Cancer among children

(excluding non-melanoma skin cancer)

Patients diagnosed 1993-2019
(Ages 0 to 14; ICD10: C00-C43, C45-C97)

Further information

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

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Acknowledgements

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.
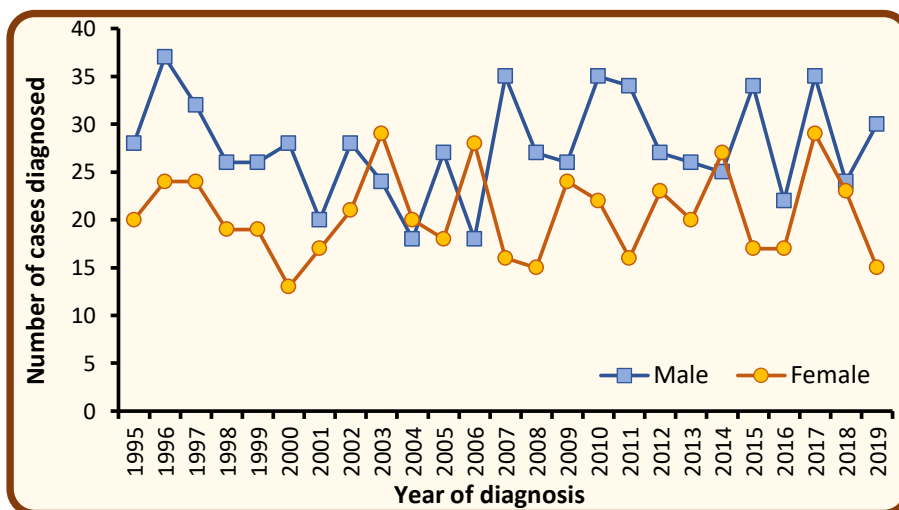
Incidence

▪ During 2010-2019 there were 29 male and 21 female cases of cancer (ex NMSC) diagnosed among children (ages 0 to 14) each year.

▪ Cancer (ex NMSC) among children made up 0.6% of all male, and 0.4% of female cancers (ex NMSC) from all age groups.

## Incidence by year of diagnosis - *Cancer among children, Cases in 1995-2019*

▪ The number of cases of cancer (ex NMSC) among children increased by 16.0% among males and increased by 5.0% among females between 2000-2009 and 2010-2019.

Year of diagnosis	Male	Female	Both sexes
2010	35	22	57
2011	34	16	50
2012	27	23	50
2013	26	20	46
2014	25	27	52
2015	34	17	51
2016	22	17	39
2017	35	29	64
2018	24	23	47
2019	30	15	45

Trends in age-standardised incidence rates - *Cancer among children, Cases in 1995-2019*

▪ Among boys aged 0-14 age-standardised incidence rates of cancer (ex NMSC) increased by 14.0% from 13.6 per 100,000 person years in 2000-2009 to 15.5 cases per 100,000 persons years in 2010-2019. This difference was not statistically significant.

