N. IRELAND Cancer Registry

CANCER INCIDENCE TRENDS 1993-2013

WITH PROJECTIONS TO 2035

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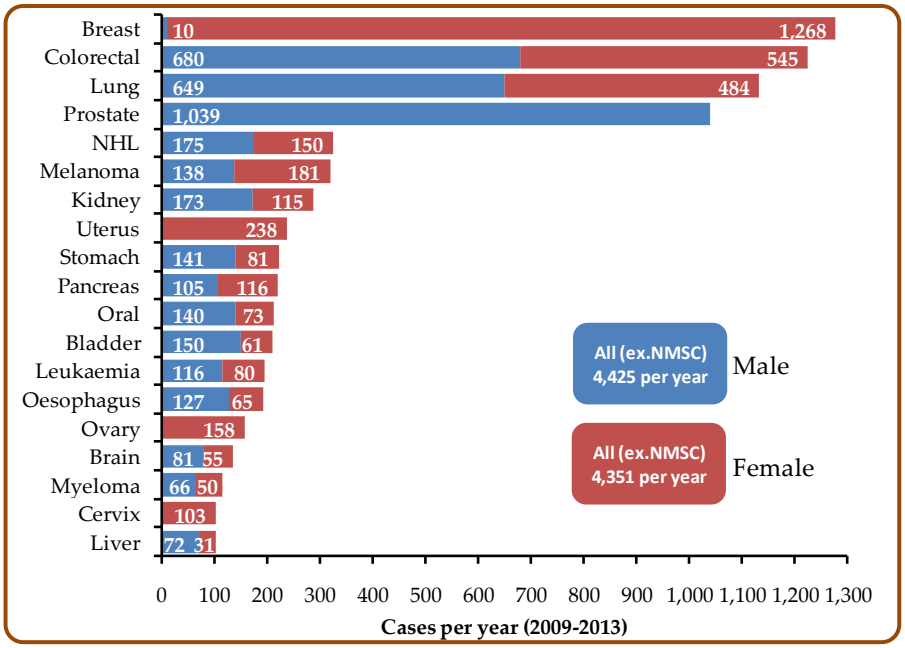
SUMMARY

Monitoring trends in cancer incidence is essential if high quality cancer services are to be maintained and resourced. Trends for all cancers (excluding non-melanoma skin cancer - NMSC) along with the most common cancers are analysed in detail. Additionally projections of cancer incidence up to the year 2035 are presented for the first time in Northern Ireland.

Methods

Data on all malignant cancers (excluding non-melanoma skin cancer) diagnosed between 1993 and 2013 was extracted from the NI Cancer Registry. Age-specific rates for all cancers combined and 30 common cancers were determined for both sexes by year of diagnosis. The data was fitted separately for ages 0-49, 50-59, 60-69, 70-79 and 80+ using a regression model with five-year age group, five-year birth cohort and year of diagnosis used as predictors of the cancer incidence rate. The resulting model was used to predict rates in future years, which were combined with population projections to provide estimates of the future number of cases.

KEY FACTS



NUMBER OF CASES DIAGNOSED EACH YEAR BY SEX AND TYPE: 2009-2013

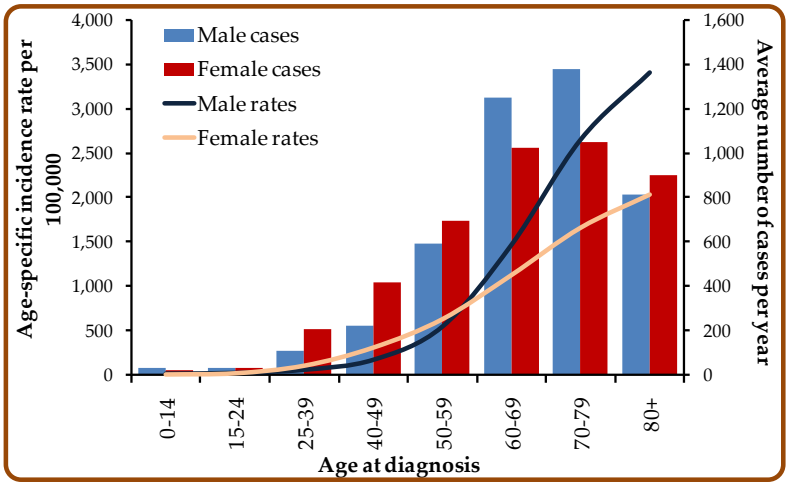
There were 4,425 male and 4,351 female cases (excluding NMSC) diagnosed each year during 2009-2013.

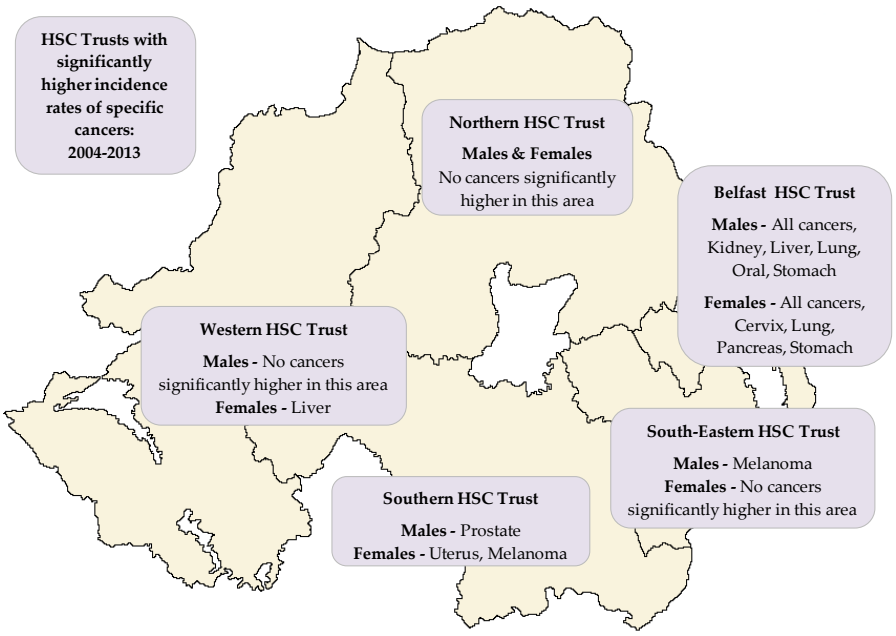
The most common cancers among men were prostate (23.5%), colorectal (15.4%) and lung (14.7%), while among women they were breast (29.1%), colorectal (12.5%) and lung (11.1%).

NUMBER OF CASES DIAGNOSED EACH YEAR BY SEX AND AGE: 2009-2013

Cancer occurs primarily among older people with a median age at diagnosis of 69 for males and 68 for females.

Incidence rates were greatest among both men and women aged 80 and over.





CANCER INCIDENCE BY HSC TRUST OF RESIDENCE: 2004-2013

During 2004-2013 cancer incidence rates were significantly higher than the NI average in Belfast HSCT by 8.3% for men and by 7.6% for women.

All areas except the Northern HSCT had higher than average incidence rates of at least one type of cancer.

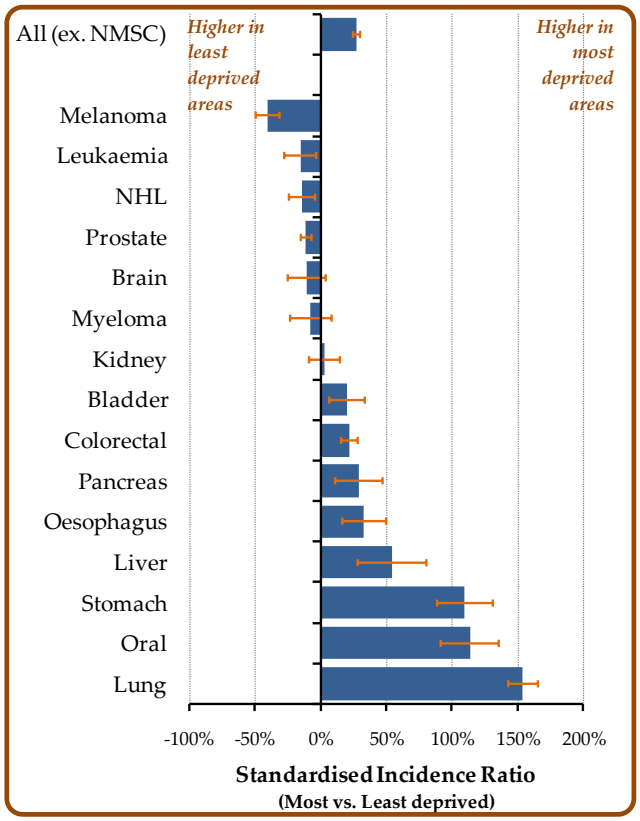
CANCER INCIDENCE AND DEPRIVATION: 2004-2013

Cancer incidence rates were higher in the most deprived areas than the least deprived areas by 27% for men and 17% for women during 2004-2013.

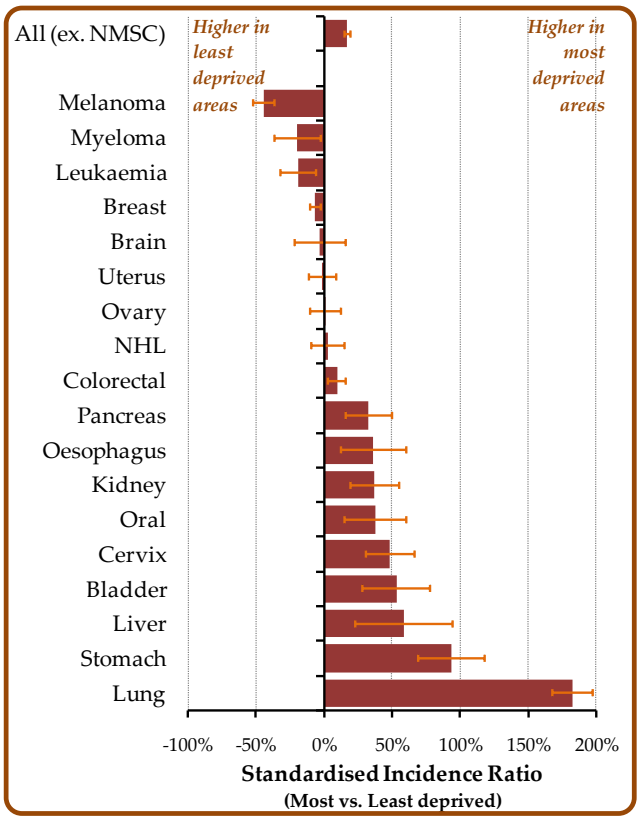
Lung cancer incidence rates were between two and three times higher in deprived than affluent areas, while rates were also higher in deprived areas for bladder, cervical, colorectal, kidney (female only), liver, oesophageal, oral, pancreatic and stomach cancer.

Incidence rates of breast cancer, leukaemia, melanoma, myeloma (female only), non-Hodgkin's lymphoma (male only) and prostate cancer were all higher in the least deprived areas.

Male



Female



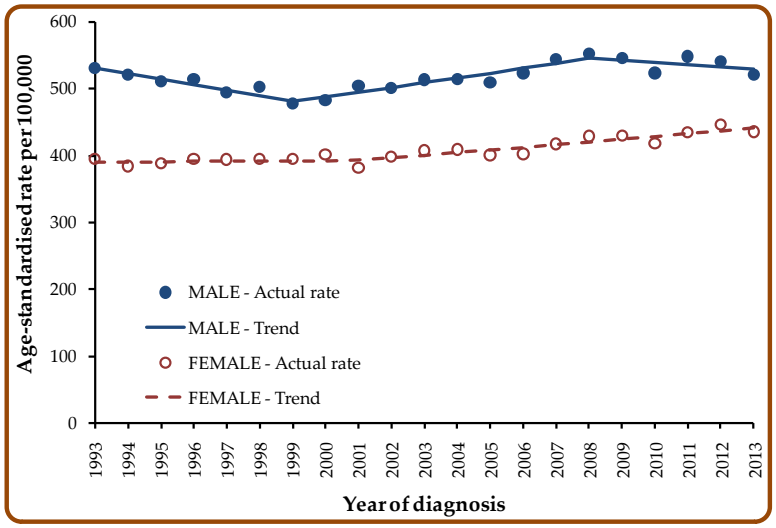
NHL: Non-Hodgkin's lymphoma, NMSC: Non-melanoma skin cancer

PAST TRENDS IN INCIDENCE RATES

TREND IN INCIDENCE RATES BY SEX: 1993-2013

Cancer incidence rates, adjusted for age and population change, decreased by 1.6% per year among males during 1993-1999, after which rates increased by 1.4% per year until 2008. There was no significant change after 2008.

Among women there was no change in incidence rates during 1993-2001, however after 2001 rates increased by 1.0% per year.



ANNUAL CHANGE IN INCIDENCE RATES BY SEX AND TYPE

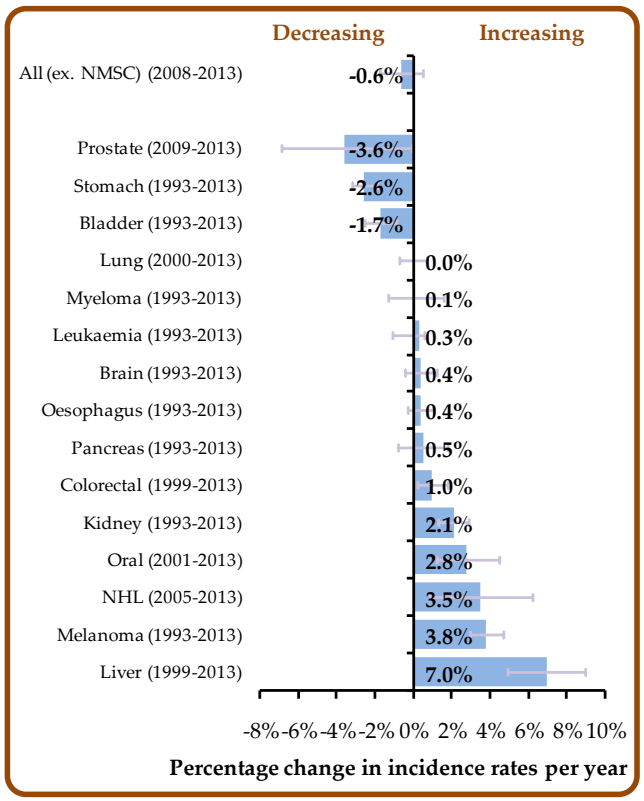
At the end of 2013 the trend in cancer incidence rates among men was:

- **decreasing** for prostate cancer, stomach cancer and bladder cancer;
- **increasing** for liver cancer, malignant melanoma, non-Hodgkin's lymphoma, oral cancer, kidney cancer and colorectal cancer.

At the end of 2013 the trend in cancer incidence rates among women was:

- **decreasing** for stomach cancer and bladder cancer;
- **increasing** for oral cancer, uterine cancer, kidney cancer, malignant melanoma, pancreatic cancer, lung cancer, breast cancer and colorectal cancer.

Male



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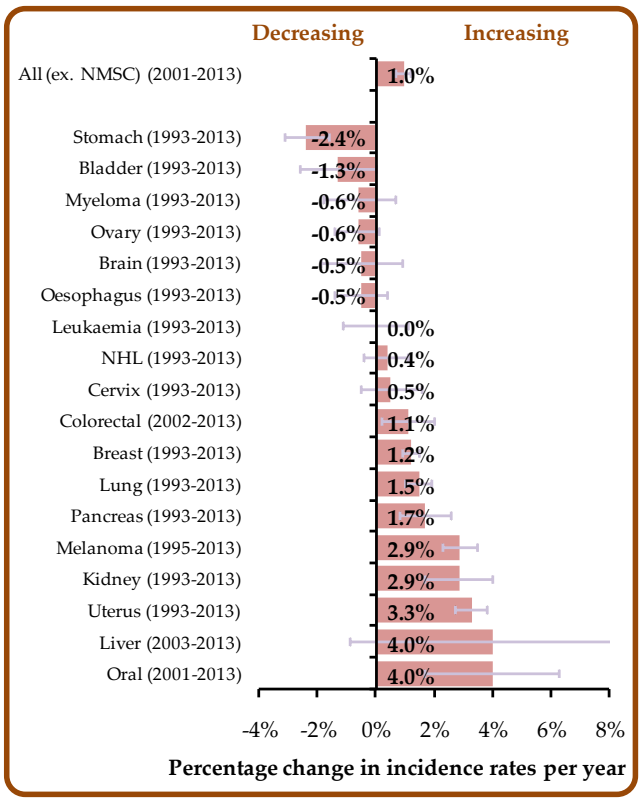


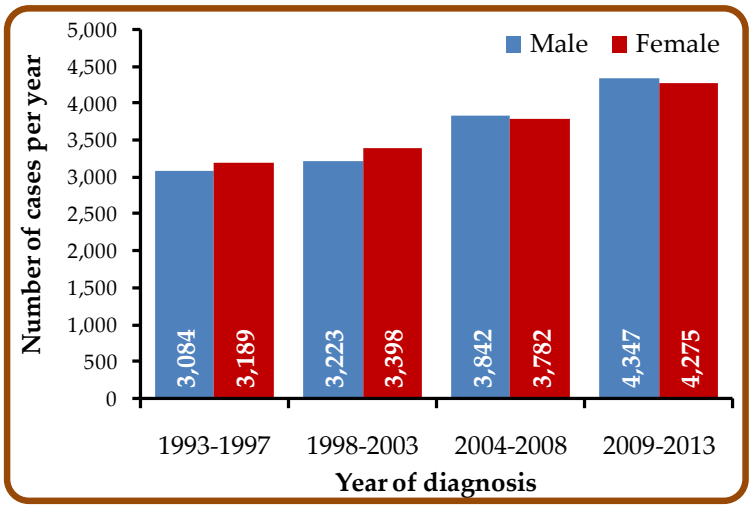
NHL: Non-Hodgkin's lymphoma, NMSC: Non-melanoma skin cancer

PAST TRENDS IN NUMBER OF CASES DIAGNOSED

NUMBER OF CASES DIAGNOSED EACH YEAR BY SEX AND PERIOD OF DIAGNOSIS

In 2009-2013 there were 8,622 cancers (4,347 male, 4,275 female)[1] diagnosed each year compared to 6,273 per year (3,084 male, 3,189 female) in 1993-1997; an increase of 37.4%.

On average the number of cases diagnosed increased by 1.8% per year among men between 2008 and 2013, while among women the number of cases increased between 2001 and 2013 by 2.4% per year.



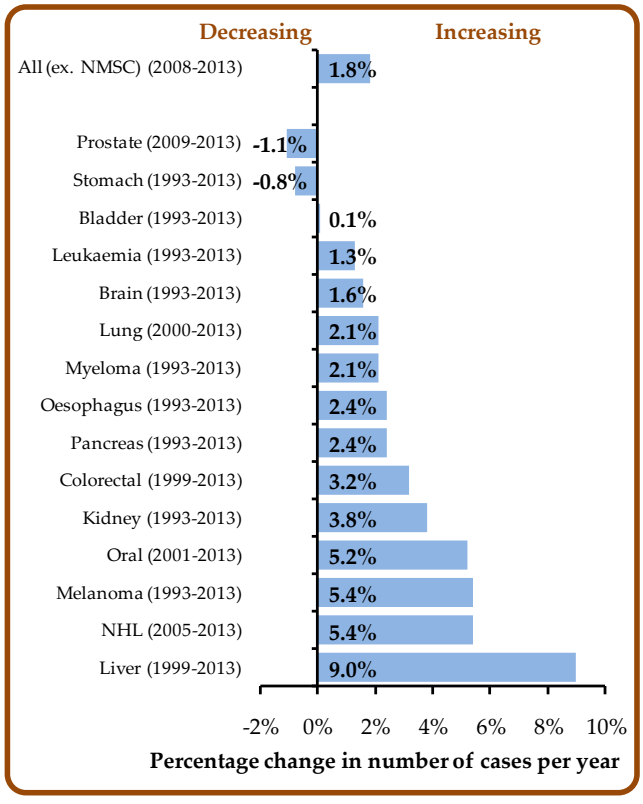
ANNUAL CHANGE IN NUMBER OF CASES DIAGNOSED BY SEX AND TYPE

Among men cancer incidence was increasing at the end of 2013 for all cancer types, except for prostate and stomach cancer. Among women increases were occurring for all cancer types.

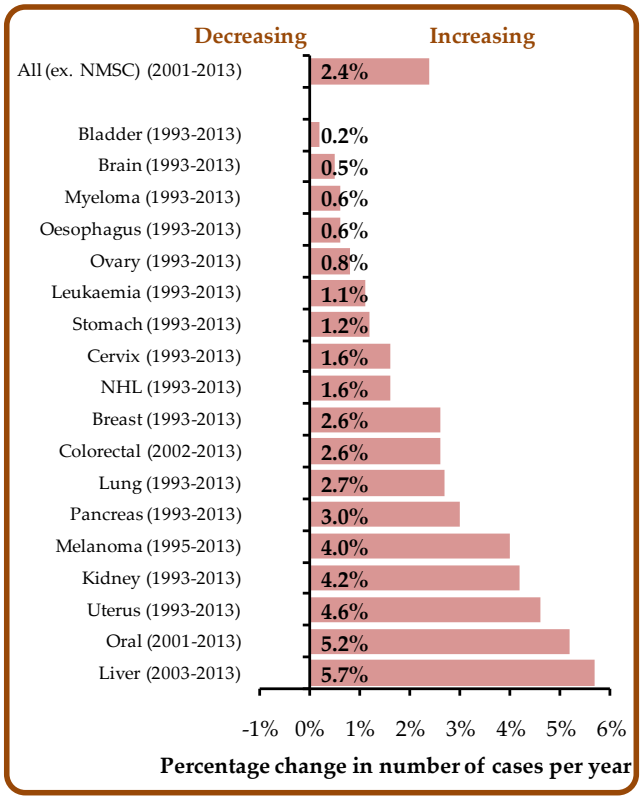
Among men the number of cases diagnosed each year was increasing by more than 4% per year for liver cancer, non-Hodgkin's lymphoma, malignant melanoma and oral cancer.

Among women the number of cases diagnosed each year was increasing by more than 4% per year for liver cancer, oral cancer, uterine cancer, kidney cancer and malignant melanoma.

Male



Female



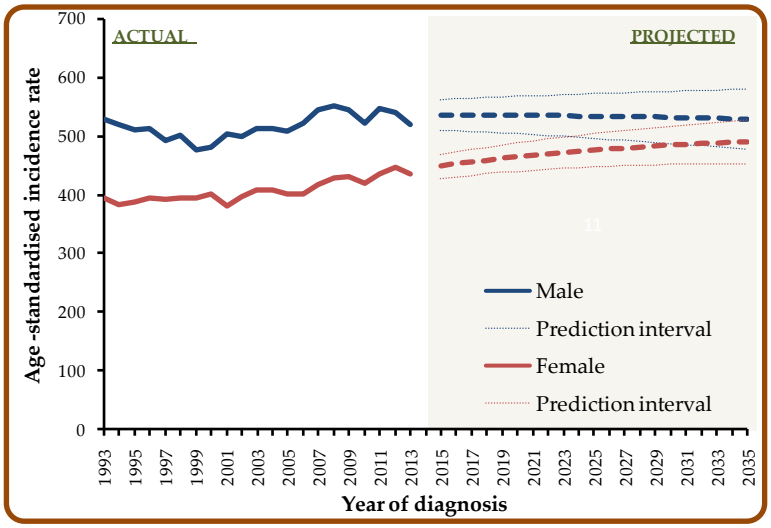
NHL: Non-Hodgkin's lymphoma, NMSC: Non-melanoma skin cancer

PROJECTED INCIDENCE RATES

PROJECTED INCIDENCE RATES FROM 2015 TO 2035

Incidence rates of cancer among men are projected to remain fairly steady in forthcoming years with no change by 2020 compared to rates in 2009-2013, while by 2035 a slight drop of 1% is expected.

Among women incidence rates are projected to continue to increase, with a 7% rise by 2020 and a 13% rise by 2035 expected.



PROJECTED CHANGE IN INCIDENCE RATES BY SEX AND TYPE

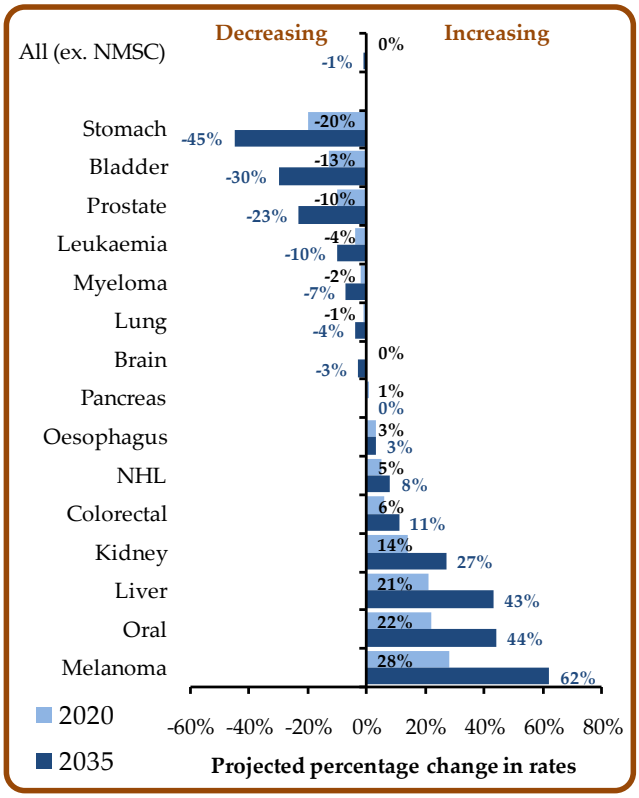
Compared to the 2009-2013 average male incidence rates are projected to:

- **decrease** by more than 10% by 2020 and by more than 20% by 2035 for stomach, bladder and prostate cancers,
- **increase** by more than 10% by 2020 and by more than 20% by 2035 for malignant melanoma, oral, liver and kidney cancers.

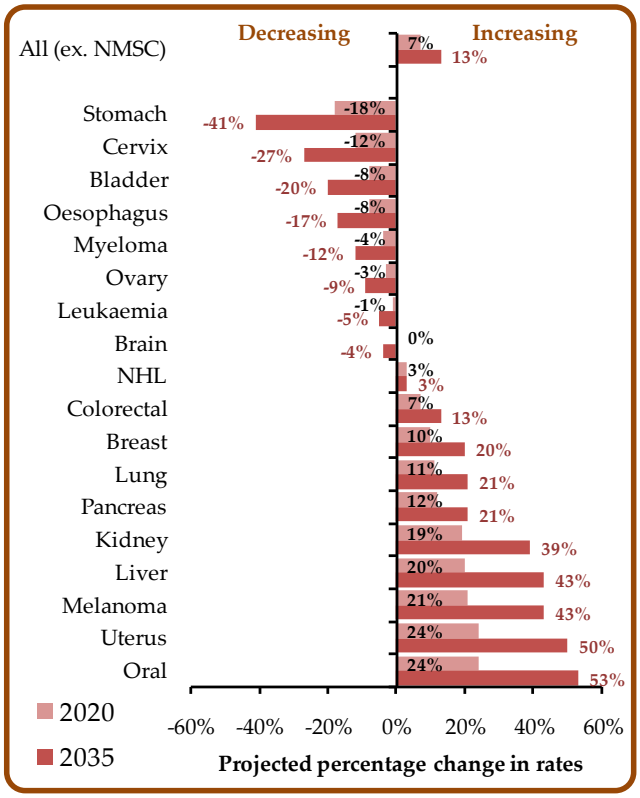
Also compared to the 2009-2013 average female incidence rates are projected to:

- **decrease** by more than 10% by 2020 and by more than 20% by 2035 for stomach and cervical cancers;
- **increase** by more than 10% by 2020 and by more than 20% by 2035 for malignant melanoma, oral, uterine, liver, kidney, pancreatic, lung and breast cancer.

Male



Female



NHL: Non-Hodgkin's lymphoma, NMSC: Non-melanoma skin cancer

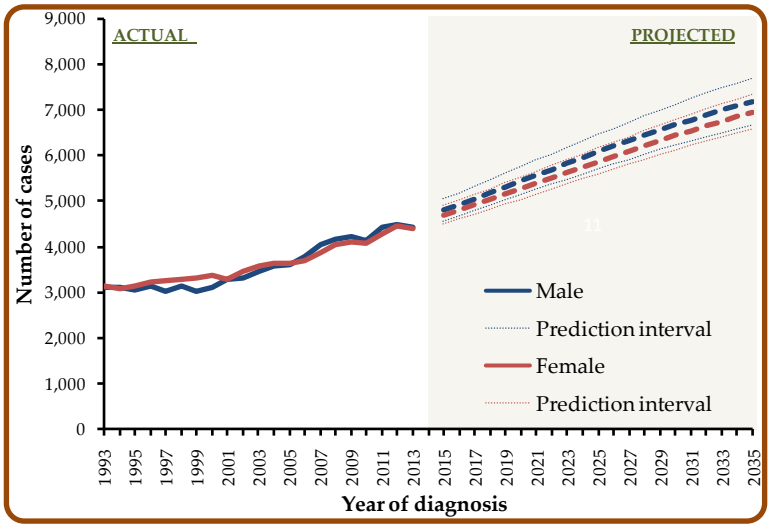
PROJECTED NUMBER OF CASES DIAGNOSED

PROJECTED NUMBER OF CASES DIAGNOSED FROM 2015 TO 2035

In 2009-2013 there were 4,347 male and 4,275 female cases of cancer (ex. NMSC) diagnosed each year[1].

By 2020 this is expected to rise by 25% for men and by 24% for women to 5,443 and 5,285 cases per year respectively.

By 2035 the number of cases per year is projected to be 7,181 male and 6,967 females cases, a 65% rise among men and a 63% rise among women.



PROJECTED NUMBER OF CASES DIAGNOSED BY SEX AND TYPE IN 2020 AND 2035

By 2035 the most common cancers are expected to remain breast, colorectal, lung and prostate cancer, with the number of breast cancers expected to reach 2,000 cases per year and the number of male lung and colorectal cancers expected to exceed 1,000 cases per year.

CANCER TYPE	Male					Female				
	2009-13 cases per year	2020		2035		2009-13 cases per year	2020		2035	
		Cases per year	(prediction interval)	Cases per year	(prediction interval)		Cases per year	(prediction interval)	Cases per year	(prediction interval)
All (ex. NMSC)[1]	4,425	5,443	(5,140, 5,746)	7,181	(6,675, 7,687)	4,351	5,285	(5,050, 5,520)	6,967	(6,590, 7,344)
Bladder	150	169	(128, 210)	205	(162, 248)	61	67	(47, 87)	83	(62, 104)
Brain	81	94	(67, 121)	110	(76, 144)	55	63	(42, 84)	75	(49, 101)
Breast						1,268	1,589	(1,464, 1,714)	2,077	(1,888, 2,266)
Cervix						103	93	(56, 130)	74	(26, 122)
Colorectal	680	909	(807, 1,011)	1,292	(1,143, 1,441)	545	688	(605, 771)	946	(818, 1,074)
Kidney	173	244	(195, 293)	368	(294, 442)	115	161	(124, 198)	246	(189, 303)
Leukaemia	116	137	(101, 173)	170	(128, 212)	80	91	(66, 116)	116	(88, 144)
Liver	72	110	(77, 143)	179	(125, 233)	31	43	(24, 62)	67	(33, 101)
Lung	649	816	(717, 915)	1,128	(991, 1,265)	484	641	(570, 712)	923	(821, 1,025)
Melanoma	138	215	(168, 262)	370	(288, 452)	181	239	(193, 285)	317	(244, 390)
Myeloma	66	82	(54, 110)	104	(70, 138)	50	57	(38, 76)	74	(54, 94)
NHL	175	226	(182, 270)	316	(257, 375)	150	180	(146, 214)	232	(191, 273)
Oesophagus	127	163	(124, 202)	215	(165, 265)	65	72	(52, 92)	86	(63, 109)
Oral	140	204	(157, 251)	288	(204, 372)	73	103	(73, 133)	146	(96, 196)
Ovary[2]						158	178	(143, 213)	223	(183, 263)
Pancreas	105	135	(98, 172)	185	(139, 231)	116	156	(125, 187)	241	(198, 284)
Prostate	1,039	1,183	(1,040, 1,326)	1,294	(1,082, 1,506)					
Stomach	141	143	(107, 179)	140	(106, 174)	81	78	(56, 100)	76	(56, 96)
Uterus						238	343	(286, 400)	506	(411, 601)

NHL: Non-Hodgkin's lymphoma, NMSC: Non-melanoma skin cancer

[1] Excludes myelodysplastic syndromes and myeloproliferative disorders to maintain consistency in trends over time. Totals thus differ slightly from those on page I.

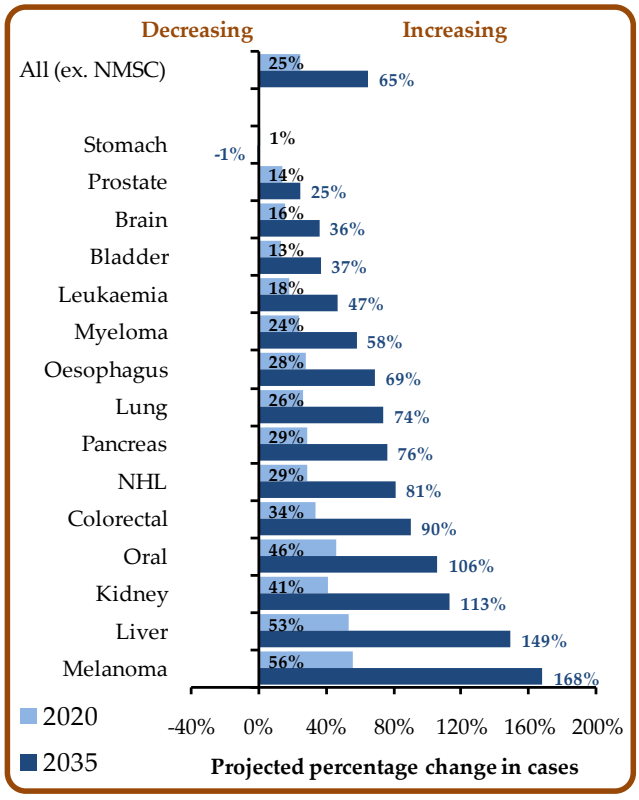
[2] Excludes borderline ovarian tumours to maintain consistency in trends over time.

PROJECTED ANNUAL CHANGE IN NUMBER OF CASES DIAGNOSED BY SEX AND TYPE

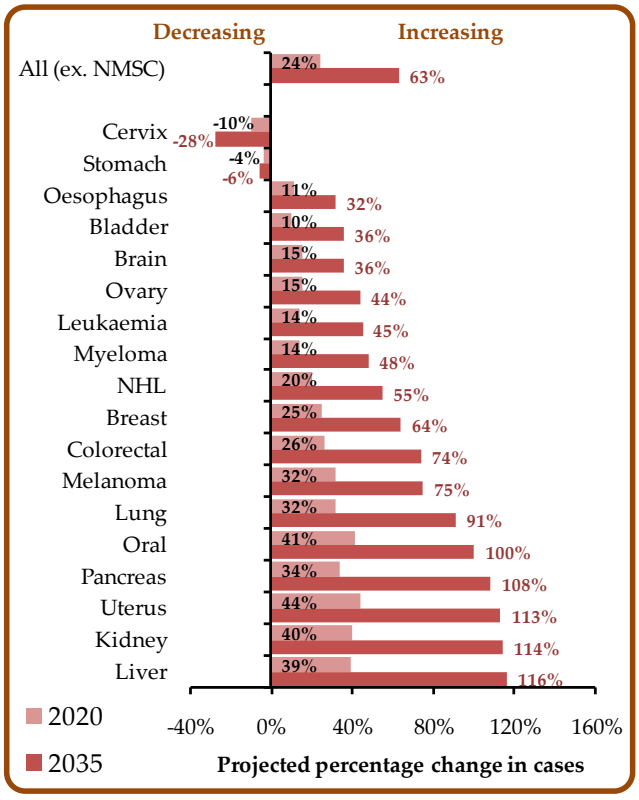
By 2035 the number of cases diagnosed each year among men is projected to increase for all cancer types compared to 2009-2013, except for stomach cancer, while among women increases are expected for all cancer types except cervical and stomach cancer.

The number of cases diagnosed each year is expected to increase among males by more than 100% for malignant melanoma, liver, kidney and oral cancers, and among females by more than 100% for liver, kidney, uterine, pancreatic and oral cancers.

Male



Female



NHL: Non-Hodgkin's lymphoma, NMSC: Non-melanoma skin cancer

FACTORS THAT CAN INFLUENCE CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- **Changes to risk factor exposure within the general population.**
  The risk factors likely to have the greatest impact on future projections are:
  - Tobacco use;
  - Excessive alcohol consumption;
  - Obesity, lack of physical activity and/or lack of a balanced diet;
  - Ultraviolet radiation from sunshine or sun beds.

  The potential exists to alter cancer incidence projections through control of these risk factors.
- **Introduction of health service initiatives that aim to either prevent or diagnose cancer early**. These include vaccinations (e.g. the HPV vaccination), screening (e.g. the breast, cervical and colorectal screening programmes) and diagnostic tests (e.g. PSA testing for prostate cancer).
- **Changes to the way in which cancer is classified.**
  In particular including or excluding certain tumour types among those considered malignant.
- **Revisions to population projections.**
  In particular changes to the size of the elderly population.

CONTENTS

01 INTRODUCTION

Since the beginning of detailed cancer registration in Northern Ireland in 1993, the number of cancers diagnosed excluding the rarely fatal non-melanoma skin cancer has increased considerably, from 6,274 diagnosed in 1993 to 8,859 in 2013[1], an increase of 41.2 per cent. This increase undoubtedly has resulted in an increased burden on health service resources in Northern Ireland with the treatment of cancer continuing to require additional resources in order to keep pace with the increasing incidence of the disease.

The burden this continuing increase will have on the NHS in Northern Ireland in the future cannot be underestimated, as one in three members of the population will develop some form of cancer by the time they reach 75 years of age[1]. In addition cancer was responsible for over one quarter of all deaths (28%) occurring in Northern Ireland in 2013 during which it was also the most common cause of death leading coronary heart disease and stroke[2].

Careful monitoring of trends in cancer incidence is thus essential if a high quality cancer diagnosis and treatment service is to be adequately maintained and resourced. However cancer is not a disease that has a single set of characteristics. There are many different types, each of which occur at different rates depending upon socio-economic background, area of residence, age and gender. When investigating trends it can therefore be beneficial to investigate not only changes over time for each type of cancer but also how the trend in each type varies by key demographic factors such as age, Health and Social Care (HSC) Trust of residence and area-based socio-economic deprivation as this can reveal crucial information about patients with particular characteristics. This not only allows better allocation of resources but can be useful in targeting various demographic groups in order to promote measures which increase public understanding of the link between lifestyle choices and cancer thereby helping the control of this disease through prevention.

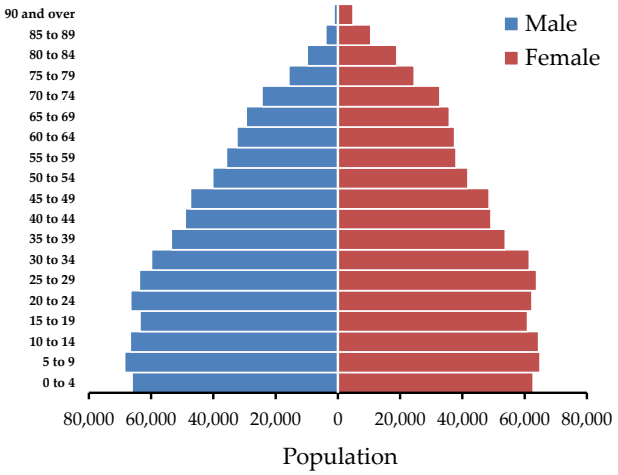
In addition to the analysis of historical trends, predictions of cancer incidence in future years can provide a general guide to patient volumes which is helpful in planning of future health service resources. Incidence projections are typically based upon both the projected population and an assumed continuation of the current trend in cancer incidence rates.

Given the projected rise in the elderly population and the strong relationship between cancer and age, the former of these is actually the most relevant when projecting cancer incidence into the future. Since 1993 the population of Northern Ireland has increased by 11.9 per cent from 1.636 million to 1.830 million in 2013[3]. Future population projections suggest a further increase of 9.2 per cent to 1.997 million by 2035[4]. While this may not suggest a huge increase in cancer incidence, the age structure of this population is due to change dramatically and very significantly from a cancer perspective. In 1993 20,600 people were aged 85 and over. By 2013 this had increased to 33,300 people[3], an increase of 61.7 per cent, but it is projected to further increase by 155.7 per cent to 85,100 people by 2035[4]. Given the accelerated rate at which the elderly population is projected to increase, we would expect the rate of increase in cancer incidence to also accelerate as the primary risk factor associated with cancer is age. (Fig. 1.1)

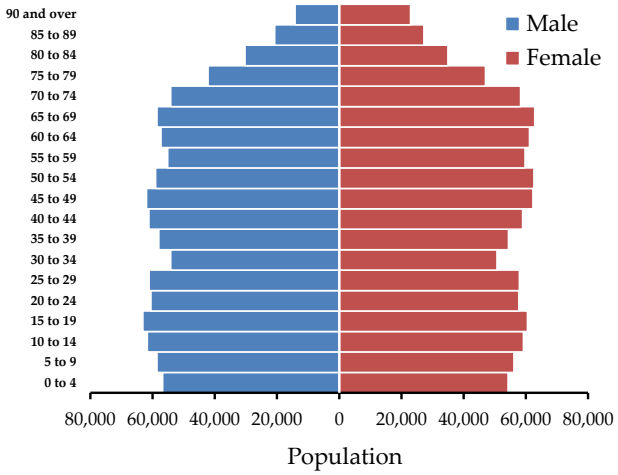
For the first time in Northern Ireland this report aims to examine in detail the historical trends in cancer incidence and uses these trends to project forward and forecast what the cancer incidence is expected to be up to the year 2035. The data in this report is based on all malignant cancers (excluding non-melanoma skin cancer) which were diagnosed between 1993 and 2013. In addition

Figure 1.1: Northern Ireland population by sex, age and calendar year

(a) 1993



(b) 2035



Source: NISRA [3] & ONS[4]

to data for all cancers combined we provide detailed data for the 15 most common cancers for each sex including analysis of trends by age, HSC Trust of residence and area-based socio-economic deprivation. A less detailed analysis is provided for the next 11 most common cancers and cancers of an unknown primary.

We hope this report will assist in planning cancer services in the future but will also highlight certain types of cancer and patients that would benefit from further preventative measures. In this way some of the projections in this report may prove to be incorrect due to future prevention of cancers (e.g. via tobacco control or the HPV vaccination) reversing or at least reducing the upward trend in cancer rates, thereby counteracting the influence of the projected increase in the elderly population.

02 CANCER IN NORTHERN IRELAND

There are many different types of cancer diagnosed in Northern Ireland each year. The most common of these among both men and women is non-melanoma skin cancer. There were 3,359 cases (1,885 male and 1,474 female) of this cancer diagnosed each year during 2009-2013. However, despite its frequency this cancer is not usually included in the overall number of cancers quoted as it is easily and quickly treated and is rarely fatal. (Fig. 2.1)

Excluding non-melanoma skin cancer there were on average 4,425 male and 4,351 female cases of cancer diagnosed each year in Northern Ireland between 2009 and 2013. (Fig. 2.1)

Among males the most common cancers were prostate (23.5%), colorectal (15.4%) and lung (14.7%), while among females the most common cancers were breast (29.1%), colorectal (12.5%) and lung (11.1%). For both sexes the three most common cancers made up over half of all cancers diagnosed. (Fig. 2.2)

The average annual number of cases diagnosed during 2009-2013 for the thirty most common cancers are presented in table 2.1 along with incidence rates per 100,000 persons. The four most common cancers (breast, colorectal, lung and prostate) each had more than 1,000 cases diagnosed each year. Overall approximately 1 in 200 (or 484.0 per 100,000) people resident in Northern Ireland were diagnosed each year with cancer (excluding non-melanoma skin cancer). (Tab 2.1)

Figure 2.1: Number of cancers diagnosed per year in Northern Ireland by sex: 2009-2013

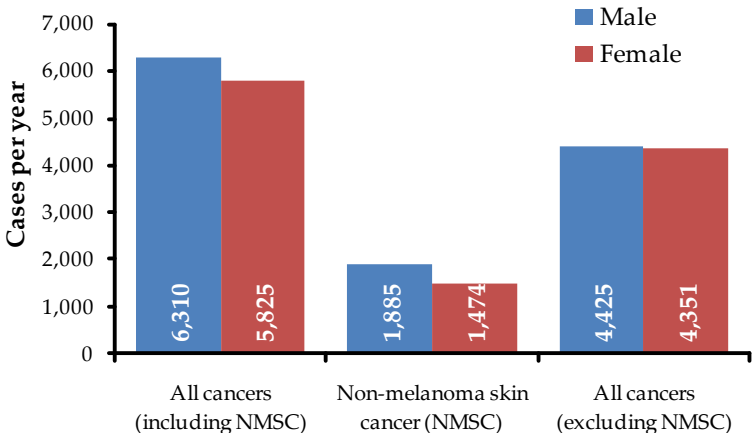
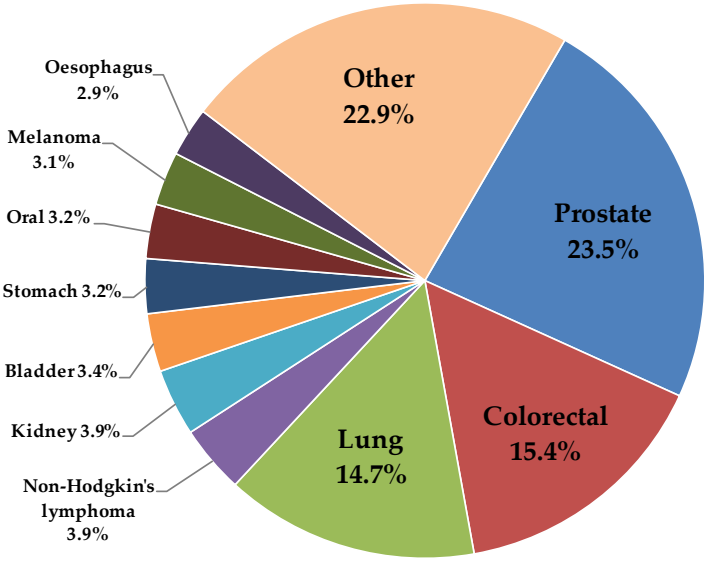


Figure 2.2: Most common cancers diagnosed in Northern Ireland: 2009-2013

(a) Male



(b) Female

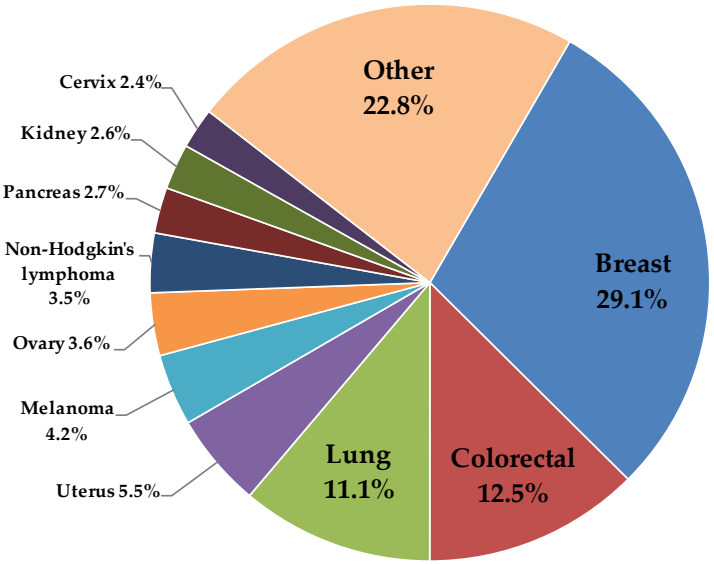


Table 2.1: Cancer incidence by sex and type: 2009-2013

CANCER TYPE	Male			Female			Total		
	Cases per year	Percent (ex. NMSC)	Rate per 100,000 males	Cases per year	Percent (ex. NMSC)	Rate per 100,000 females	Cases per year	Percent (ex. NMSC)	Rate per 100,000 persons
Bladder	150	3.4%	16.8	61	1.4%	6.6	211	2.4%	11.6
Bone	8	0.2%	0.9	7	0.2%	0.7	15	0.2%	0.8
Brain (and CNS)	81	1.8%	9.1	55	1.3%	6.0	136	1.5%	7.5
Breast	10	0.2%	1.1	1,268	29.1%	137.2	1,278	14.6%	70.5
Cervix				103	2.4%	11.1	103	1.2%	5.7
Colorectal	680	15.4%	76.5	545	12.5%	59.0	1,225	14.0%	67.6
Gallbladder	36	0.8%	4.0	44	1.0%	4.8	80	0.9%	4.4
Hodgkin's lymphoma	36	0.8%	4.0	23	0.5%	2.4	59	0.7%	3.2
Kidney	173	3.9%	19.4	115	2.6%	12.5	288	3.3%	15.9
Larynx	63	1.4%	7.1	15	0.4%	1.7	78	0.9%	4.3
Leukaemia	116	2.6%	13.1	80	1.8%	8.7	196	2.2%	10.8
Liver	72	1.6%	8.1	31	0.7%	3.4	103	1.2%	5.7
Lung	649	14.7%	73.1	484	11.1%	52.4	1,133	12.9%	62.5
Melanoma	138	3.1%	15.5	181	4.2%	19.6	319	3.6%	17.6
Mesothelioma	42	1.0%	4.7	5	0.1%	0.5	47	0.5%	2.6
Myeloma	66	1.5%	7.4	50	1.2%	5.5	116	1.3%	6.4
Non-Hodgkin's lymphoma	175	3.9%	19.6	150	3.5%	16.2	325	3.7%	17.9
Oesophagus	127	2.9%	14.3	65	1.5%	7.0	192	2.2%	10.6
Oral	140	3.2%	15.8	73	1.7%	7.9	213	2.4%	11.8
Ovary				158	3.6%	17.1	158	1.8%	8.7
Pancreas	105	2.4%	11.8	116	2.7%	12.5	221	2.5%	12.2
Penis	18	0.4%	2.0				18	0.2%	1.0
Prostate	1,039	23.5%	116.9				1,039	11.8%	57.3
Small intestine	20	0.4%	2.2	18	0.4%	1.9	38	0.4%	2.1
Stomach	141	3.2%	15.9	81	1.9%	8.8	222	2.5%	12.2
Testes	65	1.5%	7.3				65	0.7%	3.6
Thyroid	21	0.5%	2.4	57	1.3%	6.2	78	0.9%	4.3
Tissue (connective & soft)	30	0.7%	3.4	19	0.4%	2.0	49	0.6%	2.7
Uterus				238	5.5%	25.7	238	2.7%	13.1
Vulva				29	0.7%	3.1	29	0.3%	1.6
Unknown primary	111	2.5%	12.4	138	3.2%	14.9	249	2.8%	13.7
Other	113	2.6%	13.0	142	3.2%	15.2	255	2.9%	14.1
All cancers (ex. NMSC)	4,425		497.9	4,351		470.8	8,776		484.0
Non-melanoma skin	1,885		212.1	1,474		159.4	3,359		185.3
All cancers	6,310		710.0	5,825		630.2	12,135		669.3

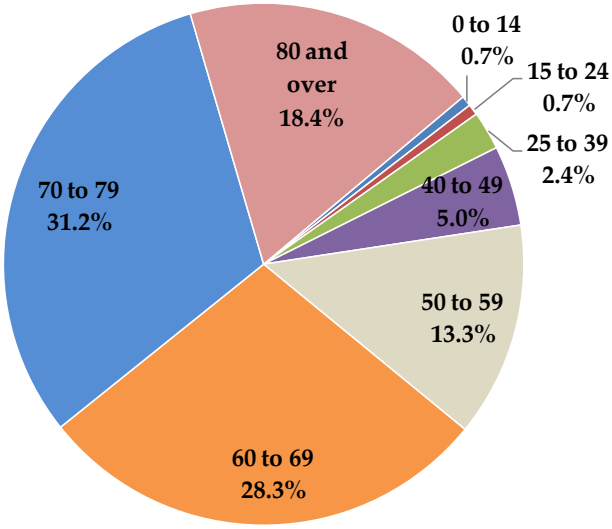
NMSC: Non-melanoma skin cancer; CNS: Central Nervous System

2.1: CANCER AND AGE AT DIAGNOSIS

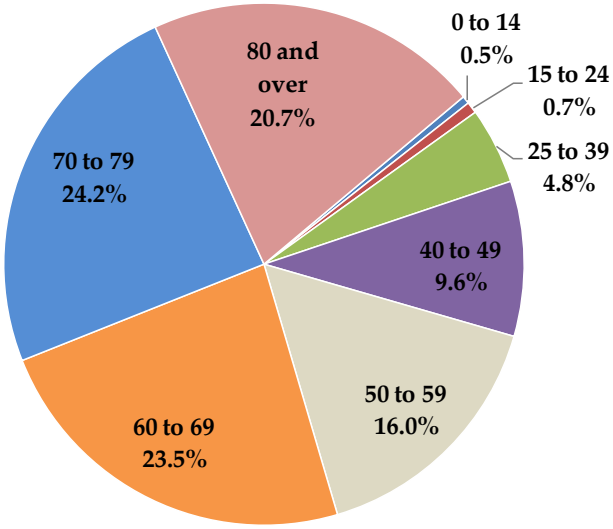
Cancer is a disease that occurs primarily among older people with a median age at diagnosis of 69 for males and 68 for females (i.e. half of people diagnosed with cancer are this age or more). However despite occurring primarily among the elderly, cancer is diagnosed among people of all ages. Excluding non-melanoma skin cancer there were an average of 50 cancers (29 boys and 21 girls) diagnosed among children (aged 0 to 14) each year during 2009-2013 and a further 61 cancers (30 males and 31 females) diagnosed each year among young people (aged 15 to 24). (Fig. 2.3)

Figure 2.3: Age at diagnosis for all cancers (excluding non-melanoma skin cancer) by sex: 2009-2013

(a) Male



(b) Female



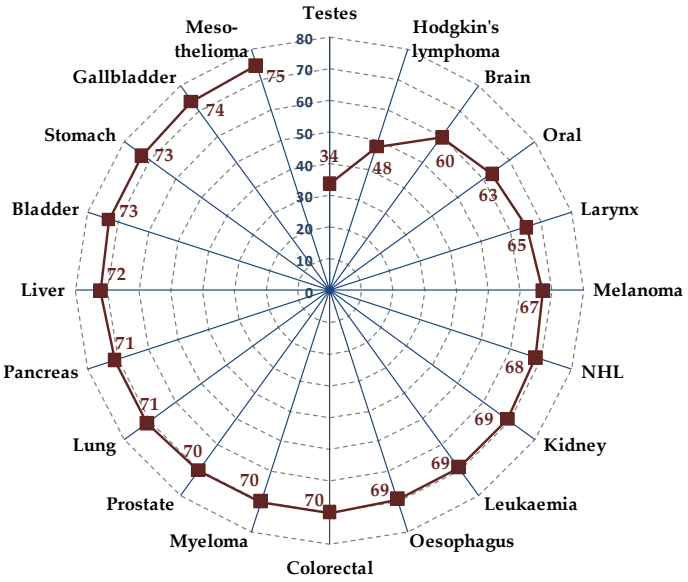
The relationship to age varies according to the type of cancer with the median age during 2009-2013 ranging from 34 for testicular cancer to 75 for mesothelioma among men and from 40 for cervical cancer to 77 for stomach cancer among women. (Fig. 2.4)

While for most cancers the median age at diagnosis is similar for men and women, some cancers occur considerably earlier among one of the sexes, such as malignant melanoma (56 for women vs. 67 for men) and oesophageal cancer (69 for men vs. 74 for women). (Fig. 2.4)

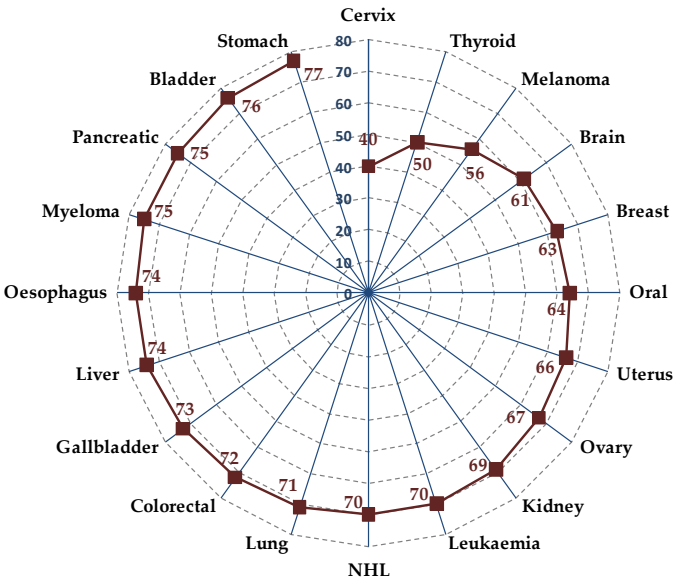
The most common female cancer, breast cancer, had a younger median age at diagnosis than the most common male cancer, prostate cancer (63 for breast cancer vs. 70 for prostate cancer). (Fig. 2.4)

Figure 2.4: Median age at diagnosis by sex and cancer type: 2009-2013

(a) Male



(b) Female



NHL: Non-Hodgkin's lymphoma

2.2: CANCER AND AREA OF RESIDENCE

During 2004-2013 the average number of cases of cancer (excluding NMSC) diagnosed each year varied considerably within the eleven Local Government Districts, ranging from 479 in Fermanagh & Omagh LGD to 1,666 in Belfast LGD. The variation by Health and Social Care Trust was also considerable with an average of 1,226 cases diagnosed per year in the Western Trust compared to 2,094 cases per year in the Northern Trust. (Tab. 2.2)

Table 2.2: Number of cancers (ex. NMSC) diagnosed per year by sex and area of residence: 2004-2013

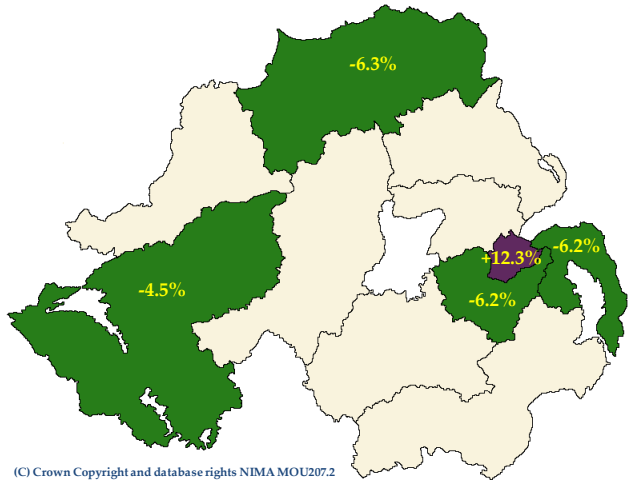
LOCAL GOVERNMENT DISTRICT	Cases per year		
	Male	Female	Total
Antrim & Newtownabbey	317	311	628
Armagh, Banbridge & Craigavon	444	423	867
Belfast	819	847	1,666
Causeway Coast & Glens	320	317	637
Derry & Strabane	303	305	608
Fermanagh & Omagh	253	226	479
Lisburn & Castlereagh	302	308	610
Mid & East Antrim	336	319	655
Mid Ulster	278	252	530
Newry, Mourne & Down	367	364	731
North Down & Ards	395	395	790

HSC TRUST	Cases per year		
	Male	Female	Total
Belfast	869	899	1,768
Northern	1,070	1,024	2,094
South-Eastern	805	806	1,611
Southern	768	736	1,504
Western	624	602	1,226
Northern Ireland	4,135	4,067	8,202

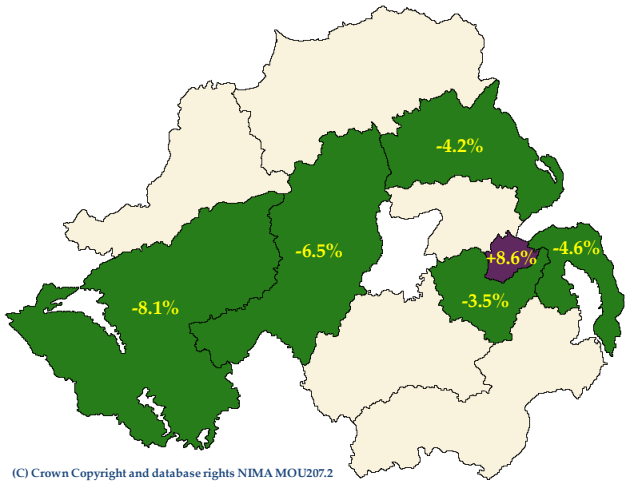
NMSC: Non-melanoma skin cancer

Figure 2.5: Geographic areas with significantly higher and lower incidence rates of cancer (ex. NMSC): 2004-2013

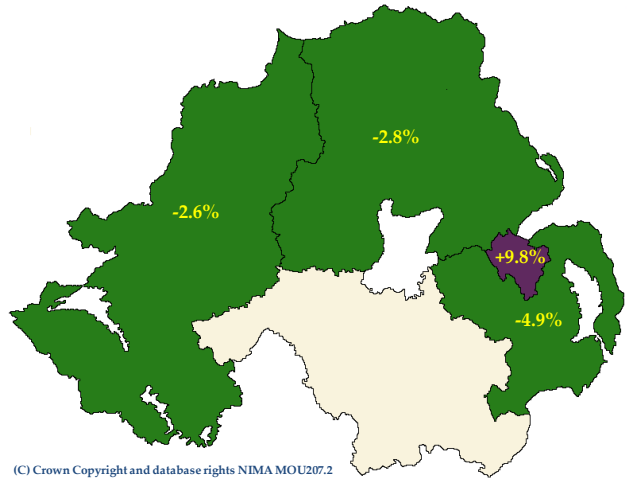
(a) Male – Local Government District



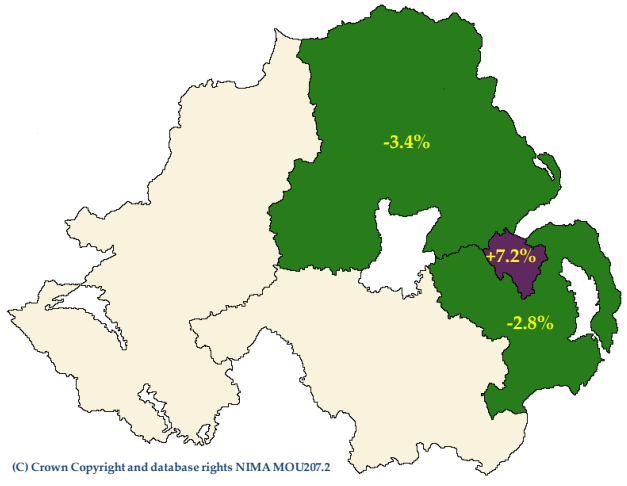
(b) Female – Local Government District



(c) Male – Health and Social Care Trust



(d) Female – Health and Social Care Trust



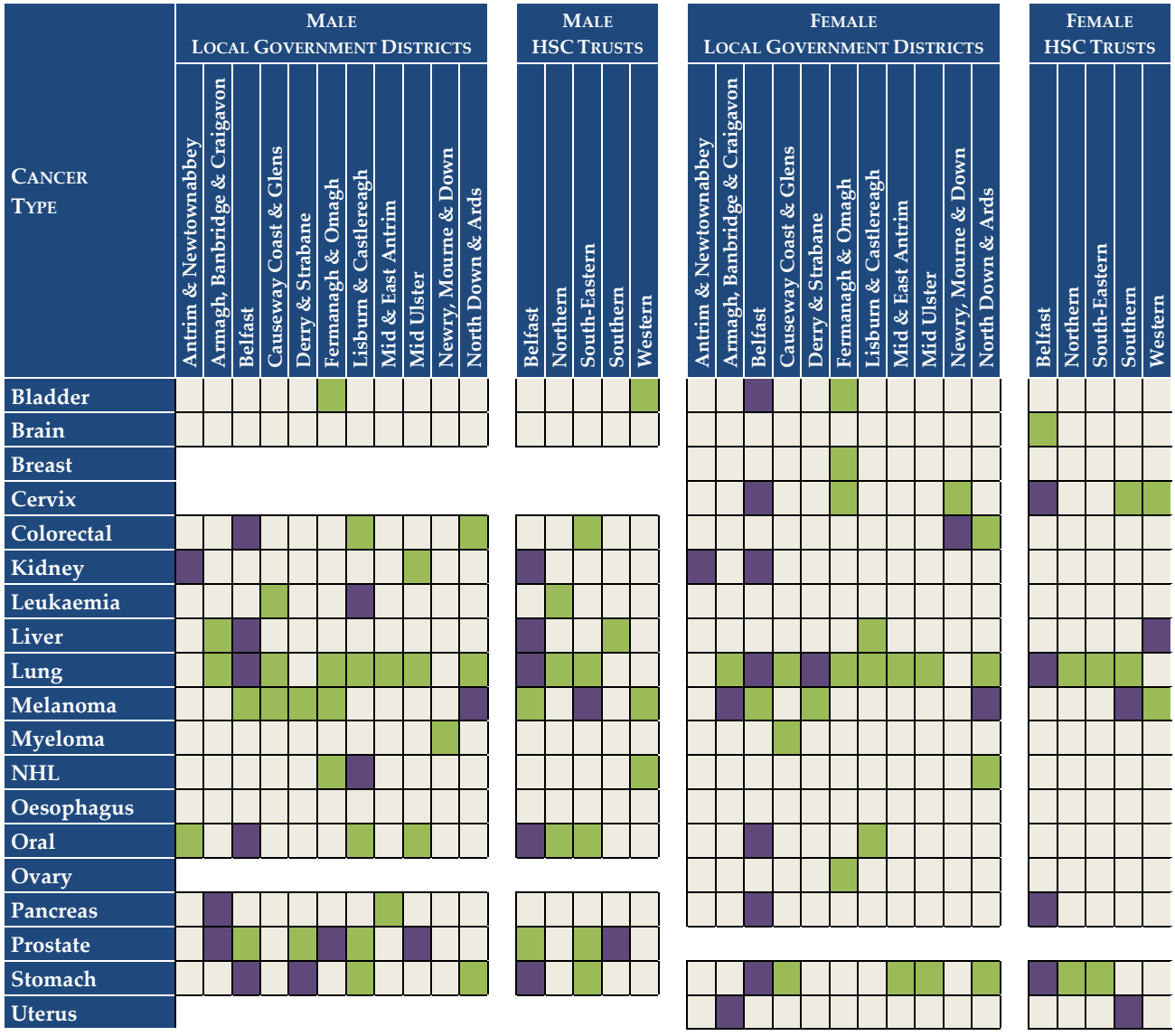
Significantly higher than average

Significantly lower than average

The variation in the number of cases by Local Government District (LGD) and HSC Trust (HSCT) is reflective of the size and age-structure of the different areas. Adjusting for these factors using age-standardised rates illustrates that among males, rates were significantly higher than the NI average in Belfast LGD and HSCT and were significantly lower than the NI average in Causeway Coast & Glens, Lisburn & Castlereagh, North Down & Ards and Fermanagh & Omagh LGDs and the South-Eastern, Northern and Western HSCTs. Among females rates were significantly higher than the NI average in Belfast LGD and HSCT and were significantly lower than the NI average in Lisburn & Castlereagh, Fermanagh & Omagh, Mid UIster, North Down & Ards and Mid & East Antrim LGDs and the Northern and South-Eastern HSCTs. (Fig. 2.5)

This geographic variation is strongly related to lifestyle factors and the socio-economic status of people resident in these areas; however other factors such as higher use of PSA testing (for prostate cancer) and genetic factors will have an impact. Consequently the variation illustrated for all cancers combined is not necessarily the same for each type of cancer. All areas except Mid & East Antrim and Causeway Coast & Glens LGDs and consequently the Northern HSCT had higher than average incidence rates of at least one type of cancer. All areas had lower than average incidence rates of at least one type of cancer. There was no LGD variation for brain or oesophageal cancer. (Tab. 2.3)

Table 2.3: Geographic areas with significantly higher and lower incidence rates of specific cancers: 2004-2013

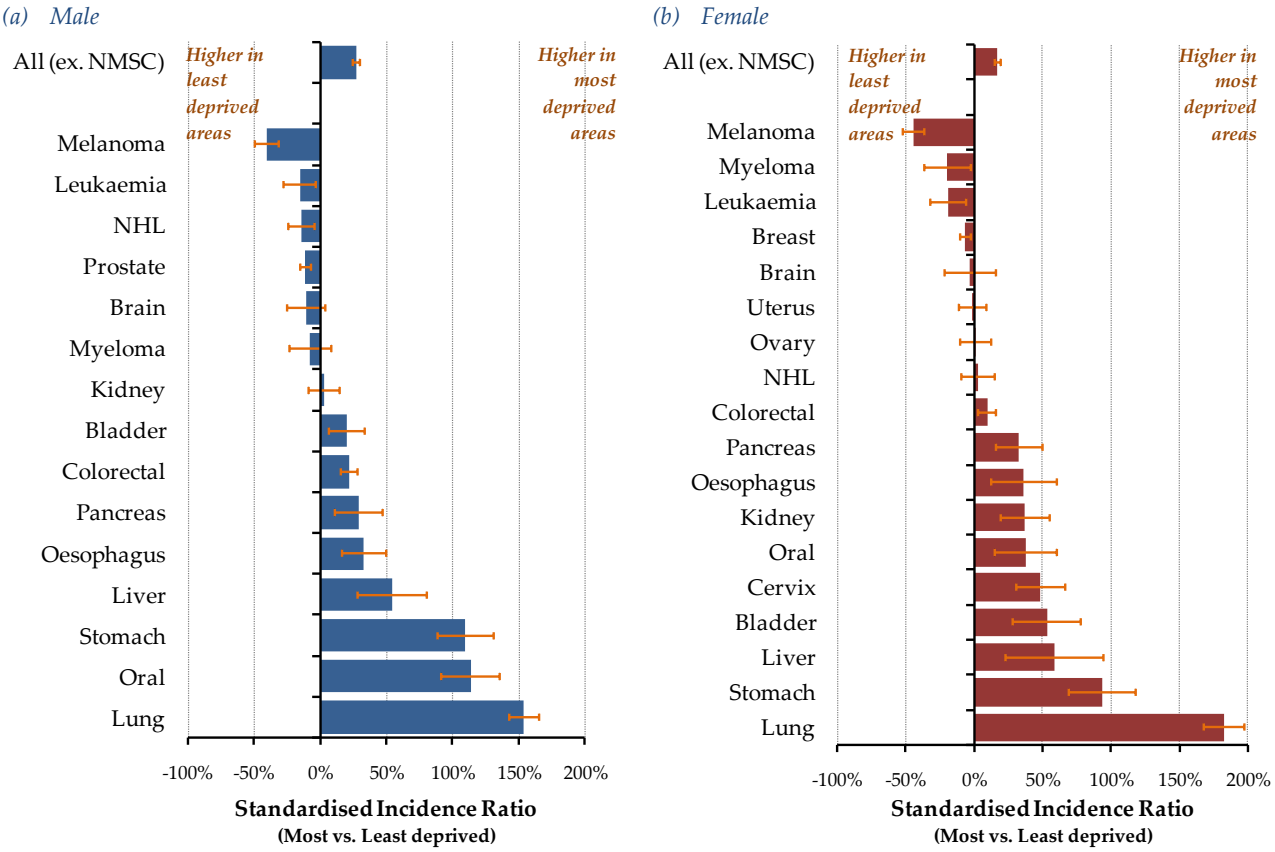


NHL: Non-Hodgkin's lymphoma *Significantly higher than average* *Significantly lower than average*

2.3: CANCER AND DEPRIVATION

Cancer incidence rates are higher in the most deprived areas in Northern Ireland than in the least deprived areas with a 27% difference for men and a 17% difference for women. The relationship between cancer and deprivation differs depending upon the cancer type. Lung cancer is between two and three times higher in deprived areas, while rates are also elevated for bladder, cervical, colorectal, kidney (female only), liver, oesophageal, oral, pancreatic and stomach cancer. However, rates of breast cancer, leukaemia, melanoma, myeloma (females only), non-Hodgkin's lymphoma (males only) and prostate cancer were all higher in the least deprived areas. There was no difference for brain cancer, male kidney cancer, ovarian cancer, male myeloma, female non-Hodgkin's lymphoma and uterine cancer. (Fig. 2.6)

Figure 2.6: Standardised incidence ratio comparing cancer incidence in the most deprived areas to the least deprived areas in Northern Ireland by sex and cancer site: 2004-2013



NHL: Non-Hodgkin's lymphoma; NMSC: Non-melanoma skin cancer

03 ALL CANCERS (EX. NMSC) (C00-C97 EX. C44)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
4,425 PER YEAR	4,351 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
69 YEARS	68 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
BELFAST HSCT (MALES & FEMALES)	NORTHERN & SOUTH-EASTERN HSCT (MALES & FEMALES)
	WESTERN HSCT (MALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+1.8% PER YEAR (2008-2013)	+2.4% PER YEAR (2001-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
NO CHANGE (2008-2013)	+1.0% PER YEAR (2001-2013)

PROJECTED CHANGE IN RATES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
NO CHANGE	+7%	-1%	+13%

PROJECTED CHANGE IN CASES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+25% TO 5,443 CASES PER YEAR	+24% TO 5,285 CASES PER YEAR	+65% TO 7,181 CASES PER YEAR	+63% TO 6,967 CASES PER YEAR

3.1: BACKGROUND

During 2009-2013 there was an average of 8,776 cancers (4,425 male, 4,351 female) diagnosed each year. As a proportion of the resident population in Northern Ireland, there were 497.9 cases diagnosed per 100,000 men and 470.8 cases diagnosed per 100,000 women. The risk of developing cancer before the age of 40 was 1 in 75 for men and 1 in 49 for women, while before the age of 65 it was 1 in 8 for men and 1 in 7 for women and before the age of 85 it was 1 in 3 for both men and women.

Cancer and age

Cancer (excluding non-melanoma skin cancer) was more common among older people with a median age at diagnosis of 69 years for men and 68 years for women during 2009-2013. Overall 73.2% (77.9% male, 68.4% female) of cases occurred among those aged 60 and over, with 19.6% (18.4% male, 20.7% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 3,403 cases per 100,000 males and 2,039 cases per 100,000 females in this age group. Despite being more common among the elderly cancer was still diagnosed among children and young people with 50 cases per year among those aged 0 to 14 and 61 cases per year among those aged 15 to 24. (Tab. 3.1, Fig 3.1)

Figure 3.1: Incidence of cancer (ex. NMSC) by sex and age: 2009-2013

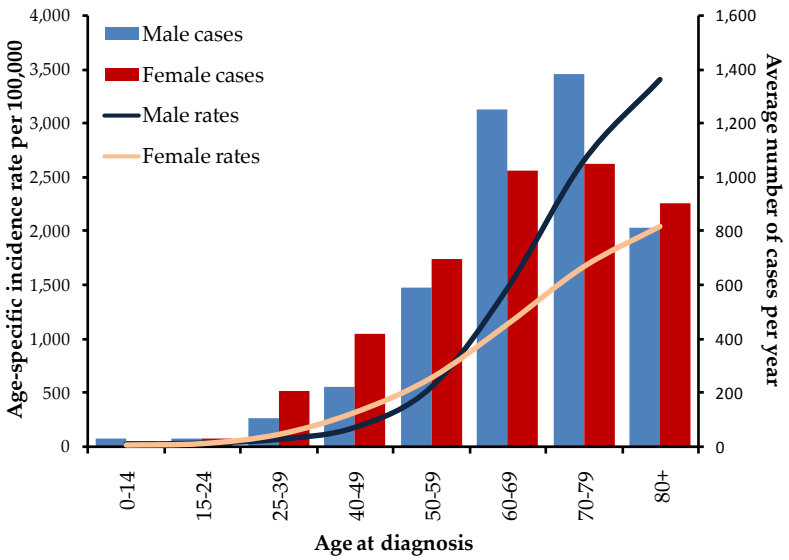


Table 3.1: Average number of cancers (ex. NMSC) diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	29	21	50
15-24	30	31	61
25-39	106	207	313
40-49	220	419	639
50-59	590	695	1285
60-69	1,252	1,023	2,275
70-79	1,381	1,052	2,433
80+	815	902	1,717
Total	4,425	4,351	8,776

Cancer and area of residence

During 2004-2013 incidence of cancer (ex. NMSC) was higher than average in the Belfast Trust by 9.8% for males and by 7.2% for females. Among males rates were lower than average in the Northern, South-Eastern and Western Trusts, while among females they were lower in the Northern and South-Eastern Trusts. (Tab. 3.2, Fig. 3.2)

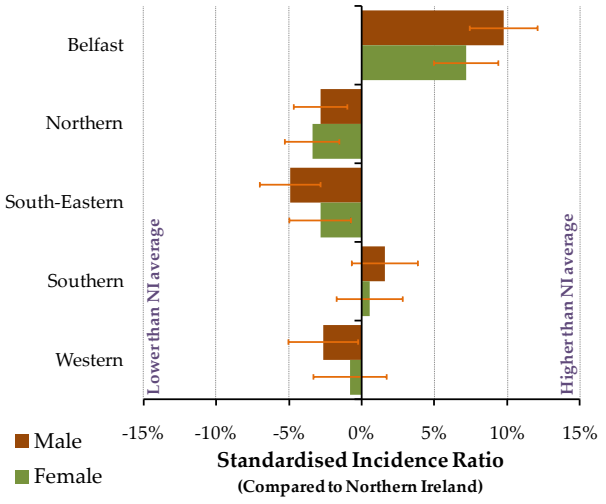
Incidence of all cancers (ex. NMSC) varied by the socio-economic characteristics of area of residence with incidence rates higher in the most deprived areas compared to the least deprived areas by 27.1% for males and 17.1% for females. (Tab. 3.2, Fig. 3.2)

Table 3.2: Average number of cancers (ex. NMSC) diagnosed per year by sex and area of residence: 2004-2013

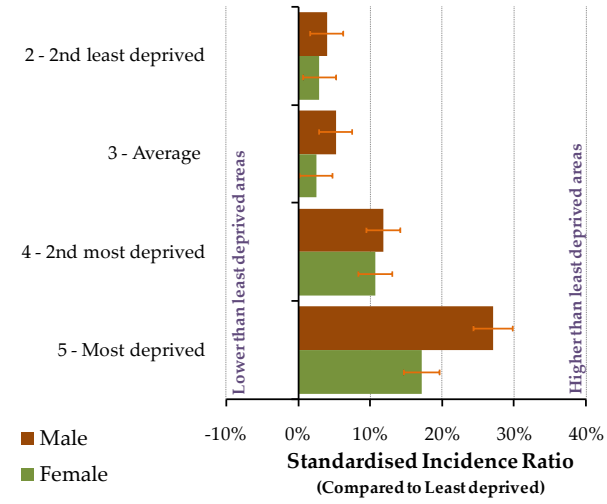
AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	869	899	1,768
	Northern	1,070	1,024	2,094
	South-Eastern	805	806	1,611
	Southern	768	736	1,504
	Western	624	602	1,226
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	814	799	1,613
	2 - 2nd least deprived	789	769	1,558
	3 - Average	810	782	1,592
	4 - 2nd most deprived	859	871	1,730
	5 - Most deprived	863	846	1,709

Figure 3.2: Age-standardised incidence rates of cancer (ex. NMSC) by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile



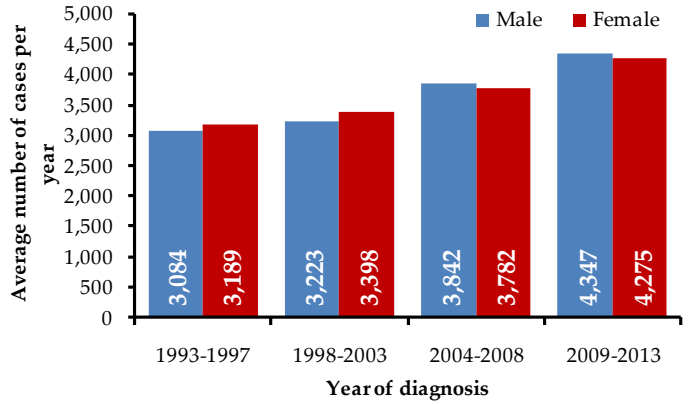
In order to maintain consistency in any trend analysis all results from this point forward exclude myelodysplastic syndromes and myeloproliferative disorders whose classification as malignant changed in 2009 (see section 24.4 for further discussion)

3.2: INCIDENCE TRENDS

Trends in cases

In 2009-2013 there were 8,622 cancers (4,347 male, 4,275 female) diagnosed each year compared to 6,273 per year (3,084 male, 3,189 female) in 1993-1997. (Tab. 3.3, Fig. 3.3)

Figure 3.3: Average number of cases of cancer (ex. NMSC) diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases increased by 1.8% per year for men between 2008 and 2013, while among women the number of cases increased between 2001 and 2013 by 2.4% per year. (Tab. 3.3, Fig. 3.3)

Table 3.3: Number of cases of cancer (ex. NMSC) diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	3,108	3,166	6,274
1994	3,100	3,094	6,194
1995	3,045	3,153	6,198
1996	3,146	3,254	6,400
1997	3,019	3,279	6,298
1998	3,128	3,307	6,435
1999	3,019	3,338	6,357
2000	3,121	3,396	6,517
2001	3,285	3,289	6,574
2002	3,315	3,476	6,791
2003	3,470	3,582	7,052
2004	3,572	3,643	7,215
2005	3,619	3,643	7,262
2006	3,787	3,702	7,489
2007	4,058	3,874	7,932
2008	4,174	4,047	8,221
2009	4,228	4,107	8,335
2010	4,135	4,077	8,212
2011	4,447	4,302	8,749
2012	4,495	4,468	8,963
2013	4,430	4,422	8,852

Trends in incidence rates

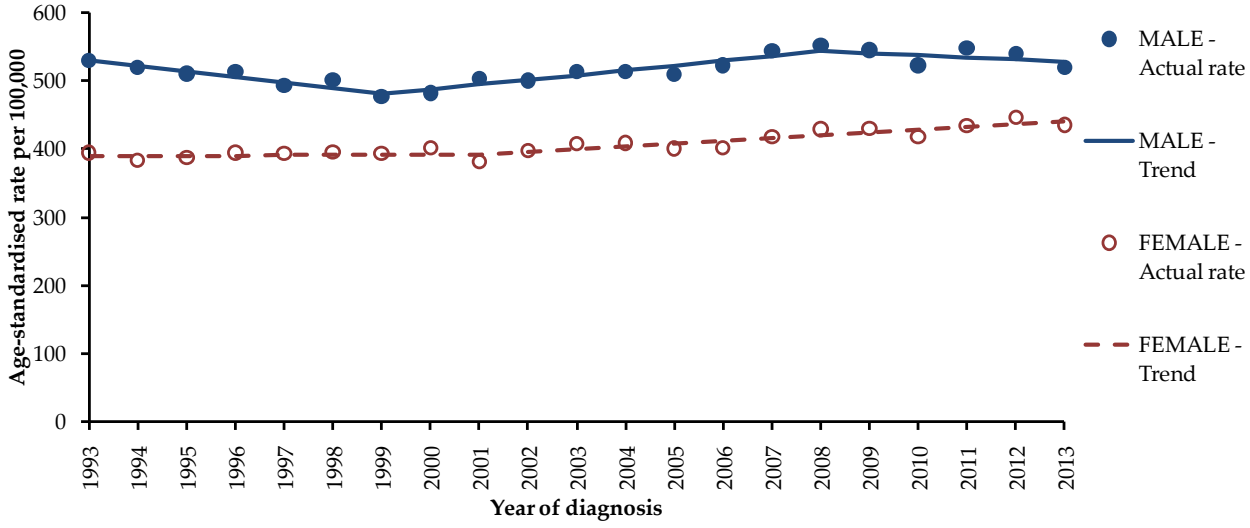
Cancer (ex. NMSC) incidence rates decreased by 1.6% per year (p=0.005) among males during 1993-1999, after which rates increased by 1.4% per year (p<0.001) until 2008. There was no change after 2008. Among women there was no change in incidence rates during 1993-2001, however after 2001 rates increased by 1.0% per year (p<0.001). (Tab. 3.4, Fig. 3.4)

Table 3.4: Annual percentage change in age-standardised cancer (ex. NMSC) incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-1999**	**-1.6% (-2.6%, -0.6%)**	**p=0.005**
	1999-2008	**1.4% (0.7%, 2.0%)**	**p<0.001**
	2008-2013	-0.6% (-1.7%, 0.5%)	p=0.276
Female	1993-2001	0.1% (-0.5%, 0.6%)	p=0.745
	2001-2013	**1.0% (0.7%, 1.2%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 3.4: Trends in age-standardised cancer (ex. NMSC) incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

At the end of 2013 incidence rates among males were increasing in the 0-49 and 50-59 age groups by 1.6% (p=0.013) and 0.9% (p<0.001) per year respectively. However rates were declining in the 60-69, 70-79 and 80+ age groups, although not significantly. Among women incidence rates were increasing at the end of 2013 in all age groups except for the 50-59 age group. (Tab. 3.5, Fig 3.5)

Figure 3.5: Trends in age-standardised cancer (ex. NMSC) incidence rates by sex and age at diagnosis: 1993-2013

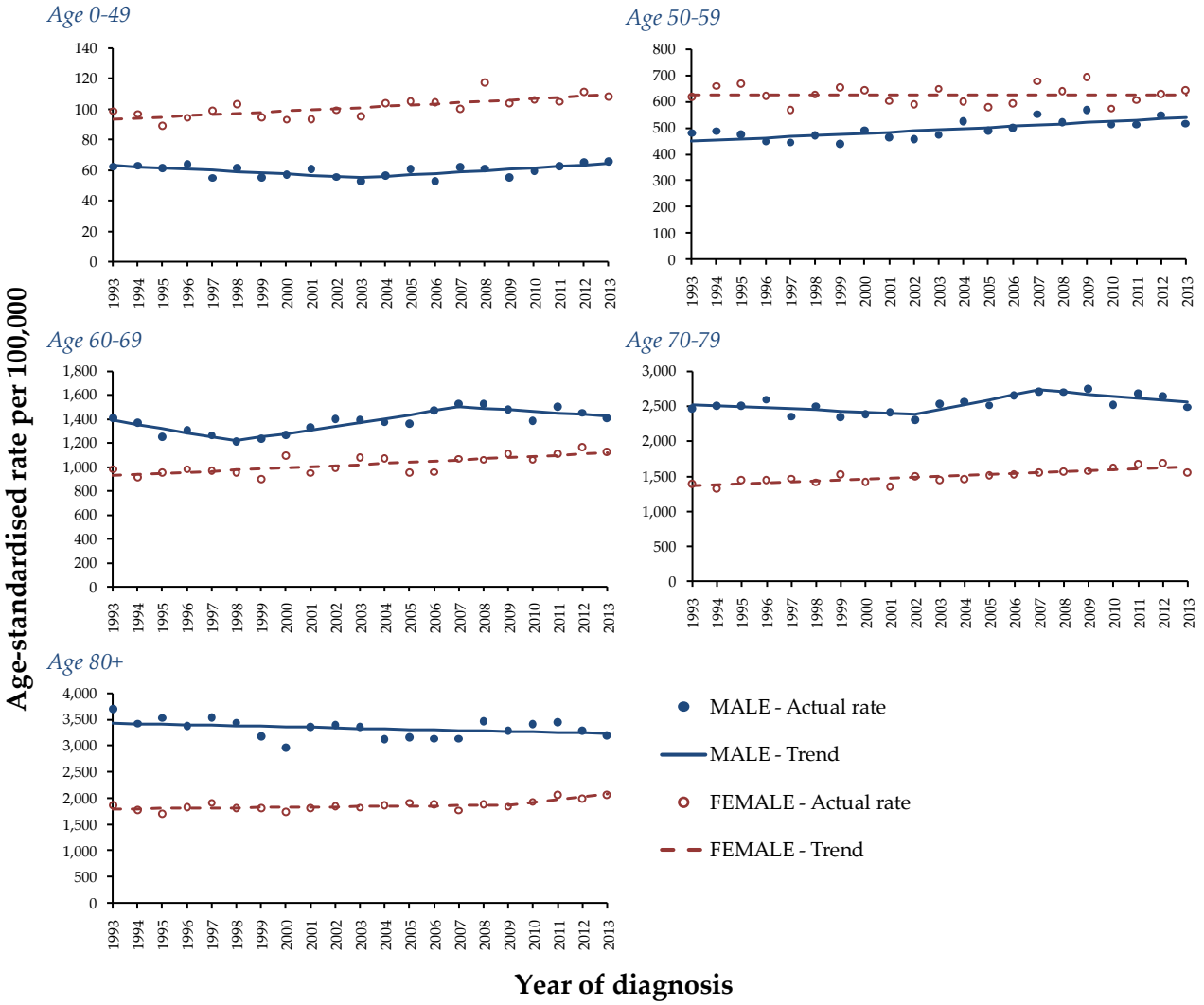


Table 3.5: Annual percentage change in age-standardised cancer (ex. NMSC) incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2003**	**-1.3% (-2.6%, -0.1%)**	**p=0.037**	**1993-2013**	**0.8% (0.4%, 1.2%)**	**p<0.001**
	2003-2013	**1.6% (0.4%, 2.8%)**	**p=0.013**			
50-59	**1993-2013**	**0.9% (0.5%, 1.3%)**	**p<0.001**	1993-2013	0.0% (-0.4%, 0.4%)	p=0.959
60-69	**1993-1998**	**-2.6% (-4.9%, -0.2%)**	**p=0.038**	**1993-2013**	**0.9% (0.6%, 1.3%)**	**p<0.001**
	1998-2007	**2.4% (1.2%, 3.5%)**	**p=0.001**			
	2007-2013	-0.9% (-2.4%, 0.6%)	p=0.227			
70-79	1993-2002	-0.6% (-1.5%, 0.3%)	p=0.147	**1993-2013**	**0.9% (0.6%, 1.2%)**	**p<0.001**
	2002-2007	**2.8% (-0.1%, 5.9%)**	**p=0.058**			
	2007-2013	-1.1% (-2.6%, 0.3%)	p=0.112			
80+	1993-2013	-0.3% (-0.6%, 0.1%)	p=0.133	1993-2009	0.3% (-0.1%, 0.6%)	p=0.162
				2009-2013	**2.8% (0.0%, 5.6%)**	**p=0.047**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

At the end of 2013 cancer incidence rates were increasing among men resident in the Northern, Trust, with non-significant increases in the Belfast and South-Eastern HSCT. Rates were static in the Western and Southern Trusts, although in the Southern Trust this was after a period of increase from 2001 to 2008. Among women rates were increasing at the end of 2013 in all five HSC Trusts although in the Western Trust this increase only commenced in 2003. (Tab. 3.6, Fig. 3.6)

Figure 3.6: Trends in age-standardised cancer (ex. NMSC) incidence rates by sex and Trust of residence: 1993-2013

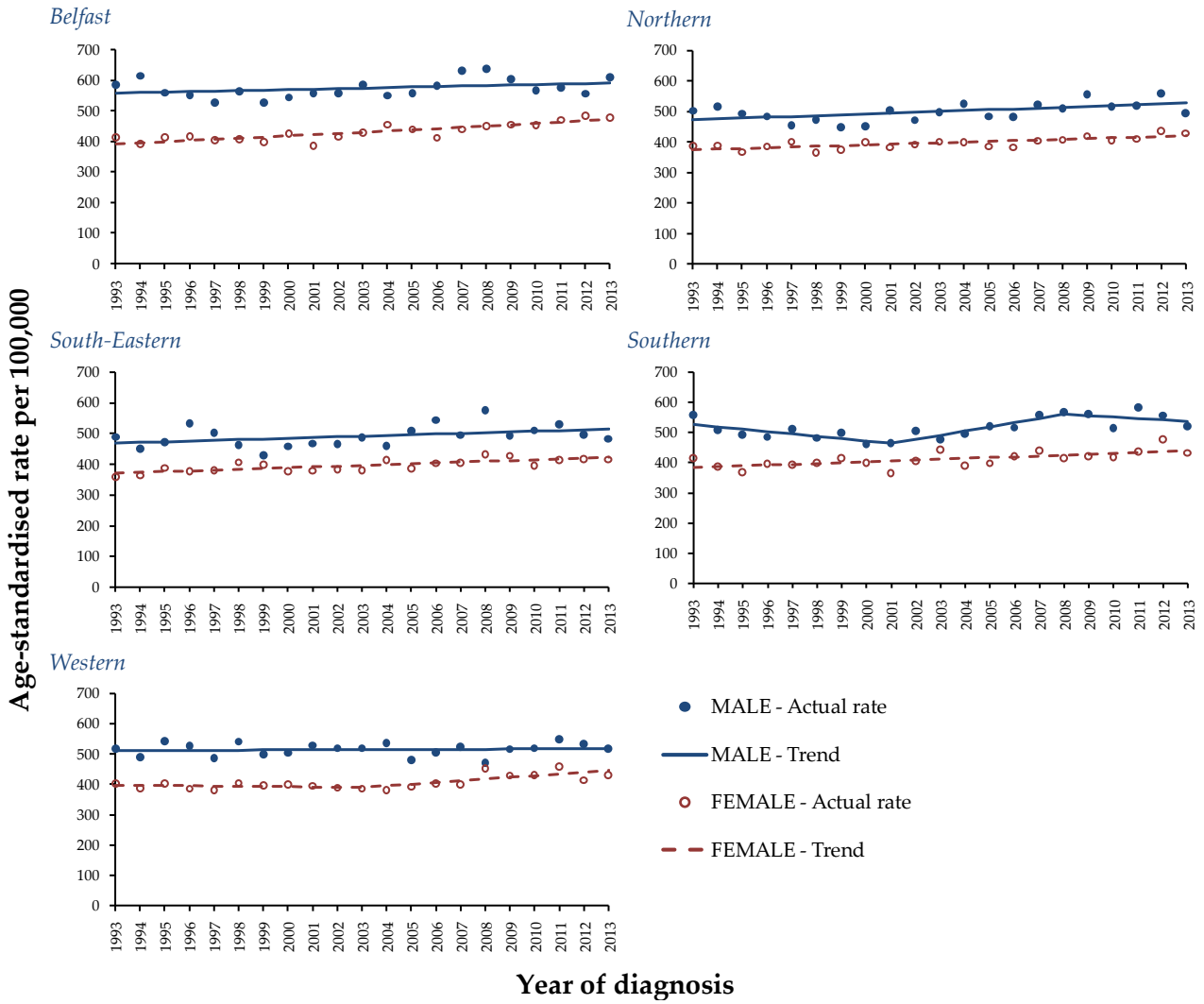


Table 3.6: Annual percentage change in age-standardised cancer (ex. NMSC) incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	0.3% (-0.1%, 0.7%)	p=0.123	**1993-2013**	**0.9% (0.6%, 1.2%)**	**p<0.001**
Northern	**1993-2013**	**0.5% (0.1%, 0.9%)**	**p=0.010**	**1993-2013**	**0.6% (0.4%, 0.8%)**	**p<0.001**
South-Eastern	1993-2013	0.5% (0.0%, 1.0%)	p=0.068	**1993-2013**	**0.6% (0.4%, 0.9%)**	**p<0.001**
Southern	1993-2001	-1.6% (-3.2%, 0.1%)	p=0.067	**1993-2013**	**0.7% (0.3%, 1.1%)**	**p=0.001**
	2001-2008	**2.7% (0.4%, 5.1%)**	**p=0.026**			
	2008-2013	-0.9% (-3.5%, 1.9%)	p=0.510			
Western	1993-2013	0.1% (-0.2%, 0.4%)	p=0.611	1993-2003	-0.2% (-1.1%, 0.8%)	p=0.718
				2003-2013	**1.3% (0.4%, 2.2%)**	**p=0.006**

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

At the end of 2013 cancer incidence rates were increasing by 1.0% per year (p=0.002) among men resident in the most deprived areas with no significant change in the other areas although increases in the 2nd most deprived quintile were close to being significant. Among women incidence rates were increasing at the end of 2013 in all five deprivation quintiles. (Tab. 3.7, Fig. 3.7)

Figure 3.7: Trends in age-standardised cancer (ex. NMSC) incidence rates by sex and deprivation: 2001-2013

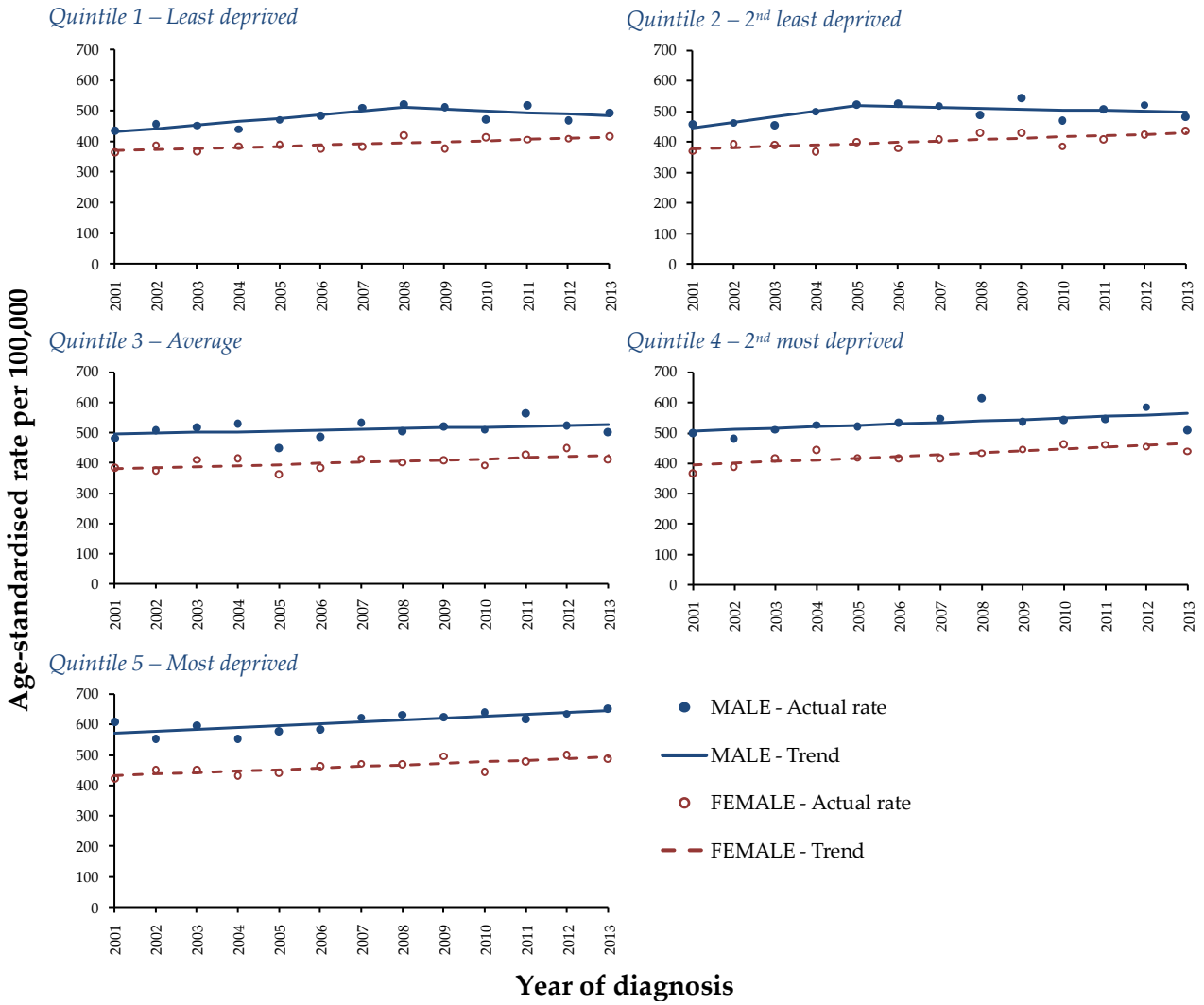


Table 3.7: Annual percentage change in age-standardised cancer (ex. NMSC) incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2008**	**2.5% (0.6%, 4.4%)**	**p=0.015**	**2001-2013**	**0.9% (0.4%, 1.5%)**	**p=0.002**
	2008-2013	-1.1% (-3.8%, 1.6%)	p=0.356			
Quintile 2 2nd least deprived	2001-2005	4.0% (-1.4%, 9.7%)	p=0.131	**2001-2013**	**1.1% (0.4%, 1.8%)**	**p=0.005**
	2005-2013	-0.5% (-2.2%, 1.1%)	p=0.460			
Quintile 3 Average	2001-2013	0.5% (-0.3%, 1.4%)	p=0.207	**2001-2013**	**0.9% (0.1%, 1.7%)**	**p=0.030**
Quintile 4 2nd most deprived	2001-2013	0.9% (-0.1%, 1.9%)	p=0.072	**2001-2013**	**1.4% (0.7%, 2.1%)**	**p=0.001**
Quintile 5 Most deprived	**2001-2013**	**1.0% (0.5%, 1.6%)**	**p=0.002**	**2001-2013**	**1.1% (0.5%, 1.7%)**	**p=0.001**

CI – Confidence interval; Significant trends are in bold

3.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

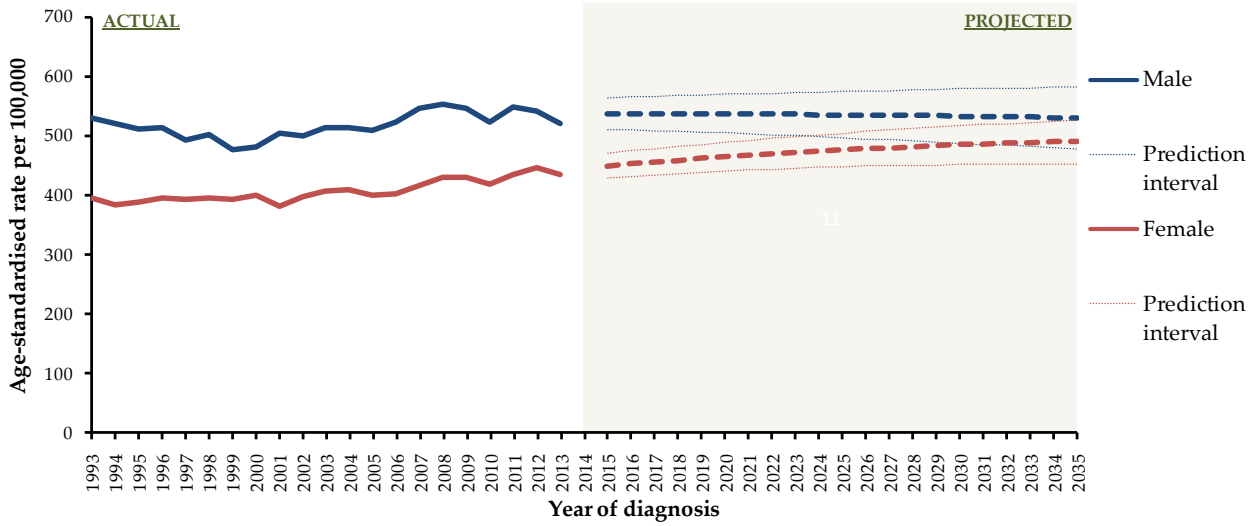
Age-standardised incidence rates of cancer (ex. NMSC) among men are projected to remain fairly steady in forthcoming years with no change by 2020 compared to rates in 2009-2013, while by 2035 a slight drop of 1% is expected. Among women however, incidence rates are expected to continue to increase with a 7% rise by 2020 and a 13% rise by 2035. (Tab. 3.8, Fig. 3.8)

Table 3.8: Cancer (ex. NMSC) age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	535.7				433.3			
2015	536.6	(509.7, 563.4)	0%	(-5%, 5%)	449.2	(428.2, 470.1)	4%	(-1%, 8%)
2020	536.6	(504.2, 569.0)	0%	(-6%, 6%)	464.6	(440.2, 489.0)	7%	(2%, 13%)
2025	535.3	(496.7, 573.8)	0%	(-7%, 7%)	476.1	(447.8, 504.4)	10%	(3%, 16%)
2030	532.9	(488.1, 577.7)	-1%	(-9%, 8%)	484.3	(451.7, 516.9)	12%	(4%, 19%)
2035	529.7	(478.5, 581.0)	-1%	(-11%, 8%)	489.9	(452.4, 527.3)	13%	(4%, 22%)

ASIR: Age-standardised incidence rate

Figure 3.8: Cancer (ex. NMSC) age-standardised incidence rate projections to 2035 by sex



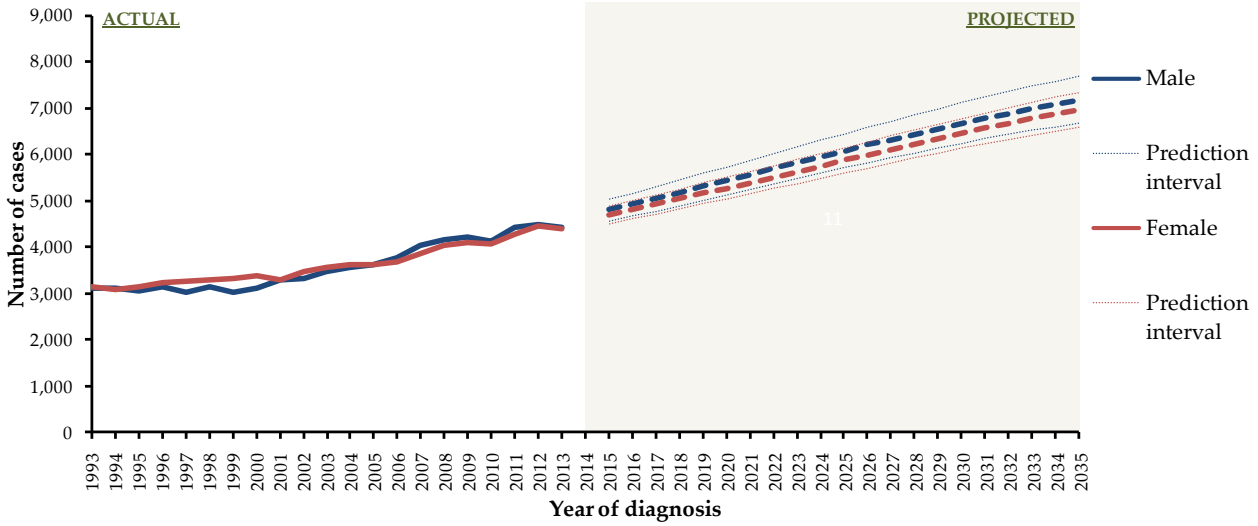
Case projections

In 2009-2013 there were 4,347 male and 4,275 female cases of cancer (ex. NMSC) diagnosed each year. By 2020 this is expected to rise by 25% for men and by 24% for women to 5,443 and 5,285 cases per year respectively. By 2035 the number of cases per year is projected to be 7,181 male and 6,967 females cases, a 65% rise among men and a 63% rise among women. (Tab. 3.9, Fig. 3.9)

Table 3.9: Cancer (ex. NMSC) incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	4,347				4,275			
2015	4,809	(4,565, 5,053)	11%	(5%, 16%)	4,706	(4,508, 4,904)	10%	(5%, 15%)
2020	5,443	(5,140, 5,746)	25%	(18%, 32%)	5,285	(5,050, 5,520)	24%	(18%, 29%)
2025	6,083	(5,713, 6,453)	40%	(31%, 48%)	5,882	(5,604, 6,160)	38%	(31%, 44%)
2030	6,675	(6,237, 7,113)	54%	(43%, 64%)	6,458	(6,132, 6,784)	51%	(43%, 59%)
2035	7,181	(6,675, 7,687)	65%	(54%, 77%)	6,967	(6,590, 7,344)	63%	(54%, 72%)

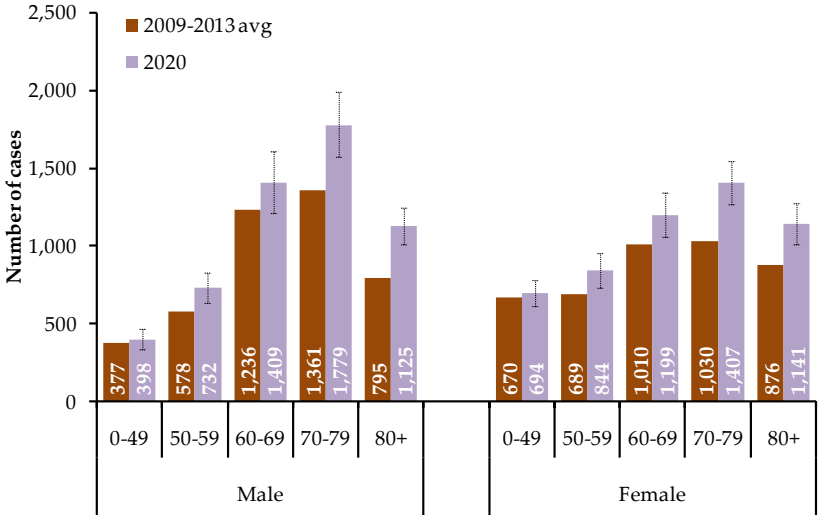
Figure 3.9: Cancer (ex. NMSC) incidence projections to 2035 by sex



Case projections by age

The number of cases in 2020 is expected to be greater than in 2009-2013 for all age groups. The percentage increase is likely to be small among those aged 0-49, however among men there is projected to be a 42% increase in the 80 and over age group, while among women a 37% increase is expected in the 70-79 age group. (Fig. 3.10)

Figure 3.10: Cancer (ex. NMSC) incidence projections to 2020 by sex and age



FACTORS THAT CAN INFLUENCE CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- **Changes to risk factor exposure within the general population.**
  The risk factors likely to have the greatest impact on future projections are:
  - Tobacco use;
  - Excessive alcohol consumption;
  - Obesity, lack of physical activity and/or lack of a balanced diet;
  - Ultraviolet radiation from sunshine or sun beds.

