
Cancer among children

1993-2021

(Excluding non-melanoma skin cancer)

(ICD10 codes: C00-C43, C45-C97; Aged 0-14)



Northern Ireland Cancer Registry, 2024

An official statistics publication

ABOUT THIS REPORT

Contents

This report includes information on incidence of cancer among children (excluding non-melanoma skin cancer) 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 ten 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. Cancer among children: 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

Phone: +44 (0)28 9097 6028 **e-mail:** nicr@qub.ac.uk

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.

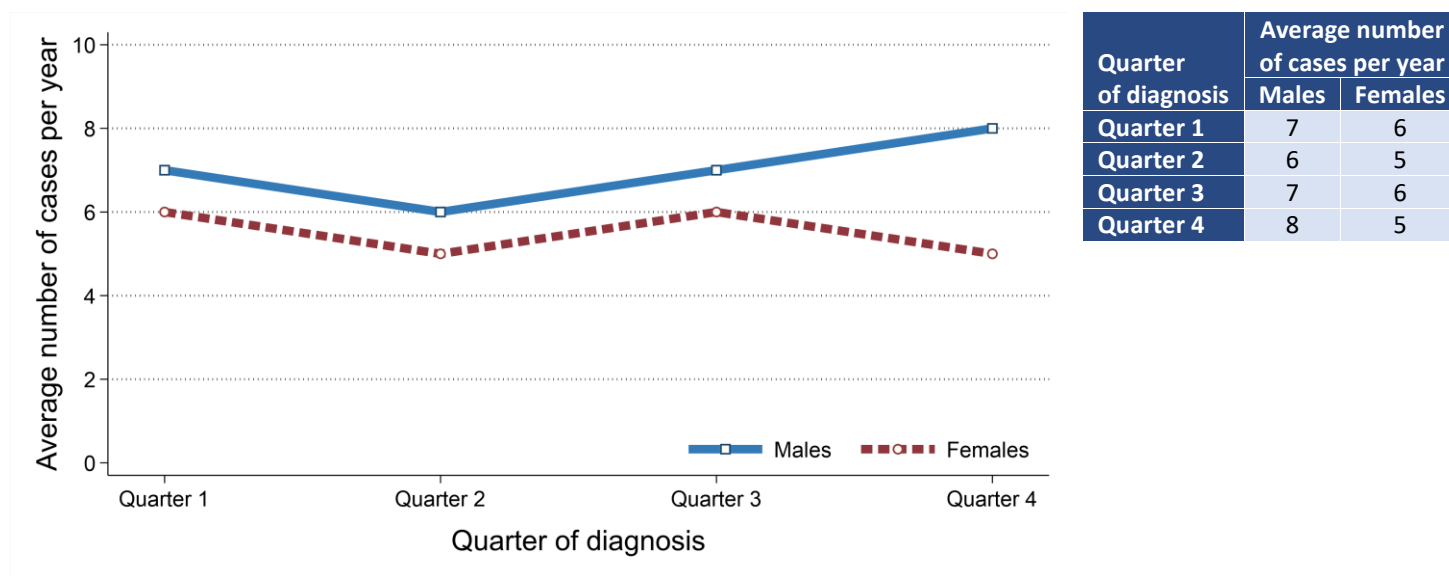
NICR is funded by the Public Health Agency and is based in Queen's University, Belfast.



INCIDENCE

- There were 497 cases of cancer among children (excluding non-melanoma skin cancer) diagnosed during 2012-2021 in Northern Ireland. On average this was 50 cases per year.
- During this period 44.1% of childhood cancer cases were among girls (Male cases: 278, Female cases: 219). On average there were 28 male and 22 female cases of cancer among children per year.
- The most common diagnosis quarter during 2012-2021 was quarter 4 among males with 8 cases per year and quarter 1 and quarter 3 among females with 6 cases per year.

Figure 1: Average number of cases of cancer among children per year in 2012-2021 by quarter of diagnosis



- The childhood cancer incidence rates for each gender were 14.8 cases per 100,000 males aged 0 to 14 and 12.3 cases per 100,000 females aged 0 to 14.

INCIDENCE BY CANCER TYPE

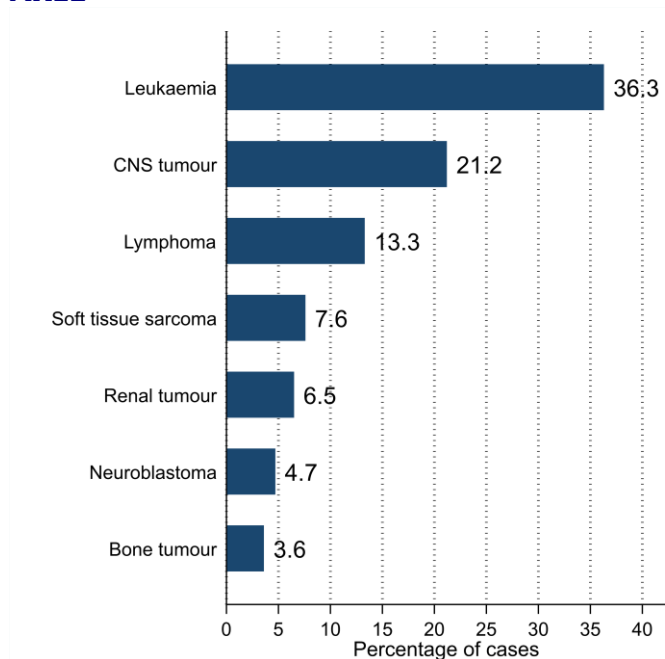
- During 2012-2021 the most common childhood cancer types among males were leukaemia, myeloproliferative disease, and myelodysplastic disease (36.3%), central nervous system and miscellaneous intracranial and intraspinal neoplasm (21.2%) and lymphoma and reticuloendothelial neoplasm (13.3%).
- Among females they were leukaemia, myeloproliferative disease, and myelodysplastic disease (32.0%), central nervous system and miscellaneous intracranial and intraspinal neoplasm (20.5%) and renal tumour (8.7%).