▪ Among girls aged 0-14 age-standardised incidence rates of cancer (ex NMSC) increased by 0.9% from 11.5 per 100,000 person years in 2000-2009 to 11.6 cases per 100,000 persons years in 2010-2019. This difference was not statistically significant.
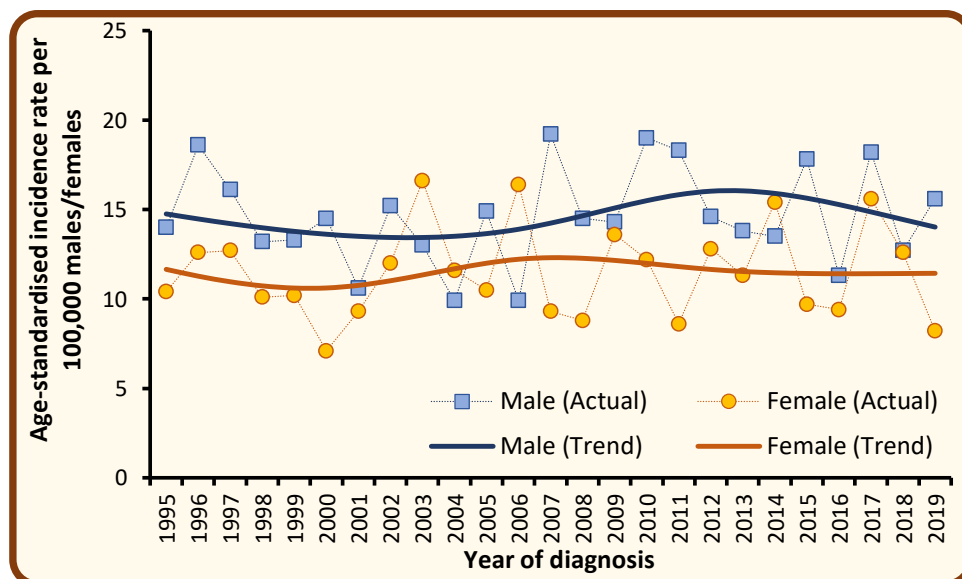
Age-standardised incidence rates illustrate the change in the number of cases within a population of a fixed size and age structure (2013 European Standard).
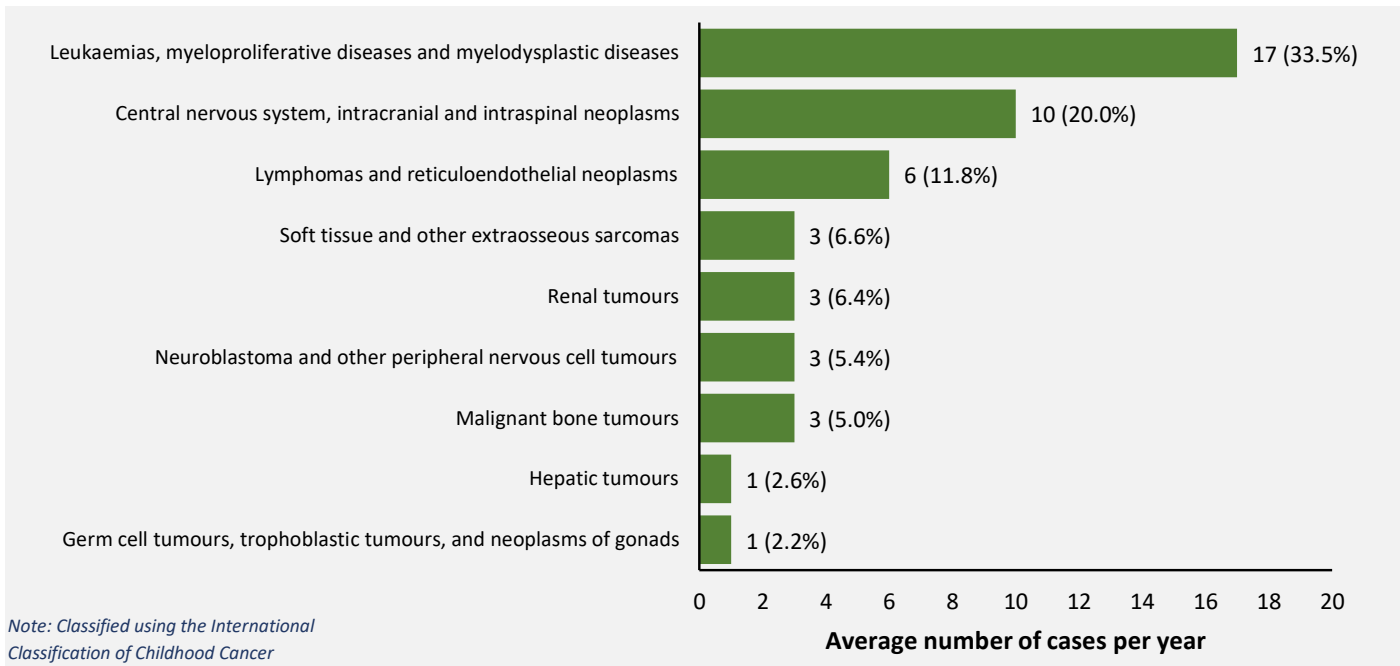
They thus represent changes other than those caused by population growth and/or ageing.

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).

Note: Annual averages have been rounded to the nearest integer. Sums of numbers in table rows or columns may thus differ slightly from the given total.

NMSC: Non-melanoma skin cancer

Incidence by cancer type - *Cancer among children, Cases in 2010-2019*

The most common cancer types among children aged 0-14 (excluding NMSC), were leukaemias, myeloproliferative diseases and myelodysplastic diseases (33.5%), central nervous system, intracranial and intraspinal neoplasms (20.0%) and lymphomas and reticuloendothelial neoplasms (11.8%).

