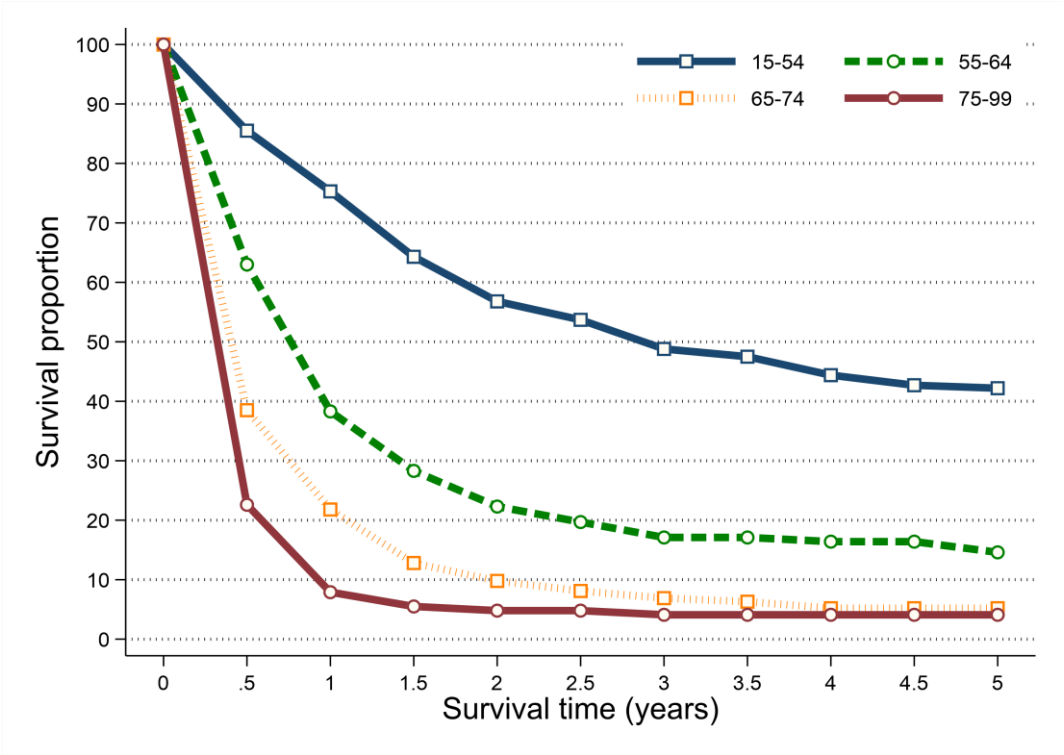
SURVIVAL BY AGE

- Survival from brain cancer 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 42.2% among patients aged 15 to 54 at diagnosis to 4.1% among those aged 75 to 99.

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

Age group	All persons	
	One-year	Five-years
15 to 54	75.3%	42.2%
55 to 64	38.3%	14.6%
65 to 74	21.8%	5.2%
75 to 99	7.9%	4.1%

