Rectal cancer

1993-2021

(ICD10 codes: C19-C20)

Contents

This report includes information on incidence of rectal 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 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

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Northern Ireland Cancer Registry 2023. Rectal 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.
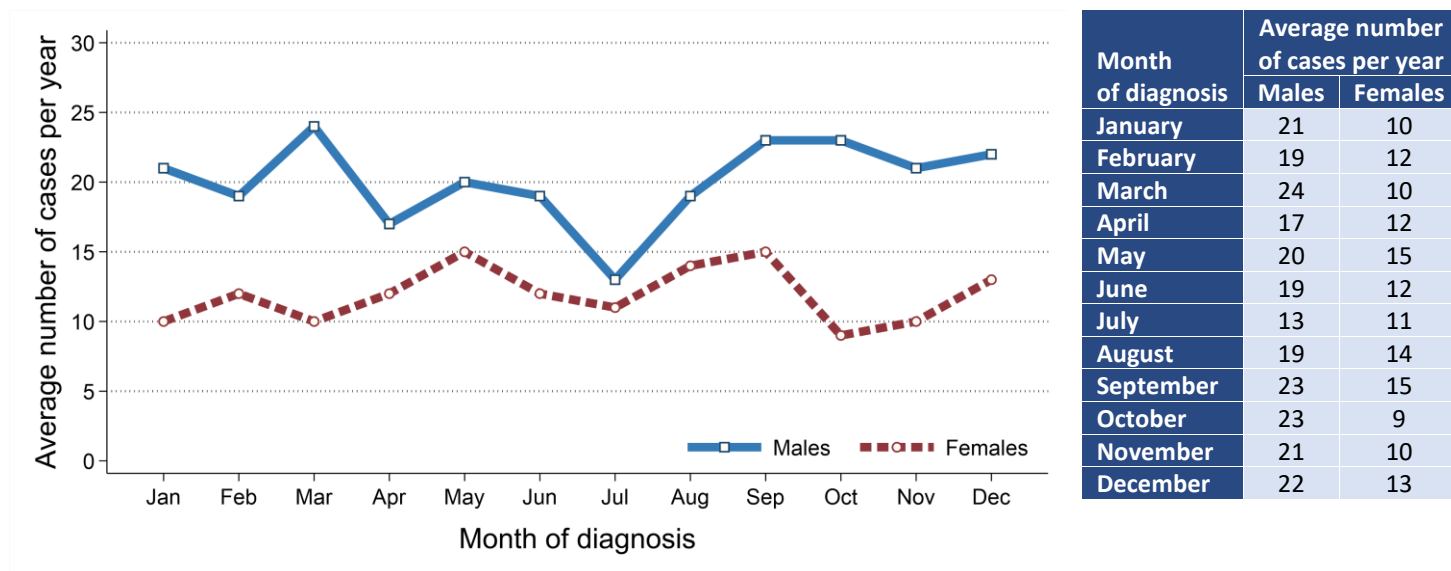
NICR is funded by the Public Health Agency and is based in Queen's University, Belfast.
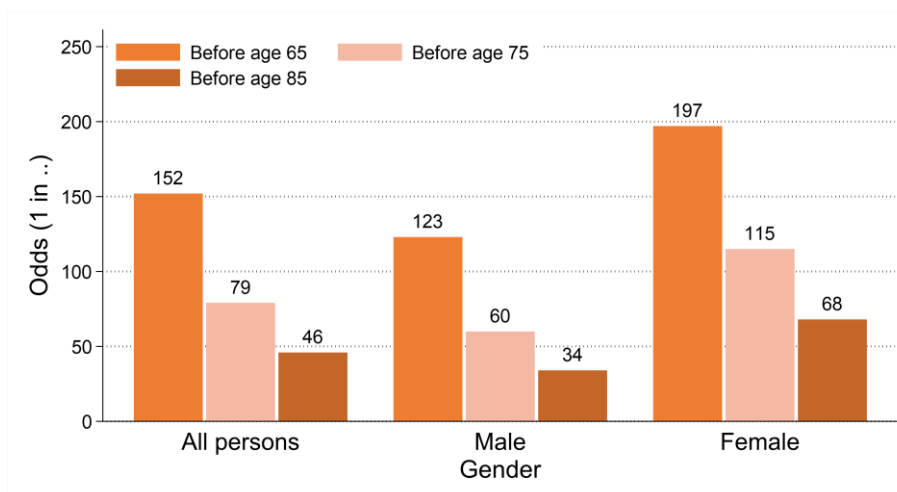
INCIDENCE

- There were 1,925 cases of rectal cancer diagnosed during 2017-2021 in Northern Ireland. On average this was 385 cases per year.

- During this period 37.4% of rectal cancer cases were among women (Male cases: 1,205, Female cases: 720). On average there were 241 male and 144 female cases of rectal cancer per year.

- The most common diagnosis month during 2017-2021 was March among males with 24 cases per year and September and May among females with 15 cases per year.

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

Month of diagnosis	Average number of cases per year	
	Males	Females
January	21	10
February	19	12
March	24	10
April	17	12
May	20	15
June	19	12
July	13	11
August	19	14
September	23	15
October	23	9
November	21	10
December	22	13

- The rectal cancer incidence rates for each gender were 25.9 cases per 100,000 males and 15.0 cases per 100,000 females.

- The odds of developing rectal cancer before age 85 was 1 in 34 for men and 1 in 68 for women.

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

- The median age of patients diagnosed with rectal cancer during 2017-2021 was 68 years (Males: 68, Females: 68).
- The risk of developing rectal cancer varied by age, with 30.7% of men and 34.7% of women diagnosed with rectal cancer aged 75 and over at diagnosis.
- In contrast, 15.6% of patients diagnosed with rectal cancer were aged 0 to 54 at diagnosis.