Cancer type	Average number of cases per year
Leukaemias, myeloproliferative diseases and myelodysplastic diseases	17 (33.5%)
Central nervous system, intracranial and intraspinal neoplasms	10 (20.0%)
Lymphomas and reticuloendothelial neoplasms	6 (11.8%)
Soft tissue and other extraosseous sarcomas	3 (6.6%)
Renal tumours	3 (6.4%)
Neuroblastoma and other peripheral nervous cell tumours	3 (5.4%)
Malignant bone tumours	3 (5.0%)
Hepatic tumours	1 (2.6%)
Germ cell tumours, trophoblastic tumours, and neoplasms of gonads	1 (2.2%)

Note: Classified using the International Classification of Childhood Cancer

Average number of cases per year

Incidence by deprivation quintile - *Cancer among children, Cases in 2010-2019*

The annual number of cases during 2010-2019 varied in each deprivation quintile due to variations in population size and age.
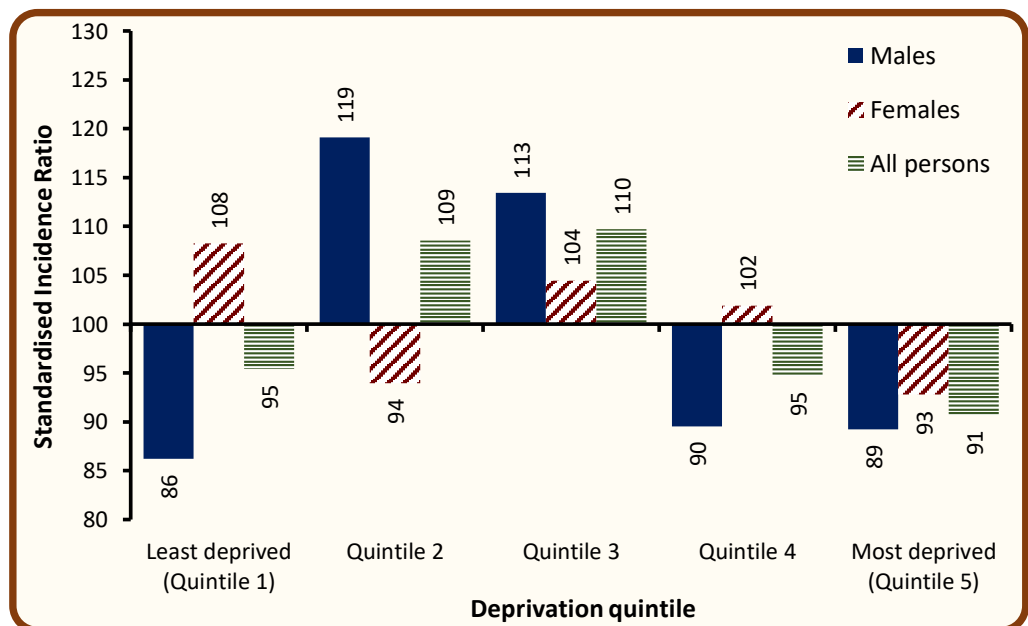
After accounting for these factors, incidence rates:

▪ 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.

Deprivation quintile	Average cases per year		
	Male	**Female**	**Both sexes**
Least deprived (Quintile 1)	4	4	8
Quintile 2	7	4	11
Quintile 3	7	5	12
Quintile 4	6	5	10
Most deprived (Quintile 5)	5	4	9
Northern Ireland	29	21	50

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

A value above 100 means that incidence rates in that deprivation quintile are greater than the Northern Ireland average.

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

Deprivation quintile	Males	Females	All persons
Least deprived (Quintile 1)	86	108	95
Quintile 2	119	94	109
Quintile 3	113	104	110
Quintile 4	90	102	95
Most deprived (Quintile 5)	89	93	91

Standardised Incidence Ratio / **Deprivation quintile**

Incidence by Health and Social Care Trust (HSCT) - *Cancer among children, Cases in 2010-2019*

The annual number of cases during 2010-2019 varied in each HSCT 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.