Table 1: Number of cases of cancer among children diagnosed in 2012-2021 by cancer type

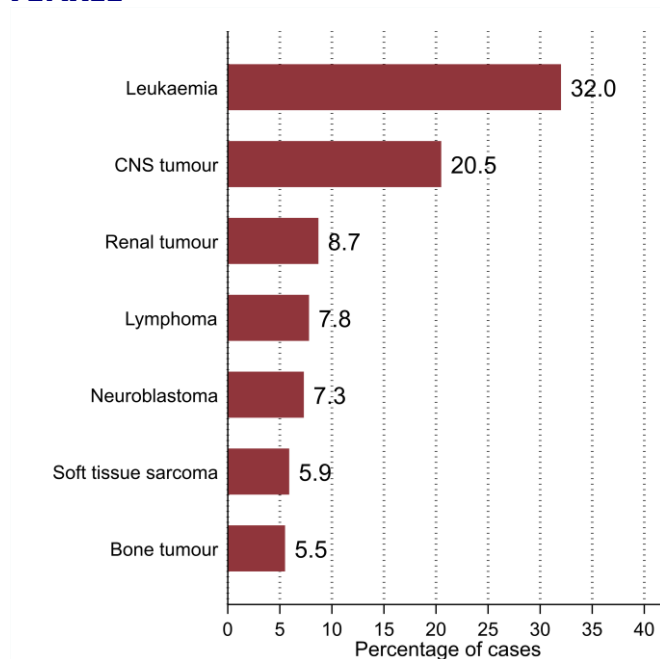
Cancer type	All persons		Male		Female	
	Total cases in period	Average cases per year	Total cases in period	Average cases per year	Total cases in period	Average cases per year
Cancer among children	497	50	278	28	219	22
Central nervous system and miscellaneous intracranial and intraspinal neoplasm	104	10	59	6	45	5
Leukaemia, myeloproliferative disease, and myelodysplastic disease	171	17	101	10	70	7
Lymphoma and reticuloendothelial neoplasm	54	5	37	4	17	2
Malignant bone tumour	22	2	10	1	12	1
Neuroblastoma and other peripheral nervous cell tumour	29	3	13	1	16	2
Renal tumour	37	4	18	2	19	2
Soft tissue and other extrasosseous sarcoma	34	3	21	2	13	1
Other cancer among children	46	5	19	2	27	3

Figure 2: Proportion of cases of cancer among children in 2012-2021 by cancer type

MALE



FEMALE

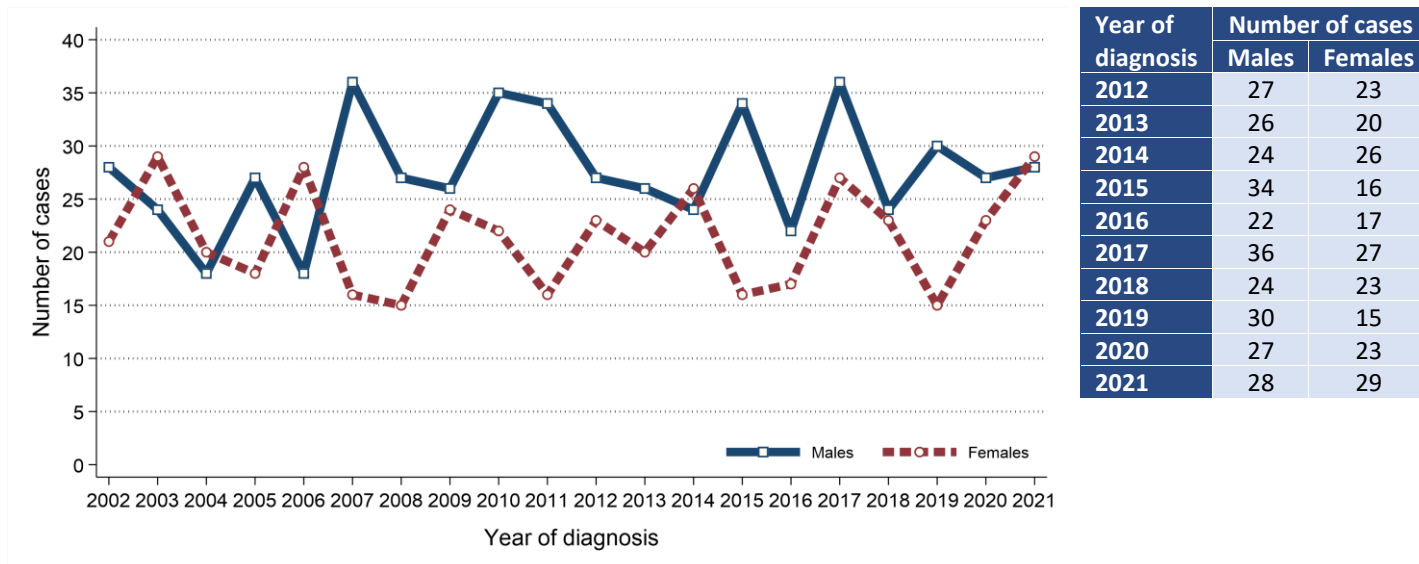


Note: CNS tumour = Central nervous system and miscellaneous intracranial and intraspinal neoplasm, Leukaemia = Leukaemia, myeloproliferative disease, and myelodysplastic disease, Lymphoma = Lymphoma and reticuloendothelial neoplasm, Neuroblastoma = Neuroblastoma and other peripheral nervous cell tumour, Soft tissue sarcoma = Soft tissue and other extrasosseous sarcoma.