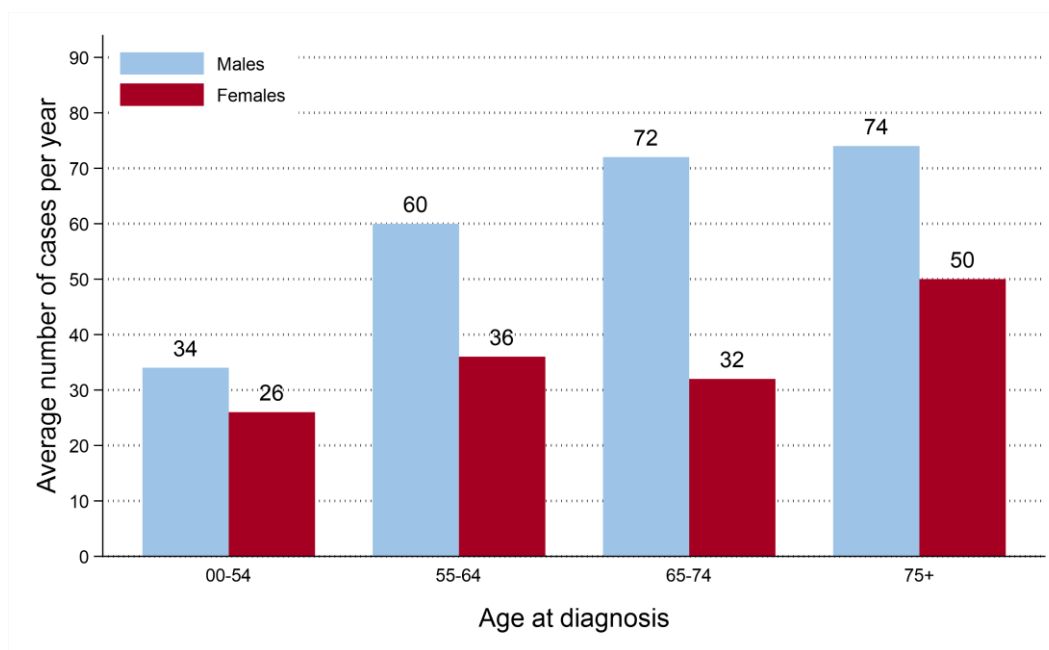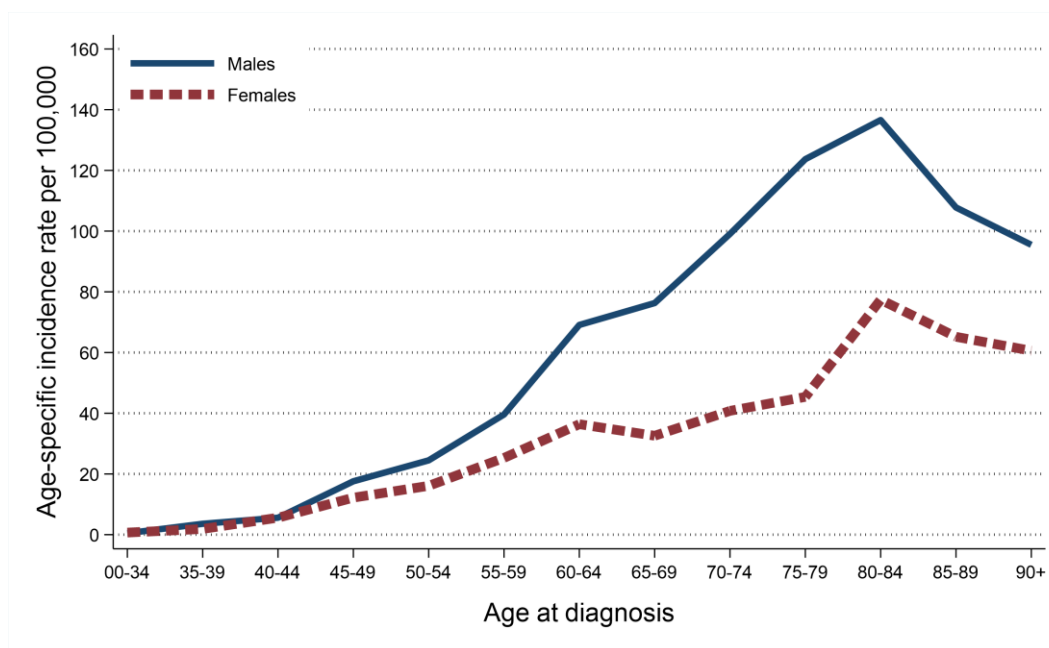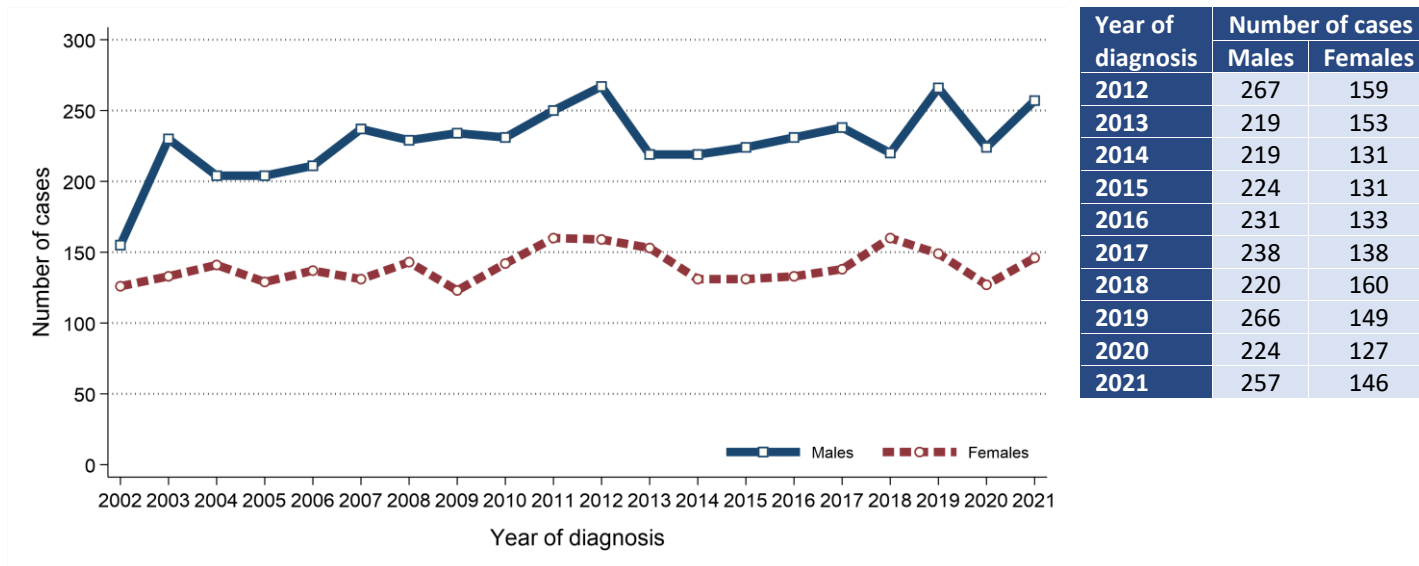*Figure 3: Average number of cases of rectal cancer diagnosed per year in 2017-2021 by age at diagnosis*

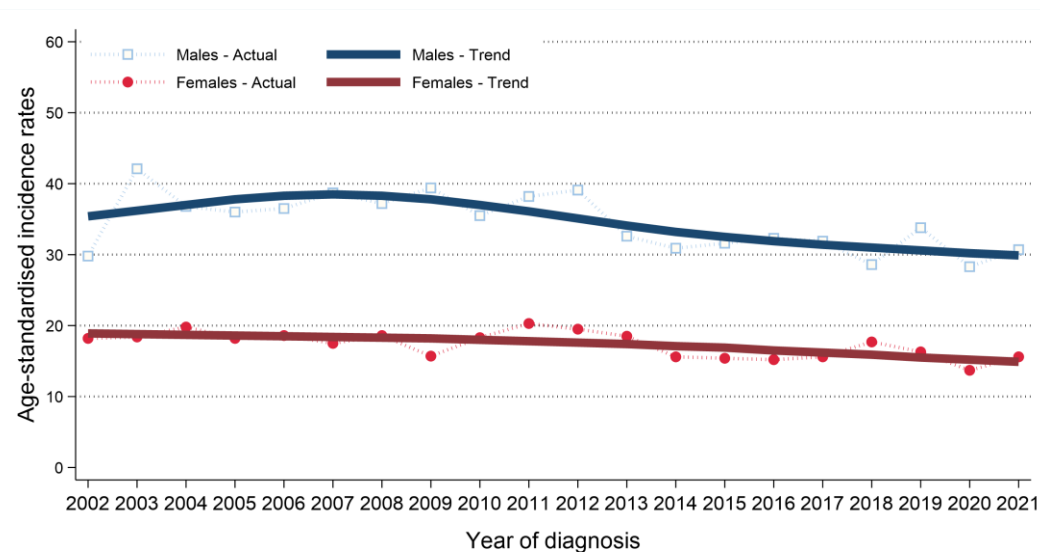*Figure 4: Age-specific incidence rates of rectal cancer in 2017-2021*

INCIDENCE TRENDS

- The number of cases of rectal cancer among males increased between 2012-2016 and 2017-2021 by 3.9% from 1,160 cases (232 cases per year) to 1,205 cases (241 cases per year).
- The number of cases of rectal cancer among females increased between 2012-2016 and 2017-2021 by 1.8% from 707 cases (141 cases per year) to 720 cases (144 cases per year).

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

Year of diagnosis	Number of cases	
	Males	Females
2012	267	159
2013	219	153
2014	219	131
2015	224	131
2016	231	133
2017	238	138
2018	220	160
2019	266	149
2020	224	127
2021	257	146

- Male age-standardised rectal cancer incidence rates decreased between 2012-2016 and 2017-2021 by 7.8% from 33.2 to 30.6 cases per 100,000 males. This change was not statistically significant.
- Female age-standardised rectal cancer incidence rates decreased between 2012-2016 and 2017-2021 by 6.0% from 16.8 to 15.8 cases per 100,000 females. This change was not statistically significant.

Figure 6: Trends in incidence rates of rectal 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 TRENDS BY AGE

- Between 2012-2016 and 2017-2021 the number of cases of rectal cancer among
  - Persons aged 0 to 54 increased by 25.7% among males and increased by 16.1% among females.
  - Persons aged 55 to 64 increased by 6.0% among males and increased by 27.1% among females.
  - Persons aged 65 to 74 decreased by 5.5% among males and decreased by 12.4% among females.
  - Persons aged 75 and over increased by 3.9% among males and decreased by 7.4% among females.