  The potential exists to alter cancer incidence projections through control of these risk factors.
- **Introduction of health service initiatives that aim to either prevent or diagnose cancer early**. These include vaccinations (e.g. the HPV vaccination), screening (e.g. the breast, cervical and colorectal screening programmes) and diagnostic tests (e.g. PSA testing for prostate cancer).
- **Changes to the way in which cancer is classified.**
  In particular including or excluding certain tumour types among those considered malignant.
- **Revisions to population projections.**
  In particular changes to the size of the elderly population.

04 BLADDER CANCER (C67)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
150 PER YEAR	61 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
73 YEARS	76 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
NO HSC TRUSTS (MALES & FEMALES)	WESTERN HSCT (MALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
NO CHANGE (1993-2013)	NO CHANGE (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
-1.7% PER YEAR (1993-2013)	-1.3% PER YEAR (1993-2013)

PROJECTED CHANGE IN RATES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
-13%	-8%	-30%	-20%

PROJECTED CHANGE IN CASES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+13% TO 169 CASES PER YEAR	+10% TO 67 CASES PER YEAR	+37% TO 205 CASES PER YEAR	+36% TO 83 CASES PER YEAR

4.1: BACKGROUND

An average of 211 cases (150 male, 61 female) of bladder cancer were diagnosed each year during 2009-2013 in Northern Ireland. It was the 6th most common male cancer diagnosed in this period making up 3.4% of all cancers (ex. NMSC), while it was the 15th most common female cancer making up 1.4% of cancers (ex. NMSC) diagnosed. As a proportion of the resident population in Northern Ireland there were 16.8 cases diagnosed per 100,000 males and 6.6 cases diagnosed per 100,000 females. The risk of developing bladder cancer before the age of 65 was 1 in 325 for men and 1 in 889 for women, while before age 85 it was 1 in 63 for men and 1 in 178 for women.

Cancer and age

Bladder cancer was more common among older people with a median age at diagnosis of 73 years for men and 76 years for women during 2009-2013. Overall 87.7% (87.3% male, 88.5% female) of cases occurred among those aged 60 and over, with 30.8% (28.0% male, 37.7% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 176 cases per 100,000 males and 51 cases per 100,000 females in this age group. Bladder cancer was rare among those aged 25 to 39, while there were no cases diagnosed among those aged under 25. (Tab. 4.1, Fig. 4.1)

Figure 4.1: Incidence of bladder cancer by sex and age: 2009-2013

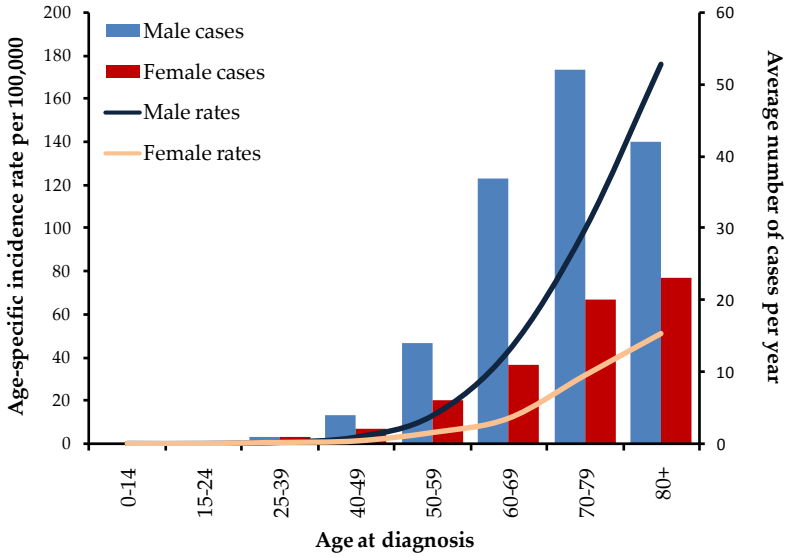


Table 4.1: Average number of bladder cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	0	0	0
25-39	1	1	2
40-49	4	2	6
50-59	14	6	20
60-69	37	11	48
70-79	52	20	72
80+	42	23	65
Total	150	61	211

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of bladder cancer were lower in the Western Trust than the Northern Ireland average by 17.7% for males. There were no other significant variations in bladder cancer incidence rates for either sex by HSC Trust despite slightly elevated rates in the South-Eastern Trust for males and females and in the Belfast Trust for females. (Tab. 4.2, Fig. 4.2)

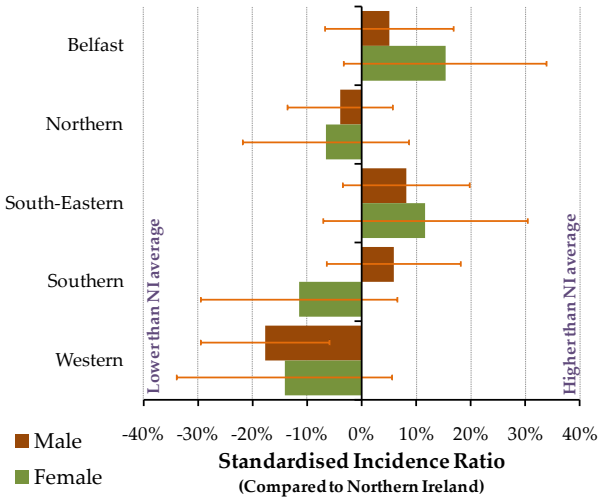
Table 4.2: Average number of bladder cancers diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	31	15	46
	Northern	38	14	52
	South-Eastern	33	14	47
	Southern	29	9	38
	Western	19	7	26
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	30	11	41
	2 - 2nd least deprived	27	11	38
	3 - Average	30	10	40
	4 - 2nd most deprived	32	14	46
	5 - Most deprived	30	14	44

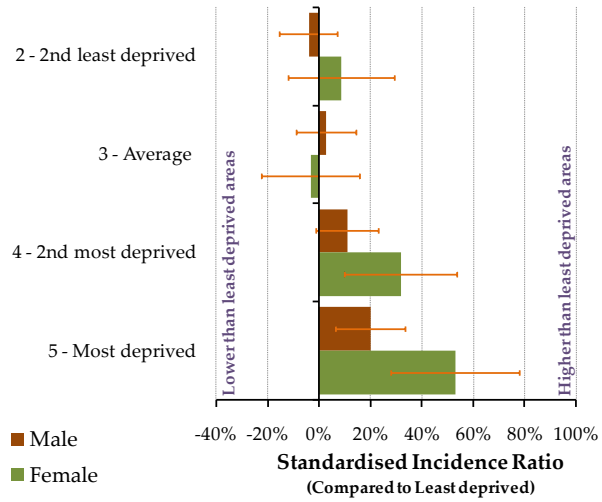
Incidence of bladder cancer varied by the socio-economic characteristics of area of residence during 2004-2013 with age-standardised incidence rates higher in the most deprived areas compared to the least deprived areas by 20.1% for males and by 53.2% for females. (Tab. 4.2, Fig. 4.2)

Figure 4.2: Age-standardised incidence rates of bladder cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

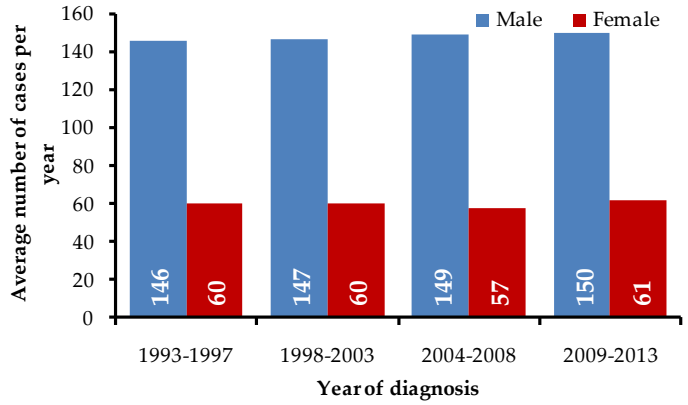


4.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 211 bladder cancers (150 male, 61 female) diagnosed each year compared to an average of 206 cancers (146 male, 60 female) in 1993-1997. (Tab. 4.3, Fig. 4.3)

Figure 4.3: Average number of cases of bladder cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average there has been no change in the number of cases of bladder cancer diagnosed each year during 1993-2013 for either males or females. (Tab. 4.3, Fig. 4.3)

Table 4.3: Number of cases of bladder cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	155	50	205
1994	138	57	195
1995	143	66	209
1996	175	84	259
1997	118	43	161
1998	161	72	233
1999	156	58	214
2000	145	66	211
2001	123	59	182
2002	129	44	173
2003	165	59	224
2004	150	58	208
2005	135	57	192
2006	159	66	225
2007	145	47	192
2008	155	59	214
2009	177	76	253
2010	131	50	181
2011	146	58	204
2012	137	64	201
2013	157	59	216

Trends in incidence rates

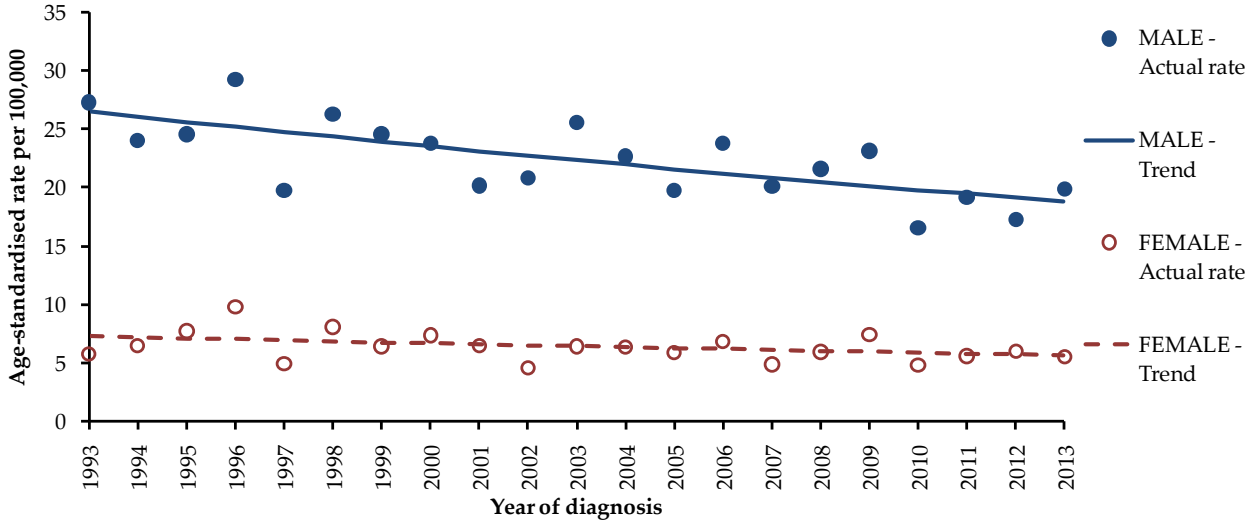
Age-standardised incidence rates of bladder cancer decreased among males during 1993-2013 by an average of 1.7% per year (p<0.001), while they decreased among women by an average of 1.3% per year (p<0.001). (Tab. 4.4, Fig. 4.4)

Table 4.4: Annual percentage change in age-standardised bladder cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-2013**	**-1.7% (-2.5%, -0.9%)**	**p<0.001**
Female	**1993-2013**	**-1.3% (-2.6%, 0.0%)**	**p=0.047**

CI – Confidence interval; Significant trends are in bold

Figure 4.4: Trends in age-standardised bladder cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Male bladder cancer incidence rates decreased significantly among all age groups during 1993-2013 except for those aged 80 and over. Among females, while decreases were apparent in each ten year age band from aged 50 upwards, the decline in incidence rates was significant only in the 70-79 age group. (Tab. 4.5, Fig. 4.5)

Figure 4.5: Trends in age-standardised bladder cancer incidence rates by sex and age at diagnosis: 1993-2013

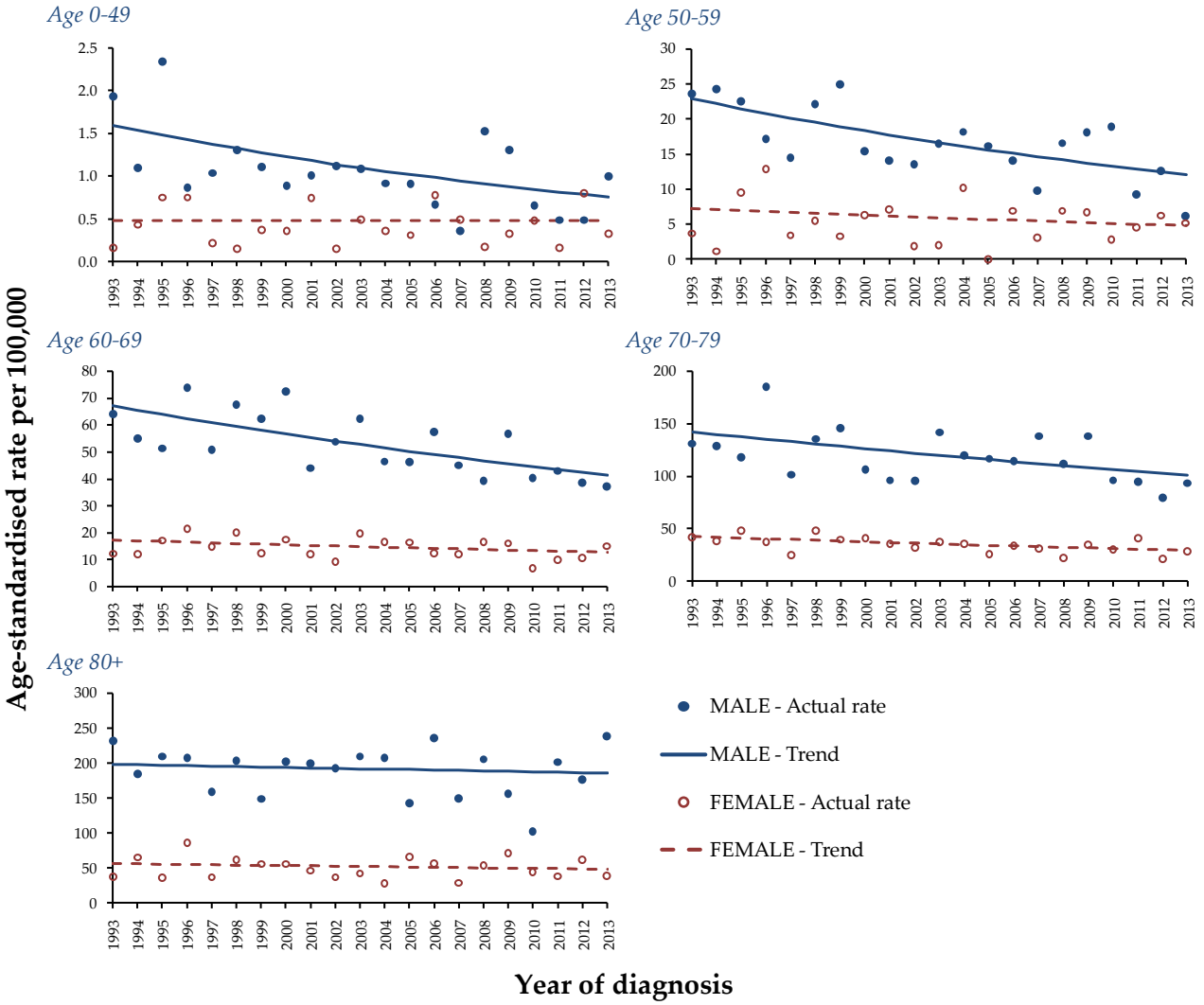


Table 4.5: Annual percentage change in age-standardised bladder cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**-3.7% (-6.2%, -1.1%)**	**p=0.008**	1993-2013	0.0% (-3.9%, 4.2%)	p=0.989
50-59	**1993-2013**	**-3.1% (-4.9%, -1.3%)**	**p=0.002**	1993-2013	-1.9% (-7.8%, 4.3%)	p=0.517
60-69	**1993-2013**	**-2.4% (-3.6%, -1.2%)**	**p=0.000**	1993-2013	-1.4% (-3.4%, 0.5%)	p=0.136
70-79	**1993-2013**	**-1.7% (-3.0%, -0.3%)**	**p=0.018**	**1993-2013**	**-1.9% (-3.2%, -0.6%)**	**p=0.008**
80+	1993-2013	-0.3% (-1.7%, 1.1%)	p=0.661	1993-2013	-0.7% (-2.9%, 1.6%)	p=0.544

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Bladder cancer incidence rates decreased by 2.9% per year (p<0.001) among men living in the Belfast Trust and by 2.7% per year (p=0.001) among men living in the Western Trust during 1993-2013. While decreases also occurred in the other Trusts these were not statistically significant. Among women there was no significant change but non-significant decreases occurred in all but the South-Eastern Trust. (Tab. 4.6, Fig. 4.6)

Figure 4.6: Trends in age-standardised bladder cancer incidence rates by sex and Trust of residence: 1993-2013

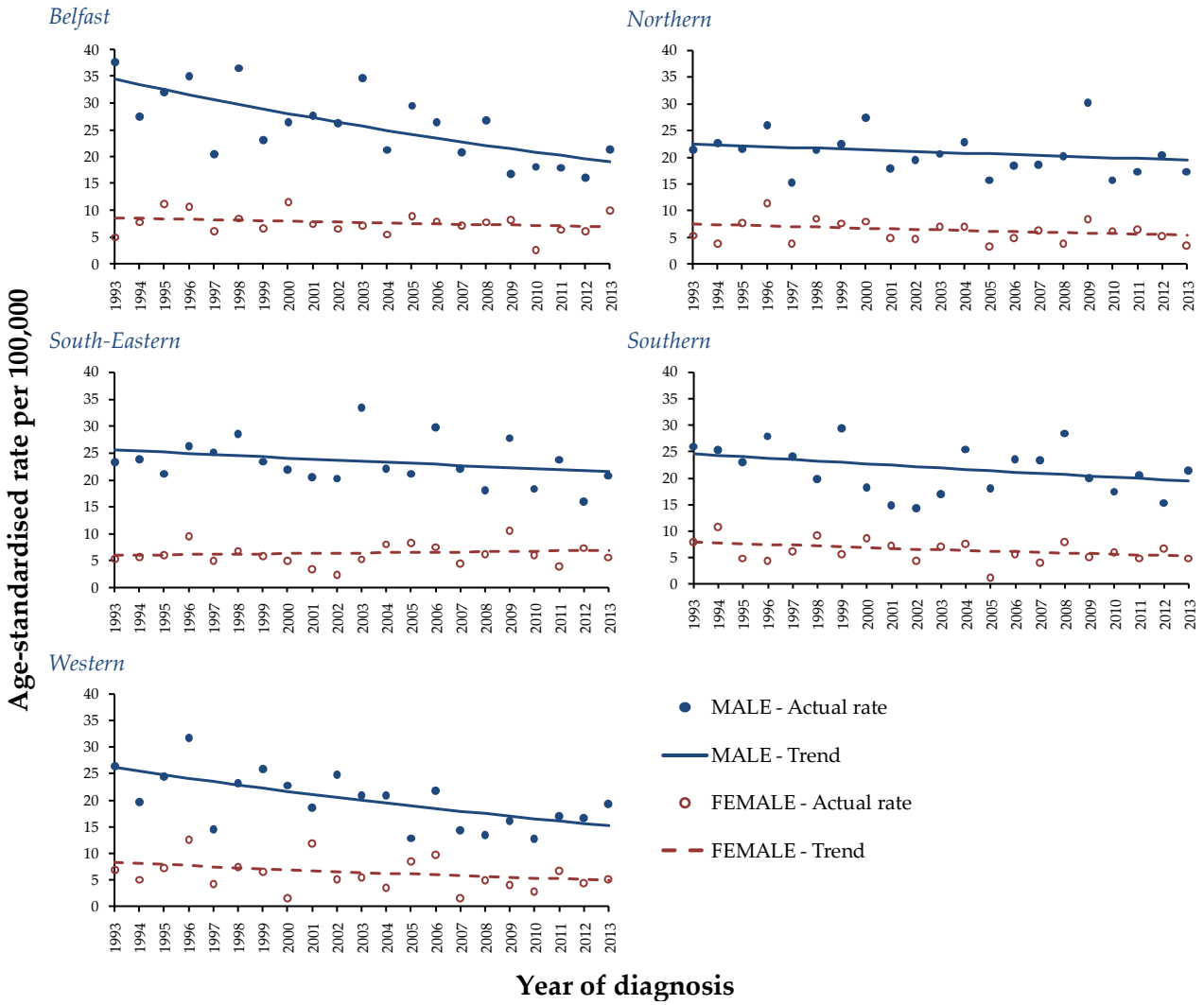


Table 4.6: Annual percentage change in age-standardised bladder cancer incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**-2.9% (-4.3%, -1.5%)**	**p<0.001**	1993-2013	-1.0% (-3.1%, 1.2%)	p=0.345
Northern	1993-2013	-0.7% (-2.1%, 0.7%)	p=0.314	1993-2013	-1.6% (-4.0%, 0.8%)	p=0.172
South-Eastern	1993-2013	-0.9% (-2.2%, 0.5%)	p=0.211	1993-2013	0.6% (-1.8%, 3.1%)	p=0.593
Southern	1993-2013	-1.1% (-2.7%, 0.4%)	p=0.132	1993-2013	-1.9% (-4.1%, 0.3%)	p=0.085
Western	**1993-2013**	**-2.7% (-4.1%, -1.2%)**	**p=0.001**	1993-2013	-2.5% (-5.7%, 0.9%)	p=0.138

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Bladder cancer incidence rates decreased among men in the least deprived areas of Northern Ireland by 3.9% per year (p=0.019) during 2001-2013. Other than this decrease rates did not change significantly among men or women resident in each of the five deprivation quintiles during this period. However a notable, but non-significant, change occurred for women in areas of average deprivation with an annual increase of 3.6% per year in rates. (Tab. 4.7, Fig. 4.7)

Figure 4.7: Trends in age-standardised bladder cancer incidence rates by sex and deprivation: 2001-2013

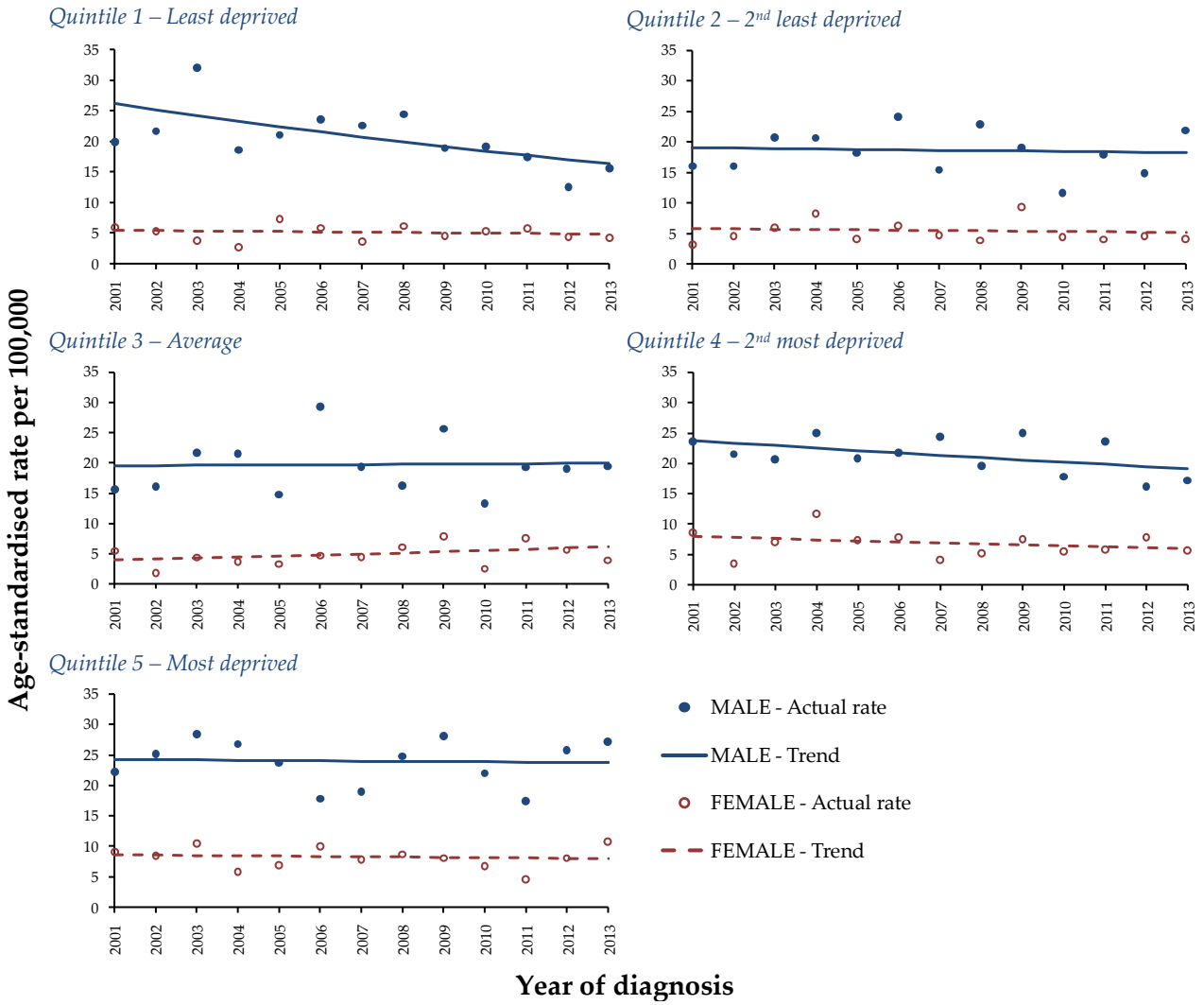


Table 4.7: Annual percentage change in age-standardised bladder cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2013**	**-3.9% (-6.9%, -0.8%)**	**p=0.019**	2001-2013	-0.9% (-4.8%, 3.2%)	p=0.626
Quintile 2 2nd least deprived	2001-2013	-0.3% (-3.6%, 3.2%)	p=0.849	2001-2013	-1.0% (-7.0%, 5.3%)	p=0.717
Quintile 3 Average	2001-2013	0.2% (-3.8%, 4.3%)	p=0.928	2001-2013	3.6% (-2.8%, 10.4%)	p=0.250
Quintile 4 2nd most deprived	2001-2013	-1.8% (-3.9%, 0.4%)	p=0.103	2001-2013	-2.4% (-7.0%, 2.6%)	p=0.309
Quintile 5 Most deprived	2001-2013	-0.1% (-2.8%, 2.6%)	p=0.916	2001-2013	-0.6% (-4.1%, 3.1%)	p=0.733

CI – Confidence interval; Significant trends are in bold

4.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

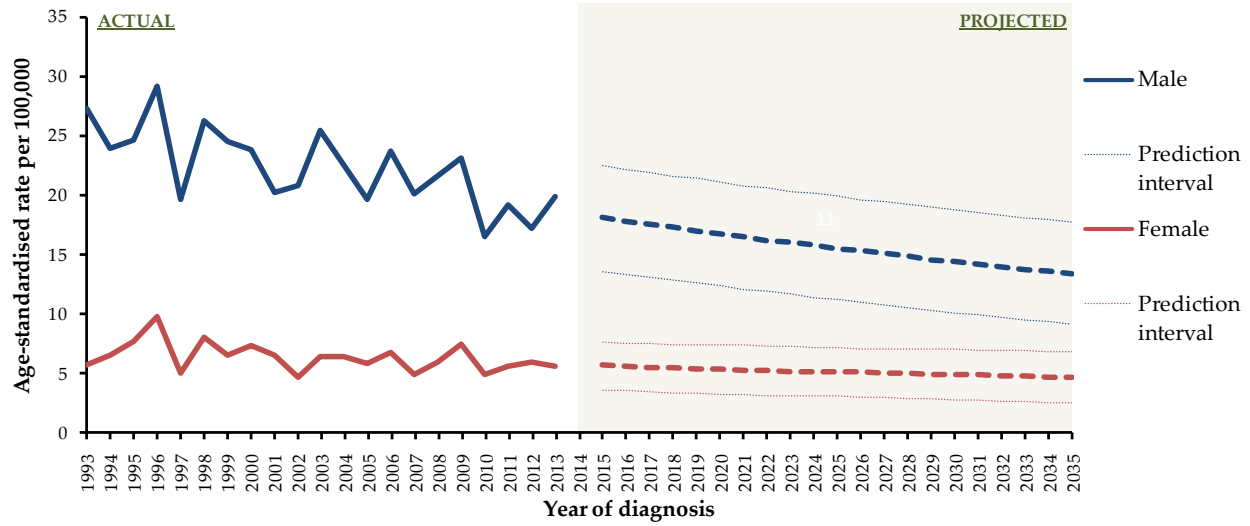
Incidence rates of bladder cancer are projected to continue to decrease compared to the baseline 2009-2013 average. Among males a 13% decrease is expected by 2020, while by 2035 a 30% decrease is projected. Among females a smaller decrease is forecast, with an 8% drop compared to the baseline by 2020 and a 20% drop by 2035. (Tab. 4.8, Fig. 4.8)

Table 4.8: Bladder cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	19.2				5.9			
2015	18.1	(13.6, 22.5)	-6%	(-29%, 17%)	5.7	(3.6, 7.7)	-3%	(-39%, 31%)
2020	16.7	(12.4, 21.1)	-13%	(-35%, 10%)	5.4	(3.3, 7.4)	-8%	(-44%, 25%)
2025	15.5	(11.2, 19.9)	-19%	(-42%, 4%)	5.1	(3.1, 7.2)	-14%	(-47%, 22%)
2030	14.4	(10.1, 18.7)	-25%	(-47%, -3%)	4.9	(2.8, 7.0)	-17%	(-53%, 19%)
2035	13.4	(9.1, 17.7)	-30%	(-53%, -8%)	4.7	(2.6, 6.8)	-20%	(-56%, 15%)

ASIR: Age-standardised incidence rate

Figure 4.8: Bladder cancer age-standardised incidence rate projections to 2035 by sex



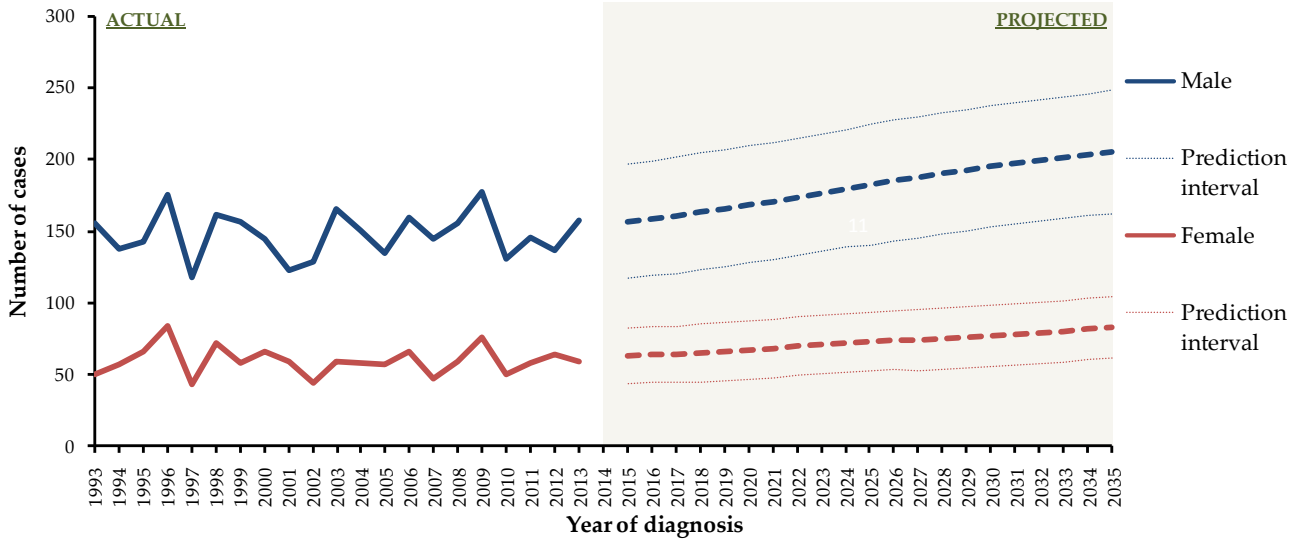
Case projections

Despite the decrease in incidence rates, due to demographic change the number of cases of bladder cancer is projected to increase for both males and females. Among males 169 cases are expected in 2020 with 205 cases expected in 2035, representing a 13% and 37% increase in 2009-2013 levels respectively. Among females a 10% increase between 2009-2013 and 2020 to 67 cases per year is projected with a 36% increase to 83 cases per year expected in 2035. (Tab. 4.9, Fig. 4.9)

Table 4.9: Bladder cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	150				61			
2015	157	(117, 197)	5%	(-22%, 31%)	63	(44, 82)	3%	(-28%, 34%)
2020	169	(128, 210)	13%	(-15%, 40%)	67	(47, 87)	10%	(-23%, 43%)
2025	182	(140, 224)	21%	(-7%, 49%)	73	(53, 93)	20%	(-13%, 52%)
2030	195	(153, 237)	30%	(2%, 58%)	77	(56, 98)	26%	(-8%, 61%)
2035	205	(162, 248)	37%	(8%, 65%)	83	(62, 104)	36%	(2%, 70%)

Figure 4.9: Bladder cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE BLADDER CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter bladder cancer incidence projections through control of tobacco smoking which is a risk factor for bladder cancer.
- Other risk factors which may have a lesser impact on future projections include:
  - Exposure to ionizing radiation;
  - Exposure to arsenic, aromatic amines and polycyclic aromatic hydrocarbons.
- Other potential factors that can influence bladder cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which bladder cancer is classified;
  - Revisions to population projections.

05 BRAIN CANCER (C70-C72 & C75.1-C75.3)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
81 PER YEAR	55 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
60 YEARS	61 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
NO HSC TRUSTS (MALES & FEMALES)	BELFAST HSCT (FEMALES ONLY)

NO DIFFERENCE BETWEEN THE LEAST AND MOST DEPRIVED AREAS

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+1.6% PER YEAR (1993-2013)	+0.5% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
NO CHANGE (1993-2013)	NO CHANGE (1993-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
NO CHANGE	NO CHANGE	-3%	-4%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+16% TO 94 CASES PER YEAR	+15% TO 63 CASES PER YEAR	+36% TO 110 CASES PER YEAR	+36% TO 75 CASES PER YEAR

5.1: BACKGROUND

An average of 136 cases (81 male, 55 female) of brain cancer were diagnosed each year during 2009-2013. It was the 13th most common male cancer diagnosed making up 1.8% of cancers (ex. NMSC), while it was the 17th most common female cancer making up 1.3% of cancers (ex. NMSC). There were 9.1 cases diagnosed per 100,000 males and 6.0 cases diagnosed per 100,000 females. The risk of developing brain cancer before the age of 65 was 1 in 234 for men and 1 in 381 for women, while before age 85 it was 1 in 129 for men and 1 in 191 for women.

Cancer and age

Brain cancer was more common among older people with a median age at diagnosis of 60 years for men and 61 years for women during 2009-2013. Overall 51.5% (50.6% male, 52.7% female) of cases occurred among those aged 60 and over, with 11.0% (7.4% male, 16.4% female) occurring among those aged 80 and over. Incidence rates were greatest among men aged 70 to 79 with 31 cases per 100,000 men in this age group and among women aged 80 and over with 20 cases per 100,000 females in this age group. Brain cancer was occasionally diagnosed among children and young people with 8 cases per year among those aged 0 to 14 and 5 cases per year among those aged 15 to 24. (Tab. 5.1, Fig 5.1)

Figure 5.1: Incidence of brain cancer by sex and age: 2009-2013

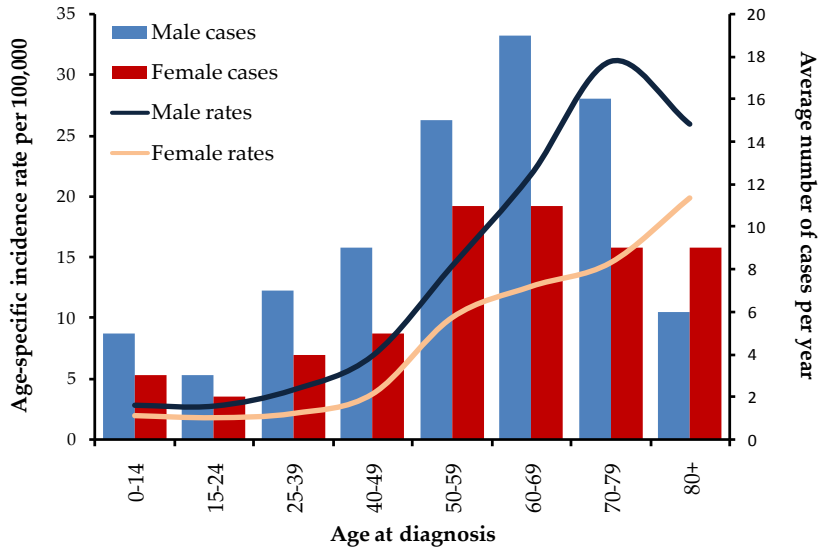


Table 5.1: Average number of brain cancers diagnosed per year by sex and age: 2009-2013

Age	Cases per year		
	Male	Female	Total
0-14	5	3	8
15-24	3	2	5
25-39	7	4	11
40-49	9	5	14
50-59	15	11	26
60-69	19	11	30
70-79	16	9	25
80+	6	9	15
Total	81	55	136

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of brain cancer among women were 18.1% lower in Belfast HSCT than the Northern Ireland average. There were no other significant variations for either sex by HSC Trust despite slightly elevated rates in the Western Trust for females. (Tab. 5.2, Fig. 5.2)

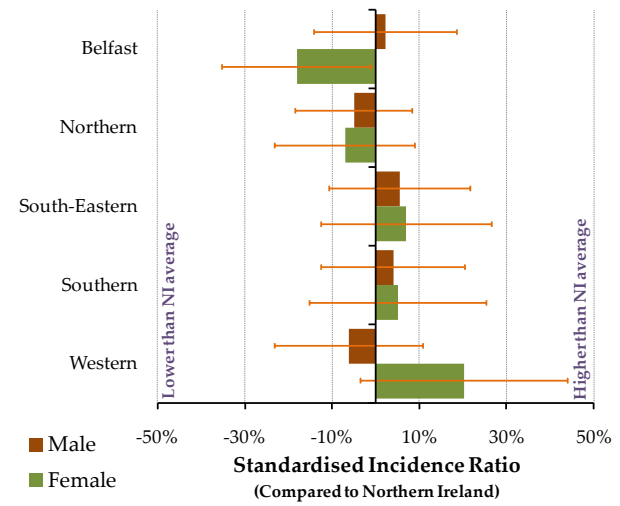
Table 5.2: Average number of brain cancers diagnosed per year by sex and area of residence: 2004-2013

Area of Residence		Cases per year		
		Male	Female	Total
Health & Social Care Trust	Belfast	15	9	24
	Northern	19	13	32
	South-Eastern	16	11	27
	Southern	15	10	25
	Western	12	10	22
Area Based Deprivation Quintile	1 - Least deprived	18	11	29
	2 - 2nd least deprived	16	8	24
	3 - Average	14	13	27
	4 - 2nd most deprived	16	11	27
	5 - Most deprived	14	10	24

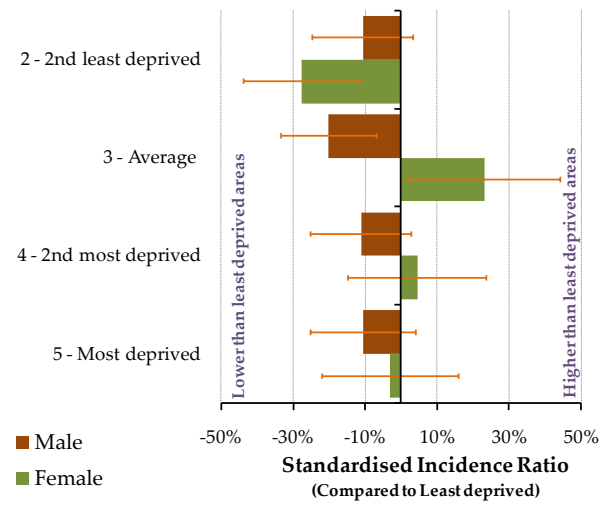
Age-standardised incidence rates of brain cancer were similar in the most and least deprived areas of Northern Ireland during 1993-2013. However rates in areas of average deprivation were lower than those in the least deprived areas for men, while they were higher in areas of average deprivation than in the least deprived areas for women. (Tab. 5.2, Fig. 5.2)

Figure 5.2: Age-standardised incidence rates of brain cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

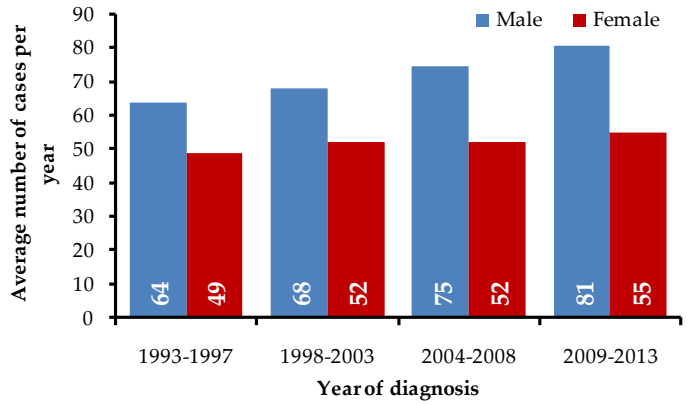


5.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 136 brain cancers (81 male, 55 female) diagnosed each year compared to an average of 113 brain cancers (64 male, 49 female) in 1993-1997. (Tab. 5.3, Fig. 5.3)

Figure 5.3: Average number of cases of brain cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of brain cancer cases increased by 1.6% per year for men and by 0.5% per year among women between 1993 and 2013. (Tab. 5.3, Fig. 5.3)

Table 5.3: Number of cases of brain cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	65	52	117
1994	58	64	122
1995	59	26	85
1996	75	47	122
1997	62	54	116
1998	65	65	130
1999	58	31	89
2000	63	52	115
2001	72	57	129
2002	80	53	133
2003	70	54	124
2004	53	50	103
2005	79	44	123
2006	81	60	141
2007	83	53	136
2008	77	52	129
2009	80	54	134
2010	91	52	143
2011	73	43	116
2012	83	59	142
2013	77	67	144

Trends in incidence rates

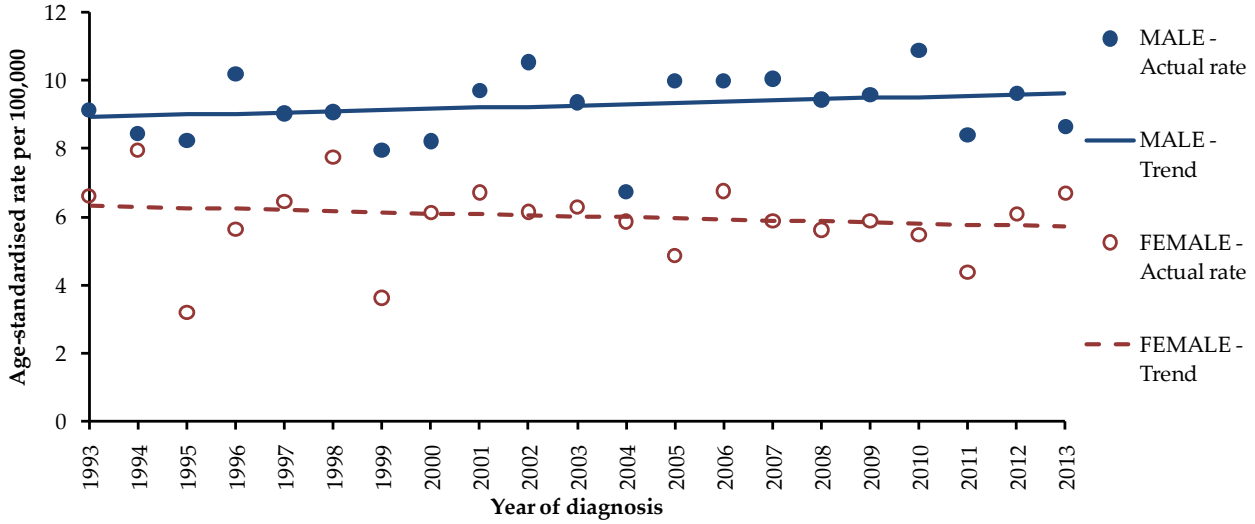
Brain cancer age-standardised incidence rates were static over time for both men and women with very little change between 1993 and 2013. (Tab. 5.4, Fig. 5.4)

Table 5.4: Annual percentage change in age-standardised brain cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-2013	0.4% (-0.4%, 1.2%)	p=0.349
Female	1993-2013	-0.5% (-1.9%, 0.9%)	p=0.466

CI – Confidence interval; Significant trends are in bold

Figure 5.4: Trends in age-standardised brain cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Due to the small number of cases of brain cancer diagnosed, incidence rates vary considerably each year in each age group for both sexes. Consequently there were no significant changes in male rates over time by age despite an apparently large increase in the 80 and over age group. Among females however there was a definite decrease among those aged 0-49 and a significant increase among those aged 80 and over. (Tab. 5.5, Fig. 5.5)

Figure 5.5: Trends in age-standardised brain cancer incidence rates by sex and age at diagnosis: 1993-2013

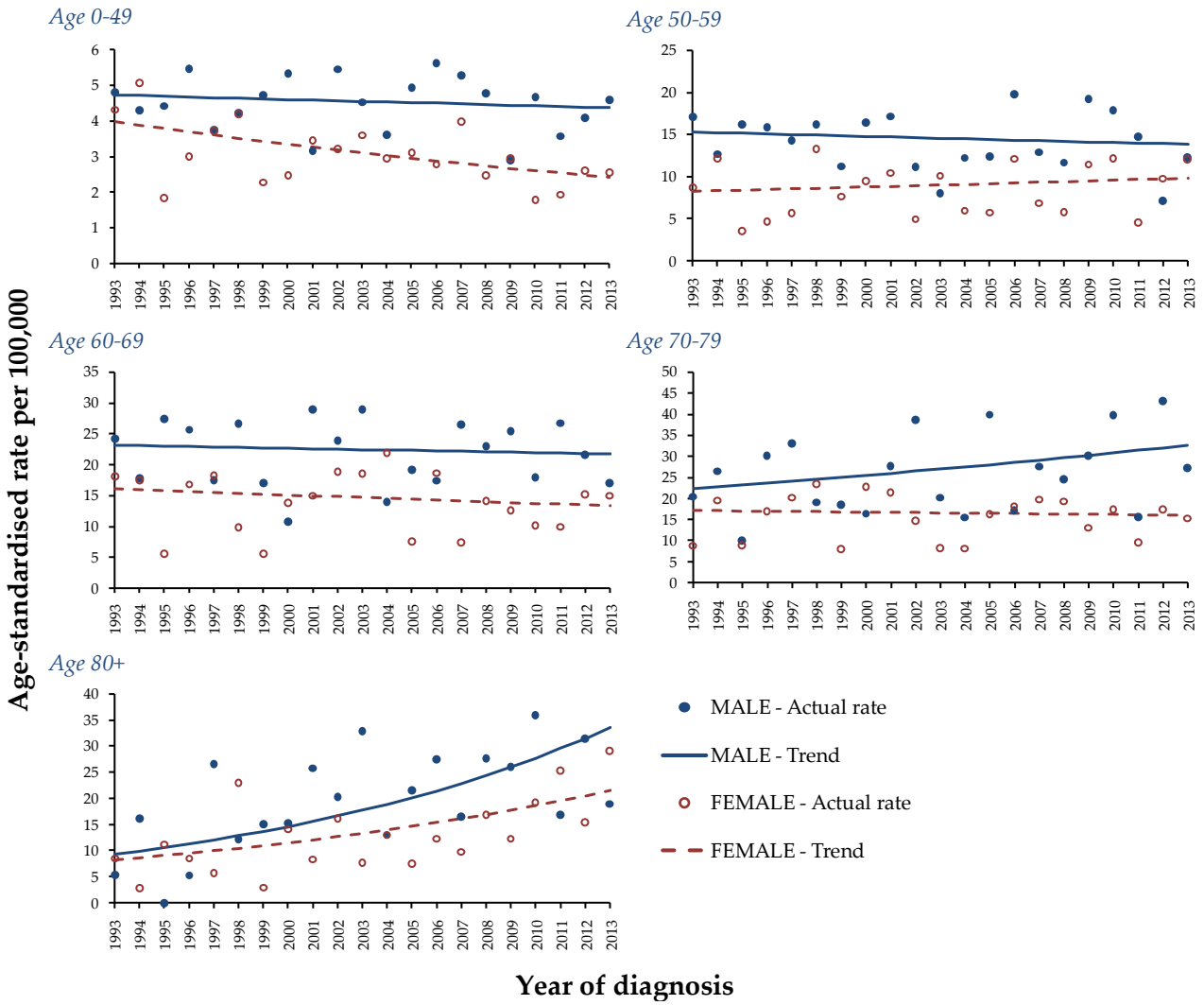


Table 5.5: Annual percentage change in age-standardised brain cancer incidence rates by sex and age: 1993-2013

AGE	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2013	-0.4% (-1.7%, 1.0%)	p=0.555	**1993-2013**	**-2.5% (-4.2%, -0.7%)**	**p=0.009**
50-59	1993-2013	-0.5% (-2.4%, 1.4%)	p=0.582	1993-2013	0.9% (-1.8%, 3.6%)	p=0.500
60-69	1993-2013	-0.3% (-2.1%, 1.5%)	p=0.721	1993-2013	-0.9% (-3.4%, 1.6%)	p=0.441
70-79	1993-2013	1.9% (-0.7%, 4.6%)	p=0.140	1993-2013	-0.4% (-2.8%, 2.2%)	p=0.771
80+	1993-2013	6.6% (-1.1%, 14.9%)	p=0.090	**1993-2013**	**4.9% (1.7%, 8.3%)**	**p=0.005**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Age-standardised incidence rates of brain cancer fluctuate randomly in each HSC Trust by year. Among males there was no definitive trend in rates apparent for any Trust. A similar situation existed for females; however there was a notable (but not quite significant) decrease in rates in the Belfast Trusts. (Tab. 5.6, Fig. 5.6)

Figure 5.6: Trends in age-standardised brain cancer incidence rates by sex and Trust of residence: 1993-2013

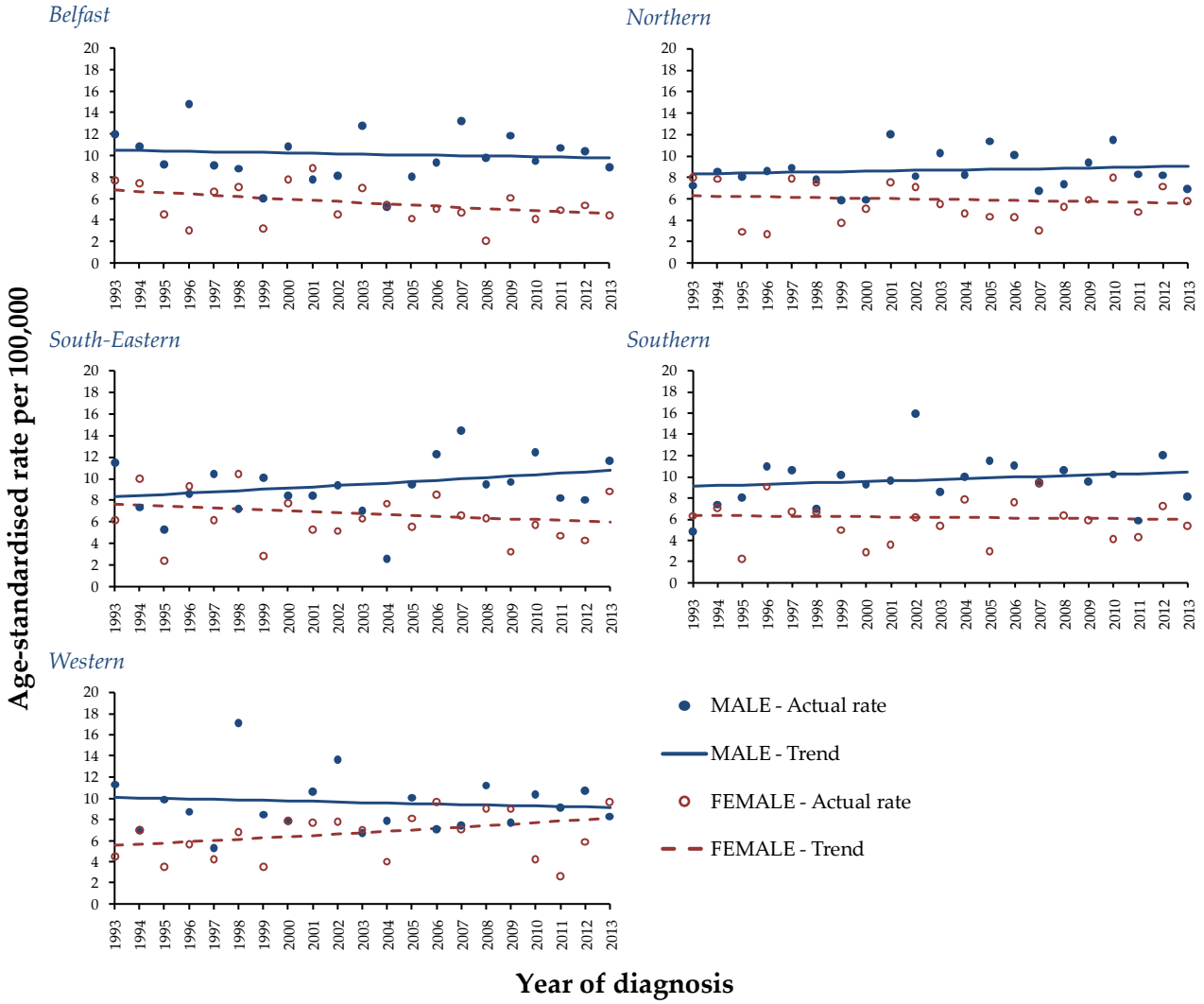


Table 5.6: Annual percentage change in age-standardised brain cancer incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	-0.3% (-2.0%, 1.4%)	p=0.683	1993-2013	-2.0% (-4.1%, 0.3%)	p=0.080
Northern	1993-2013	0.4% (-1.2%, 2.0%)	p=0.583	1993-2013	-0.5% (-2.7%, 1.7%)	p=0.633
South-Eastern	1993-2013	1.3% (-0.8%, 3.4%)	p=0.218	1993-2013	-1.2% (-3.7%, 1.3%)	p=0.323
Southern	1993-2013	0.7% (-1.3%, 2.6%)	p=0.487	1993-2013	-0.3% (-2.7%, 2.2%)	p=0.807
Western	1993-2013	-0.5% (-2.5%, 1.6%)	p=0.609	1993-2013	1.9% (-0.7%, 4.6%)	p=0.136

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

There was a considerable amount of random variation in brain cancer incidence rates each year by deprivation quintile for both sexes. Overall some quintiles saw a slight decline (e.g. males in areas of average levels of deprivation and females in the most deprived areas), while others saw a slight increase (e.g. males in the least deprived areas). However none of the changes were statistically significant and may thus be a result of the annual random fluctuation in rates. (Tab. 5.7, Fig. 5.7)

Figure 5.7: Trends in age-standardised brain cancer incidence rates by sex and deprivation: 2001-2013

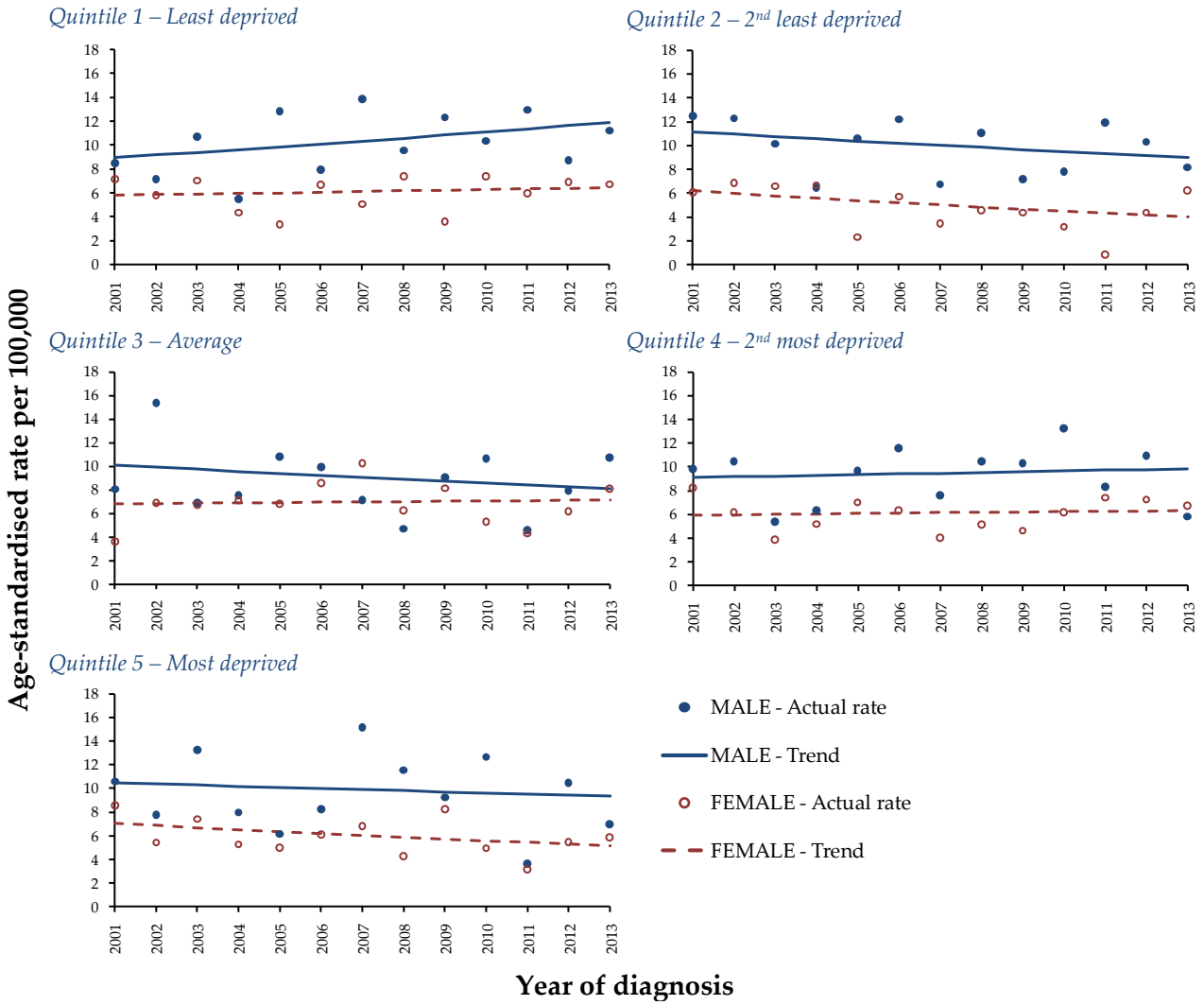


Table 5.7: Annual percentage change in age-standardised brain cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	2.3% (-1.7%, 6.5%)	p=0.234	2001-2013	0.8% (-3.0%, 4.8%)	p=0.650
Quintile 2 2nd least deprived	2001-2013	-1.7% (-5.2%, 1.8%)	p=0.306	2001-2013	-3.5% (-8.9%, 2.2%)	p=0.202
Quintile 3 Average	2001-2013	-1.8% (-6.7%, 3.4%)	p=0.457	2001-2013	0.4% (-4.2%, 5.1%)	p=0.870
Quintile 4 2nd most deprived	2001-2013	0.7% (-3.7%, 5.2%)	p=0.752	2001-2013	0.5% (-3.0%, 4.2%)	p=0.750
Quintile 5 Most deprived	2001-2013	-0.9% (-6.5%, 5.0%)	p=0.736	2001-2013	-2.6% (-6.4%, 1.4%)	p=0.181

CI – Confidence interval; Significant trends are in bold

5.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

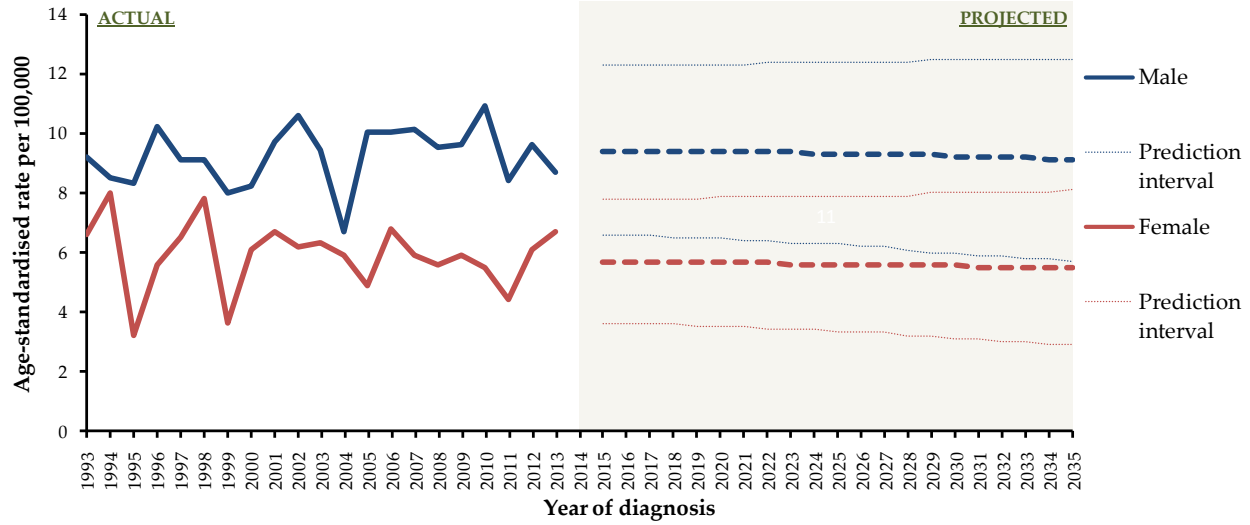
Age-standardised incidence rates of brain cancer are expected to remain at a similar level in the short term to the rates observed in 2009-2013. However compared to the 2009-2013 average, by 2035 a decrease in rates is expected with a 3% drop among males and a 4% drop among females. (Tab. 5.8, Fig. 5.8)

Table 5.8: Brain cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	9.4				5.7			
2015	9.4	(6.6, 12.3)	0%	(-30%, 31%)	5.7	(3.6, 7.8)	0%	(-37%, 37%)
2020	9.4	(6.5, 12.3)	0%	(-31%, 31%)	5.7	(3.5, 7.9)	0%	(-39%, 39%)
2025	9.3	(6.3, 12.4)	-1%	(-33%, 32%)	5.6	(3.3, 7.9)	-2%	(-42%, 39%)
2030	9.2	(6.0, 12.5)	-2%	(-36%, 33%)	5.6	(3.1, 8.0)	-2%	(-46%, 40%)
2035	9.1	(5.7, 12.5)	-3%	(-39%, 33%)	5.5	(2.9, 8.1)	-4%	(-49%, 42%)

ASIR: Age-standardised incidence rate

Figure 5.8: Brain cancer age-standardised incidence rate projections to 2035 by sex



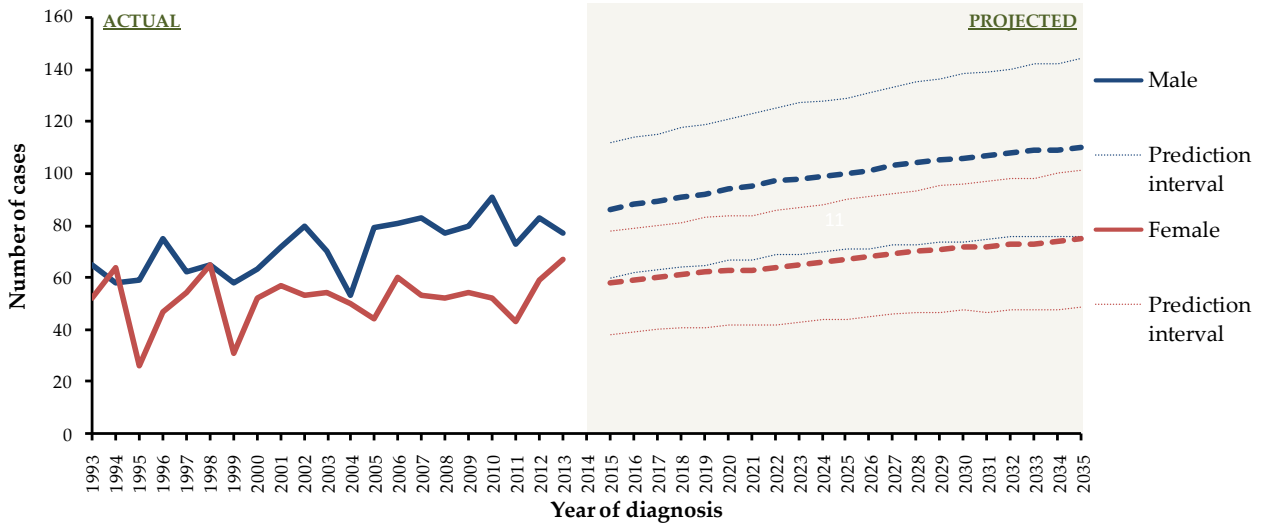
Case projections

The growth of the elderly population projected in the future is expected to result in an increase in the number of brain cancers diagnosed despite the slight reduction in rates forecast. In 2009-2013 there were 81 male and 55 female cases of brain cancer each year. By 2020 the number of male cases is expected to increase by 16% to 94 cases per year, while the number of female cases is projected to increase by 15% to 63 cases per year. By 2035 there is projected to be a 36% increase among males and females resulting in 110 male and 75 female cases per year. (Tab. 5.9, Fig. 5.9)

Table 5.9: Brain cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	81				55			
2015	86	(60, 112)	6%	(-26%, 38%)	58	(38, 78)	5%	(-31%, 42%)
2020	94	(67, 121)	16%	(-17%, 49%)	63	(42, 84)	15%	(-24%, 53%)
2025	100	(71, 129)	23%	(-12%, 59%)	67	(44, 90)	22%	(-20%, 64%)
2030	106	(74, 138)	31%	(-9%, 70%)	72	(48, 96)	31%	(-13%, 75%)
2035	110	(76, 144)	36%	(-6%, 78%)	75	(49, 101)	36%	(-11%, 84%)

Figure 5.9: Brain cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE BRAIN CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter brain cancer incidence projections by minimising exposure to ionizing radiation which can cause brain cancer.
- Other than ionizing radiation the causes of brain cancer are not well understood, thus limited potential exists to alter brain cancer incidence projections through control of risk factors.
- Other potential factors that can influence brain cancer incidence projections include:
    - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
    - Changes to the way in which brain cancers are classified, particular with regard to the inclusion or exclusion of non-invasive brain tumours.
    - Revisions to population projections.

06 BREAST CANCER (C50, FEMALE ONLY)

ANNUAL NUMBER OF CASES (2009-2013)

1,268 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

63 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
AFFLUENT AREAS	DEPRIVED AREAS

NO VARIATION BY HSC TRUST

AVERAGE CHANGE IN CASES PER YEAR

+2.6% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

+1.2% PER YEAR (1993-2013)

PROJECTED CHANGE IN RATES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
+10%	+20%

PROJECTED CHANGE IN CASES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
+25% TO 1,589 CASES PER YEAR	+64% TO 2,077 CASES PER YEAR

6.1: BACKGROUND

An average of 1,278 cases of breast cancer were diagnosed each year during 2009-2013 in Northern Ireland with 1,268 of these occurring among women. It was the most common female cancer diagnosed in this period making up 29.1% of all cancers (ex. NMSC), while it was a much rarer cancer among men with only 10 cases diagnosed per year contributing only 0.2% of all cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 137.2 cases diagnosed per 100,000 females. The risk among women of developing breast cancer before the age of 55 was 1 in 32, while before age 65 it was 1 in 17 and before age 85 it was 1 in 9.

Cancer and age

Breast cancer was more common among older women with a median age at diagnosis of 63 years during 2009-2013. Approximately 11 out of 20 (57.4%) cases occurred among those aged 60 and over, with 13.7% occurring among those aged 80 and over. Incidence rates were greatest among women aged 80 and over with 393 cases diagnosed per 100,000 females in this age group. Despite this breast cancer was still frequently diagnosed among younger age groups with 56 cases diagnosed per year among 25 to 39 year olds, however on average there were no cases diagnosed each year among those aged under 25. (Tab. 6.1, Fig 6.1)

Figure 6.1: Incidence of female breast cancer by age: 2009-2013

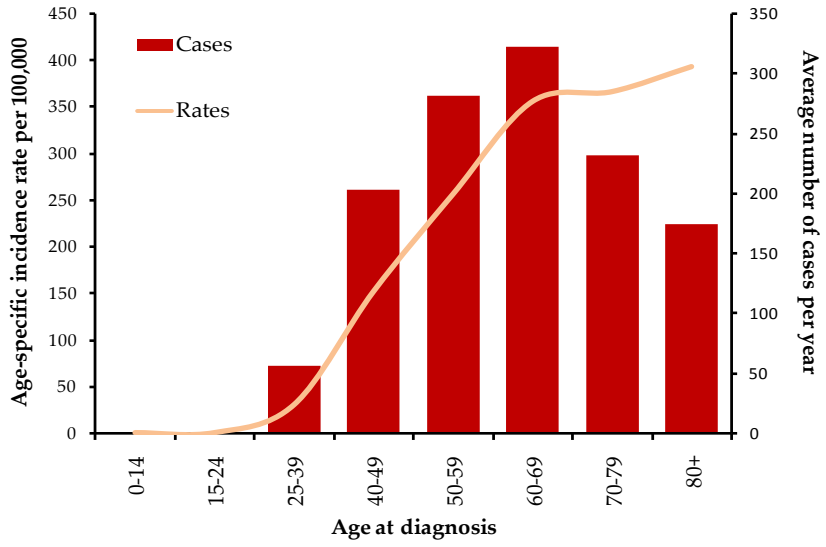


Table 6.1: Average number of female breast cancers diagnosed per year by age: 2009-2013

AGE	Cases per year
0-14	0
15-24	0
25-39	56
40-49	203
50-59	281
60-69	322
70-79	232
80+	174
Total	1,268

Cancer and area of residence

During 2004-2013 age-standardised incidence of female breast cancer did not vary significantly by HSC Trust despite slightly elevated rates in the South-Eastern and Belfast Trusts. The Northern Trust had the highest average number of cases per year (308 cases) due to the larger population resident in this Trust area. (Tab. 6.2, Fig. 6.2)

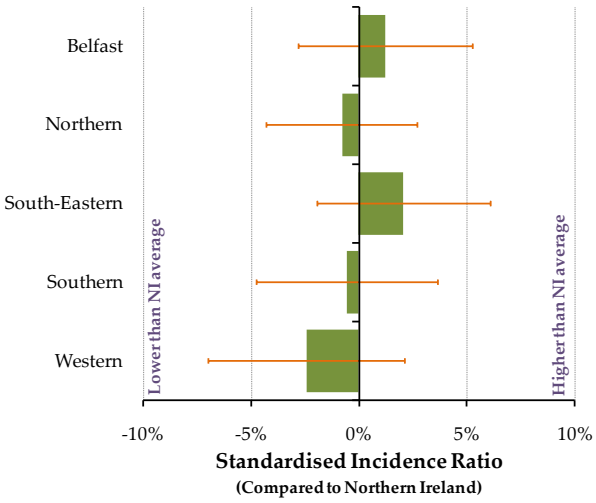
Table 6.2: Average number of female breast cancers diagnosed per year by area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year
HEALTH & SOCIAL CARE TRUST	Belfast	241
	Northern	308
	South-Eastern	249
	Southern	215
	Western	177
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	261
	2 - 2nd least deprived	239
	3 - Average	229
	4 - 2nd most deprived	244
	5 - Most deprived	216

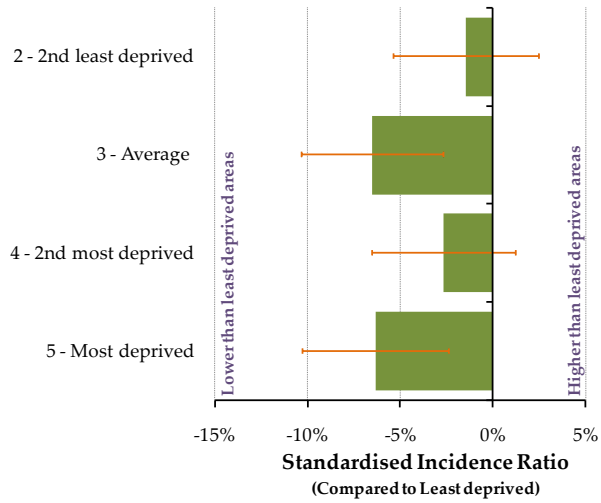
However incidence of breast cancer was more common in affluent areas with age-standardised incidence rates 6.3% lower in the most deprived areas compared to the least deprived areas. Additionally rates in areas with average levels of deprivation were 6.5% lower than in the least deprived areas. (Tab. 6.2, Fig. 6.2)

Figure 6.2: Age-standardised incidence rates of female breast cancer by area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

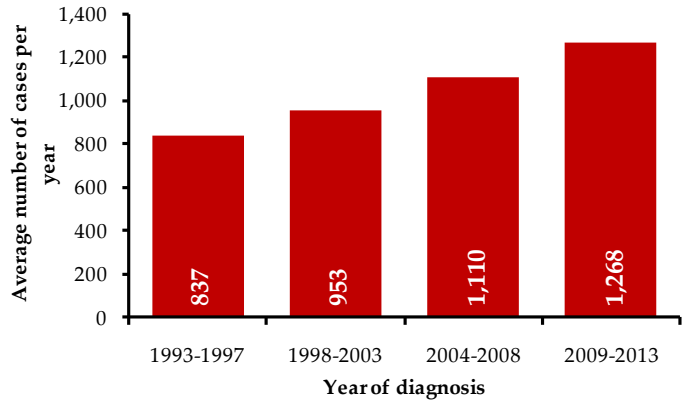


6.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 1,268 female breast cancers diagnosed each year compared to an average of 837 female breast cancers per year in 1993-1997. (Tab. 6.3, Fig. 6.3)

Figure 6.3: Average number of cases of female breast cancer diagnosed per year by period of diagnosis: 1993-2013



On average the number of female breast cancer cases increased by 2.6% per year between 1993 and 2013. (Tab. 6.3, Fig. 6.3)

Table 6.3: Number of cases of female breast cancer diagnosed by year: 1993-2013

YEAR	Number of cases
1993	772
1994	830
1995	880
1996	849
1997	856
1998	910
1999	940
2000	952
2001	923
2002	952
2003	1,038
2004	1,137
2005	1,079
2006	990
2007	1,166
2008	1,179
2009	1,227
2010	1,217
2011	1,287
2012	1,316
2013	1,294

Trends in incidence rates

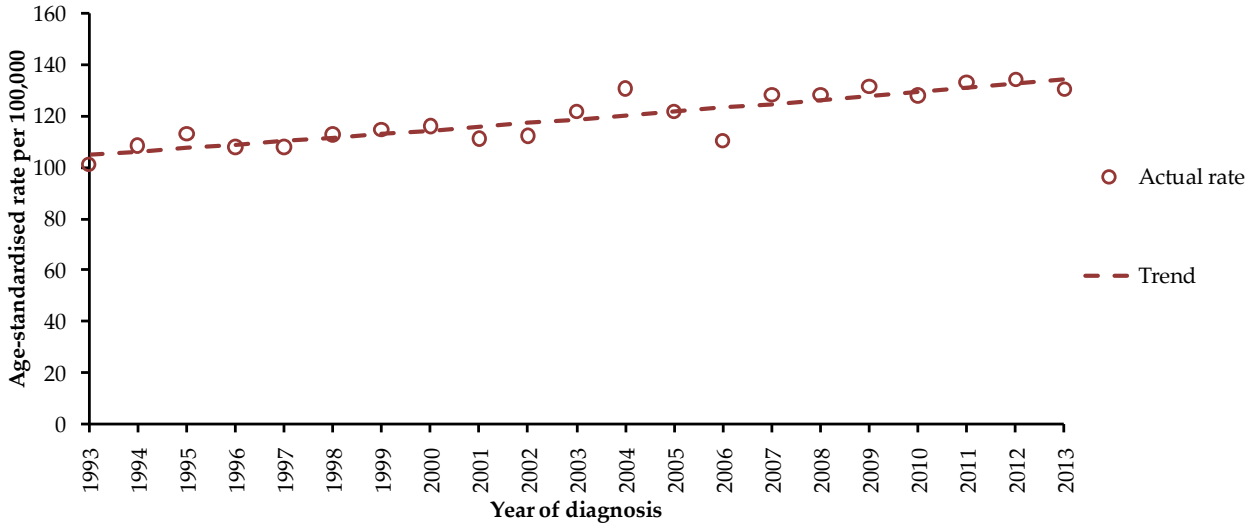
While part of this increase was due to the growth and ageing of the population, other factors influenced the increase as age-standardised incidence rates of female breast cancer increased during 1993-2013 by an average of 1.2% per year (p<0.001). (Tab. 6.4, Fig. 6.4)

Table 6.4: Annual percentage change in age-standardised female breast cancer incidence rates: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Females	**1993-2013**	**1.2% (0.9%, 1.5%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 6.4: Trends in age-standardised female breast cancer incidence rates: 1993-2013



Incidence trends by age at diagnosis

Female breast cancer incidence rates increased among all age groups during 1993-2013 except among those aged 50-59, where there was no significant change. The largest increase was among the 60-69 and 70-79 age groups which saw increases of 2.4% (p<0.001) and 2.3% (p<0.001) per year respectively. (Tab. 6.5, Fig. 6.5)

Figure 6.5: Trends in age-standardised female breast cancer incidence rates by age at diagnosis: 1993-2013

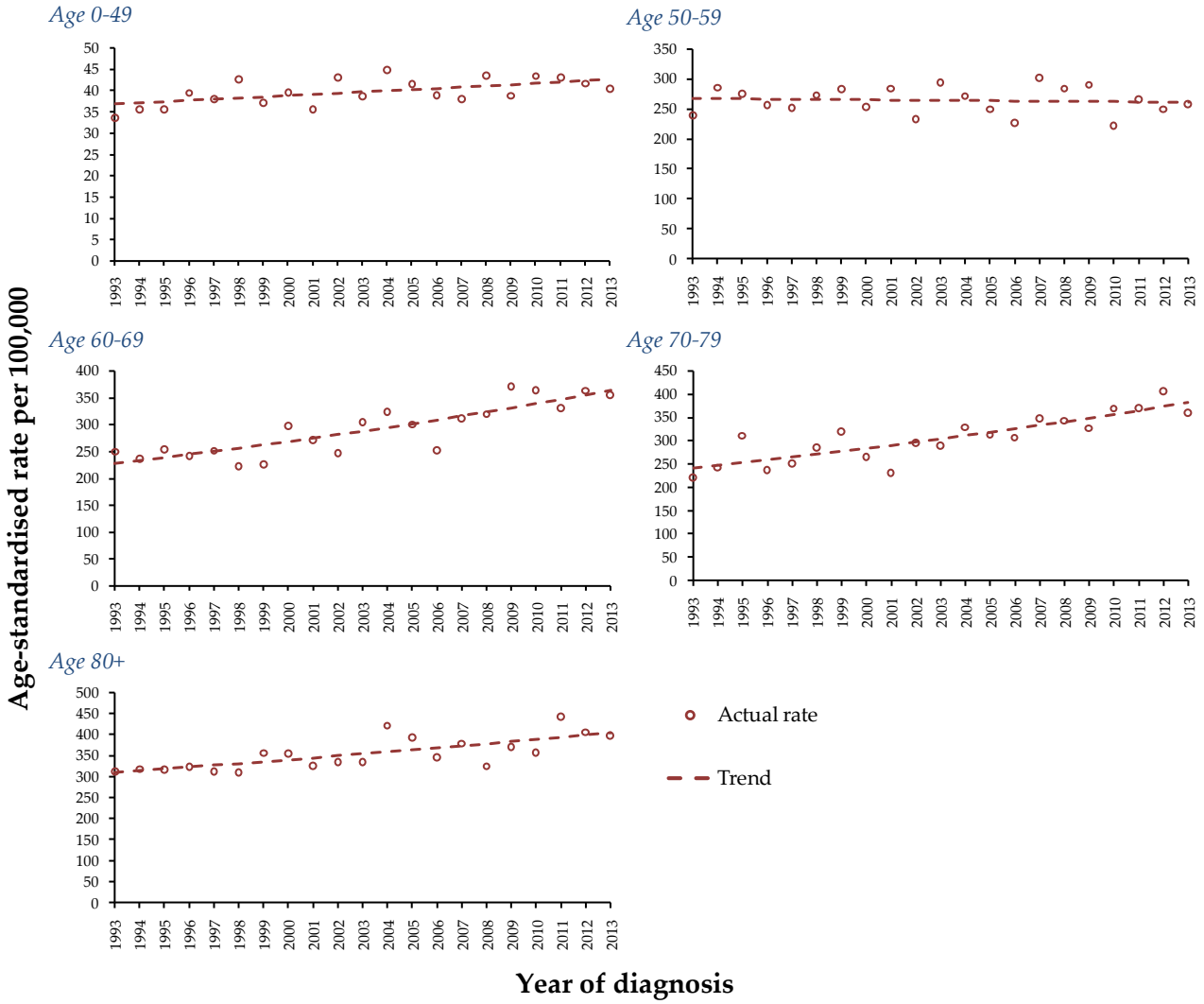


Table 6.5: Annual percentage change in age-standardised female breast cancer incidence rates by age: 1993-2013

AGE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**0.7% (0.2%, 1.2%)**	**p=0.006**
50-59	1993-2013	-0.1% (-0.8%, 0.6%)	p=0.732
60-69	**1993-2013**	**2.4% (1.7%, 3.0%)**	**p<0.001**
70-79	**1993-2013**	**2.3% (1.6%, 3.0%)**	**p<0.001**
80+	**1993-2013**	**1.3% (0.8%, 1.9%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Age-standardised incidence rates of female breast cancer increased for residents in all five of the HSC Trusts during 1993-2013 although the increase in the Western Trust was not quite statistically significant. The increase was greatest in the South-Eastern Trust with an annual increase of 1.7% per year (p<0.001). (Tab. 6.6, Fig. 6.6)

Figure 6.6: Trends in age-standardised female breast cancer incidence rates by Trust of residence: 1993-2013