INCIDENCE TRENDS

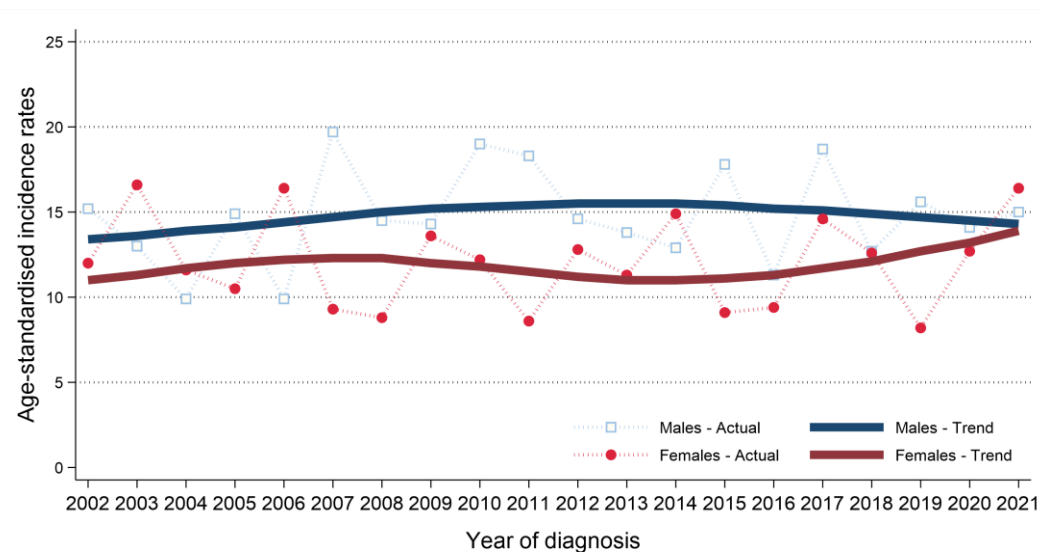
- The number of cases of childhood cancer among males increased between 2012-2016 and 2017-2021 by 9.0% from 133 cases (27 cases per year) to 145 cases (29 cases per year).
- The number of cases of childhood cancer among females increased between 2012-2016 and 2017-2021 by 14.7% from 102 cases (20 cases per year) to 117 cases (23 cases per year).

Figure 3: Trends in number of cases of cancer among children diagnosed from 2002 to 2021



- Male age-standardised childhood cancer incidence rates increased between 2012-2016 and 2017-2021 by 7.8% from 14.1 to 15.2 cases per 100,000 males aged 0 to 14. This change was not statistically significant.
- Female age-standardised childhood cancer incidence rates increased between 2012-2016 and 2017-2021 by 12.2% from 11.5 to 12.9 cases per 100,000 females aged 0 to 14. This change was not statistically significant.

Figure 4: Trends in incidence rates of cancer among children 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).