Table 1: Average number of cases per year of rectal cancer by period of diagnosis in 2012-2021

Age at diagnosis	All persons		Male		Female	
	2012-2016	2017-2021	2012-2016	2017-2021	2012-2016	2017-2021
All ages	373	385	232	241	141	144
	.	.	.	.	.	.
0 to 54	50	60	27	34	22	26
55 to 64	85	96	57	60	28	36
65 to 74	114	105	77	72	37	32
75 and over	125	124	71	74	54	50

- Between 2012-2016 and 2017-2021 age-standardised incidence rates of rectal cancer among
  - Persons aged 0 to 54 did not change significantly among males or females.
  - Persons aged 55 to 64 did not change significantly among males or females.
  - Persons aged 65 to 74 did not change significantly among males or females.
  - Persons aged 75 and over did not change significantly among males or females.

Figure 7: Trends in incidence rates of rectal cancer from 2002 to 2021 by age group
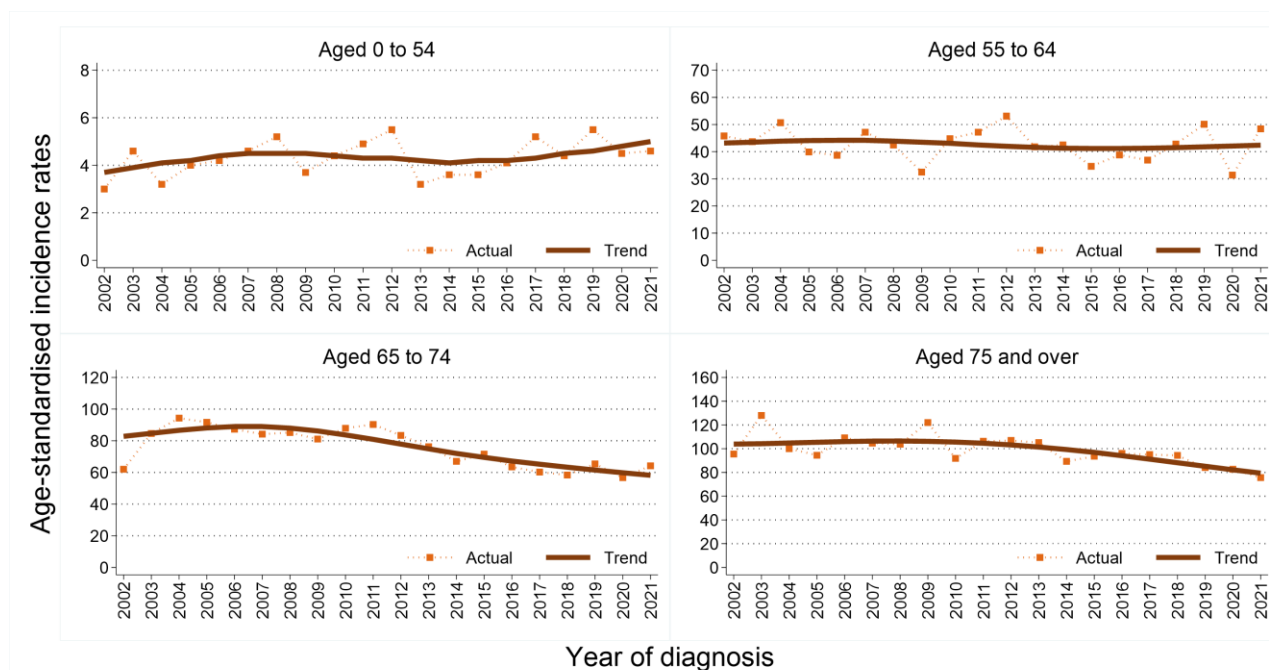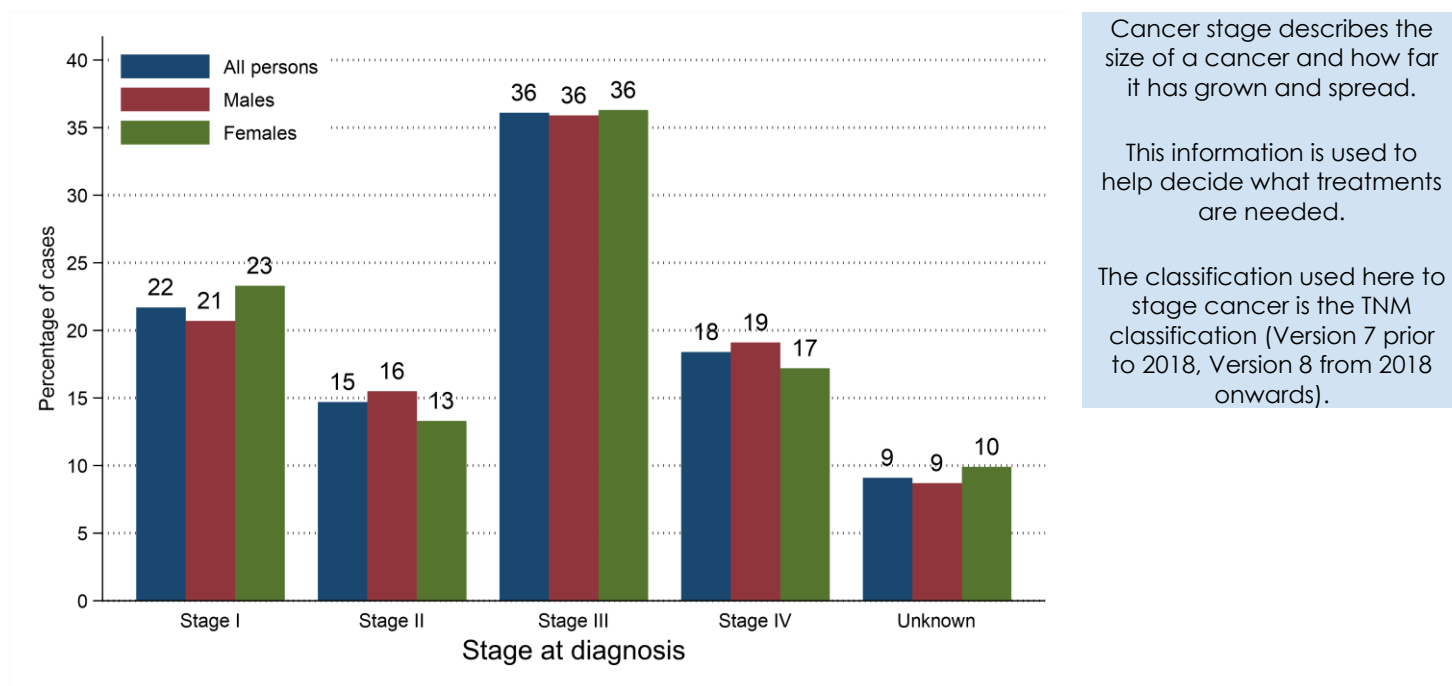
INCIDENCE BY STAGE AT DIAGNOSIS

- During 2017-2021 90.9% of rectal cancer cases had a stage assigned.

- 21.7% of rectal cancer cases were diagnosed at Stage I. (23.9% of staged cases)

- 18.4% of rectal cancer cases were diagnosed at Stage IV. (20.2% of staged cases)

Table 2: Number of cases of rectal cancer diagnosed in 2017-2021 by stage at diagnosis

Stage at diagnosis	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
All stages	**1,925**	**385**	**1,205**	**241**	**720**	**144**
	.	.	.	.	.	.
Stage I	418	84	250	50	168	34
Stage II	283	57	187	37	96	19
Stage III	694	139	433	87	261	52
Stage IV	354	71	230	46	124	25
Unknown	176	35	105	21	71	14

Figure 8: Proportion of cases of rectal cancer diagnosed in 2017-2021 by stage at diagnosis

Cancer stage describes the size of a cancer and how far it has grown and spread.

This information is used to help decide what treatments are needed.