Health and Social Care Trust	Average cases per year		
	Male	Female	Both sexes
Belfast HSCT	5	3	8
Northern HSCT	9	5	13
South-Eastern HSCT	5	4	9
Southern HSCT	6	5	11
Western HSCT	5	4	9
Northern Ireland	29	21	50
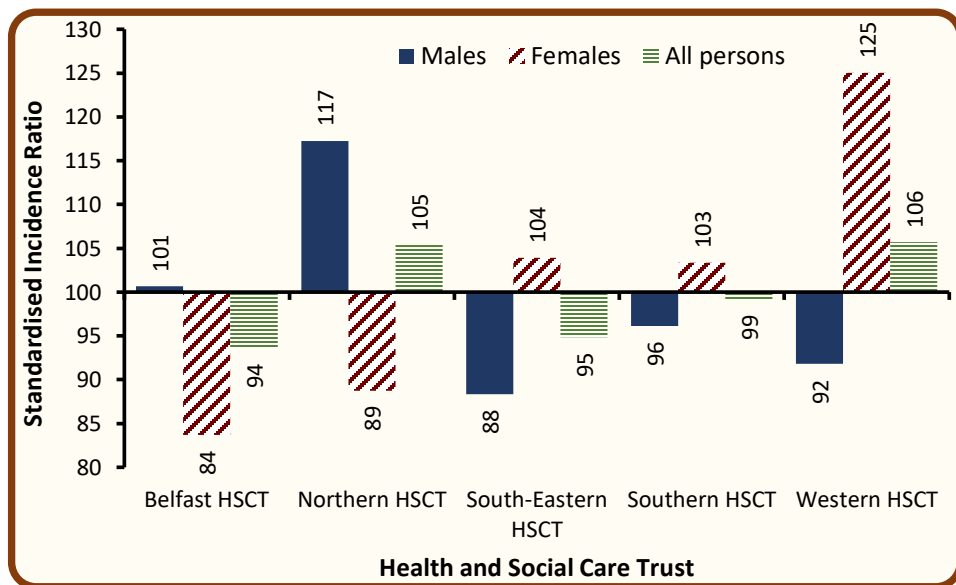
Standardised incidence ratios compare incidence rates in each HSC Trust with the Northern Ireland incidence rate.

A value above 100 means that incidence rates in that HSC Trust 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.

Data for Local Government Districts and Parliamentary Constituencies are available at www.qub.ac.uk/research-centres/nicr

Survival

- 88.1% of patients aged 0-14 were alive one year and 78.5% were alive five years from a cancer (ex NMSC) diagnosis in 2005-2014. (observed survival)
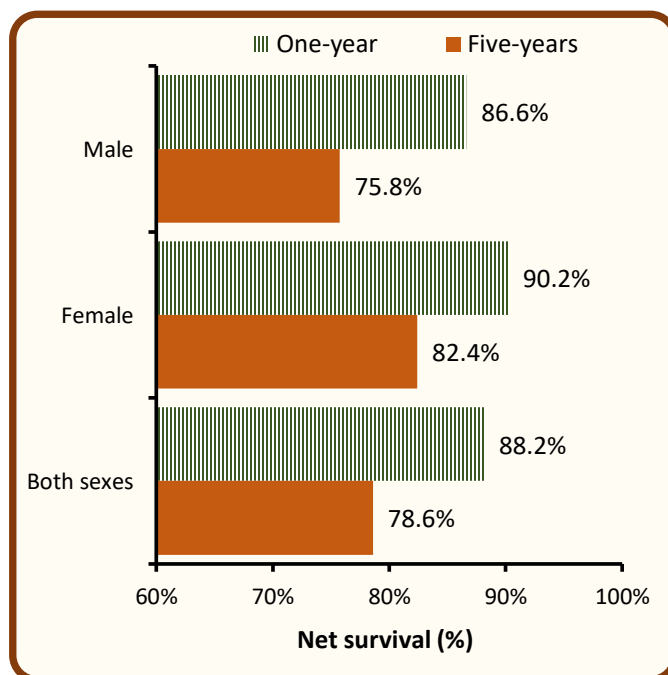
- Net survival, which removes the effect of deaths from causes unrelated to cancer, was 88.2% one year and 78.6% five years from a cancer (ex NMSC) diagnosis among those aged 0-14 in 2005-2014.