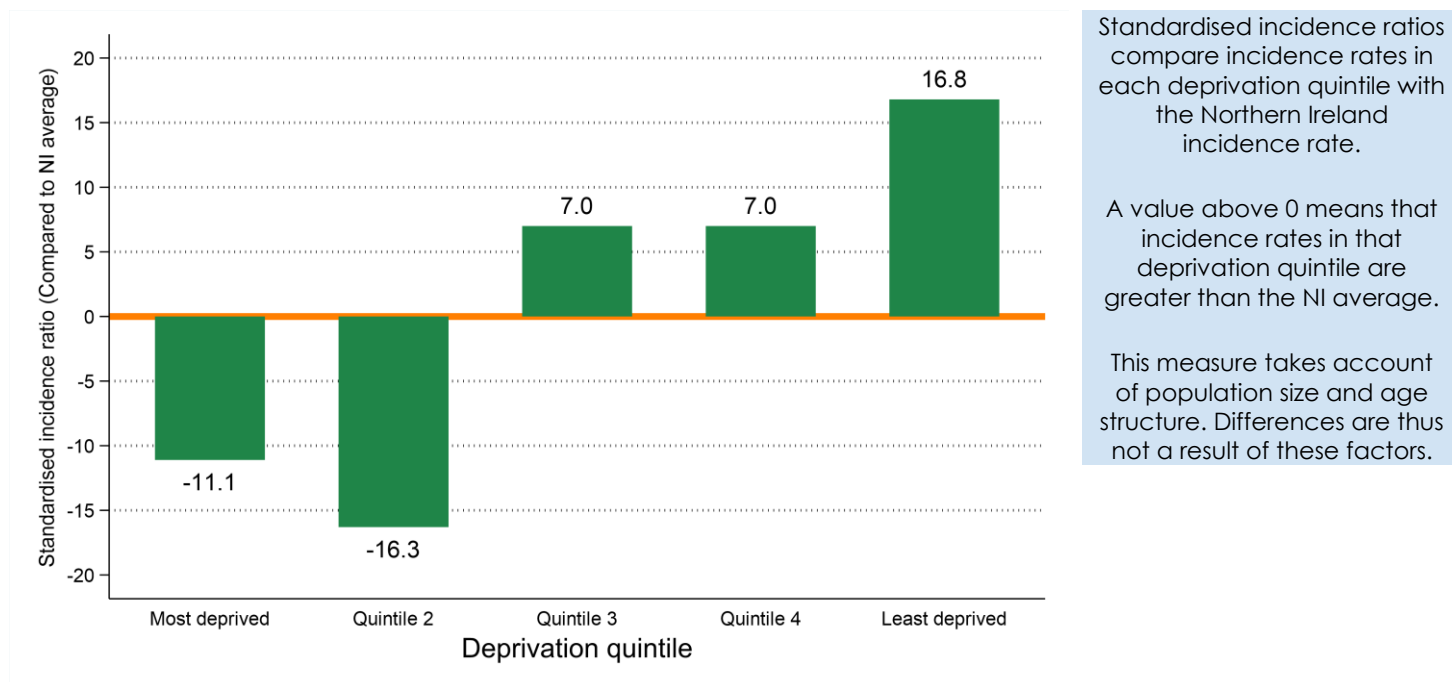
INCIDENCE BY DEPRIVATION

- The number of cases of cancer among children diagnosed during 2012-2021 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 2: Number of cases of cancer among children diagnosed in 2012-2021 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	497	50	278	28	219	22
Most deprived
Quintile 2	91	9	51	5	40	4
Quintile 3	88	9	45	5	43	4
Quintile 4	112	11	59	6	53	5
Least deprived	108	11	69	7	39	4
Unknown	98	10	54	5	44	4
Unknown	0	0	0	0	0	0

Figure 5: Standardised incidence ratio comparing deprivation quintile to Northern Ireland for cancer among children diagnosed in 2012-2021



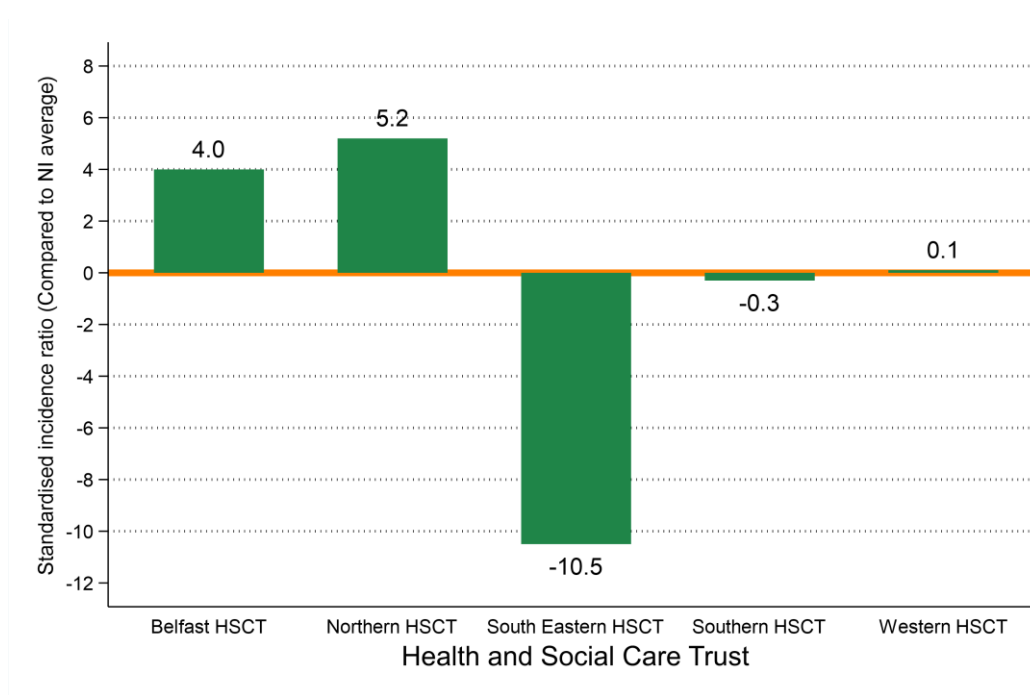
INCIDENCE BY HEALTH AND SOCIAL CARE TRUST

- The number of cases of cancer among children diagnosed during 2012-2021 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 3: Number of cases of cancer among children diagnosed in 2012-2021 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	497	50	278	28	219	22
Belfast HSCT	92	9	53	5	39	4
Northern HSCT	129	13	82	8	47	5
South Eastern HSCT	82	8	43	4	39	4
Southern HSCT	111	11	64	6	47	5
Western HSCT	83	8	36	4	47	5
Unknown	0	0	0	0	0	0

Figure 6: Standardised incidence ratio comparing Health and Social Care Trust to Northern Ireland for cancer among children diagnosed in 2012-2021