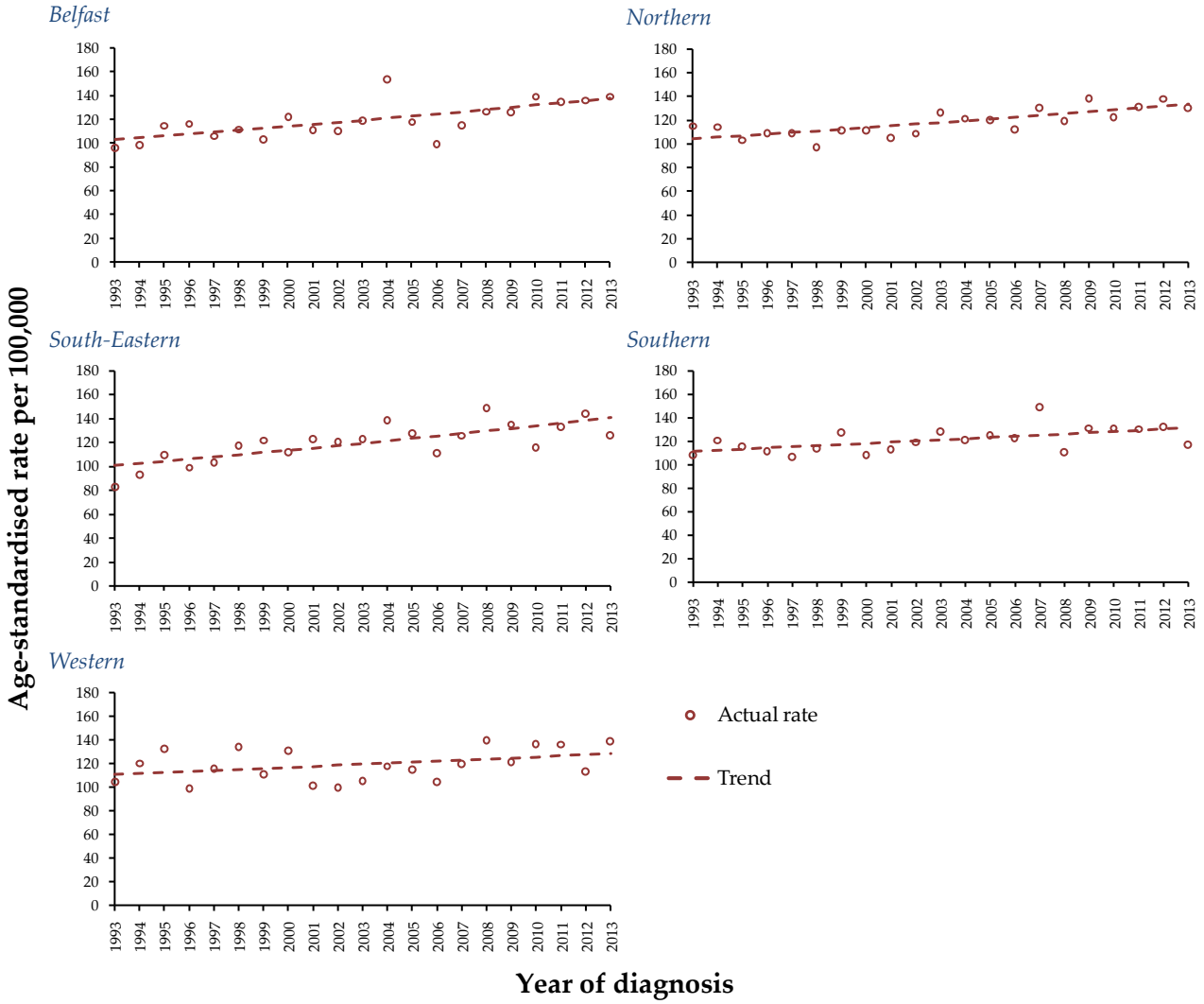


Table 6.6: Annual percentage change in age-standardised female breast cancer incidence rates by Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**1.5% (0.8%, 2.2%)**	**p<0.001**
Northern	**1993-2013**	**1.2% (0.8%, 1.7%)**	**p<0.001**
South-Eastern	**1993-2013**	**1.7% (1.0%, 2.4%)**	**p<0.001**
Southern	**1993-2013**	**0.8% (0.2%, 1.4%)**	**p=0.009**
Western	1993-2013	0.7% (-0.1%, 1.6%)	p=0.079

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Age-standardised incidence rates of breast cancer increased for females resident in all five deprivation quintiles during 2001-2013, although only the annual increase of 1.5% per year (p=0.005) in the most deprived areas of Northern Ireland was statistically significant. (Tab. 6.7, Fig. 6.7)

Figure 6.7: Trends in age-standardised female breast cancer incidence rates by deprivation: 2001-2013

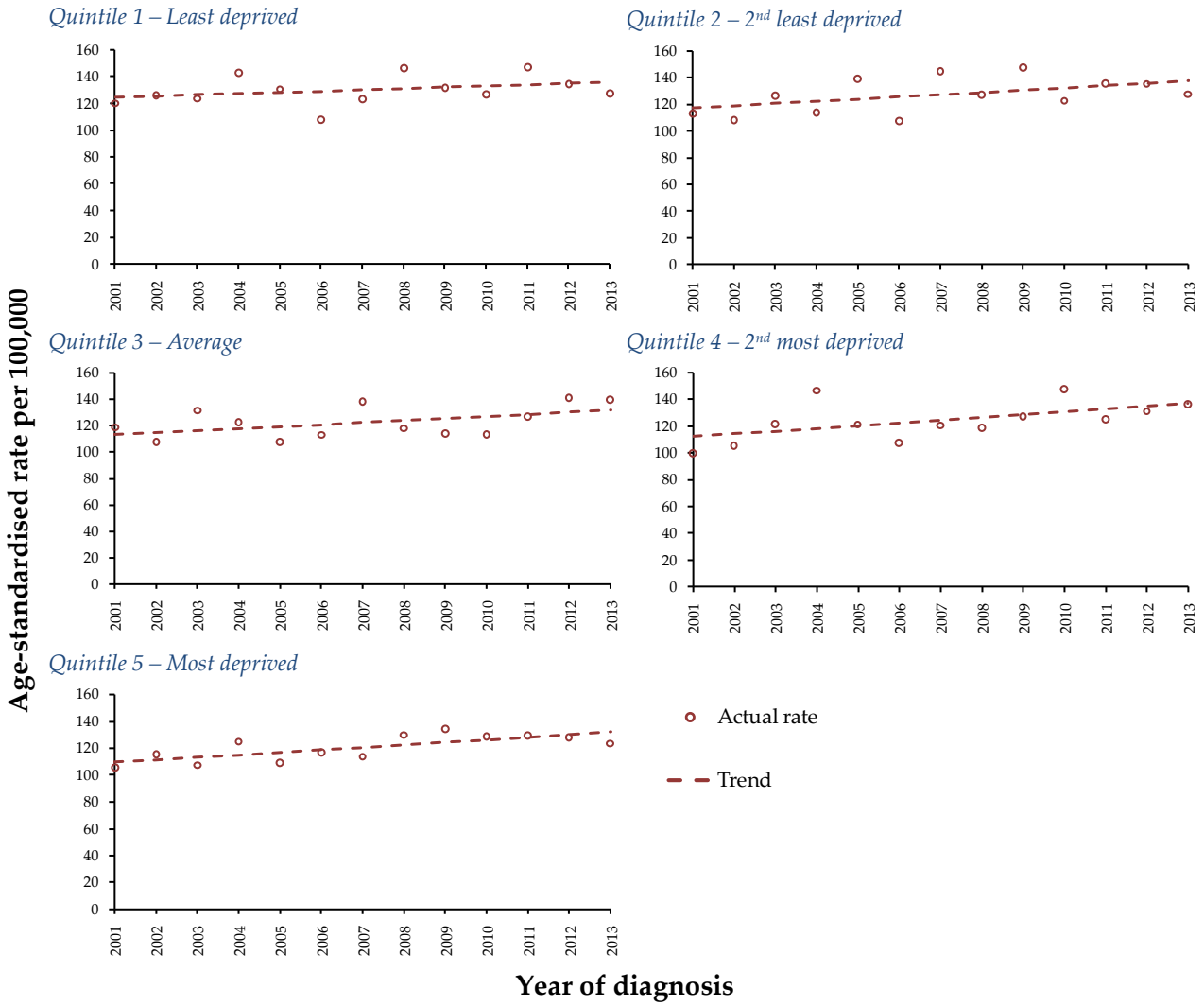


Table 6.7: Annual percentage change in age-standardised female breast cancer incidence rates by deprivation: 2001-2013

AREA BASED DEPRIVATION QUINTILE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	0.7% (-0.7%, 2.1%)	p=0.276
Quintile 2 2nd least deprived	2001-2013	1.3% (-0.3%, 3.0%)	p=0.094
Quintile 3 Average	2001-2013	1.3% (-0.2%, 2.8%)	p=0.082
Quintile 4 2nd most deprived	2001-2013	1.6% (0.0%, 3.3%)	p=0.053
Quintile 5 Most deprived	**2001-2013**	**1.5% (0.6%, 2.5%)**	**p=0.005**

CI – Confidence interval; Significant trends are in bold

6.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

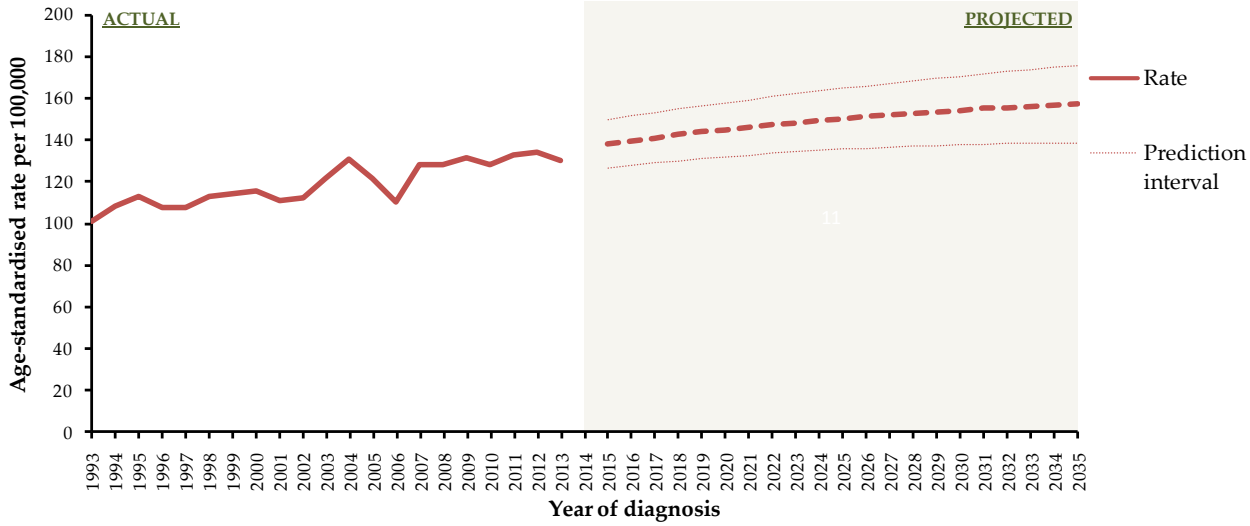
Incidence rates of female breast cancer are projected to continue to increase. Compared to the 2009-2013 average by 2020 age-standardised incidence rates are expected to increase by 10%, while by 2035 rates are forecast to increase by 20%. (Tab. 6.8, Fig. 6.8)

Table 6.8: Female breast cancer age-standardised incidence rate projections to 2035 with comparison to 2009-2013 average

YEAR	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	131.4			
2015	138.0	(126.5, 149.5)	5%	(-4%, 14%)
2020	144.8	(131.8, 157.7)	10%	(0%, 20%)
2025	150.1	(135.4, 164.7)	14%	(3%, 25%)
2030	154.1	(137.5, 170.6)	17%	(5%, 30%)
2035	157.1	(138.3, 175.8)	20%	(5%, 34%)

ASIR: Age-standardised incidence rate

Figure 6.8: Female breast cancer age-standardised incidence rate projections to 2035



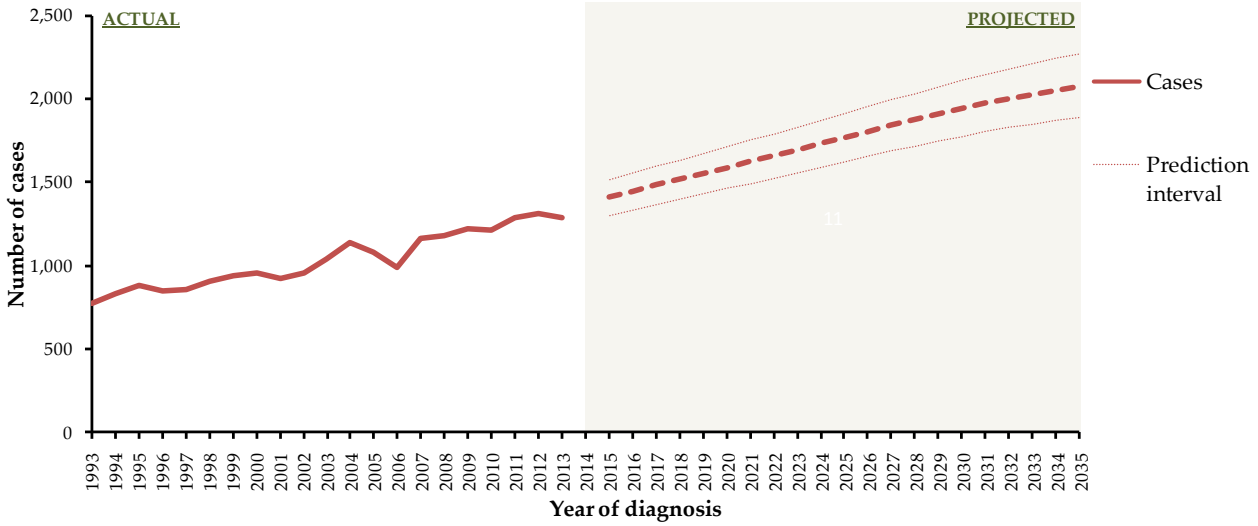
Case projections

The combined impact of the projected increase in rates and the increase in the elderly population is expected to be a significant increase in the number of female breast cancers diagnosed. In 2009-2013 there were 1,268 cases of female breast cancer diagnosed each year. By 2020 this is expected to increase to 1,589 cases; a 25% increase. By 2035 the number of cases is forecast to increase to 2,077 per year; a 64% increase on 2009-2013 levels. (Tab. 6.9; Fig. 6.9)

Table 6.9: Female breast cancer incidence projections to 2035 with comparison to 2009-2013 average

YEAR	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	1,268			
2015	1,411	(1,303 , 1,519)	11%	(3%, 20%)
2020	1,589	(1,464 , 1,714)	25%	(15%, 35%)
2025	1,770	(1,626 , 1,914)	40%	(28%, 51%)
2030	1,941	(1,776 , 2,106)	53%	(40%, 66%)
2035	2,077	(1,888 , 2,266)	64%	(49%, 79%)

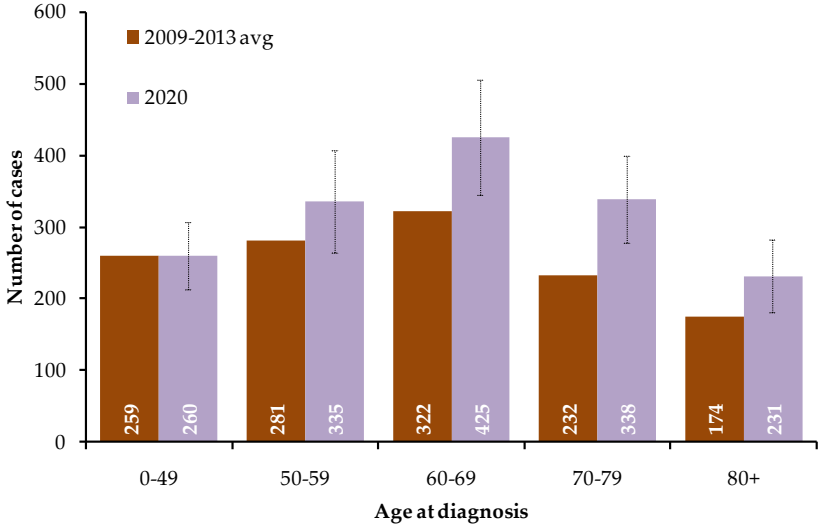
Figure 6.9: Female breast cancer incidence projections to 2035



Case projections by age

The number of breast cancers diagnosed each year among women is expected to rise among all age groups. The greatest percentage increase between 2009-2013 and 2020 is expected to be among those aged 70-79 with a 46% increase from 232 to 338 cases per year, while only a small increase is expected among those aged 0-49. (Fig. 6.10)

Figure 6.10: Female breast cancer incidence projections to 2020 by age



FACTORS THAT CAN INFLUENCE BREAST CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter breast cancer incidence projections through control of the following risk factors:
  - Post menopausal obesity and/or lack of physical exercise;
  - Excessive alcohol consumption;
  - Hormone replacement therapy.
- Other risk factors which may have a lesser impact on future projections include:
  - Family history;
  - Reproductive factors (such as higher age at first pregnancy, low parity, lack of breastfeeding etc.).
- Other potential factors that can influence breast cancer incidence projections include:
  - Future modifications to the breast screening program and/or introduction of further health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which breast cancer is classified;
  - Revisions to population projections.

07 CERVICAL CANCER (C53)

ANNUAL NUMBER OF CASES (2009-2013)

103 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

40 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS	AFFLUENT AREAS
BELFAST HSCT	SOUTHERN HSCT
	WESTERN HSCT

AVERAGE CHANGE IN CASES PER YEAR

+1.6% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

NO CHANGE (1993-2013)

PROJECTED CHANGE IN RATES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
-12%	-27%

PROJECTED CHANGE IN CASES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
-10% TO 93 CASES PER YEAR	-28% TO 74 CASES PER YEAR

7.1: BACKGROUND

An average of 103 cases of cervical cancer were diagnosed among women each year during 2009-2013 in Northern Ireland. It was the 10th most common female cancer diagnosed in this period making up 2.4% of all cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 11.1 cases diagnosed per 100,000 females. The risk among women of developing cervical cancer before the age of 40 was 1 in 247; while before age 85 it was 1 in 118.

Cancer and age

Cervical cancer was more common among younger women with a median age at diagnosis of 40 years during 2009-2013. One half (49.5%) of cases occurred among those aged 39 and under, with only 4.9% occurring among those aged 80 and over. Incidence rates were greatest among women aged 25 to 39 with 26 cases diagnosed per 100,000 females in this age group. However despite the younger age of women diagnosed cervical cancer was rare among those aged under 25 with only 3 cases diagnosed each year among those aged 15 to 24 and no cases diagnosed among those aged under 15. (Tab. 7.1, Fig. 7.1)

Figure 7.1: Incidence of cervical cancer by age: 2009-2013

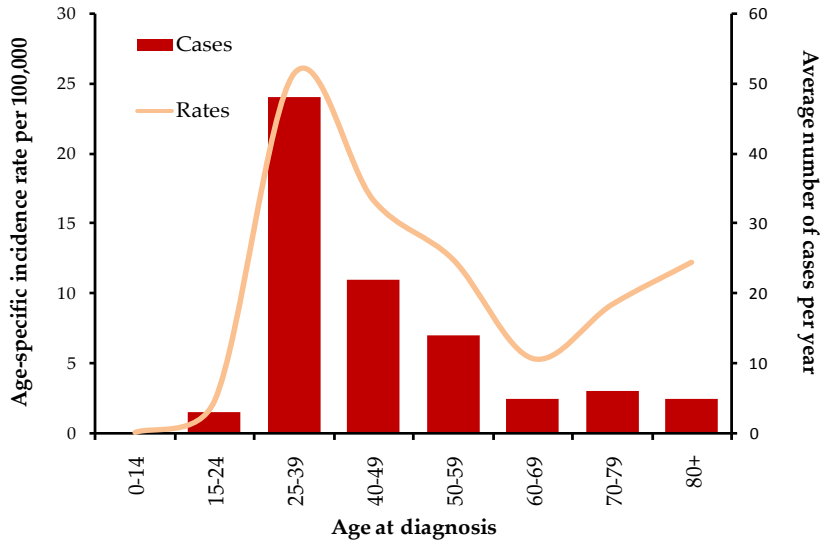


Table 7.1: Average number of cervical cancers diagnosed per year by age: 2009-2013

AGE	Cases per year
0-14	0
15-24	3
25-39	48
40-49	22
50-59	14
60-69	5
70-79	6
80+	5
Total	103

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of cervical cancer were 26.0% higher in the Belfast Trust than the Northern Ireland average, while rates were 17.6% lower than average in the Western Trust and 13.6% lower than average in the Southern Trust. (Tab. 7.2, Fig. 7.2)

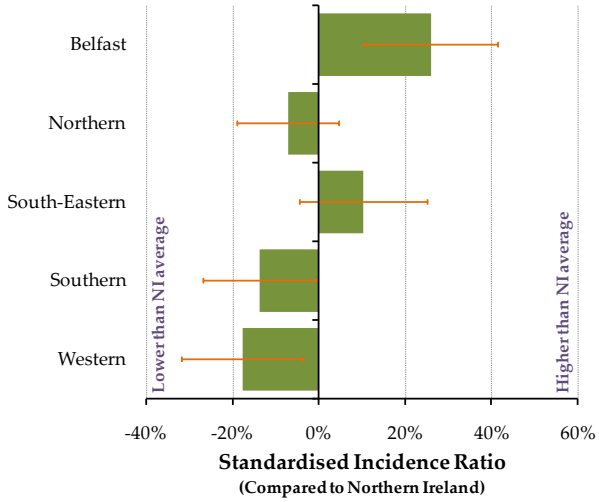
Table 7.2: Average number of cervical cancers diagnosed per year by area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year
HEALTH & SOCIAL CARE TRUST	Belfast	25
	Northern	24
	South-Eastern	21
	Southern	16
	Western	13
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	18
	2 - 2nd least deprived	14
	3 - Average	18
	4 - 2nd most deprived	22
	5 - Most deprived	27

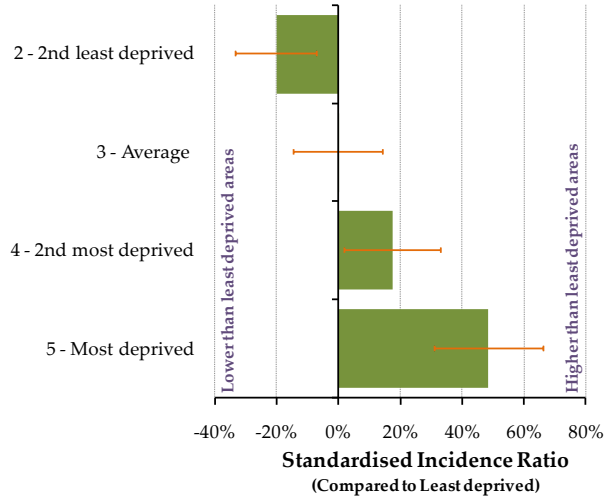
Incidence of cervical cancer was strongly related to area based socio-economic deprivation during 2004-2013 with age-standardised incidence rates 48.6% higher in the most deprived areas than the least deprived areas. Rates in the least deprived areas were also significantly lower than in the 2nd most deprived areas. (Tab. 7.2, Fig. 7.2)

Figure 7.2: Age-standardised incidence rates of cervical cancer by area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

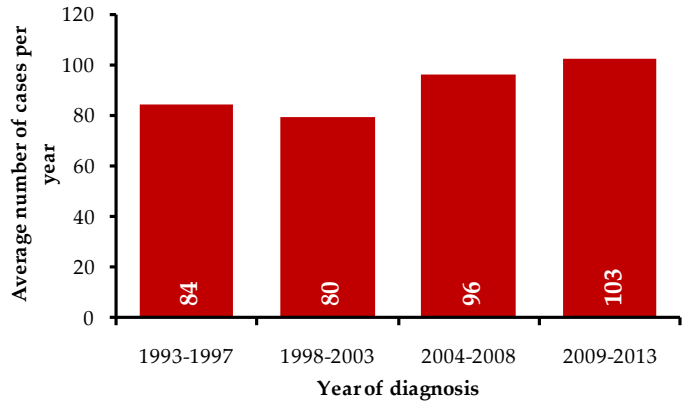


7.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 103 cervical cancers diagnosed each year among women compared to an average of 84 cases per year in 1993-1997. The number of cases was highest in 2008 with 127 cases diagnosed and was lowest in 2001 with 72 cases diagnosed. (Tab. 7.3, Fig. 7.3)

Figure 7.3: Average number of cases of cervical cancer diagnosed per year by period of diagnosis: 1993-2013



On average the number of cervical cancer cases increased by an average of 1.6% per year between 1993 and 2013. (Tab. 7.3, Fig. 7.3)

Table 7.3: Number of cases of cervical cancer diagnosed by year: 1993-2013

YEAR	Number of cases
1993	83
1994	76
1995	86
1996	93
1997	84
1998	80
1999	76
2000	95
2001	72
2002	82
2003	73
2004	74
2005	88
2006	103
2007	88
2008	127
2009	119
2010	90
2011	106
2012	95
2013	104

Trends in incidence rates

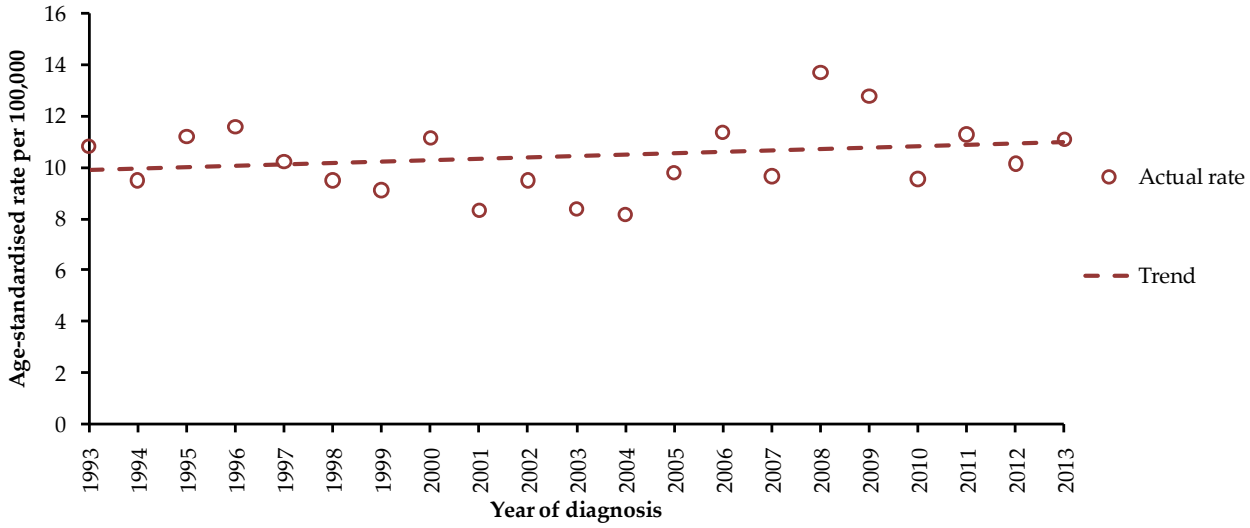
Most of this increase was due to the ageing and growth of the population. Adjusting for these factors using age-standardised rates illustrates an increase in rates of 0.5% per year, an annual change which was not statistically significant. (Tab. 7.4, Fig. 7.4)

Table 7.4: Annual percentage change in age-standardised cervical cancer incidence rates: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Females	1993-2013	0.5% (-0.5%, 1.6%)	p=0.313

CI – Confidence interval; Significant trends are in bold

Figure 7.4: Trends in age-standardised cervical cancer incidence rates: 1993-2013



Incidence trends by age at diagnosis

Cervical cancer incidence rates decreased among those aged 50-59, 60-69 and 70-79 during 1993-2013 by 2.3% per year (p=0.013), 6.2% per year (p<0.001) and 3.2% per year (p=0.006) respectively. There was no significant change among those aged 80 and over or aged 0-49, although during 2003-2008 there appeared to be a sharp increase in rates among 0-49 year olds, followed by a period of decrease. (Tab. 7.5, Fig. 7.5)

Figure 7.5: Trends in age-standardised cervical cancer incidence rates by age at diagnosis: 1993-2013

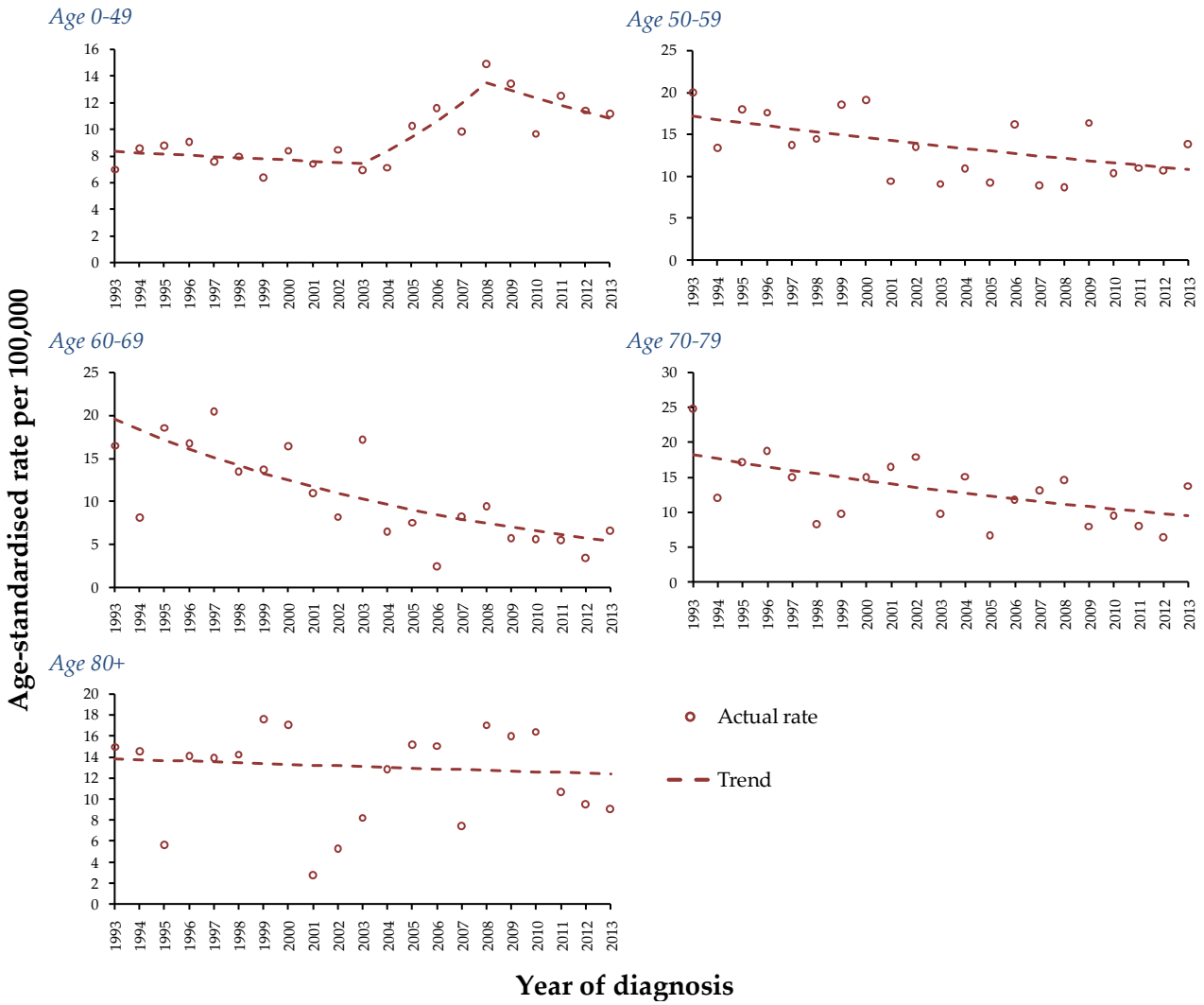


Table 7.5: Annual percentage change in age-standardised cervical cancer incidence rates by age: 1993-2013

AGE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2003	-1.1% (-4.6%, 2.4%)	p=0.500
	2003-2008	12.7% (-1.1%, 28.6%)	p=0.070
	2008-2013	-4.3% (-11.5%, 3.5%)	p=0.247
50-59	**1993-2013**	**-2.3% (-4.0%, -0.5%)**	**p=0.013**
60-69	**1993-2013**	**-6.2% (-8.7%, -3.7%)**	**p<0.001**
70-79	**1993-2013**	**-3.2% (-5.3%, -1.1%)**	**p=0.006**
80+	1993-2013	-0.5% (-3.1%, 2.1%)	p=0.666

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Age-standardised incidence rates of cervical cancer appeared to increase among women resident in the Northern Trust during 1993-2008 with a drop in rates apparent after that point. Slight increases also appeared to occur in the Belfast and South-Eastern Trusts, however none of these variations were statistically significant. (Tab. 7.6, Fig. 7.6)

Figure 7.6: Trends in age-standardised cervical cancer incidence rates by Trust of residence: 1993-2013

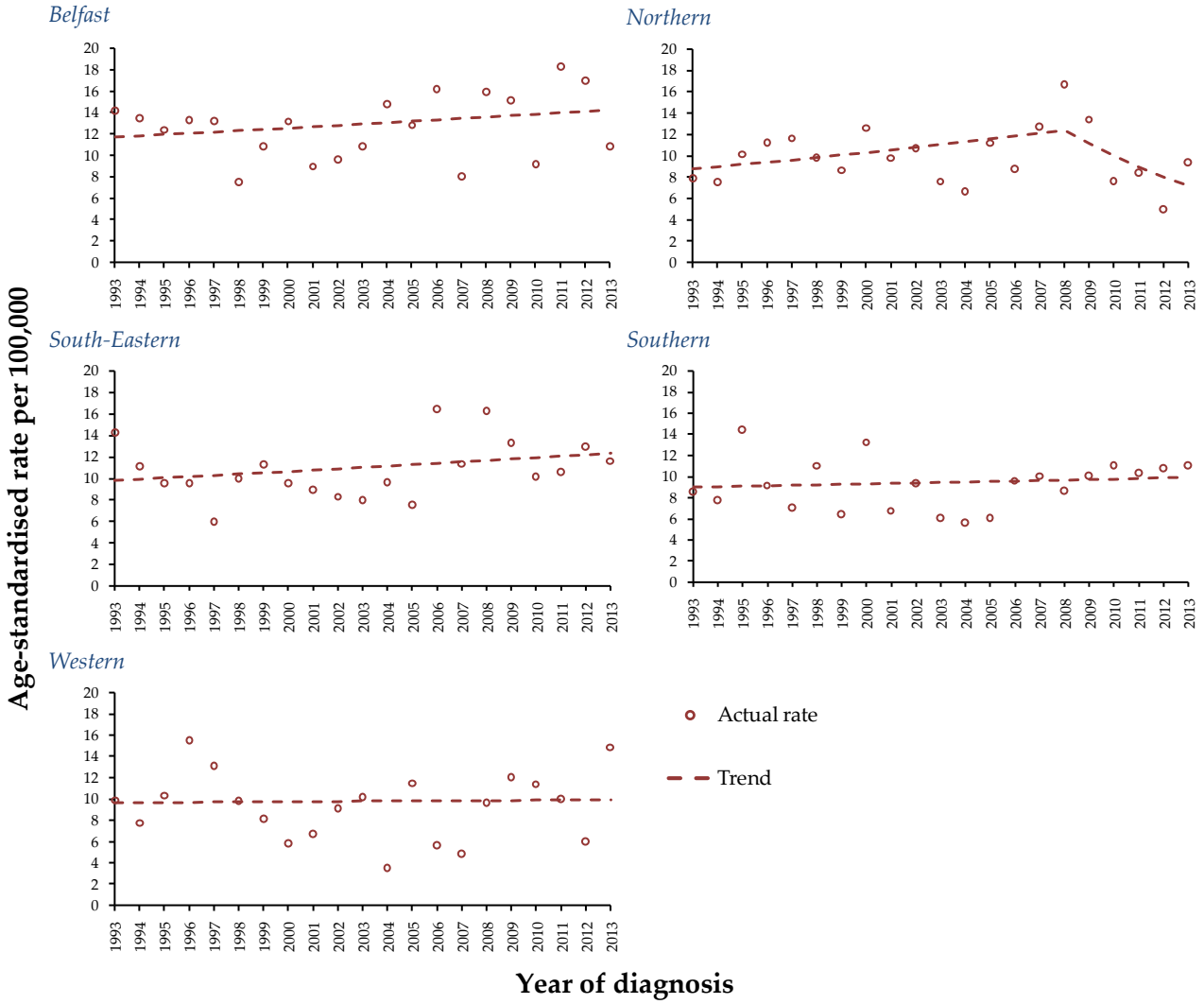


Table 7.6: Annual percentage change in age-standardised cervical cancer incidence rates by Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	1.0% (-0.7%, 2.8%)	p=0.240
Northern	1993-2008	2.3% (-0.6%, 5.4%)	p=0.113
	2008-2013	-10.4% (-22.4%, 3.5%)	p=0.126
South-Eastern	1993-2013	1.1% (-0.7%, 3.0%)	p=0.200
Southern	1993-2013	0.5% (-1.3%, 2.3%)	p=0.591
Western	1993-2013	0.2% (-2.3%, 2.7%)	p=0.894

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

In all but the second least deprived quintile age-standardised incidence rates of cervical cancer increased between 2001 and 2013, although the changes were not statistically significant. However in the second least deprived quintile rates increased by 11.6% per year (p=0.011) between 2001 and 2008, but decreased again by the same amount each year from 2008 onwards. (Tab. 7.7, Fig. 7.7)

Figure 7.7: Trends in age-standardised cervical cancer incidence rates by deprivation: 2001-2013

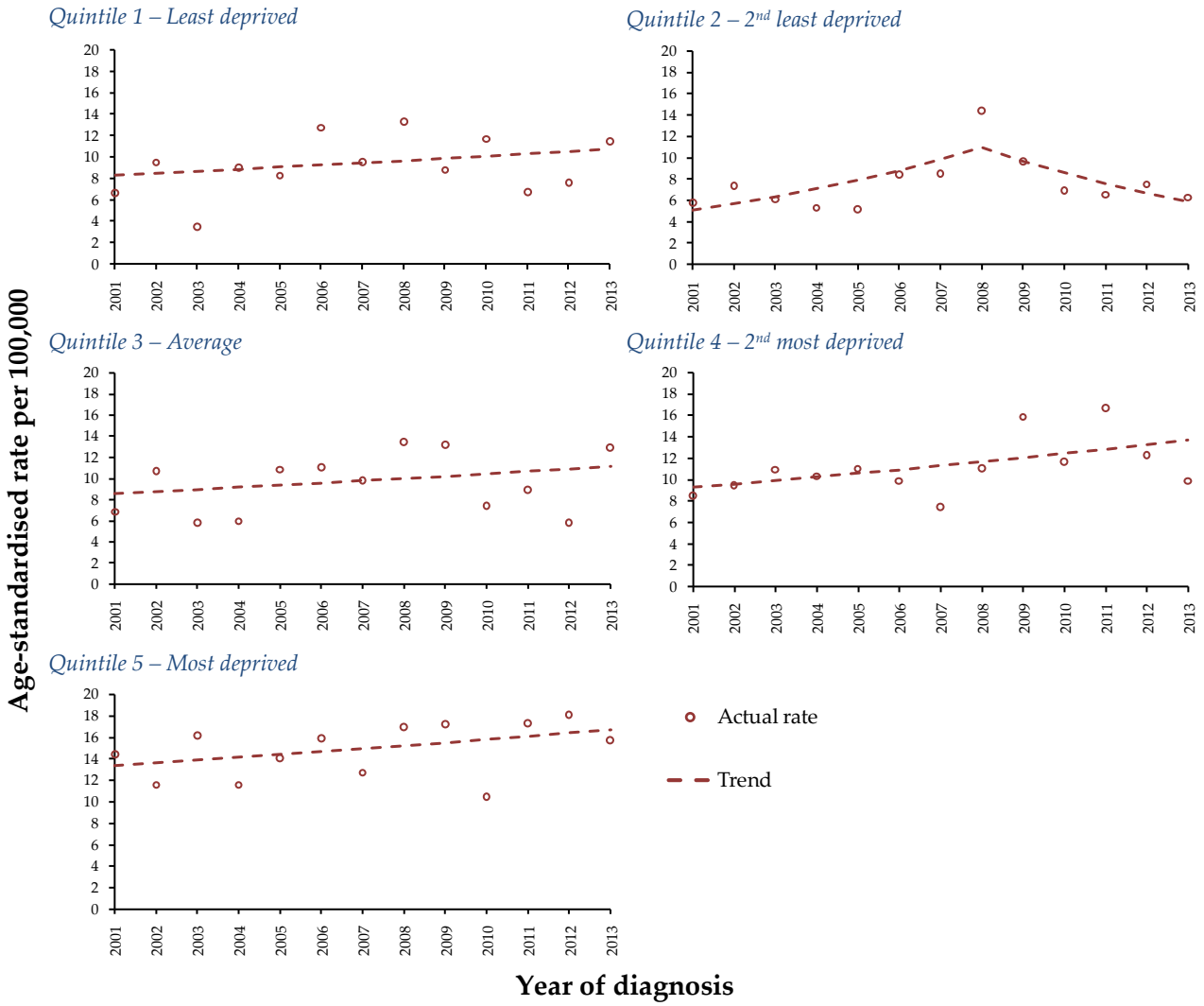


Table 7.7: Annual percentage change in age-standardised cervical cancer incidence rates by deprivation: 2001-2013

AREA BASED DEPRIVATION QUINTILE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	2.2% (-2.9%, 7.5%)	p=0.374
Quintile 2 2nd least deprived	**2001-2008**	**11.6% (3.3%, 20.5%)**	**p=0.011**
	2008-2013	**-11.6% (-21.4%, -0.7%)**	**p=0.041**
Quintile 3 Average	2001-2013	2.2% (-2.9%, 7.7%)	p=0.369
Quintile 4 2nd most deprived	2001-2013	3.3% (-0.2%, 7.0%)	p=0.063
Quintile 5 Most deprived	2001-2013	1.9% (-0.7%, 4.6%)	p=0.145

CI – Confidence interval; Significant trends are in bold

7.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

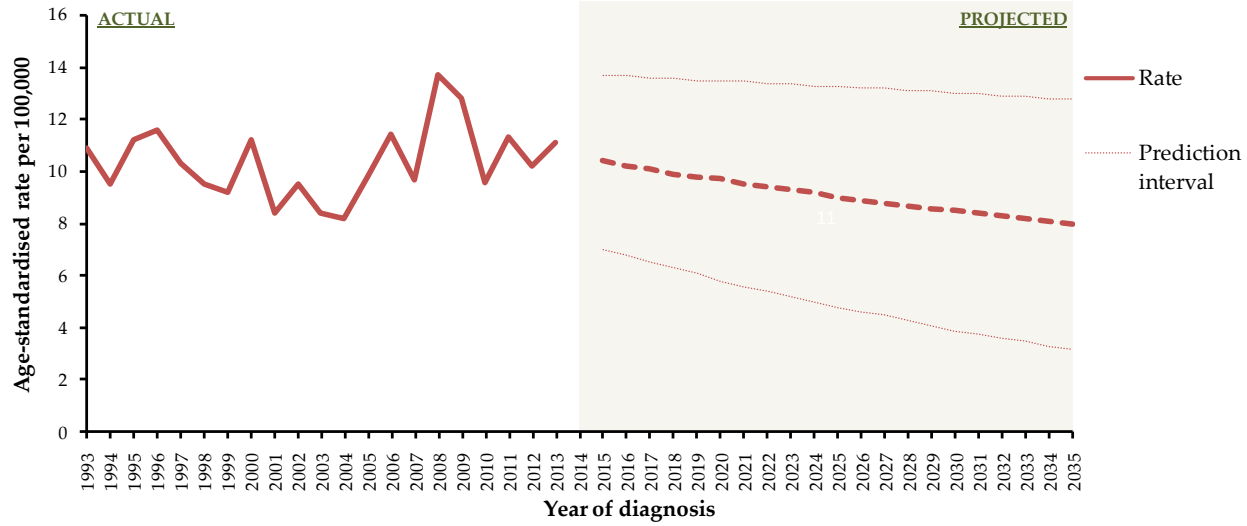
Age-standardised incidence rates of cervical cancer are projected to decline over the next twenty-two years. Compared to the average incidence rate in 2009-2013 there is expected to be a 12% drop in rates by 2020, with a drop of 27% expected by 2035. (Tab. 7.8, Fig. 7.8)

Table 7.8: Cervical cancer age-standardised incidence rate projections to 2035 with comparison to 2009-2013 average

YEAR	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	11.0			
2015	10.4	(7.0 , 13.7)	-5%	(-36% , 25%)
2020	9.7	(5.8 , 13.5)	-12%	(-47% , 23%)
2025	9.0	(4.8 , 13.3)	-18%	(-56% , 21%)
2030	8.5	(3.9 , 13.0)	-23%	(-65% , 18%)
2035	8.0	(3.2 , 12.8)	-27%	(-71% , 16%)

ASIR: Age-standardised incidence rate

Figure 7.8: Cervical cancer age-standardised incidence rate projections to 2035



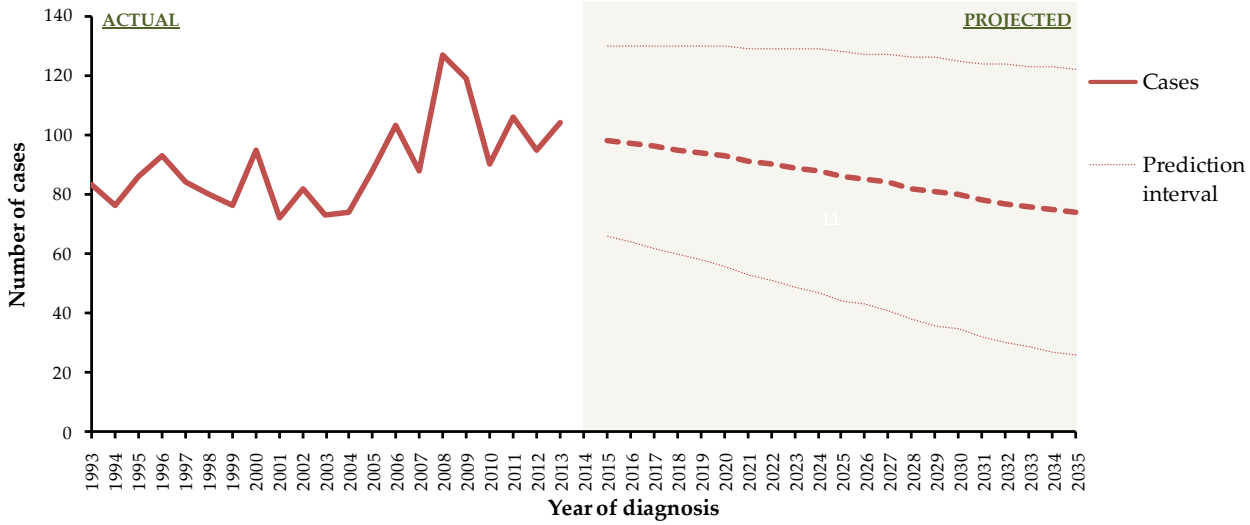
Case projections

In 2009-2013 there were 103 cases of cervical cancer diagnosed each year. By 2020 this is expected to decrease by 10% to 93 cases per year, while by 2035 a decrease of 28% is expected resulting in a reduction to 74 cases per year. The reduction is driven by a fall in the underlying incidence rates combined with the expectation that the population of younger women will not change considerably over the next twenty-two years. (Tab. 7.9, Fig. 7.9)

Table 7.9: Cervical cancer incidence projections to 2035 with comparison to 2009-2013 average

YEAR	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	103			
2015	98	(66, 130)	-5%	(-36%, 26%)
2020	93	(56, 130)	-10%	(-46%, 26%)
2025	86	(44, 128)	-17%	(-57%, 24%)
2030	80	(35, 125)	-22%	(-66%, 21%)
2035	74	(26, 122)	-28%	(-75%, 18%)

Figure 7.9: Cervical cancer incidence projections to 2035



FACTORS THAT CAN INFLUENCE CERVICAL CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter cervical cancer incidence projections through control of the following risk factors:
  - Infection with human papilloma virus;
  - Tobacco smoking.
- Other risk factors which may have a lesser impact on future projections include:
  - Low immunity;
  - High parity.
- The introduction of the HPV vaccination in 2008 for girls aged 12-13 has the potential to alter the projected decrease in cervical cancer incidence among women aged up to 39 in the year 2035. However the projections presented are currently in line with the expected benefit to be gained from the vaccine.
- Other potential factors that can influence cervical cancer incidence projections include:
  - Future modifications to the cervical screening program;
  - Changes to the way in which cervical cancer is classified;
  - Revisions to population projections.

08 COLORECTAL CANCER (C18-C21)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
680 PER YEAR	545 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
70 YEARS	72 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
NO HSC TRUSTS (MALES & FEMALES)	SOUTH EASTERN HSCT (MALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+3.2% PER YEAR (1999-2013)	+2.6% PER YEAR (2002-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
+1.0% PER YEAR (1999-2013)	+1.1% PER YEAR (2002-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+6%	+7%	+11%	+13%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+34% TO 909 CASES PER YEAR	+26% TO 688 CASES PER YEAR	+90% TO 1,292 CASES PER YEAR	+74% TO 946 CASES PER YEAR

8.1: BACKGROUND

An average of 1,225 cases (680 male, 545 female) of colorectal cancer were diagnosed each year during 2009-2013. It was the 2nd most common male and female cancer diagnosed making up 15.4% and 12.5% of cancers (ex. NMSC) respectively. There were 76.5 cases diagnosed per 100,000 males and 59.0 cases diagnosed per 100,000 females. The risk of developing colorectal cancer before the age of 65 was 1 in 54 for men and 1 in 72 for women, while before age 85 it was 1 in 15 for men and 1 in 20 for women.

Cancer and age

Colorectal cancer was more common among older people with a median age at diagnosis of 70 years for men and 72 years for women during 2009-2013. Overall 81.4% (81.6% male, 81.1% female) of cases were among those aged 60 and over, with 22.9% (19.0% male, 27.7% female) occurring among those aged 80 and over. Incidence rates were greatest among men and women aged 80 and over with 539 cases per 100,000 males and 341 cases per 100,000 females in this age group. Colorectal cancer was rare among those aged under 25, with 3 cases per year among 15 to 24 year olds and one case per year among children aged 0 to 14. (Tab. 8.1, Fig. 8.1)

Figure 8.1: Incidence of colorectal cancer by sex and age: 2009-2013

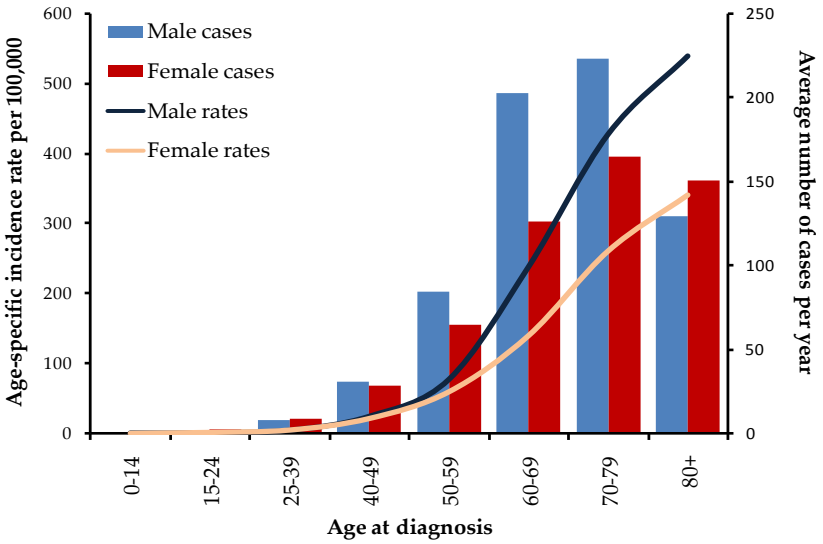


Table 8.1: Average number of colorectal cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	1	0	1
15-24	1	2	3
25-39	8	9	17
40-49	31	28	59
50-59	84	65	149
60-69	203	126	329
70-79	223	165	388
80+	129	151	280
Total	680	545	1,225

Cancer and area of residence

During 2004-2013 there was no significant variation in age-standardised incidence rates of colorectal cancer by HSC Trust except for lower rates in the South-Eastern Trust for males. The greatest case load (296 cases per year) was in the Northern Trust due to its greater population. (Tab. 8.2, Fig. 8.2)

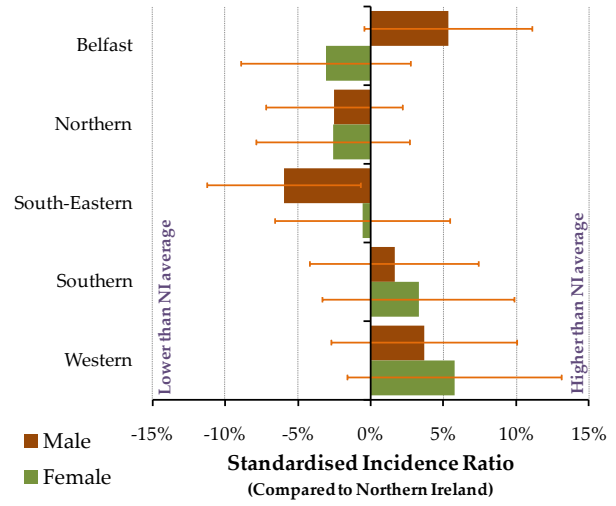
Table 8.2: Average number of colorectal cancers diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	128	105	233
	Northern	165	131	296
	South-Eastern	122	105	227
	Southern	117	94	211
	Western	101	79	180
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	126	103	229
	2 - 2nd least deprived	119	95	214
	3 - Average	129	102	231
	4 - 2nd most deprived	131	111	242
	5 - Most deprived	127	102	229

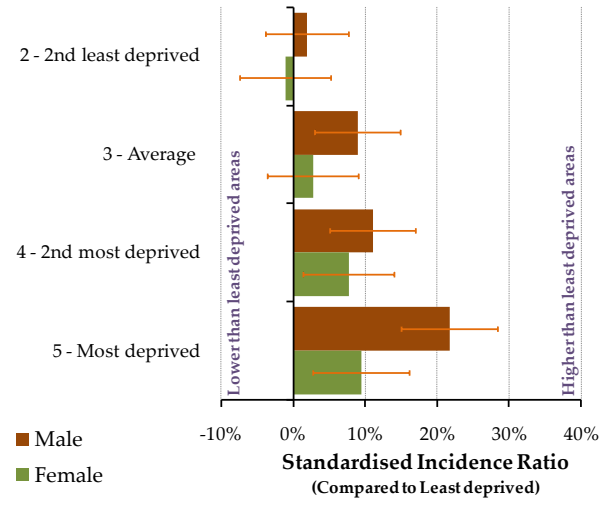
However incidence of colorectal cancer did vary by area based socio-economic deprivation with rates increasing with increasing levels of deprivation. In particular age-standardised incidence rates were higher in the most deprived areas compared with the least deprived areas by 21.8% for males and by 9.5% for females. (Tab. 8.2, Fig. 8.2)

Figure 8.2: Age-standardised incidence rates of colorectal cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

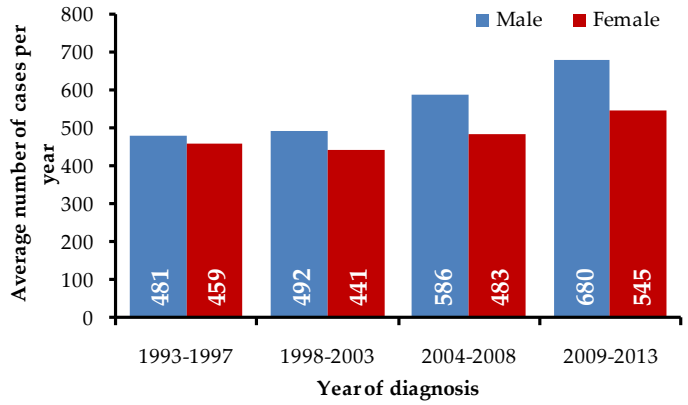


8.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 1,225 colorectal cancers (680 male, 545 female) diagnosed each year compared to an average of 940 cases (481 male, 459 female) in 1993-1997. (Tab. 8.3, Fig. 8.3)

Figure 8.3: Average number of cases of colorectal cancer diagnosed per year by sex and period of diagnosis: 1993-2013



The number of colorectal cancer cases increased by 3.2% per year for men during 1999-2013 and by 2.6% per year for women between 2002 and 2013. (Tab. 8.3, Fig. 8.3)

Table 8.3: Number of cases of colorectal cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	475	450	925
1994	482	433	915
1995	491	494	985
1996	500	464	964
1997	456	455	911
1998	490	442	932
1999	450	456	906
2000	454	423	877
2001	532	430	962
2002	467	446	913
2003	558	451	1,009
2004	522	470	992
2005	582	426	1,008
2006	573	489	1,062
2007	655	516	1,171
2008	597	515	1,112
2009	623	484	1,107
2010	661	536	1,197
2011	687	572	1,259
2012	750	562	1,312
2013	679	572	1,251

Trends in incidence rates

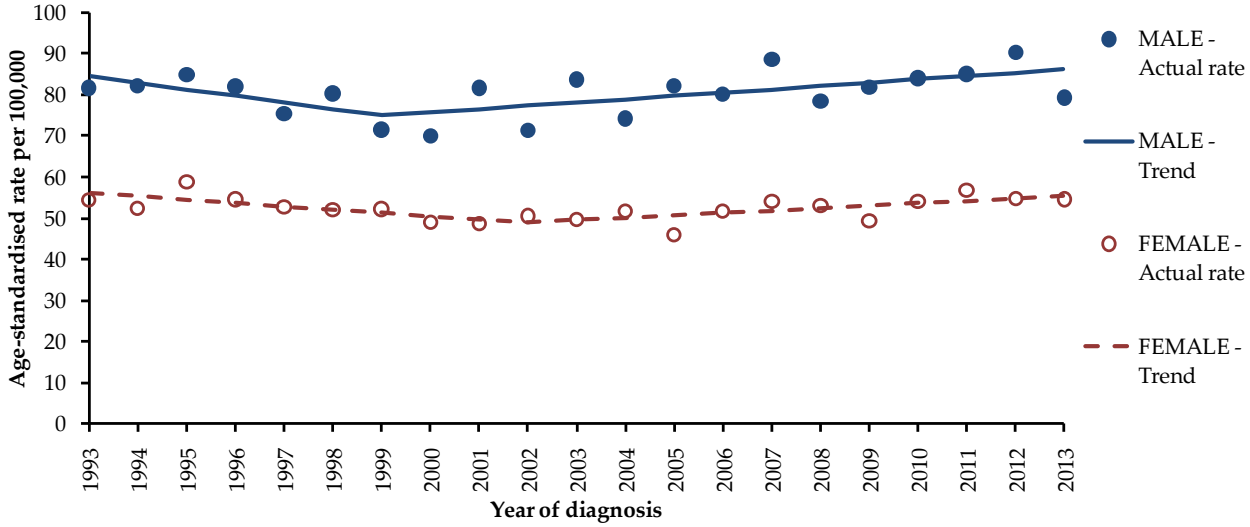
Colorectal cancer incidence rates did not change significantly among males during 1993-1999 but increased by 1.0% per year (p=0.017) from 1999 onwards. Among females colorectal cancer incidence rates decreased by 1.5% per year (p=0.025) between 1993 and 2002 but increased again by 1.1% per year (p=0.016) from 2002 to 2013. (Tab. 8.4, Fig. 8.4)

Table 8.4: Annual percentage change in age-standardised colorectal cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-1999	-1.9% (-5.0%, 1.2%)	p=0.209
	1999-2013	**1.0% (0.2%, 1.8%)**	**p=0.017**
Female	**1993-2002**	**-1.5% (-2.7%, -0.2%)**	**p=0.025**
	2002-2013	**1.1% (0.2%, 2.0%)**	**p=0.016**

CI – Confidence interval; Significant trends are in bold

Figure 8.4: Trends in age-standardised colorectal cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

The overall change in colorectal cancer incidence rates is not driven by a particular age group. Age-standardised incidence rates of the disease increased slightly, but not significantly, during 1993-2013 for males aged 0-49 and 60-69 with a significant increase for those aged 70-79. There was no significant change for females of any age during 1993-2013. (Tab. 8.5, Fig. 8.5)

Figure 8.5: Trends in age-standardised colorectal cancer incidence rates by sex and age at diagnosis: 1993-2013

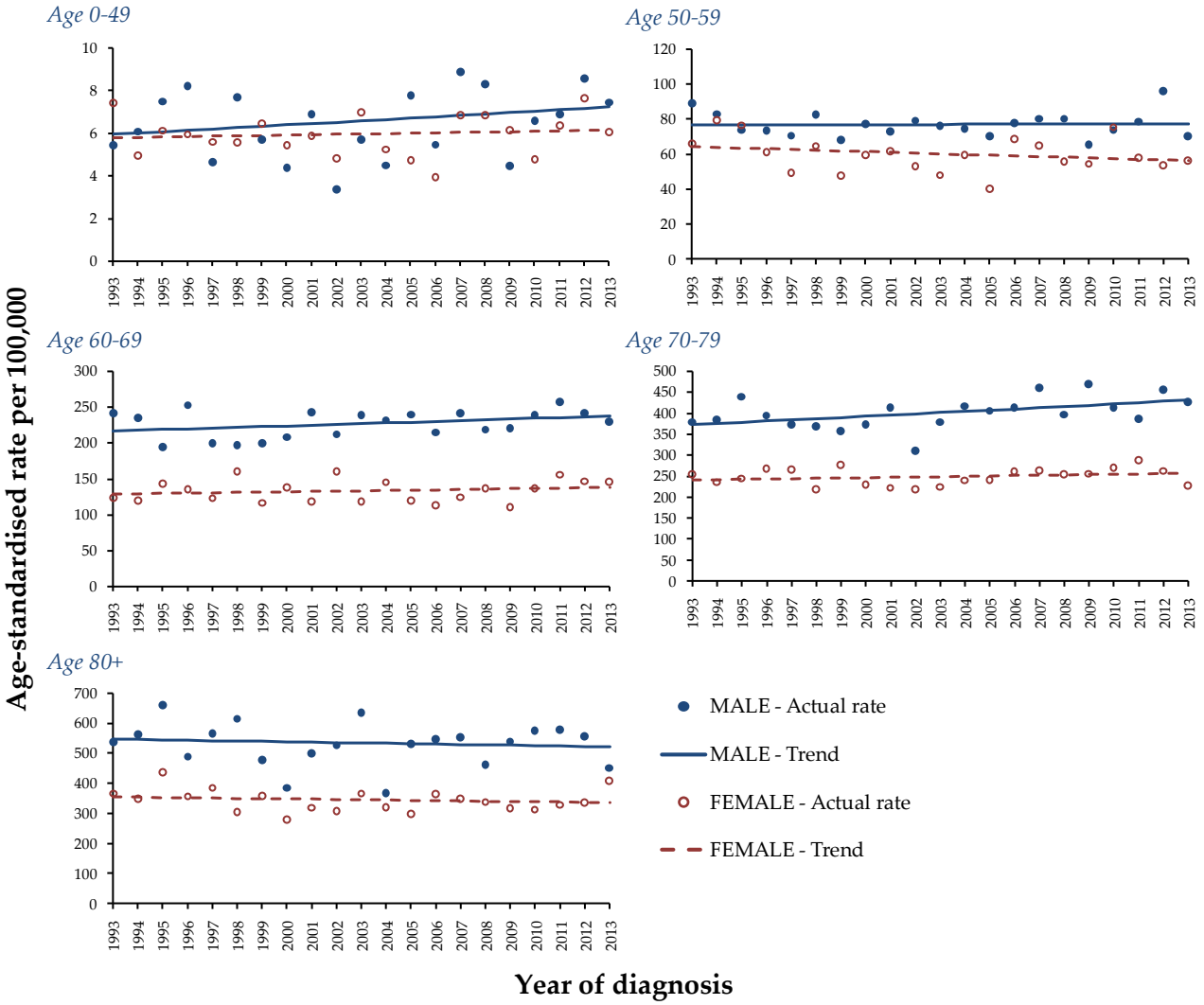


Table 8.5: Annual percentage change in age-standardised colorectal cancer incidence rates by sex and age: 1993-2013

AGE	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2013	1.0% (-0.8%, 2.8%)	p=0.271	1993-2013	0.3% (-0.9%, 1.6%)	p=0.611
50-59	1993-2013	0.0% (-0.7%, 0.8%)	p=0.938	1993-2013	-0.7% (-1.8%, 0.5%)	p=0.267
60-69	1993-2013	0.5% (-0.2%, 1.1%)	p=0.133	1993-2013	0.4% (-0.5%, 1.2%)	p=0.402
70-79	**1993-2013**	**0.7% (0.1%, 1.4%)**	**p=0.026**	1993-2013	0.3% (-0.3%, 0.9%)	p=0.335
80+	1993-2013	-0.2% (-1.3%, 0.8%)	p=0.636	1993-2013	-0.3% (-1.1%, 0.5%)	p=0.446

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Colorectal cancer incidence rates increased among men resident in the Southern Trust by 0.9% per year (p=0.019) during 1993-2013. In the remaining trusts there was no significant change for men. Among women rates in the Southern Trust declined during 1993-2009 although not by a significant amount, however after 2009 rates increased significantly by 8.4% per year (p=0.041). None of the other Trusts exhibited significant changes in female rates during 1993-2013. (Tab. 8.6, Fig. 8.6)

Figure 8.6: Trends in age-standardised colorectal cancer incidence rates by sex and Trust of residence: 1993-2013

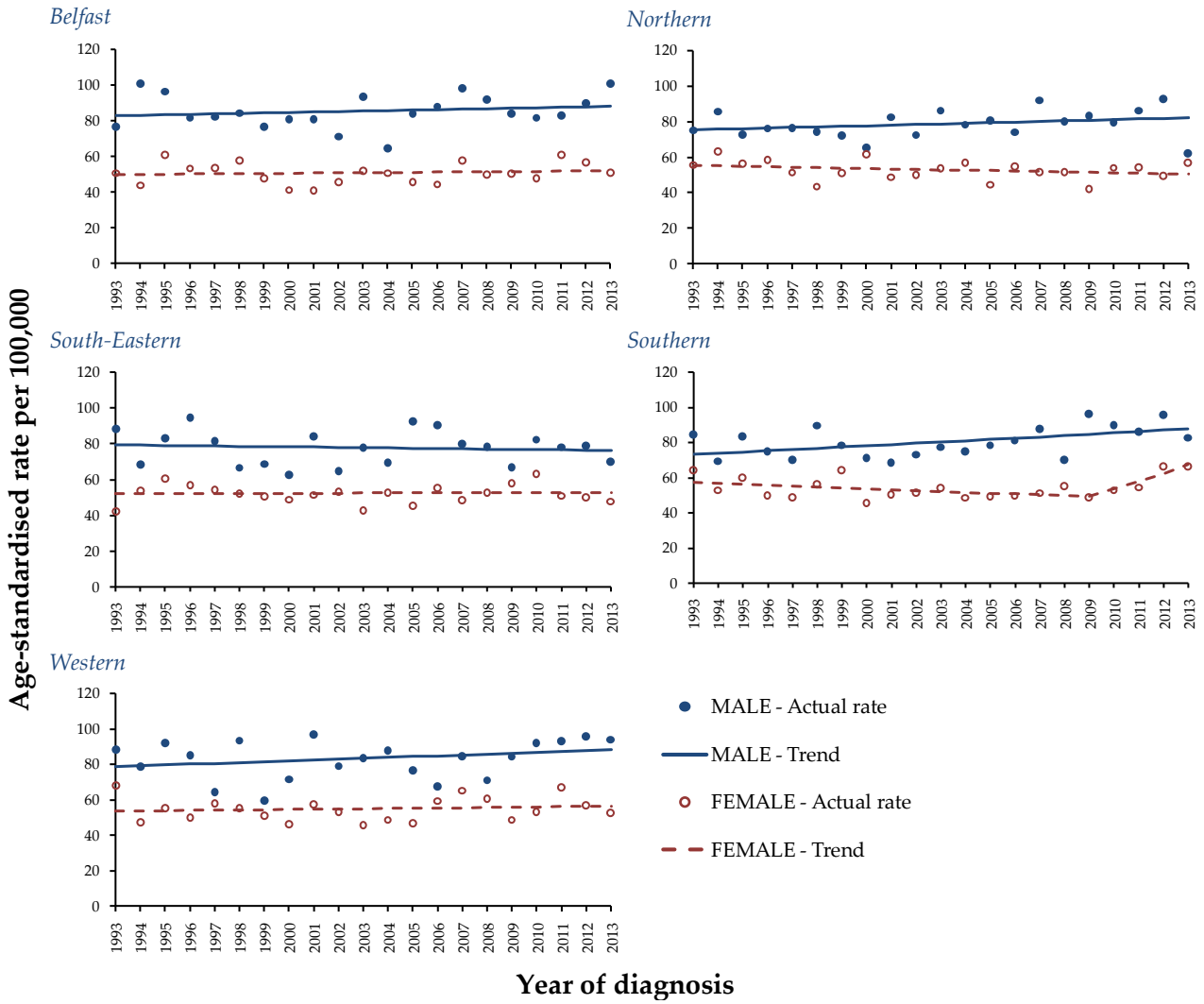


Table 8.6: Annual percentage change in age-standardised colorectal cancer incidence rates by sex and Trust of residence: 1993-2013

Health & Social Care Trust	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	0.3% (-0.5%, 1.1%)	p=0.430	1993-2013	0.2% (-0.7%, 1.1%)	p=0.664
Northern	1993-2013	0.4% (-0.3%, 1.2%)	p=0.259	1993-2013	-0.4% (-1.2%, 0.3%)	p=0.228
South-Eastern	1993-2013	-0.2% (-1.1%, 0.7%)	p=0.664	1993-2013	0.0% (-0.7%, 0.8%)	p=0.948
Southern	**1993-2013**	**0.9% (0.2%, 1.6%)**	**p=0.019**	1993-2009	-0.9% (-2.0%, 0.1%)	p=0.076
				2009-2013	**8.4% (0.4%, 17.1%)**	**p=0.041**
Western	1993-2013	0.6% (-0.4%, 1.5%)	p=0.220	1993-2013	0.2% (-0.7%, 1.1%)	p=0.604

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

In general colorectal cancer incidence rates which have been age-standardised increased for both males and females in all deprivation quintiles during 2001-2013. However due to the amount of random variation from year to year in these rates the increases were not statistically significant. (Tab. 8.7, Fig. 8.7)

Figure 8.7: Trends in age-standardised colorectal cancer incidence rates by sex and deprivation: 2001-2013

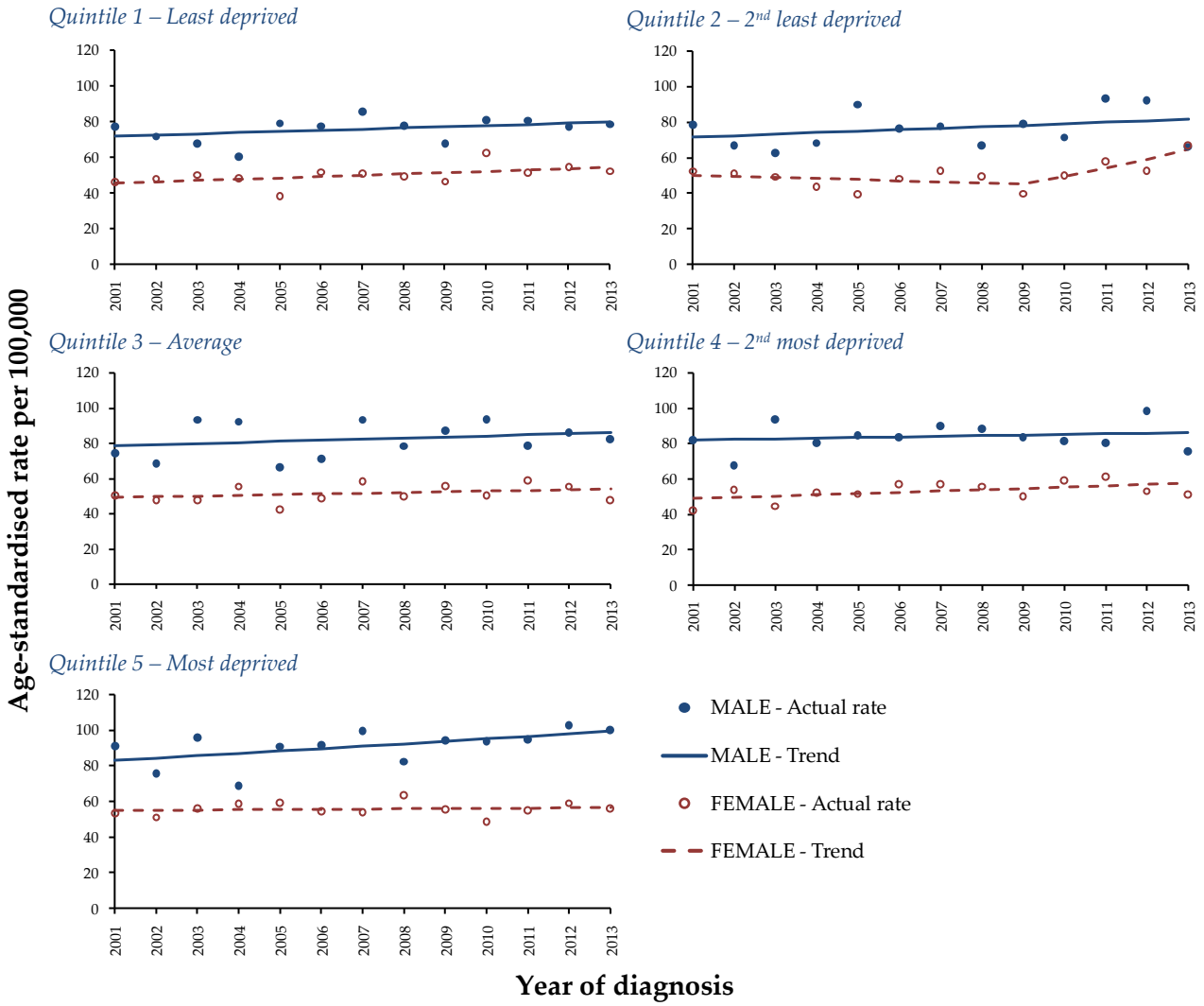


Table 8.7: Annual percentage change in age-standardised colorectal cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	0.9% (-0.5%, 2.3%)	p=0.193	2001-2013	1.5% (-0.2%, 3.1%)	p=0.072
Quintile 2 2nd least deprived	2001-2013	1.1% (-1.1%, 3.4%)	p=0.295	2001-2009	-1.3% (-4.8%, 2.4%)	p=0.439
				2009-2013	9.4% (-0.3%, 19.9%)	p=0.055
Quintile 3 Average	2001-2013	0.7% (-1.2%, 2.7%)	p=0.422	2001-2013	0.8% (-0.7%, 2.4%)	p=0.260
Quintile 4 2nd most deprived	2001-2013	0.4% (-1.1%, 2.0%)	p=0.574	2001-2013	1.4% (-0.2%, 2.9%)	p=0.077
Quintile 5 Most deprived	2001-2013	1.5% (0.0%, 3.1%)	p=0.053	2001-2013	0.3% (-0.9%, 1.4%)	p=0.628

CI – Confidence interval; Significant trends are in bold

8.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

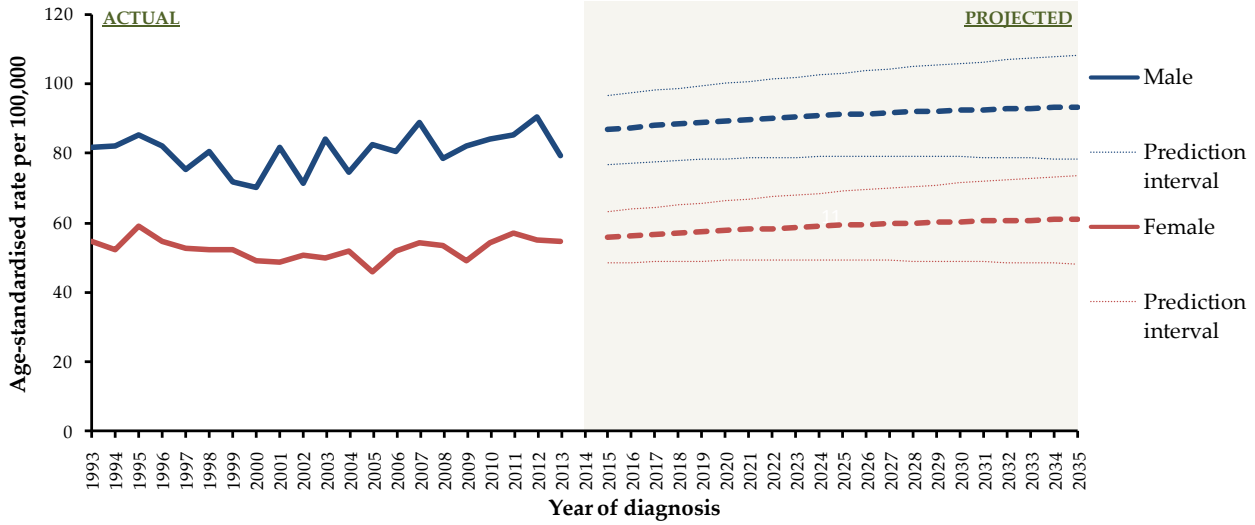
Age-standardised incidence rates of colorectal cancer are expected to continue to increase for both sexes in forthcoming years. Compared to the average in 2009-2013 rates among men are expected to rise by 6% by 2020 and by 11% by 2035. Among women rates are projected to increase by 7% by 2020 and by 13% by 2035. (Tab. 8.8, Fig. 8.8)

Table 8.8: Colorectal cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	84.2				54.0			
2015	86.7	(76.8, 96.6)	3%	(-9%, 15%)	55.9	(48.5, 63.3)	4%	(-10%, 17%)
2020	89.2	(78.3, 100.1)	6%	(-7%, 19%)	57.8	(49.2, 66.4)	7%	(-9%, 23%)
2025	91.1	(79.0, 103.2)	8%	(-6%, 23%)	59.2	(49.3, 69.1)	10%	(-9%, 28%)
2030	92.4	(78.9, 105.9)	10%	(-6%, 26%)	60.2	(48.9, 71.5)	11%	(-9%, 32%)
2035	93.3	(78.2, 108.3)	11%	(-7%, 29%)	60.9	(48.2, 73.6)	13%	(-11%, 36%)

ASIR: Age-standardised incidence rate

Figure 8.8: Colorectal cancer age-standardised incidence rate projections to 2035 by sex



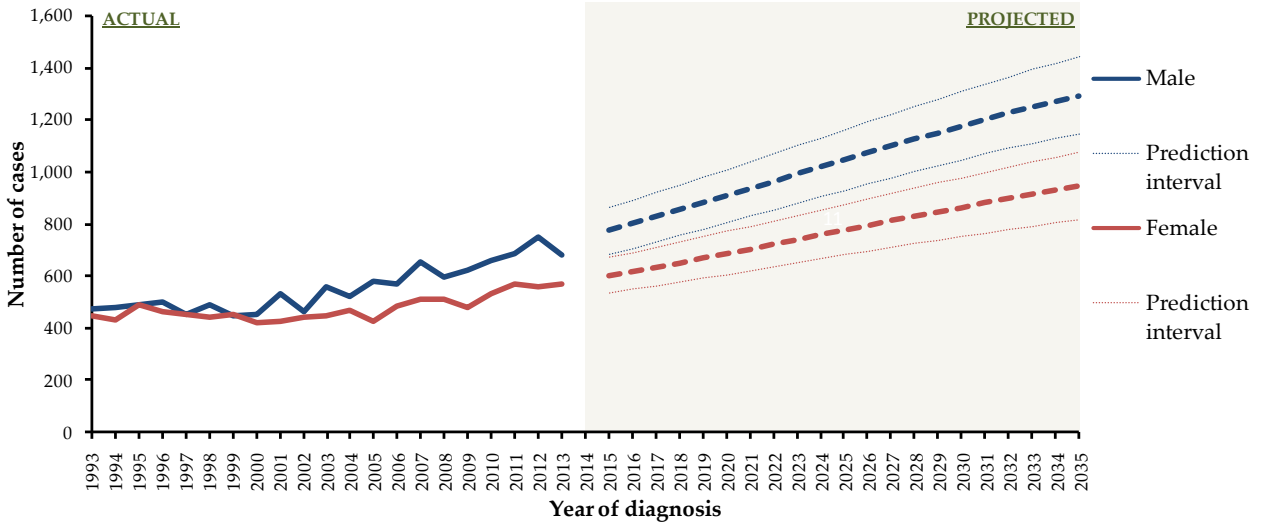
Case projections

The combination of increasing rates and the projected increase in the elderly population is expected to result in a sizeable increase in the number of colorectal cancers diagnosed in future years. In 2009-2013 there were 680 male and 545 female cases diagnosed per year. By 2020 this is expected to increase by 34% to 909 cases for men and by 26% to 688 cases for women. By 2035 the number is expected to increase by 90% among men to 1,292 cases and by 74% among women to 946 cases. (Tab. 8.9, Fig. 8.9)

Table 8.9: Colorectal cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	680				545			
2015	776	(686 , 866)	14%	(1%, 27%)	603	(533 , 673)	11%	(-2%, 23%)
2020	909	(807 , 1,011)	34%	(19%, 49%)	688	(605 , 771)	26%	(11%, 41%)
2025	1,046	(930 , 1,162)	54%	(37%, 71%)	778	(681 , 875)	43%	(25%, 61%)
2030	1,177	(1,045 , 1,309)	73%	(54%, 93%)	864	(752 , 976)	59%	(38%, 79%)
2035	1,292	(1,143 , 1,441)	90%	(68%, 112%)	946	(818 , 1,074)	74%	(50%, 97%)

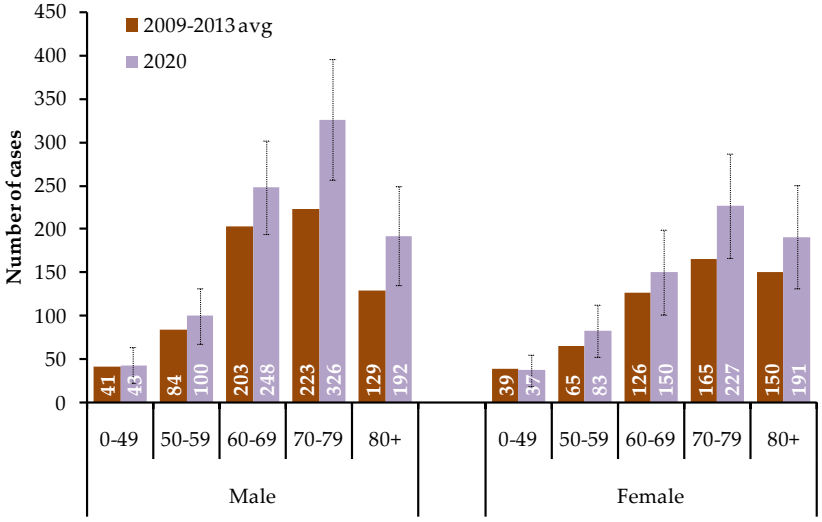
Figure 8.9: Colorectal cancer incidence projections to 2035 by sex



Case projections by age

The number of colorectal cases diagnosed among males and females is expected to increase for all age groups except those aged 0-49 where only small variations are expected. Among males a 46% increase is expected among those aged 70-79 while a 49% increase is expected among those aged 80 and over. Among women the largest percentage increase is projected to be among 70-79 year olds with a 38% increase. (Fig. 8.10)

Figure 8.10: Colorectal cancer incidence projections to 2020 by sex and age



FACTORS THAT CAN INFLUENCE COLORECTAL CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter colorectal cancer incidence projections through control of the following risk factors:
  - Obesity, lack of physical activity and/or lack of a balanced diet;
  - Excessive alcohol consumption;
  - Tobacco smoking.
- Other risk factors which may have a lesser impact on future projections include:
  - Family history;
  - Exposure to ionising radiation.
- The introduction of the colorectal screening programme may cause a temporary increase in colorectal cancer incidence followed by a brief decrease among those aged 60-74. However the overall trend is unlikely to be altered unless significant levels of premalignant conditions are detected allowing treatment which prevents colorectal cancer before it occurs.
- Other potential factors that can influence colorectal cancer incidence projections include:
  - Changes to the way in which colorectal cancer is classified;
  - Revisions to population projections.

09 KIDNEY CANCER (C65-C66 & C68)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
173 PER YEAR	115 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
69 YEARS	69 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (FEMALES ONLY)	AFFLUENT AREAS (FEMALES ONLY)
BELFAST HSCT (MALES ONLY)	NO HSC TRUSTS (MALES & FEMALES)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+3.8% PER YEAR (1993-2013)	+4.2% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
+2.1% PER YEAR (1993-2013)	+2.9% PER YEAR (1993-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+14%	+19%	+27%	+39%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+41% TO 244 CASES PER YEAR	+40% TO 161 CASES PER YEAR	+113% TO 368 CASES PER YEAR	+114% TO 246 CASES PER YEAR

9.1: BACKGROUND

An average of 288 cases (173 male, 115 female) of kidney cancer were diagnosed each year during 2009-2013 in Northern Ireland. It was the 5th most common male cancer diagnosed in this period making up 3.9% of all cancers (ex. NMSC), while it was the 9th most common female cancer making up 2.6% of cancers (ex. NMSC) diagnosed. As a proportion of the resident population in Northern Ireland there were 19.4 cases diagnosed per 100,000 males and 12.5 cases diagnosed per 100,000 females. The risk of developing kidney cancer before the age of 65 was 1 in 180 for men and 1 in 281 for women, while before age 85 it was 1 in 56 for men and 1 in 91 for women.