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

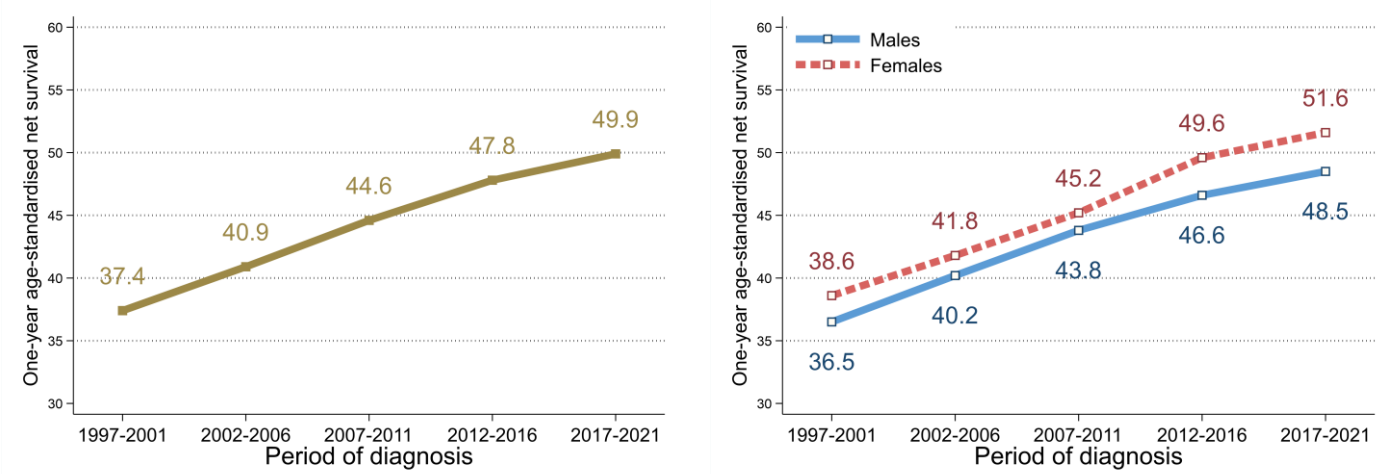


SURVIVAL TRENDS

ONE-YEAR NET SURVIVAL

- Between 2012-2016 and 2017-2021 there was no significant change in one-year survival (ASNS) from brain cancer.
- Compared to 1997-2001 one-year survival (ASNS) from brain cancer in 2017-2021 increased significantly from 37.4% to 49.9%. This change was not significant for either males or females when considered separately.

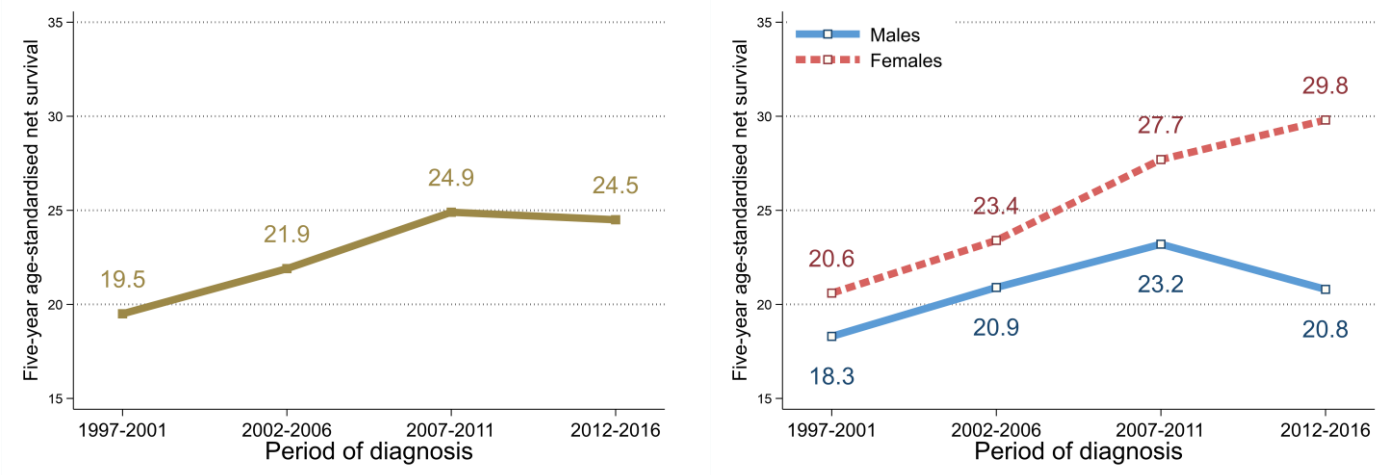
Figure 11: Trends in one-year age-standardised net survival from brain cancer in 1997-2021



FIVE-YEAR NET SURVIVAL

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

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



PREVALENCE

- At the end of 2021, there were 678 people (Males: 387; Females: 291) living with brain cancer who had been diagnosed with the disease during 1997-2021.
- Of these 14.9% had been diagnosed in the previous year (one-year prevalence) and 60.8% in the previous 10 years (ten-year prevalence).
- 5.0% of brain cancer survivors were aged 75 and over at the end of 2021.