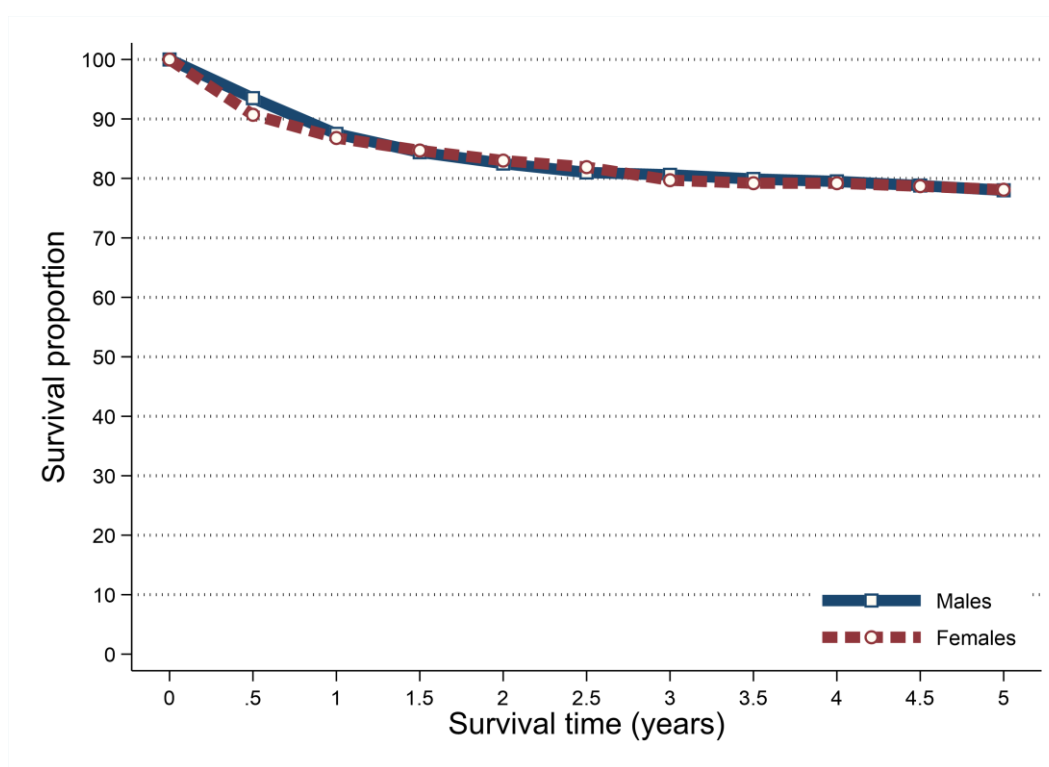
SURVIVAL

- 87.2% of children aged 0-14 were alive one year and 77.9% were alive five years from a cancer diagnosis in 2007-2016. (observed survival)
- Among children net survival (NS), which removes the effect of deaths from causes unrelated to cancer, was 87.2% one year and 78.1% five years from a cancer diagnosis in 2007-2016.
- Five-year net survival for cancer among children diagnosed in 2007-2016 was 78.0% among boys and 78.1% among girls.

Table 4: Survival from cancer among children diagnosed in 2007-2016

Time since diagnosis	All persons		Male		Female	
	Observed survival	Net survival	Observed survival	Net survival	Observed survival	Net survival
6 months	92.3%	92.4%	93.5%	93.5%	90.7%	90.7%
One year	87.2%	87.2%	87.4%	87.5%	86.8%	86.8%
Two years	82.6%	82.7%	82.4%	82.5%	83.0%	83.0%
Five years	77.9%	78.1%	77.8%	78.0%	78.0%	78.1%

Figure 7: Net survival from cancer among children diagnosed in 2007-2016



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.

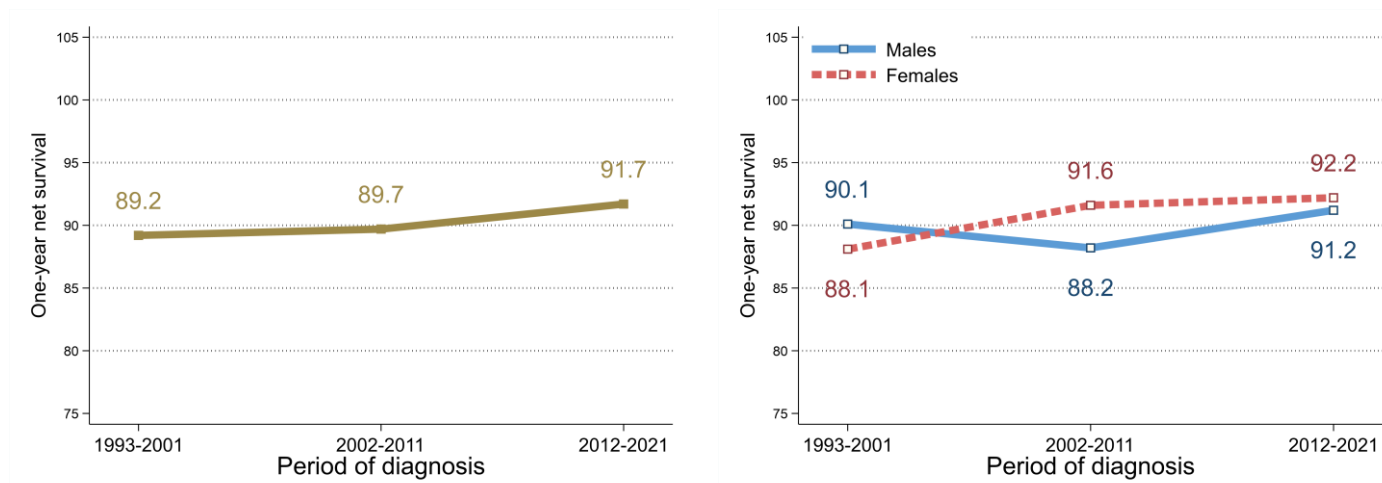
Net survival provides an estimate of patient survival which has been adjusted to take account of deaths unrelated to cancer. It is more widely used to assess the impact of changes in cancer care on patient survival.

SURVIVAL TRENDS

ONE-YEAR NET SURVIVAL

- Between 2002-2011 and 2012-2021 there was no significant change in one-year survival (NS) from cancer among children aged 0 to 14.
- Between 1993-2001 and 2012-2021 there was no significant change in one-year survival (NS) from cancer among children aged 0 to 14.