Cancer and age

Kidney cancer was more common among older people with a median age at diagnosis of 69 years for men and women during 2009-2013. Overall 74.3% (73.4% male, 75.7% female) of cases were among those aged 60 and over, with 19.4% (17.9% male, 21.7% female) among those aged 80 and over. Incidence rates were greatest among men and women aged 80 and over with 130 cases per 100,000 males and 56 cases per 100,000 females in this age group. Kidney cancer was rare among those aged 25 to 39 with only 5 cases diagnosed each year, while there were 2 cases diagnosed each year among those aged under 25. (Tab. 9.1, Fig 9.1)

Figure 9.1: Incidence of kidney cancer by sex and age: 2009-2013

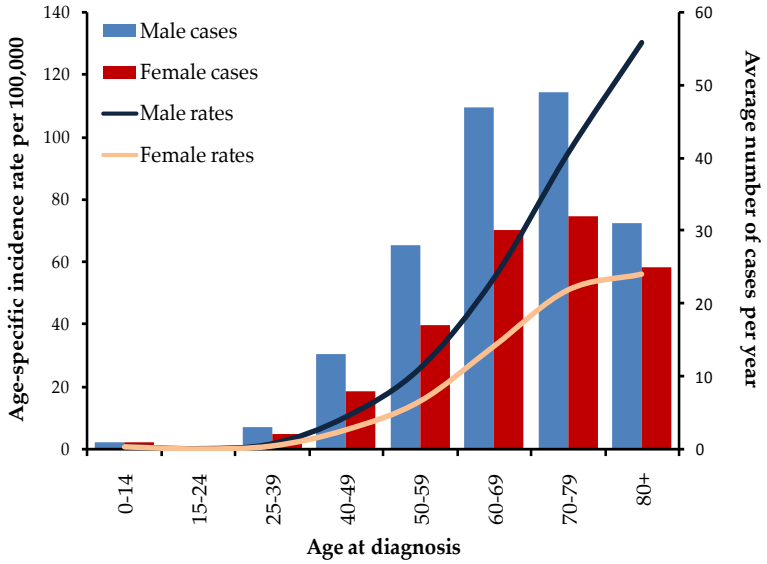


Table 9.1: Average number of kidney cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	1	1	2
15-24	0	0	0
25-39	3	2	5
40-49	13	8	21
50-59	28	17	45
60-69	47	30	77
70-79	49	32	81
80+	31	25	56
Total	173	115	288

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of kidney cancer were 12.4% higher than the Northern Ireland average among males living in Belfast HSC Trust. There was no other significant variation by HSC Trust despite slightly elevated rates in the Belfast Trust for females and slightly lower rates in the South-Eastern Trust for both sexes. (Tab. 9.2, Fig. 9.2)

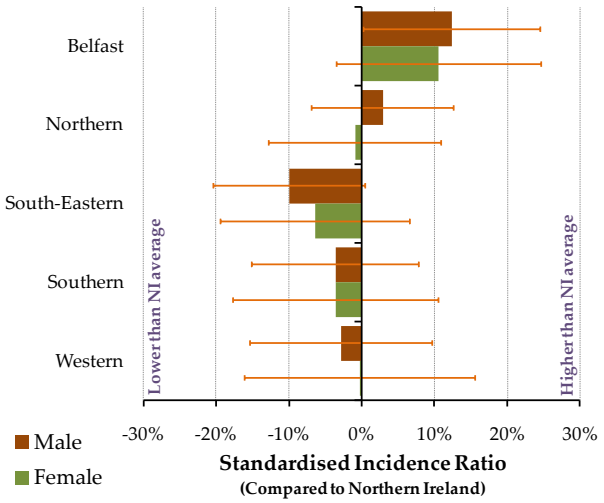
Age-standardised incidence rates in the most deprived areas of Northern Ireland were 37.0% higher for women than in the least deprived areas during 2004-2013; however there was no significant difference between the least and most deprived areas for men. (Tab. 9.2, Fig. 9.2)

Table 9.2: Average number of kidney cancers diagnosed per year by sex and area of residence: 2004-2013

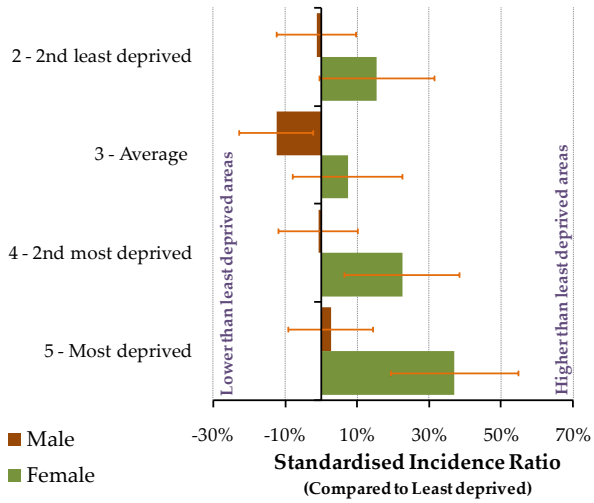
AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	33	24	57
	Northern	42	27	69
	South-Eastern	28	20	48
	Southern	27	18	45
	Western	23	15	38
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	34	19	53
	2 - 2nd least deprived	31	20	51
	3 - Average	28	19	47
	4 - 2nd most deprived	32	23	55
	5 - Most deprived	29	23	52

Figure 9.2: Age-standardised incidence rates of kidney cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

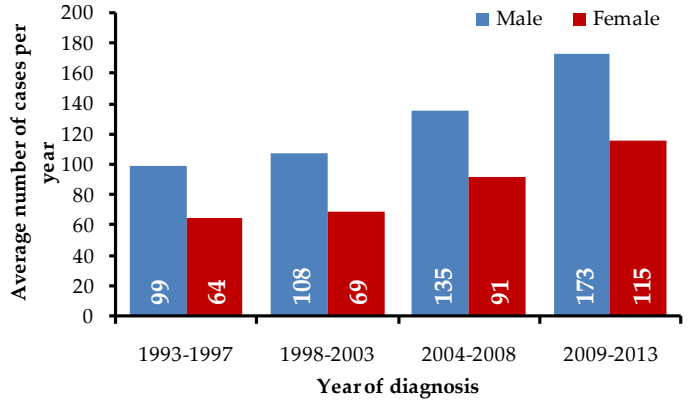


9.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 288 kidney cancers (173 male, 115 female) diagnosed each year compared to an average of 163 kidney cancers (99 male, 64 female) in 1993-1997. (Tab. 9.3, Fig. 9.3)

Figure 9.3: Average number of cases of kidney cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of kidney cancer cases increased by 3.8% per year for men and by 4.2% per year for women between 1993 and 2013. (Tab. 9.3, Fig. 9.3)

Table 9.3: Number of cases of kidney cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	96	70	166
1994	111	47	158
1995	96	68	164
1996	94	63	157
1997	99	73	172
1998	99	75	174
1999	102	58	160
2000	92	70	162
2001	106	64	170
2002	116	64	180
2003	130	81	211
2004	110	81	191
2005	105	77	182
2006	137	83	220
2007	156	85	241
2008	167	131	298
2009	160	98	258
2010	160	113	273
2011	192	95	287
2012	163	135	298
2013	189	135	324

Trends in incidence rates

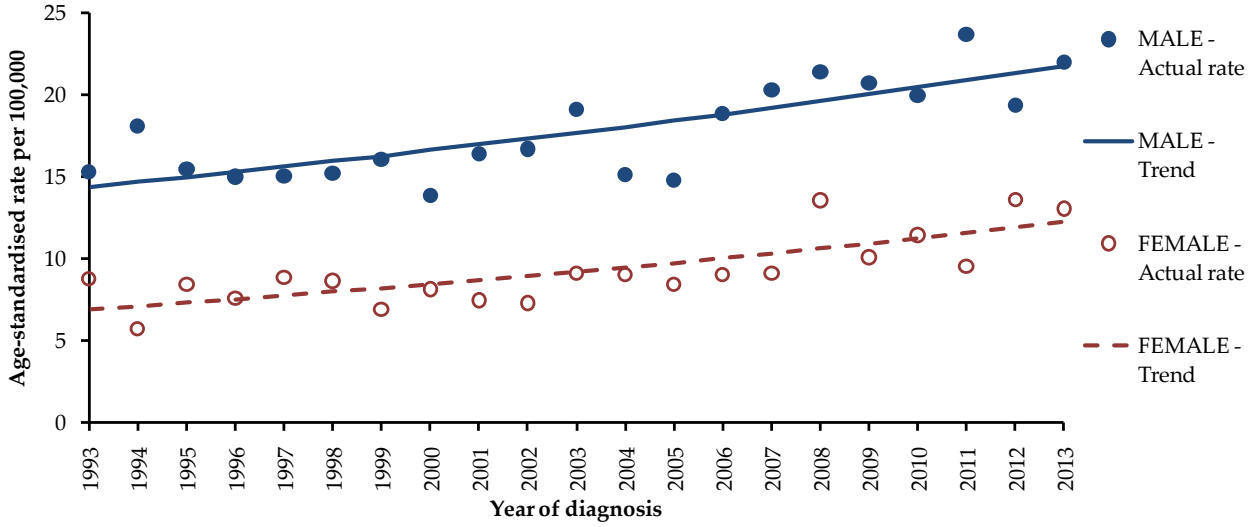
Kidney cancer incidence rates, which have been adjusted for changes in the age of the population, increased among males by an average of 2.1% per year (p<0.001) and by an average of 2.9% per year (p<0.001) among females during 1993-2013. (Tab. 9.4, Fig. 9.4)

Table 9.4: Annual percentage change in age-standardised kidney cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-2013**	**2.1% (1.3%, 2.9%)**	**p<0.001**
Female	**1993-2013**	**2.9% (1.7%, 4.0%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 9.4: Trends in age-standardised kidney cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

With the exception of the 0-49 age group incidence rates of kidney cancer increased among all ages for both males and females during 1993-2013. The greatest increases for both sexes were among the 80 and over age group with a 4.0% per year (p<0.001) increase among men and a 5.2% per year (p<0.001) increase among women. (Tab. 9.5, Fig. 9.5)

Figure 9.5: Trends in age-standardised kidney cancer incidence rates by sex and age at diagnosis: 1993-2013

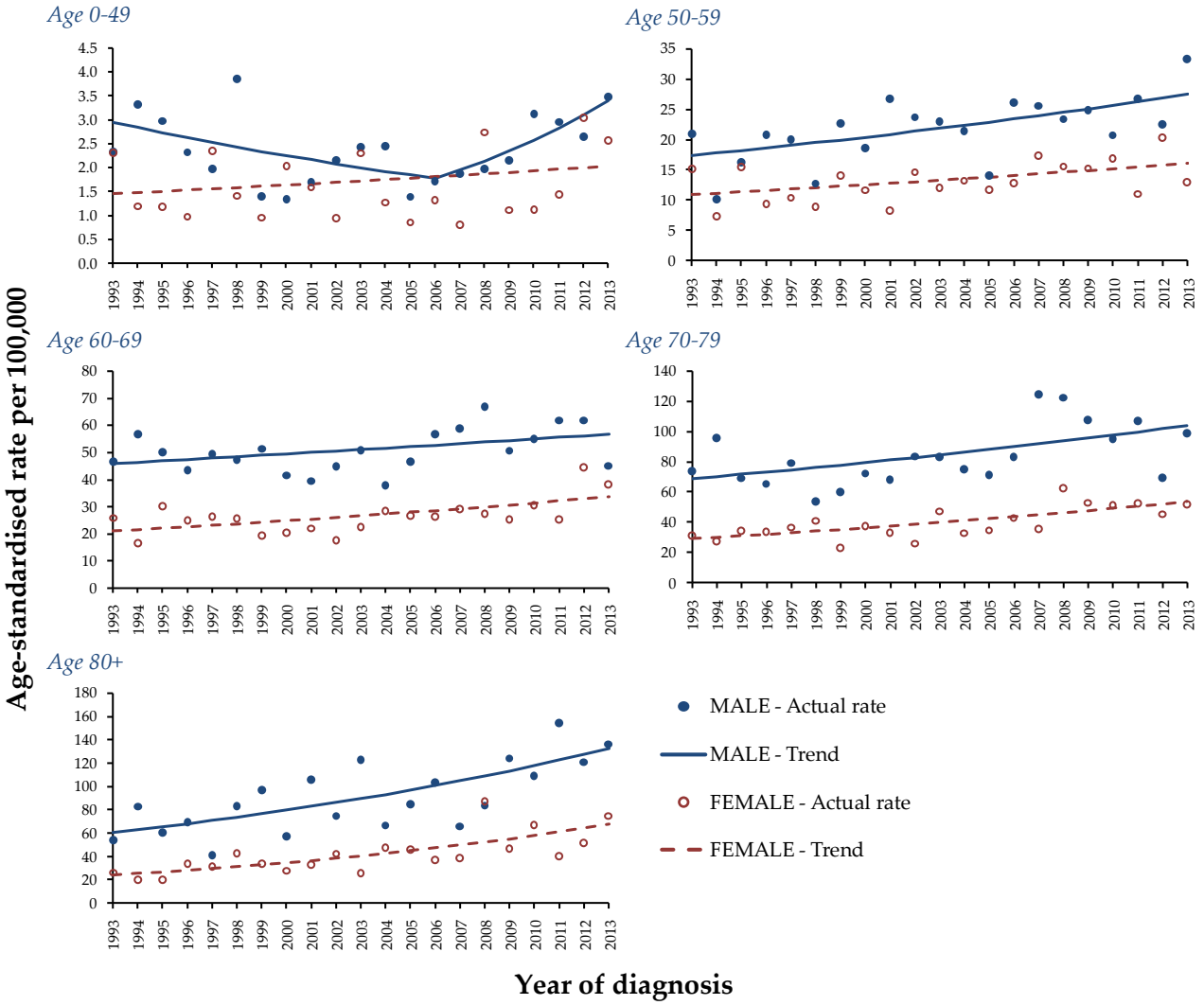


Table 9.5: Annual percentage change in age-standardised kidney cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2006 2006-2013	-3.8% (-7.8%, 0.3%) 9.7% (-0.5%, 20.9%)	p=0.066 p=0.061	1993-2013	1.7% (-1.3%, 4.8%)	p=0.249
50-59	**1993-2013**	**2.3% (0.8%, 3.9%)**	**p=0.004**	**1993-2013**	**1.9% (0.2%, 3.7%)**	**p=0.028**
60-69	**1993-2013**	**1.1% (0.0%, 2.2%)**	**p=0.048**	**1993-2013**	**2.4% (0.9%, 3.8%)**	**p=0.003**
70-79	**1993-2013**	**2.1% (0.6%, 3.6%)**	**p=0.009**	**1993-2013**	**3.0% (1.6%, 4.4%)**	**p<0.001**
80+	**1993-2013**	**4.0% (2.2%, 5.8%)**	**p<0.001**	**1993-2013**	**5.2% (3.0%, 7.5%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Increases in kidney cancer were apparent for residents (male and female) of all five HSC Trusts except for males living in the Southern Trust. The increases were statistically significant except for females in the South-Eastern and Western Trusts where increases were just outside of being statistically significant. (Tab. 9.6, Fig. 9.6)

Figure 9.6: Trends in age-standardised kidney cancer incidence rates by sex and Trust of residence: 1993-2013

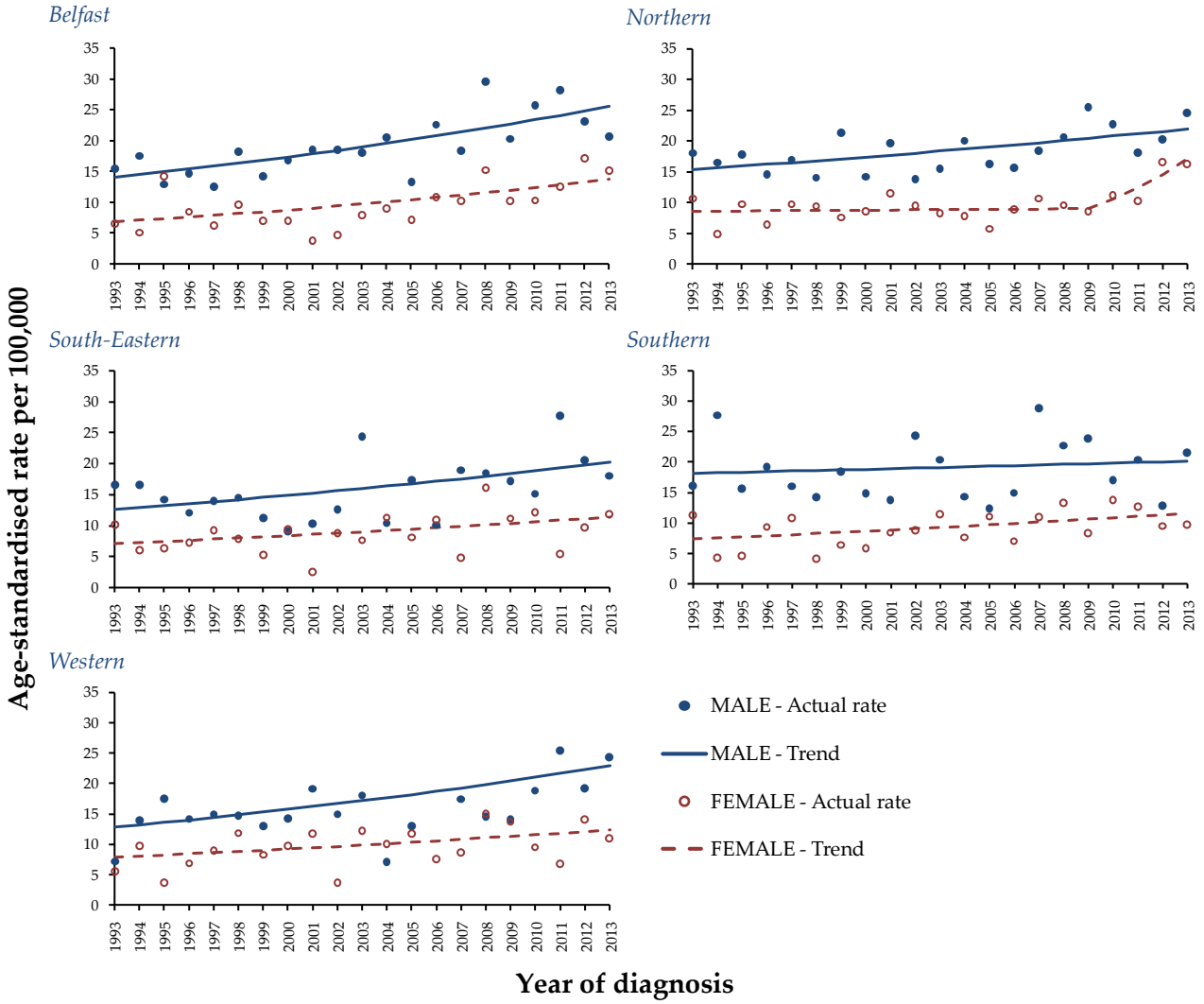


Table 9.6: Annual percentage change in age-standardised kidney cancer incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**3.0% (1.7%, 4.4%)**	**p=0.000**	**1993-2013**	**3.5% (1.2%, 5.9%)**	**p=0.005**
Northern	**1993-2013**	**1.8% (0.6%, 3.0%)**	**p=0.004**	1993-2009	0.3% (-2.2%, 2.8%)	p=0.805
				2009-2013	**17.3% (0.9%, 36.3%)**	**p=0.039**
South-Eastern	**1993-2013**	**2.4% (0.4%, 4.5%)**	**p=0.022**	1993-2013	2.3% (-0.2%, 4.9%)	p=0.065
Southern	1993-2013	0.5% (-1.4%, 2.5%)	p=0.589	**1993-2013**	**2.3% (0.1%, 4.5%)**	**p=0.040**
Western	**1993-2013**	**3.0% (0.5%, 5.5%)**	**p=0.020**	1993-2013	2.3% (0.0%, 4.6%)	p=0.054

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Kidney cancer age-standardised incidence rates increased for both males and females during 2001-2013 in each deprivation quintile. However among the increases only the rate increases observed in the least deprived areas and in the most deprived areas for both sexes were statistically significant. (Tab. 9.7, Fig. 9.7)

Figure 9.7: Trends in age-standardised kidney cancer incidence rates by sex and deprivation: 2001-2013

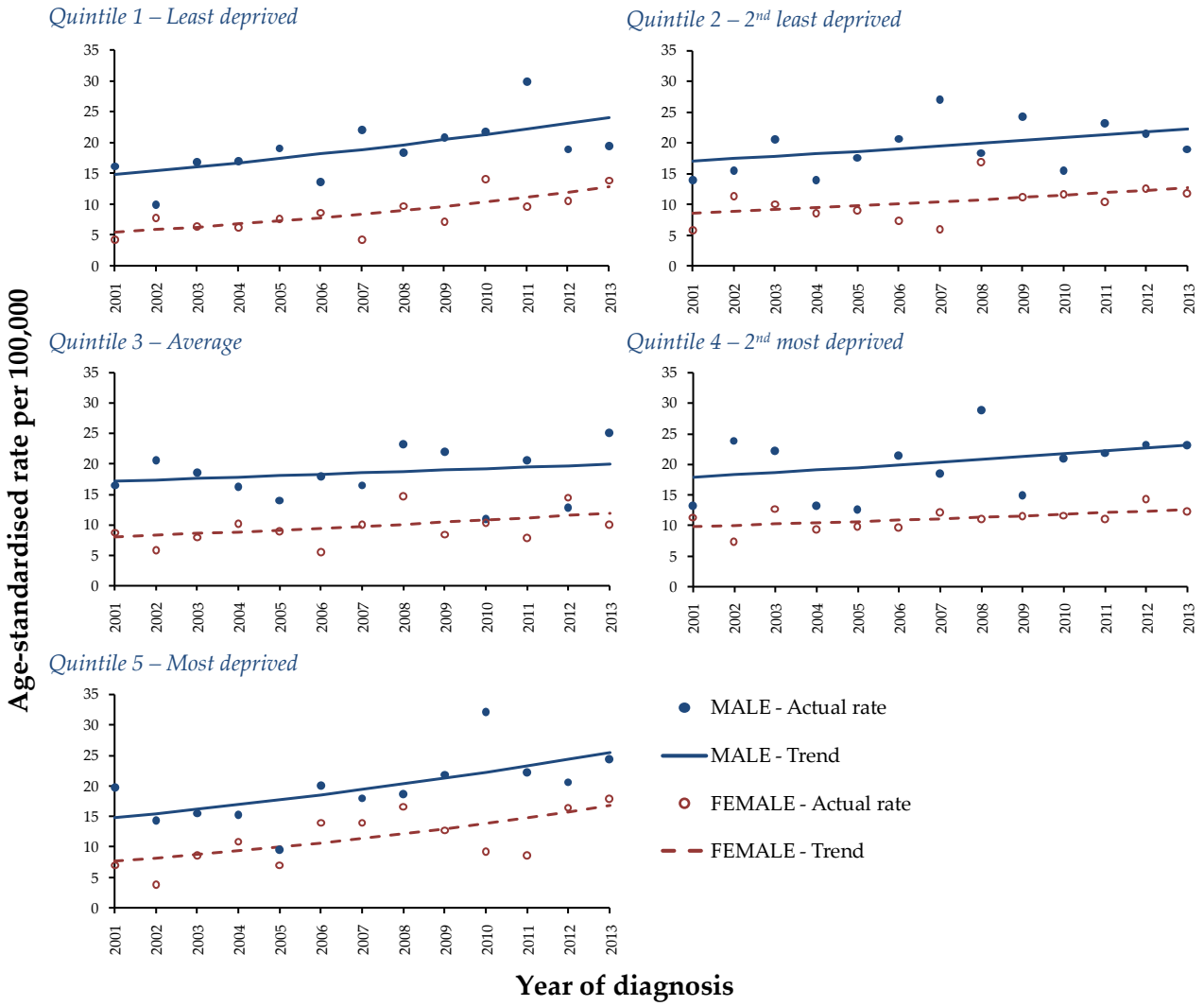


Table 9.7: Annual percentage change in age-standardised kidney cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2013**	**4.1% (0.6%, 7.8%)**	**p=0.026**	**2001-2013**	**7.3% (3.0%, 11.8%)**	**p=0.003**
Quintile 2 2nd least deprived	2001-2013	2.3% (-1.1%, 5.8%)	p=0.170	2001-2013	3.3% (-1.1%, 8.0%)	p=0.131
Quintile 3 Average	2001-2013	1.3% (-2.6%, 5.2%)	p=0.490	2001-2013	3.4% (-1.0%, 8.0%)	p=0.117
Quintile 4 2nd most deprived	2001-2013	2.1% (-1.8%, 6.2%)	p=0.266	2001-2013	2.1% (-0.1%, 4.4%)	p=0.058
Quintile 5 Most deprived	**2001-2013**	**4.6% (0.8%, 8.5%)**	**p=0.022**	**2001-2013**	**6.7% (1.5%, 12.1%)**	**p=0.016**

CI – Confidence interval; Significant trends are in bold

9.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

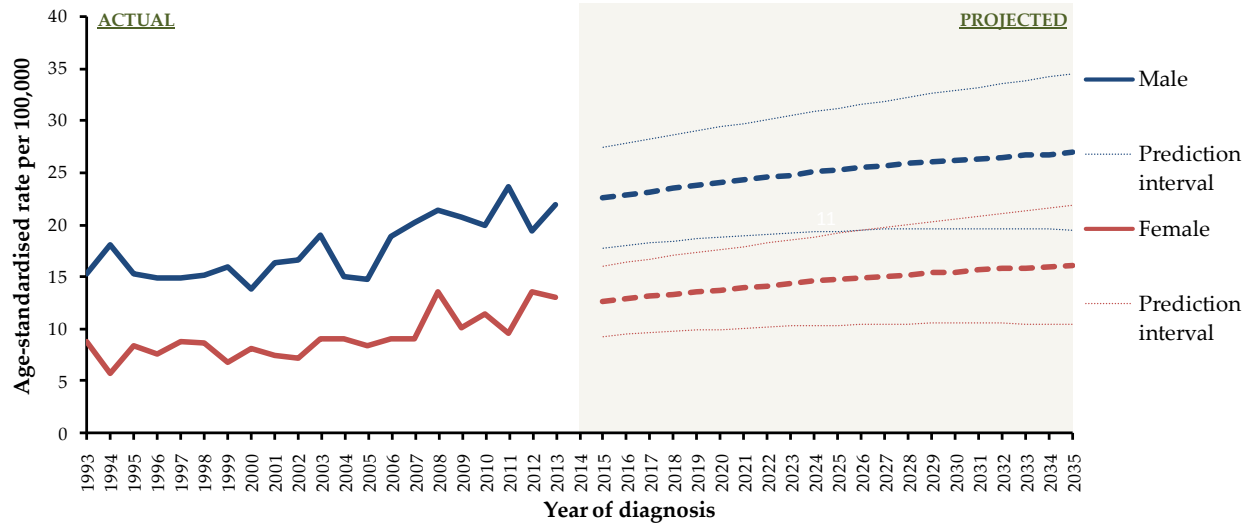
Age-standardised incidence rates of kidney cancer are forecast to continue to rise with expected increases between 2009-2013 and 2020 of 14% among men and 19% among women. By 2035 a 27% increase among men and a 39% increase among women is projected. (Tab. 9.8, Fig. 9.8)

Table 9.8: Kidney cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	21.2				11.6			
2015	22.6	(17.8, 27.4)	7%	(-16%, 29%)	12.7	(9.3, 16.0)	9%	(-20%, 38%)
2020	24.1	(18.8, 29.4)	14%	(-11%, 39%)	13.8	(10.0, 17.6)	19%	(-14%, 52%)
2025	25.3	(19.4, 31.1)	19%	(-8%, 47%)	14.8	(10.4, 19.1)	28%	(-10%, 65%)
2030	26.2	(19.6, 32.8)	24%	(-8%, 55%)	15.5	(10.6, 20.5)	34%	(-9%, 77%)
2035	27.0	(19.5, 34.4)	27%	(-8%, 62%)	16.1	(10.5, 21.8)	39%	(-9%, 88%)

ASIR: Age-standardised incidence rate

Figure 9.8: Kidney cancer age-standardised incidence rate projections to 2035 by sex



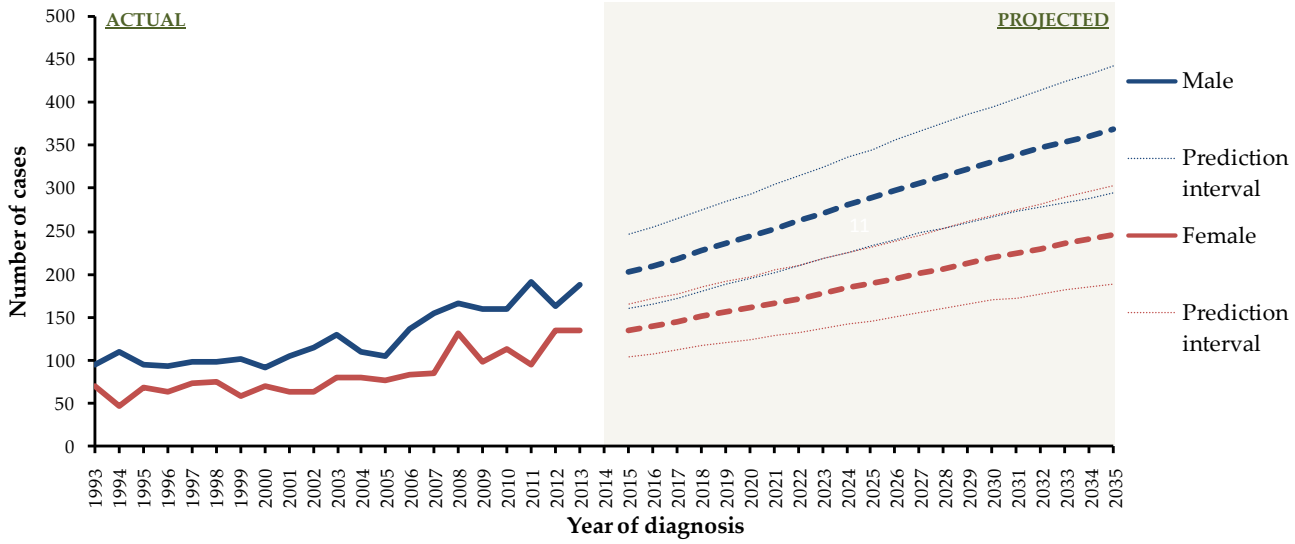
Case projections

The combined effect of the projected increases in incidence rates and expected growth in the elderly population over the next twenty-two years is projected to lead to a considerable increase in the number of kidney cancers diagnosed each year. By 2020 the number of cases is projected to reach 244 male and 161 female cases, which is a 41% increase among men and a 40% increase among women compared to the 2009-2013 average. By 2035 the number of cases is expected to increase further to 368 male and 246 female cases, which is a 113% increase among males and a 114% increase among females compared to 2009-2013 levels. (Tab. 9.9, Fig. 9.9)

Table 9.9: Kidney cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	173				115			
2015	203	(160, 246)	17%	(-8%, 42%)	135	(104, 166)	17%	(-10%, 44%)
2020	244	(195, 293)	41%	(13%, 69%)	161	(124, 198)	40%	(8%, 72%)
2025	288	(232, 344)	66%	(34%, 99%)	189	(146, 232)	64%	(27%, 102%)
2030	330	(266, 394)	91%	(54%, 128%)	219	(170, 268)	90%	(48%, 133%)
2035	368	(294, 442)	113%	(70%, 155%)	246	(189, 303)	114%	(64%, 163%)

Figure 9.9: Kidney cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE KIDNEY CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter kidney cancer incidence projections through control of the following risk factors:
  - Tobacco smoking;
  - Obesity.
- Other risk factors which may have a lesser impact on future projections include:
  - Family history;
  - High blood pressure;
  - Kidney dialysis;
  - Exposure to ionising radiation and cadmium.
- Other potential factors that can influence kidney cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which kidney cancer is classified;
  - Revisions to population projections.

10 LEUKAEMIA (C91-C95)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
116 PER YEAR	80 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
69 YEARS	70 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
AFFLUENT AREAS (FEMALES ONLY)	DEPRIVED AREAS (FEMALES ONLY)
NO HSC TRUSTS (MALES & FEMALES)	BELFAST HSCT (MALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+1.3% PER YEAR (1993-2013)	+1.1% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
NO CHANGE (1993-2013)	NO CHANGE (1993-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
-4%	-1%	-10%	-5%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+18% TO 137 CASES PER YEAR	+14% TO 91 CASES PER YEAR	+47% TO 170 CASES PER YEAR	+45% TO 116 CASES PER YEAR

10.1: BACKGROUND

An average of 196 cases (116 male, 80 female) of leukaemia were diagnosed each year during 2009-2013. It was the 11th most common male and 12th most common female cancer making up 2.6% and 1.8% of cancers (ex. NMSC) respectively. There were 13.1 cases diagnosed per 100,000 males and 8.7 cases diagnosed per 100,000 females. The risk of developing leukaemia before the age of 65 was 1 in 253 for men and 1 in 375 for women, while before age 85 it was 1 in 86 for men and 1 in 140 for women. There are many different types of leukaemia with the four most common in 2009-2013 being acute myeloid (32.8%), chronic lymphocytic (29.9%), acute lymphoblastic (11.1%) and chronic myeloid (9.0%).

Cancer and age

Leukaemia was more common among older people with a median age at diagnosis of 69 years for men and 70 years for women during 2009-2013. Overall 67.9% (67.2% male, 68.8% female) of cases were among those aged 60 and over, with 21.4% (17.2% male, 27.5% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 84 cases per 100,000 males and 50 cases per 100,000 females in this age group. Leukaemia was occasionally diagnosed among children and young people with 16 cases per year among those aged 0 to 14 and 5 cases per year among those aged 15 to 24. (Tab. 10.1, Fig 10.1)

Figure 10.1: Incidence of leukaemia by sex and age: 2009-2013

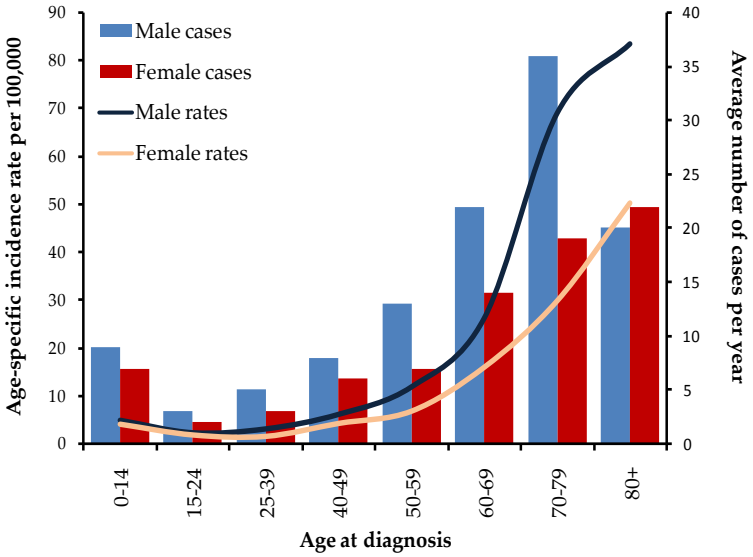


Table 10.1: Average number of leukaemias diagnosed per year by sex and age: 2009-2013

Age	Cases per year		
	Male	Female	Total
0-14	9	7	16
15-24	3	2	5
25-39	5	3	8
40-49	8	6	14
50-59	13	7	20
60-69	22	14	36
70-79	36	19	55
80+	20	22	42
Total	116	80	196

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of leukaemia were lower than the Northern Ireland average among males living in the Northern HSC Trust. There was no other significant variation by HSC Trust despite slightly elevated rates in the South-Eastern Trust for males and in the South-Eastern and Western Trusts for females. (Tab. 10.2, Fig. 10.2)

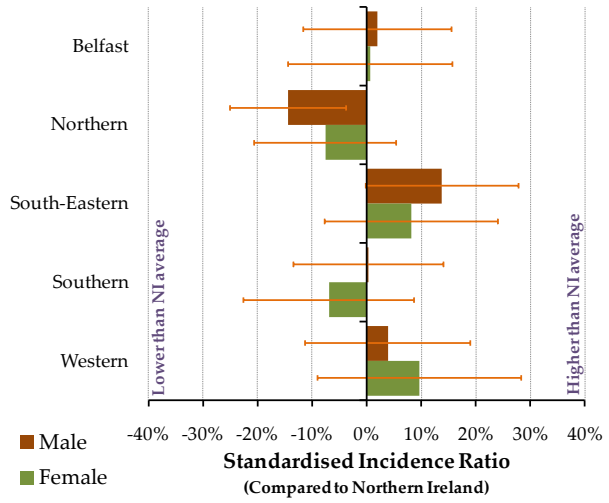
Incidence of leukaemia was related to area-based deprivation during 2004-2013 with age-standardised incidence rates in the most deprived areas of Northern Ireland 15.5% lower for men and 19.2% lower for women than in the least deprived areas. (Tab. 10.2, Fig. 10.2)

Table 10.2: Average number of leukaemias diagnosed per year by sex and area of residence: 2004-2013

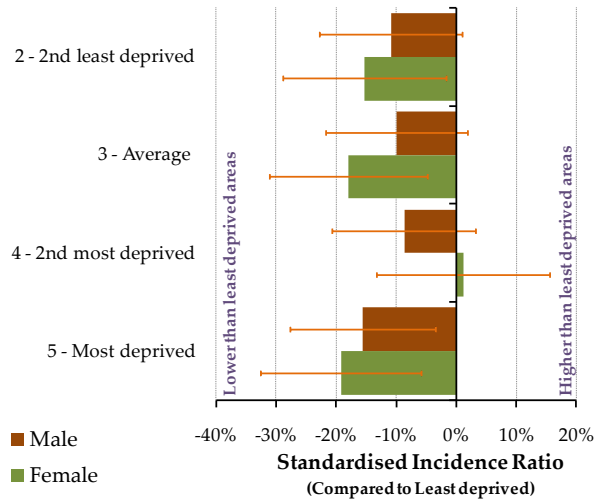
Area of Residence		Cases per year		
		Male	Female	Total
Health & Social Care Trust	Belfast	22	17	39
	Northern	25	19	44
	South-Eastern	25	18	43
	Southern	21	14	35
	Western	18	13	31
Area Based Deprivation Quintile	1 - Least deprived	25	18	43
	2 - 2nd least deprived	22	15	37
	3 - Average	22	15	37
	4 - 2nd most deprived	22	19	41
	5 - Most deprived	19	14	33

Figure 10.2: Age-standardised incidence rates of leukaemia by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

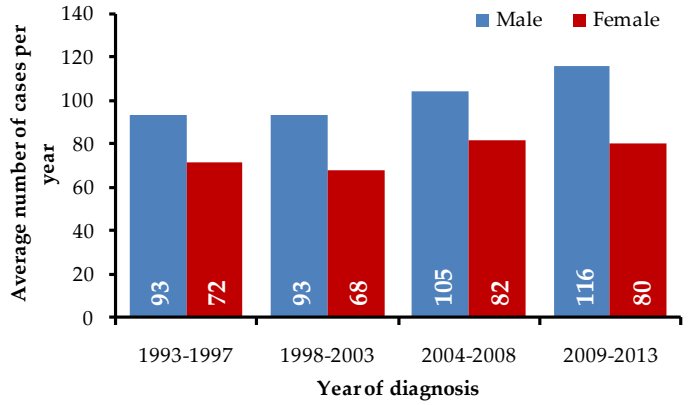


10.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 196 cases of leukaemia (116 male, 80 female) diagnosed each year compared to an average of 165 cases (93 male, 72 female) in 1993-1997. (Tab. 10.3, Fig. 10.3)

Figure 10.3: Average number of cases of leukaemia diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases of leukaemia increased by 1.3% per year for men and by 1.1% per year for women between 1993 and 2013. (Tab. 10.3, Fig. 10.3)

Table 10.3: Number of cases of leukaemia diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	93	65	158
1994	102	53	155
1995	91	75	166
1996	77	75	152
1997	104	90	194
1998	104	67	171
1999	95	61	156
2000	102	73	175
2001	84	62	146
2002	105	77	182
2003	70	67	137
2004	104	74	178
2005	98	90	188
2006	96	88	184
2007	102	69	171
2008	123	89	212
2009	106	84	190
2010	131	83	214
2011	131	98	229
2012	103	70	173
2013	109	67	176

Trends in incidence rates

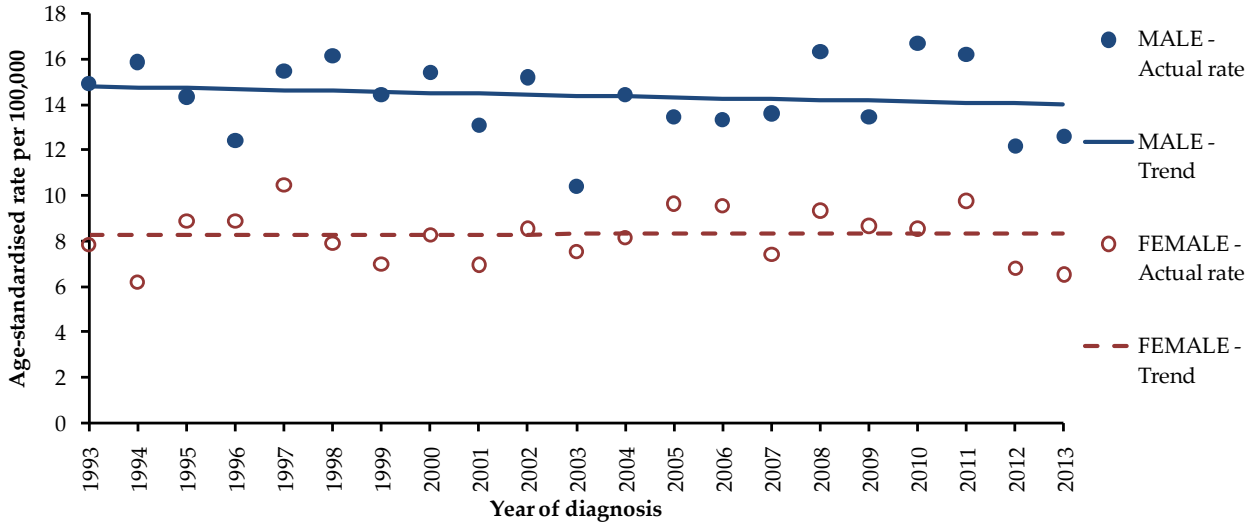
Most of this increase was due to the ageing and growth of the population. Adjusting for these factors using age-standarised rates illustrates that there was no significant change in incidence rates for either sex during 1993-2013. (Tab. 10.4, Fig. 10.4)

Table 10.4: Annual percentage change in age-standardised leukaemia incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-2013	-0.3% (-1.1%, 0.6%)	p=0.509
Female	1993-2013	0.0% (-1.1%, 1.1%)	p=0.965

CI – Confidence interval; Significant trends are in bold

Figure 10.4: Trends in age-standardised leukaemia incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

While overall leukaemia incidence rates were fairly constant over time, there was evidence of a trend for particular age groups. While these trends were mostly non-significant there was a significant decrease in incidence rates among men aged 0-49 between 1993 and 2009 and among the 70-79 age group between 1993 and 2005. (Tab. 10.5, Fig. 10.5)

Figure 10.5: Trends in age-standardised leukaemia incidence rates by sex and age at diagnosis: 1993-2013

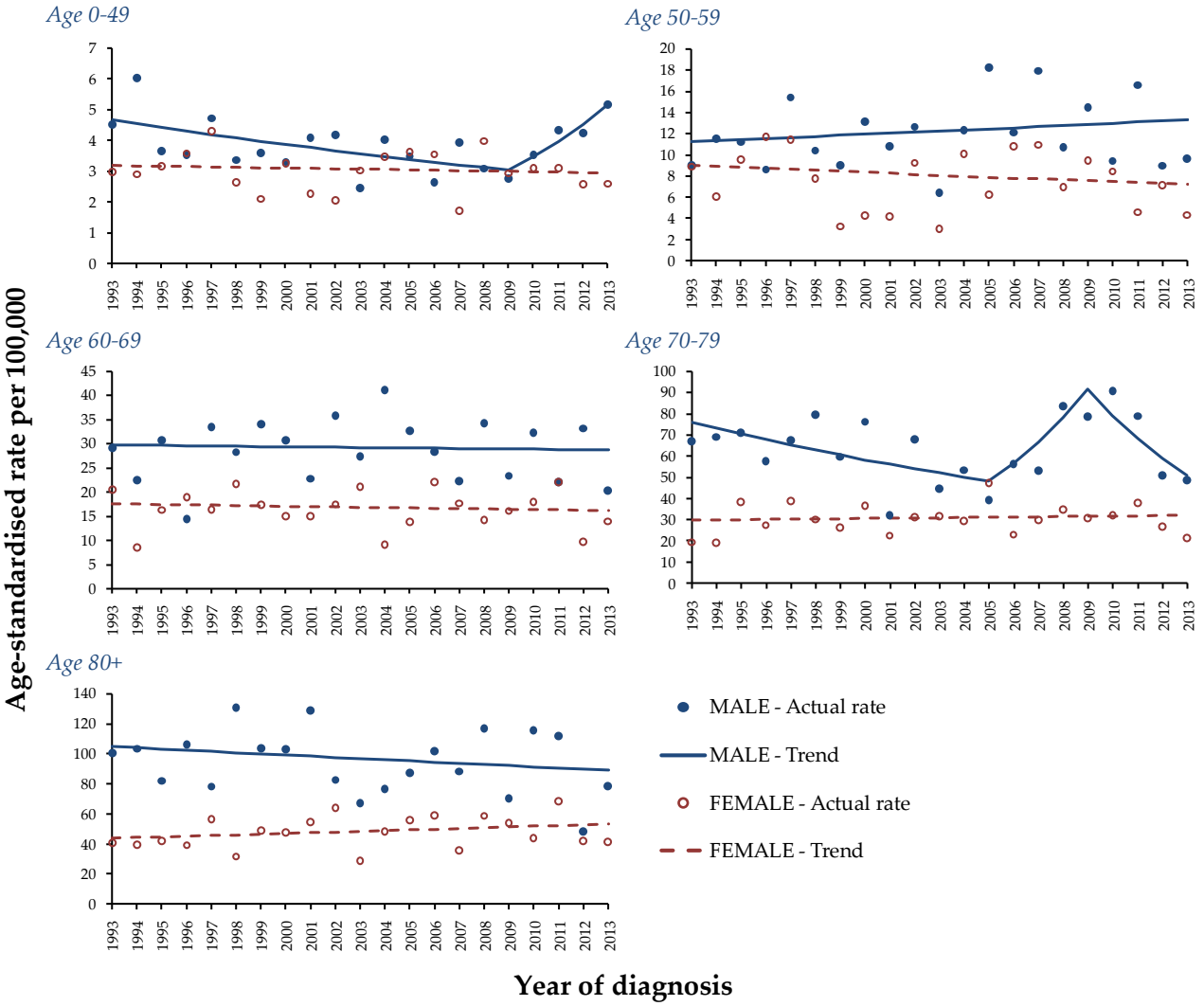


Table 10.5: Annual percentage change in age-standardised leukaemia incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2009**	**-2.7% (-4.6%, -0.7%)**	**p=0.012**	1993-2013	-0.4% (-2.0%, 1.3%)	p=0.623
	2009-2013	14.2% (-2.4%, 33.7%)	p=0.091			
50-59	1993-2013	0.9% (-1.3%, 3.0%)	p=0.412	1993-2013	-1.1% (-3.8%, 1.7%)	p=0.416
60-69	1993-2013	-0.2% (-1.9%, 1.6%)	p=0.854	1993-2013	-0.4% (-2.3%, 1.5%)	p=0.670
70-79	**1993-2005**	**-3.7% (-7.1%, -0.1%)**	**p=0.045**	1993-2013	0.4% (-1.5%, 2.3%)	p=0.694
	2005-2009	17.3% (-10.8%, 54.1%)	p=0.230			
	2009-2013	-13.5% (-26.8%, 2.2%)	p=0.082			
80+	1993-2013	-0.8% (-2.5%, 0.9%)	p=0.336	1993-2013	1.0% (-0.7%, 2.7%)	p=0.248

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

There was little change in incidence rates of leukaemia for women living in each of the five HSC Trusts during 1993-2013. This was also the situation for men resident in all HSC Trusts except the Western Trust where male leukaemia incidence rates declined by an average of 1.3% per year (p=0.038) during 1993-2013. (Tab. 10.6, Fig. 10.6)

Figure 10.6: Trends in age-standardised leukaemia incidence rates by sex and Trust of residence: 1993-2013

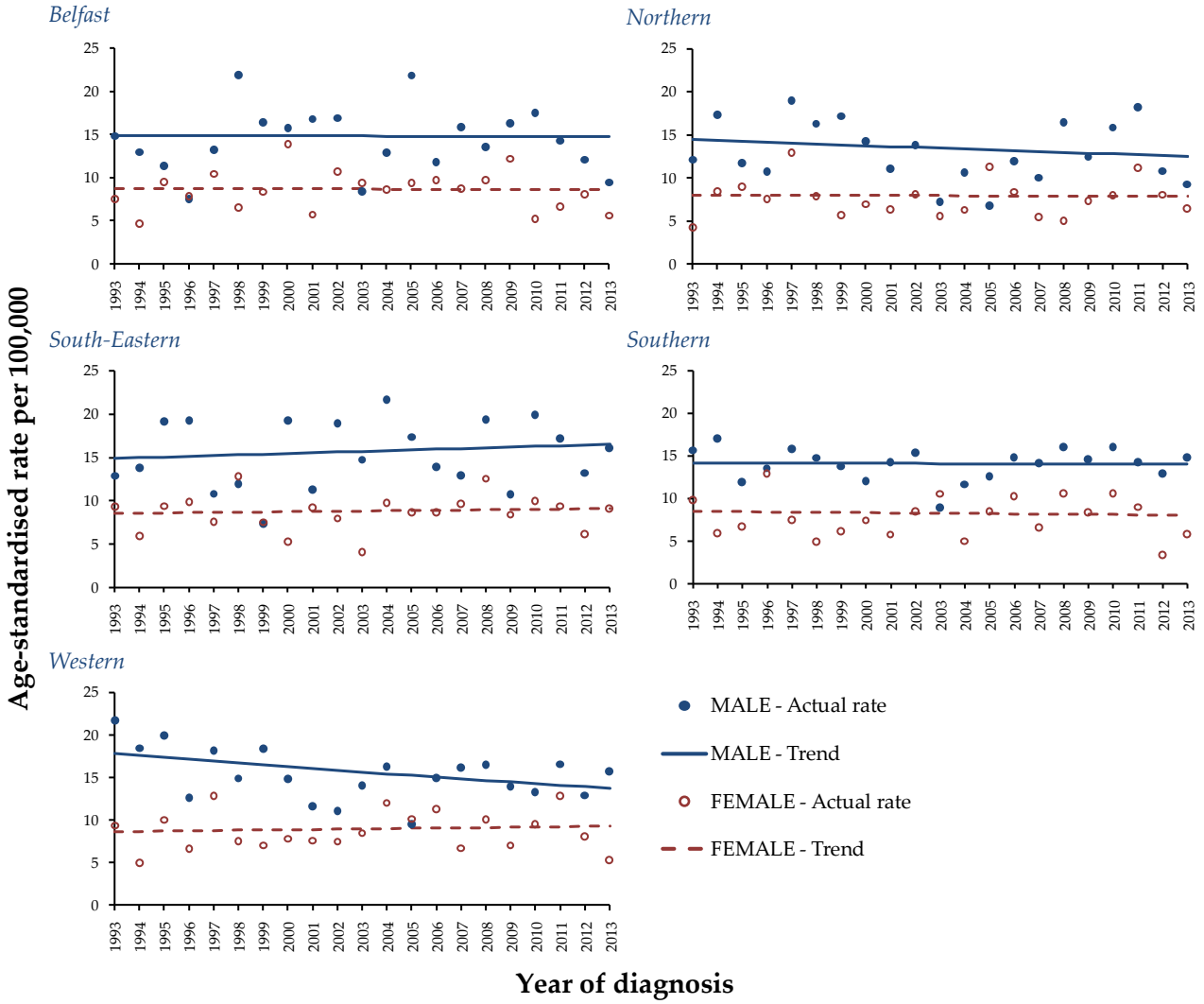


Table 10.6: Annual percentage change in age-standardised leukaemia incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	-0.1% (-2.1%, 2.0%)	p=0.949	1993-2013	-0.1% (-2.3%, 2.2%)	p=0.946
Northern	1993-2013	-0.7% (-2.7%, 1.3%)	p=0.469	1993-2013	-0.1% (-2.2%, 2.1%)	p=0.941
South-Eastern	1993-2013	0.5% (-1.4%, 2.5%)	p=0.560	1993-2013	0.3% (-1.5%, 2.2%)	p=0.743
Southern	1993-2013	0.0% (-1.1%, 1.0%)	p=0.948	1993-2013	-0.2% (-2.6%, 2.1%)	p=0.834
Western	**1993-2013**	**-1.3% (-2.5%, -0.1%)**	**p=0.038**	1993-2013	0.4% (-1.7%, 2.5%)	p=0.708

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Throughout 2001-2013 incidence rates of leukaemia among men increased in each deprivation quintile, although none of these increases was statistically significant. Among women there was a significant increase in the 2nd least deprived quintile of 7.1% per year (p=0.032) between 2001 and 2009 although this was offset by a non-significant decrease from 2009 onwards. Other changes over time among women were not statistically significant. (Tab. 10.7, Fig. 10.7)

Figure 10.7: Trends in age-standardised leukaemia incidence rates by sex and deprivation: 2001-2013

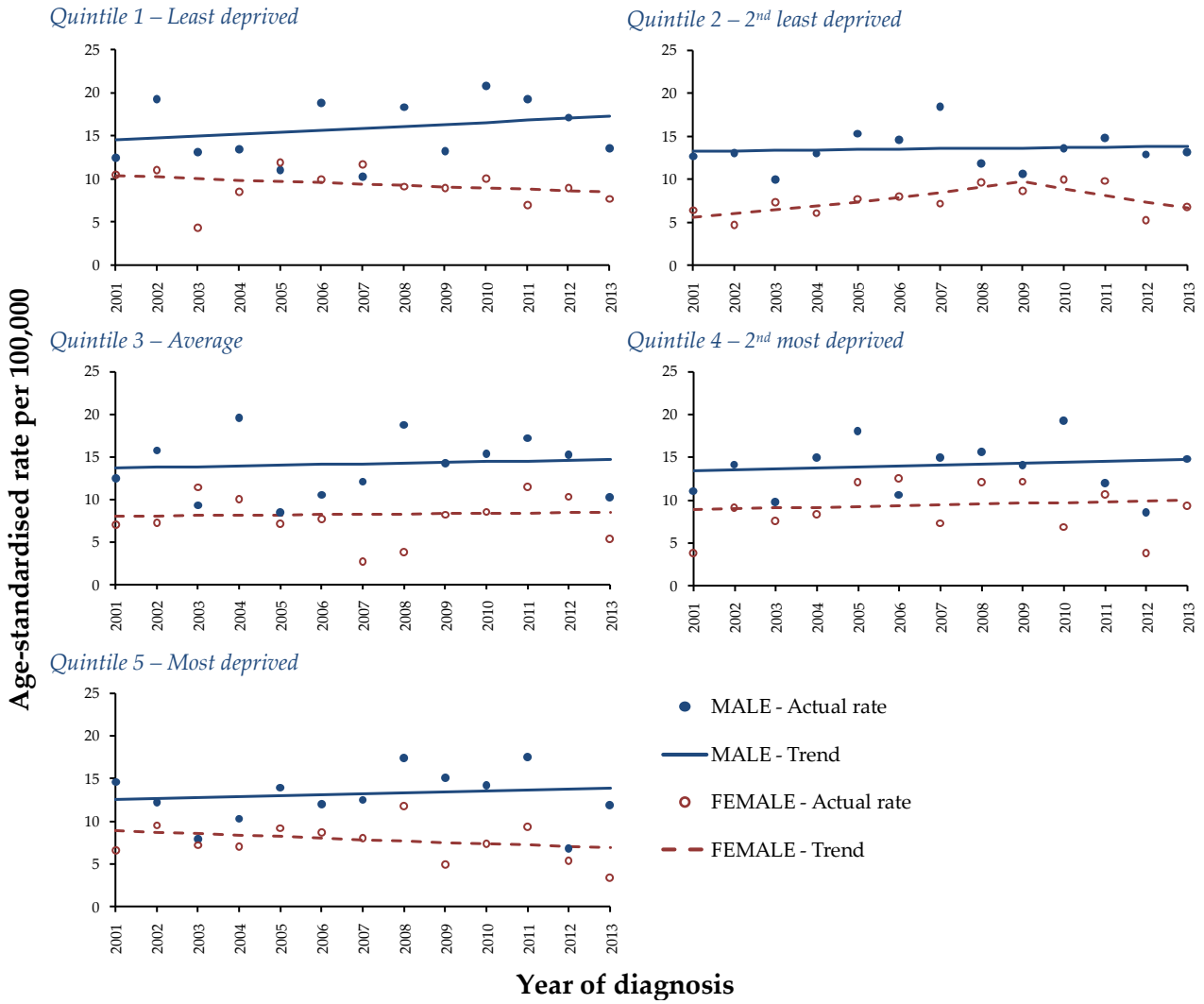


Table 10.7: Annual percentage change in age-standardised leukaemia incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	1.5% (-2.3%, 5.3%)	p=0.414	2001-2013	-1.6% (-5.1%, 2.0%)	p=0.346
Quintile 2 2nd least deprived	2001-2013	0.3% (-2.4%, 3.1%)	p=0.800	**2001-2009**	**7.1% (0.8%, 13.9%)**	**p=0.032**
				2009-2013	-8.9% (-22.5%, 7.1%)	p=0.219
Quintile 3 Average	2001-2013	0.6% (-3.8%, 5.1%)	p=0.785	2001-2013	0.5% (-4.9%, 6.2%)	p=0.852
Quintile 4 2nd most deprived	2001-2013	0.8% (-3.2%, 4.9%)	p=0.688	2001-2013	1.0% (-5.0%, 7.3%)	p=0.728
Quintile 5 Most deprived	2001-2013	0.8% (-3.4%, 5.2%)	p=0.685	2001-2013	-2.0% (-6.9%, 3.1%)	p=0.397

CI – Confidence interval; Significant trends are in bold

10.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

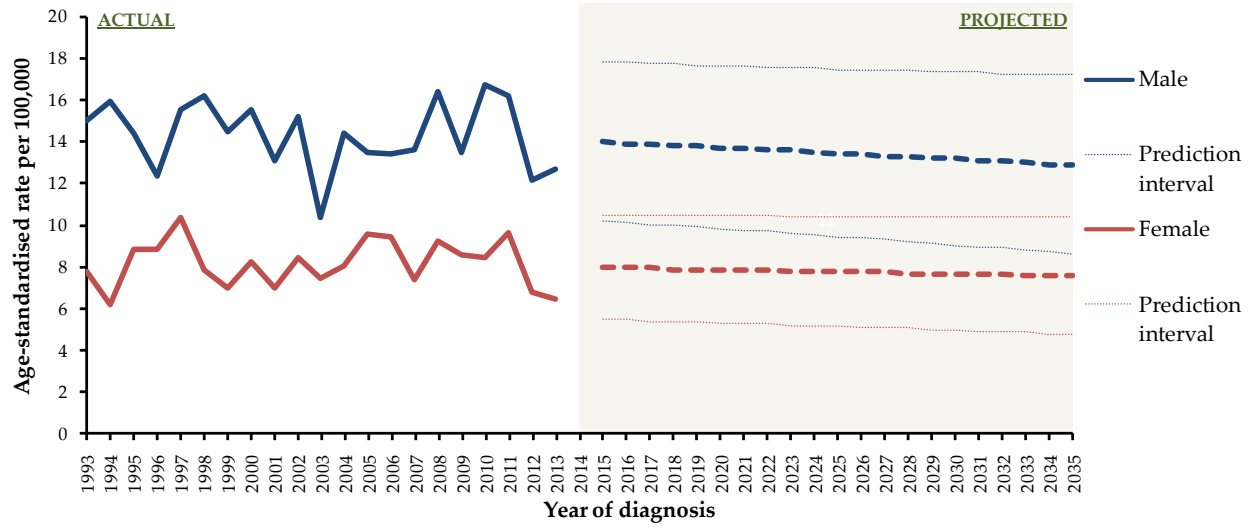
Compared to the baseline in 2009-2013 age-standardised incidence rates of leukaemia are projected to decrease slightly by 2020, with a 4% decrease among men and a 1% decrease among women. By 2035 there is expected to be a 10% decrease among men and a 5% decrease among women. (Tab. 10.8, Fig. 10.8)

Table 10.8: Leukaemia age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	14.3				8.0			
2015	14.0	(10.2, 17.8)	-2%	(-29%, 24%)	8.0	(5.5, 10.5)	0%	(-31%, 31%)
2020	13.7	(9.8, 17.6)	-4%	(-31%, 23%)	7.9	(5.3, 10.5)	-1%	(-34%, 31%)
2025	13.4	(9.4, 17.4)	-6%	(-34%, 22%)	7.8	(5.2, 10.4)	-3%	(-35%, 30%)
2030	13.2	(9.0, 17.3)	-8%	(-37%, 21%)	7.7	(5.0, 10.4)	-4%	(-38%, 30%)
2035	12.9	(8.6, 17.2)	-10%	(-40%, 20%)	7.6	(4.8, 10.4)	-5%	(-40%, 30%)

ASIR: Age-standardised incidence rate

Figure 10.8: Leukaemia age-standardised incidence rate projections to 2035 by sex



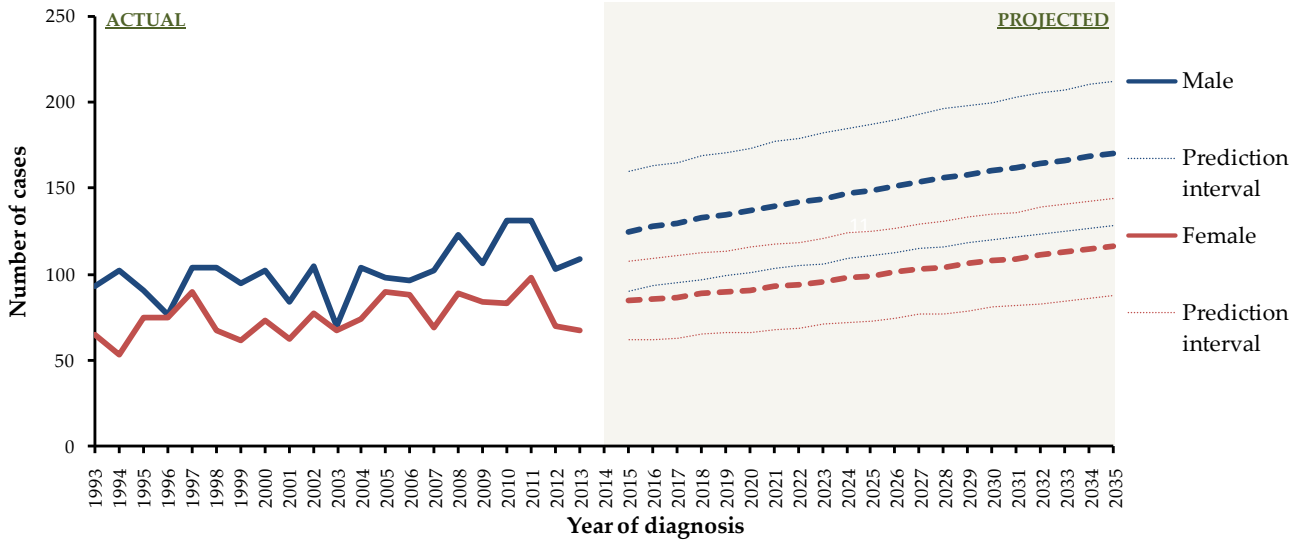
Case projections

Demographic changes over the next twenty-two years means that despite the slight reduction in incidence rates the number of leukaemia cases diagnosed is expected to increase. By 2020 there is projected to be an 18% increase from 116 to 137 cases per year, while among women there is expected to be a 14% increase from 80 to 91 cases per year. By 2035 the increase is projected to be 47% to 170 cases per year among men and 45% to 116 cases per year among women. (Tab. 10.9, Fig. 10.9)

Table 10.9: Leukaemia incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	116				80			
2015	125	(90, 160)	8%	(-22%, 38%)	85	(62, 108)	6%	(-23%, 35%)
2020	137	(101, 173)	18%	(-13%, 49%)	91	(66, 116)	14%	(-18%, 45%)
2025	149	(111, 187)	28%	(-4%, 61%)	99	(73, 125)	24%	(-9%, 56%)
2030	160	(120, 200)	38%	(3%, 72%)	108	(81, 135)	35%	(1%, 69%)
2035	170	(128, 212)	47%	(10%, 83%)	116	(88, 144)	45%	(10%, 80%)

Figure 10.9: Leukaemia incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE LEUKAEMIA INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter leukaemia incidence projections through reducing exposure to ionising radiation, which is a risk factor for all types of leukaemia, and through control of tobacco smoking which is a risk factor for myeloid leukaemia.
- Other risk factors which may have a lesser impact on future projections include:
    - Family history;
    - Anti-neoplastic drugs given as part of treatment of other types of cancer;
    - Exposure to formaldehyde, benzene or styrene.
- Other potential factors that can influence leukaemia incidence projections include:
    - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
    - Changes to the way in which leukaemias are classified and/or the rules regarding their registration as cancer;
    - Revisions to population projections.

11 LIVER CANCER (C22)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
72 PER YEAR	31 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
72 YEARS	74 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
BELFAST HSCT (MALES ONLY)	SOUTHERN HSCT (MALES ONLY)
WESTERN HSCT (FEMALES ONLY)	

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+9.0% PER YEAR (1999-2013)	+5.7% PER YEAR (2003-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
+7.0% PER YEAR (1999-2013)	NO CHANGE (2003-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+21%	+20%	+43%	+43%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+53% TO 110 CASES PER YEAR	+39% TO 43 CASES PER YEAR	+149% TO 179 CASES PER YEAR	+116% TO 67 CASES PER YEAR

11.1: BACKGROUND

An average of 103 cases (72 male, 31 female) of liver cancer were diagnosed each year during 2009-2013 in Northern Ireland. It was the 14th most common male cancer diagnosed in this period making up 1.6% of all cancers (ex. NMSC), while it was the 20th most common female cancer making up 0.7% of cancers (ex. NMSC) diagnosed. As a proportion of the resident population in Northern Ireland there were 8.1 cases diagnosed per 100,000 males and 3.4 cases diagnosed per 100,000 females. The risk of developing liver cancer before the age of 65 was 1 in 511 for men and 1 in 1,255 for women, while before age 85 it was 1 in 131 for men and 1 in 345 for women.

Cancer and age

Primary liver cancer was more common among older people with a median age at diagnosis of 72 years for men and 74 years for women during 2009-2013. Overall 82.5% (83.3% male, 80.6% female) of cases occurred among those aged 60 and over, with 25.2% (20.8% male, 35.5% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 61 cases per 100,000 males and 24 cases per 100,000 females in this age group. Liver cancer was rare among those aged under 40 with only 3 cases diagnosed each year, although 2 of these cases were among children aged 0 to 14. (Tab. 11.1, Fig 11.1)

Figure 11.1: Incidence of liver cancer by sex and age: 2009-2013

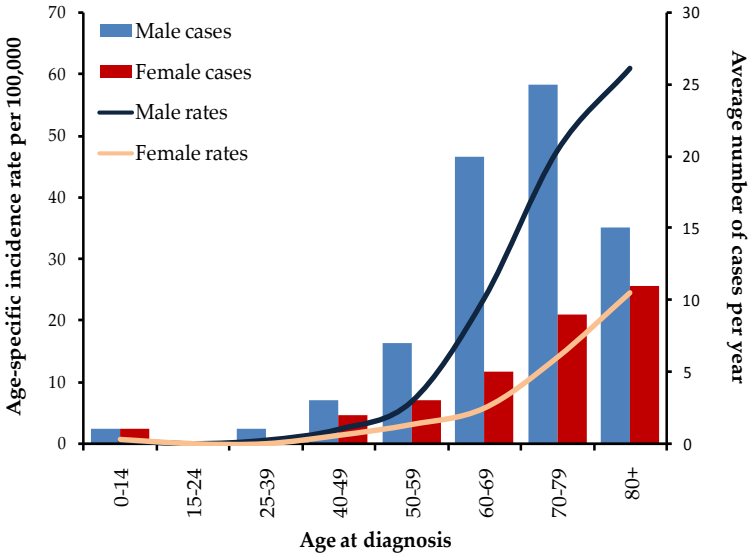


Table 11.1: Average number of liver cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	1	1	2
15-24	0	0	0
25-39	1	0	1
40-49	3	2	5
50-59	7	3	10
60-69	20	5	25
70-79	25	9	34
80+	15	11	26
Total	72	31	103

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of liver cancer were 49.9% higher than the Northern Ireland average in the Belfast Trust and 27.3% lower than average in the Southern Trust for males. Among females rates were 50.9% higher than average in the Western Trust. (Tab. 11.2, Fig. 11.2)

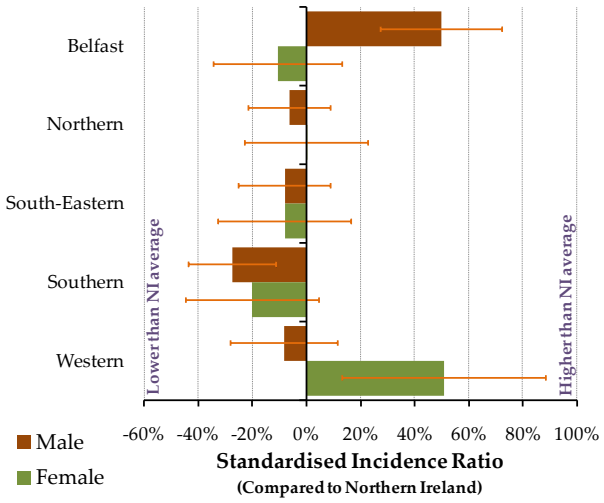
Incidence of liver cancer varied by the socio-economic characteristics of area of residence with age-standardised incidence rates higher in the most deprived areas compared to the least deprived areas by 54.3% for males and by 58.8% for females. (Tab. 11.2, Fig. 11.2)

Table 11.2: Average number of liver cancers diagnosed per year by sex and area of residence: 2004-2013

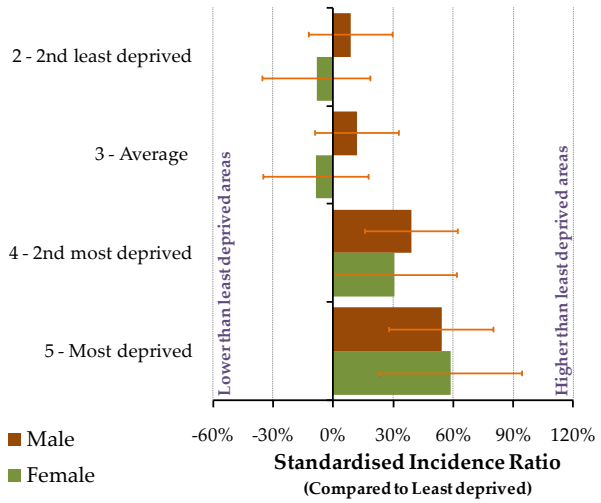
AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	17	5	22
	Northern	15	7	22
	South-Eastern	11	5	16
	Southern	8	4	12
	Western	8	6	14
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	10	5	15
	2 - 2nd least deprived	10	4	14
	3 - Average	11	5	16
	4 - 2nd most deprived	14	7	21
	5 - Most deprived	13	8	21

Figure 11.2: Age-standardised incidence rates of liver cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

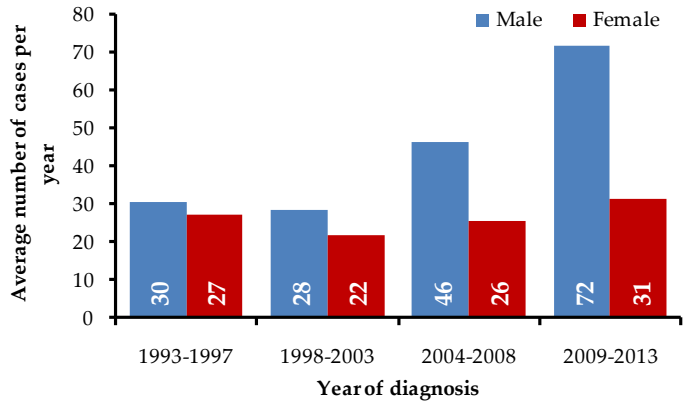


11.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 103 liver cancers (72 male, 31 female) diagnosed each year compared to an average of 57 liver cancers (30 male, 27 female) per year in 1993-1997. (Tab. 11.3, Fig. 11.3)

Figure 11.3: Average number of cases of liver cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases of liver cancer increased by 9.0% per year for men between 1999 and 2013, while among women there was an annual increase of 5.7% per year during 2003-2013. (Tab. 11.3, Fig. 11.3)

Table 11.3: Number of cases of liver cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	32	33	65
1994	25	29	54
1995	32	16	48
1996	32	30	62
1997	31	27	58
1998	26	20	46
1999	19	28	47
2000	33	30	63
2001	17	8	25
2002	41	25	66
2003	34	19	53
2004	30	18	48
2005	44	23	67
2006	53	32	85
2007	53	28	81
2008	51	27	78
2009	62	22	84
2010	59	34	93
2011	73	39	112
2012	87	21	108
2013	78	41	119

Trends in incidence rates

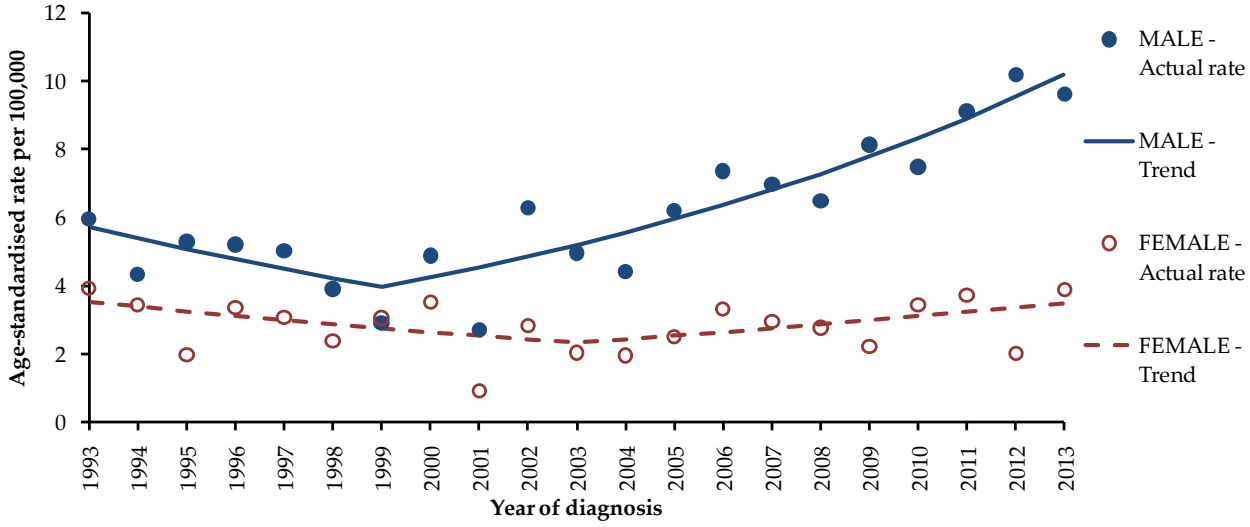
Liver cancer incidence rates increased by an average of 7.0% per year (p<0.001) between 1999 and 2013 among men, prior to which there was no significant change. Among women there was no significant change in liver cancer incidence rates during 1993-2013 although a change in trend direction occurred in 2003. (Tab. 11.4, Fig. 11.4)

Table 11.4: Annual percentage change in age-standardised liver cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-1999	-5.9% (-14.1%, 3.0%)	p=0.173
	1999-2013	**7.0% (4.9%, 9.0%)**	**p<0.001**
Female	1993-2003	-4.0% (-9.8%, 2.2%)	p=0.185
	2003-2013	4.0% (-1.9%, 10.3%)	p=0.174

CI – Confidence interval; Significant trends are in bold

Figure 11.4: Trends in age-standardised liver cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

The overall increase in male liver cancer incidence rates was apparent in all age groups, although the change was not statistically significant for those aged 50-59. For women incidence rates did not change significantly with the exception of a large annual increase of 10.1% per year (p=0.011) among those aged 0-49. (Tab. 11.5, Fig. 11.5)

Figure 11.5: Trends in age-standardised liver cancer incidence rates by sex and age at diagnosis: 1993-2013

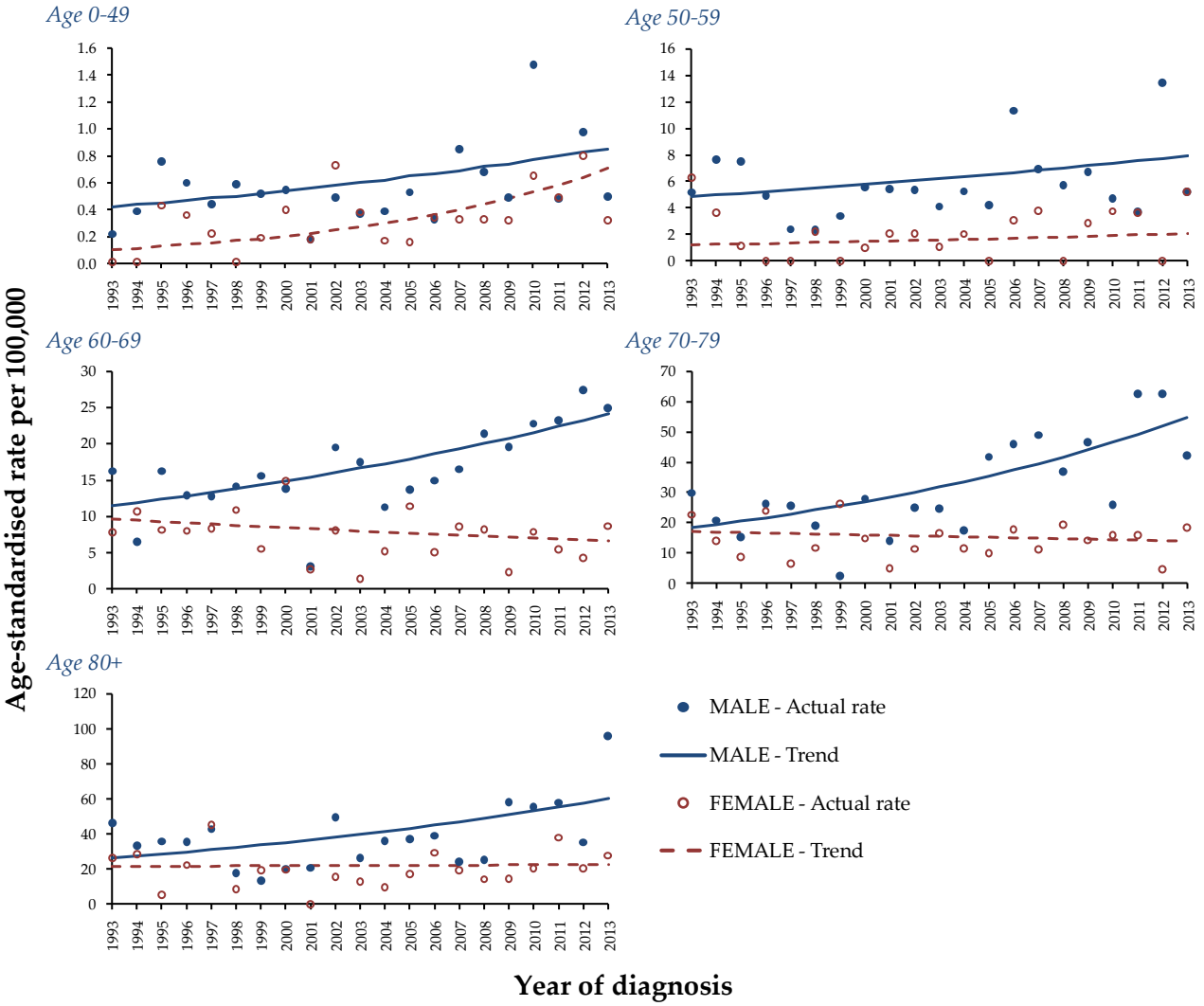


Table 11.5: Annual percentage change in age-standardised liver cancer incidence rates by sex and age: 1993-2013

AGE	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**3.6% (0.2%, 7.1%)**	**p=0.038**	**1993-2013**	**10.1% (2.5%, 18.2%)**	**p=0.011**
50-59	1993-2013	2.5% (-0.7%, 5.8%)	p=0.122	1993-2013	2.9% (-10.3%, 18.0%)	p=0.669
60-69	**1993-2013**	**3.8% (2.0%, 5.7%)**	**p<0.001**	1993-2013	-1.9% (-4.8%, 1.1%)	p=0.202
70-79	**1993-2013**	**5.5% (2.9%, 8.2%)**	**p<0.001**	1993-2013	-0.9% (-3.7%, 2.0%)	p=0.517
80+	**1993-2013**	**4.2% (1.3%, 7.2%)**	**p=0.007**	1993-2013	0.2% (-5.0%, 5.7%)	p=0.937

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Liver cancer incidence rates increased for men resident in each of the five HSC Trusts, however the increase was only statistically significant in the Belfast and Northern Trusts where there were increases of 4.6% per year (p=0.001) and 4.5% per year (p=0.001) respectively. Among women there was an increase in liver cancer rates of 8.2% per year (p=0.010) in the Western Trust from 1997 onwards, although there was no significant change in any other Trust. (Tab. 11.6, Fig. 11.6)

Figure 11.6: Trends in age-standardised liver cancer incidence rates by sex and Trust of residence: 1993-2013

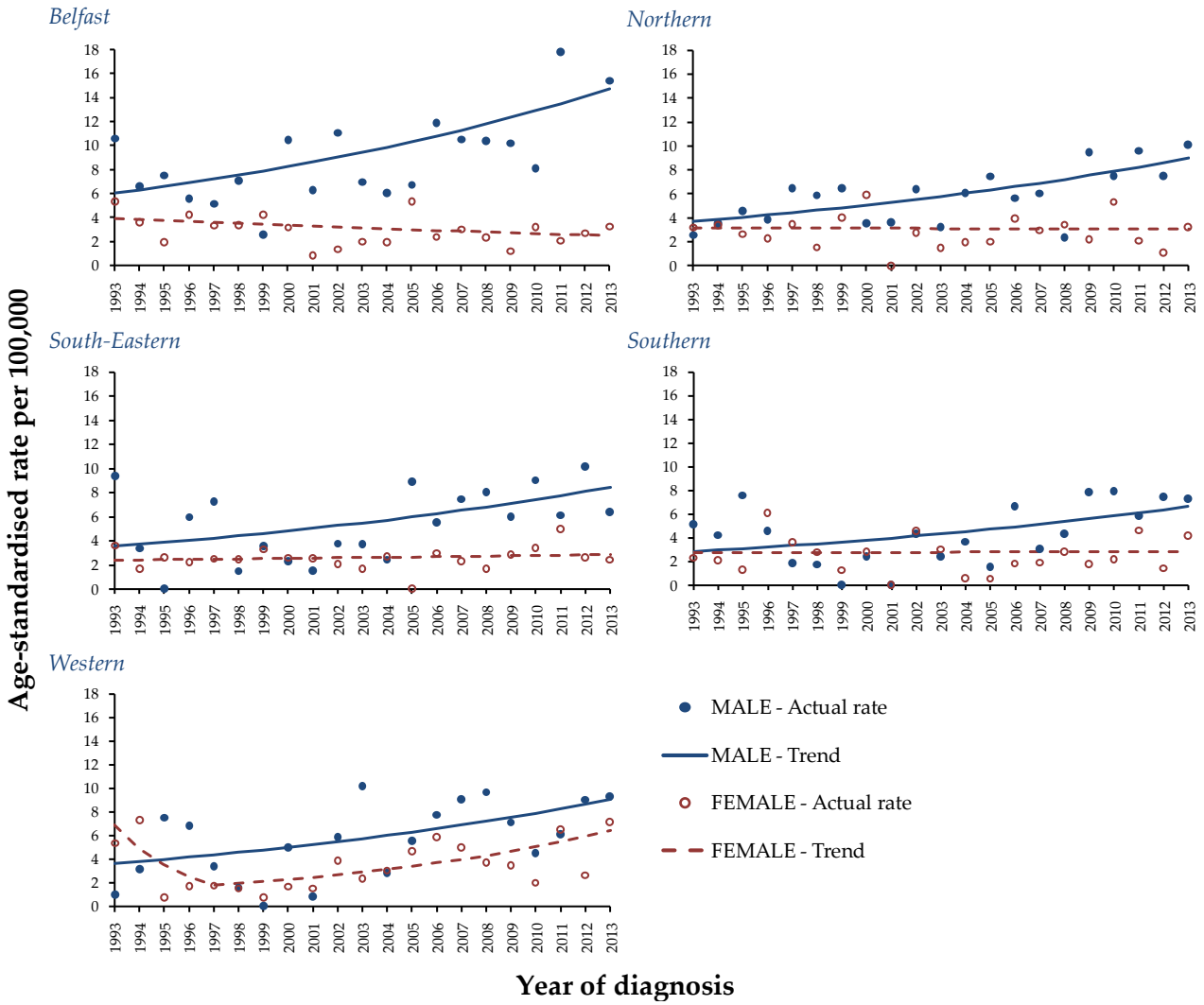


Table 11.6: Annual percentage change in age-standardised liver cancer incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**4.6% (2.2%, 7.0%)**	**p=0.001**	1993-2013	-2.2% (-4.9%, 0.6%)	p=0.122
Northern	**1993-2013**	**4.5% (2.2%, 6.8%)**	**p=0.001**	1993-2013	-0.1% (-4.9%, 4.9%)	p=0.964
South-Eastern	1993-2013	4.4% (-0.7%, 9.9%)	p=0.089	1993-2013	1.0% (-3.6%, 5.9%)	p=0.657
Southern	1993-2013	4.5% (-2.2%, 11.6%)	p=0.182	1993-2013	0.2% (-5.6%, 6.3%)	p=0.955
Western	1993-2013	4.7% (-1.2%, 10.9%)	p=0.112	1993-1997 **1997-2013**	-28.4% (-58.2%, 22.6%) **8.2% (2.2%, 14.5%)**	p=0.207 **p=0.010**

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Age-standardised incidence rates of liver cancer increased for males and females in all areas during 2001-2013, however the increase was not statistically significant for males in the 2nd least deprived areas (quintile 2) and the most deprived areas (quintile 5), nor was it significant for females in any of the five deprivation quintiles. (Tab. 11.7, Fig. 11.7)

Figure 11.7: Trends in age-standardised liver cancer incidence rates by sex and deprivation: 2001-2013

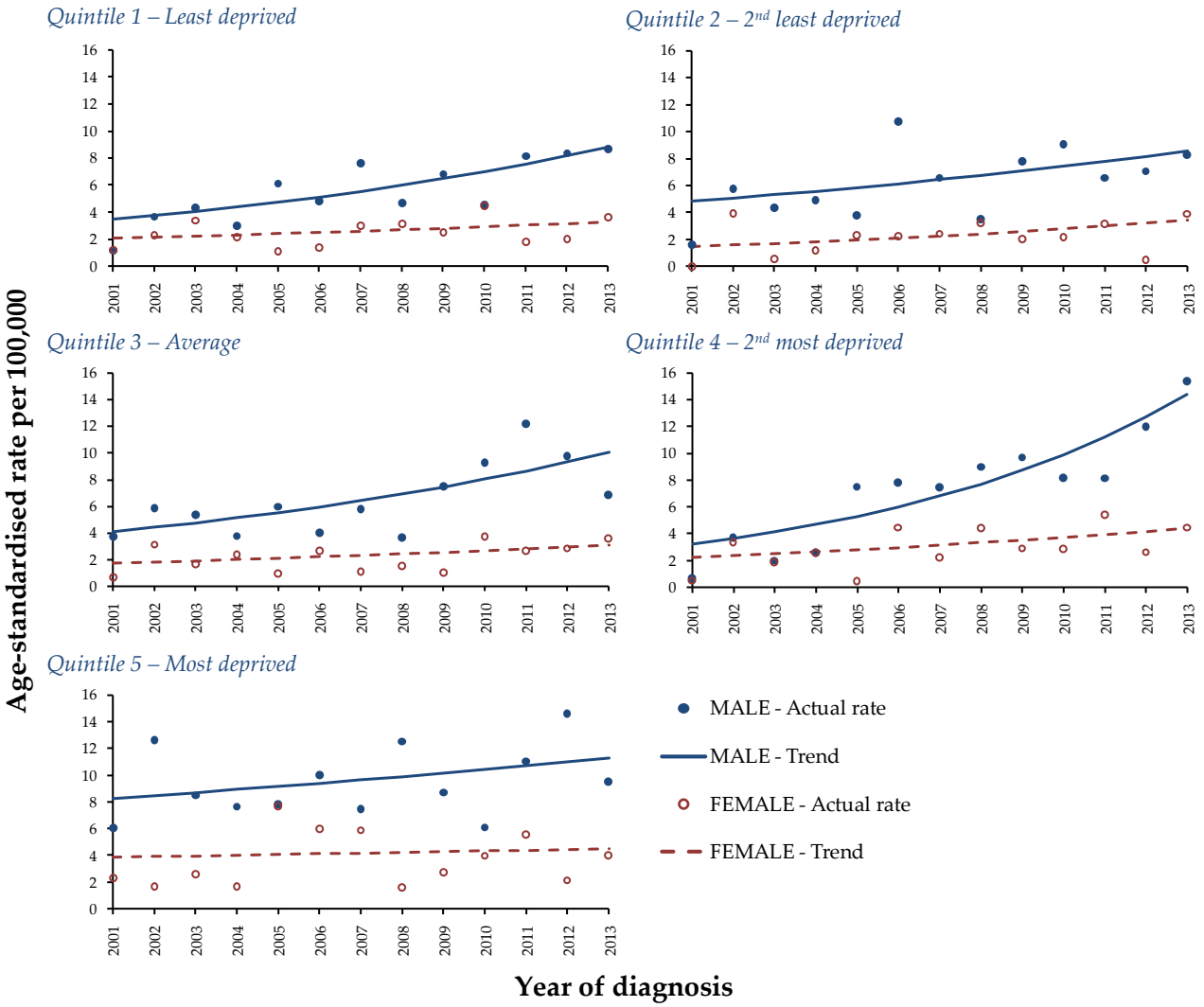


Table 11.7: Annual percentage change in age-standardised liver cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2013**	**8.1% (3.5%, 12.9%)**	**p=0.002**	2001-2013	3.8% (-2.6%, 10.7%)	p=0.225
Quintile 2 2nd least deprived	2001-2013	4.9% (-1.2%, 11.4%)	p=0.108	2001-2013	7.2% (-7.9%, 24.8%)	p=0.333
Quintile 3 Average	**2001-2013**	**7.8% (2.6%, 13.2%)**	**p=0.006**	2001-2013	5.1% (-1.9%, 12.6%)	p=0.140
Quintile 4 2nd most deprived	**2001-2013**	**13.3% (7.3%, 19.6%)**	**p<0.001**	2001-2013	5.8% (-1.8%, 13.9%)	p=0.124
Quintile 5 Most deprived	2001-2013	2.7% (-1.8%, 7.3%)	p=0.216	2001-2013	1.3% (-8.2%, 11.8%)	p=0.776

CI – Confidence interval; Significant trends are in bold

11.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

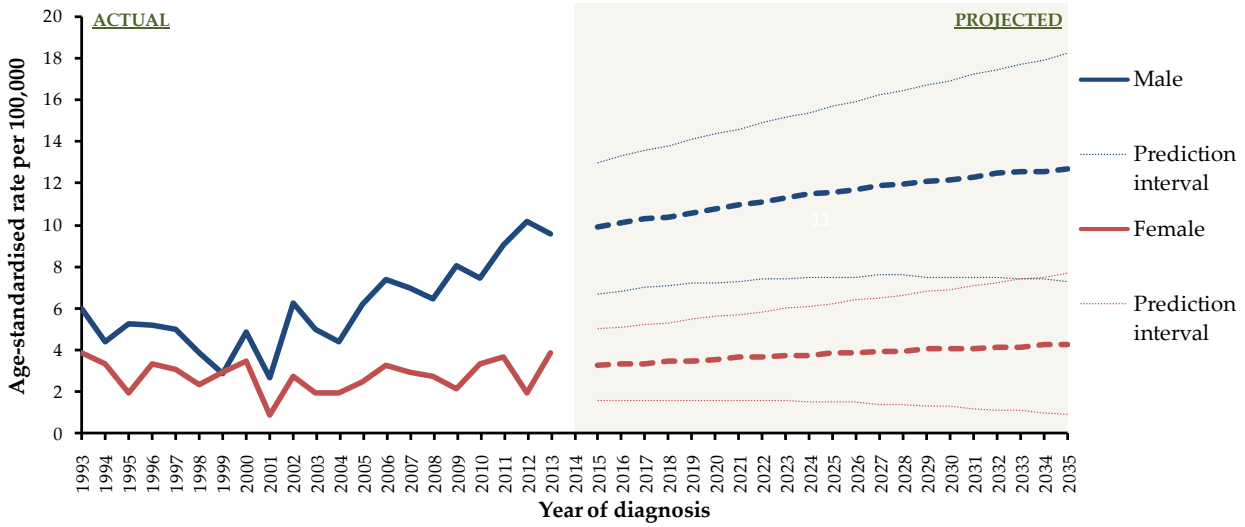
Incidence rates of liver cancer are projected to increase at a similar rate among males and females over the next twenty-two years. Compared to age-standardised incidence rates in 2009-2013 by 2020 there is expected to be a 21% increase among men and a 20% increase among women, while by 2035 there is projected to be a 43% increase among both sexes. (Tab. 11.8, Fig. 11.8)

Table 11.8: Liver cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	8.9				3.0			
2015	9.9	(6.7, 13.0)	11%	(-25%, 46%)	3.3	(1.6, 5.0)	10%	(-47%, 67%)
2020	10.8	(7.2, 14.4)	21%	(-19%, 62%)	3.6	(1.6, 5.6)	20%	(-47%, 87%)
2025	11.6	(7.5, 15.7)	30%	(-16%, 76%)	3.9	(1.5, 6.2)	30%	(-50%, 107%)
2030	12.2	(7.5, 16.9)	37%	(-16%, 90%)	4.1	(1.3, 6.9)	37%	(-57%, 130%)
2035	12.7	(7.3, 18.2)	43%	(-18%, 104%)	4.3	(0.9, 7.7)	43%	(-70%, 157%)

ASIR: Age-standardised incidence rate

Figure 11.8: Liver cancer age-standardised incidence rate projections to 2035 by sex



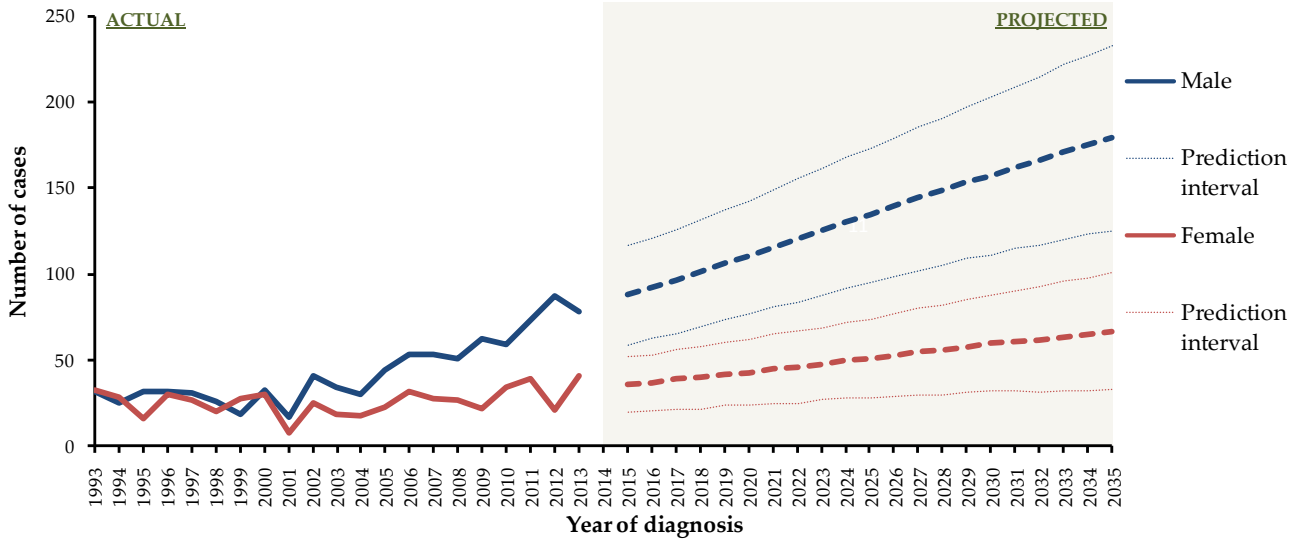
Case projections

The number of cases of liver cancer among men is expected to increase by 53% between 2009-2013 and 2020 with a rise from 72 cases per year to 110 cases per year. By 2035 this is expected to increase to 179 cases, a 149% increase. Among women the number of cases diagnosed each year is projected to increase from 31 cases per year in 2009-2013 to 43 cases in 2020 and 67 cases in 2035, a 116% increase. (Tab. 11.9, Fig. 11.9)

Table 11.9: Liver cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	72				31			
2015	88	(59, 117)	22%	(-18%, 63%)	36	(20, 52)	16%	(-35%, 68%)
2020	110	(77, 143)	53%	(7%, 99%)	43	(24, 62)	39%	(-23%, 100%)
2025	134	(95, 173)	86%	(32%, 140%)	51	(28, 74)	65%	(-10%, 139%)
2030	157	(111, 203)	118%	(54%, 182%)	60	(32, 88)	94%	(3%, 184%)
2035	179	(125, 233)	149%	(74%, 224%)	67	(33, 101)	116%	(6%, 226%)

Figure 11.9: Liver cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE LIVER CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter liver cancer incidence projections through control of the following risk factors:
  - Tobacco smoking;
  - Excessive alcohol consumption;
  - Obesity and/or diabetes;
  - Infection with hepatitis B or C and/or presence of cirrhosis.
- Other risk factors which may have a lesser impact on future projections include:
  - Family history;
  - Low immunity.
- Other potential factors that can influence liver cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which liver cancer is classified;
  - Revisions to population projections.

12 LUNG CANCER (C33-C34)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
649 PER YEAR	484 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
71 YEARS	71 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
BELFAST HSCT (MALES & FEMALES)	NORTHERN & SOUTH-EASTERN HSCT (MALES & FEMALES)
	SOUTHERN HSCT (FEMALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+2.1% PER YEAR (2000-2013)	+2.7% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
NO CHANGE (2000-2013)	1.5% PER YEAR (1993-2013)

PROJECTED CHANGE IN RATES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
-1%	+11%	-4%	+21%

PROJECTED CHANGE IN CASES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+26% TO 816 CASES PER YEAR	+32% TO 641 CASES PER YEAR	+74% TO 1,128 CASES PER YEAR	+91% TO 923 CASES PER YEAR

12.1: BACKGROUND

An average of 1,133 cases (649 male, 484 female) of lung cancer were diagnosed each year during 2009-2013. It was the 3rd most common male and female cancer diagnosed in this period making up 14.7% and 11.1% of all male and female cancers (ex. NMSC) respectively. There were 73.1 cases diagnosed per 100,000 males and 52.4 cases diagnosed per 100,000 females. The risk of developing lung cancer before the age of 65 was 1 in 68 for men and 1 in 77 for women, while before age 85 it was 1 in 14 for men and 1 in 21 for women.