The classification used here to stage cancer is the TNM classification (Version 7 prior to 2018, Version 8 from 2018 onwards).
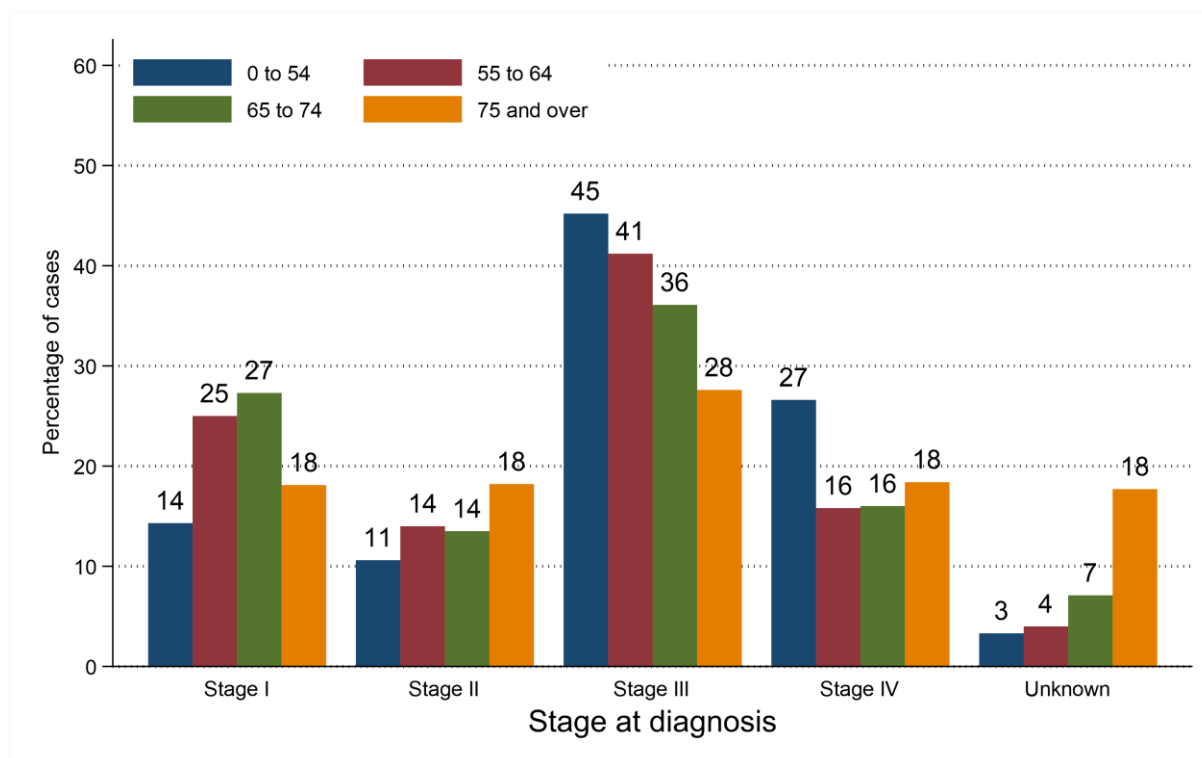
INCIDENCE BY STAGE AND AGE AT DIAGNOSIS

- During 2017-2021 82.3% of rectal cancer cases among those aged 75 and over had a stage assigned compared to 96.7% of those aged 0 to 54.
- 18.1% of rectal cancer cases among those aged 75 and over were diagnosed at Stage I (22.0% of staged cases) compared to 14.3% of those aged 0 to 54 (14.8% of staged cases).
- 18.4% of rectal cancer cases among those aged 75 and over were diagnosed at Stage IV (22.4% of staged cases) compared to 26.6% of those aged 0 to 54 (27.5% of staged cases).

Table 3: Average number of cases of rectal cancer diagnosed per year in 2017-2021 by stage and age at diagnosis

Stage at diagnosis	Age at diagnosis				
	All ages	0 to 54	55 to 64	65 to 74	75 and over
All stages	**385**	**60**	**96**	**105**	**124**
	.	.	.	.	.
Stage I	84	9	24	29	22
Stage II	57	6	13	14	23
Stage III	139	27	40	38	34
Stage IV	71	16	15	17	23
Unknown	35	2	4	7	22

Figure 9: Proportion of cases of rectal cancer diagnosed in 2017-2021 by stage and age at diagnosis
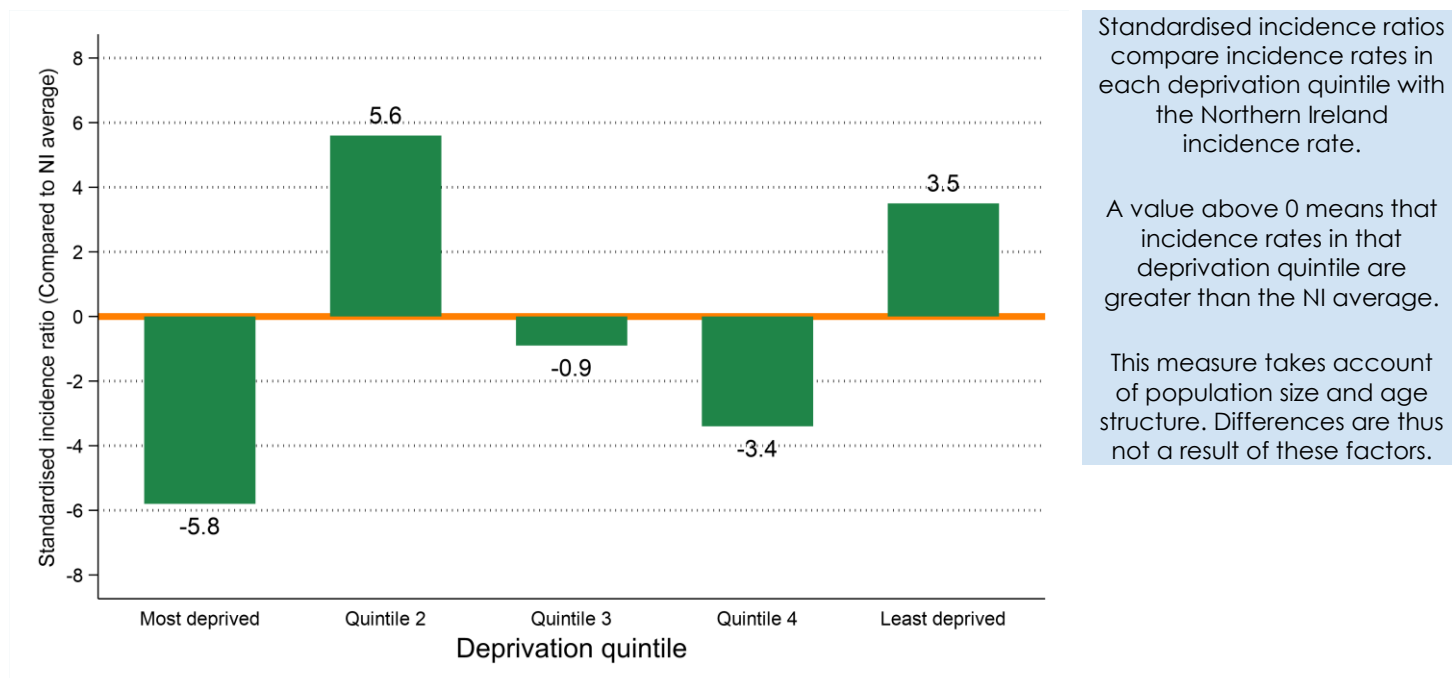
INCIDENCE BY DEPRIVATION

- The number of cases of rectal 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 4: Number of cases of rectal 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	**1,925**	**385**	**1,205**	**241**	**720**	**144**
	.	.	.	.	.	.
Most deprived	299	60	206	41	93	19
Quintile 2	407	81	262	52	145	29
Quintile 3	401	80	238	48	163	33
Quintile 4	396	79	243	49	153	31
Least deprived	422	84	256	51	166	33
Unknown	0	0	0	0	0	0

Figure 10: Standardised incidence ratio comparing deprivation quintile to Northern Ireland for rectal 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 rectal 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 5: Number of cases of rectal 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	**1,925**	**385**	**1,205**	**241**	**720**	**144**
	.	.	.	.	.	.
Belfast HSCT	339	68	216	43	123	25
Northern HSCT	478	96	291	58	187	37
South Eastern HSCT	405	81	235	47	170	34
Southern HSCT	396	79	261	52	135	27
Western HSCT	307	61	202	40	105	21
Unknown	0	0	0	0	0	0