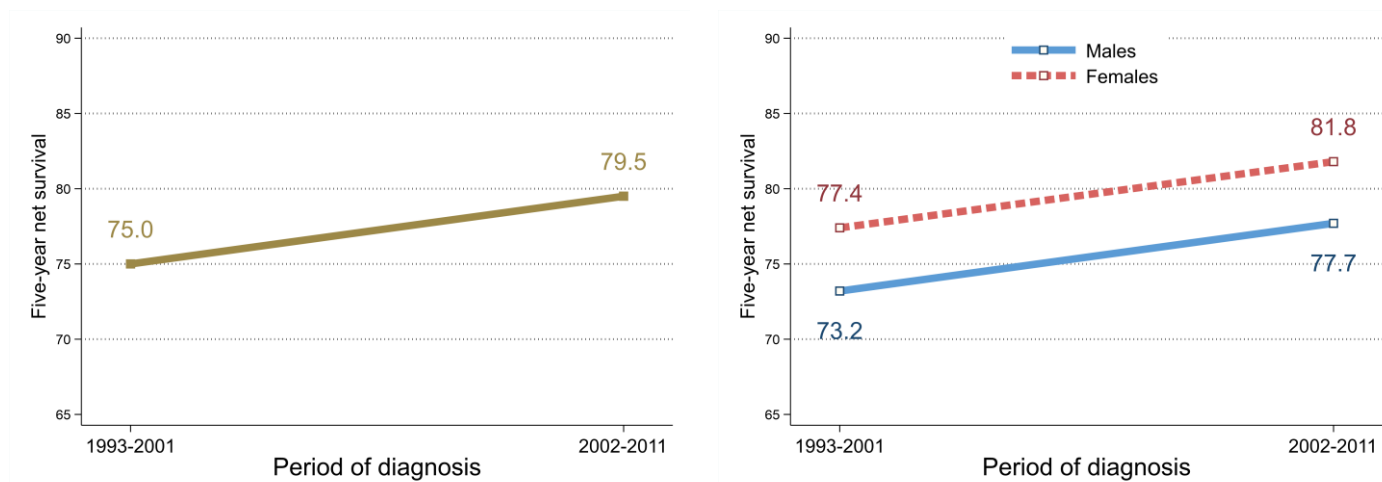
Figure 8: Trends in one-year net survival from cancer among children in 1993-2021



FIVE-YEAR NET SURVIVAL

- Between 1993-2001 and 2002-2011 there was no significant change in five-year survival (NS) from cancer among children aged 0 to 14.

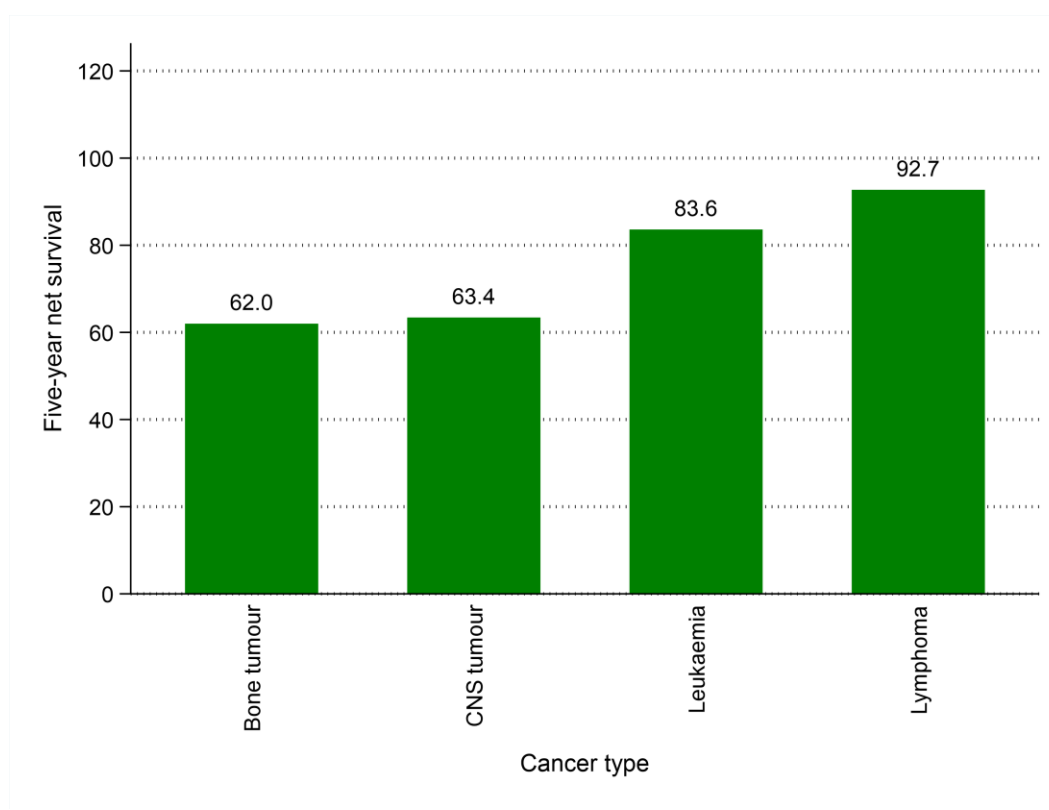
Figure 9: Trends in five-year net survival from cancer among children in 1993-2011



SURVIVAL BY CANCER TYPE

- Five-year survival (NS) for children aged 0 to 14 diagnosed in 2007-2016 ranged from 92.7% for lymphoma and reticuloendothelial neoplasm to 62.0% for malignant bone tumour.
- In particular five-year survival (NS) for the most common childhood cancer types was 83.6% for leukaemia, myeloproliferative disease, and myelodysplastic disease, 63.4% for central nervous system and miscellaneous intracranial and intraspinal neoplasm, 92.7% for lymphoma and reticuloendothelial neoplasm and 62.0% for malignant bone tumour.