Cancer and age

Lung cancer was more common among older people with a median age at diagnosis of 71 years for both men and women during 2009-2013. Overall 84.8% (85.7% male, 83.7% female) of cases occurred among those aged 60 and over, with 20.8% (20.3% male, 21.5% female) occurring among those aged 80 and over. Incidence rates were greatest among men aged 80 and over with 553 cases per 100,000 males in this age group and among women aged 70 to 79 with 255 cases per 100,000 females in this age group. Lung cancer was rare among those aged 25 to 39 with only 6 cases diagnosed each year, while there was only one case per year diagnosed among those aged under 25. (Tab. 12.1, Fig 12.1)

Figure 12.1: Incidence of lung cancer by sex and age: 2009-2013

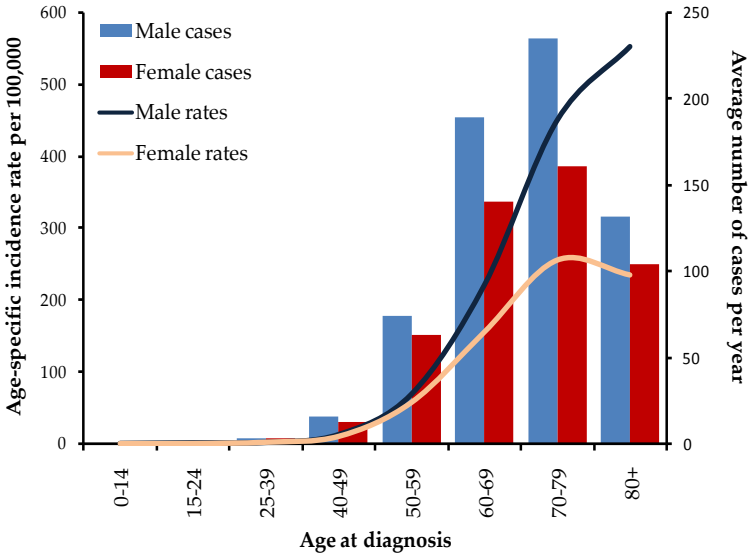


Table 12.1: Average number of lung cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	1	0	1
25-39	3	3	6
40-49	16	13	29
50-59	74	63	137
60-69	189	140	329
70-79	235	161	396
80+	132	104	236
Total	649	484	1,133

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of lung cancer were higher than the Northern Ireland average in the Belfast Trust by 39.7% for men and by 40.2% for women. Lung cancer incidence rates were lower than average in the Northern and South-Eastern Trusts for men and in the Northern, South-Eastern and Southern Trusts for women. (Tab. 12.2, Fig. 12.2)

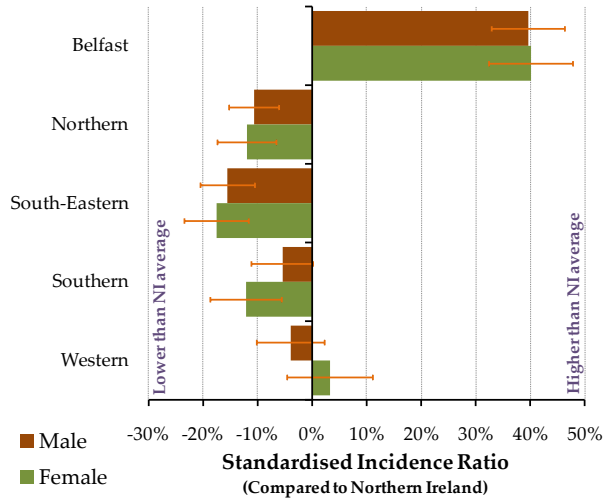
Table 12.2: Average number of lung cancers diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	167	129	296
	Northern	149	101	250
	South-Eastern	108	74	182
	Southern	107	69	176
	Western	92	66	158
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	87	55	142
	2 - 2nd least deprived	102	65	167
	3 - Average	112	78	190
	4 - 2nd most deprived	138	102	240
	5 - Most deprived	184	139	323

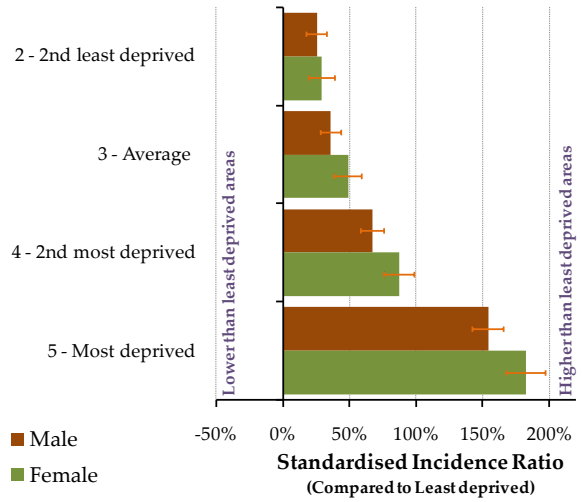
Incidence of lung cancer was strongly related to area based socio-economic deprivation during 2004-2013 with age-standardised incidence rates higher in the most deprived areas compared with the least deprived areas by 154.1% for males and by 182.6% for females. (Tab. 12.2, Fig. 12.2)

Figure 12.2: Age-standardised incidence rates of lung cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

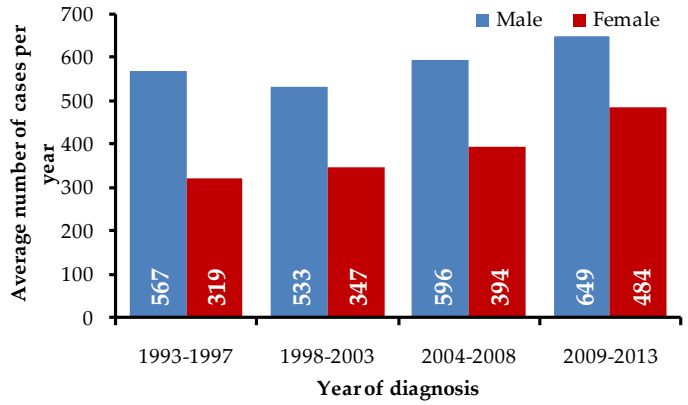


12.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 1,133 lung cancers (649 male, 484 female) diagnosed each year compared to an average of 886 cancers (567 male, 319 female) in 1993-1997. (Tab. 12.3, Fig. 12.3)

Figure 12.3: Average number of cases of lung cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of lung cancer cases increased by 2.1% per year for men between 2000 and 2013, prior to which there was a decrease of 1.7% per year. Among women the number of cases increased between 1993 and 2013 by an average of 2.7% per year. (Tab. 12.3, Fig. 12.3)

Table 12.3: Number of cases of lung cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	565	320	885
1994	624	311	935
1995	545	331	876
1996	550	310	860
1997	553	324	877
1998	562	330	892
1999	511	359	870
2000	517	342	859
2001	566	320	886
2002	508	368	876
2003	536	364	900
2004	592	374	966
2005	558	396	954
2006	574	369	943
2007	602	423	1,025
2008	653	409	1,062
2009	620	462	1,082
2010	642	423	1,065
2011	657	464	1,121
2012	655	534	1,189
2013	673	539	1,212

Trends in incidence rates

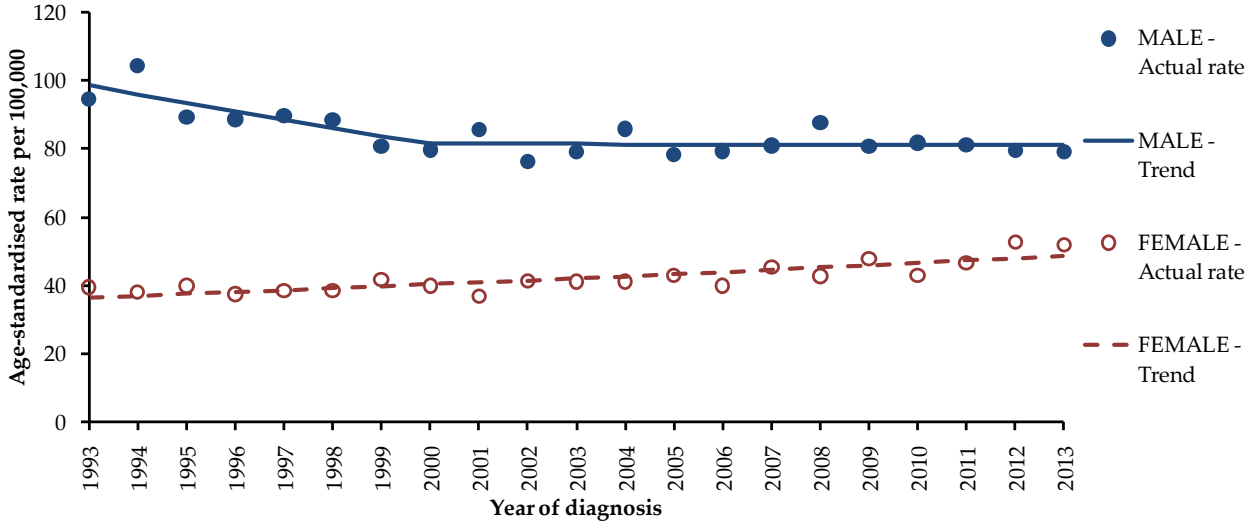
Lung cancer incidence rates decreased among males during 1993-2000 by an average of 2.7% per year (p=0.006); however after this point rates remained virtually static. Among women incidence rates increased during 1993-2013 by an average of 1.5% per year (p<0.001). (Tab. 12.4, Fig. 12.4)

Table 12.4: Annual percentage change in age-standardised lung cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-2000**	**-2.7% (-4.5%, -0.9%)**	**p=0.006**
	2000-2013	0.0% (-0.7%, 0.7%)	p=0.936
Female	**1993-2013**	**1.5% (1.0%, 1.9%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 12.4: Trends in age-standardised lung cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

A significant decrease in lung cancer incidence rates occurred among men aged 0-49, 50-59 and 60-69 during the 1993-2013 period, with decreases among men aged 70-79 and increases among men aged 80 and over that were not quite statistically significant. However, among women there was no significant change in the 0-49 and 50-59 age groups, while increases occurred among women aged 60-69, 70-79 and 80 and over. (Tab. 12.5, Fig. 12.5)

Figure 12.5: Trends in age-standardised lung cancer incidence rates by sex and age at diagnosis: 1993-2013

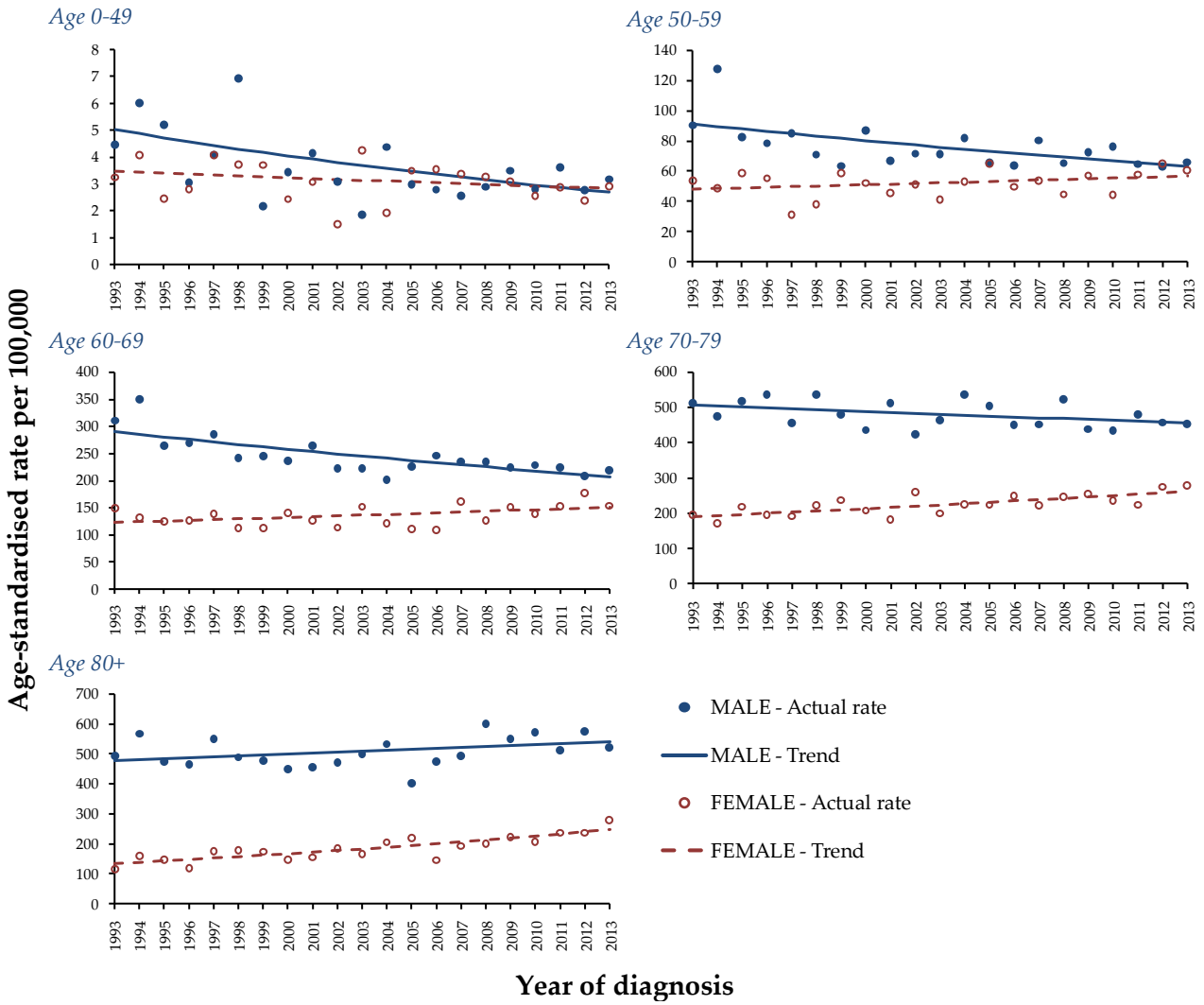


Table 12.5: Annual percentage change in age-standardised lung cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**-3.0% (-5.0%, -1.1%)**	**p=0.005**	1993-2013	-1.0% (-2.6%, 0.7%)	p=0.230
50-59	**1993-2013**	**-1.9% (-2.9%, -0.8%)**	**p=0.002**	1993-2013	0.9% (-0.3%, 2.1%)	p=0.153
60-69	**1993-2013**	**-1.7% (-2.3%, -1.1%)**	**p<0.001**	**1993-2013**	**1.0% (0.1%, 2.0%)**	**p=0.036**
70-79	1993-2013	-0.5% (-1.1%, 0.0%)	p=0.058	**1993-2013**	**1.6% (0.9%, 2.3%)**	**p=0.000**
80+	1993-2013	0.6% (-0.1%, 1.3%)	p=0.084	**1993-2013**	**3.1% (2.2%, 4.1%)**	**p=0.000**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

During 1993-2013 incidence rates of lung cancer declined among men but increased among women living in the Northern Trust. Rates also increased among women resident in the Southern and Western Trusts, while there was no change for men. In the South-Eastern Trust rates did not change for women during 1993-2013, while male rates decreased during 1993-2002 with no change from 2002 onwards. In the Belfast Trust there was a significant decrease in rates among men in 1993-2013, while rates increased for women from 2001 onwards. (Tab. 12.6, Fig. 12.6)

Figure 12.6: Trends in age-standardised lung cancer incidence rates by sex and Trust of residence: 1993-2013

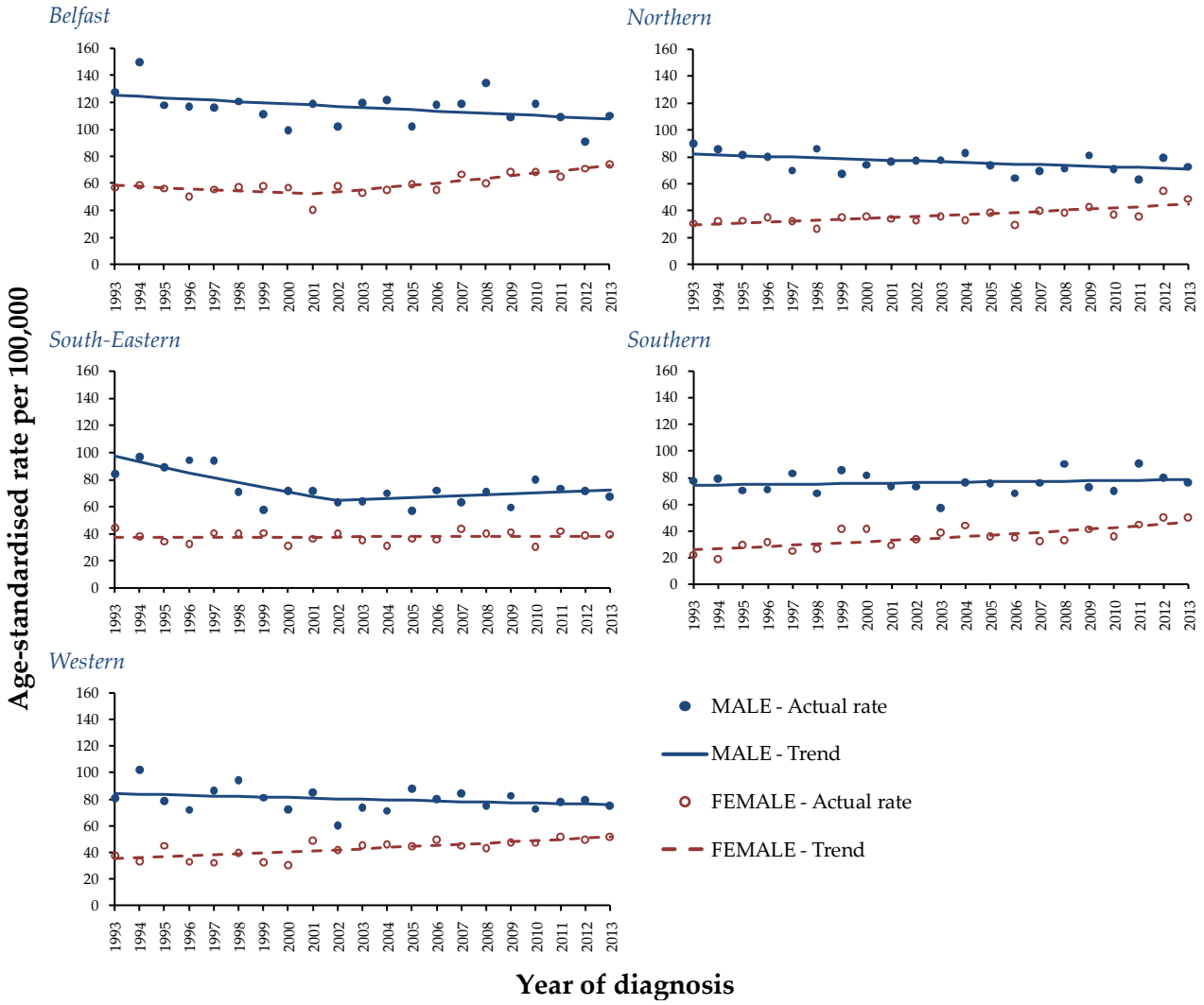


Table 12.6: Annual percentage change in age-standardised lung cancer incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**-0.7% (-1.5%, 0.0%)**	**p=0.050**	1993-2001 **2001-2013**	-1.4% (-3.1%, 0.4%) **2.9% (1.9%, 3.8%)**	p=0.120 **p<0.001**
Northern	**1993-2013**	**-0.7% (-1.4%, -0.1%)**	**p=0.024**	**1993-2013**	**2.2% (1.2%, 3.1%)**	**p<0.001**
South-Eastern	**1993-2002** 2002-2013	**-4.5% (-7.4%, -1.5%)** 1.1% (-1.1%, 3.3%)	**p=0.007** p=0.327	1993-2013	0.1% (-0.7%, 1.0%)	p=0.762
Southern	1993-2013	0.3% (-0.5%, 1.1%)	p=0.452	**1993-2013**	**3.0% (1.7%, 4.3%)**	**p<0.001**
Western	1993-2013	-0.5% (-1.3%, 0.2%)	p=0.155	**1993-2013**	**1.9% (1.1%, 2.7%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Lung cancer incidence rates among men were static in all deprivation quintiles during 2001-2013 with very little change over time. However among women incidence rates increased in all areas, with the increases statistically significant in all quintiles with the exception of areas with average levels of deprivation. (Tab. 12.7, Fig. 12.7)

Figure 12.7: Trends in age-standardised lung cancer incidence rates by sex and deprivation: 2001-2013

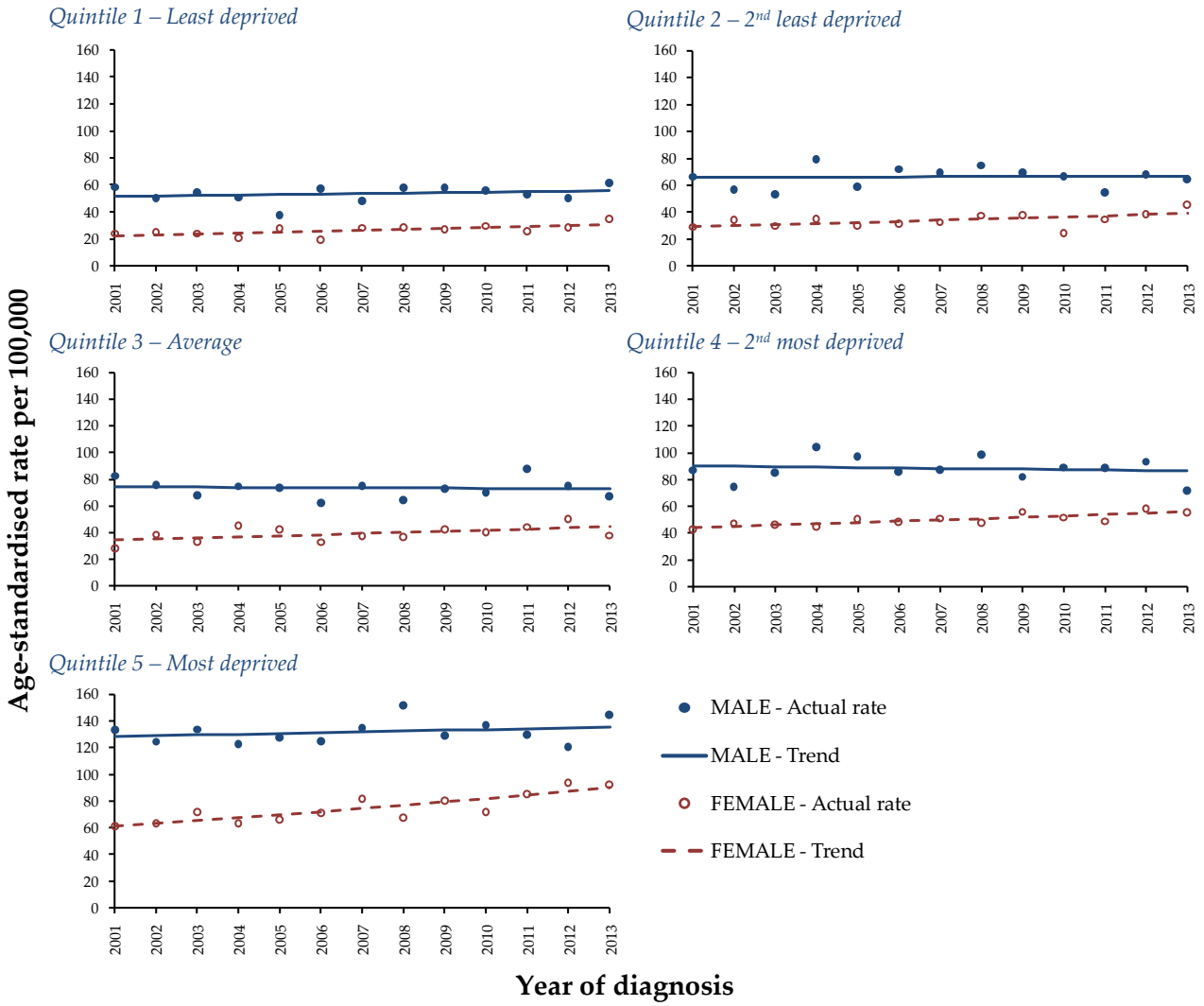


Table 12.7: Annual percentage change in age-standardised lung cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	0.7% (-1.1%, 2.6%)	p=0.400	**2001-2013**	**2.7% (0.8%, 4.7%)**	**p=0.010**
Quintile 2 2nd least deprived	2001-2013	0.2% (-1.8%, 2.2%)	p=0.856	**2001-2013**	**2.3% (0.1%, 4.6%)**	**p=0.045**
Quintile 3 Average	2001-2013	-0.2% (-1.7%, 1.5%)	p=0.839	2001-2013	2.1% (-0.2%, 4.4%)	p=0.065
Quintile 4 2nd most deprived	2001-2013	-0.3% (-2.1%, 1.5%)	p=0.685	**2001-2013**	**1.9% (1.0%, 2.9%)**	**p=0.001**
Quintile 5 Most deprived	2001-2013	0.5% (-0.6%, 1.6%)	p=0.386	**2001-2013**	**3.3% (2.1%, 4.6%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

12.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

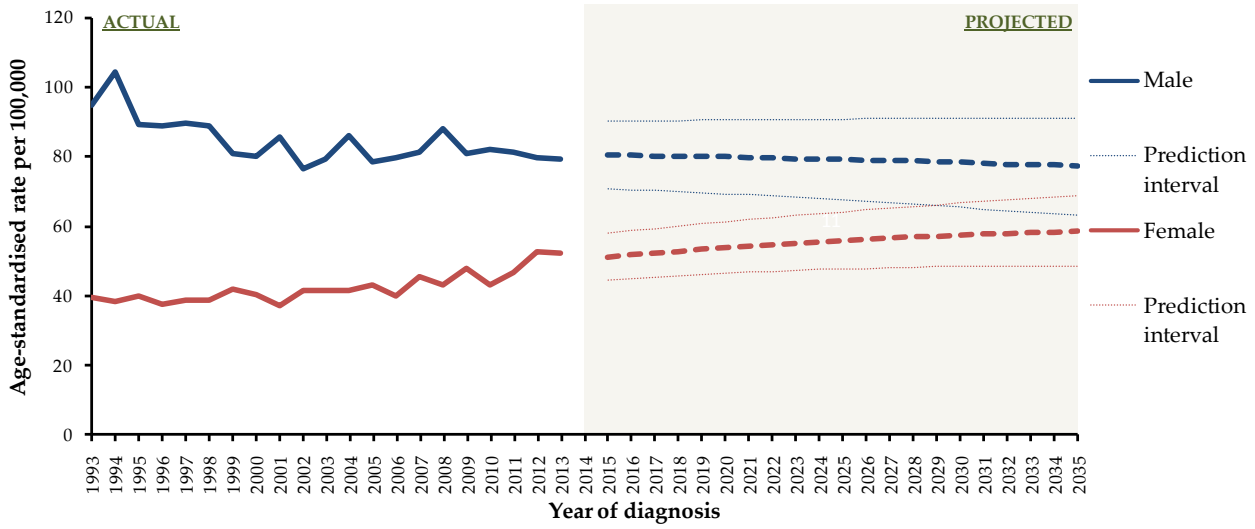
Lung cancer incidence rates among men are projected to decrease very gradually over the next twenty-two years. Compared to rates in 2009-2013 there is expected be a 1% drop in rates by 2020, and a 4% drop by 2035. Among women however rates are projected to continue to increase. By 2020 an 11% increase in female rates is expected, however after this point the rate of increase will slow, with a 21% increase compared to 2009-2013 projected for 2035. (Tab. 12.9, Fig. 12.9)

Table 12.8: Lung cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	80.6				48.5			
2015	80.4	(70.6, 90.1)	0%	(-12%, 12%)	51.2	(44.6, 57.9)	6%	(-8%, 19%)
2020	79.8	(69.2, 90.5)	-1%	(-14%, 12%)	53.9	(46.5, 61.2)	11%	(-4%, 26%)
2025	79.1	(67.5, 90.7)	-2%	(-16%, 13%)	56.0	(47.8, 64.1)	15%	(-1%, 32%)
2030	78.2	(65.6, 90.9)	-3%	(-19%, 13%)	57.5	(48.5, 66.6)	19%	(0%, 37%)
2035	77.2	(63.4, 91.0)	-4%	(-21%, 13%)	58.7	(48.6, 68.8)	21%	(0%, 42%)

ASIR: Age-standardised incidence rate

Figure 12.8: Lung cancer age-standardised incidence rate projections to 2035 by sex



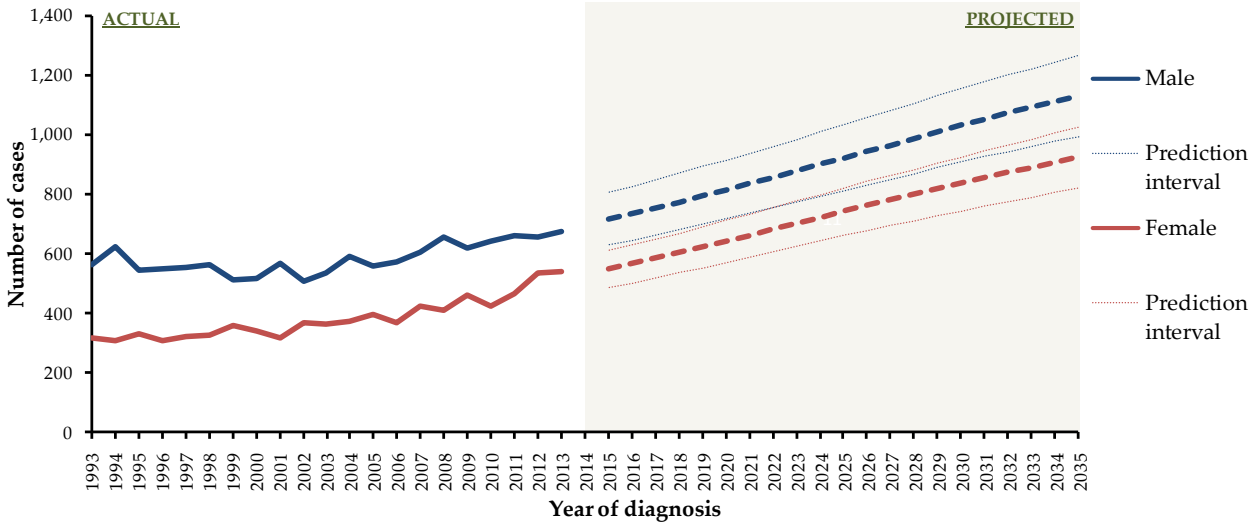
Case projections

The number of lung cancer cases diagnosed among men is projected to increase from 649 per year in 2009-2013 to 816 per year in 2020 and 1,128 per year in 2035, a 26% and 74% increase respectively. Among women the number of lung cancer cases diagnosed is projected to increase from 484 per year in 2009-2013 to 641 per year in 2020 and 923 per year in 2035, a 32% and 91% increase respectively. (Tab. 12.9, Fig. 12.9)

Table 12.9: Lung cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	649				484			
2015	718	(629, 807)	11%	(-3%, 24%)	548	(485, 611)	13%	(0%, 26%)
2020	816	(717, 915)	26%	(10%, 41%)	641	(570, 712)	32%	(18%, 47%)
2025	922	(811, 1,033)	42%	(25%, 59%)	741	(661, 821)	53%	(37%, 70%)
2030	1,030	(906, 1,154)	59%	(40%, 78%)	833	(743, 923)	72%	(54%, 91%)
2035	1,128	(991, 1,265)	74%	(53%, 95%)	923	(821, 1,025)	91%	(70%, 112%)

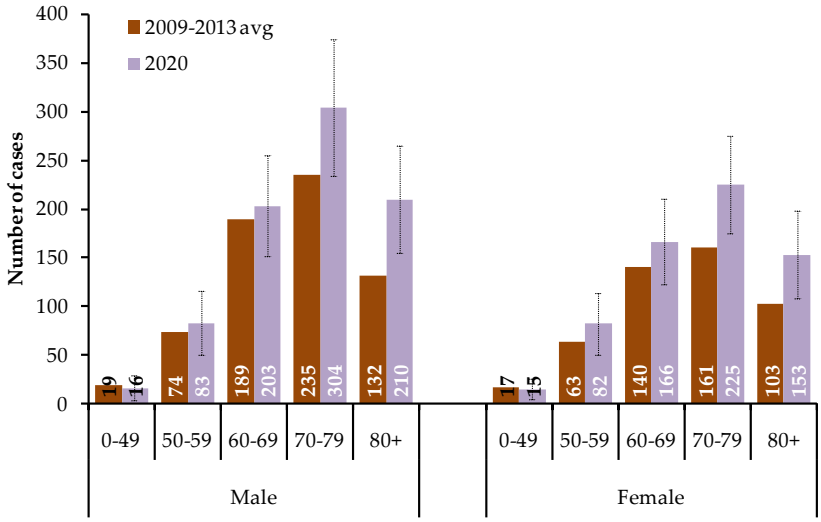
Figure 12.9: Lung cancer incidence projections to 2035 by sex



Case projections by age

While a small decrease in the number of lung cancer cases is expected among the 0-49 age group for both males and females, the remaining age groups are expected to experience increases in the number of lung cancers diagnosed by 2020. Among males the biggest percentage increase is predicted to be among those aged 80 and over, with a 59% increase from 132 cases in 2009-2013 to 210 cases in 2020. Among females the biggest percentage increase is also expected among those aged 80 and over with a 49% increase from 103 cases in 2009-2013 to 153 cases in 2020. (Fig. 12.10)

Figure 12.10: Lung cancer incidence projections to 2020 by sex and age



FACTORS THAT CAN INFLUENCE LUNG CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter lung cancer incidence projections through control of tobacco smoking which causes approximately 85% of lung cancers in the UK.
- Other risk factors which may have a lesser impact on future projections include:
  - Family history;
  - Exposure to ionising radiation, radon, asbestos, arsenic, beryllium, cadmium, silica dust, and polycyclic aromatic hydrocarbons.
- Other potential factors that can influence lung cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which lung cancer is classified;
  - Revisions to population projections.

13 MALIGNANT MELANOMA (C43)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
138 PER YEAR	181 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
67 YEARS	56 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
AFFLUENT AREAS (MALES & FEMALES)	DEPRIVED AREAS (MALES & FEMALES)
SOUTH-EASTERN HSCT (MALES ONLY)	WESTERN HSCT (MALES & FEMALES)
SOUTHERN HSCT (FEMALES ONLY)	BELFAST HSCT (MALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+5.4% PER YEAR (1993-2013)	+4.0% PER YEAR (1995-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
+3.8% PER YEAR (1993-2013)	+2.9% PER YEAR (1995-2013)

PROJECTED CHANGE IN RATES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+28%	+21%	+62%	+43%

PROJECTED CHANGE IN CASES

(COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+56% TO 215 CASES PER YEAR	+32% TO 239 CASES PER YEAR	+168% TO 370 CASES PER YEAR	+75% TO 317 CASES PER YEAR

13.1: BACKGROUND

Melanoma is the most serious form of skin cancer, but is much less common than the frequently diagnosed non-melanoma skin cancer with an average of 319 cases (138 male, 181 female) diagnosed each year during 2009-2013. It was the 9th most common male cancer and the 5th most common female cancer making up 3.1% and 4.2% of cancers (ex. NMSC) respectively. It is more common among women than men with 15.5 cases per 100,000 males compared to 19.6 cases per 100,000 females. The risk of developing melanoma before the age of 65 was 1 in 196 for men and 1 in 108 for women, while before age 85 it was 1 in 74 for men and 1 in 63 for women.

Cancer and age

Melanoma was more common among middle aged women with a median age at diagnosis of 56 years and among older men with a median age at diagnosis of 67 years during 2009-2013. 45.3% of female cases were among those aged 60 and over compared to 65.9% of male cases. Incidence rates were greatest among those aged 80 and over among both men and women with 106 cases per 100,000 males and 56 cases per 100,000 females in this age group. There were no cases of melanoma diagnosed among those aged under 15. (Tab. 13.1, Fig 13.1)

Figure 13.1: Incidence of malignant melanoma by sex and age: 2009-2013

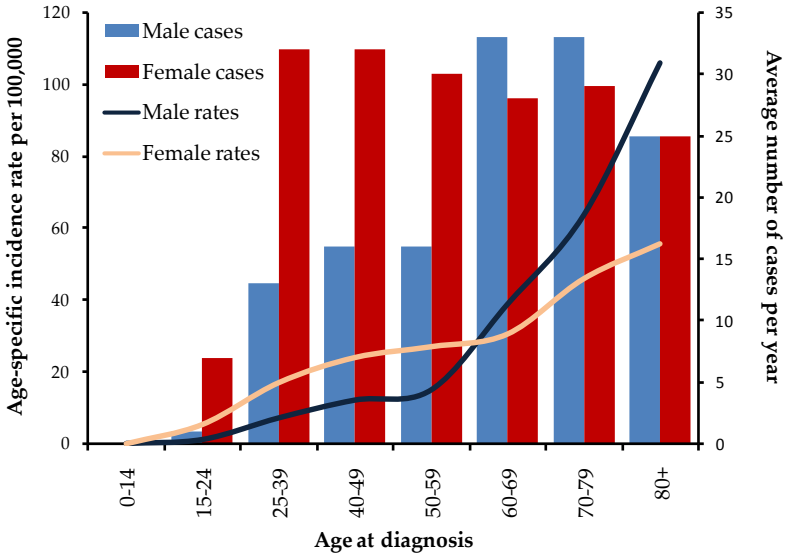


Table 13.1: Average number of malignant melanomas diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	1	7	8
25-39	13	32	45
40-49	16	32	48
50-59	16	30	46
60-69	33	28	61
70-79	33	29	62
80+	25	25	50
Total	138	181	319

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of melanoma were higher than average in the South-Eastern Trust by 15.9% for men and in the Southern Trust by 19.6% for women. Melanoma incidence rates were lower than average in the Belfast and Western Trusts for men and in the Western Trust for women. (Tab. 13.2, Fig. 13.2)

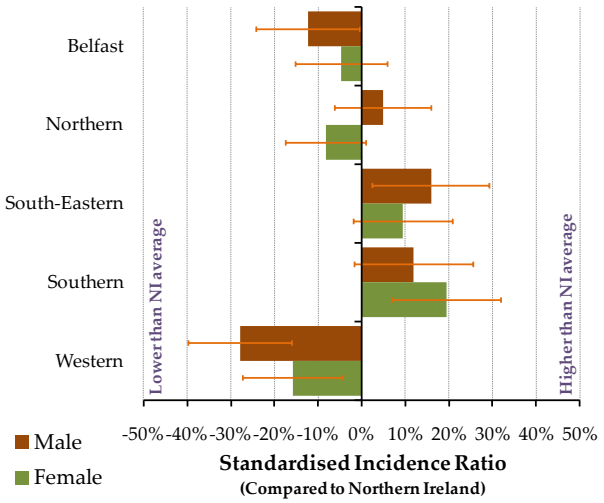
Table 13.2: Average number of malignant melanomas diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	21	32	53
	Northern	34	39	73
	South-Eastern	29	36	65
	Southern	26	36	62
	Western	14	21	35
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	33	41	74
	2 - 2nd least deprived	27	37	64
	3 - Average	24	34	58
	4 - 2nd most deprived	22	30	52
	5 - Most deprived	17	21	38

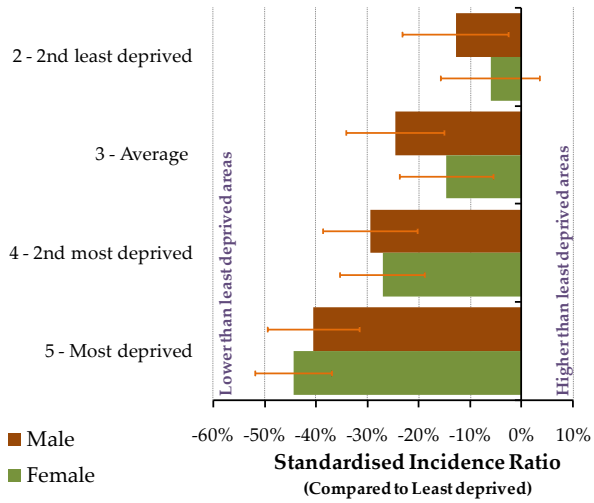
Incidence rates of melanoma were negatively related to area based socio-economic deprivation during 2004-2013 with age-standardised incidence rates lower in the most deprived areas compared with the least deprived areas by 40.5% for males and by 44.4% for females. (Tab. 13.2, Fig. 13.2)

Figure 13.2: Age-standardised incidence rates of malignant melanoma by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

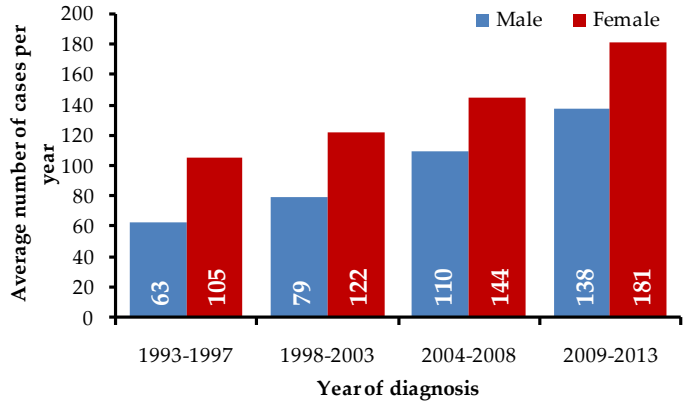


13.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 319 cases of melanoma (138 male, 181 female) diagnosed each year compared to an average of 168 cases (63 male, 105 female) in 1993-1997. (Tab. 13.3, Fig. 13.3)

Figure 13.3: Average number of cases of malignant melanoma diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases increased by 5.4% per year among men during 1993-2013, and by 4.0% per year during 1995-2013 among women. (Tab. 13.3, Fig. 13.3)

Table 13.3: Number of cases of malignant melanoma diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	56	119	175
1994	64	110	174
1995	63	100	163
1996	65	104	169
1997	65	94	159
1998	60	114	174
1999	69	109	178
2000	73	112	185
2001	88	129	217
2002	100	141	241
2003	82	128	210
2004	108	136	244
2005	99	133	232
2006	109	151	260
2007	95	138	233
2008	137	164	301
2009	123	165	288
2010	116	166	282
2011	129	172	301
2012	152	197	349
2013	170	207	377

Trends in incidence rates

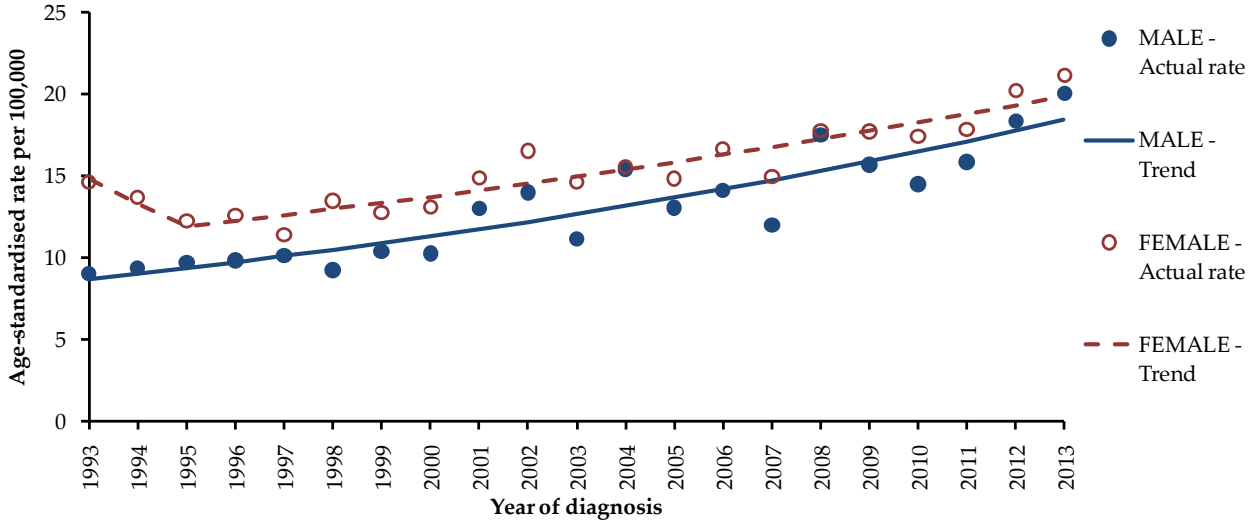
While part of this increase was due to the ageing and growth of the population, melanoma incidence rates, which were adjusted for both factors increased by 3.8% per year (p<0.001) among men during 1993-2013 and by 2.9% per year (p<0.001) among women during 1995-2013. (Tab. 13.4, Fig. 13.4)

Table 13.4: Annual percentage change in age-standardised malignant melanoma incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-2013**	**3.8% (3.0%, 4.7%)**	**p<0.001**
Female	1993-1995	-10.4% (-27.2%, 10.4%)	p=0.283
	1995-2013	**2.9% (2.3%, 3.5%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 13.4: Trends in age-standardised malignant melanoma incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Melanoma incidence rates increased significantly for all age groups except among males aged 50-59. For men the greatest increase was among those aged 70-79 and 80 and over, which saw increases of 5.7% (p<0.001) and 6.2% (p<0.001) per year respectively. Among women the largest increases were among those aged 0-49 (by 3.7% per year from 1995; p<0.001) and 70-79 (by 3.4% per year from 1993; p<0.001). (Tab. 13.5, Fig. 13.5)

Figure 13.5: Trends in age-standardised malignant melanoma incidence rates by sex and age at diagnosis: 1993-2013

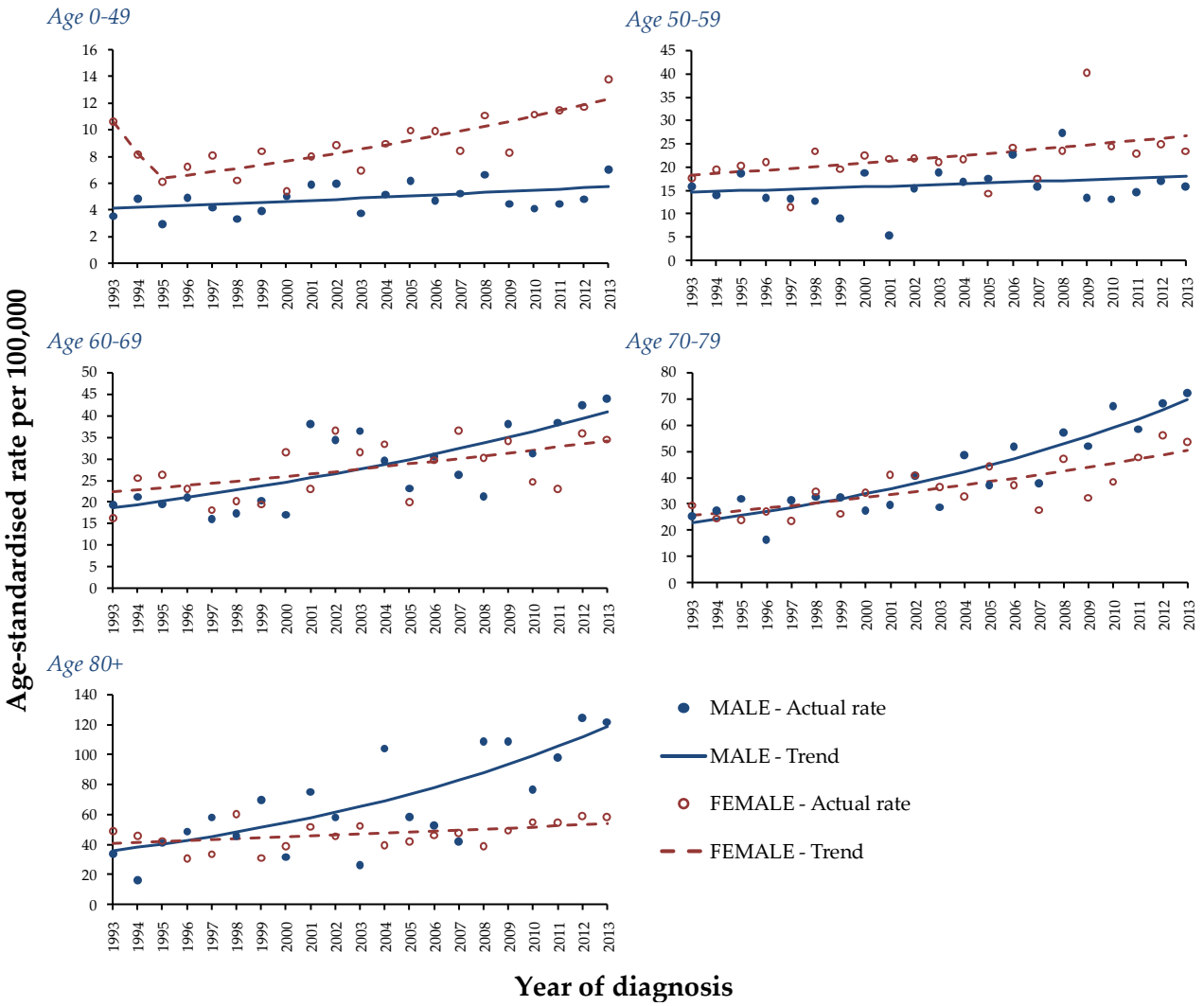


Table 13.5: Annual percentage change in age-standardised malignant melanoma incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**1.7% (0.1%, 3.3%)**	**p=0.036**	1993-1995 **1995-2013**	-22.5% (-48.6%, 16.9%) **3.7% (2.4%, 5.1%)**	p=0.207 **p<0.001**
50-59	1993-2013	1.0% (-1.1%, 3.2%)	p=0.331	**1993-2013**	**1.9% (0.2%, 3.6%)**	**p=0.029**
60-69	**1993-2013**	**4.0% (2.3%, 5.7%)**	**p<0.001**	**1993-2013**	**2.1% (0.5%, 3.8%)**	**p=0.011**
70-79	**1993-2013**	**5.7% (4.5%, 7.0%)**	**p<0.001**	**1993-2013**	**3.4% (2.1%, 4.7%)**	**p<0.001**
80+	**1993-2013**	**6.2% (3.6%, 8.9%)**	**p<0.001**	**1993-2013**	**1.4% (0.2%, 2.7%)**	**p=0.027**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

At the end of 2013 melanoma incidence rates were increasing significantly among both male and female residents of all HSC Trusts. The magnitude of the increase was greatest among males in the Southern Trust with an annual percentage increase of 5.0% per year (p<0.001) and in the Southern and Western Trusts for females with increases of 6.6% per year (from 2003 onwards; p=0.004) and 4.2% per year (from 1993 onwards; p=0.003). (Tab. 13.6, Fig 13.6)

Figure 13.6: Trends in age-standardised malignant melanoma incidence rates by sex and Trust of residence: 1993-2013

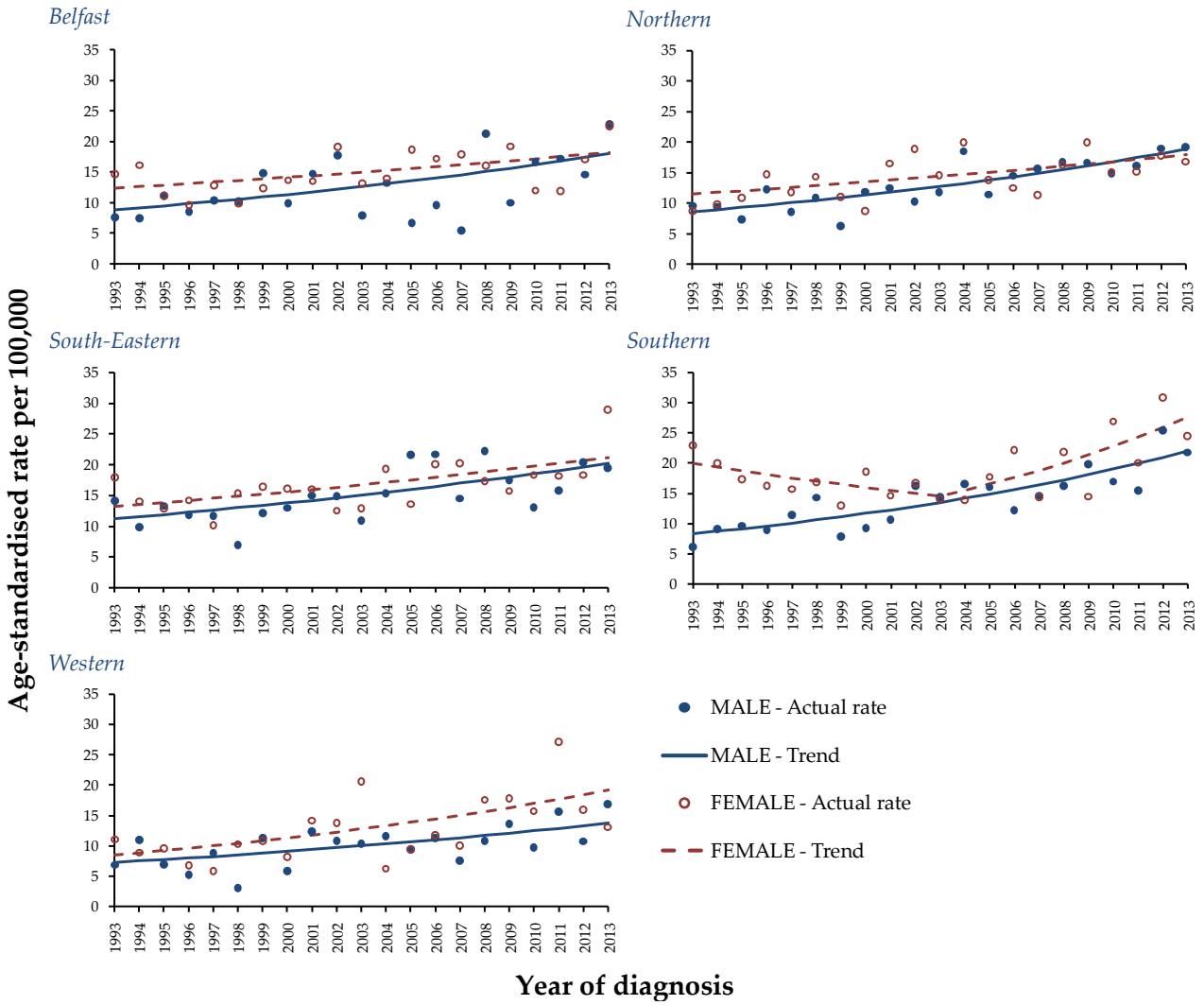


Table 13.6: Annual percentage change in age-standardised malignant melanoma incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**3.7% (1.3%, 6.1%)**	**p=0.005**	**1993-2013**	**1.9% (0.4%, 3.5%)**	**p=0.014**
Northern	**1993-2013**	**4.0% (2.7%, 5.3%)**	**p<0.001**	**1993-2013**	**2.2% (0.7%, 3.8%)**	**p=0.007**
South-Eastern	**1993-2013**	**3.0% (1.3%, 4.8%)**	**p=0.002**	**1993-2013**	**2.4% (1.0%, 3.8%)**	**p=0.002**
Southern	**1993-2013**	**5.0% (3.6%, 6.5%)**	**p<0.001**	1993-2003	-3.1% (-7.5%, 1.5%)	p=0.175
				2003-2013	**6.6% (2.3%, 11.0%)**	**p=0.004**
Western	**1993-2013**	**3.3% (1.1%, 5.4%)**	**p=0.004**	**1993-2013**	**4.2% (1.6%, 6.8%)**	**p=0.003**

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

At the end of 2013 melanoma incidence rates were increasing among both males and females living in all areas regardless of deprivation level, however with a few exceptions the increases were not statistically significant. Notable significant increases were annual increases of 2.2% per year (p=0.030) in the least deprived areas for women and 4.9% per year (p=0.017) in the most deprived areas for men. (Tab. 13.7, Fig 13.7)

Figure 13.7: Trends in age-standardised malignant melanoma incidence rates by sex and deprivation: 2001-2013

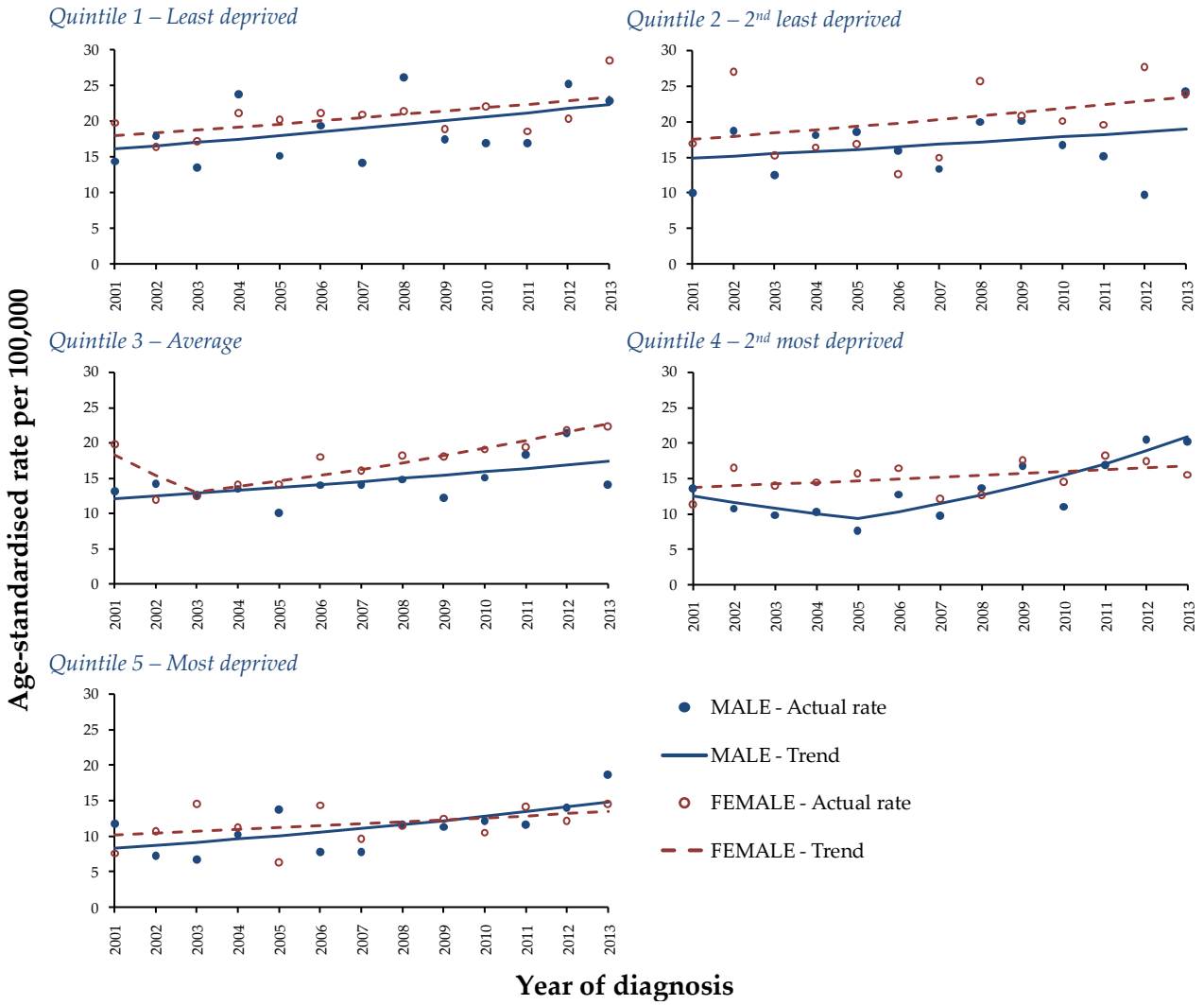


Table 13.7: Annual percentage change in age-standardised malignant melanoma incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	2.7% (-0.8%, 6.4%)	p=0.121	**2001-2013**	**2.2% (0.3%, 4.3%)**	**p=0.030**
Quintile 2 2nd least deprived	2001-2013	2.0% (-2.2%, 6.4%)	p=0.318	2001-2013	2.5% (-1.3%, 6.3%)	p=0.177
Quintile 3 Average	**2001-2013**	**3.1% (0.4%, 5.8%)**	**p=0.027**	2001-2003 **2003-2013**	-15.6% (-31.5%, 4.1%) **5.7% (4.2%, 7.2%)**	p=0.099 **p<0.001**
Quintile 4 2nd most deprived	2001-2005 **2005-2013**	-7.1% (-23.0%, 12.2%) **10.6% (4.7%, 16.8%)**	p=0.397 **p=0.003**	2001-2013	1.7% (-0.5%, 3.9%)	p=0.115
Quintile 5 Most deprived	**2001-2013**	**4.9% (1.1%, 8.9%)**	**p=0.017**	2001-2013	2.3% (-1.2%, 6.0%)	p=0.174

CI – Confidence interval; Significant trends are in bold

13.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

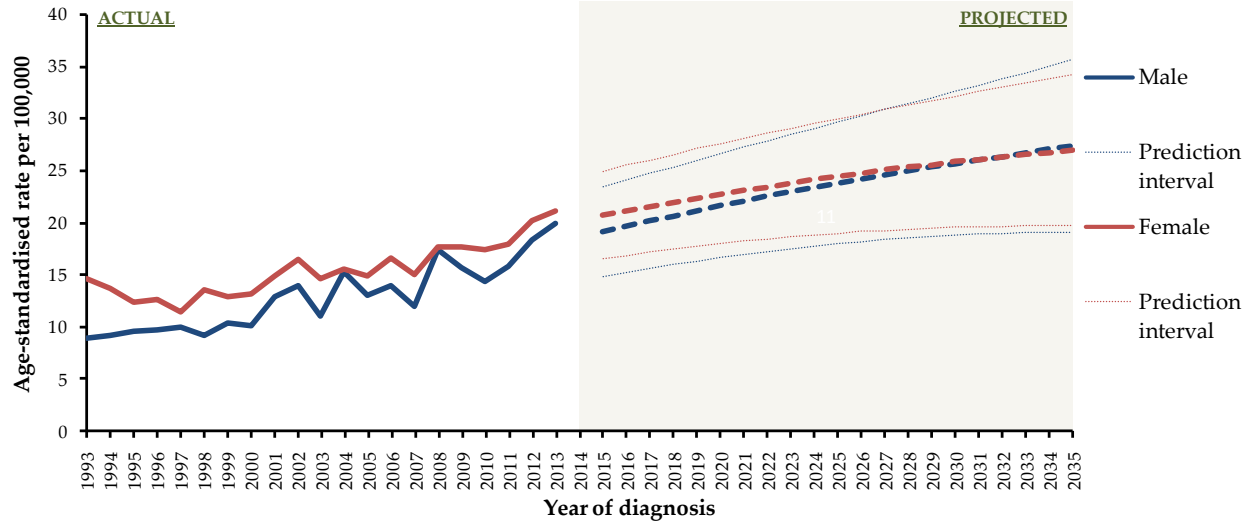
Incidence rates of melanoma are expected to continue increasing over the next twenty-two years. By 2020 rates among men are expected to increase by 28%, while by 2035 there is expected to be a 62% increase. Among women the magnitiude of the change is forecast to be slightly smaller with a 21% increase in rates by 2020 and a 43% increase by 2035. (Tab. 13.8; Fig. 13.8)

Table 13.8: Malignant melanoma age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	16.9				18.9			
2015	19.2	(14.8, 23.5)	14%	(-12%, 39%)	20.8	(16.6, 24.9)	10%	(-12%, 32%)
2020	21.7	(16.7, 26.7)	28%	(-1%, 58%)	22.8	(18.1, 27.6)	21%	(-4%, 46%)
2025	23.8	(18.0, 29.7)	41%	(7%, 76%)	24.5	(19.0, 30.0)	30%	(1%, 59%)
2030	25.7	(18.8, 32.6)	52%	(11%, 93%)	25.9	(19.6, 32.1)	37%	(4%, 70%)
2035	27.4	(19.1, 35.7)	62%	(13%, 111%)	27.0	(19.8, 34.2)	43%	(5%, 81%)

ASIR: Age-standardised incidence rate

Figure 13.8: Malignant melanoma age-standardised incidence rate projections to 2035 by sex



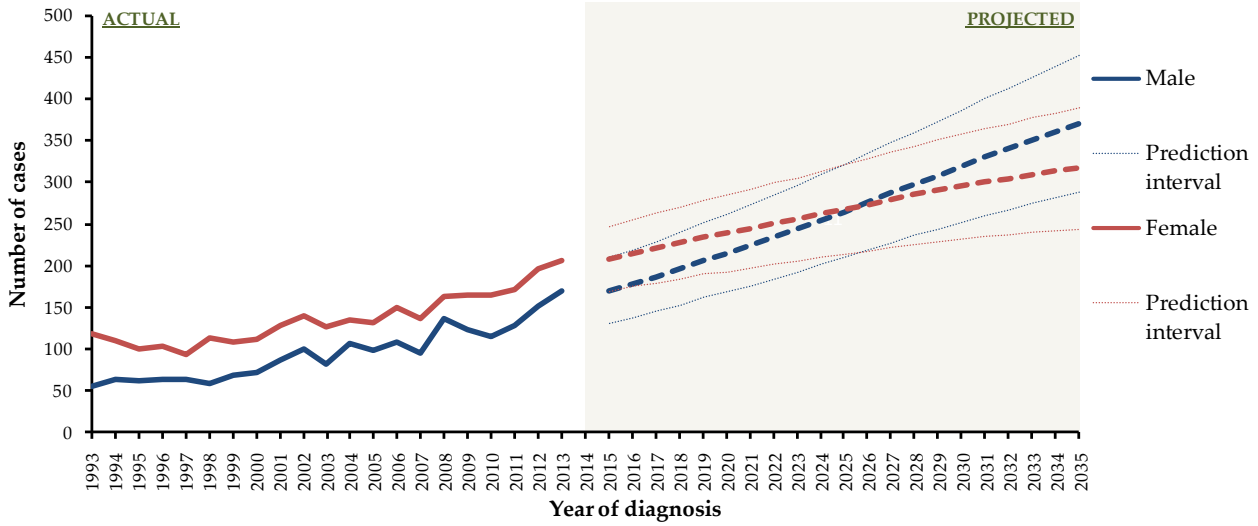
Case projections

The increase in rates will translate to a large increase in the number of cases of melanoma particularly for men as the average age at diagnosis for men is greater than that for women. By 2020 there is expected to be 215 male and 239 female cases of melanoma per year. Compared to the 2009-2013 average this is a 56% increase for men and a 32% increase for women. By 2035 there is expected to be a 168% increase among men and a 75% increase among women resulting in 370 cases per year among men and 317 cases per year among women. (Tab. 13.9, Fig. 13.9)

Table 13.9: Malignant melanoma incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	138				181			
2015	170	(130, 210)	23%	(-6%, 52%)	208	(169, 247)	15%	(-7%, 36%)
2020	215	(168, 262)	56%	(22%, 90%)	239	(193, 285)	32%	(7%, 57%)
2025	265	(209, 321)	92%	(51%, 133%)	268	(214, 322)	48%	(18%, 78%)
2030	319	(252, 386)	131%	(83%, 180%)	295	(232, 358)	63%	(28%, 98%)
2035	370	(288, 452)	168%	(109%, 228%)	317	(244, 390)	75%	(35%, 115%)

Figure 13.9: Malignant melanoma incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE MELANOMA INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter malignant melanoma incidence projections by reducing exposure to ultraviolet radiation (from sunshine or sun beds) which causes 86% of melanomas in the UK.
- Other risk factors which may have a lesser impact on future projections include:
  - Family history;
  - Skin characteristics - more moles, high density of freckles (or who had freckling as a child), light hair, light skin or eye colour and less ability to tan.
- Other potential factors that can influence malignant melanoma incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which melanoma is classified;
  - Revisions to population projections.

14 MULTIPLE MYELOMA (C90)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
66 PER YEAR	50 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
70 YEARS	75 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
AFFLUENT AREAS (FEMALES ONLY)	DEPRIVED AREAS (FEMALES ONLY)

NO VARIATION BY HSC TRUST

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+2.1% PER YEAR (1993-2013)	+0.6% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
NO CHANGE (1993-2013)	NO CHANGE (1993-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
-2%	-4%	-7%	-12%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+24% TO 82 CASES PER YEAR	+14% TO 57 CASES PER YEAR	+58% TO 104 CASES PER YEAR	+48% TO 74 CASES PER YEAR

14.1: BACKGROUND

An average of 116 cases (66 male, 50 female) of myeloma were diagnosed each year during 2009-2013 in Northern Ireland. It was the 15th most common male cancer diagnosed in this period making up 1.5% of all cancers (ex. NMSC), while it was the 18th most common female cancer making up 1.2% of cancers (ex. NMSC) diagnosed. As a proportion of the resident population in Northern Ireland there were 7.4 cases diagnosed per 100,000 males and 5.5 cases diagnosed per 100,000 females. The risk of developing myeloma before the age of 65 was 1 in 551 for men and 1 in 1,018 for women, while before age 85 it was 1 in 146 for men and 1 in 200 for women.

Cancer and age

Myeloma was more common among older people with a median age at diagnosis of 70 years for men and 75 years for women during 2009-2013. Overall 84.5% (80.3% male, 90.0% female) of cases occurred among those aged 60 and over, with 27.6% (22.7% male, 34.0% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 61 cases per 100,000 males and 38 cases per 100,000 females in this age group. Multiple myeloma was rare among those aged 40 to 49 with only 5 cases diagnosed each year, while there were no cases diagnosed among those aged under 40. (Tab. 14.1, Fig 14.1)

Figure 14.1: Incidence of multiple myeloma by sex and age: 2009-2013

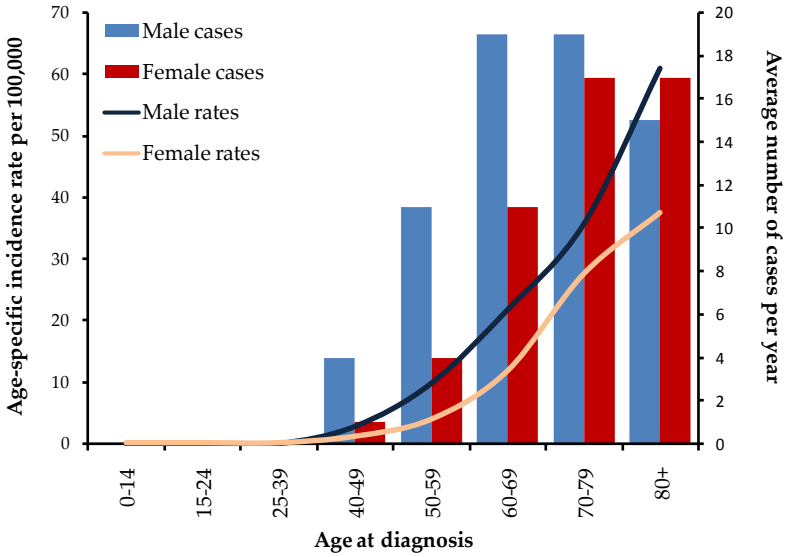


Table 14.1: Average number of multiple myelomas diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	0	0	0
25-39	0	0	0
40-49	4	1	5
50-59	11	4	15
60-69	19	11	30
70-79	19	17	36
80+	15	17	32
Total	66	50	116

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of myeloma did not vary significantly by HSC Trust despite slightly elevated rates among males living in the Western Trust, slightly elevated rates for females living in the South-Eastern Trust and slightly lower than average rates for females living in the Western Trust. (Tab. 14.2, Fig. 14.2)

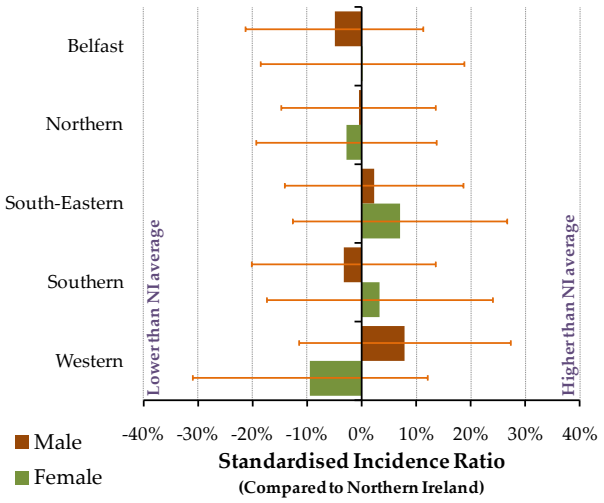
Table 14.2: Average number of multiple myelomas diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	13	11	24
	Northern	19	13	32
	South-Eastern	15	11	26
	Southern	13	10	23
	Western	12	7	19
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	17	12	29
	2 - 2nd least deprived	14	9	23
	3 - Average	15	10	25
	4 - 2nd most deprived	14	12	26
	5 - Most deprived	13	9	22

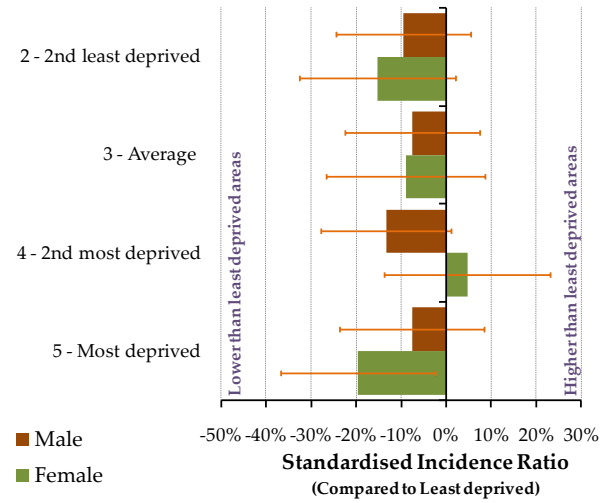
Age-standardised incidence rates in the most deprived areas of Northern Ireland were 19.5% lower for females than those in the least deprived areas during 2004-2013. However there was no significant difference between the most and least deprived areas among men. (Tab. 14.2, Fig. 14.2)

Figure 14.2: Age-standardised incidence rates of multiple myeloma by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

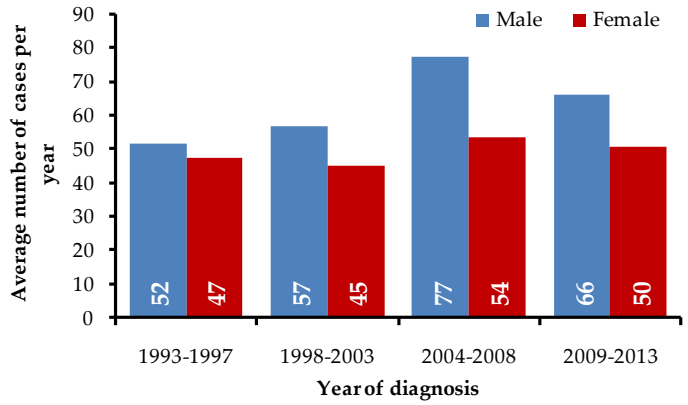


14.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 116 cases of myeloma (66 male, 50 female) diagnosed each year compared to an average of 99 myelomas (52 male, 47 female) in 1993-1997. (Tab. 14.3, Fig. 14.3)

Figure 14.3: Average number of cases of multiple myeloma diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases of myeloma increased by 2.1% per year for men between 1993 and 2013, and by 0.6% per year among women. (Tab. 14.3, Fig. 14.3)

Table 14.3: Number of cases of multiple myeloma diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	52	48	100
1994	47	46	93
1995	38	38	76
1996	52	45	97
1997	69	60	129
1998	51	39	90
1999	47	38	85
2000	51	59	110
2001	69	49	118
2002	61	39	100
2003	60	45	105
2004	64	48	112
2005	87	57	144
2006	80	69	149
2007	85	45	130
2008	70	49	119
2009	73	58	131
2010	50	52	102
2011	78	52	130
2012	61	41	102
2013	69	49	118

Trends in incidence rates

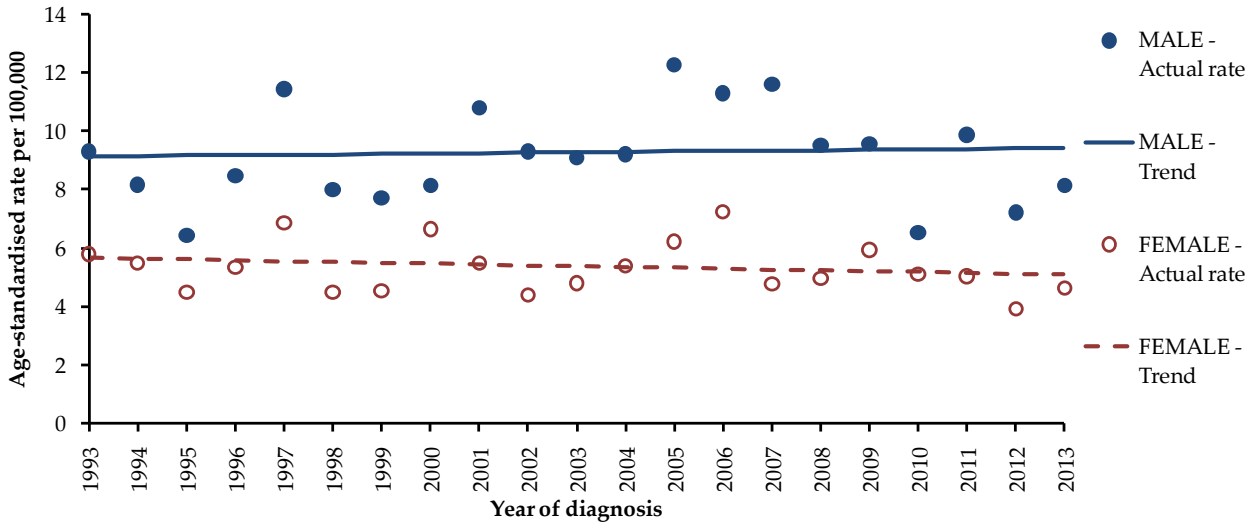
Myeloma incidence rates, adjusted for demographic change, were static over time for both sexes with very little change in age-standardised incidence rates between 1993 and 2013. (Tab. 14.4, Fig. 14.4)

Table 14.4: Annual percentage change in age-standardised multiple myeloma incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-2013	0.1% (-1.3%, 1.6%)	p=0.851
Female	1993-2013	-0.6% (-1.8%, 0.7%)	p=0.357

CI – Confidence interval; Significant trends are in bold

Figure 14.4: Trends in age-standardised multiple myeloma incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Age-standardised incidence rates of myeloma did not change significantly between 1993 and 2013 for any age group among males or females despite apparent decreases among the 0-49 age group for both sexes and in the 50-59 age groups among females. (Tab. 14.5, Fig. 14.5)

Figure 14.5: Trends in age-standardised multiple myeloma incidence rates by sex and age at diagnosis: 1993-2013

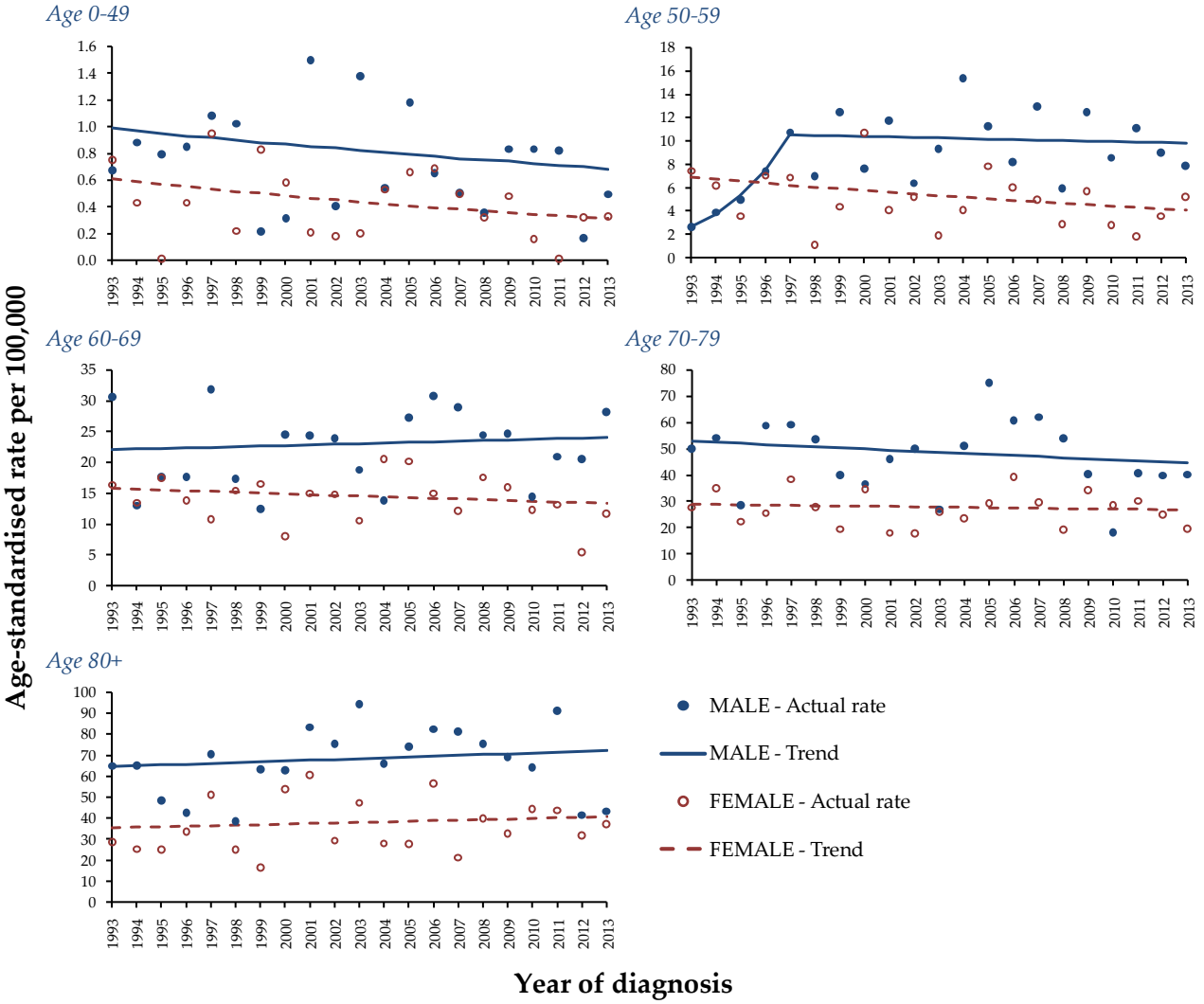


Table 14.5: Annual percentage change in age-standardised multiple myeloma incidence rates by sex and age: 1993-2013

AGE	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2013	-1.8% (-5.5%, 2.0%)	p=0.323	1993-2013	-3.3% (-10.0%, 3.8%)	p=0.331
50-59	1993-1997	41.8% (-6.8%, 115.6%)	p=0.097	1993-2013	-2.6% (-5.7%, 0.7%)	p=0.112
	1997-2013	-0.4% (-3.5%, 2.7%)	p=0.767			
60-69	1993-2013	0.4% (-1.6%, 2.5%)	p=0.655	1993-2013	-0.8% (-2.8%, 1.2%)	p=0.408
70-79	1993-2013	-0.8% (-3.0%, 1.4%)	p=0.444	1993-2013	-0.4% (-2.2%, 1.5%)	p=0.679
80+	1993-2013	0.5% (-1.5%, 2.6%)	p=0.585	1993-2013	0.7% (-1.8%, 3.3%)	p=0.572

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Incidence rates of myeloma, adjusted for population growth and ageing, did not change significantly between 1993 and 2013 for either males or females resident in any of the five HSC Trusts. (Tab. 14.6, Fig. 14.6)

Figure 14.6: Trends in age-standardised multiple myeloma incidence rates by sex and Trust of residence: 1993-2013

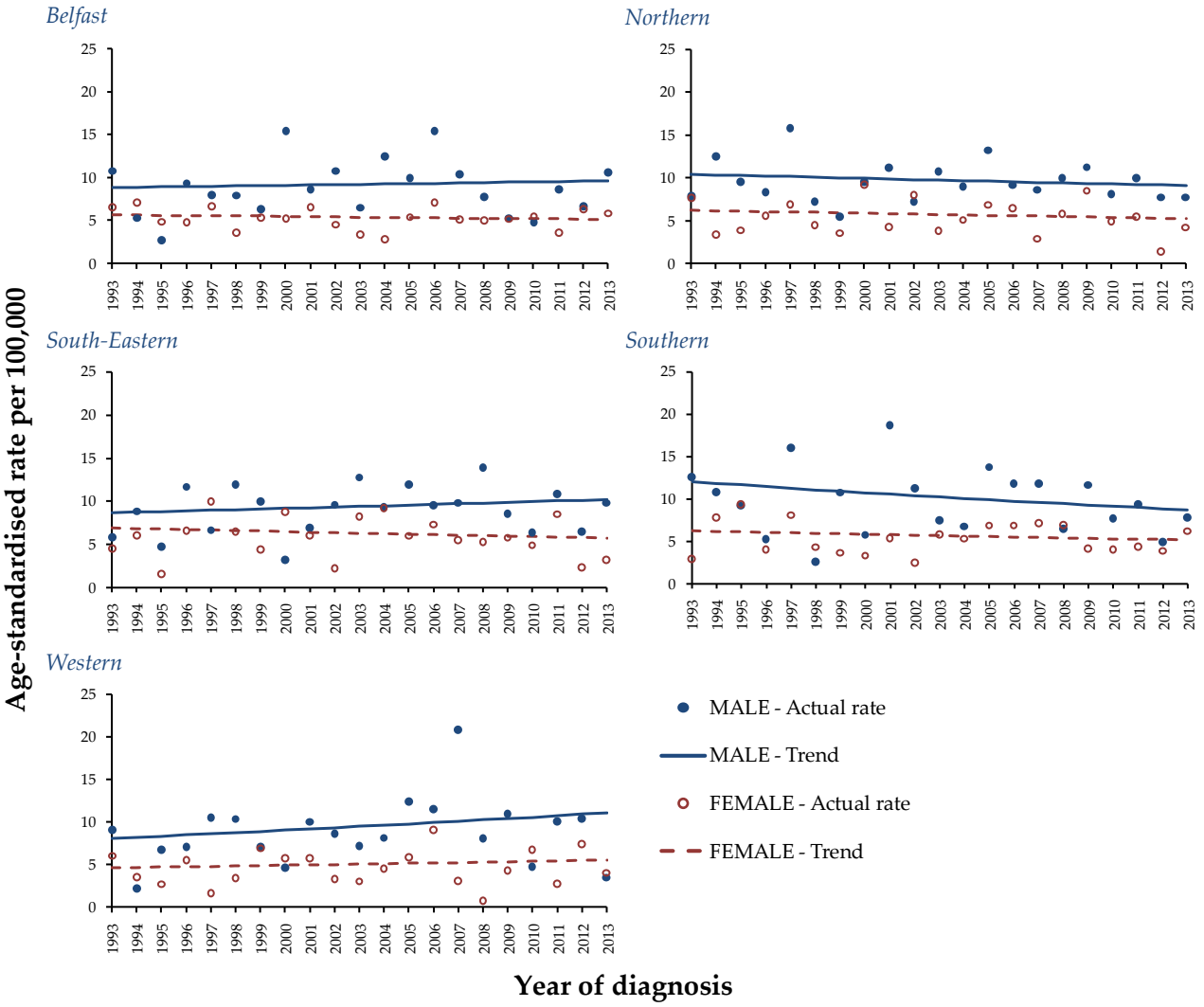


Table 14.6: Annual percentage change in age-standardised multiple myeloma incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	0.4% (-2.5%, 3.4%)	p=0.784	1993-2013	-0.4% (-2.1%, 1.3%)	p=0.604
Northern	1993-2013	-0.7% (-2.4%, 1.1%)	p=0.429	1993-2013	-0.8% (-3.6%, 2.2%)	p=0.588
South-Eastern	1993-2013	0.8% (-1.5%, 3.2%)	p=0.477	1993-2013	-0.9% (-4.0%, 2.2%)	p=0.544
Southern	1993-2013	-1.6% (-4.5%, 1.3%)	p=0.264	1993-2013	-1.0% (-3.5%, 1.6%)	p=0.424
Western	1993-2013	1.5% (-2.1%, 5.3%)	p=0.388	1993-2013	1.0% (-2.3%, 4.3%)	p=0.551

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

There was no significant change in age-standardised incidence rates of myeloma during 2001-2013 for either males or females resident in any of the five deprivation quintiles. However some noteworthy decreases occurred among males in the least deprived areas and areas of average deprivation and among females in the 2nd least deprived areas. Being non-significant these could be random occurrences. (Tab. 14.7, Fig. 14.7)

Figure 14.7: Trends in age-standardised multiple myeloma incidence rates by sex and deprivation: 2001-2013

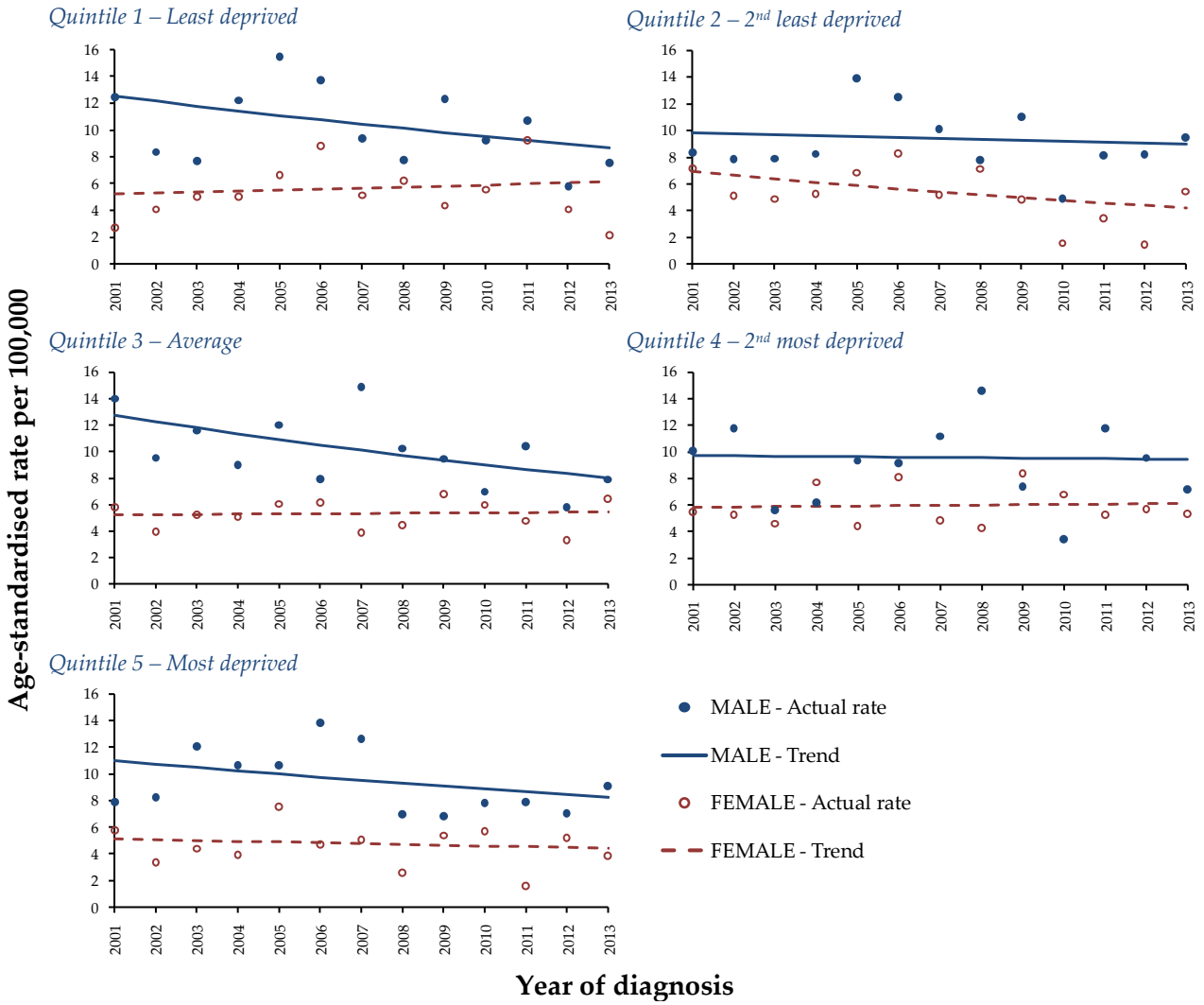


Table 14.7: Annual percentage change in age-standardised multiple myeloma incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	-3.0% (-7.3%, 1.4%)	p=0.161	2001-2013	1.3% (-5.9%, 9.1%)	p=0.700
Quintile 2 2nd least deprived	2001-2013	-0.8% (-4.9%, 3.6%)	p=0.704	2001-2013	-4.0% (-9.7%, 2.1%)	p=0.170
Quintile 3 Average	2001-2013	-3.8% (-7.4%, 0.0%)	p=0.051	2001-2013	0.3% (-3.2%, 4.0%)	p=0.840
Quintile 4 2nd most deprived	2001-2013	-0.2% (-5.7%, 5.5%)	p=0.926	2001-2013	0.4% (-3.7%, 4.6%)	p=0.842
Quintile 5 Most deprived	2001-2013	-2.4% (-6.2%, 1.6%)	p=0.208	2001-2013	-1.2% (-6.4%, 4.3%)	p=0.635

CI – Confidence interval; Significant trends are in bold

14.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

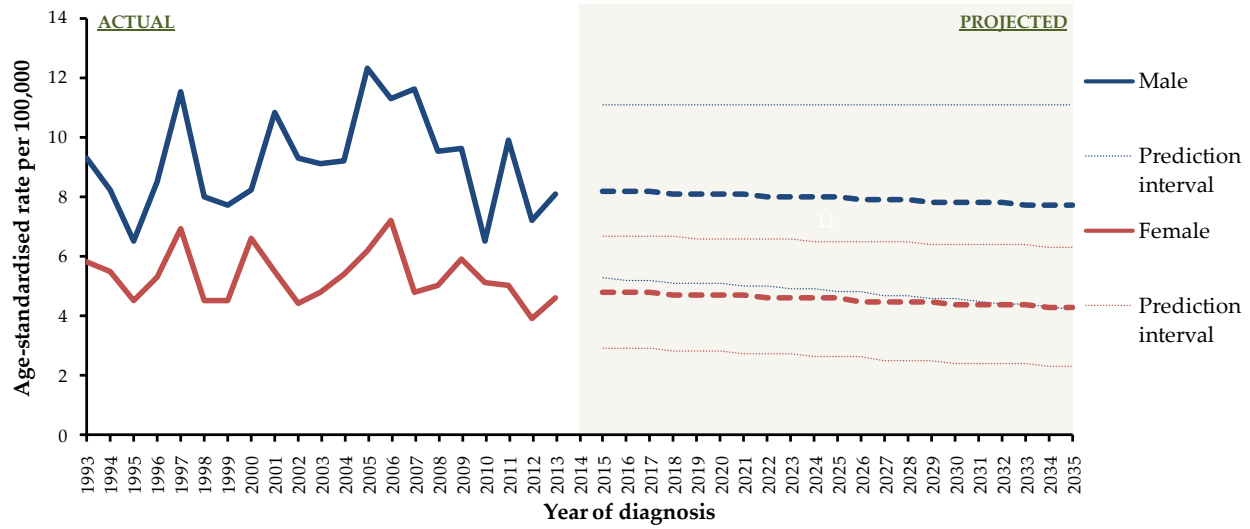
Age-standardised incidence rates of myeloma are expected to decline over the next twenty-two years for both males and females. Among males a 2% drop by 2020 is expected, while by 2035 a 7% drop is projected. Among females a 4% drop by 2020 is predicted, while by 2035 there is expected to be a 12% decrease. (Tab. 14.8, Fig. 14.8)

Table 14.8: Multiple myeloma age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	8.3				4.9			
2015	8.2	(5.3, 11.1)	-1%	(-36%, 34%)	4.8	(2.9, 6.7)	-2%	(-41%, 37%)
2020	8.1	(5.1, 11.1)	-2%	(-39%, 34%)	4.7	(2.8, 6.6)	-4%	(-43%, 35%)
2025	8.0	(4.8, 11.1)	-4%	(-42%, 34%)	4.6	(2.6, 6.5)	-6%	(-47%, 33%)
2030	7.8	(4.6, 11.1)	-6%	(-45%, 34%)	4.4	(2.4, 6.4)	-10%	(-51%, 31%)
2035	7.7	(4.2, 11.1)	-7%	(-49%, 34%)	4.3	(2.3, 6.3)	-12%	(-53%, 29%)

ASIR: Age-standardised incidence rate

Figure 14.8: Multiple myeloma age-standardised incidence rate projections to 2035 by sex



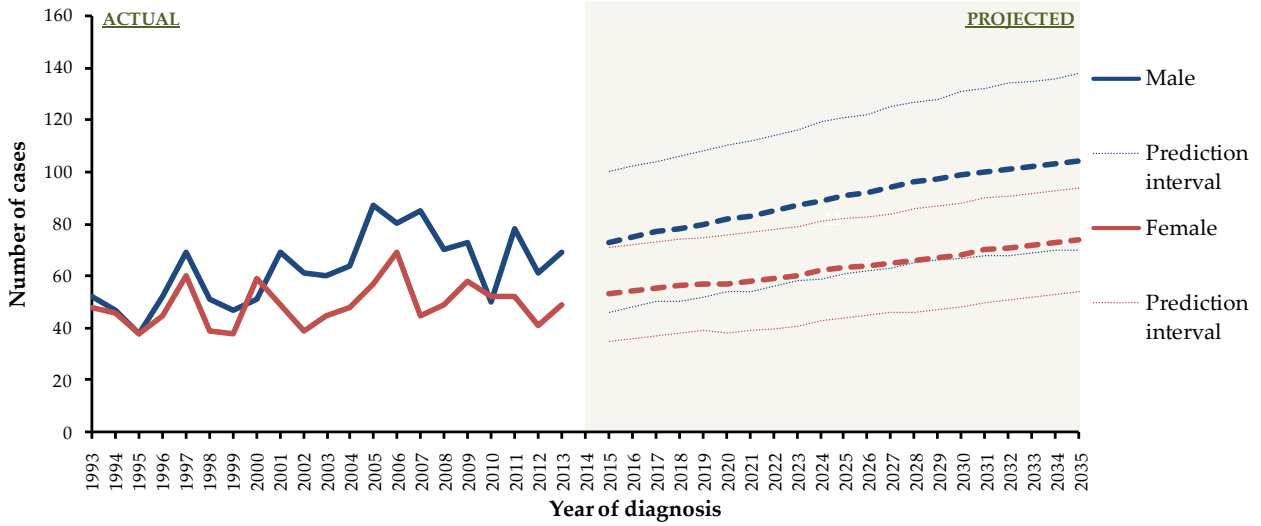
Case projections

Despite the decrease in age adjusted incidence rates, the projected growth in the elderly population is expected to result in an increase in the number of myeloma cases diagnosed. Compared to the 2009-2013 average the number of male cases is expected to rise by 24% to 82 cases in 2020, while among women the increase is expected to be 14% to 57 cases. By 2035 a 58% increase among males is projected, while a 48% increase is expected among women, thereby increasing the number of cases to 104 male and 74 females cases each year. (Tab. 14.9, Fig. 14.9)

Table 14.9: Multiple myeloma incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	66				50			
2015	73	(46, 100)	11%	(-30%, 52%)	53	(35, 71)	6%	(-30%, 42%)
2020	82	(54, 110)	24%	(-18%, 67%)	57	(38, 76)	14%	(-24%, 52%)
2025	91	(61, 121)	38%	(-8%, 83%)	63	(44, 82)	26%	(-12%, 64%)
2030	99	(67, 131)	50%	(2%, 98%)	68	(48, 88)	36%	(-4%, 76%)
2035	104	(70, 138)	58%	(6%, 109%)	74	(54, 94)	48%	(8%, 88%)

Figure 14.9: Multiple myeloma incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE MULTIPLE MYELOMA INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The risk factors associated with multiple myeloma are not well understood, thus limited potential exists to alter multiple myeloma incidence projections through control of risk factors.
- Some risk factors which may have a limited impact on future projections include:
  - Family history;
  - Immune deficiency;
  - The medical condition monoclonal gammopathy of undetermined significance.
- Other potential factors that can influence multiple myeloma incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which haematological cancers are classified and/or the rules regarding their registration as cancer;
  - Revisions to population projections.

15 Non-Hodgkin's Lymphoma (C82-C85)

Annual number of cases (2009-2013)

Male	Female
175 per year	150 per year

Median age at diagnosis (2009-2013)

Male	Female
68 years	70 years

Area of residence (2004-2013)

Rates higher in	Rates lower in
Affluent Areas (Males only)	Deprived Areas (Males only)
No HSC Trusts (Males & Females)	Western HSCT (Males only)

Average change in cases per year

Male	Female
+5.4% per year (2005-2013)	+1.6% per year (1993-2013)

Annual percentage change in rates

Male	Female
+3.5% per year (2005-2013)	No change (1993-2013)

Projected change in rates (compared to 2009-2013 average)

By 2020		By 2035	
Male	Female	Male	Female
+5%	+3%	+8%	+3%

Projected change in cases (compared to 2009-2013 average)

By 2020		By 2035	
Male	Female	Male	Female
+29% to 226 cases per year	+20% to 180 cases per year	+81% to 316 cases per year	+55% to 232 cases per year

15.1: Background

There was an average of 325 cases (175 male, 150 female) of non-Hodgkin's lymphoma diagnosed each year during 2009-2013. It was the 4th most common male cancer making up 3.9% of cancers (ex. NMSC), while it was the 7th most common female cancer making up 3.5% of cancers (ex. NMSC). There were 19.6 cases diagnosed per 100,000 males and 16.2 cases diagnosed per 100,000 females. The risk of developing non-Hodgkin's lymphoma before the age of 65 was 1 in 170 for men and 1 in 221 for women, while before age 85 it was 1 in 57 for men and 1 in 70 for women.