- Five-year net survival for patients aged 0-14 and diagnosed in 2005-2014 was 75.8% among boys and 82.4% among girls.

| Gender	Observed survival		Net survival	
	One-year	Five-years	One-year	Five-years
Male	86.6%	75.7%	86.6%	75.8%
Female	90.2%	82.4%	90.2%	82.4%
Both sexes	88.1%	78.5%	88.2%	78.6%

Observed survival is the proportion of patients still alive one/five years after diagnosis. However, in this measure patients may have died from causes unrelated to their cancer.

Net survival is the proportion of patients who would survive if the patient could not die from causes unrelated to their cancer. This measure is more typically used in studies of cancer survival.

▪ Among boys aged 0-14 five-year net survival from cancer (ex NMSC) increased from 75.0% in 1995-2004 to 75.8% in 2005-2014. This difference was not statistically significant.

▪ Among girls aged 0-14 five-year net survival from cancer (ex NMSC) increased from 76.6% in 1995-2004 to 82.4% in 2005-2014. This difference was not statistically significant.
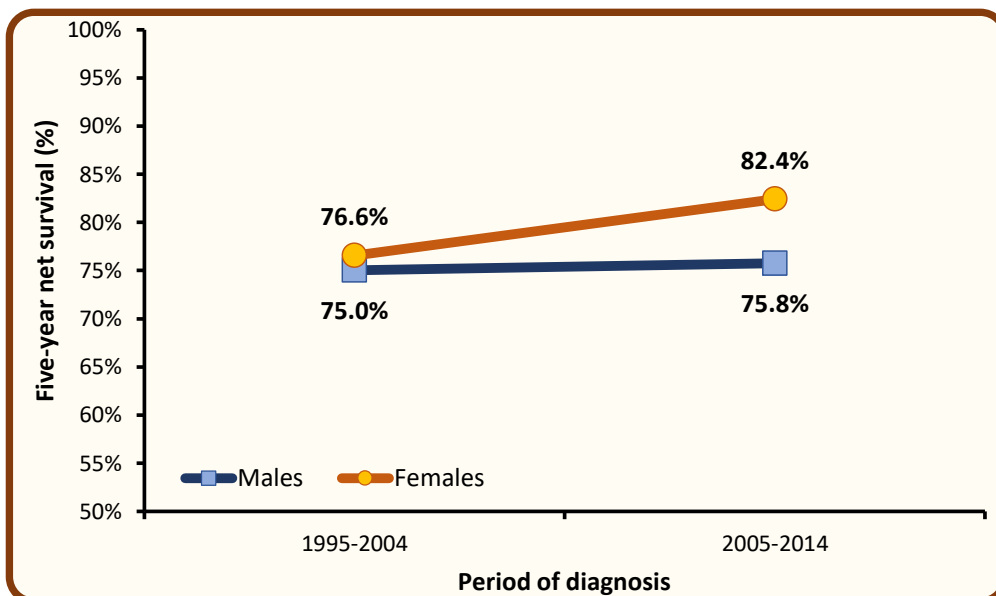
Survival by cancer type - *Cancer among children, Patients diagnosed in 2005-2014*

▪ Five-year net survival for patients diagnosed in 2005-2014 ranged from 100.0% for renal tumours to 53.4% for malignant bone tumours.