Figure 11: Standardised incidence ratio comparing Health and Social Care Trust to Northern Ireland for rectal cancer diagnosed in 2017-2021
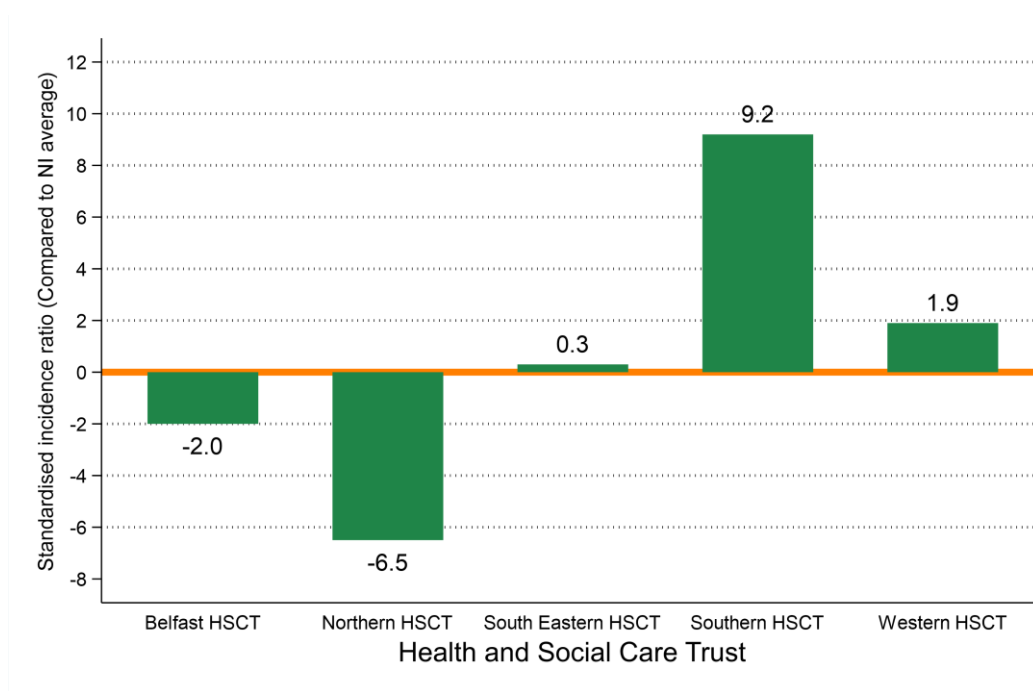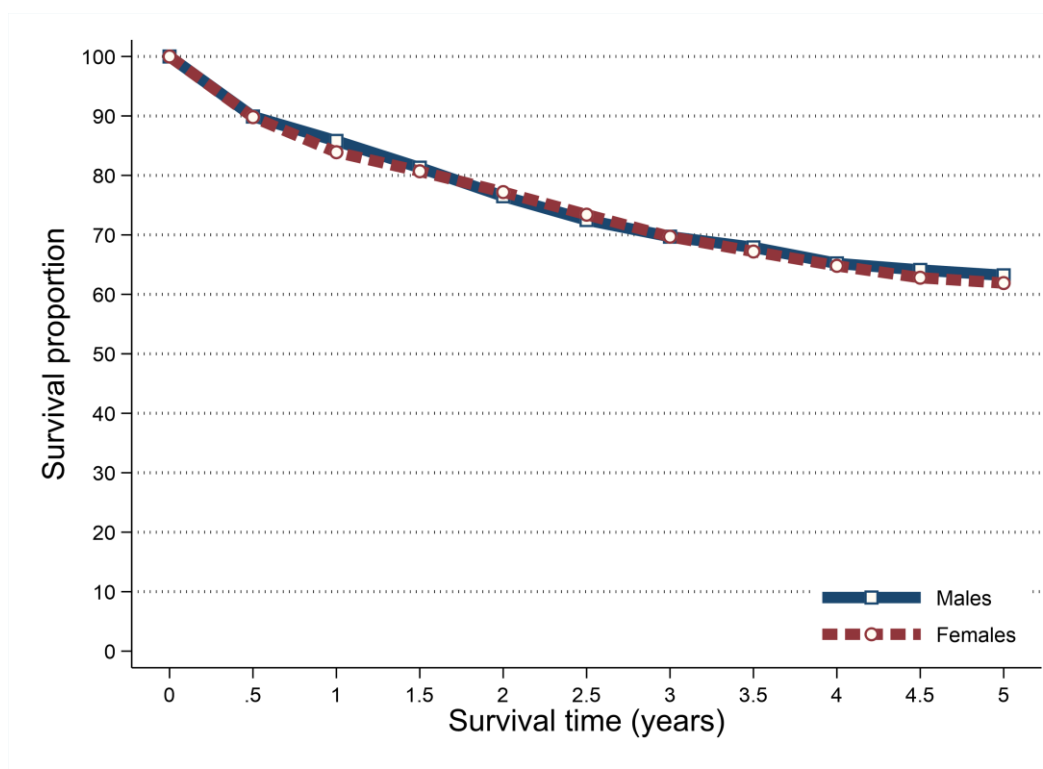
SURVIVAL

- 82.0% of patients were alive one year and 54.0% were alive five years from a rectal cancer diagnosis in 2012-2016. (observed survival)
- Age-standardised net survival (ASNS), which removes the effect of deaths from causes unrelated to cancer, was 85.1% one year and 62.8% five years from a rectal cancer diagnosis in 2012-2016.
- Five-year survival (ASNS) for rectal cancer patients diagnosed in 2012-2016 was 63.2% among men and 61.9% among women.

Table 6: Survival from rectal 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	88.0%	89.9%	88.5%	89.9%	87.2%	89.8%
One year	82.0%	85.1%	83.4%	85.8%	79.8%	83.9%
Two years	71.9%	76.8%	72.1%	76.5%	71.6%	77.2%
Five years	54.0%	62.8%	54.9%	63.2%	52.6%	61.9%

Figure 12: Age-standardised net survival from rectal 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.
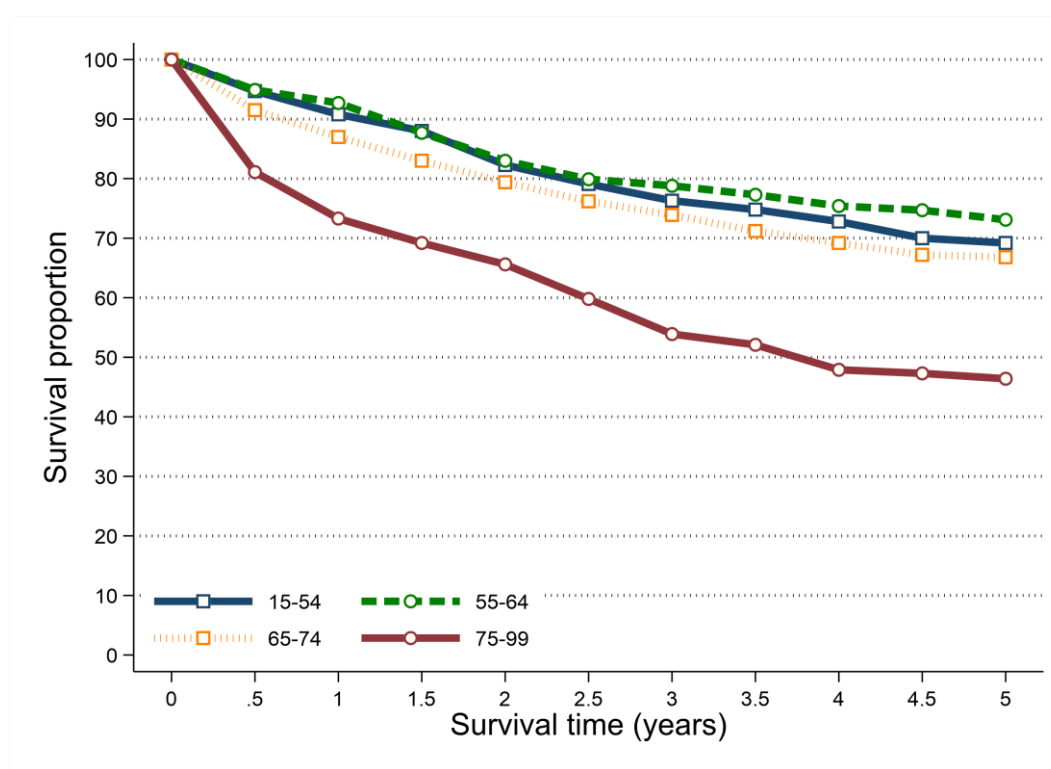
SURVIVAL BY AGE

- Survival from rectal 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 73.1% among patients aged 55 to 64 at diagnosis to 46.4% among those aged 75 to 99.
- Five-year net survival for rectal cancer patients aged 75 to 99 at diagnosis in 2012-2016 was 48.3% among men compared to 44.0% among women.