Cancer and age

Non-Hodgkin's lymphoma was more common among older people with a median age at diagnosis of 68 years for men and 70 years for women during 2009-2013. Overall 72.0% (70.3% male, 74.0% female) of cases occurred among those aged 60 and over, with 17.8% (17.1% male, 18.7% female) occurring among those aged 80 and over. Incidence rates were greatest among men aged 80 and over with 124 cases per 100,000 males in this age group, and among women aged 70 to 79 with 74 cases per 100,000 females in this age group. Non-Hodgkin's lymphoma was occasionally diagnosed among children and young people with 2 cases per year among those aged 0 to 14 and 4 cases per year among those aged 15 to 24. (Tab. 15.1, Fig 15.1)

Figure 15.1: Incidence of non-Hodgkin's lymphoma by sex and age: 2009-2013

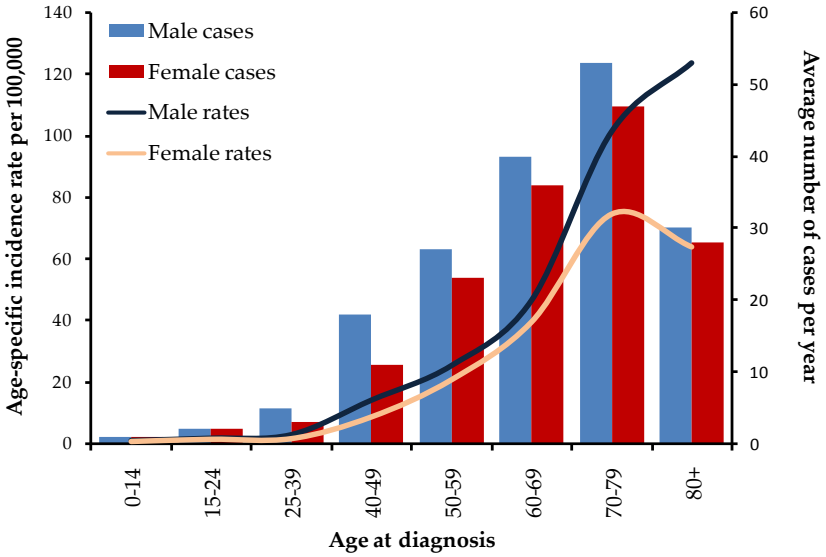


Table 15.1: Average number of non-Hodgkin's lymphomas diagnosed per year by sex and age: 2009-2013

Age	Cases per year		
	Male	Female	Total
0-14	1	1	2
15-24	2	2	4
25-39	5	3	8
40-49	18	11	29
50-59	27	23	50
60-69	40	36	76
70-79	53	47	100
80+	30	28	58
Total	175	150	325

Cancer and area of residence

During 2009-2013 age-standardised incidence rates of non-Hodgkin's lymphoma were 14.7% lower than the Northern Ireland average in the Western Trust for men. Other than this difference there was no significant variation in rates of this cancer by HSC Trust despite slightly elevated rates in the South-Eastern Trust for males and the Southern and Northern Trusts for females. (Tab. 15.2, Fig. 15.2)

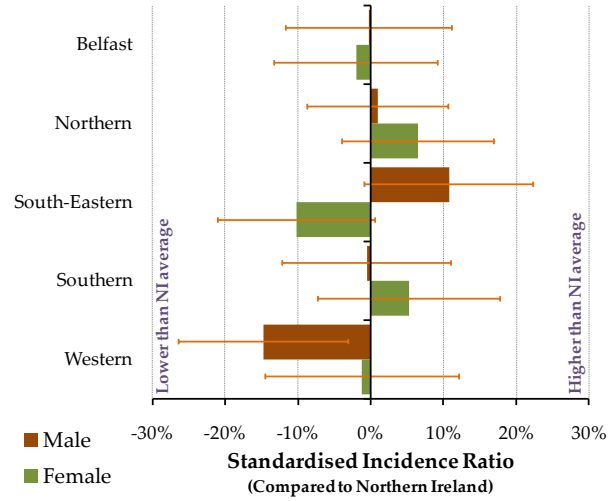
Table 15.2: Average number of non-Hodgkin's lymphomas diagnosed per year by sex and area of residence: 2004-2013

Area of Residence		Cases per year		
		Male	Female	Total
Health & Social Care Trust	Belfast	29	29	58
	Northern	41	40	81
	South-Eastern	35	26	61
	Southern	28	27	55
	Western	21	21	42
Area Based Deprivation Quintile	1 - Least deprived	37	29	66
	2 - 2nd least deprived	31	26	57
	3 - Average	30	30	60
	4 - 2nd most deprived	30	31	61
	5 - Most deprived	27	27	54

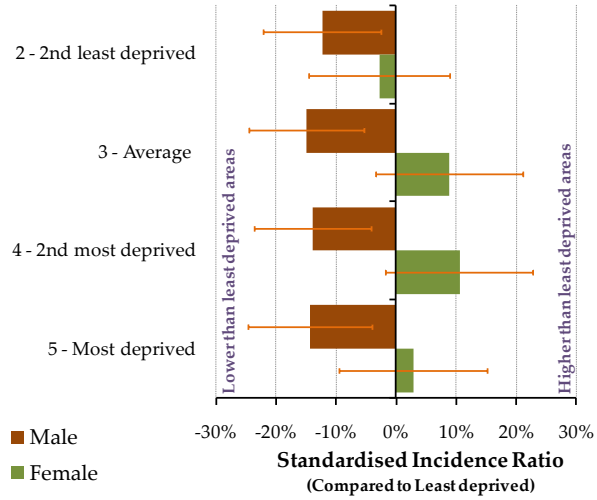
Age-standardised incidence rates of non-Hodgkin's lymphoma were 14.3% lower in the most deprived areas of Northern Ireland than those in the least deprived areas for men during 2004-2013. However there was no significant variation in rates by area-based socio-economic status among women. (Tab. 15.2, Fig. 15.2)

Figure 15.2: Age-standardised incidence rates of non-Hodgkin's lymphoma by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

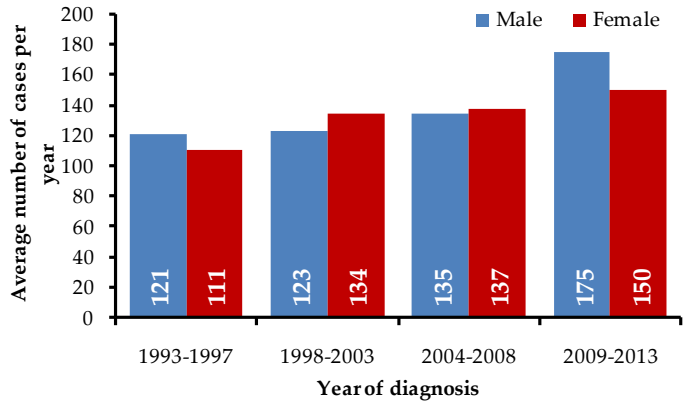


15.2: INCIDENCE TRENDS

Trends in cases

In 2009-2013 there were 325 cases of non-Hodgkin's lymphoma (175 male, 150 female) diagnosed each year compared to 232 per year (121 male, 111 female) in 1993-1997. (Tab. 15.3, Fig. 15.3)

Figure 15.3: Average number of cases of non-Hodgkin's lymphoma diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases increased by 5.4% per year for men between 2005 and 2013, prior to which there was very little change. Among women the number of cases increased steadily between 1993 and 2013 by an average of 1.6% per year. (Tab. 15.3, Fig. 15.3)

Table 15.3: Number of cases of non-Hodgkin's lymphoma diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	133	103	236
1994	105	115	220
1995	117	96	213
1996	125	120	245
1997	125	120	245
1998	118	142	260
1999	112	136	248
2000	135	134	269
2001	116	139	255
2002	125	123	248
2003	131	130	261
2004	134	146	280
2005	122	137	259
2006	132	119	251
2007	137	156	293
2008	148	127	275
2009	145	137	282
2010	166	158	324
2011	197	164	361
2012	193	151	344
2013	172	141	313

Trends in incidence rates

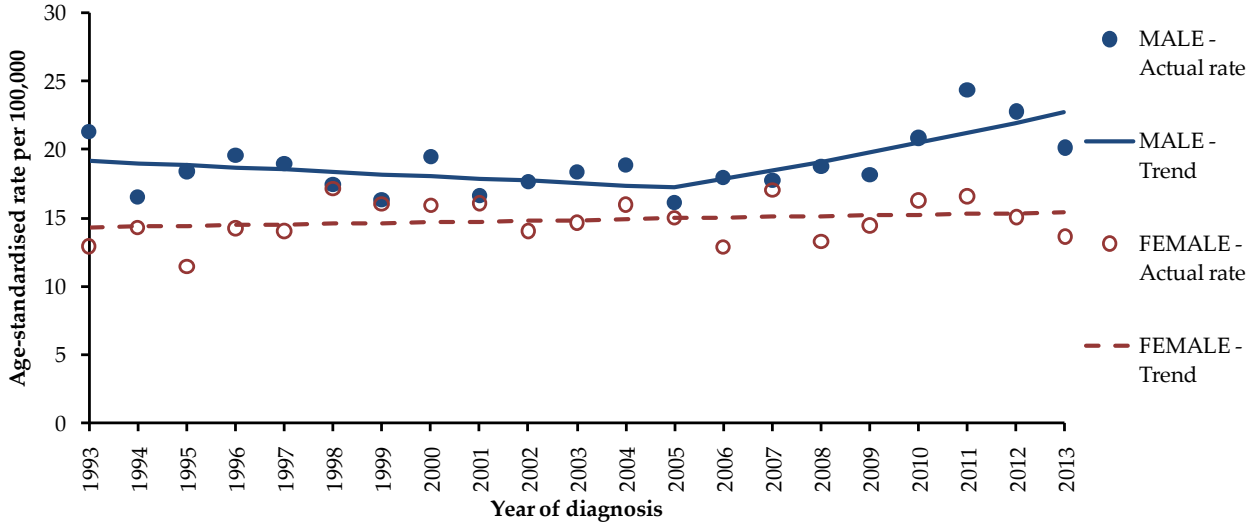
Non-Hodgkin's lymphoma incidence rates declined slightly, but not significantly, among men during 1993-2005; however rates increased after 2005 by an average of 3.5% per year (p=0.011). Among women incidence rates did not change significantly during 1993-2013. (Tab. 15.4, Fig. 15.4)

Table 15.4: Annual percentage change in age-standardised non-Hodgkin's lymphoma incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-2005	-0.9% (-2.4%, 0.7%)	p=0.246
	2005-2013	**3.5% (0.9%, 6.2%)**	**p=0.011**
Female	1993-2013	0.4% (-0.4%, 1.1%)	p=0.328

CI – Confidence interval; Significant trends are in bold

Figure 15.4: Trends in age-standardised non-Hodgkin's lymphoma incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

The trend in non-Hodgkin's lymphoma incidence rates varied considerably by age for males with the greatest increases in the 70-79 (+1.9% per year, p=0.008) and 80 and over (+2.7% per year, p=0.013) age groups with a 1.9% per year (p=0.012) decrease among those aged 0-49. Among women however rates remained reasonably constant for each age group with no significant changes despite some fluctuations among those aged 80 and over. (Tab. 15.5, Fig. 15.5)

Figure 15.5: Trends in age-standardised non-Hodgkin's lymphoma incidence rates by sex and age at diagnosis: 1993-2013

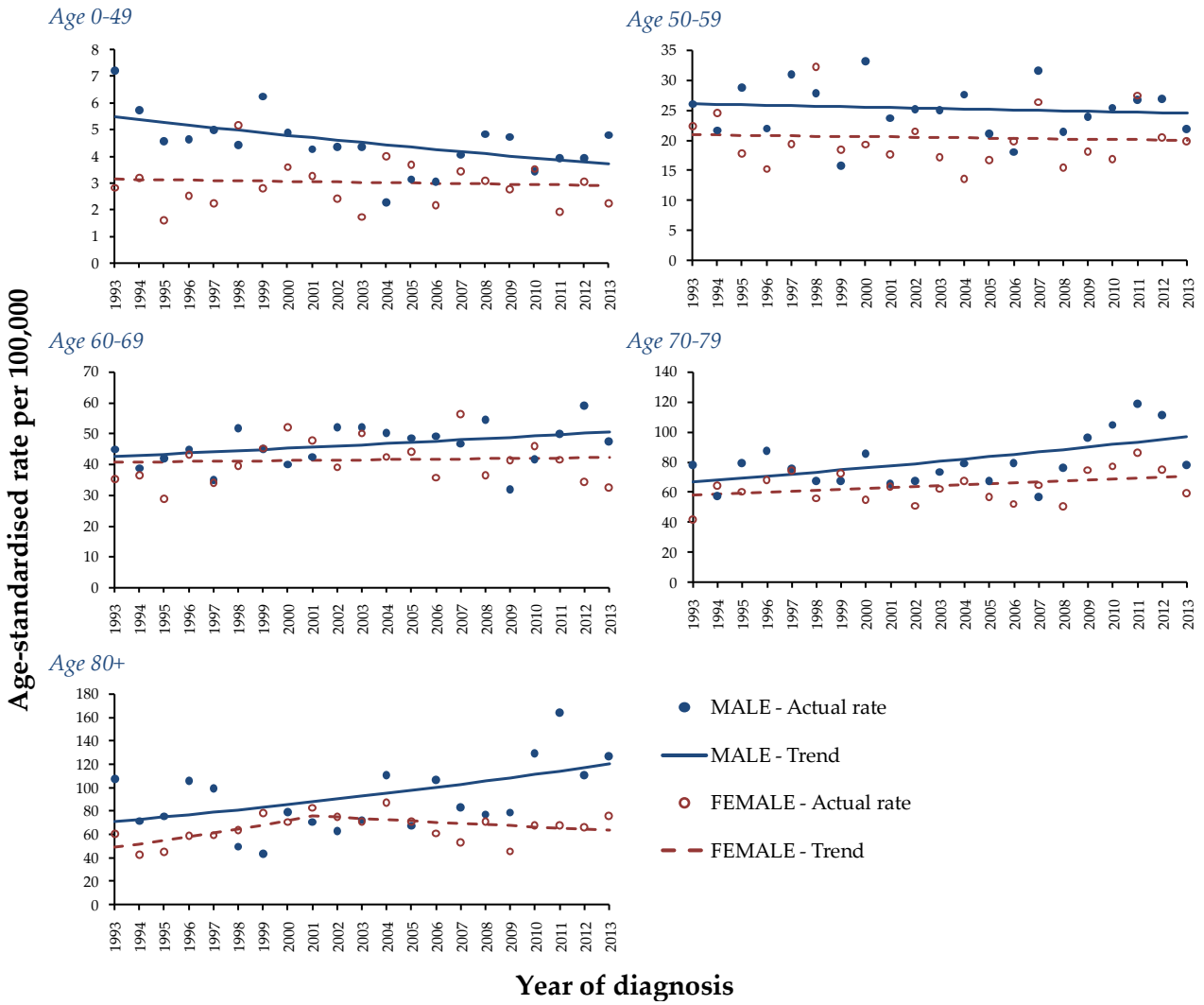


Table 15.5: Annual percentage change in age-standardised non-Hodgkin's lymphoma incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**-1.9% (-3.4%, -0.5%)**	**p=0.012**	1993-2013	-0.4% (-2.6%, 1.9%)	p=0.711
50-59	1993-2013	-0.3% (-1.6%, 1.0%)	p=0.638	1993-2013	-0.2% (-1.9%, 1.5%)	p=0.783
60-69	1993-2013	0.9% (-0.2%, 1.9%)	p=0.106	1993-2013	0.2% (-1.1%, 1.5%)	p=0.774
70-79	**1993-2013**	**1.9% (0.5%, 3.2%)**	**p=0.008**	1993-2013	1.0% (-0.2%, 2.2%)	p=0.108
80+	**1993-2013**	**2.7% (0.6%, 4.7%)**	**p=0.013**	1993-2001 2001-2013	5.6% (-0.1%, 11.5%) -1.5% (-3.9%, 1.1%)	p=0.053 p=0.232

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

In the Belfast and Western Trusts male incidence rates of non-Hodgkin's lymphoma were virtually static during 1993-2013, however rates in the Northern and South-Eastern Trusts increased by 1.7% (p=0.026) and 2.7% (p=0.002) per year respectively, while in the Southern Trust rates increased during 1993-2005 but decreased again during 2005-2013. Among women there was no significant change over time in any HSC Trust. (Tab. 15.6, Fig. 15.6)

Figure 15.6: Trends in age-standardised non-Hodgkin's lymphoma incidence rates by sex and Trust of residence: 1993-2013

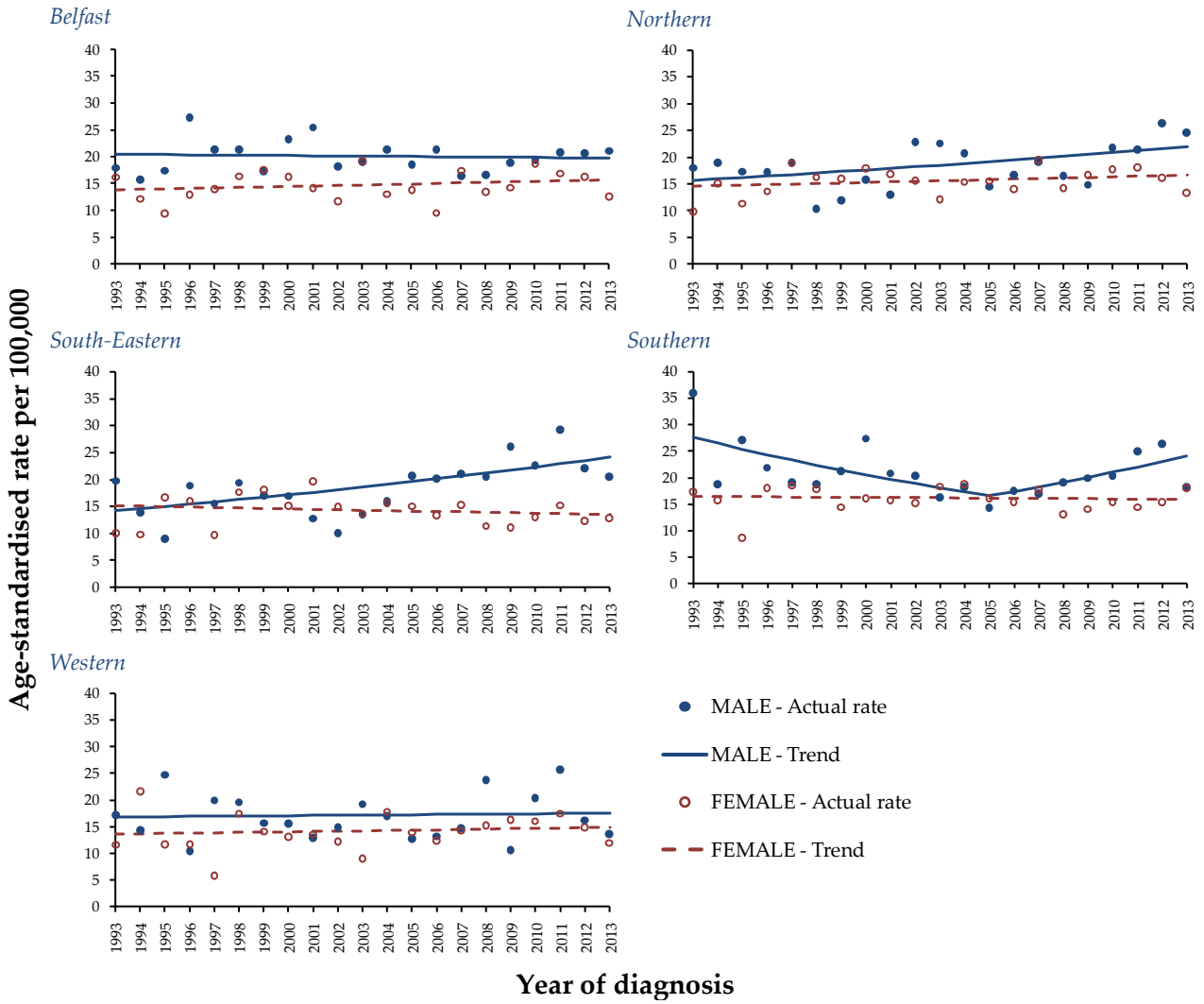


Table 15.6: Annual percentage change in age-standardised non-Hodgkin's lymphoma incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	-0.2% (-1.3%, 1.0%)	p=0.770	1993-2013	0.6% (-0.8%, 2.1%)	p=0.370
Northern	**1993-2013**	**1.7% (0.2%, 3.3%)**	**p=0.026**	1993-2013	0.7% (-0.5%, 1.9%)	p=0.216
South-Eastern	**1993-2013**	**2.7% (1.1%, 4.3%)**	**p=0.002**	1993-2013	-0.6% (-2.1%, 0.9%)	p=0.428
Southern	**1993-2005**	**-4.2% (-7.3%, -1.0%)**	**p=0.013**	1993-2013	-0.2% (-1.3%, 1.0%)	p=0.764
	2005-2013	4.8% (-1.0%, 11.0%)	p=0.099			
Western	1993-2013	0.2% (-1.8%, 2.2%)	p=0.841	1993-2013	0.4% (-1.4%, 2.2%)	p=0.643

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Non-Hodgkin's lymphoma incidence rates increased for males living in each of the five deprivation quintiles except for the most deprived quintile. However the increases were only statistically significant in quintiles 2 (+4.1% per year, p=0.010) and 4 (+3.3% per year, p=0.011). Among women there was no significant trend in non-Hodgkin's lymphoma rates for any of the five deprivation quintiles. (Tab. 15.7, Fig. 15.7)

Figure 15.7: Trends in age-standardised non-Hodgkin's lymphoma incidence rates by sex and deprivation: 2001-2013

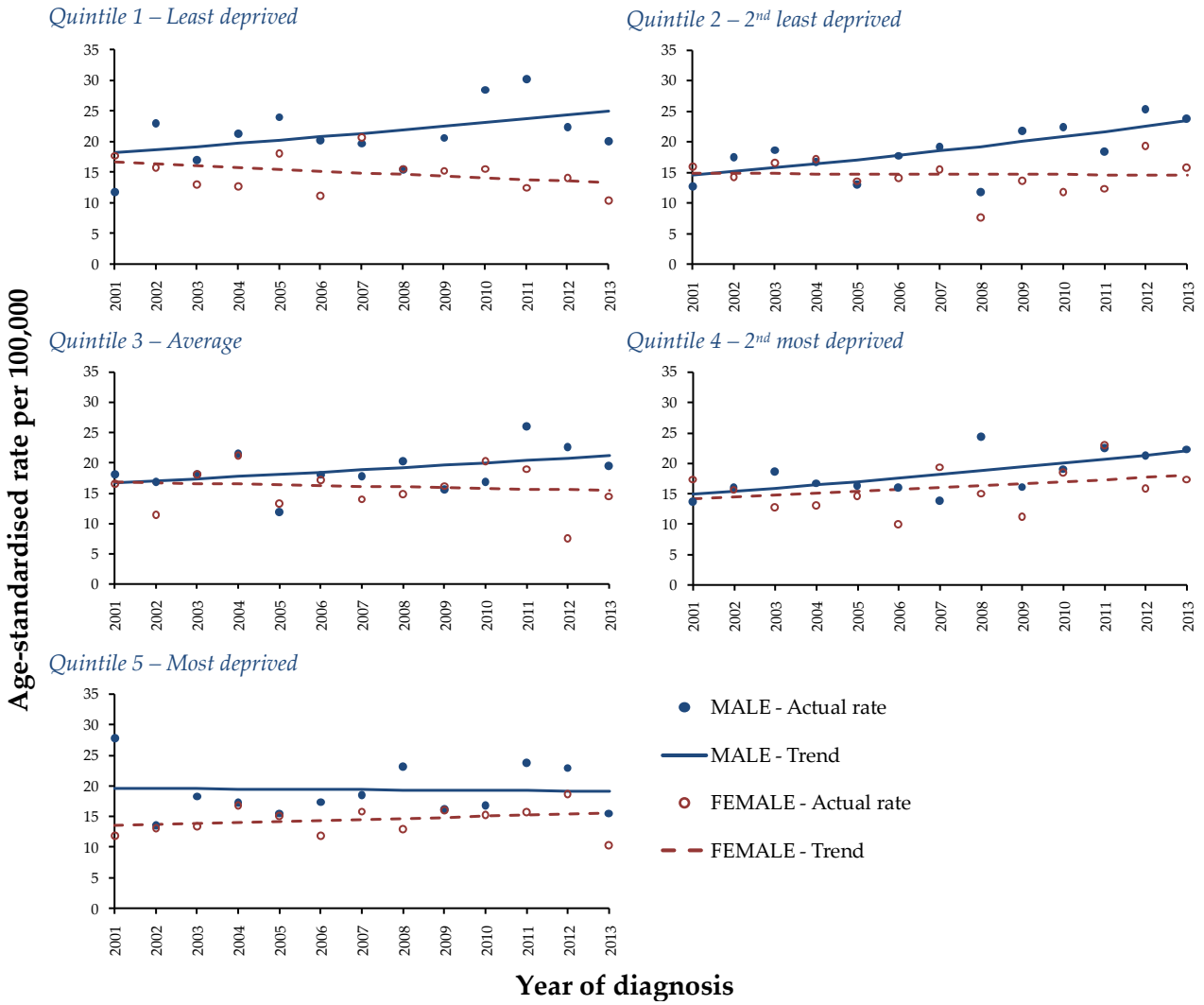


Table 15.7: Annual percentage change in age-standardised non-Hodgkin's lymphoma incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	2.7% (-1.0%, 6.5%)	p=0.138	2001-2013	-1.9% (-5.0%, 1.4%)	p=0.225
Quintile 2 2nd least deprived	**2001-2013**	**4.1% (1.2%, 7.1%)**	**p=0.010**	2001-2013	-0.2% (-3.4%, 3.2%)	p=0.906
Quintile 3 Average	2001-2013	2.0% (-0.9%, 5.0%)	p=0.153	2001-2013	-0.8% (-4.8%, 3.4%)	p=0.679
Quintile 4 2nd most deprived	**2001-2013**	**3.3% (0.9%, 5.8%)**	**p=0.011**	2001-2013	2.1% (-1.4%, 5.6%)	p=0.218
Quintile 5 Most deprived	2001-2013	-0.2% (-3.7%, 3.5%)	p=0.911	2001-2013	1.2% (-1.5%, 4.0%)	p=0.344

CI – Confidence interval; Significant trends are in bold

15.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

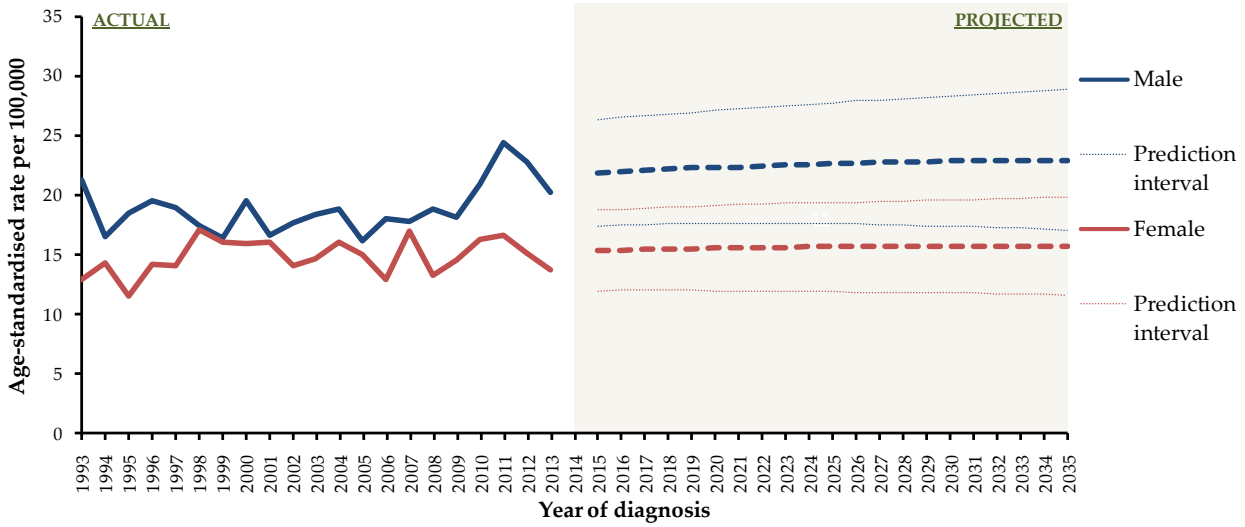
Incidence rates of non-Hodgkin's lymphoma, adjusted for population growth and ageing, are expected to rise by 5% among males between 2009-2013 and 2020, and by 8% between 2009-2013 and 2035. Among women however the increase is smaller with a 3% increase between 2009-2013 and 2020. After 2020 rates are expected to remain fairly constant up to 2035. (Tab. 15.8, Fig. 15.8)

Table 15.8: Non-Hodgkin's lymphoma age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	21.3				15.2			
2015	21.9	(17.4, 26.3)	3%	(-18%, 23%)	15.4	(12.0, 18.8)	1%	(-21%, 24%)
2020	22.4	(17.6, 27.1)	5%	(-17%, 27%)	15.6	(12.0, 19.1)	3%	(-21%, 26%)
2025	22.7	(17.6, 27.7)	7%	(-17%, 30%)	15.7	(12.0, 19.4)	3%	(-21%, 28%)
2030	22.9	(17.4, 28.3)	8%	(-18%, 33%)	15.7	(11.8, 19.6)	3%	(-22%, 29%)
2035	22.9	(17.0, 28.9)	8%	(-20%, 36%)	15.7	(11.6, 19.8)	3%	(-24%, 30%)

ASIR: Age-standardised incidence rate

Figure 15.8: Non-Hodgkin's lymphoma age-standardised incidence rate projections to 2035 by sex



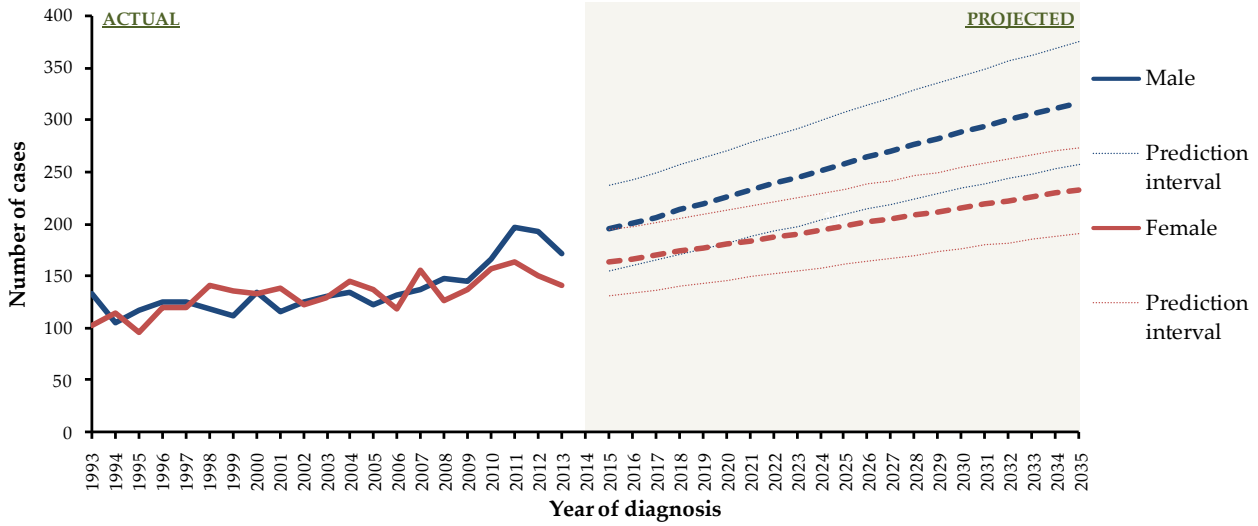
Case projections

Due to the projected growth in the elderly population and the slight increase in incidence rates, the number of cases of non-Hodgkin's lymphoma diagnosed each year is expected to increase. In 2009-2013 there were 175 male and 150 female cases diagnosed each year. By 2020 this is expected to increase to 226 (+29%) male and 180 (+20%) female cases per year, while by 2035 an increase to 316 (+81%) male and 232 (+55%) female cases per year is forecast. (Tab. 15.9, Fig. 15.9)

Table 15.9: Non-Hodgkin's lymphoma incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	175				150			
2015	196	(155, 237)	12%	(-11%, 35%)	163	(131, 195)	9%	(-13%, 30%)
2020	226	(182, 270)	29%	(4%, 54%)	180	(146, 214)	20%	(-3%, 43%)
2025	258	(209, 307)	47%	(19%, 75%)	197	(161, 233)	31%	(7%, 55%)
2030	288	(234, 342)	65%	(34%, 95%)	215	(176, 254)	43%	(17%, 69%)
2035	316	(257, 375)	81%	(47%, 114%)	232	(191, 273)	55%	(27%, 82%)

Figure 15.9: Non-Hodgkin's lymphoma incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE NON-HODGKIN'S LYMPHOMA INCIDENCE PROJECTIONS (SEE SECTION 24 FOR FURTHER DISCUSSION)

- The risk factors associated with non-Hodgkin's lymphoma are not well understood, thus limited potential exists to alter non-Hodgkin's lymphoma incidence projections through control of risk factors.
- Some risk factors which may have a limited impact on future projections include:
    - Family history;
    - Immune deficiency;
    - Exposure to benzene, ethylene oxide, and formaldehyde.
- Other potential factors that can influence non-Hodgkin's lymphoma incidence projections include:
    - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
    - Changes to the way in which lymphomas are classified and/or the rules regarding their registration as cancer;
    - Revisions to population projections.

16 Oesophageal Cancer (C15)

Annual number of cases (2009-2013)

Male	Female
127 per year	65 per year

Median age at diagnosis (2009-2013)

Male	Female
69 years	74 years

Area of residence (2004-2013)

Rates higher in	Rates lower in
Deprived Areas (Males & Females)	Affluent Areas (Males & Females)

No variation by HSC Trust

Average change in cases per year

Male	Female
+2.4% per year (1993-2013)	+0.6% per year (1993-2013)

Annual percentage change in rates

Male	Female
No change (1993-2013)	No change (1993-2013)

Projected change in rates (compared to 2009-2013 average)

By 2020		By 2035	
Male	Female	Male	Female
+3%	-8%	+3%	-17%

Projected change in cases (compared to 2009-2013 average)

By 2020		By 2035	
Male	Female	Male	Female
+28% to 163 cases per year	+11% to 72 cases per year	+69% to 215 cases per year	+32% to 86 cases per year

16.1: Background

An average of 192 cases (127 male, 65 female) of oesophageal cancer were diagnosed each year during 2009-2013. It was the 10th most common male cancer diagnosed in this period making up 2.9% of cancers (ex. NMSC), while it was the 14th most common female cancer making up 1.5% of cancers (ex. NMSC) diagnosed. There were 14.3 cases diagnosed per 100,000 males and 7.0 cases diagnosed per 100,000 females. The risk of developing oesophageal cancer before the age of 65 was 1 in 234 for men and 1 in 707 for women, while before age 85 it was 1 in 75 for men and 1 in 166 for women.

Cancer and age

Oesophageal cancer was more common among older people with a median age at diagnosis of 69 years for men and 74 years for women during 2009-2013. Overall 81.3% (78.7% male, 86.2% female) of cases were among those aged 60 and over, with 22.4% (16.5% male, 33.8% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 86 cases per 100,000 males and 50 cases per 100,000 females in this age group. Oesophageal cancer was rare among those aged 25 to 39 with only one case diagnosed each year, while there were no cases diagnosed among those aged under 25. (Tab. 16.1, Fig 16.1)

Figure 16.1: Incidence of oesophageal cancer by sex and age: 2009-2013

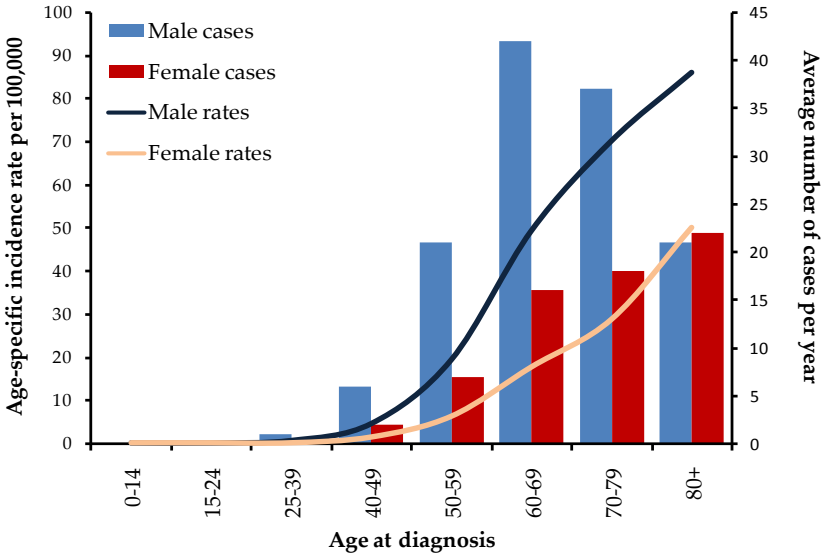


Table 16.1: Average number of oesophageal cancers diagnosed per year by sex and age: 2009-2013

Age	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	0	0	0
25-39	1	0	1
40-49	6	2	8
50-59	21	7	28
60-69	42	16	58
70-79	37	18	55
80+	21	22	43
Total	127	65	192

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of oesophageal cancer did not vary significantly by HSC Trust despite slightly lower rates in the Western Trust for males and females and higher than average rates in the Belfast Trust for women. (Tab. 16.2, Fig. 16.2)

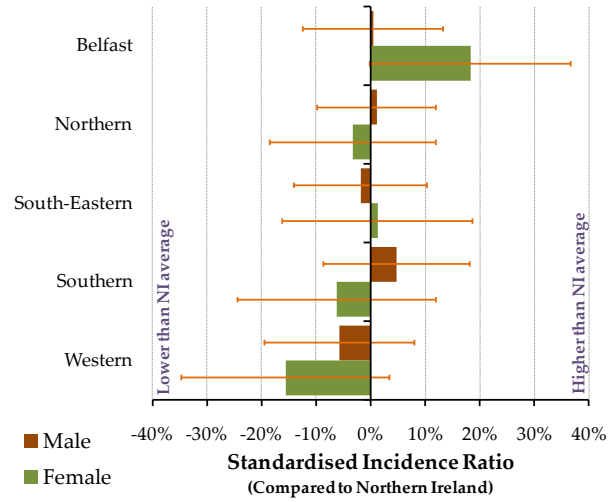
Table 16.2: Average number of oesophageal cancers diagnosed per year by sex and area of residence: 2004-2013

Area of Residence		Cases per year		
		Male	Female	Total
Health & Social Care Trust	Belfast	23	16	39
	Northern	33	16	49
	South-Eastern	25	13	38
	Southern	24	10	34
	Western	18	8	26
Area Based Deprivation Quintile	1 - Least deprived	22	10	32
	2 - 2nd least deprived	24	12	36
	3 - Average	24	13	37
	4 - 2nd most deprived	28	14	42
	5 - Most deprived	24	13	37

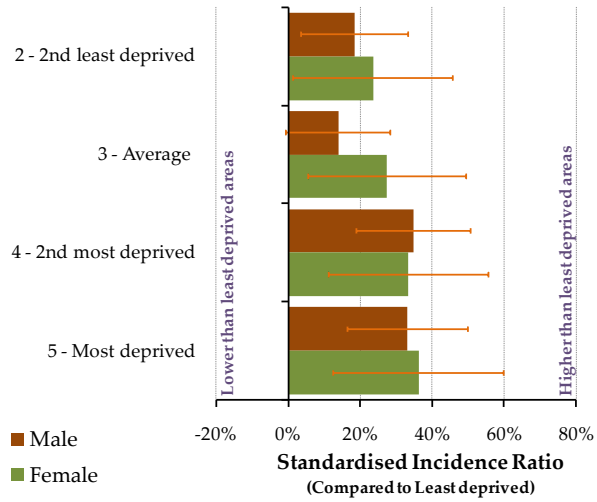
The age-standardised incidence rate of oesophageal cancer in the most deprived areas of Northern Ireland was 33.2% higher than in the least deprived areas for men and 36.3% higher than in the least deprived areas for women. The least deprived areas also had a significantly lower incidence rate than all other deprivation quintiles for both sexes except for males living in areas with average levels of deprivation. (Tab. 16.2, Fig. 16.2)

Figure 16.2: Age-standardised incidence rates of oesophageal cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

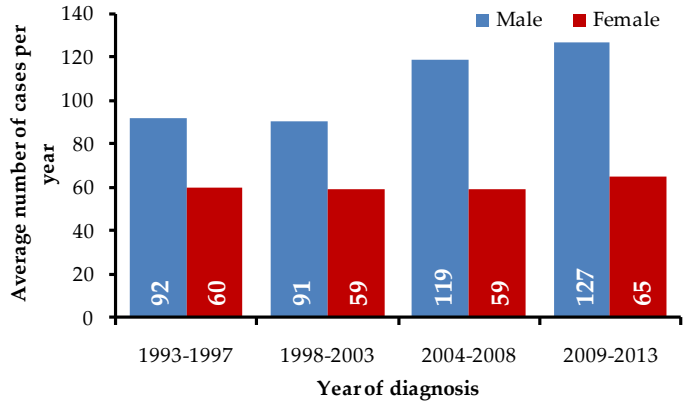


16.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 192 oesophageal cancers (127 male, 65 female) diagnosed each year compared to an average of 152 cancers (92 male, 60 female) in 1993-1997. (Tab. 16.3, Fig. 16.3)

Figure 16.3: Average number of cases of oesophageal cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of oesophageal cancer cases increased by 2.4% per year among men between 1993 and 2013, while the number of cases increased by 0.6% per year among women. (Tab. 16.3, Fig. 16.3)

Table 16.3: Number of cases of oesophageal cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	88	56	144
1994	100	52	152
1995	96	56	152
1996	78	61	139
1997	97	74	171
1998	100	53	153
1999	92	61	153
2000	70	69	139
2001	102	62	164
2002	84	58	142
2003	95	52	147
2004	107	53	160
2005	112	49	161
2006	121	59	180
2007	126	71	197
2008	127	62	189
2009	114	58	172
2010	121	66	187
2011	125	61	186
2012	139	75	214
2013	136	65	201

Trends in incidence rates

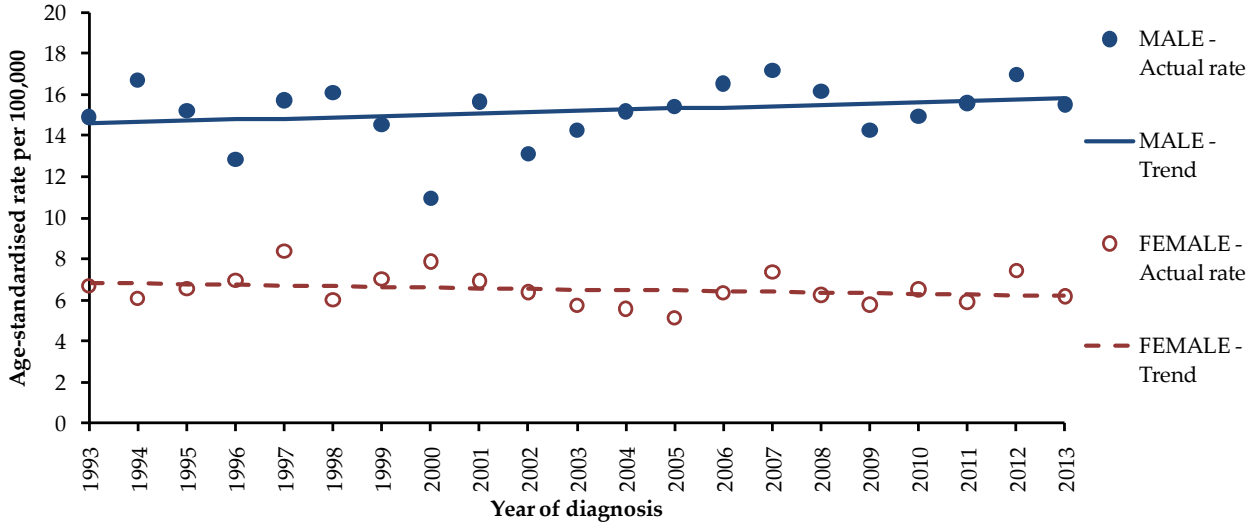
Oesophageal cancer incidence rates which have been adjusted for the growth and ageing of the population were static over time for both men and women with very little change between 1993 and 2013. (Tab. 16.4, Fig. 16.4)

Table 16.4: Annual percentage change in age-standardised oesophageal cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-2013	0.4% (-0.3%, 1.1%)	p=0.247
Female	1993-2013	-0.5% (-1.4%, 0.4%)	p=0.296

CI – Confidence interval; Significant trends are in bold

Figure 16.4: Trends in age-standardised oesophageal cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Incidence rates of oesophageal cancer increased slightly among males aged 70-79 and aged 80 and over, while rates decreased slightly among males aged 0-49, however none of these changes were statistically significant. Among females aged 70-79 and aged 80 and over there were also decreases in rates however only the decrease among 70-79 year olds was statistically significant. (Tab. 16.5, Fig. 16.5)

Figure 16.5: Trends in age-standardised oesophageal cancer incidence rates by sex and age at diagnosis: 1993-2013

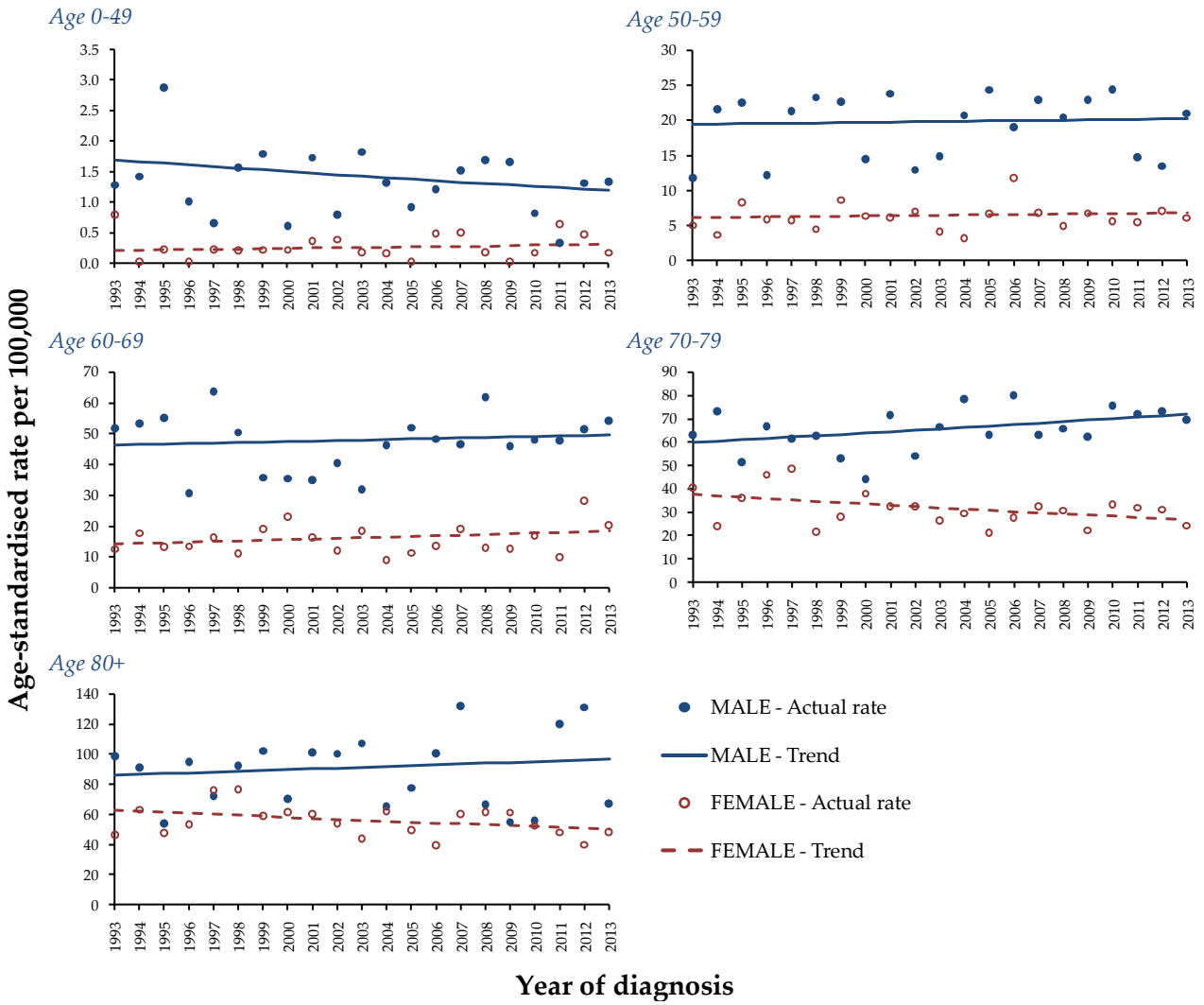


Table 16.5: Annual percentage change in age-standardised oesophageal cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2013	-1.7% (-4.5%, 1.2%)	p=0.235	1993-2013	2.2% (-6.9%, 12.2%)	p=0.625
50-59	1993-2013	0.2% (-1.5%, 2.0%)	p=0.787	1993-2013	0.5% (-1.8%, 2.9%)	p=0.659
60-69	1993-2013	0.3% (-1.0%, 1.8%)	p=0.607	1993-2013	1.3% (-0.9%, 3.5%)	p=0.224
70-79	1993-2013	0.9% (-0.1%, 1.9%)	p=0.066	**1993-2013**	**-1.7% (-3.2%, -0.1%)**	**p=0.037**
80+	1993-2013	0.6% (-1.5%, 2.8%)	p=0.568	1993-2013	-1.1% (-2.4%, 0.2%)	p=0.093

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

While at Northern Ireland level there was no trend in oesophageal cancer, at Trust level there was an increase of 1.6% per year (p=0.042) in incidence rates of oesophageal cancer in the Northern Trust among males and a non-significant increase of 1.4% per year (p=0.069) in the Southern Trust. Oesophageal cancer incidence rates did not change significantly among women resident in any of the five HSC trusts during 1993-2013. (Tab. 16.6, Fig. 16.6)

Figure 16.6: Trends in age-standardised oesophageal cancer incidence rates by sex and Trust of residence: 1993-2013

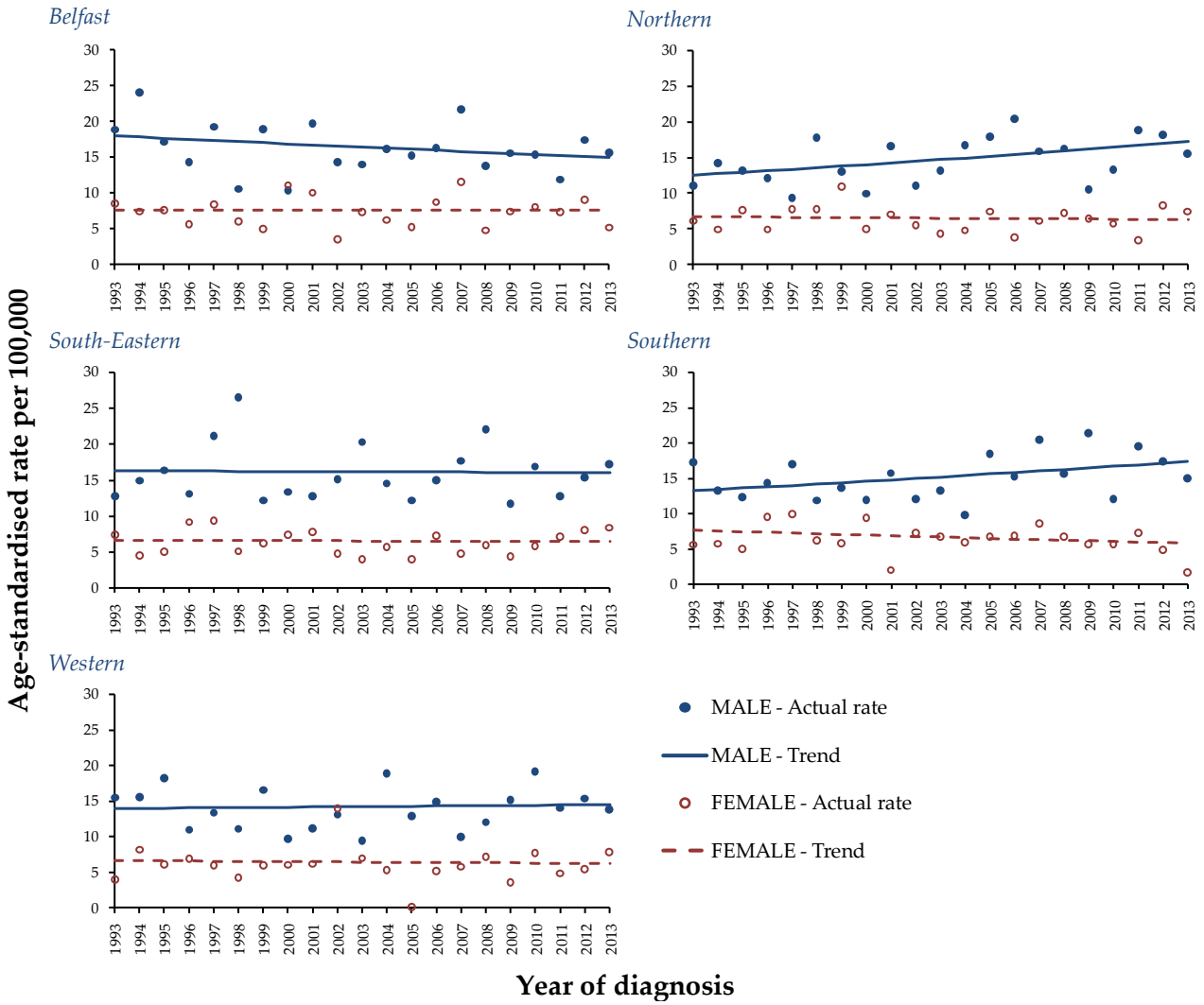


Table 16.6: Annual percentage change in age-standardised oesophageal cancer incidence rates by sex and Trust of residence: 1993-2013

Health & Social Care Trust	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	-0.9% (-2.4%, 0.6%)	p=0.217	1993-2013	0.0% (-2.2%, 2.2%)	p=0.992
Northern	**1993-2013**	**1.6% (0.1%, 3.1%)**	**p=0.042**	1993-2013	-0.3% (-2.4%, 1.8%)	p=0.755
South-Eastern	1993-2013	-0.1% (-1.9%, 1.7%)	p=0.908	1993-2013	-0.1% (-2.0%, 1.9%)	p=0.938
Southern	1993-2013	1.4% (-0.1%, 2.9%)	p=0.069	1993-2013	-1.3% (-3.7%, 1.1%)	p=0.273
Western	1993-2013	0.2% (-1.3%, 1.7%)	p=0.783	1993-2013	-0.4% (-5.0%, 4.5%)	p=0.869

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Incidence rates of oesophageal cancer increased slightly among males resident in three of the five deprivation quintiles (least deprived and quintiles 3 and 4) and among females resident in two of the deprivation quintiles (quintiles 3 and 4). Rates decreased slightly among males in the most deprived areas and among females in the least and 2nd least deprived quintiles. However with the exception of the increase among males in the 2nd most deprived areas these changes were not statistically significant and may be random occurrences. (Tab. 16.7, Fig. 16.7)

Figure 16.7: Trends in age-standardised oesophageal cancer incidence rates by sex and deprivation: 2001-2013

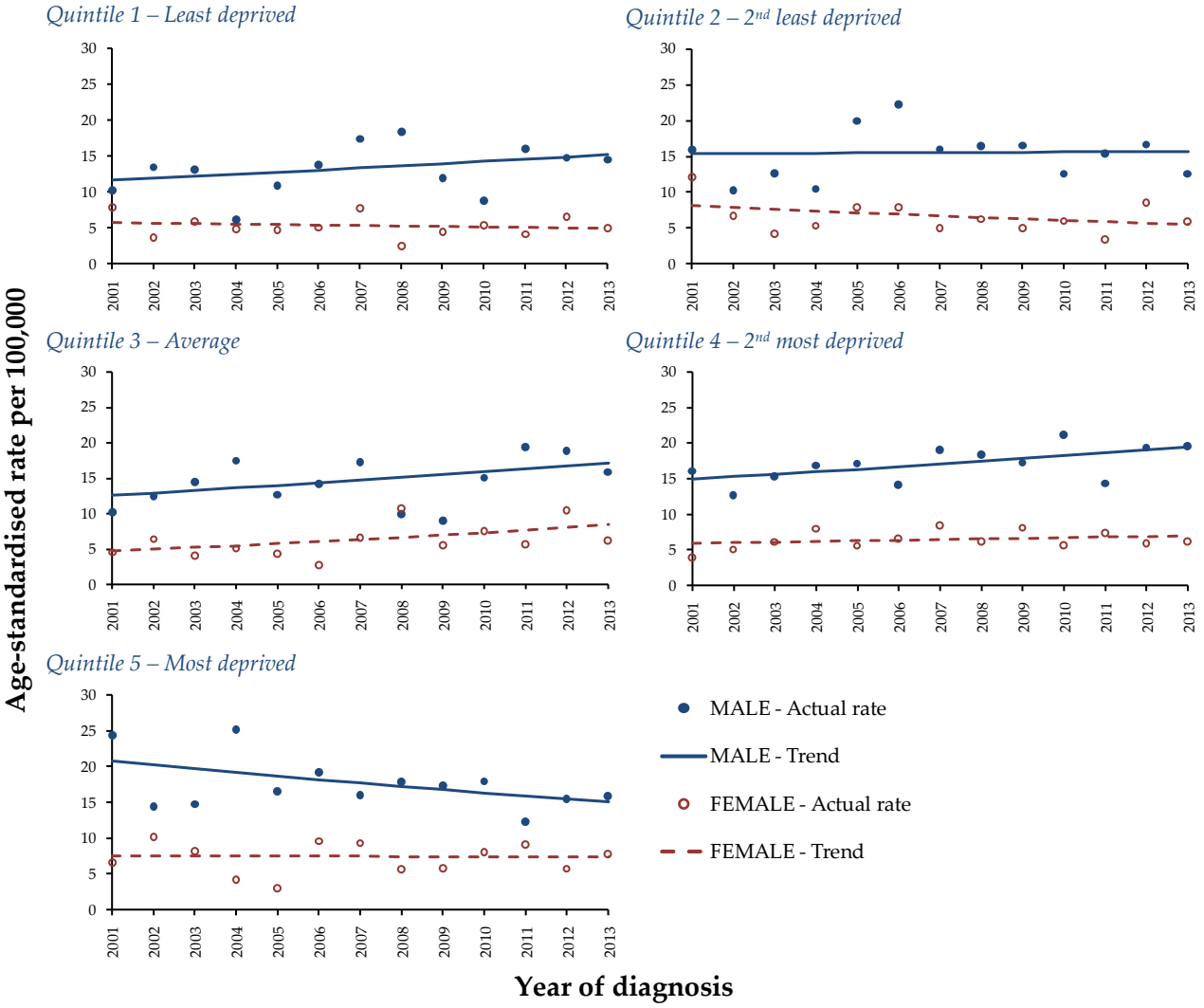


Table 16.7: Annual percentage change in age-standardised oesophageal cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	2.2% (-2.2%, 6.8%)	p=0.292	2001-2013	-1.2% (-5.7%, 3.4%)	p=0.561
Quintile 2 2nd least deprived	2001-2013	0.2% (-3.7%, 4.2%)	p=0.925	2001-2013	-3.1% (-7.8%, 1.7%)	p=0.179
Quintile 3 Average	2001-2013	2.6% (-1.0%, 6.4%)	p=0.143	2001-2013	5.0% (-0.6%, 11.0%)	p=0.077
Quintile 4 2nd most deprived	**2001-2013**	**2.2% (0.2%, 4.3%)**	**p=0.033**	2001-2013	1.4% (-2.0%, 5.0%)	p=0.380
Quintile 5 Most deprived	2001-2013	-2.6% (-5.5%, 0.3%)	p=0.076	2001-2013	-0.2% (-5.1%, 5.0%)	p=0.935

CI – Confidence interval; Significant trends are in bold

16.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

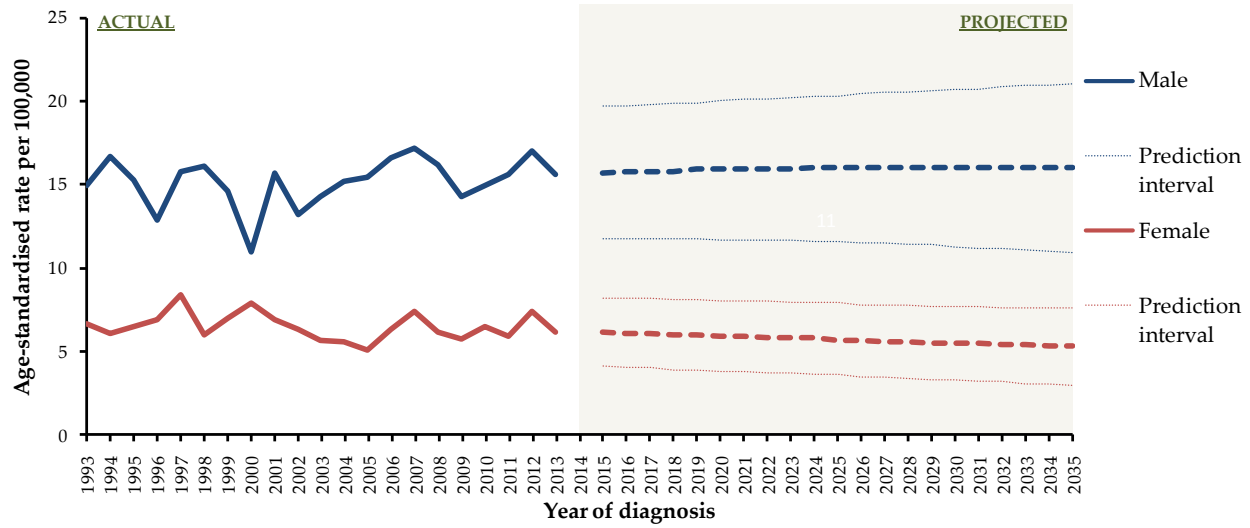
Incidence rates of oesophageal cancer, adjusted for population change, is expected to rise by 3% among males between 2009-2013 and 2020. After that point they are expected to remain fairly constant up to 2035. However among women rates of this cancer are expected to decrease, by 8% up to 2020 and by 17% up to 2035. (Tab. 16.8, Fig. 16.8)

Table 16.8: Oesophageal cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	15.5				6.4			
2015	15.7	(11.8, 19.7)	1%	(-24%, 27%)	6.2	(4.1, 8.2)	-3%	(-36%, 28%)
2020	15.9	(11.7, 20.0)	3%	(-25%, 29%)	5.9	(3.8, 8.0)	-8%	(-41%, 25%)
2025	16.0	(11.6, 20.3)	3%	(-25%, 31%)	5.7	(3.6, 7.9)	-11%	(-44%, 23%)
2030	16.0	(11.3, 20.7)	3%	(-27%, 34%)	5.5	(3.3, 7.7)	-14%	(-48%, 20%)
2035	16.0	(10.9, 21.0)	3%	(-30%, 35%)	5.3	(3.0, 7.6)	-17%	(-53%, 19%)

ASIR: Age-standardised incidence rate

Figure 16.8: Oesophageal cancer age-standardised incidence rate projections to 2035 by sex



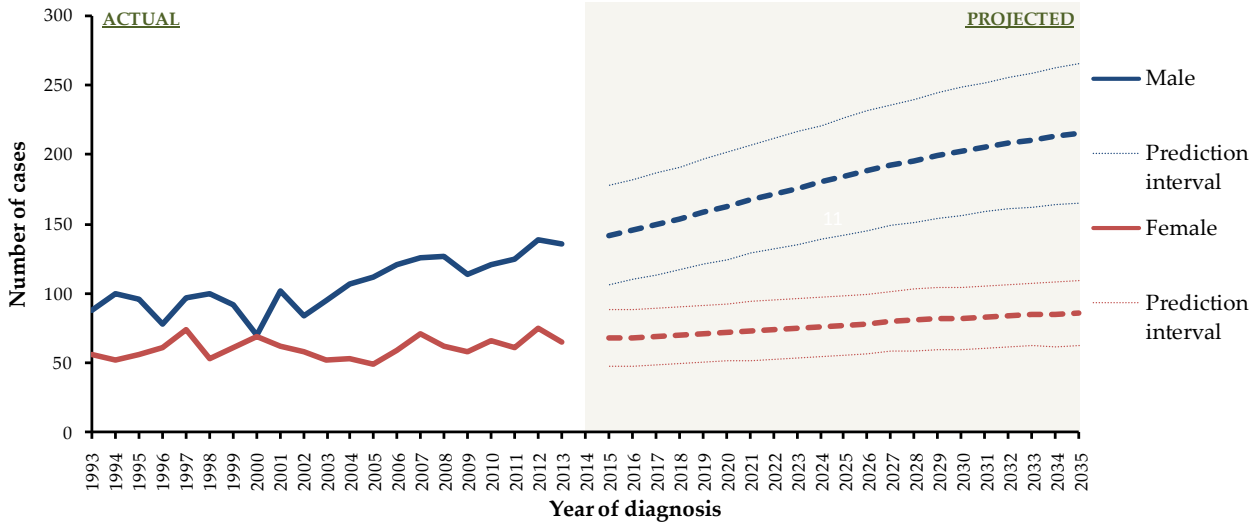
Case projections

In 2009-2013 there were 127 male and 65 female cases of oesophageal cancer each year. Due to incidence rates remaining reasonably constant among men, the number of cases of oesophageal cancer is expected to increase to 163 (+28%) by 2020 and to 215 (+69%) by 2035. Among women the decline in the incidence rate offsets some of the increase caused by demographic change, however the number of cases among women is still expected to rise to 72 (+11%) by 2020 and to 86 (+32%) by 2035. (Tab. 16.9, Fig.16.9)

Table 16.9: Oesophageal cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	127				65			
2015	142	(106, 178)	12%	(-17%, 40%)	68	(48, 88)	5%	(-26%, 35%)
2020	163	(124, 202)	28%	(-2%, 59%)	72	(52, 92)	11%	(-20%, 42%)
2025	184	(142, 226)	45%	(12%, 78%)	77	(56, 98)	18%	(-14%, 51%)
2030	202	(156, 248)	59%	(23%, 95%)	82	(60, 104)	26%	(-8%, 60%)
2035	215	(165, 265)	69%	(30%, 109%)	86	(63, 109)	32%	(-3%, 68%)

Figure 16.9: Oesophageal cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE OESOPHAGEAL CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter oesophageal cancer incidence projections through control of the following risk factors:
  - Tobacco smoking and smokeless tobacco;
  - Excessive alcohol consumption;
  - Obesity and/or lack of consumption of fruit and vegetables.
- Other risk factors which may have a lesser impact on future projections include:
  - Gastro-oesophageal reflux disease;
  - Exposure to ionising radiation.
- Other potential factors that can influence oesophageal cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which oesophageal cancer is classified;
  - Revisions to population projections.

17 ORAL CANCER (C00-C14)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
140 PER YEAR	73 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
63 YEARS	64 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
BELFAST HSCT (MALES ONLY)	NORTHERN HSCT (MALES ONLY)
	SOUTH-EASTERN HSCT (MALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
+5.2% PER YEAR (2001-2013)	+5.2% PER YEAR (2001-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
+2.8% PER YEAR (2001-2013)	+4.0% PER YEAR (2001-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+22%	+24%	+44%	+53%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+46% TO 204 CASES PER YEAR	+41% TO 103 CASES PER YEAR	+106% TO 288 CASES PER YEAR	+100% TO 146 CASES PER YEAR

17.1: BACKGROUND

Oral cancer encompasses several different types of cancer including cancer of the mouth, cancer of the pharynx (i.e. throat), cancer of the salivary glands and cancer of the lip. Using this definition there were an average of 213 cases (140 male, 73 female) diagnosed each year during 2009-2013. It was the 8th most common male cancer making up 3.2% of cancers (ex. NMSC), while it was the 13th most common female cancer making up 1.7% of cancers (ex. NMSC). There were 15.8 cases per 100,000 males and 7.9 cases per 100,000 females. The risk of developing oral cancer before the age of 65 was 1 in 162 for men and 1 in 320 for women, while before age 85 it was 1 in 77 for men and 1 in 154 for women.

Cancer and age

Oral cancer was more common among older people with a median age at diagnosis of 63 years for men and 64 years for women during 2009-2013. Overall 62.4% (62.1% male, 63.0% female) of cases were among those aged 60 and over. Incidence rates were greatest among men aged 80 and over with 60 cases per 100,000 males of this age and among women aged 70-79 with 25 cases per 100,000 females in this age group. Oral cancer was rare among those aged under 25, with 3 cases per year among 0 to 24 year olds. (Tab. 17.1, Fig 17.1)

Figure 17.1: Incidence of oral cancer by sex and age: 2009-2013

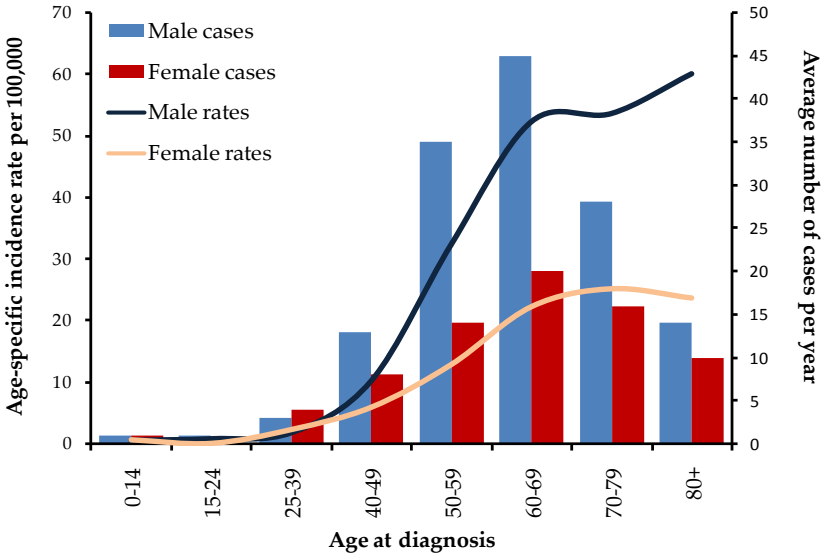


Table 17.1: Average number of oral cancers diagnosed per year by sex and age: 2009-2013

Age	Cases per year		
	Male	Female	Total
0-14	1	1	2
15-24	1	0	1
25-39	3	4	7
40-49	13	8	21
50-59	35	14	49
60-69	45	20	65
70-79	28	16	44
80+	14	10	24
Total	140	73	213

Cancer and area of residence

During 2004-2013 the age-standardised incidence rate of oral cancer among men was 41.7% higher than the Northern Ireland average in the Belfast Trust while rates were 15.2% lower than average in the Northern Trust and 15.7% lower than average in the South-Eastern Trust. There was no significant variation for women in incidence rates of oral cancer by HSC Trust. (Tab. 17.2; Fig. 17.2)

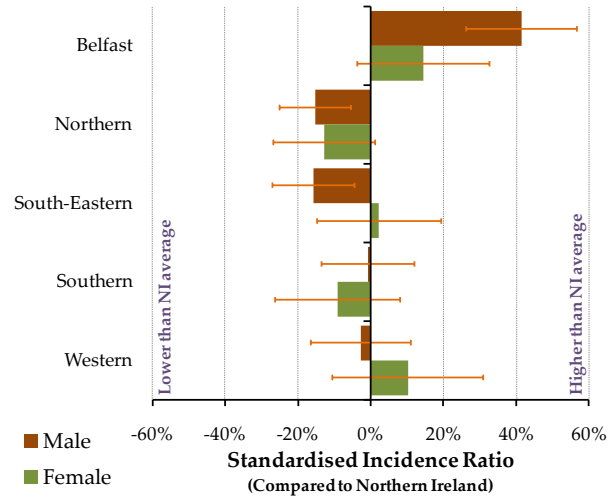
Table 17.2: Average number of oral cancers diagnosed per year by sex and area of residence: 2004-2013

Area of Residence		Cases per year		
		Male	Female	Total
Health & Social Care Trust	Belfast	33	15	48
	Northern	28	15	43
	South-Eastern	22	14	36
	Southern	23	11	34
	Western	19	11	30
Area Based Deprivation Quintile	1 - Least deprived	20	11	31
	2 - 2nd least deprived	19	14	33
	3 - Average	24	13	37
	4 - 2nd most deprived	27	14	41
	5 - Most deprived	36	14	50

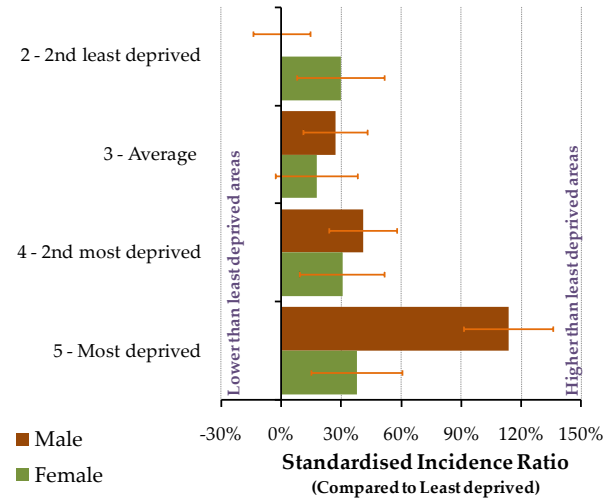
Incidence of oral cancer was strongly related to area based socio-economic deprivation during 2004-2013 with age-standardised incidence rates higher in the most deprived areas compared with the least deprived areas by 113.9% for males and by 38.1% for females. (Tab. 17.2; Fig. 17.2)

Figure 17.2: Age-standardised incidence rates of oral cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

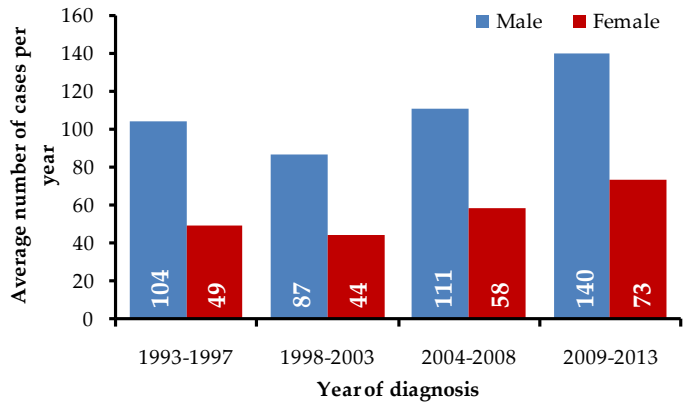


17.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 213 oral cancers (140 male, 73 female) diagnosed each year compared to an average of 153 oral cancers (104 male, 49 female) in 1993-1997. (Tab. 17.3; Fig. 17.3)

Figure 17.3: Average number of cases of oral cancer diagnosed per year by sex and period of diagnosis: 1993-2013



The number of oral cancers increased by 5.2% per year (p<0.001) for both sexes during 2001-2013. Prior to 2001 there was a 3.0% decrease per year among men and a 2.0% per year decrease among women. (Fig. 17.3; Tab. 17.3)

Table 17.3: Number of cases of oral cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	106	54	160
1994	106	47	153
1995	99	51	150
1996	103	51	154
1997	105	44	149
1998	83	40	123
1999	92	56	148
2000	82	41	123
2001	90	39	129
2002	89	41	130
2003	83	48	131
2004	108	47	155
2005	92	65	157
2006	123	64	187
2007	127	58	185
2008	104	57	161
2009	132	67	199
2010	118	75	193
2011	140	81	221
2012	162	81	243
2013	150	62	212

Trends in incidence rates

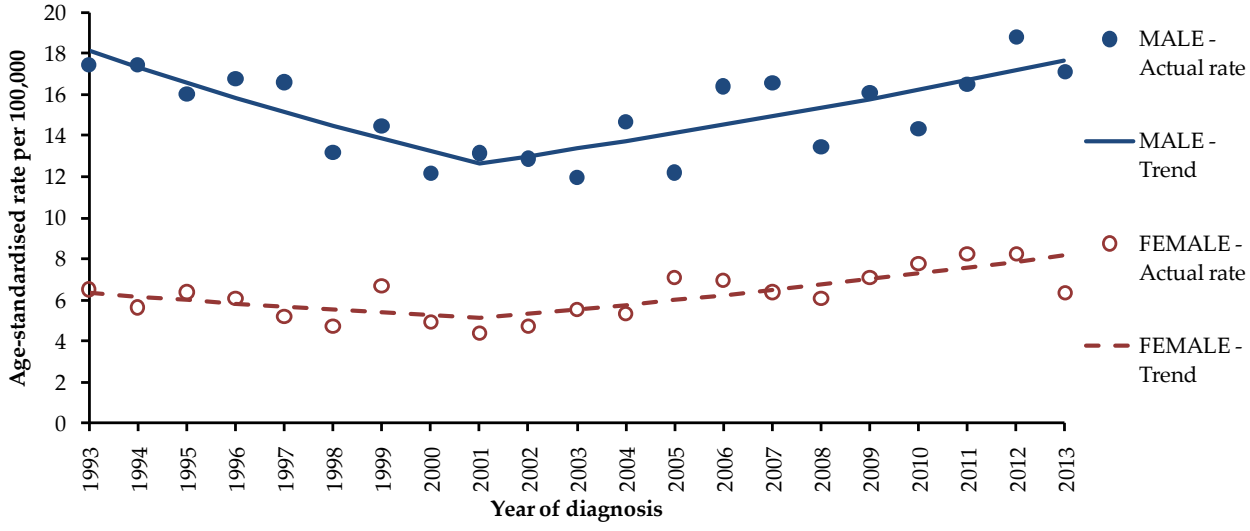
Oral cancer incidence rates (adjusted for population growth and ageing) increased by an average of 2.8% per year (p=0.002) among men and by 4.0% per year (p=0.002) among women during 2001-2013. Prior to 2001 there was no significant change for women, however male rates dropped by 4.4% per year (p=0.009). (Fig. 17.4, Tab. 17.4)

Table 17.4: Annual percentage change in age-standardised oral cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-2001**	**-4.4% (-7.5%, -1.3%)**	**p=0.009**
	2001-2013	**2.8% (1.2%, 4.5%)**	**p=0.002**
Female	1993-2001	-2.6% (-6.8%, 1.9%)	p=0.231
	2001-2013	**4.0% (1.7%, 6.3%)**	**p=0.002**

CI – Confidence interval; Significant trends are in bold

Figure 17.4: Trends in age-standardised oral cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Oral cancer incidence rates did not change significantly among those aged 0-49 or 70-79 for either sex. Among those aged 60-69 rates increased by 4.8% per year (p=0.001) among men from 2002 onwards and by 2.2% per year (p=0.037) among women from 1993. Among 50-59 year olds rates increased for both sexes although the change was not quite significant for men. Rates decreased among 80+ year olds although the change was not significant for women. (Fig. 17.5, Tab. 17.5)

Figure 17.5: Trends in age-standardised oral cancer incidence rates by sex and age at diagnosis: 1993-2013

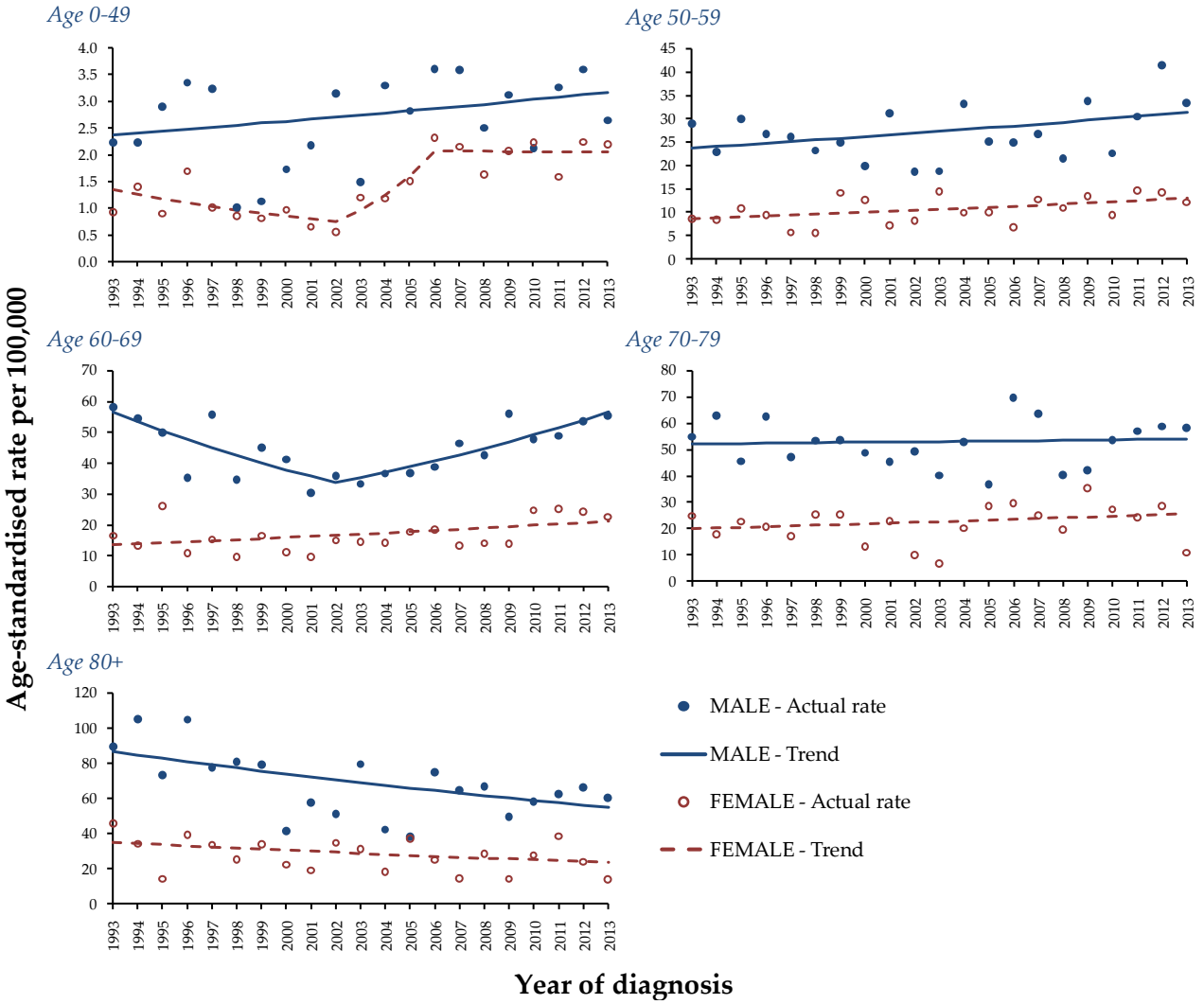


Table 17.5: Annual percentage change in age-standardised oral cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2013	1.4% (-0.7%, 3.7%)	p=0.183	1993-2002 2002-2006 2006-2013	-6.3% (-13.1%, 1.0%) 29.0% (-7.1%, 79.1%) -0.1% (-6.6%, 6.9%)	p=0.085 p=0.118 p=0.981
50-59	1993-2013	1.4% (-0.1%, 2.9%)	p=0.061	**1993-2013**	**2.1% (0.2%, 4.0%)**	**p=0.034**
60-69	**1993-2002** **2002-2013**	**-5.6% (-8.9%, -2.1%)** **4.8% (2.3%, 7.4%)**	**p=0.004** **p=0.001**	**1993-2013**	**2.2% (0.2%, 4.3%)**	**p=0.037**
70-79	1993-2013	0.1% (-1.1%, 1.4%)	p=0.812	1993-2013	1.3% (-1.1%, 3.7%)	p=0.286
80+	**1993-2013**	**-2.2% (-3.7%, -0.7%)**	**p=0.006**	1993-2013	-2.0% (-4.3%, 0.4%)	p=0.097

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

In the Belfast Trust male oral cancer incidence rates fell between 1993 and 1999 but increased again by 5.0% per year (p=0.001) between 1999 and 2013, while in the Western Trust incidence rates declined between 1993 and 2008. Changes among males in the other Trusts were not significant despite an apparent increase in the Southern Trust. Incidence appeared to increase for females in all HSC Trusts but only the 2.4% per year (p=0.015) increase in the Belfast Trust and the 2.3% per year (p=0.018) increase in the South-Eastern Trust were statistically significant. (Fig. 17.6, Tab. 17.6)

Figure 17.6: Trends in age-standardised oral cancer incidence rates by sex and Trust of residence: 1993-2013

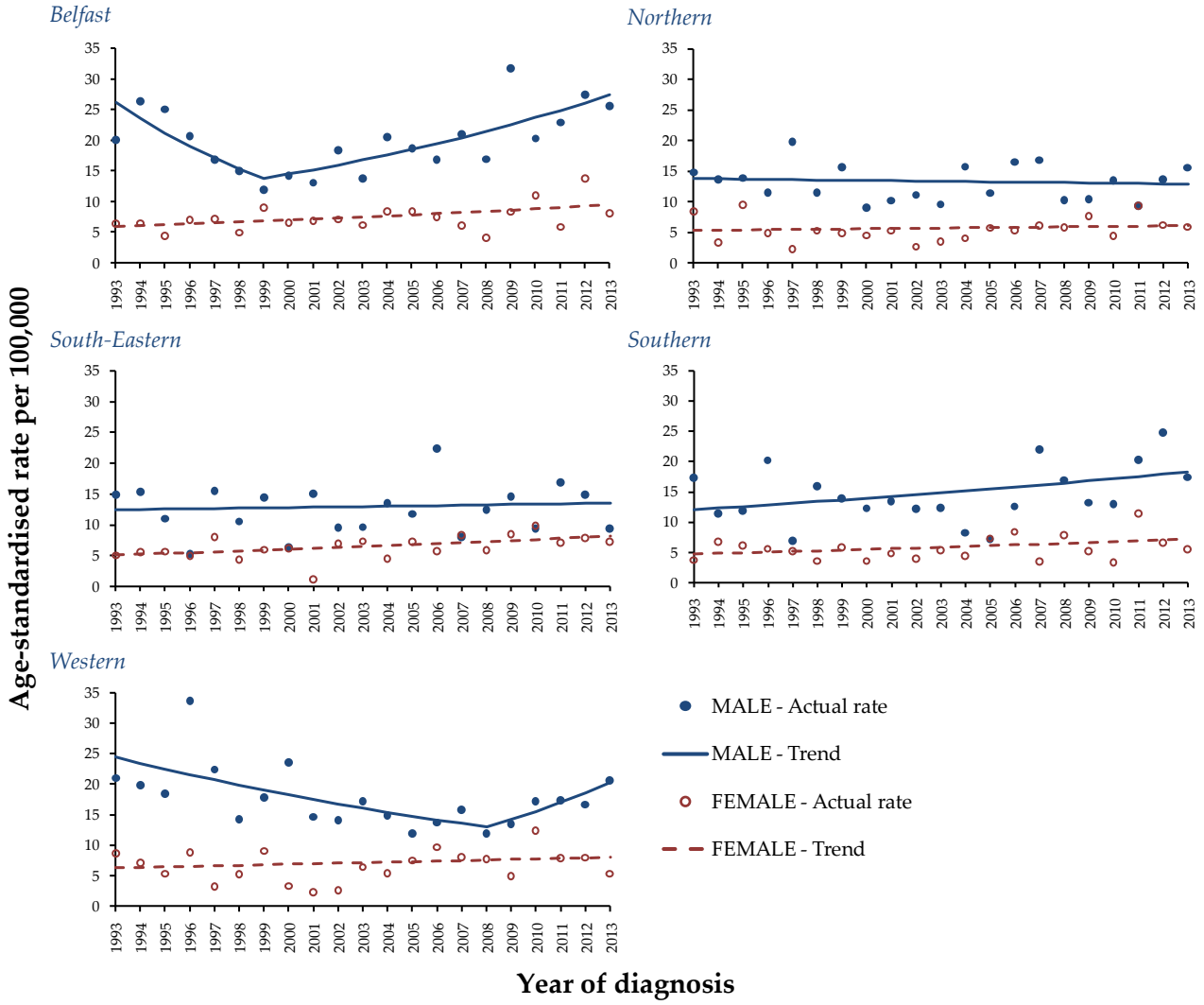


Table 17.6: Annual percentage change in age-standardised oral cancer incidence rates by sex and Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-1999** **1999-2013**	**-10.2% (-18.3%, -1.2%)** **5.0% (2.4%, 7.7%)**	**p=0.029** **p=0.001**	**1993-2013**	**2.4% (0.5%, 4.4%)**	**p=0.015**
Northern	1993-2013	-0.4% (-2.1%, 1.4%)	p=0.669	1993-2013	0.7% (-1.8%, 3.3%)	p=0.579
South-Eastern	1993-2013	0.4% (-2.0%, 2.9%)	p=0.719	**1993-2013**	**2.3% (0.4%, 4.2%)**	**p=0.018**
Southern	1993-2013	2.1% (-0.2%, 4.4%)	p=0.069	1993-2013	2.1% (-0.4%, 4.7%)	p=0.100
Western	**1993-2008** 2008-2013	**-4.1% (-6.7%, -1.5%)** 9.3% (-3.6%, 23.9%)	**p=0.004** p=0.154	1993-2013	1.2% (-1.5%, 4.0%)	p=0.352

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Male oral cancer incidence rates increased between 2001 and 2013 in the most deprived areas of Northern Ireland by 4.5% per year (p<0.001) and in the 2nd most deprived areas by 2.5% per year (p=0.036). While male incidence of oral cancer also appeared to increase in the other deprivation quintiles, these differences were not statistically significant. Similarly incidence appeared to increase for females in all areas but only the increases in the 2nd most deprived areas were statistically significant. (Fig. 17.7, Tab. 17.7)

Figure 17.7: Trends in age-standardised oral cancer incidence rates by sex and deprivation: 2001-2013

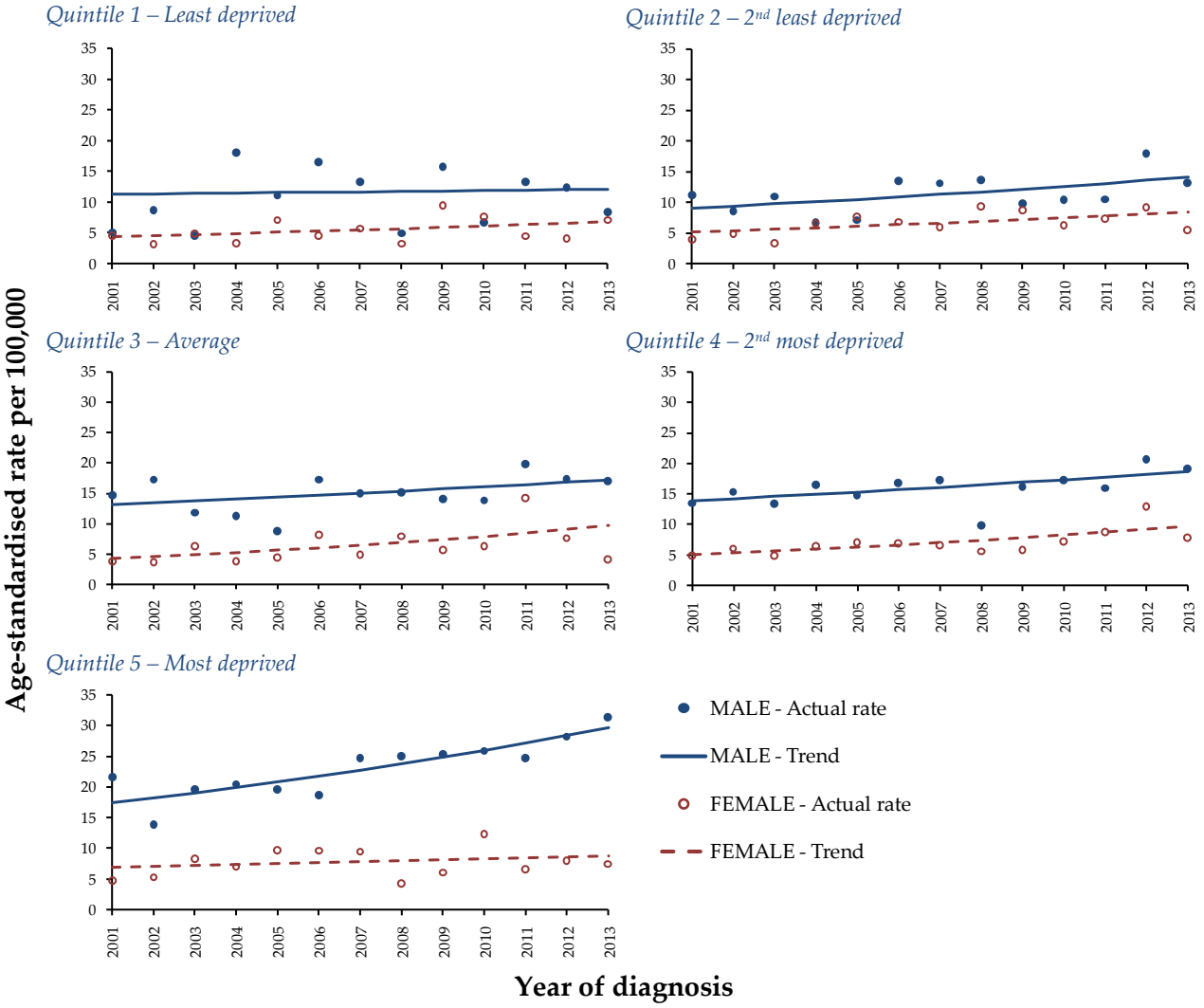


Table 17.7: Annual percentage change in age-standardised oral cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	0.5% (-7.0%, 8.6%)	p=0.886	2001-2013	3.8% (-2.1%, 10.0%)	p=0.189
Quintile 2 2nd least deprived	2001-2013	3.7% (-0.3%, 7.9%)	p=0.064	2001-2013	4.0% (-0.3%, 8.6%)	p=0.068
Quintile 3 Average	2001-2013	2.2% (-0.8%, 5.3%)	p=0.134	2001-2013	7.0% (-0.3%, 14.9%)	p=0.058
Quintile 4 2nd most deprived	**2001-2013**	**2.5% (0.2%, 4.9%)**	**p=0.036**	**2001-2013**	**5.6% (2.1%, 9.2%)**	**p=0.004**
Quintile 5 Most deprived	**2001-2013**	**4.5% (2.6%, 6.4%)**	**p<0.001**	2001-2013	2.0% (-3.1%, 7.4%)	p=0.414

CI – Confidence interval; Significant trends are in bold

17.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

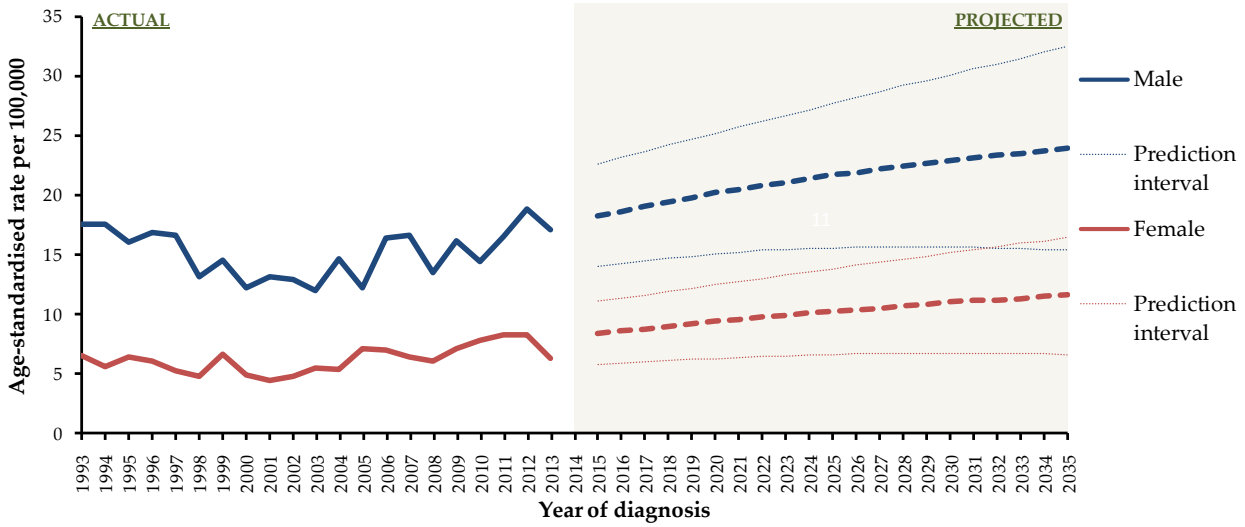
Incidence rates of oral cancer are projected to increase for both sexes. Compared to the 2009-2013 average by 2020 male incidence rates are expected to increase by 22%, while female incidence rates are expected to increase by 24%. Compared to the same baseline, by 2035 male rates are expected to increase by 44%, while female rates are expected to increase by 53%. (Tab. 17.8, Fig. 17.8)

Table 17.8: Oral cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	16.6				7.6			
2015	18.3	(14.0, 22.6)	10%	(-16%, 36%)	8.4	(5.8 , 11.1)	11%	(-24%, 46%)
2020	20.2	(15.1, 25.2)	22%	(-9%, 52%)	9.4	(6.3 , 12.5)	24%	(-17%, 64%)
2025	21.7	(15.6, 27.7)	31%	(-6%, 67%)	10.2	(6.6 , 13.8)	34%	(-13%, 82%)
2030	22.9	(15.7, 30.1)	38%	(-5%, 81%)	11.0	(6.7 , 15.2)	45%	(-12%, 100%)
2035	23.9	(15.4, 32.5)	44%	(-7%, 96%)	11.6	(6.6 , 16.5)	53%	(-13%, 117%)

ASIR: Age-standardised incidence rate

Figure 17.8: Oral cancer age-standardised incidence rate projections to 2035 by sex



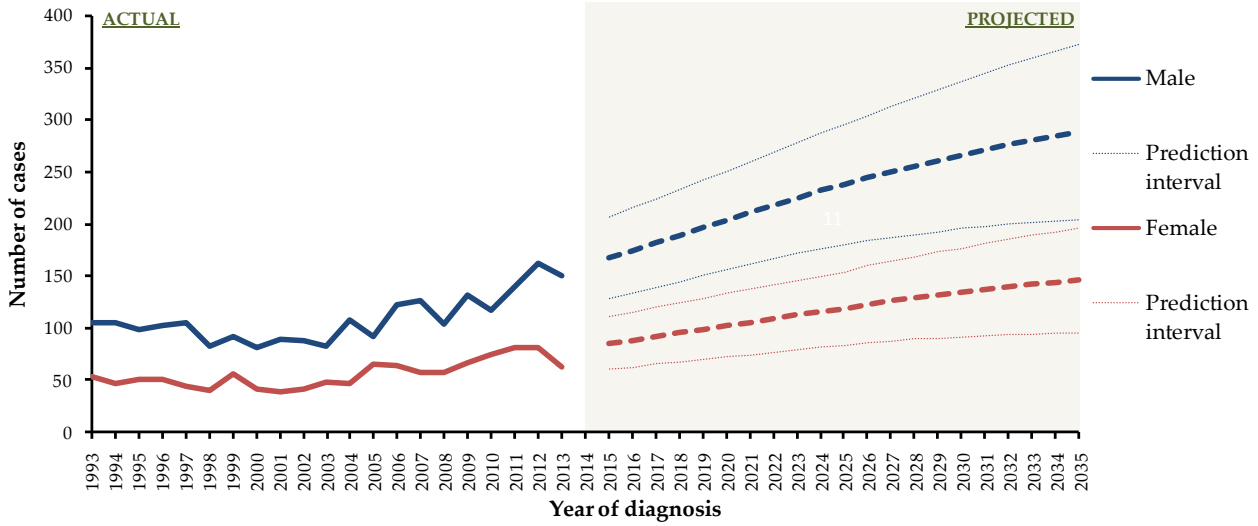
Case projections

Demographic changes and increasing incidence rates will result in an increase in the number of oral cancers diagnosed in future years. In 2009-2013 there were 140 male and 73 female cases of oral cancer diagnosed each year. By 2020 this is expected to increase to 204 male and 103 female cases; a 46% and 41% increase respectively. By 2035 the number of cases is forecast to increase to 288 male and 146 females cases; a 106% and 100% increase respectively. (Tab. 17.9; Fig. 17.9)

Table 17.9: Oral cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	140				73			
2015	168	(129, 207)	20%	(-8%, 48%)	86	(61 , 111)	18%	(-16%, 52%)
2020	204	(157, 251)	46%	(12%, 79%)	103	(73 , 133)	41%	(0%, 82%)
2025	238	(180, 296)	70%	(29%, 111%)	119	(84 , 154)	63%	(15%, 111%)
2030	266	(196, 336)	90%	(40%, 140%)	134	(92 , 176)	84%	(26%, 141%)
2035	288	(204, 372)	106%	(46%, 166%)	146	(96 , 196)	100%	(32%, 168%)

Figure 17.9: Oral cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE ORAL CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter oral cancer incidence projections through control of the following risk factors:
    - Lack of consumption of sufficient fruit and vegetables;
    - Tobacco smoking and smokeless tobacco;
    - Excessive alcohol consumption;
    - Infection with human papillomavirus (type 16).
- Other risk factors which may have a lesser impact on future projections include previous family history.
- The introduction of the HPV vaccination in 2008 for girls aged 12-13 has the potential to counteract some of the projected increase in oral cancer incidence among women aged up to 39 in the year 2035.
- Other potential factors that can influence oral cancer incidence projections include:
    - Further introduction of health service initiatives that aim to either prevent or diagnose cancer early;
    - Changes to the way in which oral cancer is classified;
    - Revisions to population projections.