▪ In particular five-year net survival for the most common cancer types was 84.0% for leukaemias, myeloproliferative diseases and myelodysplastic diseases, 96.2% for lymphomas and reticuloendothelial neoplasms and 62.8% for central nervous system, intracranial and intraspinal neoplasms.
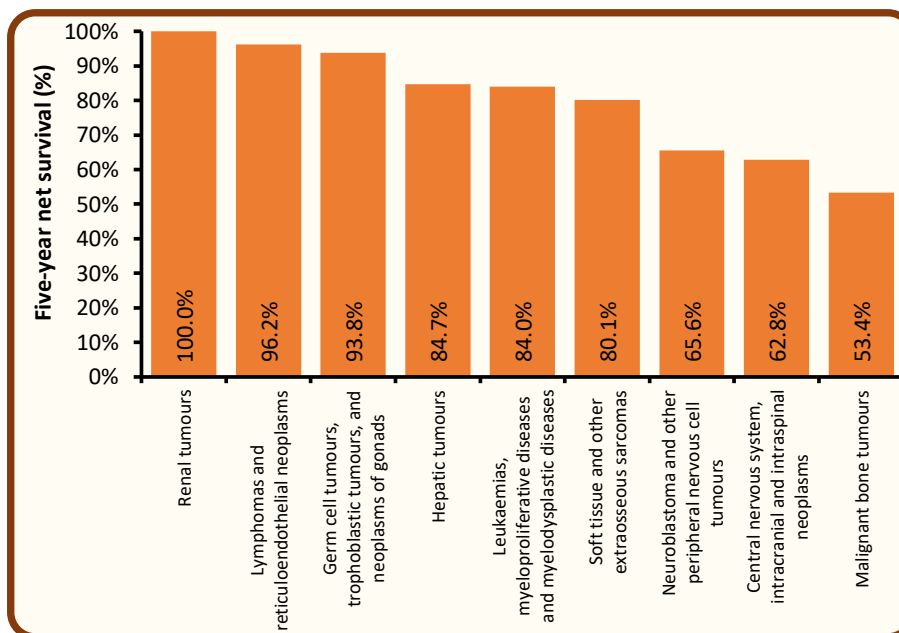
Note: Classified using the International Classification of Childhood Cancer. Survival only calculated for cancer types with more than 10 cases.

Prevalence

▪ At the end of 2019, there were 344 children (Males: 200; Females: 144) living with cancer (ex NMSC) who had previously been diagnosed with the disease.

| Prevalence type	Male	Female	Both sexes
10-year prevalence	175	130	305
Complete prevalence	200	144	344

▪ While complete prevalence figures are quoted for cancer patients who were still children at the end of 2019, there are additional cancer survivors who were diagnosed with cancer as children, but are now adults.

10-year prevalence refers to the number of cancer survivors who were alive at the end of 2019 and had been diagnosed with their cancer in the previous 10 years (i.e. 2009-2019).

▪ In total there were, 404 cancer (ex NMSC) patients diagnosed at ages 0-14 during 2010-2019 who were still alive at the end of 2019 (and aged up to 24), while there were 880 cancer patients (ex NMSC) diagnosed at ages 0-14 during 1995-2019 who were still alive (and aged up to 39) at the end of 2019.

Complete prevalence by cancer type *- Cancer among children, Patients alive at end of 2019*

The most prevalent cancer types among cancer survivors aged 0-14 at the end of 2019 (ex NMSC), were leukaemias, myeloproliferative diseases and myelodysplastic diseases (132 survivors) and central nervous system, intracranial and intraspinal neoplasms (60 survivors).

Note: Classified using the International Classification of Childhood Cancer
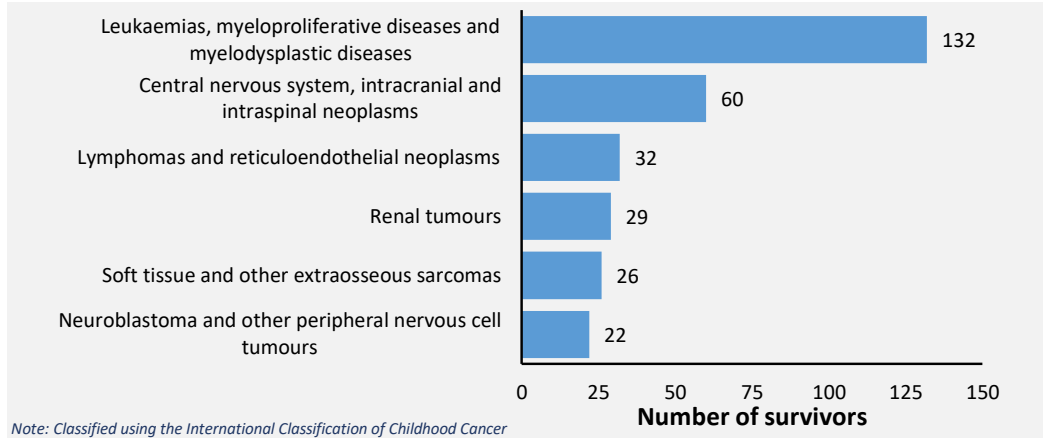
Trends in 10-year prevalence *- Cancer among children, Patients alive at end of each year from 2010-2019*

▪ The number of survivors from cancer (ex NMSC) aged 0-14 who had been diagnosed within the previous ten years increased by 13.0% from 270 survivors in 2009 to 305 survivors in 2019.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Both sexes	282	287	289	283	287	293	283	299	299	305

Mortality

During 2010-2019 there were 5 male and 3 female deaths among children from cancer (ex NMSC) each year.