Table 7: Net survival from rectal cancer for patients diagnosed in 2012-2016 by age at diagnosis

Age group	All persons		Male		Female	
	One-year	Five-years	One-year	Five-years	One-year	Five-years
15 to 54	90.8%	69.2%	87.6%	66.0%	94.7%	73.1%
55 to 64	92.7%	73.1%	92.9%	73.0%	92.4%	73.3%
65 to 74	87.0%	66.8%	87.4%	68.4%	86.1%	63.4%
75 to 99	73.3%	46.4%	77.4%	48.3%	67.9%	44.0%

*Figure 13: Net survival from rectal 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 rectal cancer.
- Compared to 1997-2001 one-year survival (ASNS) from rectal cancer in 2017-2021 increased significantly from 78.5% to 85.0%. This increase was significant for males (76.9% to 85.3%) but not females.

Figure 14: Trends in one-year age-standardised net survival from rectal cancer in 1997-2021
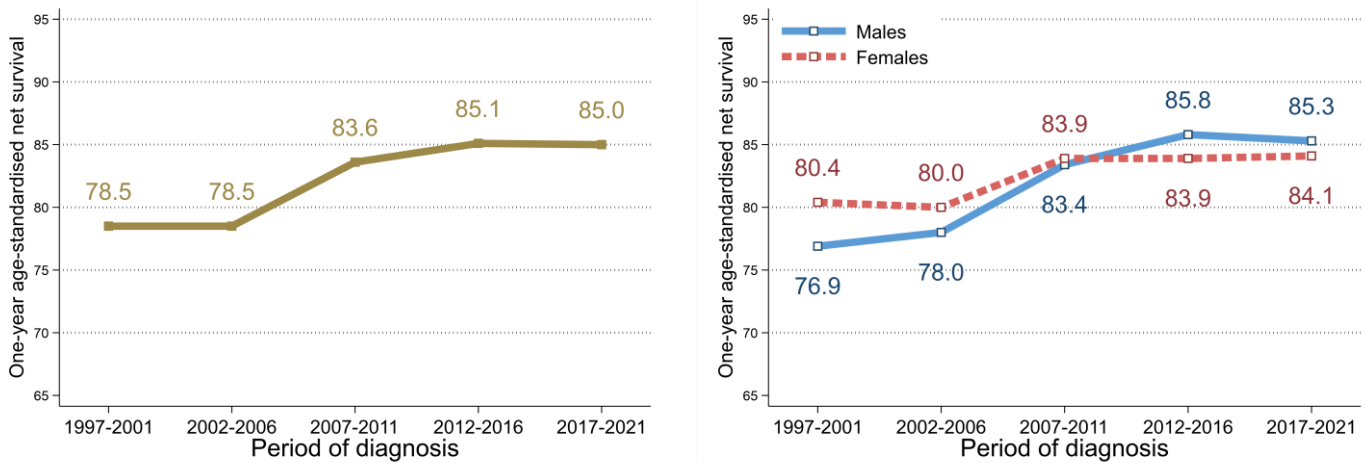
FIVE-YEAR NET SURVIVAL

- Between 2007-2011 and 2012-2016 there was no significant change in five-year survival (ASNS) from rectal cancer.
- Compared to 1997-2001 five-year survival (ASNS) from rectal cancer in 2012-2016 increased significantly from 47.8% to 62.8%. This increase was significant for males (46.2% to 63.2%) and females (50.0% to 61.9%).

*Figure 15: Trends in five-year age-standardised net survival from rectal cancer in 1997-2016*
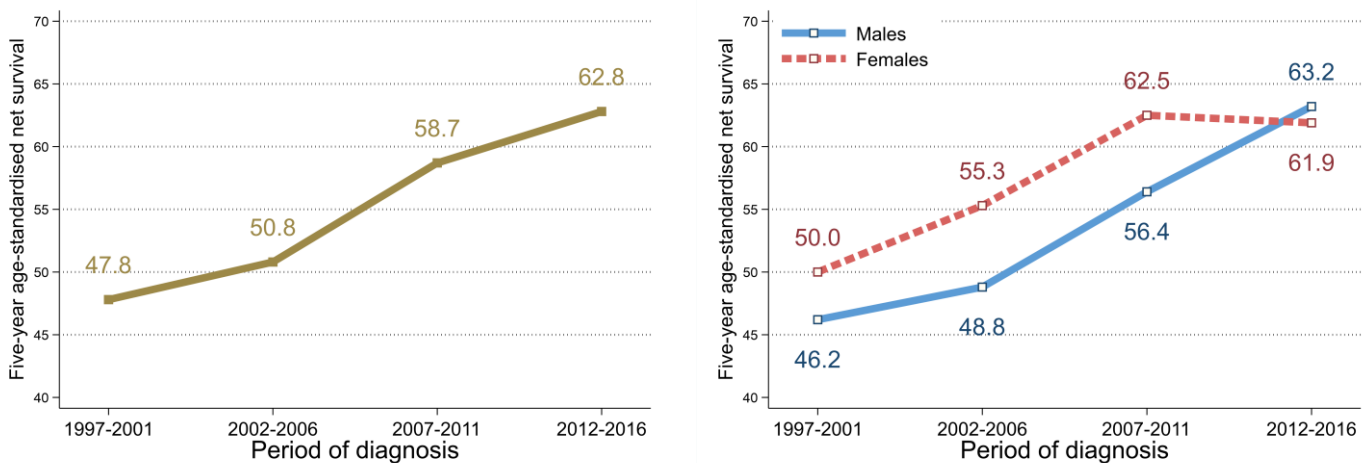
SURVIVAL BY STAGE

- Survival from rectal cancer among patients diagnosed during 2012-2016 was strongly related to stage with better five-year survival among those diagnosed at earlier stages.
- Five-year survival (ASNS) ranged from 90.5% among patients diagnosed at Stage I to 6.9% among those diagnosed at Stage IV.
- Five-year survival (ASNS) for rectal cancer patients diagnosed at Stage IV in 2012-2016 was 7.7% among men compared to 5.5% among women.

Table 8: Age-standardised net survival from rectal cancer for patients diagnosed in 2012-2016 by stage at diagnosis

Stage at diagnosis	All persons		Male		Female	
	One-year	Five-years	One-year	Five-years	One-year	Five-years
Stage I	98.0%	90.5%	97.5%	88.9%	99.2%	93.6%
Stage II	96.6%	82.1%	96.5%	80.4%	96.7%	83.8%
Stage III	92.1%	62.8%	92.3%	64.3%	91.7%	60.4%
Stage IV	50.1%	6.9%	52.0%	7.7%	48.7%	5.5%
Unknown	63.2%	39.0%	48.3%	15.2%	51.5%	38.9%