18 OVARIAN CANCER (C56)

ANNUAL NUMBER OF CASES (2009-2013)

158 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

67 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
NO DIFFERENCE BETWEEN THE LEAST AND MOST DEPRIVED AREAS	
NO VARIATION BY HSC TRUST	

AVERAGE CHANGE IN CASES PER YEAR

+0.8% PER YEAR
(1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

NO CHANGE
(1993-2013)

PROJECTED CHANGE IN RATES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
 -3%	 -9%

PROJECTED CHANGE IN CASES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
 +15% TO 178 CASES PER YEAR	 +44% TO 223 CASES PER YEAR

18.1: BACKGROUND

An average of 158 cases of ovarian cancer were diagnosed among women each year during 2009-2013 in Northern Ireland. It was the 6th most common female cancer diagnosed in this period making up 3.6% of all female cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 17.1 cases diagnosed per 100,000 females. The risk of developing ovarian cancer before the age of 65 was 1 in 168 for women, while before age 85 it was 1 in 68.

Cancer and age

Ovarian cancer was more common among older women with a median age at diagnosis of 67 years during 2009-2013. Two thirds (65.8%) of cases were diagnosed among those aged 60 and over, with 21.5% diagnosed among women aged 80 and over. Age-specific incidence rates were greatest among those aged 80 and over with 78 cases diagnosed per 100,000 females in this age group. Ovarian cancer was rare among those aged 15 to 24 with only one case diagnosed each year, while there were no cases diagnosed among those aged under 15. (Tab. 18.1, Fig 18.1)

Figure 18.1: Incidence of ovarian cancer by age: 2009-2013

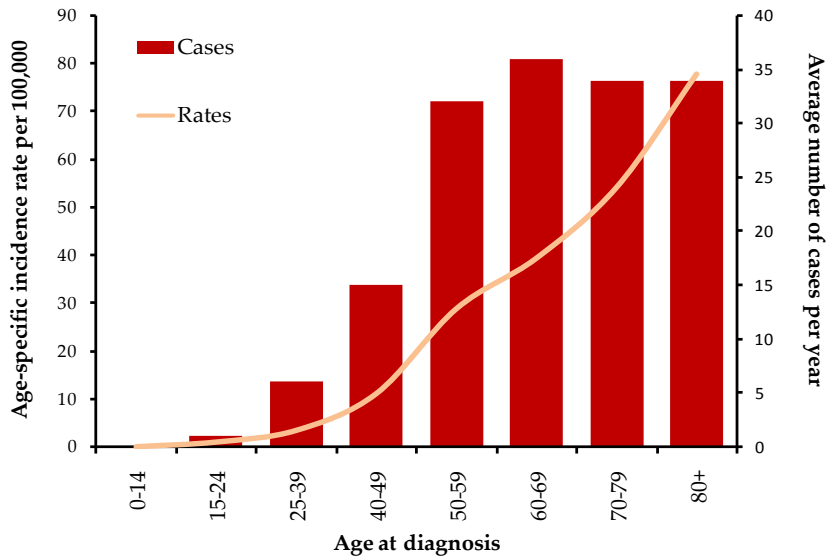


Table 18.1: Average number of ovarian cancers diagnosed per year by age: 2009-2013

AGE	Cases per year
0-14	0
15-24	1
25-39	6
40-49	15
50-59	32
60-69	36
70-79	34
80+	34
Total	158

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of ovarian cancer did not vary significantly by HSC Trust despite slightly elevated incidence rates in the Southern and Northern Trusts and slightly lower than average rates in the Belfast and Western Trusts. (Tab. 18.2, Fig. 18.2)

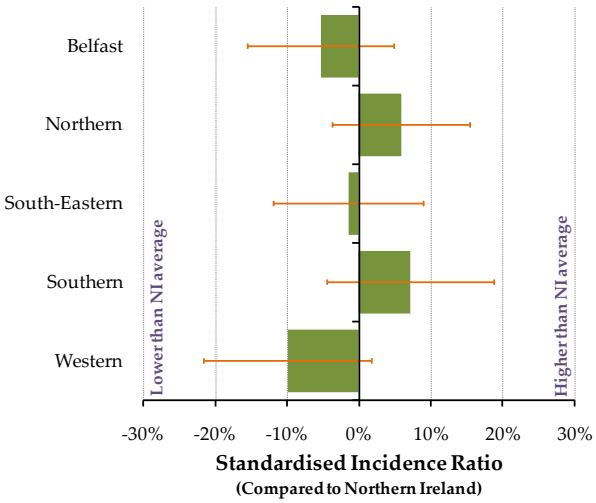
There was no definitive relationship between ovarian cancer and socio-economic deprivation during 2004-2013 with age-standardised incidence rates in the most deprived areas of Northern Ireland similar to those in the least deprived areas. However rates in the least deprived areas were lower than in the 2nd least and 2nd most deprived areas. (Tab. 18.2, Fig. 18.2)

Table 18.2: Average number of ovarian cancers diagnosed per year by area of residence: 2004-2013

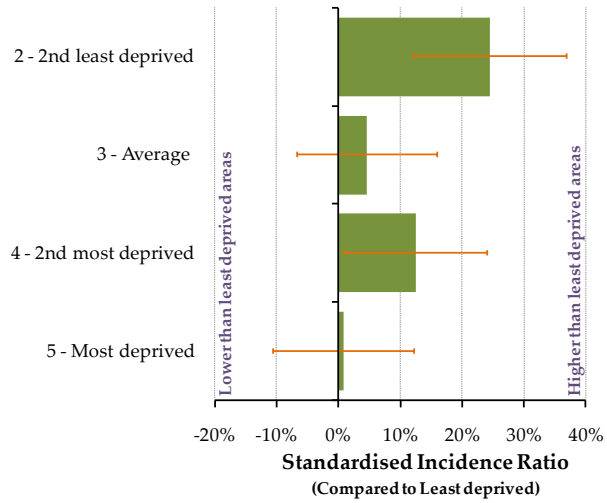
AREA OF RESIDENCE		Cases per year
HEALTH & SOCIAL CARE TRUST	Belfast	33
	Northern	47
	South-Eastern	34
	Southern	33
	Western	23
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	33
	2 - 2nd least deprived	38
	3 - Average	33
	4 - 2nd most deprived	36
	5 - Most deprived	30

Figure 18.2: Age-standardised incidence rates of ovarian cancer by area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile



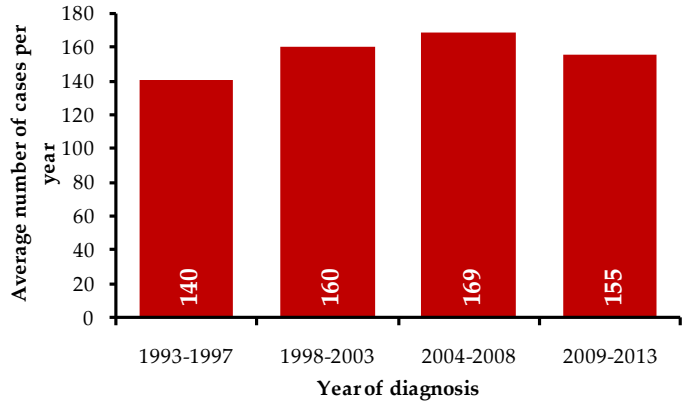
In order to maintain consistency in any trend analysis all results from this point forward exclude borderline ovarian cancer whose classification as malignant changed in 2006 (see section 24.4 for further discussion)

18.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 155 ovarian cancers diagnosed each year compared to an average of 140 ovarian cancers in 1993-1997. (Tab. 18.3, Fig. 18.3)

Figure 18.3: Average number of cases of ovarian cancer (ex. borderline cases) diagnosed per year by period of diagnosis: 1993-2013



On average the number of ovarian cancer cases increased among women by 0.8% per year between 1993 and 2013. (Tab. 18.3, Fig. 18.3)

Table 18.3: Number of cases of ovarian cancer (ex. borderline cases) diagnosed by year: 1993-2013

YEAR	Number of cases
1993	133
1994	131
1995	137
1996	139
1997	161
1998	170
1999	148
2000	143
2001	154
2002	172
2003	175
2004	169
2005	168
2006	169
2007	152
2008	185
2009	150
2010	133
2011	150
2012	175
2013	169

Trends in incidence rates

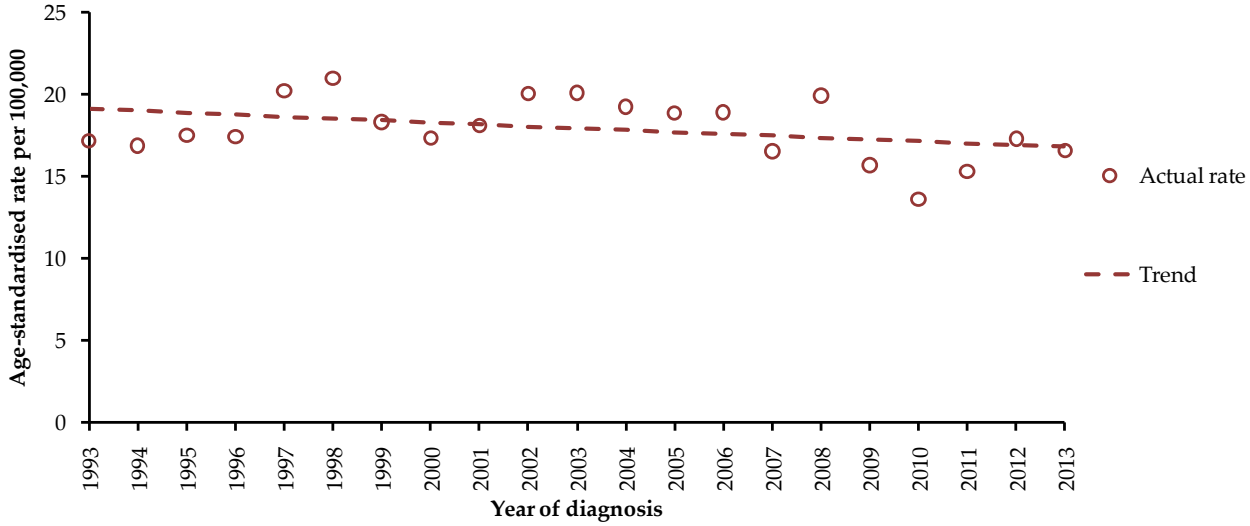
During 1993 to 2013 age-standardised incidence rates of ovarian cancer decreased by 0.6% per year although this change was not statistically significant (p=0.101). (Fig. 18.4; Tab. 18.4)

Table 18.4: Annual percentage change in age-standardised ovarian cancer (ex. borderline cases) incidence rates: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Females	1993-2013	-0.6% (-1.4%, 0.1%)	p=0.101

CI – Confidence interval; Significant trends are in bold

Figure 18.4: Trends in age-standardised ovarian cancer (ex. borderline cases) incidence rates: 1993-2013



Incidence trends by age at diagnosis

Ovarian cancer incidence rates declined by 2.8% per year (p=0.003) among females aged 0-49 and by 1.2% per year among females aged 50-59 during 1993-2013, although the later was not quite statistically significant (p=0.090). There was a considerable decrease of 7.4% per year (p=0.009) in rates among females aged 60-69 during 2006-2013. However over the twenty-one year period ovarian cancer incidence rates among those aged 80 and over increased by 3.2% per year (p<0.001). (Tab. 18.5, Fig. 18.5)

Figure 18.5: Trends in age-standardised ovarian cancer (ex. borderline cases) incidence rates by age at diagnosis: 1993-2013

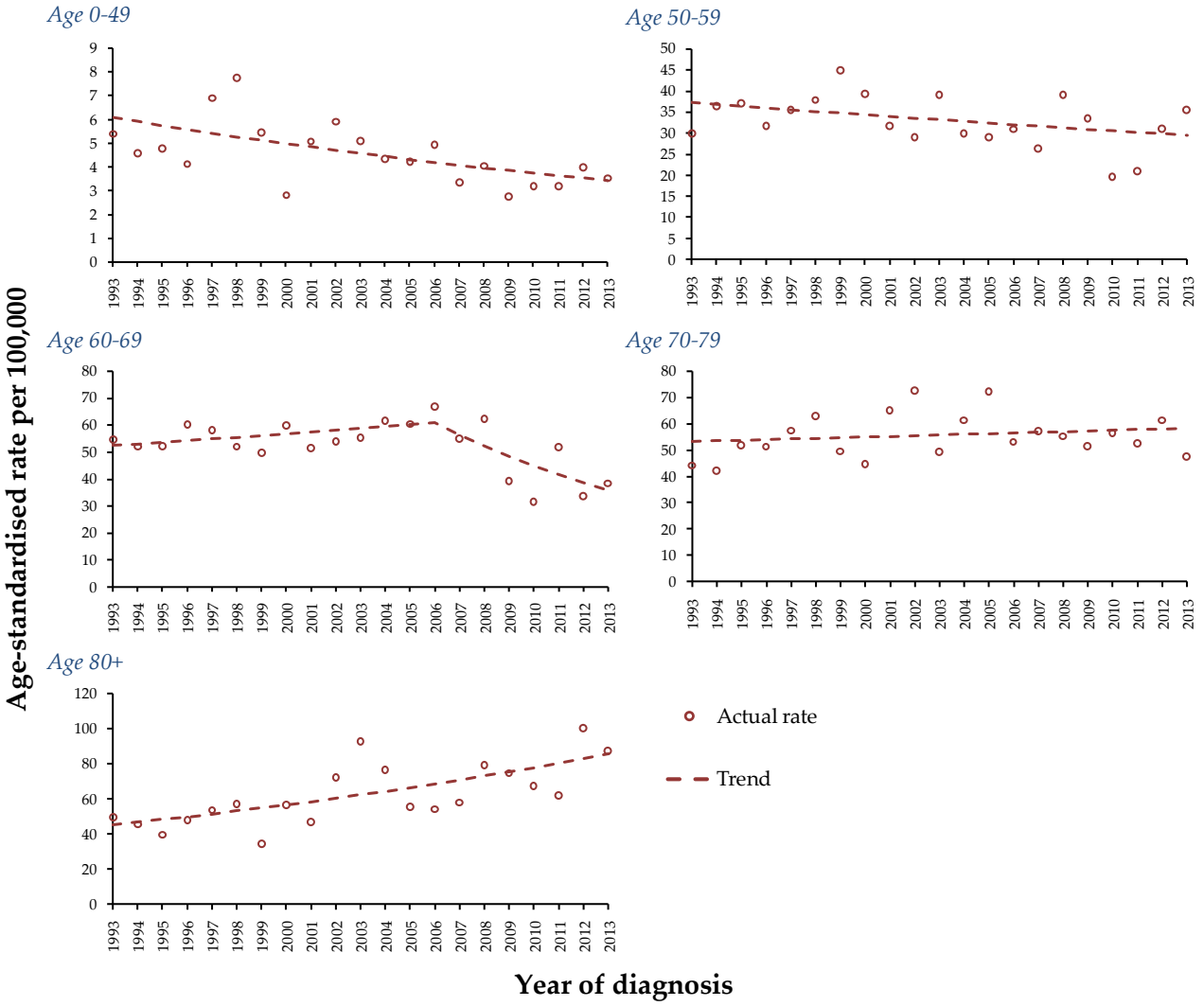


Table 18.5: Annual percentage change in age-standardised ovarian cancer (ex. borderline cases) incidence rates by age: 1993-2013

AGE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**-2.8% (-4.5%, -1.1%)**	**p=0.003**
50-59	1993-2013	-1.2% (-2.5%, 0.2%)	p=0.090
60-69	1993-2006	1.2% (-0.9%, 3.3%)	p=0.254
	2006-2013	**-7.4% (-12.3%, -2.2%)**	**p=0.009**
70-79	1993-2013	0.5% (-0.7%, 1.7%)	p=0.416
80+	**1993-2013**	**3.2% (1.7%, 4.8%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Ovarian cancer incidence rates declined by 1.3% per year (p=0.015) among females resident in the Belfast Trust during 1993-2013. The Northern, South-Eastern and Southern Trust demonstrated some evidence of declining rates of ovarian cancer, however since these changes were not statistically significant this decrease is not conclusive. There was no change in rates in the Western Trust. (Tab. 18.6, Fig. 18.6)

Figure 18.6: Trends in age-standardised ovarian cancer (ex. borderline cases) incidence rates by Trust of residence: 1993-2013

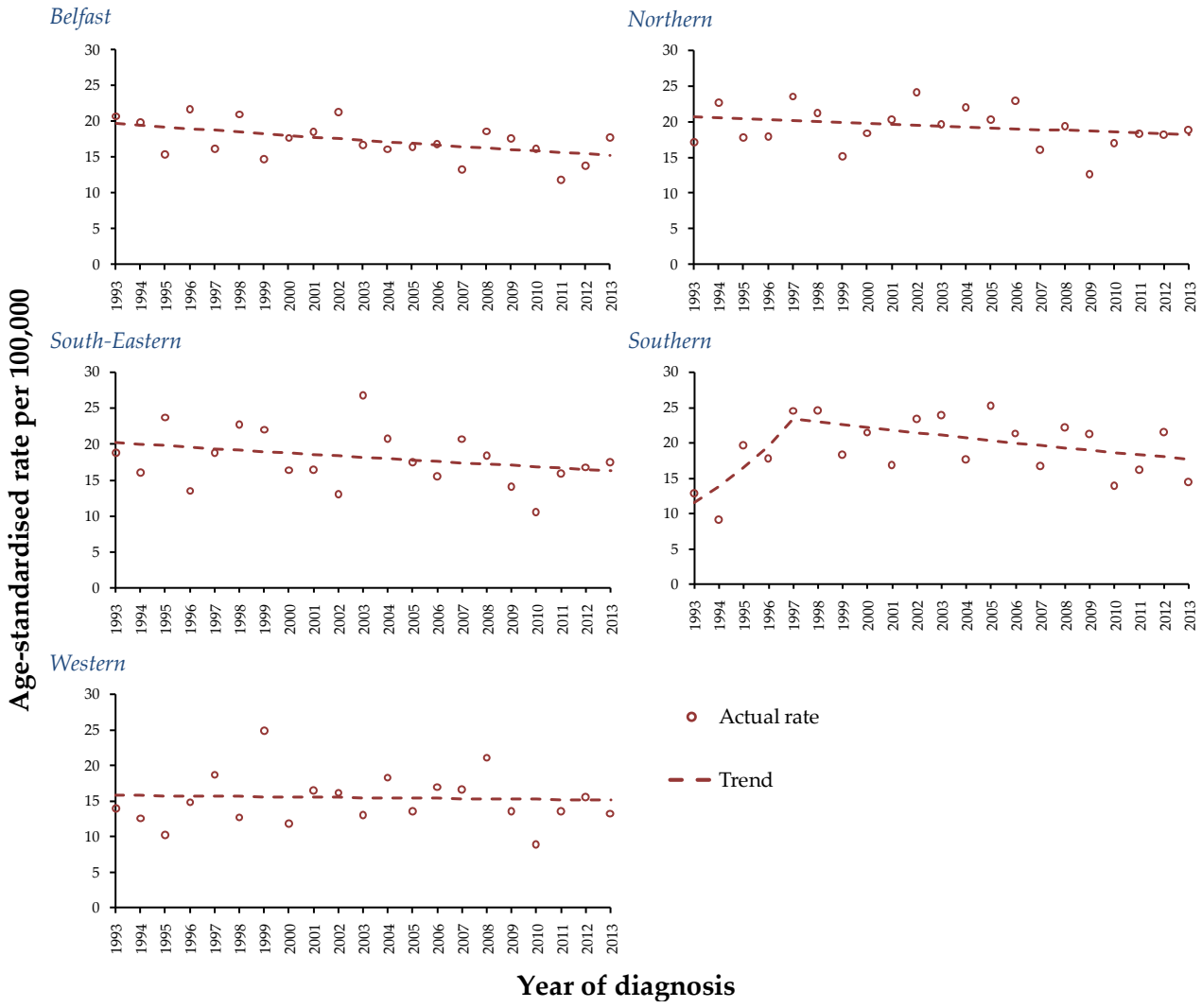


Table 18.6: Annual percentage change in age-standardised ovarian cancer (ex. borderline cases) incidence rates by Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**-1.3% (-2.3%, -0.3%)**	**p=0.015**
Northern	1993-2013	-0.6% (-1.8%, 0.5%)	p=0.252
South-Eastern	1993-2013	-1.1% (-2.6%, 0.5%)	p=0.182
Southern	1993-1997	19.5% (-4.0%, 48.7%)	p=0.104
	1997-2013	-1.7% (-3.8%, 0.4%)	p=0.098
Western	1993-2013	-0.2% (-2.1% 1.7%)	p=0.789

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Ovarian cancer incidence rates declined by 3.3% per year (p=0.025) among females resident in the least deprived areas of Northern Ireland and by 3.1% per year (p=0.032) in areas of average deprivation during 2001-2013. The most deprived areas also demonstrated some evidence of declining rates of ovarian cancer; however these changes were not statistically significant. (Tab. 18.7, Fig. 18.7)

Figure 18.7: Trends in age-standardised ovarian cancer (ex. borderline cases) incidence rates by deprivation: 2001-2013

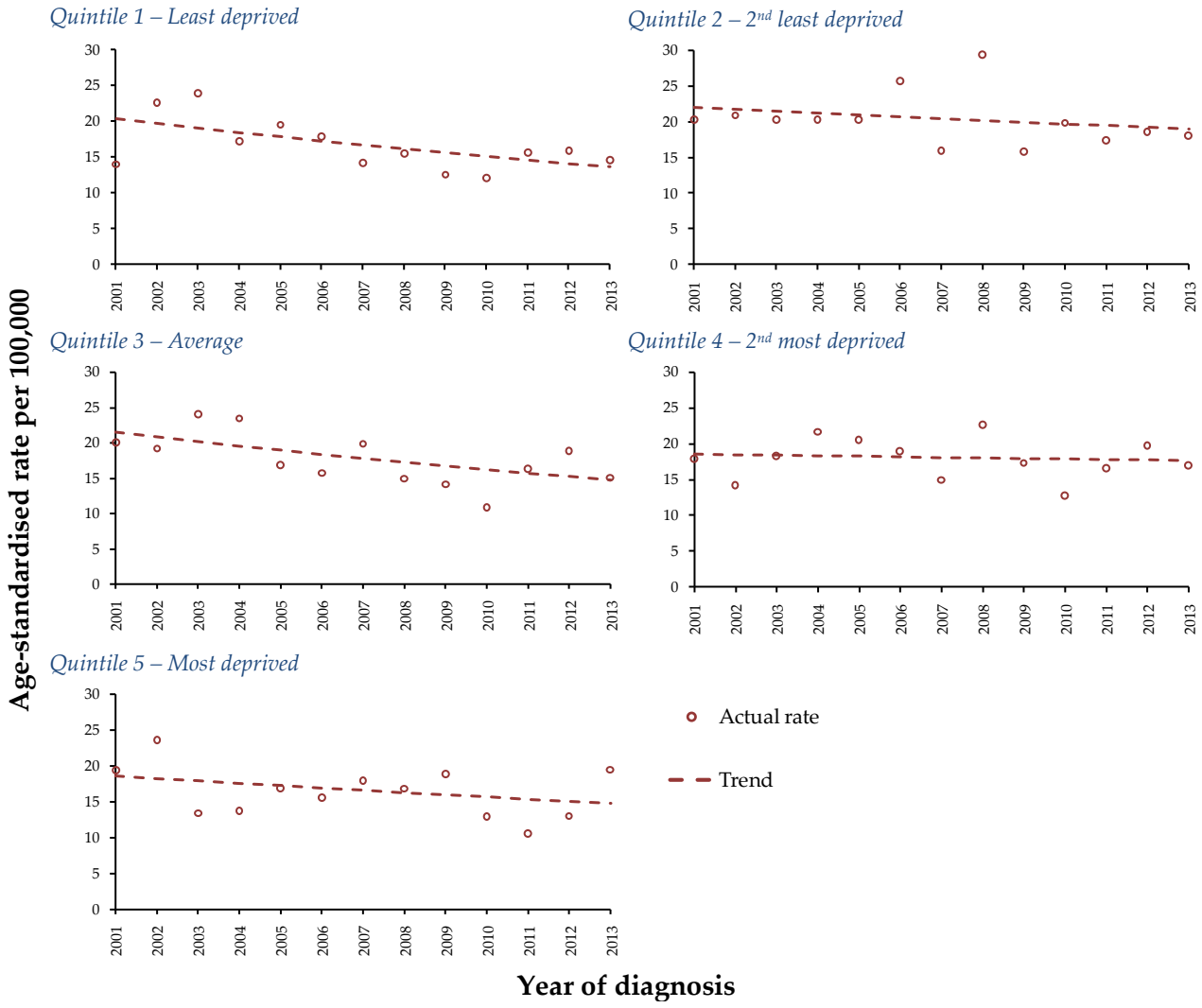


Table 18.7: Annual percentage change in age-standardised ovarian cancer (ex. borderline cases) incidence rates by deprivation: 2001-2013

AREA BASED DEPRIVATION QUINTILE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2013**	**-3.3% (-6.0%, -0.5%)**	**p=0.025**
Quintile 2 2nd least deprived	2001-2013	-1.2% (-4.3%, 1.9%)	p=0.412
Quintile 3 Average	**2001-2013**	**-3.1% (-5.9%, -0.3%)**	**p=0.032**
Quintile 4 2nd most deprived	2001-2013	-0.5% (-3.2%, 2.3%)	p=0.711
Quintile 5 Most deprived	2001-2013	-1.9% (-5.2%, 1.4%)	p=0.231

CI – Confidence interval; Significant trends are in bold

18.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

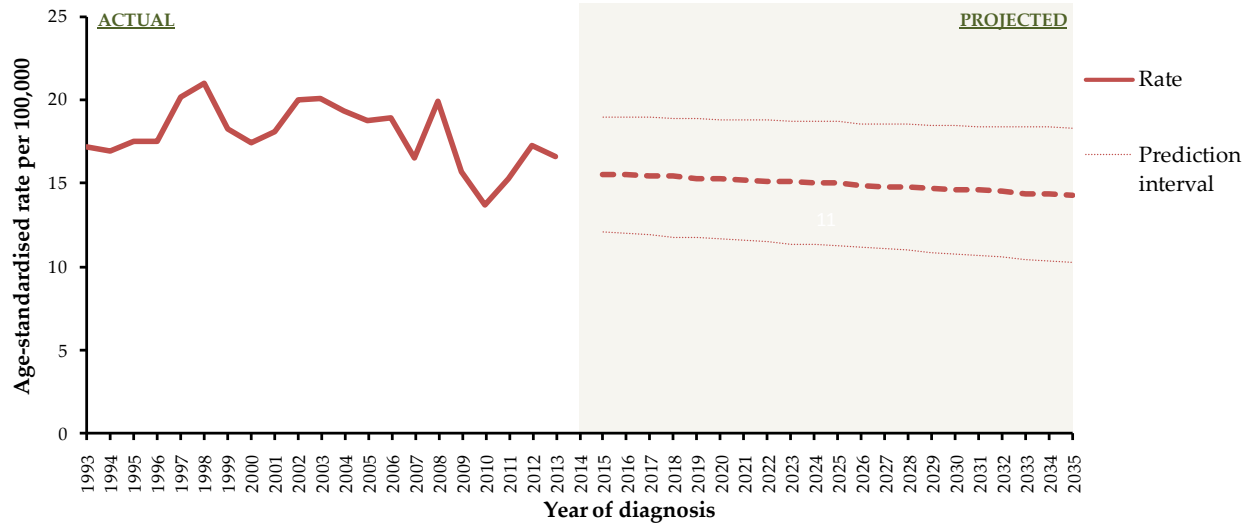
Age-standardised incidence rates of ovarian cancer (excluding borderline cases) are forecast to decline slightly over the next twenty-two years. Compared to the 2009-2013 average, rates are expected to decrease by 3% by 2020 and are expected to decrease by 9% by 2035. (Tab. 18.8, Fig. 18.8)

Table 18.8: Ovarian cancer (ex. borderline cases) age-standardised incidence rate projections to 2035 with comparison to 2009-2013

YEAR	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	15.7			
2015	15.5	(12.1, 19.0)	-1%	(-23%, 21%)
2020	15.3	(11.7, 18.8)	-3%	(-25%, 20%)
2025	15.0	(11.3, 18.7)	-4%	(-28%, 19%)
2030	14.6	(10.8, 18.5)	-7%	(-31%, 18%)
2035	14.3	(10.3, 18.3)	-9%	(-34%, 17%)

ASIR: Age-standardised incidence rate

Figure 18.8: Ovarian cancer (ex. borderline cases) age-standardised incidence rate projections to 2035



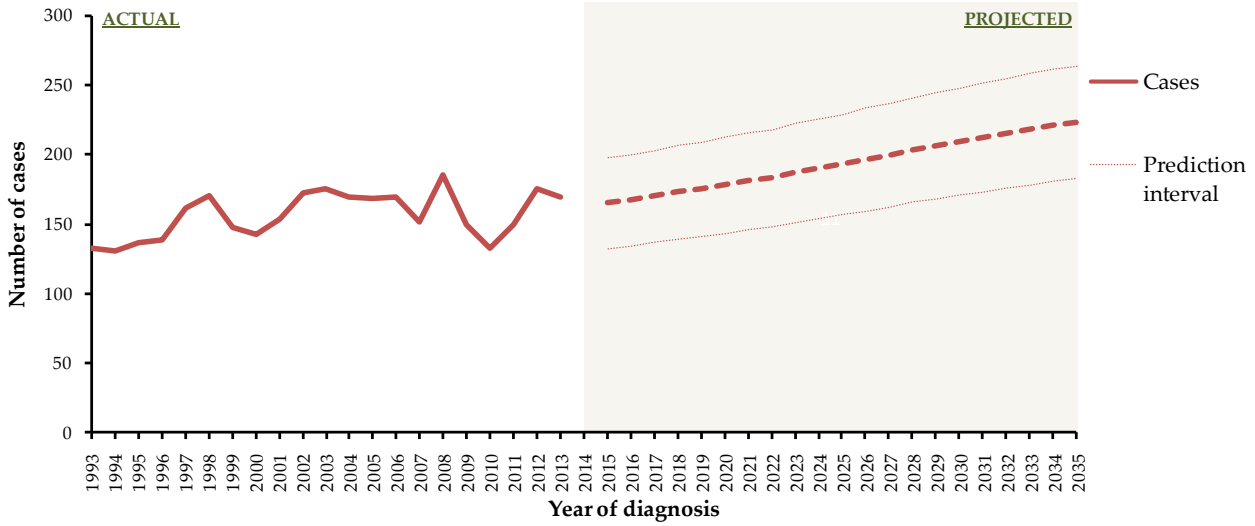
Case projections

Incidence of ovarian cancer is expected to increase as a result of the growth and ageing of the population, with the impact of these two factors creating more additional cases than the reduction in cases caused by the falling underlying incidence rate. In 2009-2013 there were 155 cases of ovarian cancer (excluding borderline cases) diagnosed each year. By 2020 this is projected to increase by 15% to 178 cases per year with an increase of 44% to 223 cases per year expected by 2035. (Tab. 18.9, Fig. 18.9)

Table 18.9: Ovarian cancer (ex. borderline cases) incidence projections to 2035 with comparison to 2009-2013 average

YEAR	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	155			
2015	165	(132 , 198)	6%	(-15%, 28%)
2020	178	(143 , 213)	15%	(-8%, 37%)
2025	193	(157 , 229)	25%	(1%, 48%)
2030	209	(171 , 247)	35%	(10%, 59%)
2035	223	(183 , 263)	44%	(18%, 70%)

Figure 18.9: Ovarian cancer (ex. borderline cases) incidence projections to 2035



FACTORS THAT CAN INFLUENCE OVARIAN CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter ovarian cancer incidence projections through control of the following risk factors:
    - Tobacco smoking and smokeless tobacco;
    - Asbestos exposure.
- Other risk factors which may have a lesser impact on future projections include:
    - Receipt of hormone therapy, such as Tamoxifen;
    - Family history;
    - Nulliparity.
- The classification of malignant ovarian cancer excludes borderline ovarian cancers. A revision to this classification would impact on ovarian cancer incidence projections.
- Other potential factors that can influence ovarian cancer incidence projections include:
    - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
    - Revisions to population projections.

19 Pancreatic Cancer (C25)

Annual number of cases (2009-2013)

Male	Female
105 per year	116 per year

Median age at diagnosis (2009-2013)

Male	Female
71 years	75 years

Area of residence (2004-2013)

Rates higher in	Rates lower in
Deprived Areas (Males & Females)	Affluent Areas (Males & Females)
Belfast HSCT (Females only)	No HSC Trusts (Males & Females)

Average change in cases per year

Male	Female
2.4% per year (1993-2013)	3.0% per year (1993-2013)

Annual percentage change in rates

Male	Female
No change (1993-2013)	1.7% per year (1993-2013)

Projected change in rates (compared to 2009-2013 average)

By 2020		By 2035	
Male	Female	Male	Female
+1%	+12%	No change	+21%

Projected change in cases (compared to 2009-2013 average)

By 2020		By 2035	
Male	Female	Male	Female
+29% to 135 cases per year	+34% to 156 cases per year	+76% to 185 cases per year	+108% to 241 cases per year

19.1: Background

An average of 221 cases (105 male, 116 female) of pancreatic cancer were diagnosed each year during 2009-2013 in Northern Ireland. It was the 12th most common male cancer diagnosed in this period making up 2.4% of all cancers (ex. NMSC), while it was the 8th most common female cancer making up 2.7% of cancers (ex. NMSC) diagnosed. As a proportion of the resident population in Northern Ireland there were 11.8 cases diagnosed per 100,000 males and 12.5 cases diagnosed per 100,000 females. The risk of developing pancreatic cancer before the age of 65 was 1 in 395 for men and 1 in 463 for women, while before age 85 it was 1 in 89 for men and 1 in 97 for women.

Cancer and age

Pancreatic cancer was more common among older people with a median age at diagnosis of 71 years for men and 75 years for women during 2009-2013. Overall 86.0% (83.8% male, 87.9% female) of cases occurred among those aged 60 and over, with 28.5% (21.9% male, 34.5% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 98 cases per 100,000 males and 90 cases per 100,000 females in this age group. Pancreatic cancer was rare (one case per year) among those aged 25 to 39, while there were no cases diagnosed among those aged under 25. (Tab. 19.1, Fig 19.1)

Figure 19.1: Incidence of pancreatic cancer by sex and age: 2009-2013

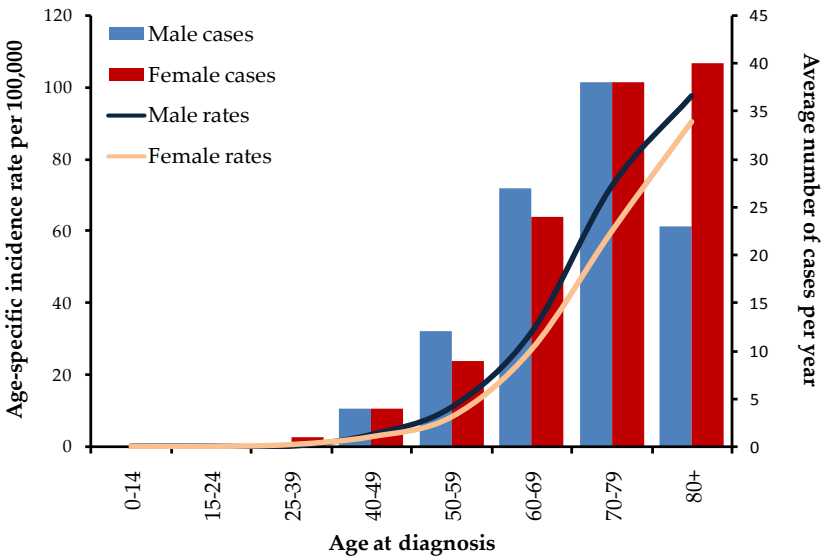


Table 19.1: Average number of pancreatic cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	0	0	0
25-39	0	1	1
40-49	4	4	8
50-59	12	9	21
60-69	27	24	51
70-79	38	38	76
80+	23	40	63
Total	105	116	221

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of pancreatic cancer were higher than average for women resident in the Belfast Trust by 15.9%. Other than this pancreatic cancer rates did not vary significantly by HSC Trust despite slightly elevated rates in the Southern Trust for males and the Western Trust for females. (Tab. 19.2, Fig. 19.2)

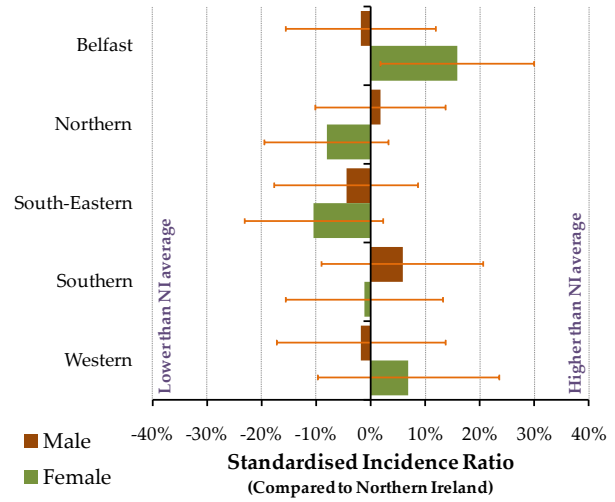
Table 19.2: Average number of pancreatic cancers diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	19	26	45
	Northern	28	25	53
	South-Eastern	20	19	39
	Southern	20	18	38
	Western	16	16	32
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	18	19	37
	2 - 2nd least deprived	21	18	39
	3 - Average	19	19	38
	4 - 2nd most deprived	24	25	49
	5 - Most deprived	19	23	42

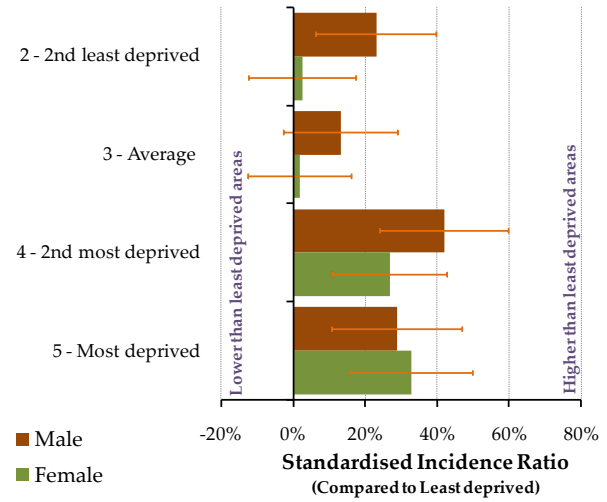
Despite the minimal variation by HSC Trust incidence of pancreatic cancer was related to area based socio-economic deprivation during 2004-2013 with age-standardised incidence rates higher in the most deprived areas compared with the least deprived areas by 28.9% for men and 32.8% for women. (Tab. 19.2, Fig. 19.2)

Figure 19.2: Age-standardised incidence rates of pancreatic cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

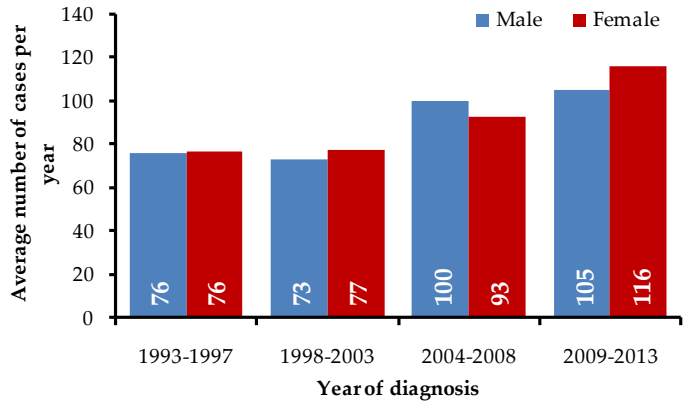


19.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 221 pancreatic cancers (105 male, 116 female) diagnosed each year compared to an average of 152 cancers (76 male, 76 female) in 1993-1997. (Tab. 19.3; Fig. 19.3)

Figure 19.3: Average number of cases of pancreatic cancer diagnosed per year by sex and period of diagnosis: 1993-2013



The number of pancreatic cancers diagnosed each year increased by 2.4% per year among men and by 3.0% per year among women during 1993-2013. (Tab. 19.3, Fig. 19.3)

Table 19.3: Number of cases of pancreatic cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	90	85	175
1994	62	77	139
1995	57	64	121
1996	91	73	164
1997	80	82	162
1998	71	65	136
1999	64	58	122
2000	64	81	145
2001	96	75	171
2002	83	87	170
2003	60	98	158
2004	77	83	160
2005	100	81	181
2006	104	102	206
2007	108	85	193
2008	112	112	224
2009	113	98	211
2010	91	105	196
2011	95	118	213
2012	124	131	255
2013	101	126	227

Trends in incidence rates

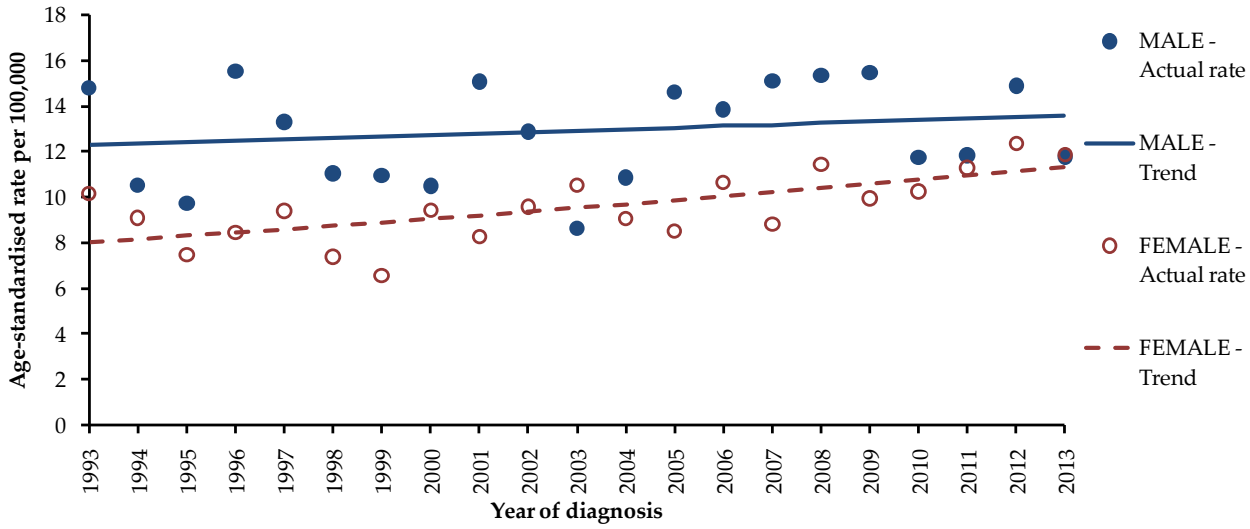
Pancreatic cancer incidence rates (adjusted for demographic change) increased among females during 1993-2013 by an average of 1.7% per year (p=0.001), however among men there was no significant change over the twenty-one year period. (Tab. 19.4, Fig. 19.4)

Table 19.4: Annual percentage change in age-standardised pancreatic cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	1993-2013	0.5% (-0.8%, 1.8%)	p=0.409
Female	**1993-2013**	**1.7% (0.8%, 2.6%)**	**p=0.001**

CI – Confidence interval; Significant trends are in bold

Figure 19.4: Trends in age-standardised pancreatic cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Pancreatic cancer incidence rates did not change significantly among men aged 60-69 and 70-79 during 1993-2013. While there was some evidence for an increase among those aged 0-49, 50-59 and 80 and over, these increases were also not statistically significant. Among women however there was an annual increase of 2.1% per year (p=0.004) in rates among those aged 70-79 and an increase of 1.9% per year (p=0.012) among those aged 80 and over. (Tab. 19.5, Fig. 19.5)

Figure 19.5: Trends in age-standardised pancreatic cancer incidence rates by sex and age at diagnosis: 1993-2013

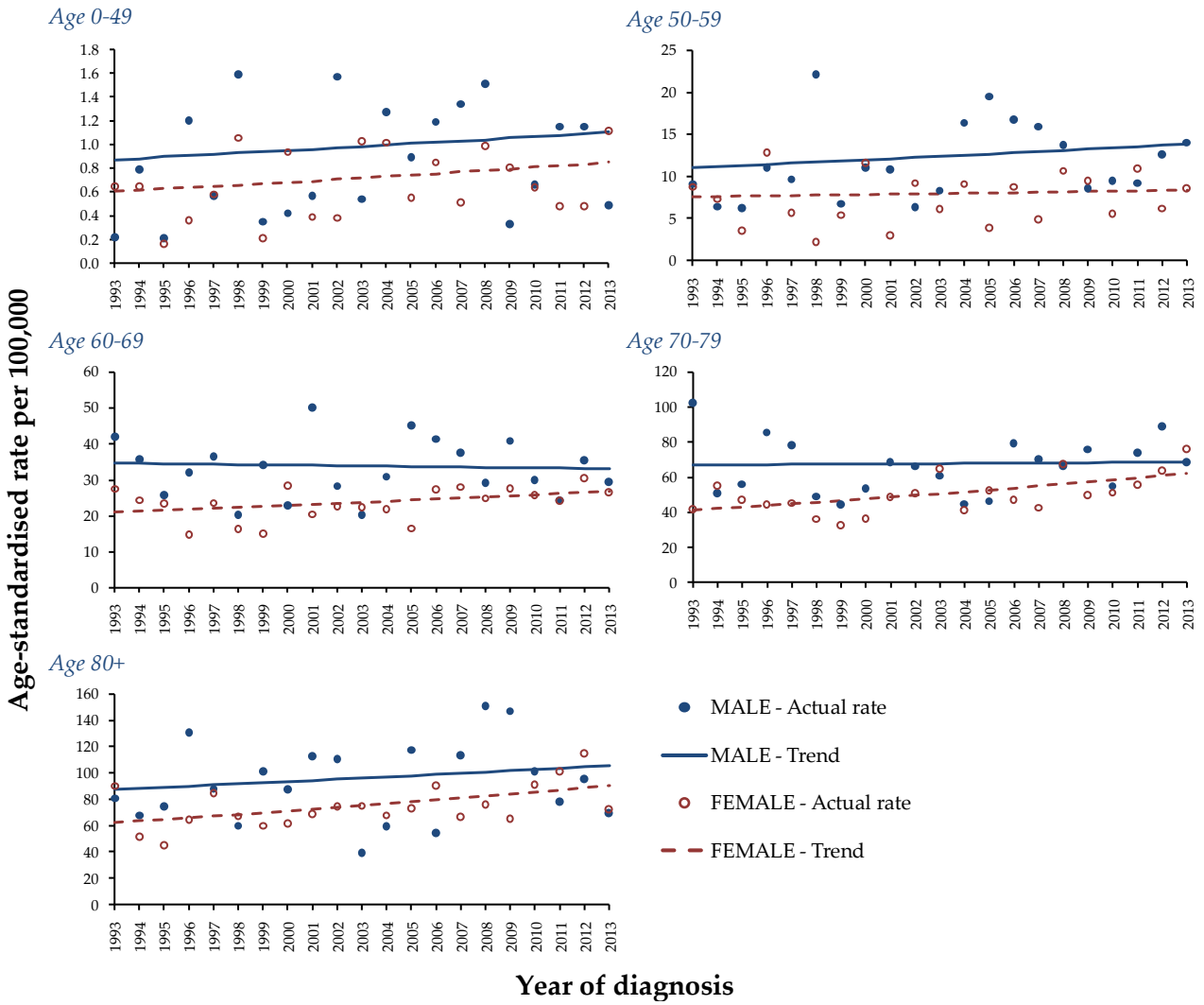


Table 19.5: Annual percentage change in age-standardised pancreatic cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2013	1.2% (-2.9%, 5.5%)	p=0.559	1993-2013	1.7% (-1.6%, 5.1%)	p=0.298
50-59	1993-2013	1.1% (-1.8%, 4.1%)	p=0.441	1993-2013	0.5% (-2.5%, 3.5%)	p=0.750
60-69	1993-2013	-0.2% (-2.0%, 1.6%)	p=0.799	1993-2013	1.2% (-0.1%, 2.5%)	p=0.069
70-79	1993-2013	0.1% (-1.6%, 1.8%)	p=0.894	**1993-2013**	**2.1% (0.8%, 3.5%)**	**p=0.004**
80+	1993-2013	0.9% (-1.6%, 3.5%)	p=0.449	**1993-2013**	**1.9% (0.5%, 3.3%)**	**p=0.012**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Pancreatic cancer incidence rates did not change significantly among men resident in each of the five HSC Trusts during 1993-2013 although there was a non-significant increase of 1.5% per year in the Southern Trust. Among women however there was an annual increase of 3.5% per year (p<0.001) in pancreatic cancer incidence rates in the Belfast Trust and an increase of 1.3% per year (p=0.027) in the South-Eastern Trust. (Tab. 19.6, Fig. 19.6)

Figure 19.6: Trends in age-standardised pancreatic cancer incidence rates by sex and Trust of residence: 1993-2013

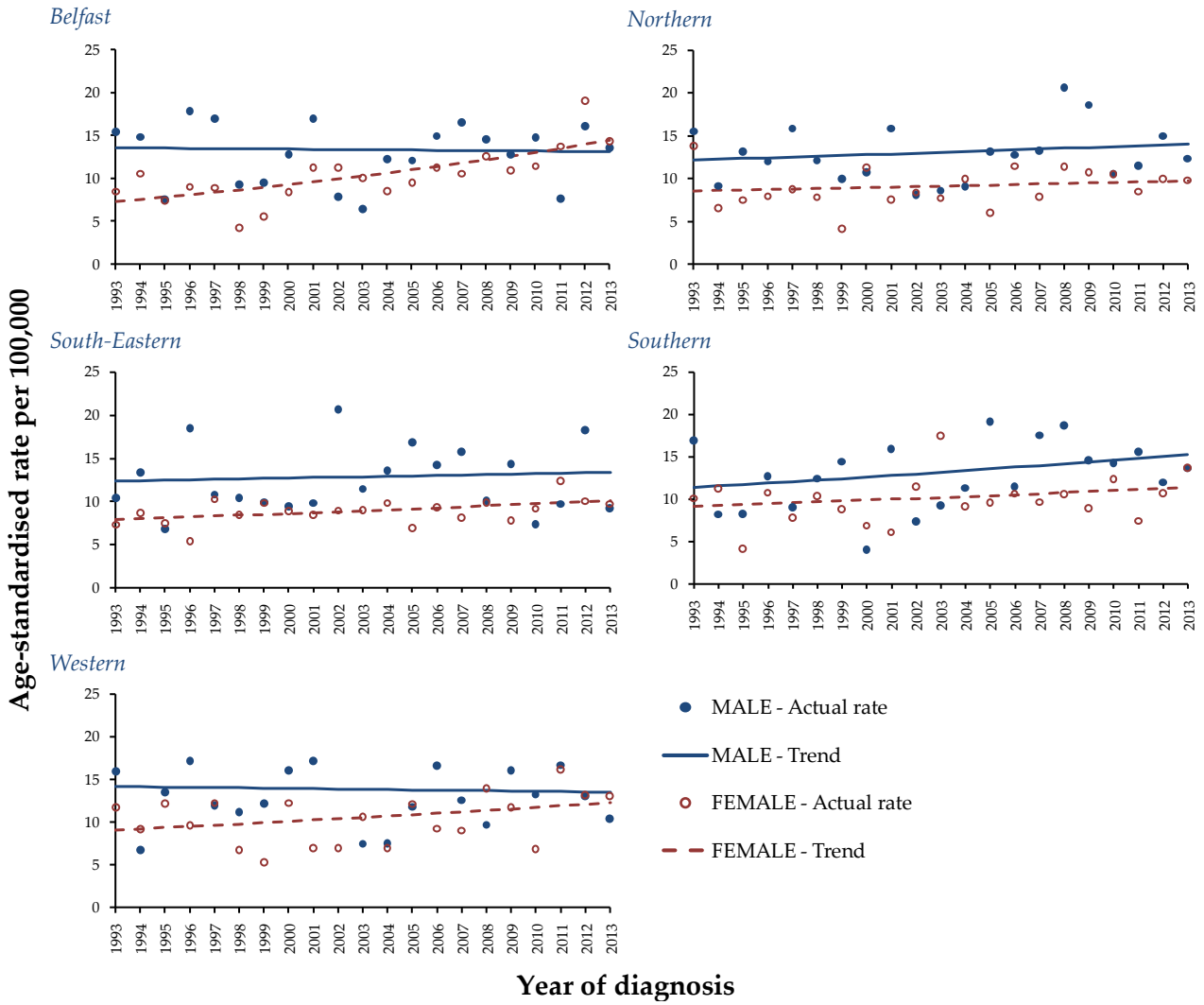


Table 19.6: Annual percentage change in age-standardised pancreatic cancer incidence rates by sex and Trust of residence: 1993-2013

Health & Social Care Trust	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-2013	-0.2% (-2.2%, 1.9%)	p=0.875	**1993-2013**	**3.5% (1.9%, 5.1%)**	**p<0.001**
Northern	1993-2013	0.7% (-1.2%, 2.6%)	p=0.433	1993-2013	0.7% (-1.1%, 2.4%)	p=0.438
South-Eastern	1993-2013	0.4% (-2.0%, 2.9%)	p=0.734	**1993-2013**	**1.3% (0.2%, 2.4%)**	**p=0.027**
Southern	1993-2013	1.5% (-0.7%, 3.7%)	p=0.173	1993-2013	1.1% (-1.0%, 3.2%)	p=0.289
Western	1993-2013	-0.2% (-2.6%, 2.2%)	p=0.831	1993-2013	1.5% (-0.4%, 3.5%)	p=0.120

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Pancreatic cancer incidence rates did not change significantly among men resident in each of the five deprivation quintiles during 2001-2013 although there was a non-significant increase of 2.1% per year in areas of average deprivation. Among women however there was an annual increase of 5.7% per year (p<0.001) in pancreatic cancer incidence rates in the 2nd least deprived areas. (Tab. 19.7, Fig. 19.7)

Figure 19.7: Trends in age-standardised pancreatic cancer incidence rates by sex and deprivation: 2001-2013

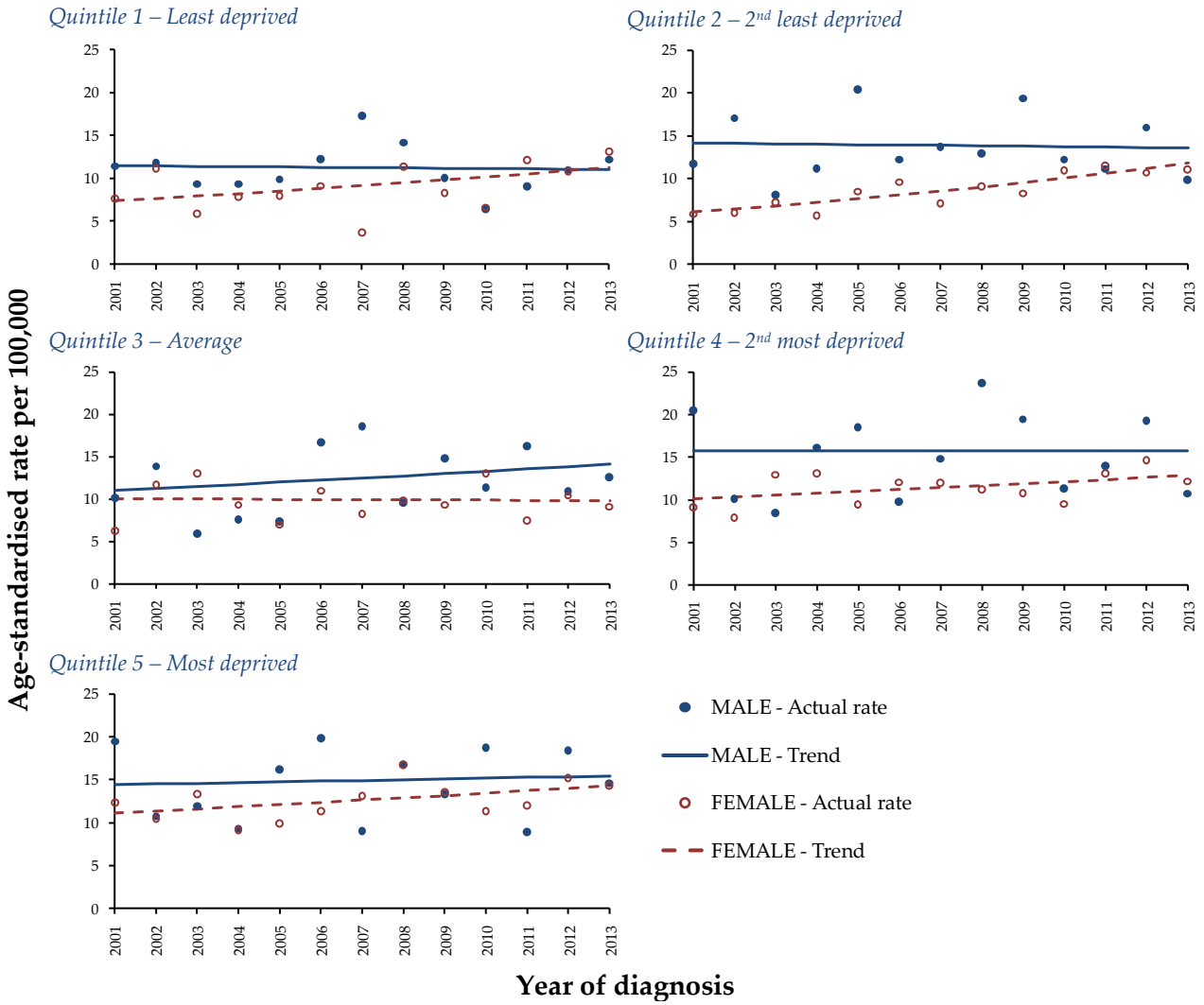


Table 19.7: Annual percentage change in age-standardised pancreatic cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	2001-2013	-0.3% (-4.3%, 3.9%)	p=0.873	2001-2013	3.6% (-0.8%, 8.2%)	p=0.101
Quintile 2 2nd least deprived	2001-2013	-0.3% (-4.9%, 4.5%)	p=0.876	**2001-2013**	**5.7% (3.5%, 7.8%)**	**p<0.001**
Quintile 3 Average	2001-2013	2.1% (-3.2%, 7.7%)	p=0.409	2001-2013	-0.1% (-3.8%, 3.7%)	p=0.939
Quintile 4 2nd most deprived	2001-2013	0.0% (-5.3%, 5.6%)	p=0.990	2001-2013	2.0% (-0.6%, 4.7%)	p=0.112
Quintile 5 Most deprived	2001-2013	0.6% (-4.0%, 5.5%)	p=0.783	2001-2013	2.1% (-0.4%, 4.7%)	p=0.092

CI – Confidence interval; Significant trends are in bold

19.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

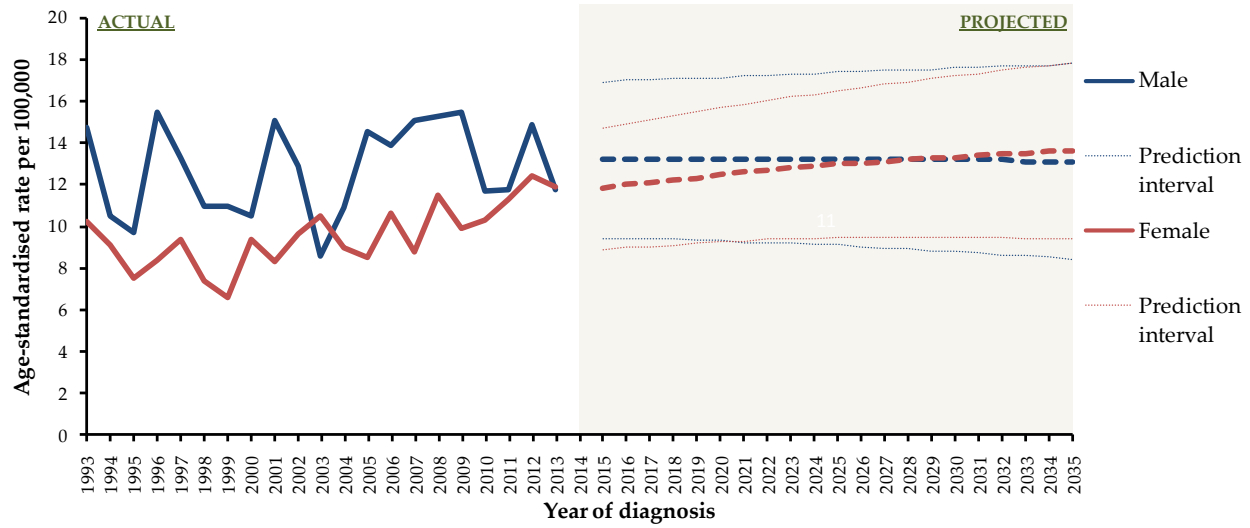
Incidence rates of pancreatic cancer among men are not anticipated to change by a significant amount over the next twenty-two years with rates in 2035 expected to be the same as those in 2009-2013. Among women the past increase in rates will continue into the future, with rates forecast to be 12% higher in 2020 and 21% higher in 2035 than the 2009-2013 average. (Tab. 19.8, Fig. 19.8)

Table 19.8: Pancreatic cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	13.1				11.2			
2015	13.2	(9.4, 16.9)	1%	(-28%, 29%)	11.8	(8.9, 14.7)	5%	(-21%, 31%)
2020	13.2	(9.3, 17.1)	1%	(-29%, 31%)	12.5	(9.3, 15.7)	12%	(-17%, 40%)
2025	13.2	(9.1, 17.4)	1%	(-31%, 33%)	13.0	(9.5, 16.5)	16%	(-15%, 47%)
2030	13.2	(8.8, 17.6)	1%	(-33%, 34%)	13.3	(9.5, 17.2)	19%	(-15%, 54%)
2035	13.1	(8.4, 17.8)	0%	(-36%, 36%)	13.6	(9.4, 17.8)	21%	(-16%, 59%)

ASIR: Age-standardised incidence rate

Figure 19.8: Pancreatic cancer age-standardised incidence rate projections to 2035 by sex



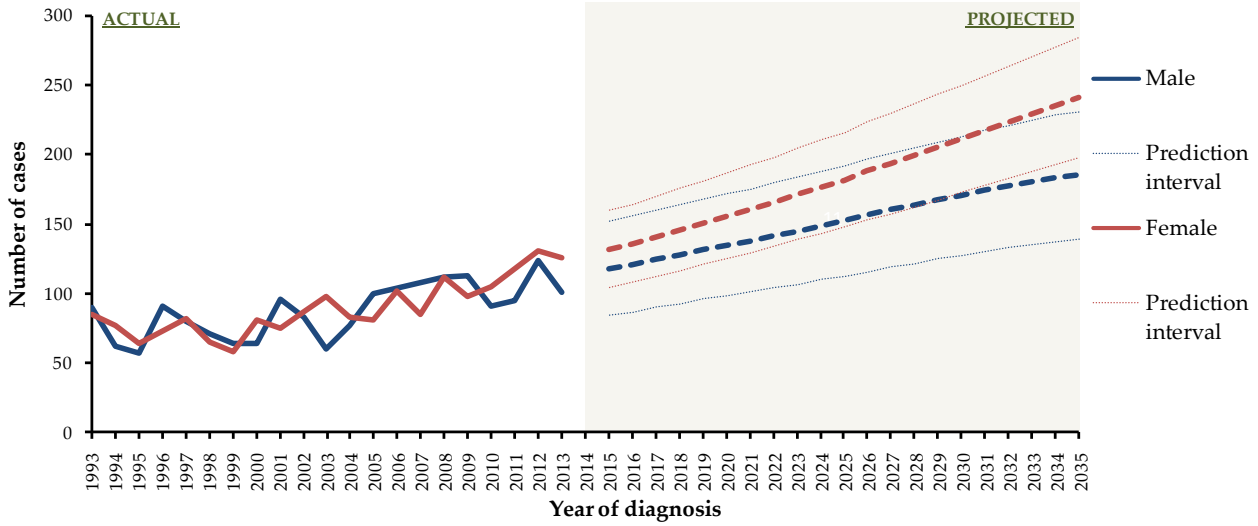
Case projections

Given the projected increase in the elderly population in forthcoming years, the lack of increase forecast in male pancreatic incidence rates translates to an increase in the number of cases, with an expected rise of 29% to 135 cases by 2020 and 76% to 185 cases by 2035. A larger increase of 34% to 156 cases by 2020 and 108% to 241 cases by 2035 is expected among women due to the combined effect of increases in the population and incidence rate. (Tab. 19.9, Fig. 19.9)

Table 19.9: Pancreatic cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	105				116			
2015	118	(84, 152)	12%	(-20%, 45%)	132	(104, 160)	14%	(-10%, 38%)
2020	135	(98, 172)	29%	(-7%, 64%)	156	(125, 187)	34%	(8%, 61%)
2025	152	(112, 192)	45%	(7%, 83%)	182	(148, 216)	57%	(28%, 86%)
2030	170	(127, 213)	62%	(21%, 103%)	211	(173, 249)	82%	(49%, 115%)
2035	185	(139, 231)	76%	(32%, 120%)	241	(198, 284)	108%	(71%, 145%)

Figure 19.9: Pancreatic cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE PANCREATIC CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter pancreatic cancer incidence projections through control of the following risk factors:
    - Tobacco smoking and smokeless tobacco;
    - Excessive alcohol consumption;
    - Obesity and/or diabetes.
- Risk factors which may have a lesser impact on future projections include:
    - Family history;
    - Long-term inflammation of the pancreas (chronic pancreatitis).
- Other potential factors that can influence pancreatic cancer incidence projections include:
    - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
    - Changes to the way in which pancreatic cancer is classified;
    - Revisions to population projections.

20 PROSTATE CANCER (C61)

ANNUAL NUMBER OF CASES (2009-2013)

1,039 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

70 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
AFFLUENT AREAS	DEPRIVED AREAS
	BELFAST HSCT
SOUTHERN HSCT	SOUTH-EASTERN HSCT

AVERAGE CHANGE IN CASES PER YEAR

+11.2% PER YEAR (1999-2003)

+5.5% PER YEAR (2003-2009)

-1.1% PER YEAR (2009-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

+8.2% PER YEAR (1999-2003)

+2.6% PER YEAR (2003-2009)

-3.6% PER YEAR (2009-2013)

PROJECTED CHANGE IN RATES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
-10%	-23%

PROJECTED CHANGE IN CASES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
+14% TO 1,183 CASES PER YEAR	+25% TO 1,294 CASES PER YEAR

20.1: BACKGROUND

On average there were 1,039 cases of prostate cancer diagnosed among men each year in Northern Ireland during 2009-2013. It was the most common male cancer diagnosed in this period making up almost a quarter (23.5%) of all male cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 116.9 cases diagnosed per 100,000 males. The risk of developing prostate cancer among men before the age of 65 was 1 in 35; while before age 85 it was 1 in 9.

Cancer and age

Prostate cancer was more common among older men with a median age at diagnosis of 70 years during 2009-2013. Over 17 out of 20 cases (85.4%) occurred among those aged 60 and over, with 16.3% occurring among those aged 80 and over. Incidence rates were greatest among those aged 80 and over with 706 cases diagnosed per 100,000 males in this age group. Prostate cancer was comparatively infrequent among those aged 40 to 49 with only 17 cases diagnosed each year, while there was only one case per year diagnosed among men aged under 40. (Tab. 20.1, Fig 20.1)

Figure 20.1: Incidence of prostate cancer by age: 2009-2013

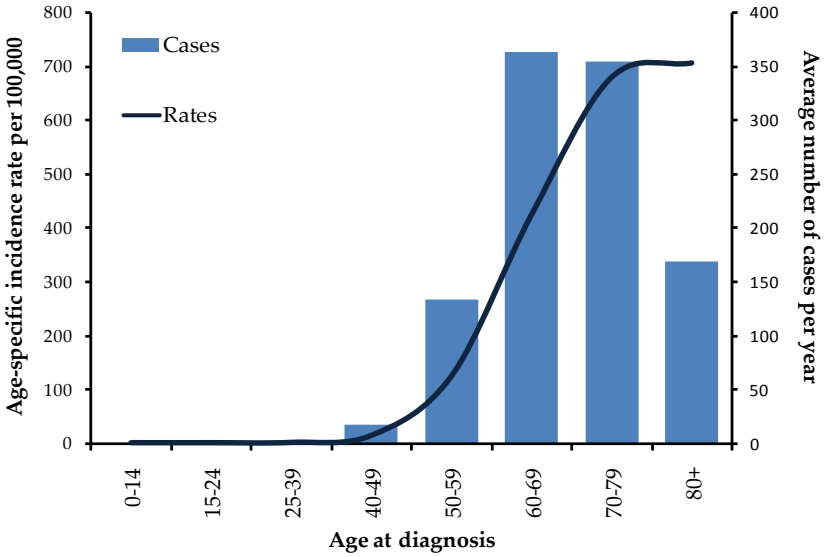


Table 20.1: Average number of prostate cancers diagnosed per year by age: 2009-2013

AGE	Cases per year
0-14	0
15-24	0
25-39	1
40-49	17
50-59	134
60-69	363
70-79	355
80+	169
Total	1,039

Cancer and area of residence

During 2009-2013 age-standardised incidence rates of prostate cancer were 8.2% higher than the Northern Ireland average in the Southern Trust, while they were lower than average by 6.6% in the Belfast Trust and by 4.6% in the South-Eastern Trust. (Tab. 20.2, Fig. 20.2)

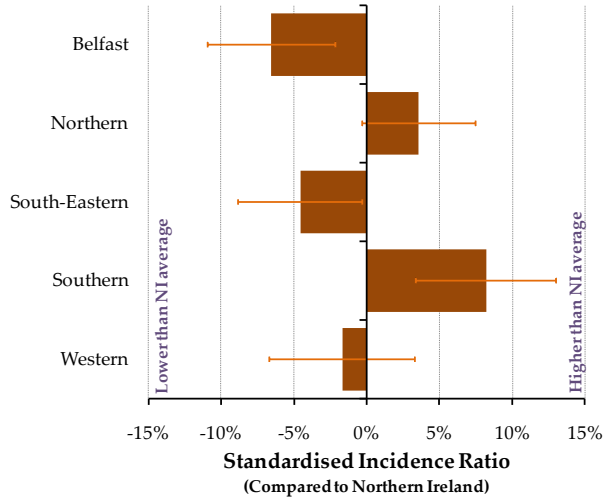
Table 20.2: Average number of prostate cancers diagnosed per year by area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year
HEALTH & SOCIAL CARE TRUST	Belfast	173
	Northern	270
	South-Eastern	192
	Southern	191
	Western	148
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	218
	2 - 2nd least deprived	206
	3 - Average	200
	4 - 2nd most deprived	190
	5 - Most deprived	159

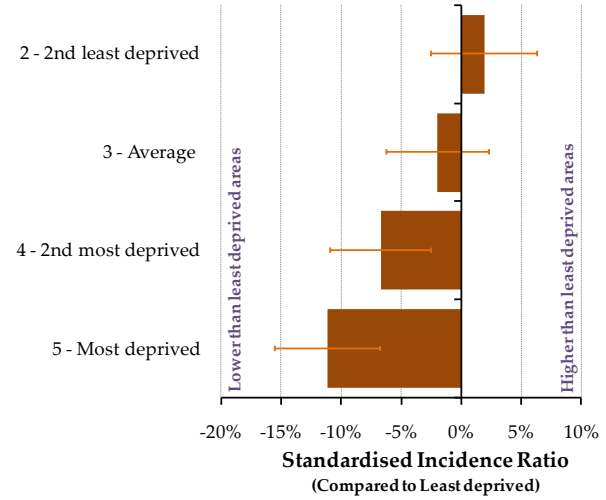
Incidence of prostate cancer was more common in affluent than deprived areas with age-standardised incidence rates 11.1% lower in the most deprived areas than in the least deprived areas. Additionally, the average Northern Ireland incidence rate was 3.3% lower than the incidence rate in the least deprived areas. (Tab. 20.2, Fig. 20.2)

Figure 20.2: Age-standardised incidence rates of prostate cancer by area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

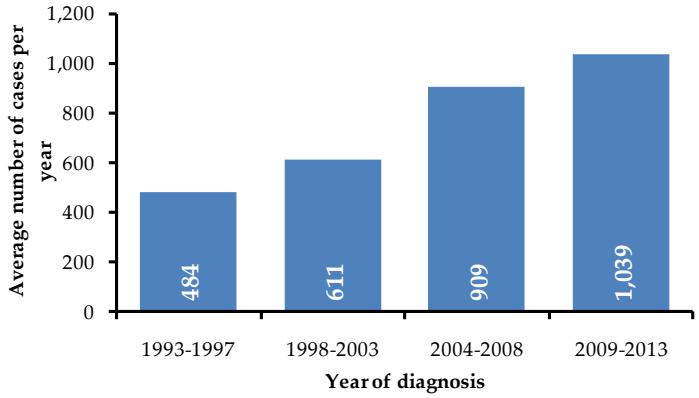


20.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there were 1,039 prostate cancers diagnosed among men each year compared to 484 cases per year in 1993-1997. (Tab. 20.3, Fig. 20.3)

Figure 20.3: Average number of cases of prostate cancer diagnosed per year by period of diagnosis: 1993-2013



The number of prostate cancer cases increased by 1.0% per year during 1993-1999. However from 1999 to 2003 there was an 11.2% increase per year followed by a 5.5% increase per year up to 2009. From 2009 onwards the number of cases decreased by 1.1% per year. (Tab. 20.3, Fig. 20.3)

Table 20.3: Number of cases of prostate cancer diagnosed by year: 1993-2013

YEAR	Number of cases
1993	470
1994	485
1995	510
1996	464
1997	490
1998	504
1999	504
2000	596
2001	583
2002	682
2003	794
2004	832
2005	842
2006	879
2007	969
2008	1,023
2009	1,114
2010	958
2011	1,053
2012	1,052
2013	1,018

Trends in incidence rates

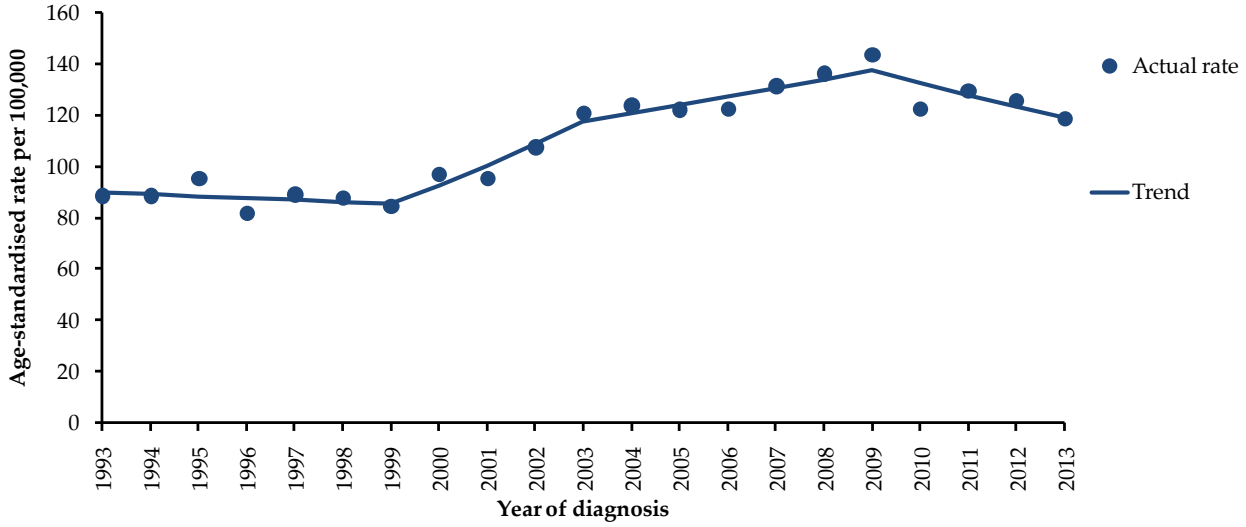
Prostate cancer rates remained steady during 1993-1999. This was followed by increases during 1999-2003 and 2003-2009 of 8.2% (p=0.034) and 2.6% (p=0.053) per year respectively. From 2009 onwards rates decreased by 3.6% per year (p=0.046). (Tab. 20.4, Fig. 20.4)

Table 20.4: Annual percentage change in age-standardised prostate cancer incidence rates: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Males	1993-1999	-0.8% (-3.5%, 2.0%)	p=0.536
	1999-2003	**8.2% (0.7%, 16.3%)**	**p=0.034**
	2003-2009	2.6% (0.0%, 5.4%)	p=0.053
	2009-2013	**-3.6% (-6.9%, -0.1%)**	**p=0.046**

CI – Confidence interval; Significant trends are in bold

Figure 20.4: Trends in age-standardised prostate cancer incidence rates: 1993-2013



Incidence trends by age at diagnosis

Incidence rates of prostate cancer among men aged 0-49 increased by a considerable 12.6% per year (p<0.001) during 1993-2013, however among those aged 80 and over there was an annual decrease in rates of 1.8% per year (p<0.001). At the end of 2013 rates among men aged 50-59, 60-69 and 70-79 were declining but not by a significant amount, however for these age groups this period of stability followed a period of increasing rates which was sizable for those aged 50-59 and 60-69. (Tab. 20.5, Fig. 20.5)

Figure 20.5: Trends in age-standardised prostate cancer incidence rates by age at diagnosis: 1993-2013

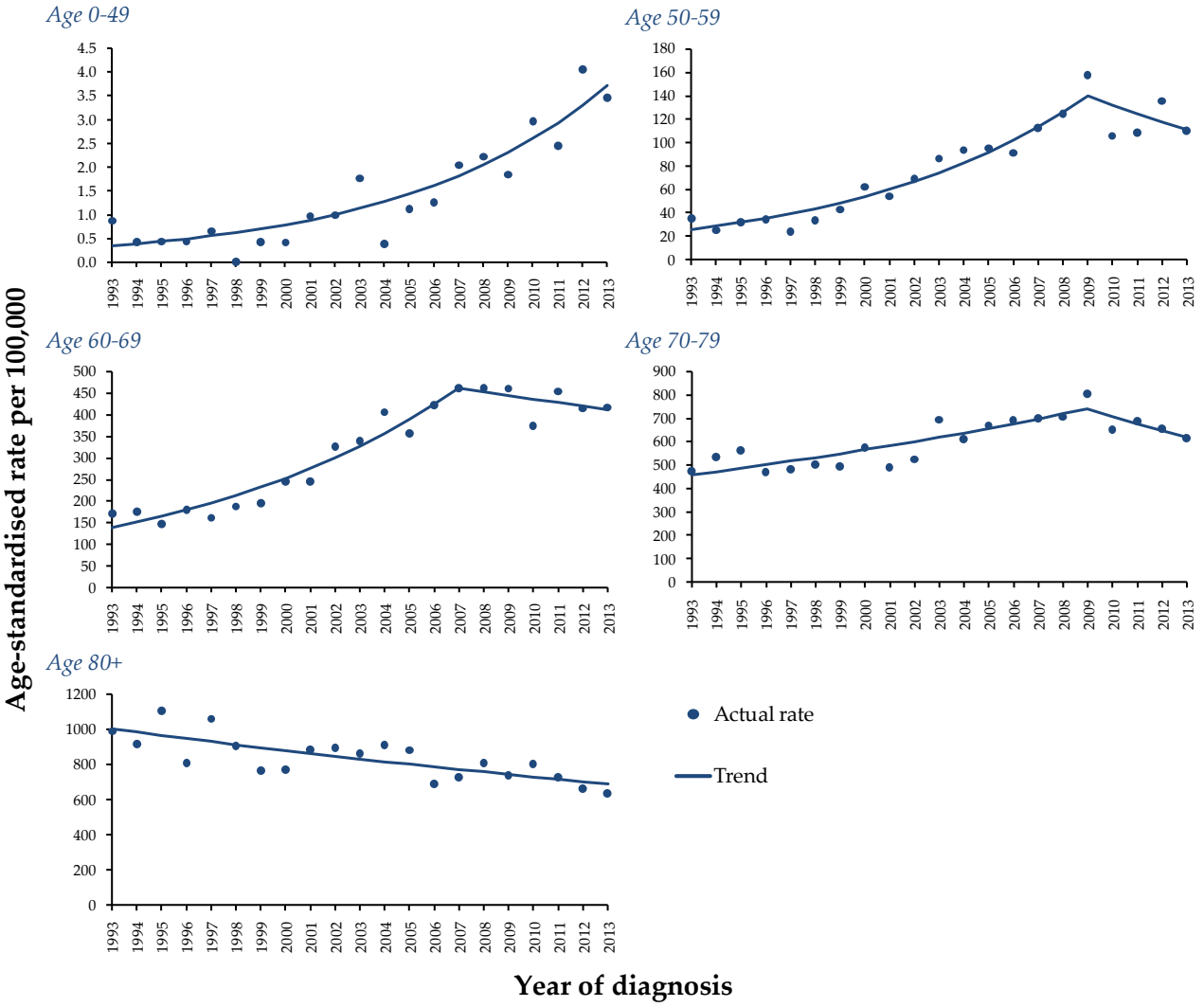


Table 20.5: Annual percentage change in age-standardised prostate cancer incidence rates by age: 1993-2013

AGE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**12.6% (8.3%, 17.1%)**	**p<0.001**
50-59	**1993-2009**	**11.1% (9.0%, 13.3%)**	**p<0.001**
	2009-2013	-5.6% (-14.6%, 4.3%)	p=0.240
60-69	**1993-2007**	**9.0% (7.2%, 10.9%)**	**p<0.001**
	2007-2013	-1.9% (-5.8%, 2.2%)	p=0.345
70-79	**1993-2009**	**3.0% (2.0%, 4.0%)**	**p<0.001**
	2009-2013	-4.4% (-10.8%, 2.6%)	p=0.195
80+	**1993-2013**	**-1.8% (-2.5%, -1.1%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Men resident in each HSC Trust, except the Western HSCT, experienced a rise in prostate cancer incidence rates for some period of time during 1993-2013. However the duration and start and end point of this increase was different in each Trust. At the end of 2013 no Trust was still experiencing an increase, while the South-Eastern Trust was experiencing a reversal of the trend with a significant annual decrease in prostate cancer incidence rates of 3.9% per year (p=0.015). The Belfast, Northern and Southern Trusts were also experiencing a decrease, but these changes were not statistically significant. (Tab. 20.6, Fig. 20.6)

Figure 20.6: Trends in age-standardised prostate cancer incidence rates by Trust of residence: 1993-2013

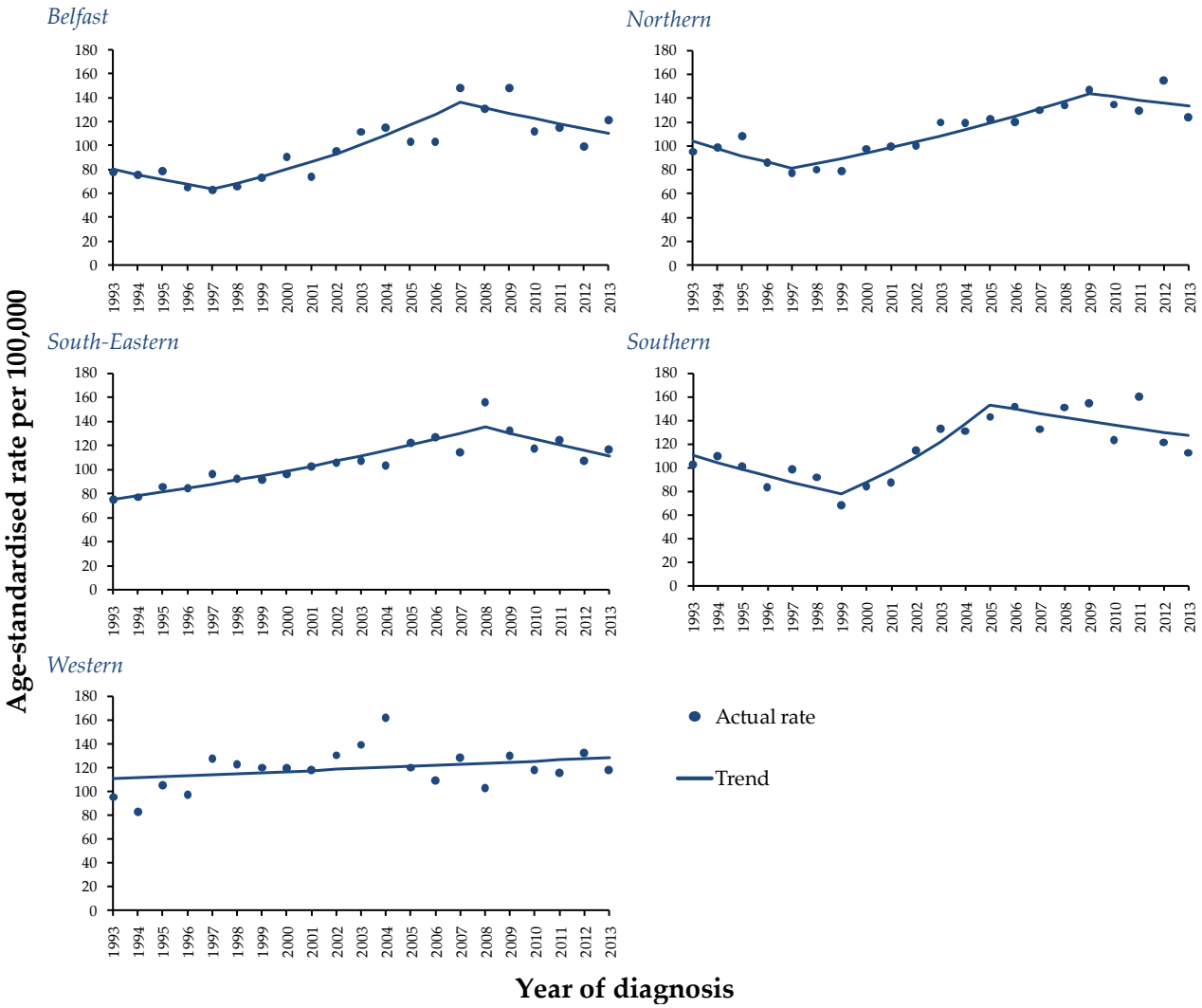


Table 20.6: Annual percentage change in age-standardised prostate cancer incidence rates by Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	HEALTH & SOCIAL CARE TRUST	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	1993-1997	-5.6% (-17.8%, 8.4%)	p=0.384	South-Eastern	**1993-2008**	**4.0% (3.2%, 4.8%)**	**p<0.001**
	1997-2007	**7.8% (4.1%, 11.7%)**	**p<0.001**		**2008-2013**	**-3.9% (-6.8%, -0.9%)**	**p=0.015**
	2007-2013	-3.4% (-8.3%, 1.6%)	p=0.164	Southern	1993-1999	-5.8% (-12.5%, 1.4%)	p=0.105
Northern	1993-1997	-5.9% (-15.3%, 4.6%)	p=0.235		**1999-2005**	**12.0% (2.9%, 21.9%)**	**p=0.012**
	1997-2009	**4.8% (2.9%, 6.8%)**	**p<0.001**		2005-2013	-2.3% (-5.4%, 0.9%)	p=0.144
	2009-2013	-1.9% (-8.2%, 4.9%)	p=0.548	Western	1993-2013	0.7% (-0.3%, 1.8%)	p=0.157

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

In the least deprived areas of Northern Ireland incidence rates of prostate cancer increased by 6.7% per year (p=0.017) between 2001 and 2008, after which the rate declined but not by a significant amount. A similar pattern was apparent in the most deprived areas with a significant increase of 7.6% between 2001 and 2007 (p=0.008) followed by a decline in rates which was not statistically significant. (Tab. 20.7, Fig. 20.7)

Figure 20.7: Trends in age-standardised prostate cancer incidence rates by deprivation: 2001-2013

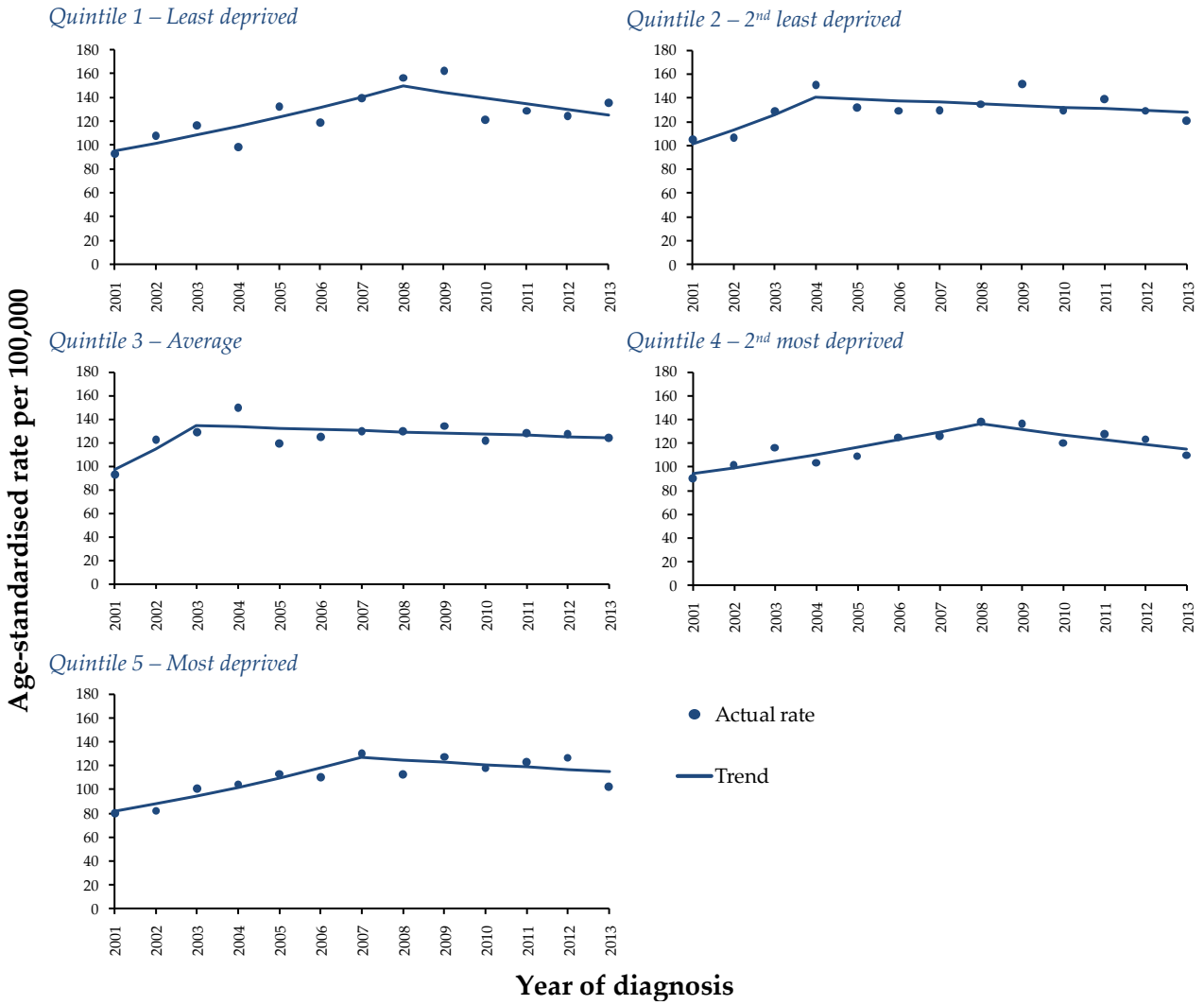


Table 20.7: Annual percentage change in age-standardised prostate cancer incidence rates by deprivation: 2001-2013

Area Based Deprivation Quintile	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2008**	**6.7% (1.5%, 12.2%)**	**p=0.017**
	2008-2013	-3.5% (-9.8%, 3.2%)	p=0.259
Quintile 2 2nd least deprived	2001-2004	11.7% (-2.3%, 27.7%)	p=0.093
	2004-2013	-1.0% (-3.1%, 1.1%)	p=0.292
Quintile 3 Average	2001-2003	17.7% (-7.3%, 49.5%)	p=0.154
	2003-2013	-0.8% (-2.3%, 0.7%)	p=0.268
Quintile 4 2nd most deprived	**2001-2008**	**5.5% (2.5%, 8.5%)**	**p=0.003**
	2008-2013	-3.4% (-7.4%, 0.7%)	p=0.090
Quintile 5 Most deprived	**2001-2007**	**7.6% (2.5%, 12.9%)**	**p=0.008**
	2007-2013	-1.7% (-5.6%, 2.5%)	p=0.371

CI – Confidence interval; Significant trends are in bold

20.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

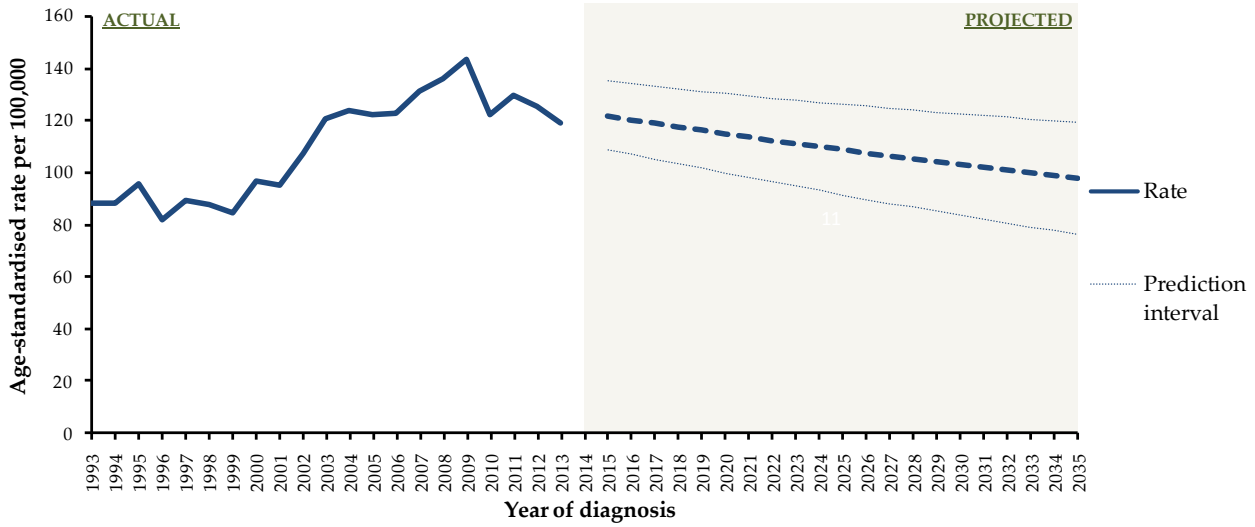
Despite the large increase up to 2009, prostate cancer incidence rates are projected to decline over the next twenty-two years, although they are not expected to fall again to the levels seen in 1993-1998. By 2020 a 10% drop in incidence rates, compared to the 2009-2013 average, is forecast with a drop of 23% expected by 2035. There is however a moderate margin of error in this estimate with the decrease possibly being as much as 40% or as little as 7%. (Tab. 20.8, Fig. 20.8)

Table 20.8: Prostate cancer age-standardised incidence rate projections to 2035 with comparison to 2009-2013 average

YEAR	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	127.8			
2015	121.7	(108.4, 135.0)	-5%	(-15%, 6%)
2020	115.0	(99.7, 130.2)	-10%	(-22%, 2%)
2025	108.8	(91.4, 126.2)	-15%	(-28%, -1%)
2030	103.1	(83.7, 122.6)	-19%	(-35%, -4%)
2035	97.9	(76.5, 119.4)	-23%	(-40%, -7%)

ASIR: Age-standardised incidence rate

Figure 20.8: Prostate cancer age-standardised incidence rate projections to 2035



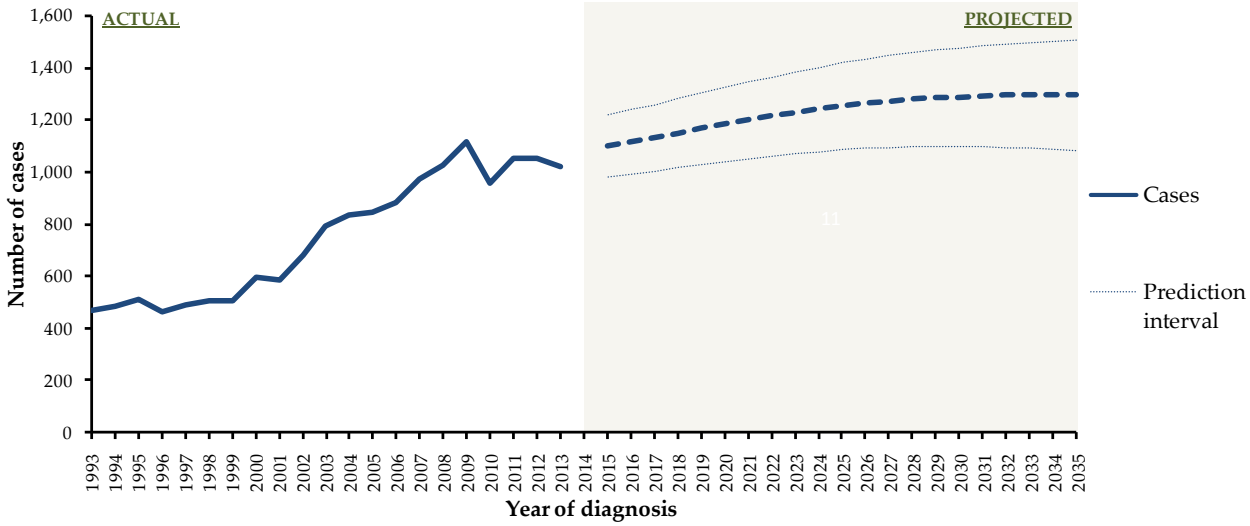
Case projections

Due to demographic change, in particular the projected growth in the elderly population, the number of cases of prostate cancer diagnosed each year is expected to increase despite the projected fall in rates. In 2009-2013 there were 1,039 cases diagnosed each year. By 2020 this is expected to increase by 14% to 1,183 cases per year, while by 2035 an increase of 25% to 1,294 cases per year is forecast. (Tab. 20.9, Fig. 20.9)

Table 20.9: Prostate cancer incidence projections to 2035 with comparison to 2009-2013 average

YEAR	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	1,039			
2015	1,100	(979, 1,221)	6%	(-6%, 18%)
2020	1,183	(1,040, 1,326)	14%	(0%, 28%)
2025	1,252	(1,085, 1,419)	21%	(4%, 37%)
2030	1,286	(1,096, 1,476)	24%	(5%, 42%)
2035	1,294	(1,082, 1,506)	25%	(4%, 45%)

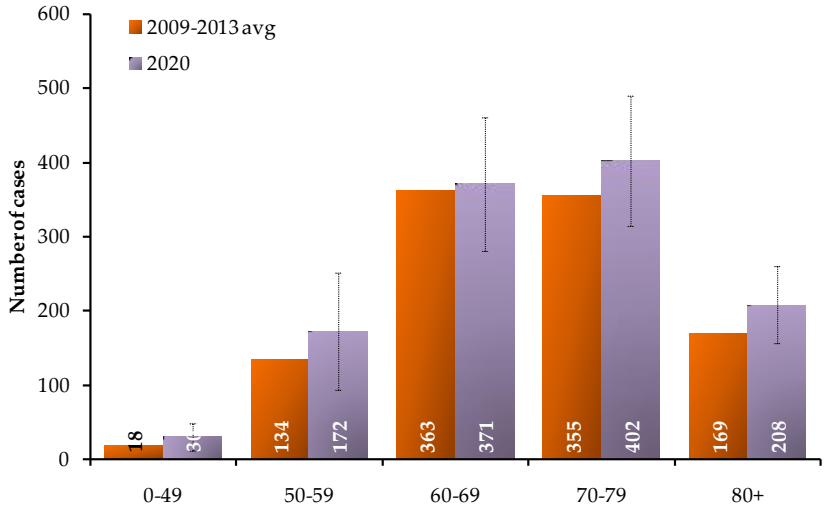
Figure 20.9: Prostate cancer incidence projections to 2035



Case projections by age

Incidence rates of prostate cancer are predicted to decrease in all age groups up to 2020, except among those in the 0-49 age group which are expected to see slight increases in rates.