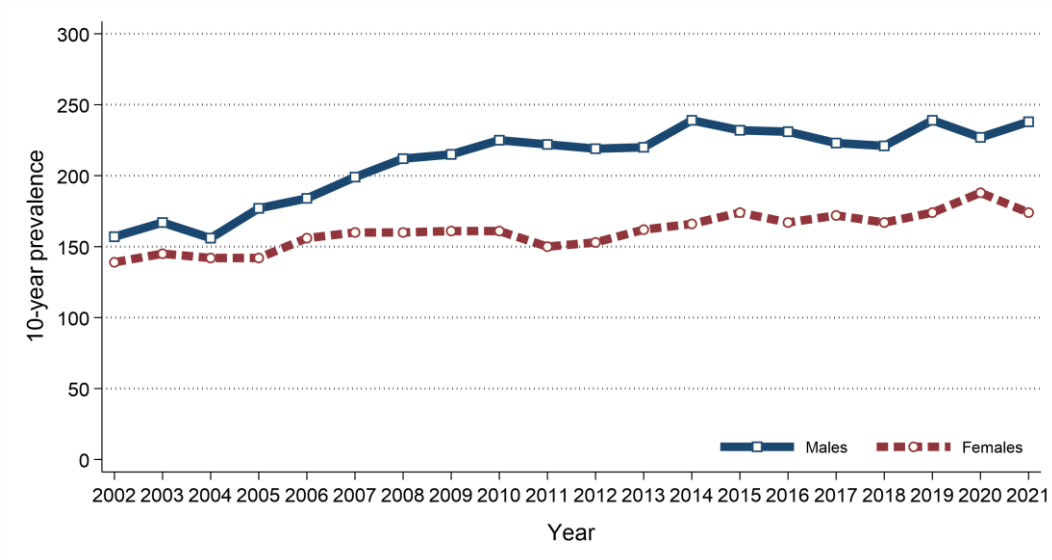
Table 5: 25-year prevalence of brain cancer by age at end of 2021

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	678	101	169	142	266
	0 to 74	644	86	165	136	257
	75 and over	34	15	4	6	9
Male	All ages	387	63	102	73	149
Female	All ages	291	38	67	69	117

PREVALENCE TRENDS

- 10-year prevalence of brain cancer among males increased between 2016 and 2021 by 3.0% from 231 survivors to 238 survivors.
- 10-year prevalence of brain cancer among females increased between 2016 and 2021 by 4.2% from 167 survivors to 174 survivors.

Figure 13: Trends in 10-year prevalence of brain cancer in 2002-2021



Year	10-year prevalence	
	Males	Females
2012	219	153
2013	220	162
2014	239	166
2015	232	174
2016	231	167
2017	223	172
2018	221	167
2019	239	174
2020	227	188
2021	238	174

MORTALITY

- There were 641 deaths from brain cancer (including central nervous system) during 2017-2021 in Northern Ireland. On average this was 128 deaths per year.
- During this period 41.7% of brain cancer deaths were among women (Male deaths: 374, Female deaths: 267). On average there were 75 male and 53 female deaths from brain cancer per year.
- Brain cancer deaths made up 3.1% of all male cancer deaths and 2.5% of all female cancer deaths.
- The median age of patients who died from brain cancer during 2017-2021 was 68 years (Males: 68, Females: 70).
- The risk of dying from brain cancer varied by age, with 32.9% of men and 36.0% of women who died from brain cancer aged 75 and over at death.
- In contrast, 20.3% of patients who died from brain cancer were aged 0 to 54 at death.