Figure 16: Age-standardised net survival from rectal cancer for patients diagnosed in 2012-2016 by stage at diagnosis
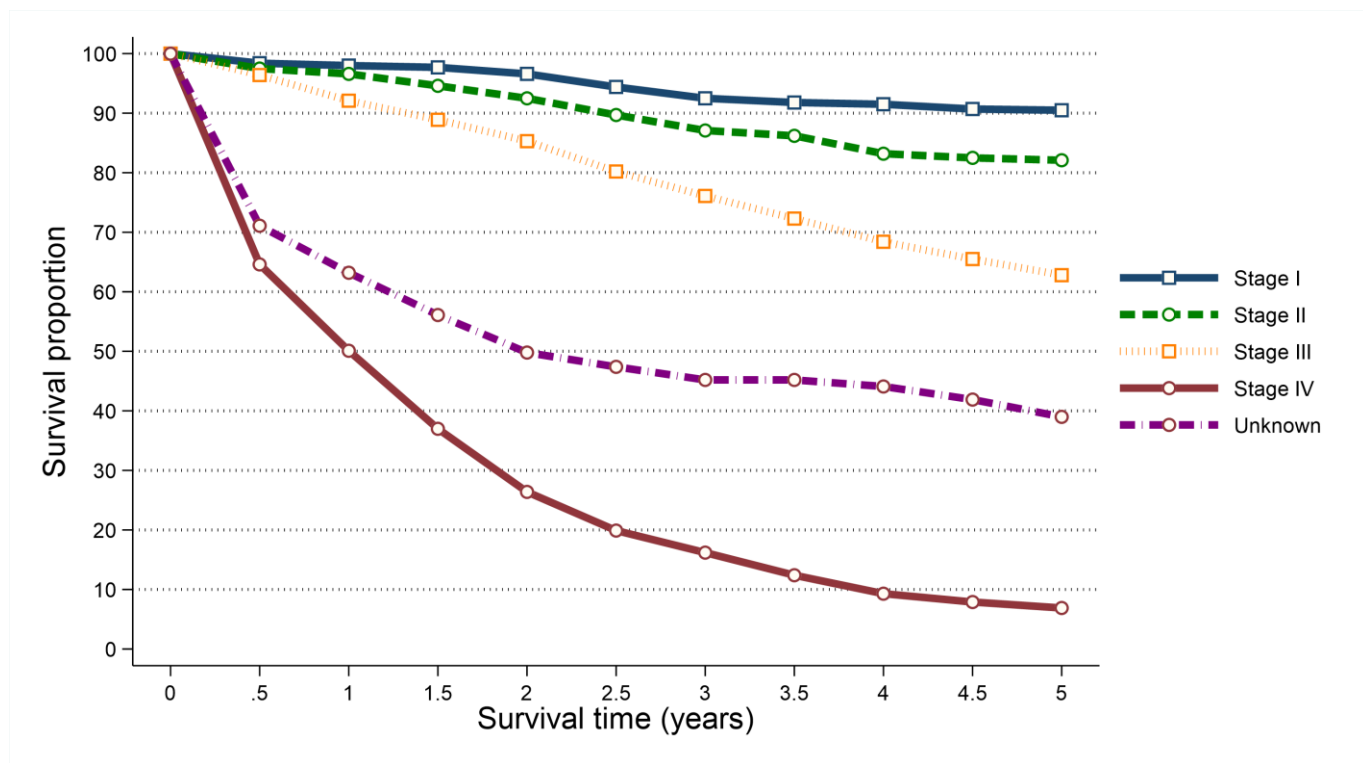
PREVALENCE

- At the end of 2021, there were 3,284 people (Males: 2,006; Females: 1,278) living with rectal cancer who had been diagnosed with the disease during 1997-2021.
- Of these 10.7% had been diagnosed in the previous year (one-year prevalence) and 67.1% in the previous 10 years (ten-year prevalence).
- 41.8% of rectal cancer survivors were aged 75 and over at the end of 2021.
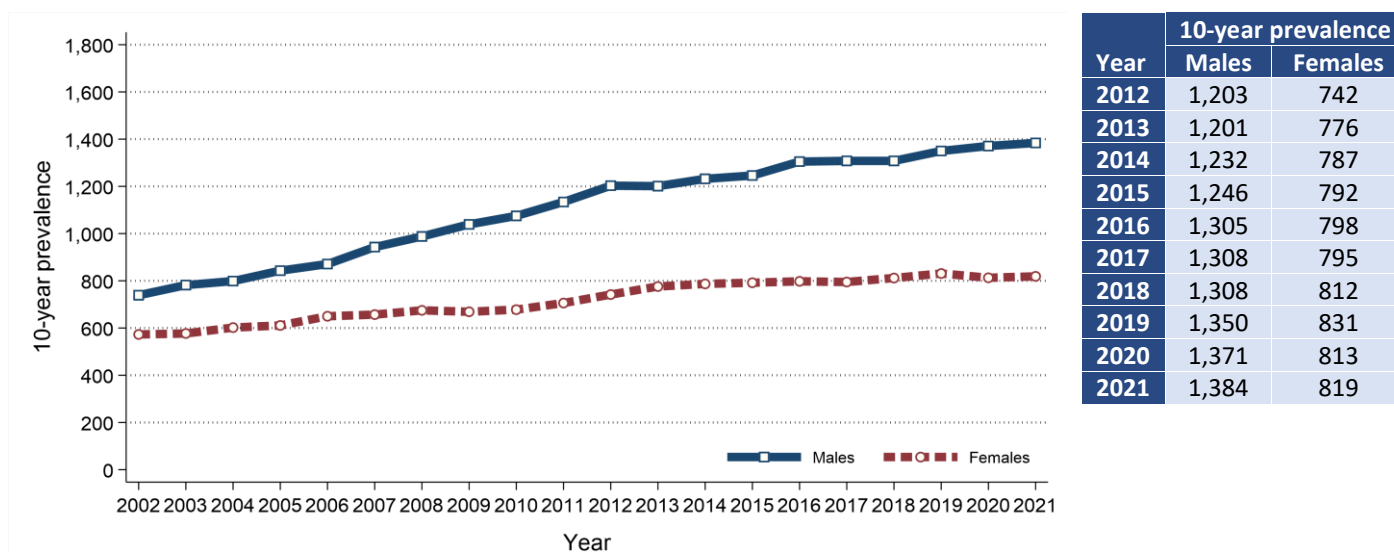
Table 9: 25-year prevalence of rectal cancer by age at end of 2021

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	3,284	353	1,015	835	1,081
	0 to 74	1,912	257	687	496	472
	75 and over	1,372	96	328	339	609
Male	All ages	2,006	225	632	527	622
	0 to 74	1,164	170	429	305	260
	75 and over	842	55	203	222	362
Female	All ages	1,278	128	383	308	459
	0 to 74	748	87	258	191	212
	75 and over	530	41	125	117	247

PREVALENCE TRENDS

- 10-year prevalence of rectal cancer among males increased between 2016 and 2021 by 6.1% from 1,305 survivors to 1,384 survivors.
- 10-year prevalence of rectal cancer among females increased between 2016 and 2021 by 2.6% from 798 survivors to 819 survivors.

Figure 17: Trends in 10-year prevalence of rectal cancer in 2002-2021

Year	10-year prevalence	
	Males	Females
2012	1,203	742
2013	1,201	776
2014	1,232	787
2015	1,246	792
2016	1,305	798
2017	1,308	795
2018	1,308	812
2019	1,350	831
2020	1,371	813
2021	1,384	819

MORTALITY

- There were 1,104 deaths from rectal cancer during 2017-2021 in Northern Ireland. On average this was 221 deaths per year.
- During this period 41.3% of rectal cancer deaths were among women (Male deaths: 648, Female deaths: 456). On average there were 130 male and 91 female deaths from rectal cancer per year.
- Rectal cancer deaths made up 5.5% of all male cancer deaths and 4.3% of all female cancer deaths.
- The median age of patients who died from rectal cancer during 2017-2021 was 75 years (Males: 74, Females: 76).
- The risk of dying from rectal cancer varied by age, with 48.5% of men and 53.1% of women who died from rectal cancer aged 75 and over at death.
- In contrast, 9.7% of patients who died from rectal cancer were aged 0 to 54 at death.