Figure 10: Five-year net survival from cancer among children diagnosed in 2007-2016 by cancer type



Note: CNS tumour = Central nervous system and miscellaneous intracranial and intraspinal neoplasm, Leukaemia = Leukaemia, myeloproliferative disease, and myelodysplastic disease, Lymphoma = Lymphoma and reticuloendothelial neoplasm.

- Five-year survival (NS) did not change significantly for any childhood cancer type between 1997-2006 and 2007-2016.

Table 5: Trends in five-year net survival from cancer among children diagnosed in 1997-2016

Cancer type	All persons	
	1997-2006	2007-2016
Central nervous system and miscellaneous intracranial and intraspinal neoplasm	71.3%	63.4%
Leukaemia, myeloproliferative disease, and myelodysplastic disease	82.9%	83.6%
Lymphoma and reticuloendothelial neoplasm	95.2%	92.7%
Malignant bone tumour	71.6%	62.0%

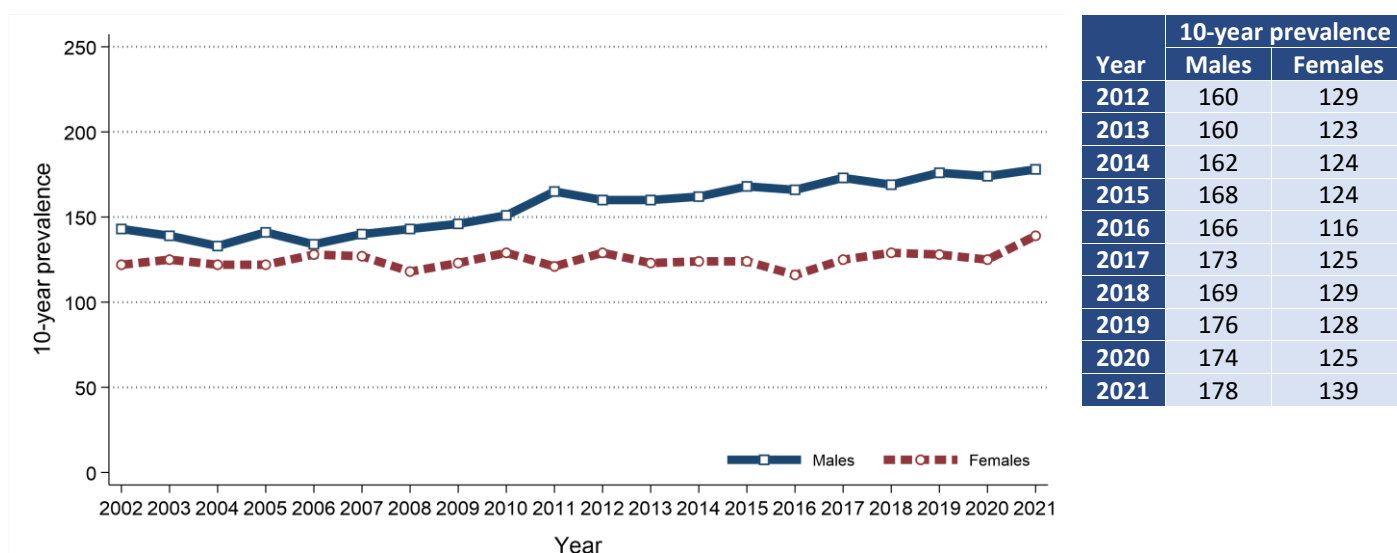
PREVALENCE

- At the end of 2021, there were 363 children (Males: 202; Females: 161) living with cancer who had been diagnosed with the disease during 2007-2021.
- Of these 15.2% had been diagnosed in the previous year (one-year prevalence) and 87.3% in the previous 10 years (ten-year prevalence).
- At the end of 2021 the most prevalent childhood cancer types were leukaemia, myeloproliferative disease, and myelodysplastic disease (146 survivors) and central nervous system and miscellaneous intracranial and intraspinal neoplasms (63 survivors).

PREVALENCE TRENDS

- 10-year prevalence of childhood cancer among males increased between 2016 and 2021 by 7.2% from 166 survivors to 178 survivors.
- 10-year prevalence of childhood cancer among females increased between 2016 and 2021 by 19.8% from 116 survivors to 139 survivors.