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

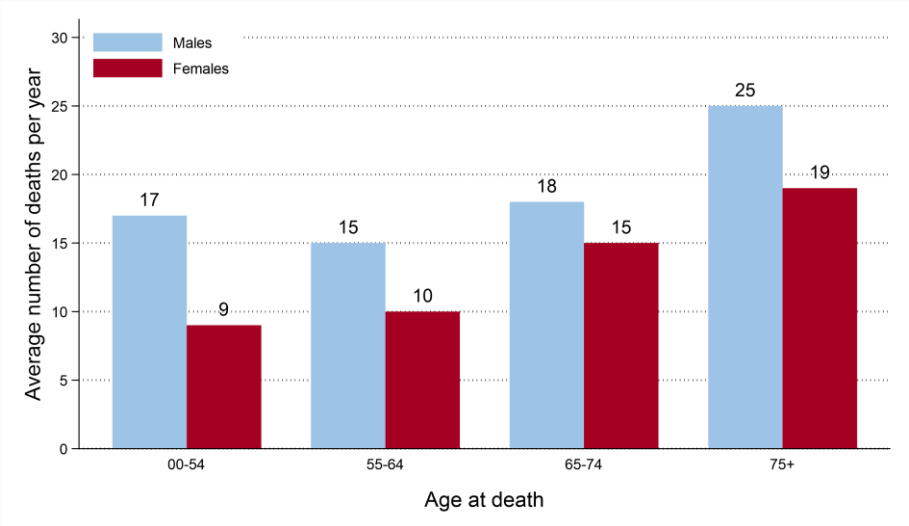
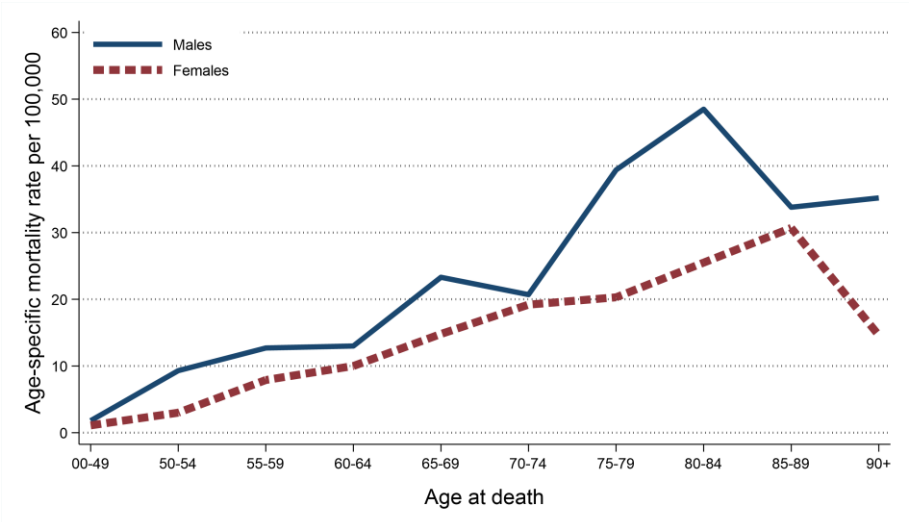


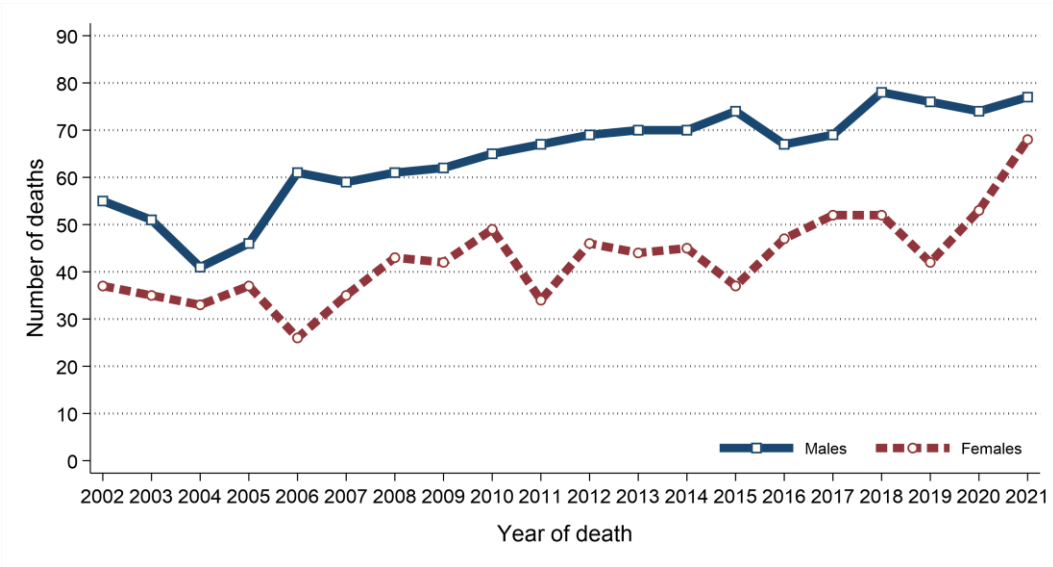
Figure 15: Age-specific mortality rates of brain cancer in 2017-2021