Deaths by year of death *- Cancer among children, Deaths in 2010-2019*

▪ Among children aged 0-14 the number of deaths from cancer (ex NMSC) decreased by 11.1% from an annual average of 9 deaths in 2000-2009 to 8 deaths in 2010-2019.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Both sexes	8	11	10	7	11	11	6	7	3	9

Trends in age-standardised mortality rates *- Cancer among children, Deaths in 1995-2019*

▪ Among children aged 0-14 the age-standardised mortality rates from cancer (ex NMSC) decreased by 8.0% between 2000-2009 and 2010-2019 from 2.5 to 2.3 deaths per 100,000 persons years. This difference was not statistically significant.
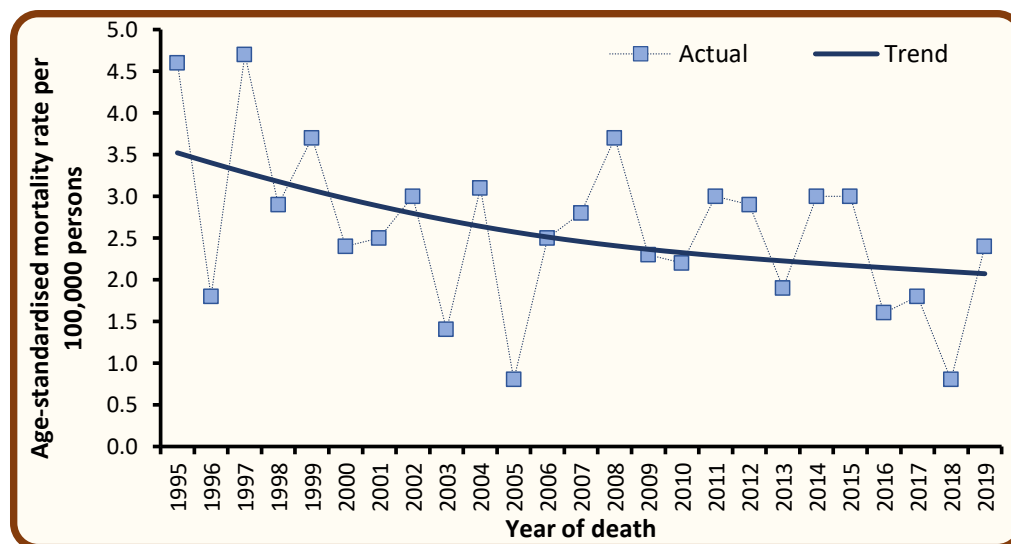
Mortality data are provided by the Northern Ireland General Registrar Office via the Department of Health.

Counts of the number of deaths are based upon the year that death occurred, and upon the primary cause of death only.

Age-standardised mortality rates remove changes over time caused by population growth and/or ageing.

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 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 are assigned based on a patient's postcode of usual residence at diagnosis using the Jan 2021 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).

A **crude incidence/mortality rate** is 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.

An **age-standardised incidence/mortality rate** per 100,000 person years is an estimate 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.

A **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

Confidence intervals are a measure of the precision of a statistic (e.g. colorectal 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. cervical 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 2019 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.

Observed survival refers to the proportion of patients who survive a specified amount of time from their date of diagnosis. Observed survival considers death from any cause and is not adjusted for the age of the patient. Cause of death may be unrelated to the cancer the patient has been diagnosed with.

Net Survival is an estimate of survival where the effect on survival of background population mortality rates has been removed. It represents the [theoretical] survival of cancer patients if they could only die from cancer-related causes. Age-standardised net survival estimates are the estimates that would occur if that population of cancer patients had a standard population age structure. The age groups and weights used here are those used by international studies such as EUROCARE, an international study group that compares cancer survival among European countries. However, due to the small number of patients in NI, the first two age categories in the standard population are combined.

Mortality: Information relating to cancer mortality is sourced from the General Registrar Office (GRONI) via the Department of Health (NI). Results are based upon the date on which death occurs, and may thus differ slightly than those produced by the Northern Ireland Statistics and Research Agency (NISRA), which produces deaths data based upon the date on which the death is registered with GRONI.