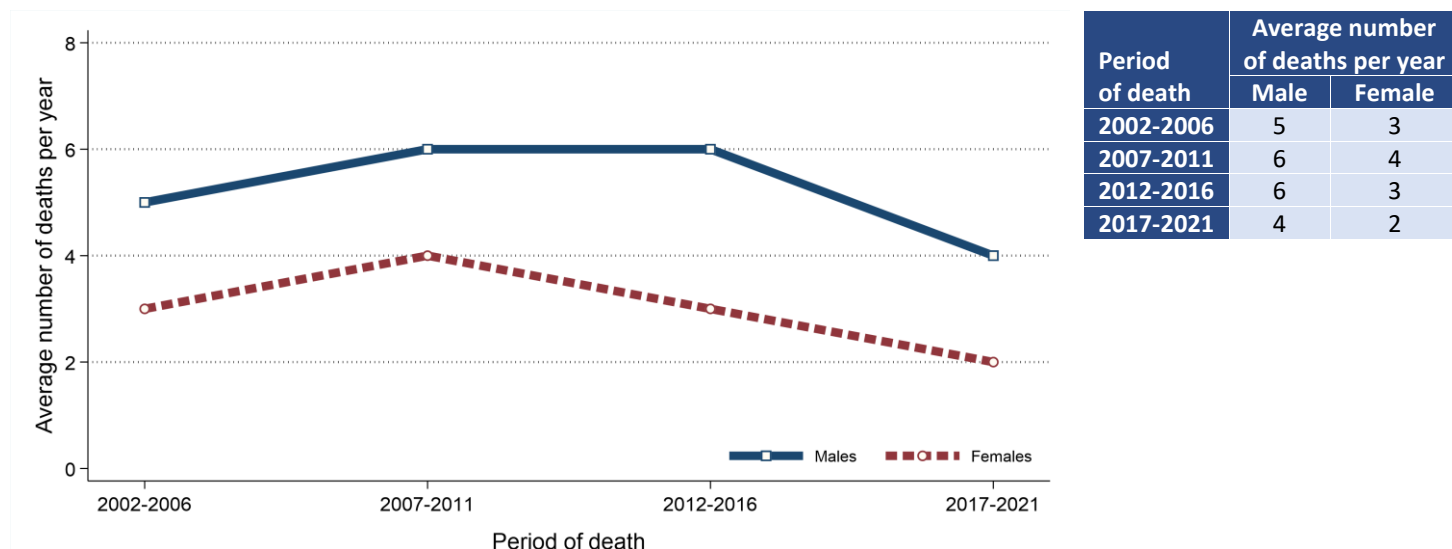
Figure 11: Trends in 10-year prevalence of cancer among children in 2002-2021



MORTALITY

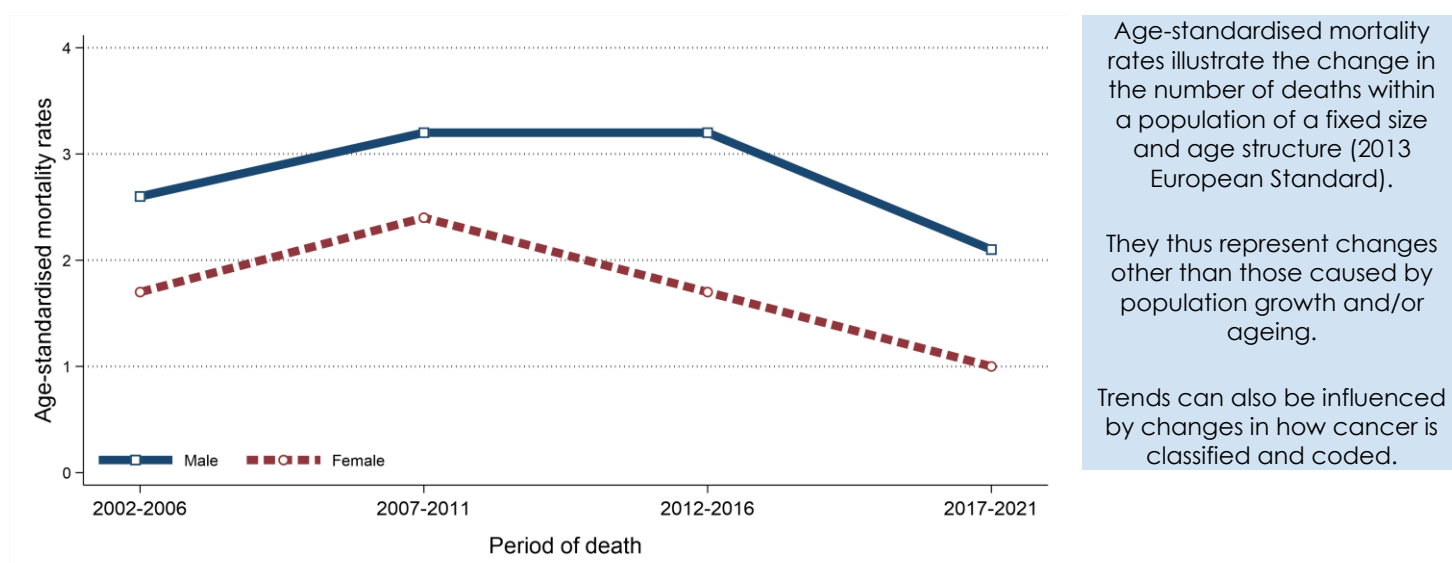
- There were 74 deaths from cancer among children (excluding non-melanoma skin cancer) during 2012-2021 in Northern Ireland. On average this was 7 deaths per year.
- During this period 32.4% of childhood cancer deaths were among girls (Male deaths: 50, Female deaths: 24). On average there were 5 male and 2 female deaths from cancer among children per year.
- The number of deaths from childhood cancer among males decreased between 2012-2016 and 2017-2021 by 33.3% from 30 deaths (6 deaths per year) to 20 deaths (4 deaths per year).
- The number of deaths from childhood cancer among females decreased between 2012-2016 and 2017-2021 by 40.0% from 15 deaths (3 deaths per year) to 9 deaths (2 deaths per year).

Figure 12: Trends in average number of deaths per year from cancer among children from 2002 to 2021



- Male age-standardised childhood cancer mortality rates decreased between 2012-2016 and 2017-2021 by 34.4% from 3.2 to 2.1 deaths per 100,000 males aged 0 to 14. This change was not statistically significant.
- Female age-standardised childhood cancer mortality rates decreased between 2012-2016 and 2017-2021 by 41.2% from 1.7 to 1.0 deaths per 100,000 females aged 0 to 14. This change was not statistically significant.

Figure 13: Trends in mortality rates of cancer among children from 2002 to 2021



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. cancer among children 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. cancer among children 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.