Figure 18: Average number of deaths from rectal cancer per year in 2017-2021 by age at death
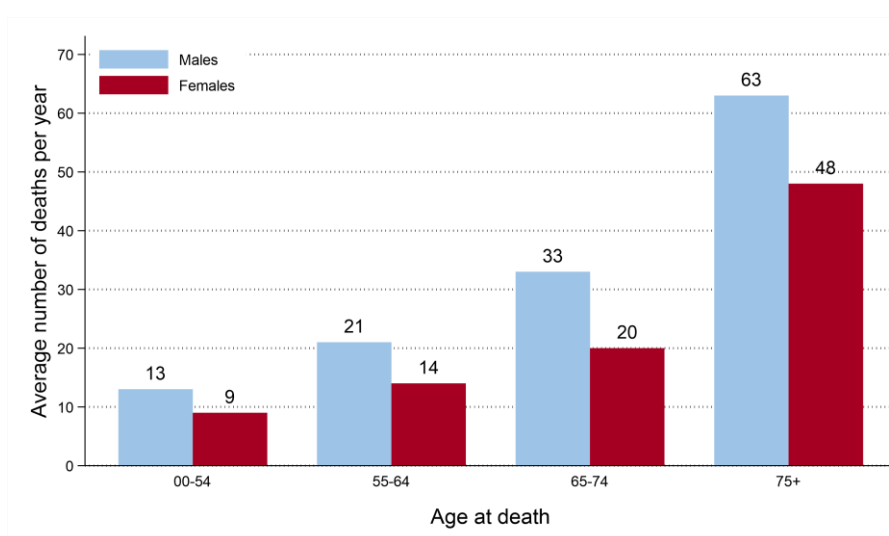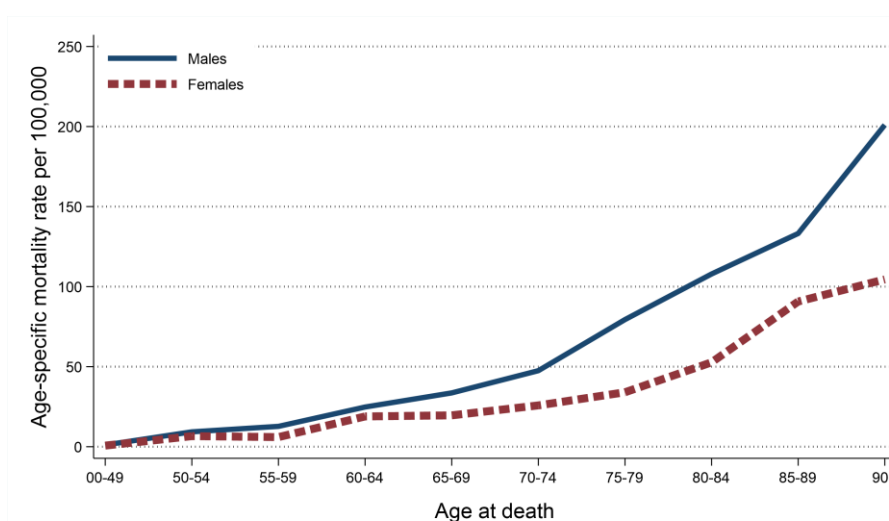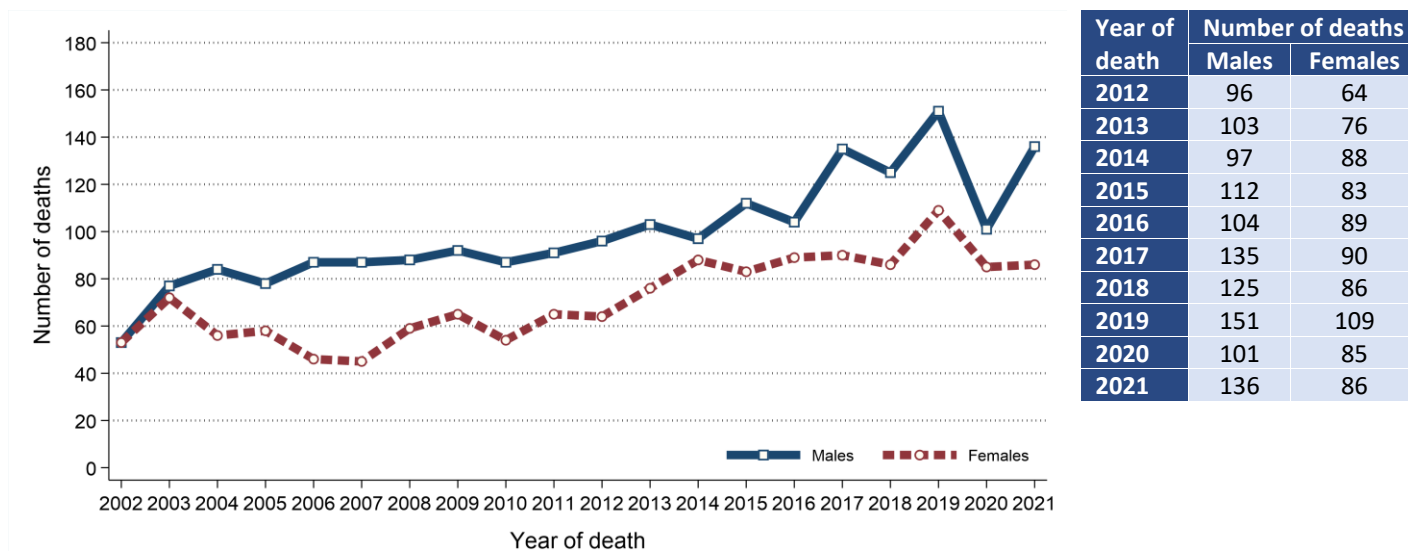

*Figure 19: Age-specific mortality rates of rectal cancer in 2017-2021*

MORTALITY TRENDS

- The number of deaths from rectal cancer among males increased between 2012-2016 and 2017-2021 by 26.6% from 512 deaths (102 deaths per year) to 648 deaths (130 deaths per year).
- The number of deaths from rectal cancer among females increased between 2012-2016 and 2017-2021 by 14.0% from 400 deaths (80 deaths per year) to 456 deaths (91 deaths per year).

Figure 20: Trends in the number of deaths from rectal cancer from 2002 to 2021

Year of death	Number of deaths	
	Males	Females
2012	96	64
2013	103	76
2014	97	88
2015	112	83
2016	104	89
2017	135	90
2018	125	86
2019	151	109
2020	101	85
2021	136	86

- Male age-standardised rectal cancer mortality rates increased between 2012-2016 and 2017-2021 by 13.4% from 15.7 to 17.8 deaths per 100,000 males. This change was not statistically significant.
- Female age-standardised rectal cancer mortality rates increased between 2012-2016 and 2017-2021 by 4.2% from 9.5 to 9.9 deaths per 100,000 females. This change was not statistically significant.

Figure 21: Trends in mortality rates of rectal cancer from 2002 to 2021
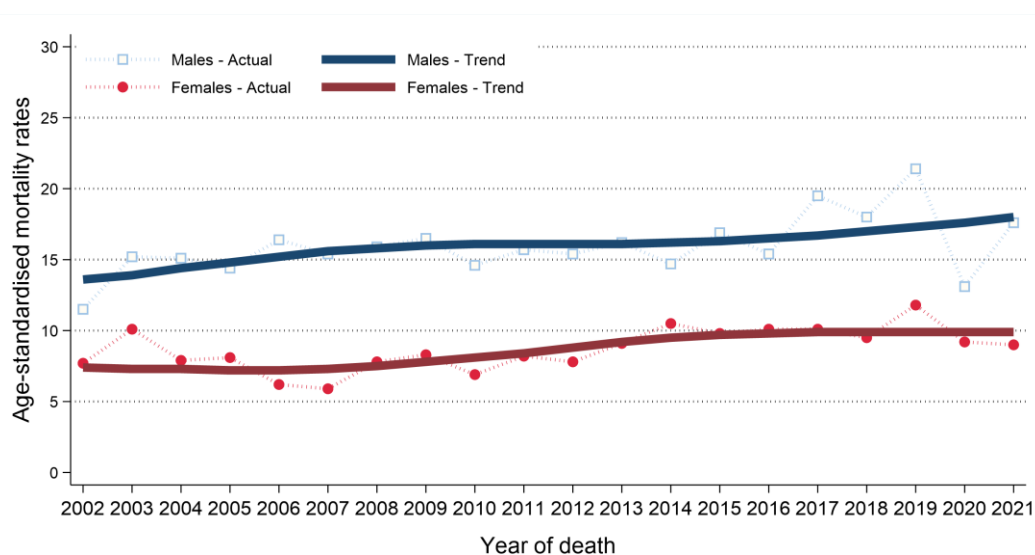
Age-standardised mortality rates illustrate the change in the number of deaths within a population of a fixed size and age structure (2013 European Standard).

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.

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. rectal 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. rectal 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.