MORTALITY TRENDS

- The number of deaths from brain cancer among males increased between 2012-2016 and 2017-2021 by 6.9% from 350 deaths (70 deaths per year) to 374 deaths (75 deaths per year).
- The number of deaths from brain cancer among females increased between 2012-2016 and 2017-2021 by 21.9% from 219 deaths (44 deaths per year) to 267 deaths (53 deaths per year).

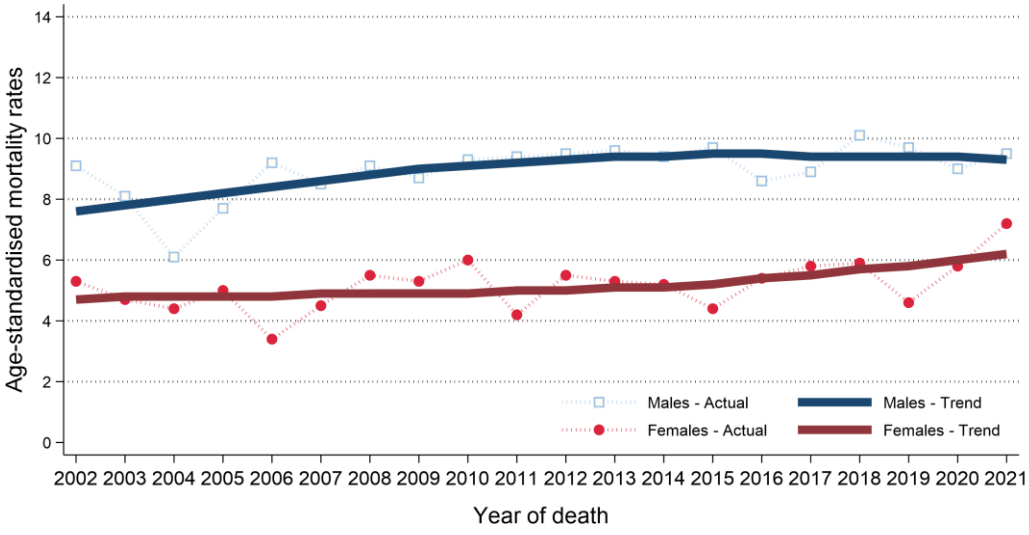
Figure 16: Trends in the number of deaths from brain cancer from 2002 to 2021



Year of death	Number of deaths	
	Males	Females
2012	69	46
2013	70	44
2014	70	45
2015	74	37
2016	67	47
2017	69	52
2018	78	52
2019	76	42
2020	74	53
2021	77	68

- Male age-standardised brain cancer mortality rates increased between 2012-2016 and 2017-2021 by 1.1% from 9.3 to 9.4 deaths per 100,000 males. This change was not statistically significant.
- Female age-standardised brain cancer mortality rates increased between 2012-2016 and 2017-2021 by 15.7% from 5.1 to 5.9 deaths per 100,000 females. This change was not statistically significant.

Figure 17: Trends in mortality rates of brain cancer 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 cancer 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 cancer 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.