Figure 20.10: Prostate cancer incidence projections to 2020 by age



Combined with demographic change the percentage increase in cases is predicted to be highest among those aged 0-49, although this age group makes up only a small proportion of the total number of prostate cancer cases. The other age groups are expected to also experience an increase in the number of prostate cancer cases as the expected increase in the population outweighs the expected decrease in rates. (Fig. 20.10)

FACTORS THAT CAN INFLUENCE PROSTATE CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The risk factors associated with prostate cancer are not well understood, thus limited potential exists to alter prostate cancer incidence projections through control of risk factors.
- Risk factors which may have a limited impact on future projections include family history.
- Prostate cancer incidence trends are highly correlated with the use of PSA testing in a population. Any future change in PSA testing levels has the potential to produce prostate cancer incidence rates that deviate considerably from current future estimates.
- Other potential factors that can influence prostate cancer incidence projections include:
    - Changes to the way in which cancer is classified;
    - Revisions to population projections.

21 STOMACH CANCER (C16)

ANNUAL NUMBER OF CASES (2009-2013)

MALE	FEMALE
141 PER YEAR	81 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

MALE	FEMALE
73 YEARS	77 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
DEPRIVED AREAS (MALES & FEMALES)	AFFLUENT AREAS (MALES & FEMALES)
BELFAST HSCT (MALES & FEMALES)	SOUTH-EASTERN HSCT (MALES & FEMALES)
	NORTHERN HSCT (FEMALES ONLY)

AVERAGE CHANGE IN CASES PER YEAR

MALE	FEMALE
-0.8% PER YEAR (1993-2013)	-1.2% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

MALE	FEMALE
-2.6% PER YEAR (1993-2013)	-2.4% PER YEAR (1993-2013)

PROJECTED CHANGE IN RATES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
-20%	-18%	-45%	-41%

PROJECTED CHANGE IN CASES (COMPARED TO 2009-2013 AVERAGE)

BY 2020		BY 2035	
MALE	FEMALE	MALE	FEMALE
+1% 143 CASES PER YEAR	-4% TO 78 CASES PER YEAR	-1% 140 CASES PER YEAR	-6% TO 76 CASES PER YEAR

21.1: BACKGROUND

An average of 222 cases (141 male, 81 female) of stomach cancer were diagnosed each year during 2009-2013 in Northern Ireland. It was the 7th most common male cancer diagnosed in this period making up 3.2% of all cancers (ex. NMSC), while it was the 11th most common female cancer making up 1.9% of cancers (ex. NMSC) diagnosed. As a proportion of the resident population in Northern Ireland there were 15.9 cases diagnosed per 100,000 males and 8.8 cases diagnosed per 100,000 females. The risk of developing stomach cancer before the age of 65 was 1 in 308 for men and 1 in 605 for women, while before age 85 it was 1 in 64 for men and 1 in 134 for women.

Cancer and age

Stomach cancer was more common among older people with a median age at diagnosis of 73 years for men and 77 years for women during 2009-2013. Overall 83.3% (82.3% male, 85.2% female) of cases occurred among those aged 60 and over, with 29.7% (24.8% male, 38.3% female) occurring among those aged 80 and over. Incidence rates were greatest among both men and women aged 80 and over with 145 cases per 100,000 males and 71 cases per 100,000 females in this age group. Stomach cancer was rare (2 cases per year) among those aged 25 to 39, while there was only one case per year diagnosed among those aged under 25. (Tab. 21.1, Fig 21.1)

Figure 21.1: Incidence of stomach cancer by sex and age: 2009-2013

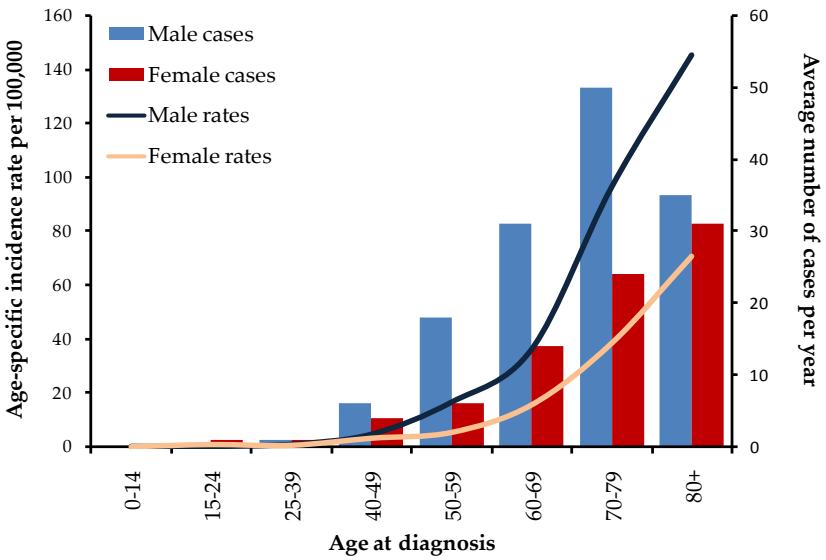


Table 21.1: Average number of stomach cancers diagnosed per year by sex and age: 2009-2013

AGE	Cases per year		
	Male	Female	Total
0-14	0	0	0
15-24	0	1	1
25-39	1	1	2
40-49	6	4	10
50-59	18	6	24
60-69	31	14	45
70-79	50	24	74
80+	35	31	66
Total	141	81	222

Cancer and area of residence

During 2004-2013 age-standardised incidence rates of stomach cancer were higher than the Northern Ireland average in the Belfast Trust by 22.6% for men and by 36.6% for women. Stomach cancer incidence rates were lower than average in the South-Eastern Trust for men and in the Northern and South-Eastern Trusts for women. (Tab. 21.2, Fig. 21.2)

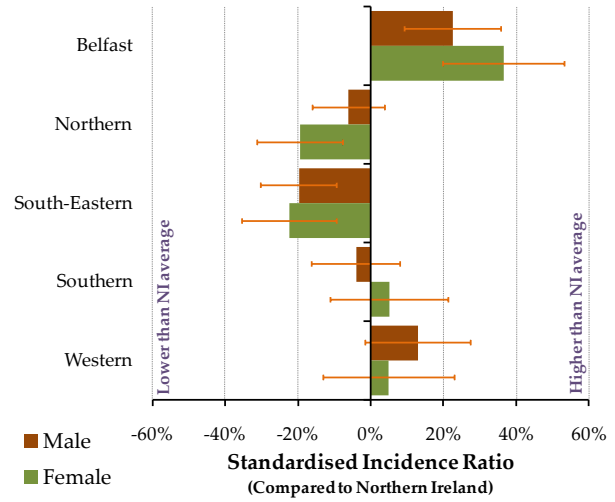
Table 21.2: Average number of stomach cancers diagnosed per year by sex and area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year		
		Male	Female	Total
HEALTH & SOCIAL CARE TRUST	Belfast	33	26	59
	Northern	34	18	52
	South-Eastern	22	14	36
	Southern	24	16	40
	Western	24	13	37
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	22	14	36
	2 - 2nd least deprived	24	14	38
	3 - Average	24	16	40
	4 - 2nd most deprived	29	20	49
	5 - Most deprived	37	24	61

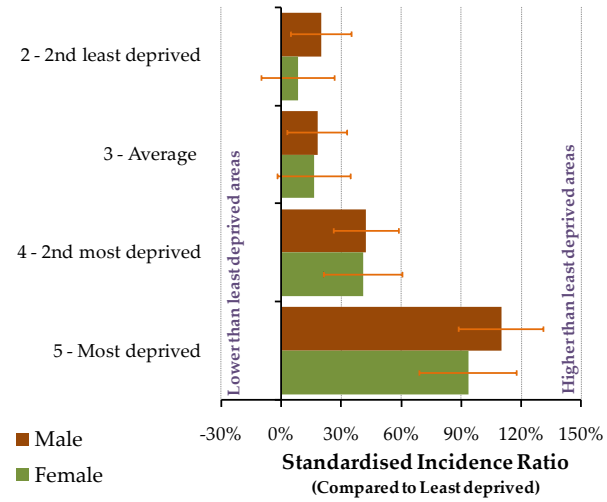
Incidence rates of stomach cancer increased with increasing levels of area based socio-economic deprivation during 2004-2013. In particular age-standardised incidence rates were higher in the most deprived areas compared with the least deprived areas by 110.0% for males and by 93.5% for females. (Tab. 21.2, Fig. 21.2)

Figure 21.2: Age-standardised incidence rates of stomach cancer by sex and area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

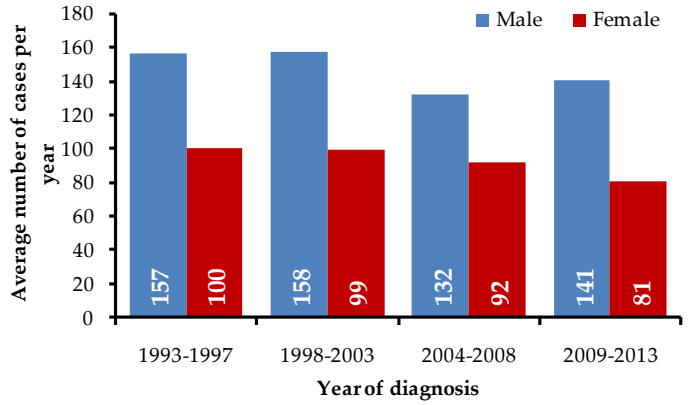


21.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there were an average of 222 stomach cancers (141 male, 81 female) diagnosed each year compared to an average of 257 cancers (157 male, 100 female) in 1993-1997. (Tab. 21.3, Fig. 21.3)

Figure 21.3: Average number of cases of stomach cancer diagnosed per year by sex and period of diagnosis: 1993-2013



On average the number of cases of stomach cancer decreased by 0.8% per year (p=0.028) among men and by 1.2% per year (p=0.003) among women between 1993 and 2013. (Tab. 21.3, Fig. 21.3)

Table 21.3: Number of cases of stomach cancer diagnosed by sex and year: 1993-2013

YEAR	Number of cases		
	Male	Female	Total
1993	150	106	256
1994	167	96	263
1995	155	85	240
1996	170	116	286
1997	142	98	240
1998	176	99	275
1999	157	106	263
2000	139	92	231
2001	148	107	255
2002	156	99	255
2003	170	93	263
2004	128	81	209
2005	125	85	210
2006	133	98	231
2007	134	99	233
2008	140	97	237
2009	127	74	201
2010	154	92	246
2011	145	89	234
2012	120	76	196
2013	159	74	233

Trends in incidence rates

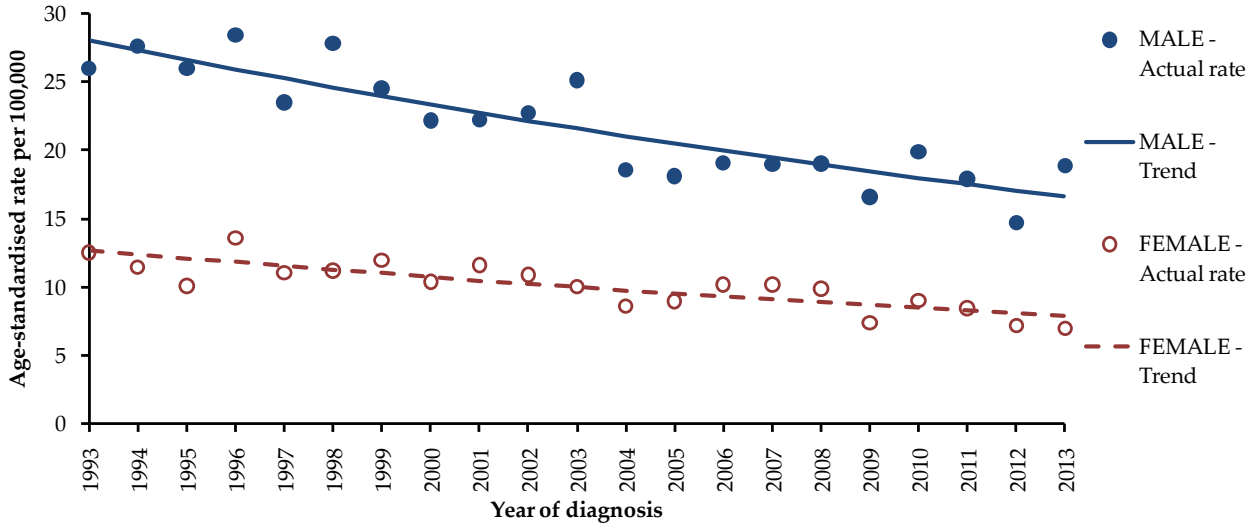
Stomach cancer incidence rates (adjusted for demographic change) decreased among males by an average of 2.6% per year (p<0.001) and among women by an average of 2.4% per year (p<0.001) during 1993-2013. (Tab. 21.4, Fig. 21.4)

Table 21.4: Annual percentage change in age-standardised stomach cancer incidence rates by sex: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Male	**1993-2013**	**-2.6% (-3.2%, -1.9%)**	**p<0.001**
Female	**1993-2013**	**-2.4% (-3.1%, -1.6%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 21.4: Trends in age-standardised stomach cancer incidence rates by sex: 1993-2013



Incidence trends by age at diagnosis

Stomach cancer incidence rates decreased significantly for all age groups during 1993-2013 except for males aged 0-49, males aged 80 and over and females aged 0-49. The greatest decreases in rates were among men aged 50-59, men aged 60-69 and women aged 50-59, all of which had annual decreases greater than 3.5% per year. (Tab. 21.5, Fig. 21.5)

Figure 21.5: Trends in age-standardised stomach cancer incidence rates by sex and age at diagnosis: 1993-2013

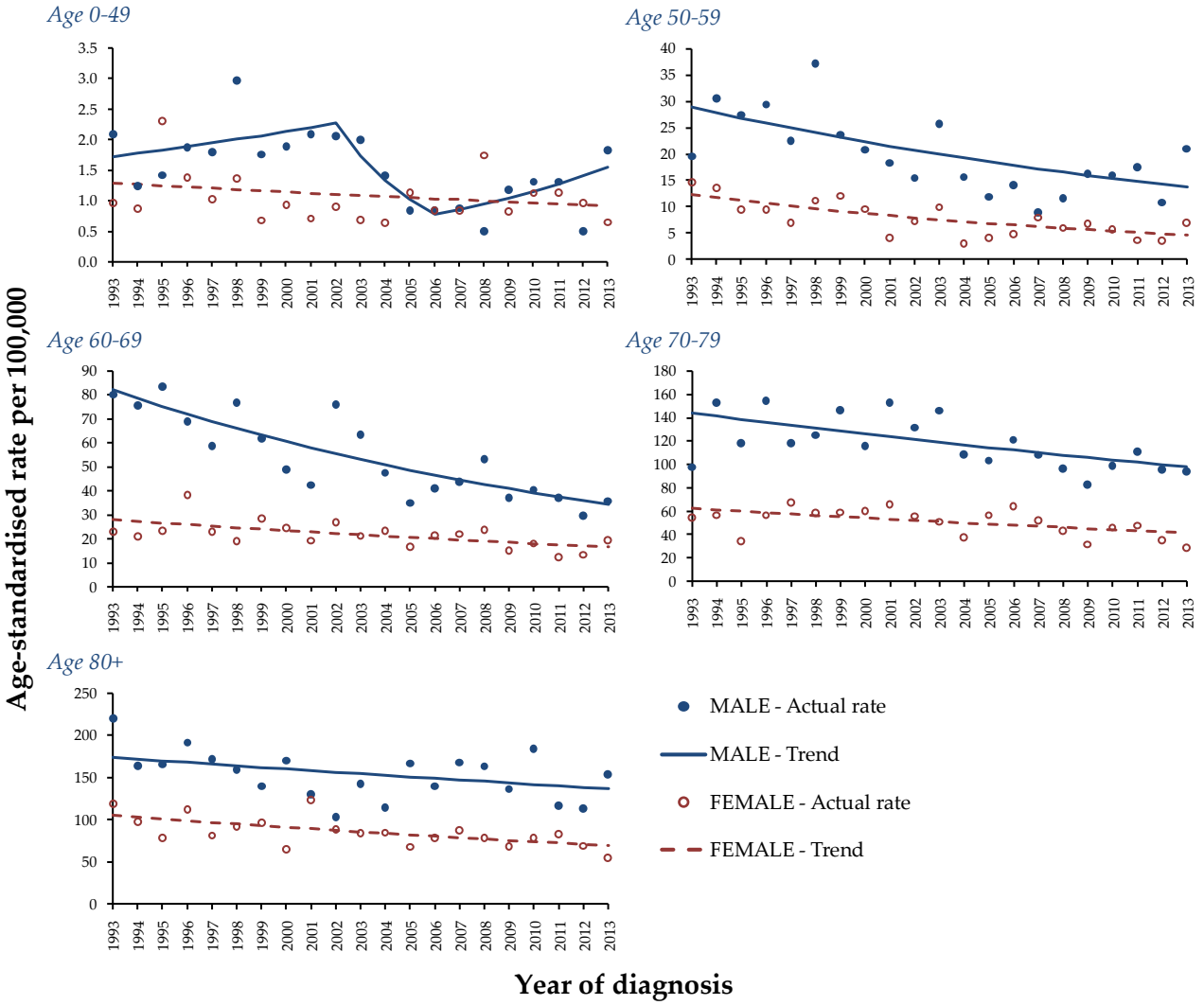


Table 21.5: Annual percentage change in age-standardised stomach cancer incidence rates by sex and age: 1993-2013

Age	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	1993-2002	3.2% (-4.5%, 11.4%)	p=0.398	1993-2013	-1.6% (-4.3%, 1.1%)	p=0.224
	2002-2006	-23.7% (-52.7%, 22.9%)	p=0.242			
	2006-2013	10.5 (-3.6%, 26.6%)	p=0.137			
50-59	**1993-2013**	**-3.6% (-5.6%, -1.6%)**	**p=0.001**	**1993-2013**	**-4.8% (-6.9%, -2.6%)**	**p<0.001**
60-69	**1993-2013**	**-4.3% (-5.5%, -3.1%)**	**p<0.001**	**1993-2013**	**-2.5% (-4.1%, -0.9%)**	**p=0.004**
70-79	**1993-2013**	**-1.9% (-3.0%, -0.8%)**	**p=0.002**	**1993-2013**	**-2.0% (-3.5%, -0.4%)**	**p=0.015**
80+	1993-2013	-1.2% (-2.5%, 0.1%)	p=0.062	**1993-2013**	**-2.1% (-3.2%, -0.9%)**	**p=0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Among both men and women incidence rates of stomach cancer decreased significantly for residents in all five HSC Trusts during 1993-2013 except for females resident in the Belfast and Western Trusts where decreases existed but they were just outside of being statistically significant. The greatest decreases appeared to be in the Southern and South-Eastern Trusts for men and in the South-Eastern Trust for women. (Fig. 21.6, Fig. 21.6)

Figure 21.6: Trends in age-standardised stomach cancer incidence rates by sex and Trust of residence: 1993-2013

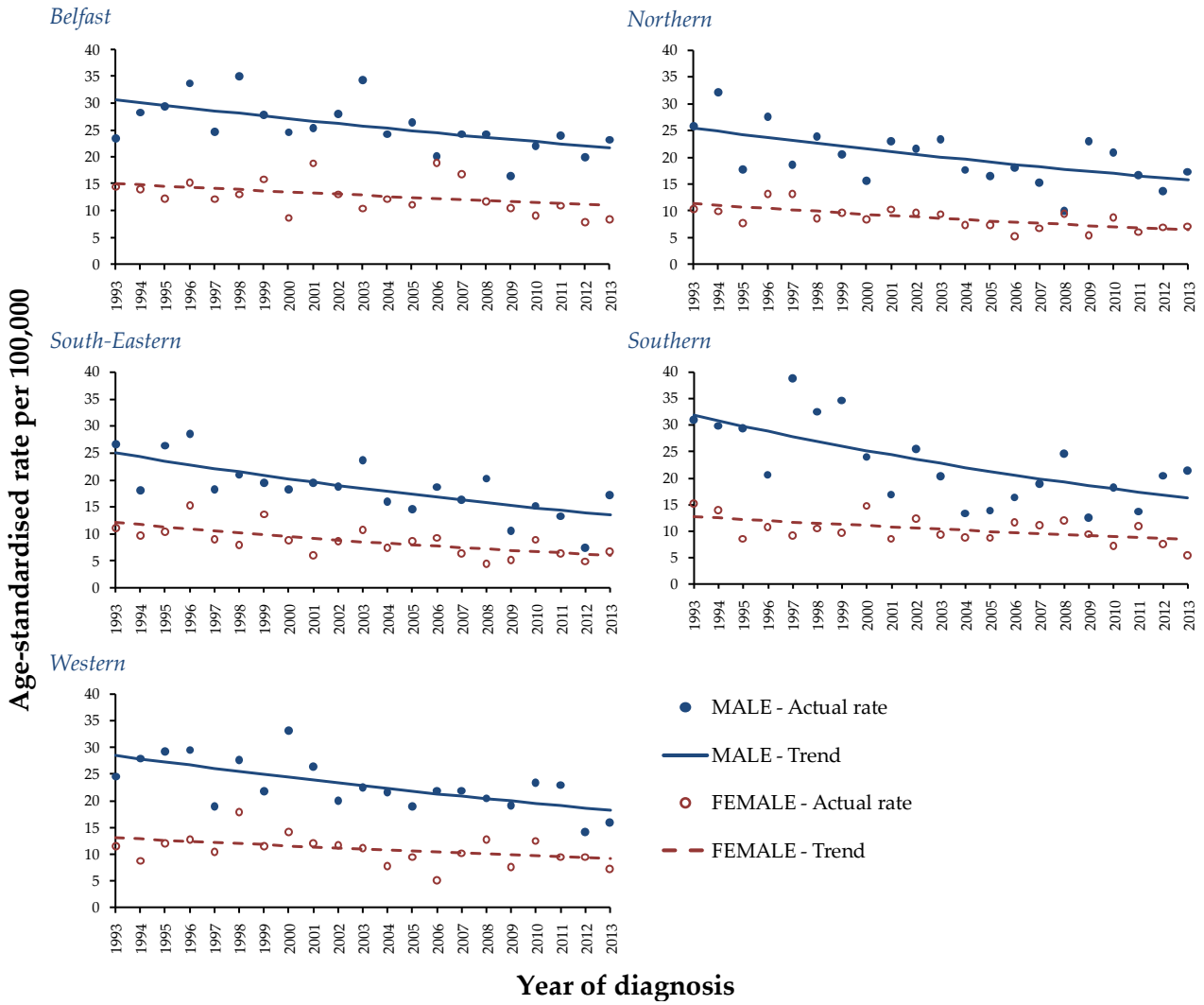


Table 21.6: Annual percentage change in age-standardised stomach cancer incidence rates by sex and Trust of residence: 1993-2013

Health & Social Care Trust	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**-1.7% (-2.8%, -0.6%)**	**p=0.005**	1993-2013	-1.6% (-3.4%, 0.3%)	p=0.092
Northern	**1993-2013**	**-2.3% (-3.8%, -0.8%)**	**p=0.005**	**1993-2013**	**-2.7% (-4.1%, -1.3%)**	**p=0.001**
South-Eastern	**1993-2013**	**-3.0% (-4.5%, -1.6%)**	**p<0.001**	**1993-2013**	**-3.5% (-5.2%, -1.7%)**	**p=0.001**
Southern	**1993-2013**	**-3.3% (-5.1%, -1.5%)**	**p=0.001**	**1993-2013**	**-2.0% (-3.5%, -0.4%)**	**p=0.019**
Western	**1993-2013**	**-2.2% (-3.3%, -1.0%)**	**p=0.001**	1993-2013	-1.8% (-3.5%, 0.0%)	p=0.053

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Stomach cancer incidence rates declined in all areas for males and females during 2001-2013. However these decreases were not statistically significant except in the least deprived areas among men where there was an annual decrease of 4.8% per year (p=0.018) and in the most deprived areas among women where there was an annual decrease of 4.2% per year (p=0.037). (Tab. 21.7, Fig. 21.7)

Figure 21.7: Trends in age-standardised stomach cancer incidence rates by sex and deprivation: 2001-2013

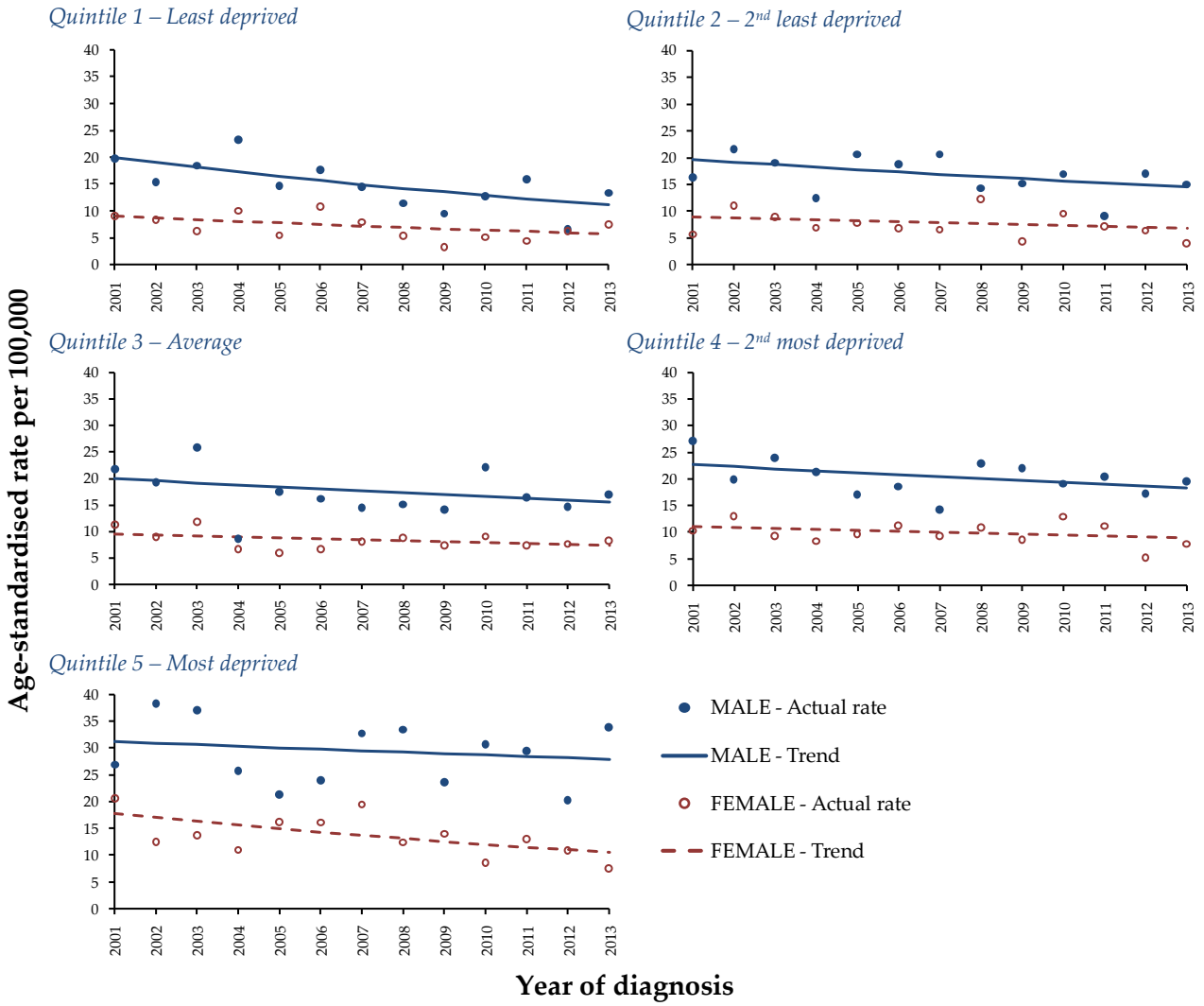


Table 21.7: Annual percentage change in age-standardised stomach cancer incidence rates by sex and deprivation: 2001-2013

Area Based Deprivation Quintile	Male			Female		
	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2013**	**-4.8% (-8.4%, -1.0%)**	**p=0.018**	2001-2013	-3.8% (-8.2%, 0.9%)	p=0.101
Quintile 2 2nd least deprived	2001-2013	-2.4% (-5.6%, 0.9%)	p=0.132	2001-2013	-2.4% (-7.6%, 3.1%)	p=0.358
Quintile 3 Average	2001-2013	-2.0% (-5.6%, 1.7%)	p=0.253	2001-2013	-2.1% (-5.0%, 0.9%)	p=0.152
Quintile 4 2nd most deprived	2001-2013	-1.7% (-4.1%, 0.7%)	p=0.141	2001-2013	-1.7% (-5.2%, 1.9%)	p=0.326
Quintile 5 Most deprived	2001-2013	-1.0% (-4.2%, 2.4%)	p=0.531	**2001-2013**	**-4.2% (-8.0%, -0.3%)**	**p=0.037**

CI – Confidence interval; Significant trends are in bold

21.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

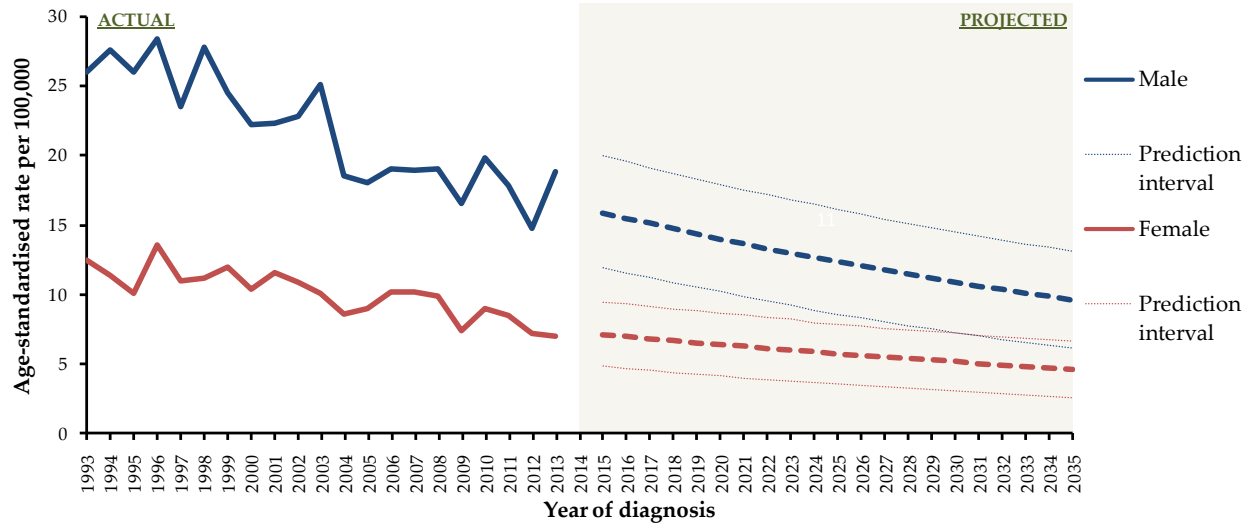
Incidence rates of stomach cancer are projected to continue to decrease compared to the baseline 2009-2013 average. Among males a 20% decrease is expected by 2020, while by 2035 a 45% decrease is projected. Among females a smaller decrease is forecast, with an 18% drop compared to the baseline by 2020 and a 41% drop by 2035. (Tab. 21.8, Fig. 21.8)

Table 21.8: Stomach cancer age-standardised incidence rate projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)		ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	17.6				7.8			
2015	15.9	(11.9, 20.0)	-10%	(-32%, 14%)	7.1	(4.9, 9.4)	-9%	(-37%, 21%)
2020	14.0	(10.2, 17.9)	-20%	(-42%, 2%)	6.4	(4.2, 8.6)	-18%	(-46%, 10%)
2025	12.4	(8.6, 16.1)	-30%	(-51%, -9%)	5.7	(3.6, 7.9)	-27%	(-54%, 1%)
2030	10.9	(7.3, 14.5)	-38%	(-59%, -18%)	5.2	(3.1, 7.3)	-33%	(-60%, -6%)
2035	9.6	(6.2, 13.1)	-45%	(-65%, -26%)	4.6	(2.6, 6.7)	-41%	(-67%, -14%)

ASIR: Age-standardised incidence rate

Figure 21.8: Stomach cancer age-standardised incidence rate projections to 2035 by sex



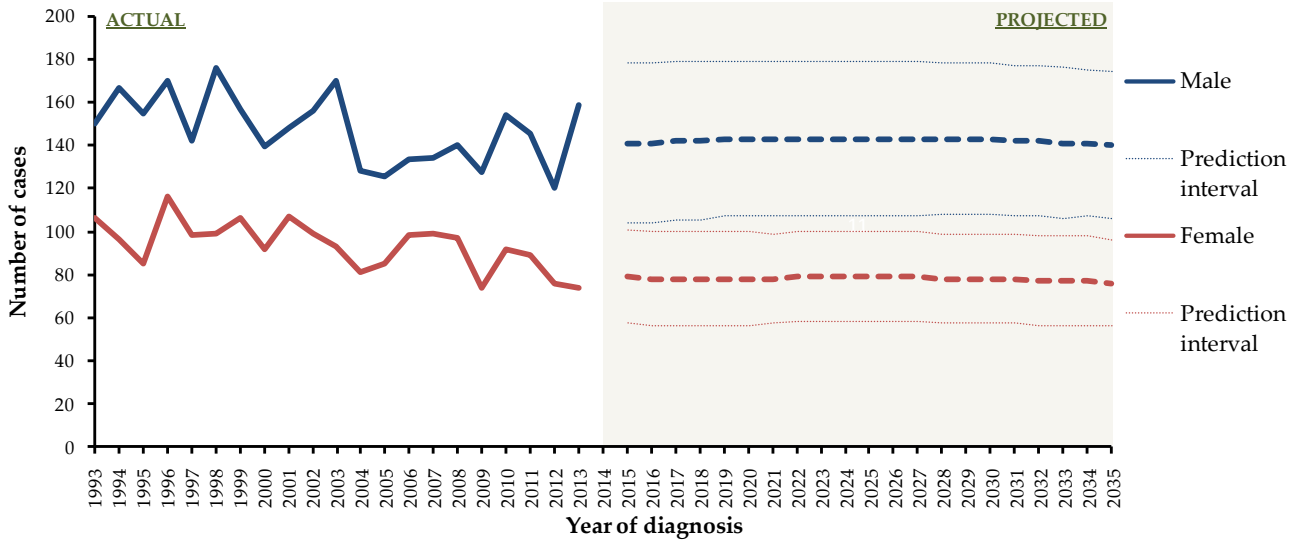
Case projections

Despite the decrease in incidence rates due to demographic change the number of cases of stomach cancer is projected to remain steady among males with 143 cases expected in 2020 and 140 cases expected in 2035. Among females the decrease in rates are expected to result in a slight decrease in the number of stomach cancer cases each year with a 4% decrease between 2009-2013 and 2020 to 78 cases per year and a 6% decrease to 76 cases per year in 2035. (Tab. 21.9, Fig. 21.9)

Table 21.9: Stomach cancer incidence projections to 2035 by sex with comparison to 2009-2013 average

YEAR	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	141				81			
2015	141	(104, 178)	0%	(-26%, 26%)	79	(57, 101)	-2%	(-30%, 25%)
2020	143	(107, 179)	1%	(-24%, 27%)	78	(56, 100)	-4%	(-31%, 23%)
2025	143	(107, 179)	1%	(-24%, 27%)	79	(58, 100)	-2%	(-28%, 23%)
2030	143	(108, 178)	1%	(-23%, 26%)	78	(57, 99)	-4%	(-30%, 22%)
2035	140	(106, 174)	-1%	(-25%, 23%)	76	(56, 96)	-6%	(-31%, 19%)

Figure 21.9: Stomach cancer incidence projections to 2035 by sex



FACTORS THAT CAN INFLUENCE STOMACH CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter stomach cancer incidence projections through control of the following risk factors:
  - Tobacco smoking;
  - Infection with helicobacter pylori;
  - Consumption of salt and/or salty foods and/or lack of consumption of sufficient fruit and vegetables.
- Other risk factors which may have a lesser impact on future projections include:
  - Exposure to ionizing radiation.
- Other potential factors that can influence stomach cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which stomach cancer is classified;
  - Revisions to population projections.

22 UTERINE CANCER (C54-C55)

ANNUAL NUMBER OF CASES (2009-2013)

238 PER YEAR

MEDIAN AGE AT DIAGNOSIS (2009-2013)

66 YEARS

AREA OF RESIDENCE (2004-2013)

RATES HIGHER IN	RATES LOWER IN
SOUTHERN HSCT	NO HSC TRUSTS

NO DIFFERENCE BETWEEN THE LEAST AND MOST DEPRIVED AREAS

AVERAGE CHANGE IN CASES PER YEAR

+4.6% PER YEAR (1993-2013)

ANNUAL PERCENTAGE CHANGE IN RATES

+3.3% PER YEAR (1993-2013)

PROJECTED CHANGE IN RATES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
+24%	+50%

PROJECTED CHANGE IN CASES

BY 2020 (COMPARED TO 2009-2013 AVERAGE)	BY 2035 (COMPARED TO 2009-2013 AVERAGE)
+44% TO 343 CASES PER YEAR	+113% TO 506 CASES PER YEAR

22.1: BACKGROUND

An average of 238 cases of uterine cancer (or cancer of the corpus uteri) were diagnosed among women each year during 2009-2013 in Northern Ireland. It was the 4th most common female cancer diagnosed in this period making up 5.5% of all female cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 25.7 cases diagnosed per 100,000 females. The risk of developing uterine cancer before the age of 65 was 1 in 103 for women, while before age 85 it was 1 in 43.

Cancer and age

Uterine cancer was more common among older women with a median age at diagnosis of 66 years during 2009-2013. Almost 7 out of 10 (69.7%) cases occurred among those aged 60 and over, with 11.8% occurring among those aged 80 and over. Age-specific incidence rates were greatest among those aged 70 to 79 with 98 cases diagnosed per 100,000 females in this age group. Uterine cancer was rare among those aged 25 to 39 with only 3 cases diagnosed each year, while there were no cases diagnosed among those aged under 25. (Tab. 22.1, Fig 22.1)

Figure 22.1: Incidence of uterine cancer by age: 2009-2013

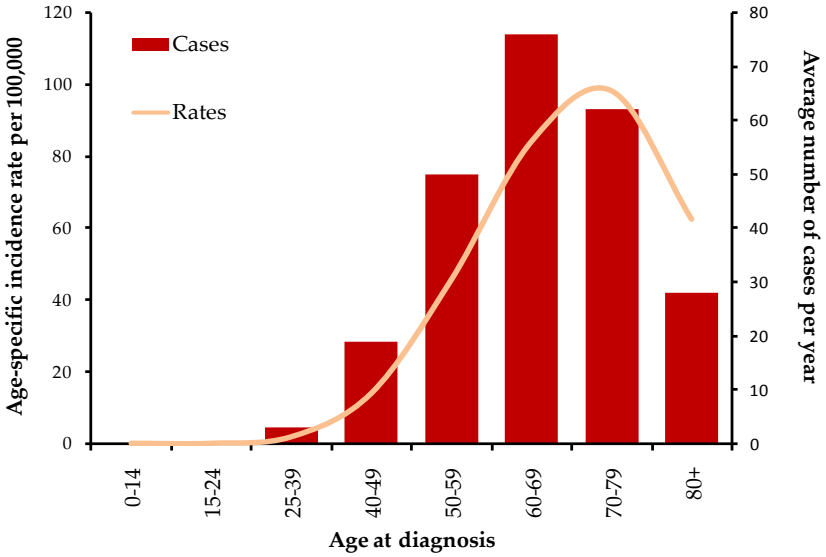


Table 22.1: Average number of uterine cancers diagnosed per year by age: 2009-2013

AGE	Cases per year
0-14	0
15-24	0
25-39	3
40-49	19
50-59	50
60-69	76
70-79	62
80+	28
Total	238

Cancer and area of residence

During 2004-2013 incidence rates of uterine cancer were 14.2% higher in the Southern Trust than the Northern Ireland average. None of the remaining HSC Trusts had significantly lower than average rates despite apparently lower rates in the South-Eastern and Northern Trusts. (Tab. 22.2, Fig. 22.2)

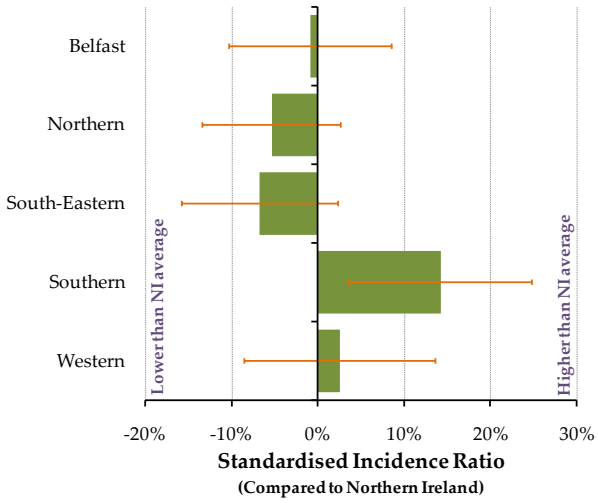
Table 22.2: Average number of uterine cancers diagnosed per year by area of residence: 2004-2013

AREA OF RESIDENCE		Cases per year
HEALTH & SOCIAL CARE TRUST	Belfast	43
	Northern	53
	South-Eastern	41
	Southern	44
	Western	33
AREA BASED DEPRIVATION QUINTILE	1 - Least deprived	44
	2 - 2nd least deprived	46
	3 - Average	39
	4 - 2nd most deprived	47
	5 - Most deprived	39

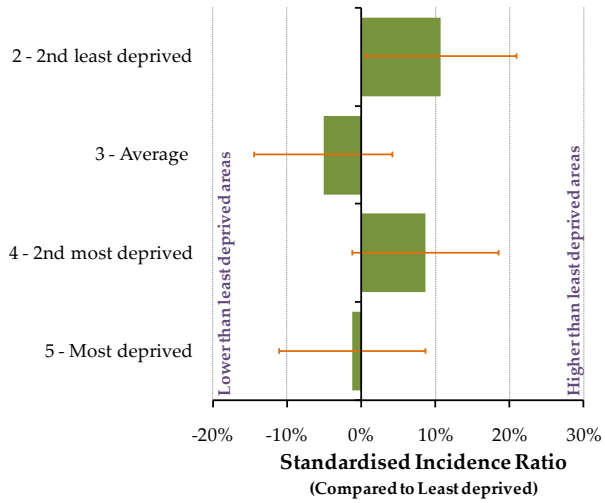
There was no definitive relationship between uterine cancer and socio-economic deprivation during 2004-2013 with age-standardised incidence rates in the most deprived areas of Northern Ireland similar to those in the least deprived areas, although a significant difference existed between the least and 2nd least deprived areas. (Tab. 22.2, Fig. 22.2)

Figure 22.2: Age-standardised incidence rates of uterine cancer by area of residence: 2004-2013

HSC Trusts



Area-based deprivation quintile

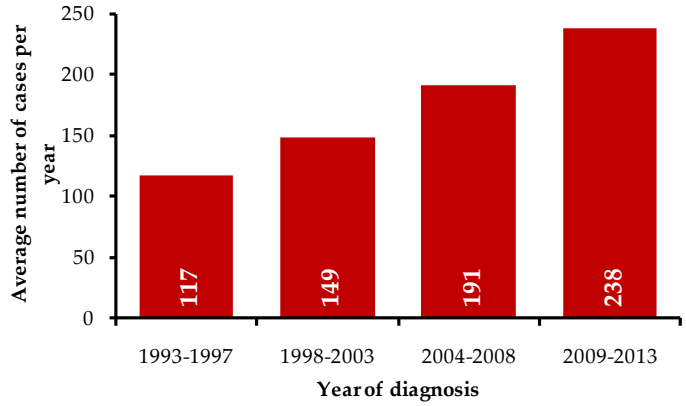


22.2: INCIDENCE TRENDS

Trends in cases

During 2009-2013 there was an average of 238 cancers of the uterus diagnosed each year compared to an average of 117 uterine cancers in 1993-1997. (Tab. 22.3, Fig. 22.3)

Figure 22.3: Average number of cases of uterine cancer diagnosed per year by period of diagnosis: 1993-2013



On average the number of uterine cancer cases increased by 4.6% per year (p<0.001) among women between 1993 and 2013. (Tab. 22.3, Fig. 22.3)

Table 22.3: Number of cases of uterine cancer diagnosed by year: 1993-2013

YEAR	Number of cases
1993	116
1994	125
1995	109
1996	111
1997	126
1998	115
1999	126
2000	150
2001	149
2002	162
2003	189
2004	165
2005	176
2006	187
2007	205
2008	223
2009	234
2010	223
2011	231
2012	253
2013	248

Trends in incidence rates

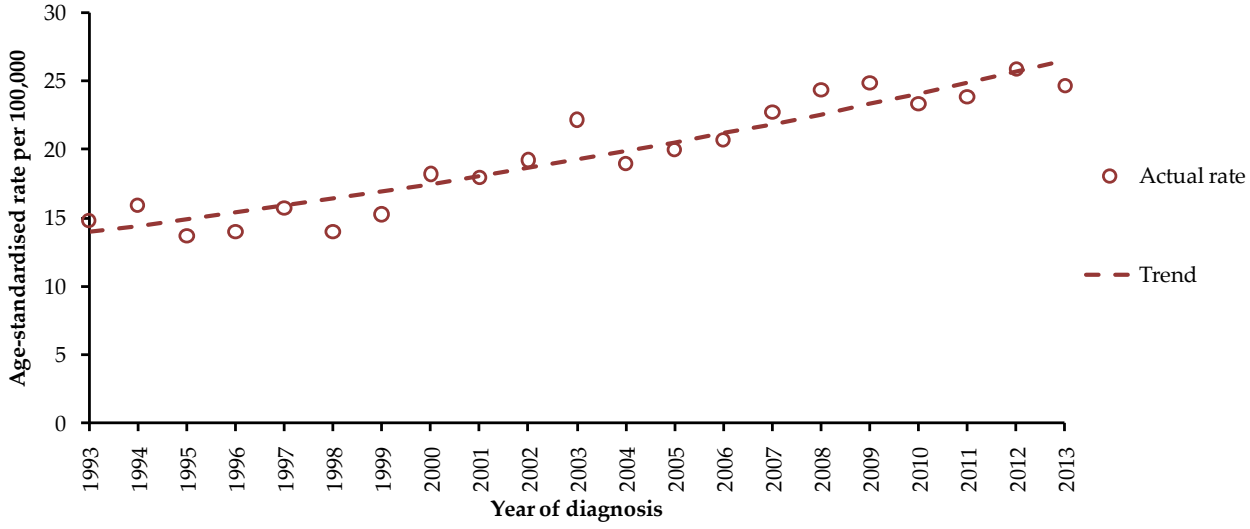
While part of this increase was due to the growth and ageing of the population, other factors influenced the increase as age-standardised incidence rates of uterine cancer increased during 1993-2013 by an average of 3.3% per year (p<0.001). (Tab. 22.4, Fig. 22.4)

Table 22.4: Annual percentage change in age-standardised uterine cancer incidence rates: 1993-2013

SEX	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Females	**1993-2013**	**3.3% (2.7%, 3.8%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Figure 22.4: Trends in age-standardised uterine cancer incidence rates: 1993-2013



Incidence trends by age at diagnosis

Among women incidence rates of uterine cancer increased significantly for all age groups during 1993-2013 except for those aged 80 and over, although this group still exhibited a non-significant increase. The greatest increase in rates was among those aged 70-79 which saw an annual increase in rates of 5.0% per year (p<0.001). (Tab. 22.5, Fig. 22.5)

Figure 22.5: Trends in age-standardised uterine cancer incidence rates by age at diagnosis: 1993-2013

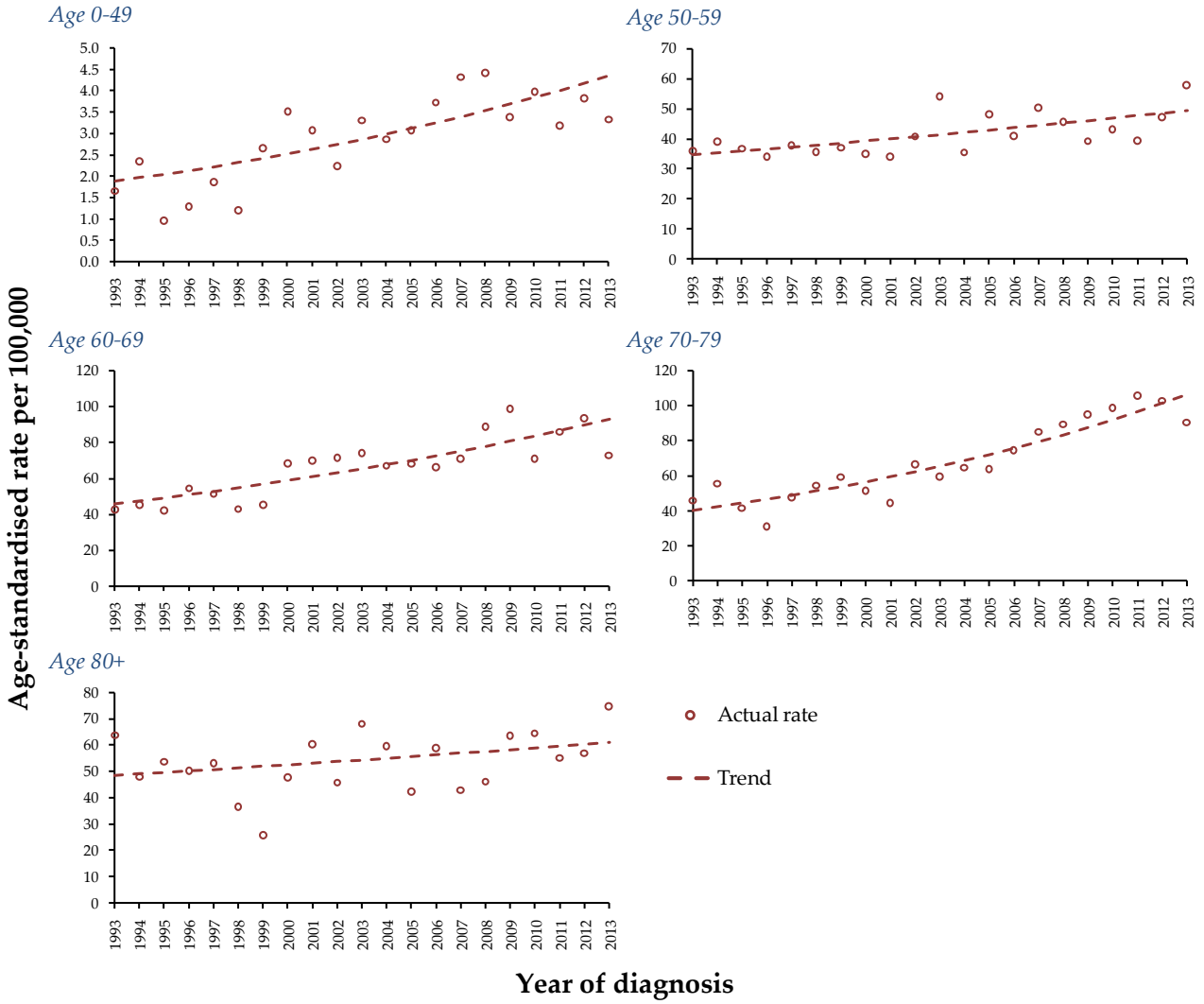


Table 22.5: Annual percentage change in age-standardised uterine cancer incidence rates by age: 1993-2013

AGE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
0-49	**1993-2013**	**4.3% (2.2%, 6.4%)**	**p<0.001**
50-59	**1993-2013**	**1.8% (0.8%, 2.8%)**	**p=0.002**
60-69	**1993-2013**	**3.6% (2.5%, 4.8%)**	**p<0.001**
70-79	**1993-2013**	**5.0% (3.9%, 6.0%)**	**p<0.001**
80+	1993-2013	1.2% (-0.3%, 2.7%)	p=0.114

CI – Confidence interval; Significant trends are in bold

Incidence trends by HSC Trust

Incidence of uterine cancer increased for females resident in all five HSC Trusts. The increase appeared greatest in the Southern and Western Trust areas which saw annual increases of 3.9% (p<0.001) and 3.8% (p<0.001) in uterine cancer incidence rates respectively. (Tab. 22.6, Fig. 22.6)

Figure 22.6: Trends in age-standardised uterine cancer incidence rates by Trust of residence: 1993-2013

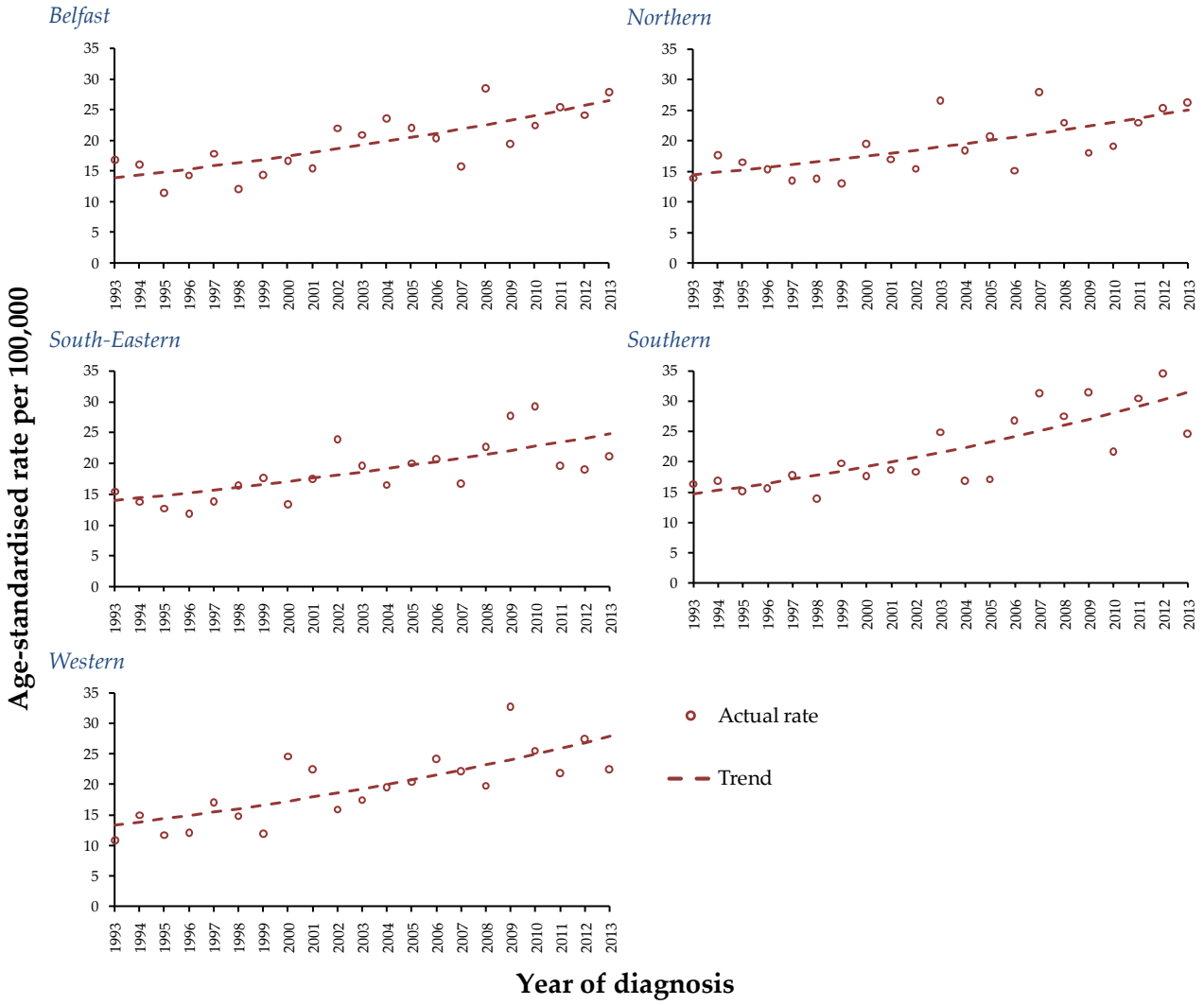


Table 22.6: Annual percentage change in age-standardised uterine cancer incidence rates by Trust of residence: 1993-2013

HEALTH & SOCIAL CARE TRUST	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Belfast	**1993-2013**	**3.3% (2.0%, 4.5%)**	**p<0.001**
Northern	**1993-2013**	**2.8% (1.4%, 4.2%)**	**p=0.001**
South-Eastern	**1993-2013**	**2.9% (1.5%, 4.4%)**	**p<0.001**
Southern	**1993-2013**	**3.9% (2.6%, 5.3%)**	**p<0.001**
Western	**1993-2013**	**3.8% (2.2%, 5.4%)**	**p<0.001**

CI – Confidence interval; Significant trends are in bold

Incidence trends by deprivation

Incidence rates of uterine cancer among females increased in all deprivation quintiles, although the increase was not significant for females resident in the 2nd least deprived areas and areas of average levels of socio-economic deprivation. The increase in rates was similar in both the most and least deprived areas. (Tab. 22.7, Fig. 22.7)

Figure 22.7: Trends in age-standardised uterine cancer incidence rates by deprivation: 2001-2013

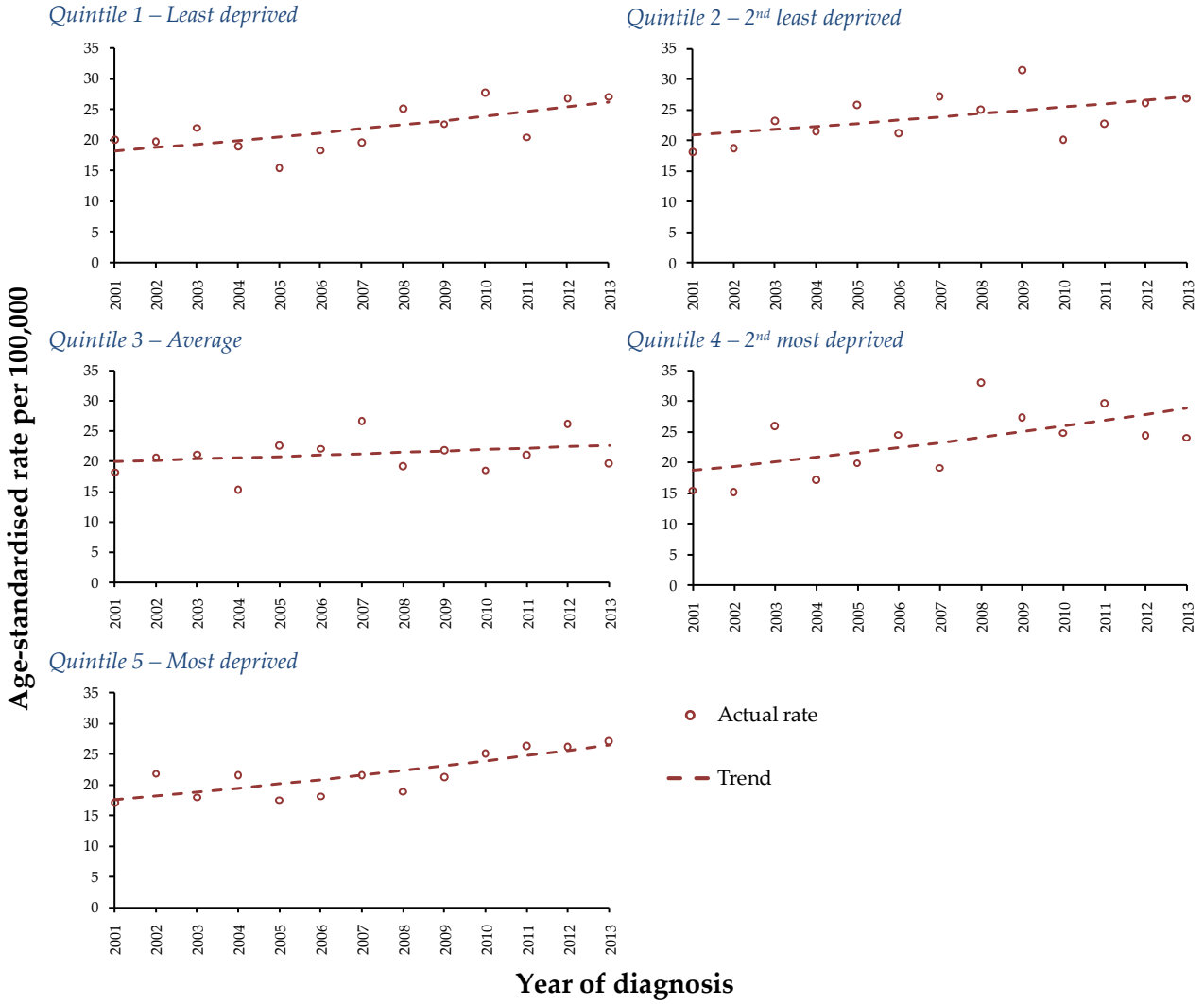


Table 22.7: Annual percentage change in age-standardised uterine cancer incidence rates by deprivation: 2001-2013

AREA BASED DEPRIVATION QUINTILE	Period of diagnosis	Annual percentage change (95% CI)	p-value for trends
Quintile 1 Least deprived	**2001-2013**	**3.1% (0.9%, 5.3%)**	**p=0.010**
Quintile 2 2nd least deprived	2001-2013	2.2% (-0.1%, 4.7%)	p=0.064
Quintile 3 Average	2001-2013	1.0% (-1.4%, 3.5%)	p=0.369
Quintile 4 2nd most deprived	**2001-2013**	**3.7% (0.2%, 7.3%)**	**p=0.038**
Quintile 5 Most deprived	**2001-2013**	**3.5% (1.8%, 5.2%)**	**p=0.001**

CI – Confidence interval; Significant trends are in bold

22.3: INCIDENCE PROJECTIONS FROM 2015 TO 2035

Rate projections

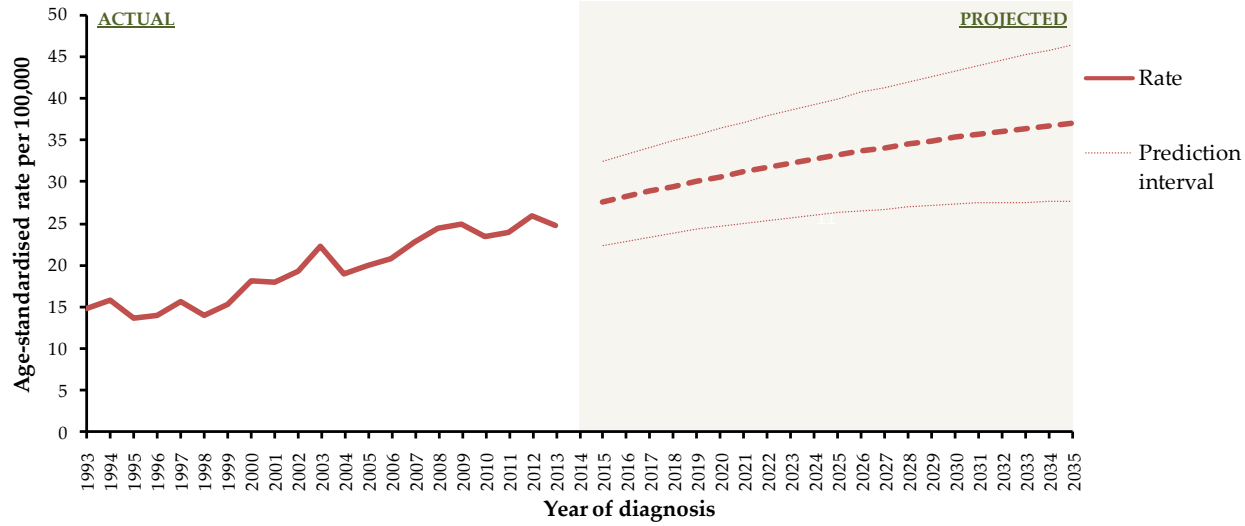
Incidence rates of uterine cancer are projected to increase considerably compared to the baseline 2009-2013 average. By 2020 the age-standardised incidence rates are expected to increase by 24%, while by 2035 a 50% increase in rates is projected. (Tab. 22.8, Fig. 22.8)

Table 22.8: Uterine cancer age-standardised incidence rate projections to 2035 with comparison to 2009-2013 average

YEAR	ASIR per 100,000 (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	24.6			
2015	27.5	(22.4, 32.5)	12%	(-9%, 32%)
2020	30.5	(24.7, 36.4)	24%	(0%, 48%)
2025	33.1	(26.3, 40.0)	35%	(7%, 63%)
2030	35.3	(27.2, 43.3)	43%	(11%, 76%)
2035	37.0	(27.6, 46.4)	50%	(12%, 89%)

ASIR: Age-standardised incidence rate

Figure 22.8: Uterine cancer age-standardised incidence rate projections to 2035



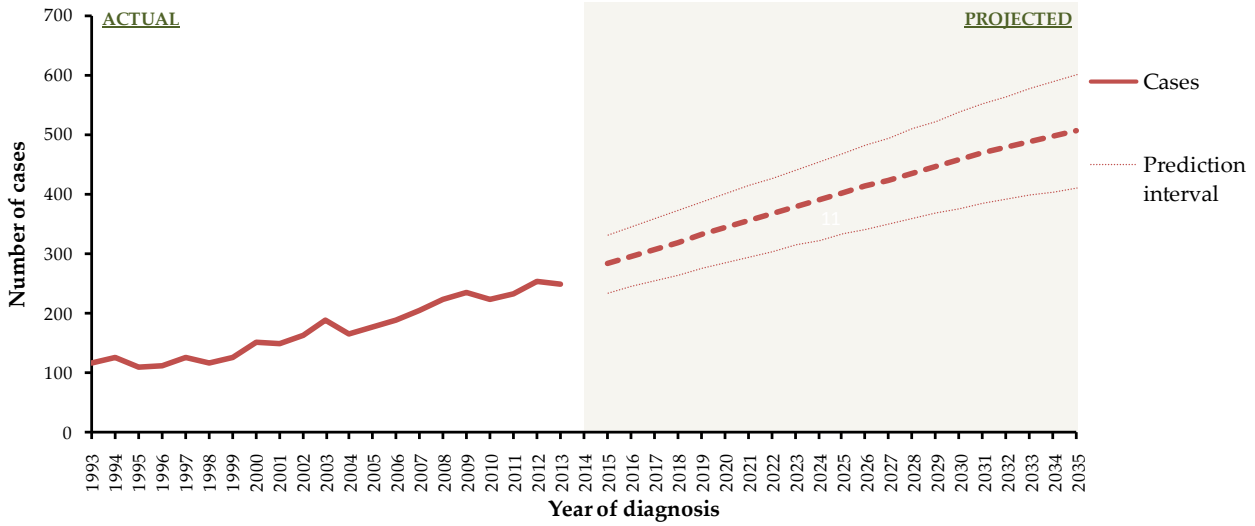
Case projections

As a result of both the sizeable increase in incidence rates and the growth and ageing of the population, the number of cases of uterine cancer is projected to increase considerably compared to the average of 238 cases per year in 2009-2013. By 2020 a 44% increase to 343 cases per year is forecast while by 2035 projections indicate a 113% increase to 506 cases per year. This is an increase of 268 cases, only 99 of which is due to demographic change, with the remaining a result of the increasing incidence rates. (Tab. 22.9, Fig. 22.9)

Table 22.9: Uterine cancer incidence projections to 2035 with comparison to 2009-2013 average

YEAR	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	238			
2015	283	(235, 331)	19%	(-1%, 39%)
2020	343	(286, 400)	44%	(20%, 68%)
2025	401	(334, 468)	68%	(40%, 97%)
2030	457	(377, 537)	92%	(58%, 126%)
2035	506	(411, 601)	113%	(73%, 153%)

Figure 22.9: Uterine cancer incidence projections to 2035



FACTORS THAT CAN INFLUENCE UTERINE CANCER INCIDENCE PROJECTIONS

(SEE SECTION 24 FOR FURTHER DISCUSSION)

- The potential exists to alter uterine cancer incidence projections through control of the following risk factors:
  - Obesity levels;
  - Lack of physical activity.
- Other risk factors which may have a lesser impact on future projections include:
  - Receipt of hormone therapy, such as Tamoxifen;
  - Family history;
  - Nulliparity.
- Other potential factors that can influence uterine cancer incidence projections include:
  - Introduction of health service initiatives that aim to either prevent or diagnose cancer early;
  - Changes to the way in which cancer uterine is classified;
  - Revisions to population projections.

23 OTHER CANCERS

23.1: BONE CANCER (C40-C41)

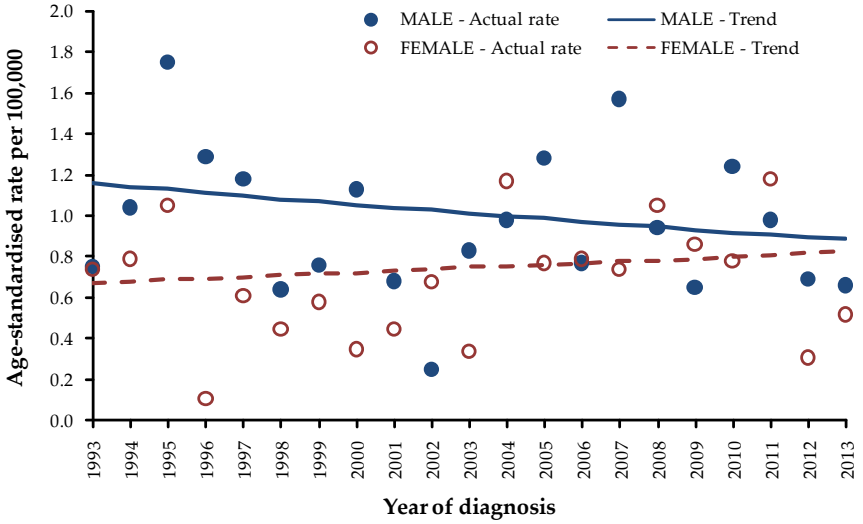
Bone cancer is a rare cancer in Northern Ireland with an average of 15 cases (8 male, 7 female) diagnosed each year during 2009-2013. During this period it only contributed 0.2% of all male and female cancers (ex. NMSC).

Incidence trends

The number of cases of bone cancer did not change significantly for either sex during 1993-2013 with 16 cases diagnosed per year in 1993-1997 compared to 15 cases per year in 2009-2013.

Similarly, there was no significant change in incidence rates of bone cancer for males or females during 1993-2013. (Fig. 23.1)

Figure 23.1: Trends in bone cancer incidence rates by sex: 1993-2013



Incidence projections

Bone cancer is projected to remain a rare cancer with very little change in the number of cases diagnosed each year expected in the short term. Up to 2035 only a small increase of 13% to 9 cases per year among men is forecast, while a 29% increase to 9 cases per year among women is expected. (Tab. 23.1, Fig. 23.2)

Figure 23.2: Bone cancer incidence projections to 2035 by sex

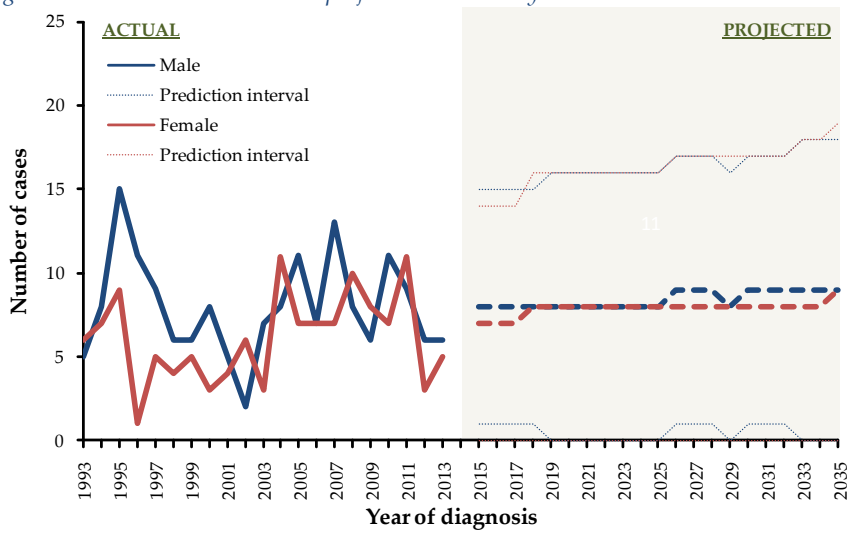


Table 23.1: Projected cases to 2035 for bone cancer by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	8				7			
2015	8	(1, 15)	0%	(-88%, 88%)	7	(0, 14)	0%	(-100%, 100%)
2020	8	(0, 16)	0%	(-100%, 100%)	8	(0, 16)	14%	(-100%, 129%)
2025	8	(0, 16)	0%	(-100%, 100%)	8	(0, 16)	14%	(-100%, 129%)
2030	9	(1, 17)	13%	(-88%, 113%)	8	(0, 17)	14%	(-100%, 143%)
2035	9	(0, 18)	13%	(-100%, 125%)	9	(0, 19)	29%	(-100%, 171%)

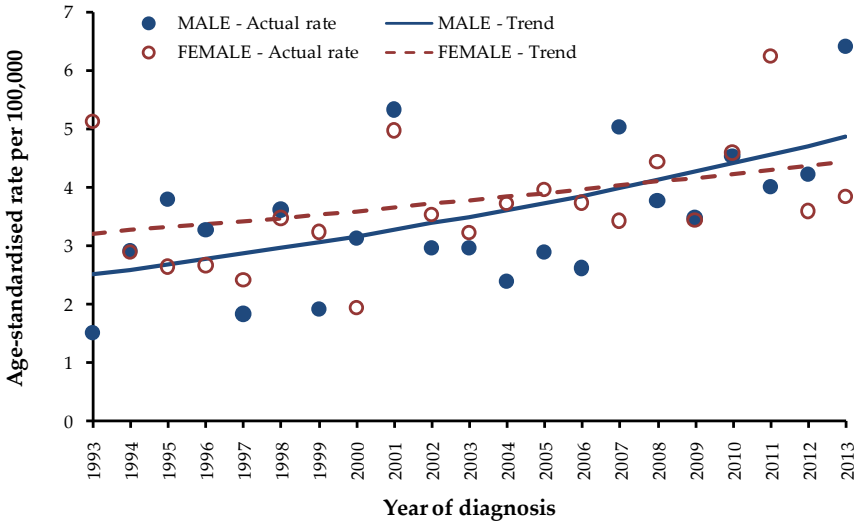
23.2: GALLBLADDER CANCER (C23-C24)

There was an average of 80 cases (36 male, 44 female) of gallbladder cancer diagnosed each year during 2009-2013. It was the 19th most common male and female cancer diagnosed making up 0.8% and 1.0% of all male and female cancers (ex. NMSC) respectively. As a proportion of the resident population there were 4.0 cases diagnosed per 100,000 males and 4.8 cases diagnosed per 100,000 females.

Incidence trends

Over the last twenty-one years gallbladder incidence increased considerably with 43 cases diagnosed per year in 1993-1997 compared to 80 cases per year in 2009-2013. On average there was a 5.2% per year increase in male cases and a 2.8% per year increase in female cases.

Figure 23.3: Trends in gallbladder cancer incidence rates by sex: 1993-2013



Incidence rates of gallbladder cancer (adjusted for age and population growth) increased by 3.3% per year (p=0.004) among men and by 1.6% per year (p=0.082) among women during 1993-2013. (Fig. 23.3)

Incidence projections

Incidence of gallbladder cancer is projected to increase from an average of 36 male and 44 female cases in 2009-2013 to 54 male and 57 female cases by 2020. Up to 2035 a 147% increase to 89 cases per year among men is forecast, while an 82% increase to 80 cases per year among women is expected. (Tab. 23.2, Fig. 23.4)

Figure 23.4: Gallbladder cancer incidence projections to 2035 by sex

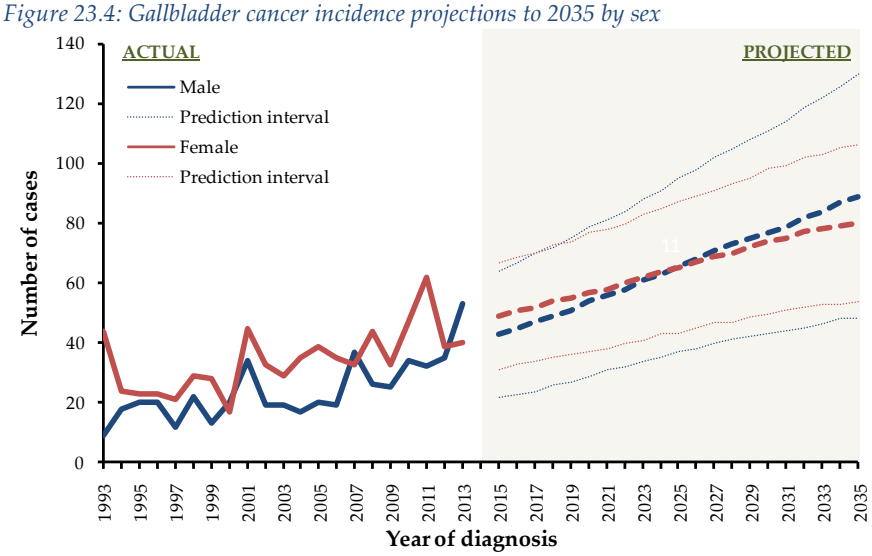


Table 23.2: Projected cases to 2035 for gallbladder cancer by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	36				44			
2015	43	(22, 64)	19%	(-39%, 78%)	49	(31, 67)	11%	(-30%, 52%)
2020	54	(29, 79)	50%	(-19%, 119%)	57	(37, 77)	30%	(-16%, 75%)
2025	66	(37, 95)	83%	(3%, 164%)	65	(43, 87)	48%	(-2%, 98%)
2030	77	(43, 111)	114%	(19%, 208%)	74	(50, 98)	68%	(14%, 123%)
2035	89	(48, 130)	147%	(33%, 261%)	80	(54, 106)	82%	(23%, 141%)

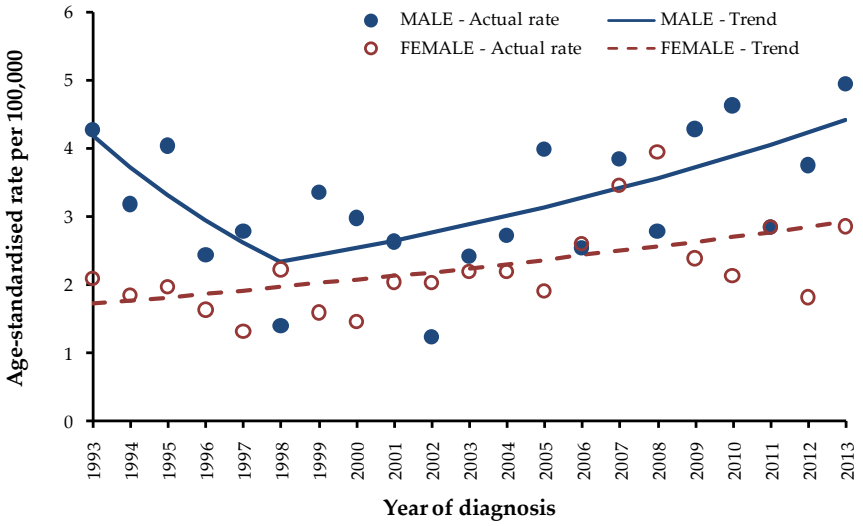
23.3: HODGKIN'S LYMPHOMA (C81)

There was an average of 59 cases (36 male, 23 female) of Hodgkin's lymphoma diagnosed each year during 2009-2013 in Northern Ireland. It was the 20th most common male and 22nd most common female cancer diagnosed in this period making up 0.8% and 0.5% of all cancers (ex. NMSC) respectively. As a proportion of the resident population in Northern Ireland, there were 4.0 cases diagnosed per 100,000 males and 2.4 cases diagnosed per 100,000 females.

Incidence trends

During 1993-2013 incidence of Hodgkin's lymphoma increased from 39 to 59 cases diagnosed per year. On average there was a 2.5% per year increase in male cases and a 3.4% per year increase in female cases.

Figure 23.5: Trends in Hodgkin's lymphoma incidence rates by sex: 1993-2013



Incidence rates of Hodgkin's lymphoma (adjusted for age and population growth) increased by 2.7% per year (p=0.006) among females during 1993-2013 with a 4.3% per year increase (p=0.007) among men from 1998 onwards. (Fig. 23.5)

Incidence projections

Incidence of Hodgkin's lymphoma is projected to increase from an average of 36 male and 23 female cases per year in 2009-2013 to 46 male and 28 female cases by 2020. Compared to 2009-2013 by 2035 there is expected to be a 64% increase to 59 cases per year among men and a 57% increase to 36 cases per year among women. (Tab. 23.3, Fig. 23.6)

Figure 23.6: Hodgkin's lymphoma incidence projections to 2035 by sex

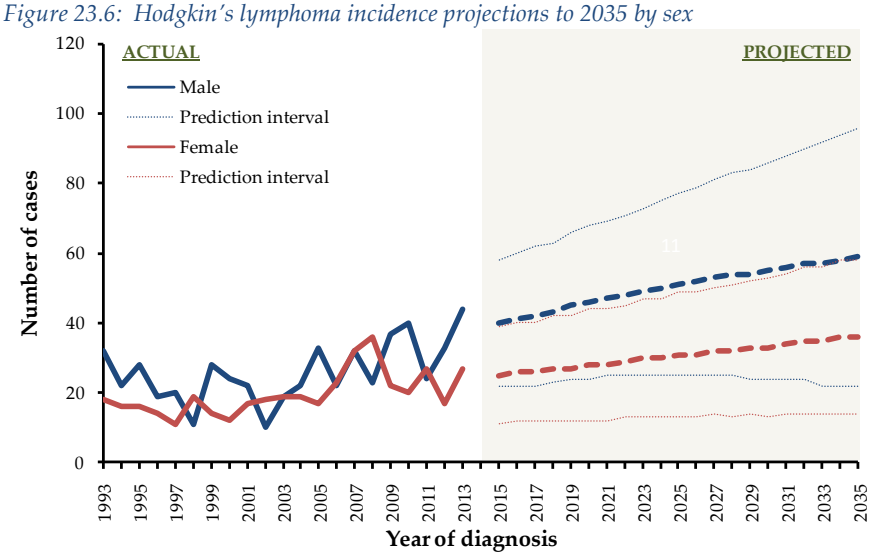


Table 23.3: Projected cases to 2035 for Hodgkin's lymphoma by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	36				23			
2015	40	(22, 58)	11%	(-39%, 61%)	25	(11, 39)	9%	(-52%, 70%)
2020	46	(24, 68)	28%	(-33%, 89%)	28	(12, 44)	22%	(-48%, 91%)
2025	51	(25, 77)	42%	(-31%, 114%)	31	(13, 49)	35%	(-43%, 113%)
2030	55	(24, 86)	53%	(-33%, 139%)	33	(13, 53)	43%	(-43%, 130%)
2035	59	(22, 96)	64%	(-39%, 167%)	36	(14, 58)	57%	(-39%, 152%)

23.4: LARYNGEAL CANCER (C32)

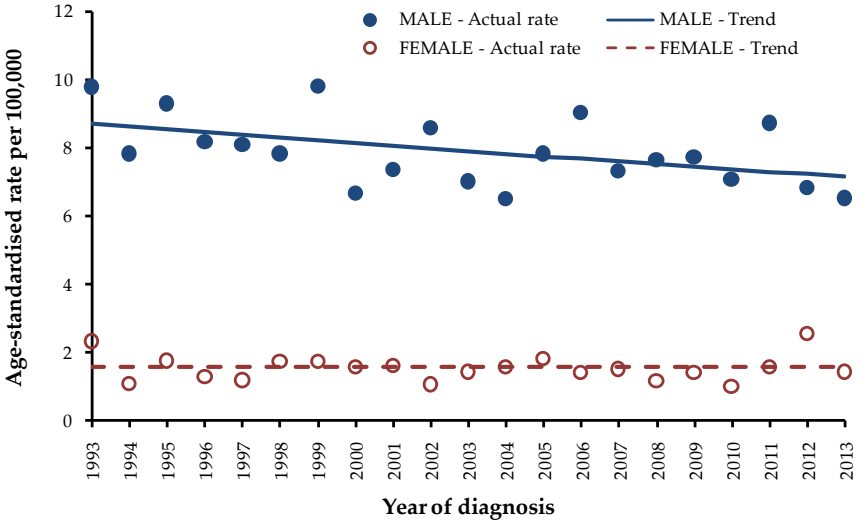
There was an average of 78 cases of laryngeal cancer diagnosed each year during 2009-2013 in Northern Ireland with the number of cases considerably higher among men than women (63 male cases, 15 female cases). It was the 17th most common male and 25th most common female cancer diagnosed in this period making up 1.4% and 0.4% of all cancers (ex. NMSC) respectively. As a proportion of the resident population in Northern Ireland there were 7.1 cases diagnosed per 100,000 males and 1.7 cases diagnosed per 100,000 females.

Incidence trends

The number of laryngeal cancer cases increased by 1.0% per year among men during 1993-2013 and by 1.2% per year among women.

However age-standardised incidence rates of laryngeal cancer decreased for males during 1993-2013 by 1.0% per year (p=0.028) while they remained virtually static for women. (Fig. 23.7)

Figure 23.7: Trends in laryngeal cancer incidence rates by sex: 1993-2013



Incidence projections

Despite the drop in incidence rates, due to demographic change the number of cases of laryngeal cancer is projected to rise among men from 63 per year in 2009-2013 to 68 cases in 2020 and 70 cases in 2035. Among women a slight increase is also expected with a rise from 15 cases per year in 2009-2013 to 17 cases in 2020 and 21 cases in 2035. (Tab. 23.4, Fig. 23.8)

Figure 23.8: Laryngeal cancer incidence projections to 2035 by sex

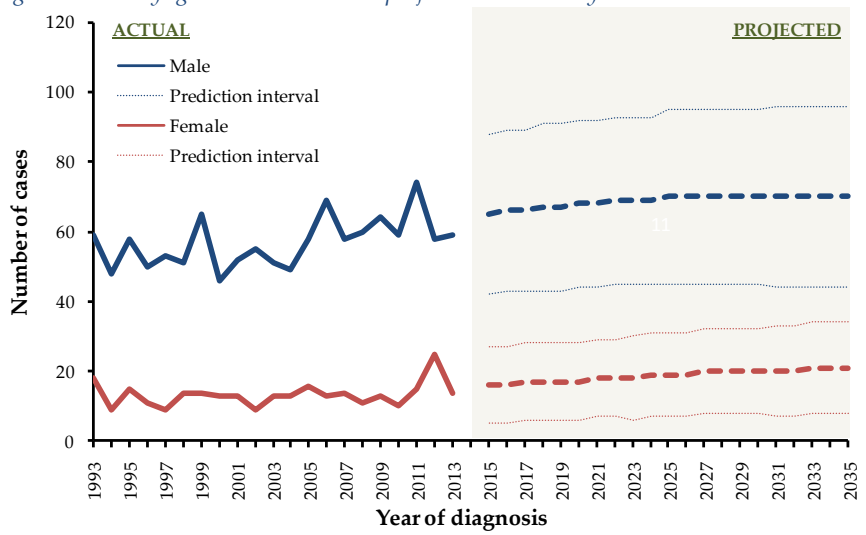


Table 23.4: Projected cases to 2035 for laryngeal cancer by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	63				15			
2015	65	(42, 88)	3%	(-33%, 40%)	16	(5, 27)	7%	(-67%, 80%)
2020	68	(44, 92)	8%	(-30%, 46%)	17	(6, 28)	13%	(-60%, 87%)
2025	70	(45, 95)	11%	(-29%, 51%)	19	(7, 31)	27%	(-53%, 107%)
2030	70	(45, 95)	11%	(-29%, 51%)	20	(8, 32)	33%	(-47%, 113%)
2035	70	(44, 96)	11%	(-30%, 52%)	21	(8, 34)	40%	(-47%, 127%)

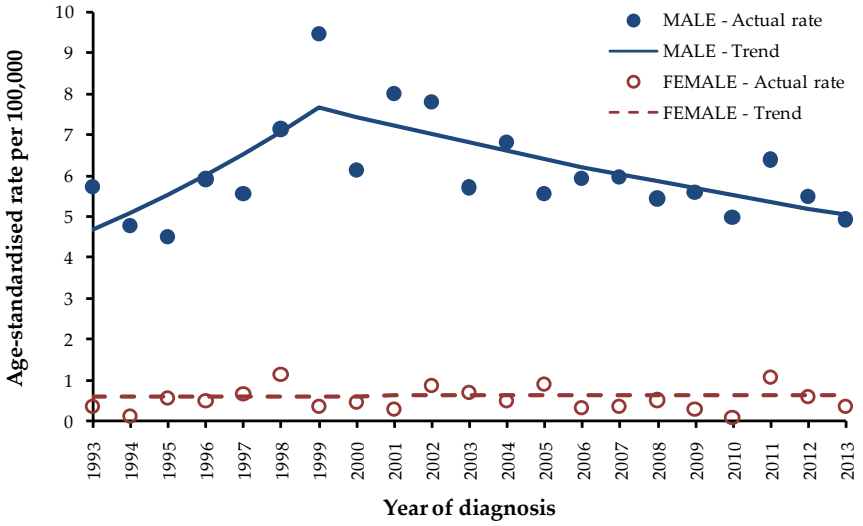
23.5: MESOTHELIOMA (C45)

An average of 47 cases of mesothelioma were diagnosed each year during 2009-2013 with 42 of these occurring among men. It was the 18th most common male cancer diagnosed in this period making up 1.0% of all cancers (ex. NMSC), while it was a rarer cancer among women with only 5 cases diagnosed per year contributing only 0.1% of all cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 4.7 cases diagnosed per 100,000 males.

Incidence trends

After a period of increase during 1993-1999, incidence of mesothelioma among males decreased by 1.2% per year from 1999 onwards. This was driven by a decrease of 2.9% per year in the age-standardised incidence rate ($p<0.001$). Female incidence of mesothelioma has remained low over the last twenty-one years with no change in the underlying incidence rate. (Fig. 23.9)

Figure 23.9: Trends in mesothelioma incidence rates by sex: 1993-2013



Incidence projections

Male incidence rates are expected to continue decreasing; however the increase in the elderly population is expected to result in an increase in the number of male cases from 42 per year in 2009-2013 to 53 per year in 2035. Female incidence of the disease is expected to also increase slightly from 5 cases per year in 2009-2013 to 7 cases per year in 2035. (Tab. 23.5, Fig. 23.10)

Figure 23.10: Mesothelioma incidence projections to 2035 by sex

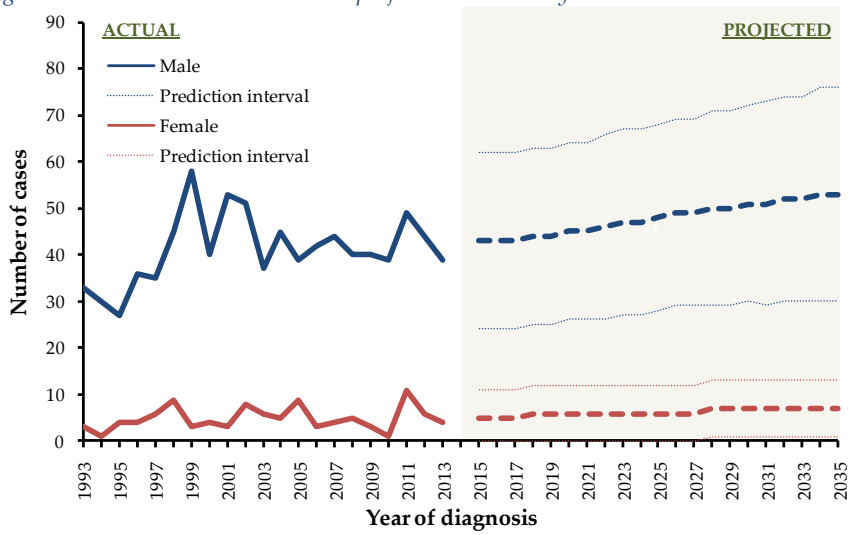


Table 23.5: Projected cases to 2035 for mesothelioma by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	42				5			
2015	43	(24, 62)	2%	(-43%, 48%)	5	(0, 11)	0%	(-100%, 120%)
2020	45	(26, 64)	7%	(-38%, 52%)	6	(0, 12)	20%	(-100%, 140%)
2025	48	(28, 68)	14%	(-33%, 62%)	6	(0, 12)	20%	(-100%, 140%)
2030	51	(30, 72)	21%	(-29%, 71%)	7	(1, 13)	40%	(-80%, 160%)
2035	53	(30, 76)	26%	(-29%, 81%)	7	(1, 13)	40%	(-80%, 160%)

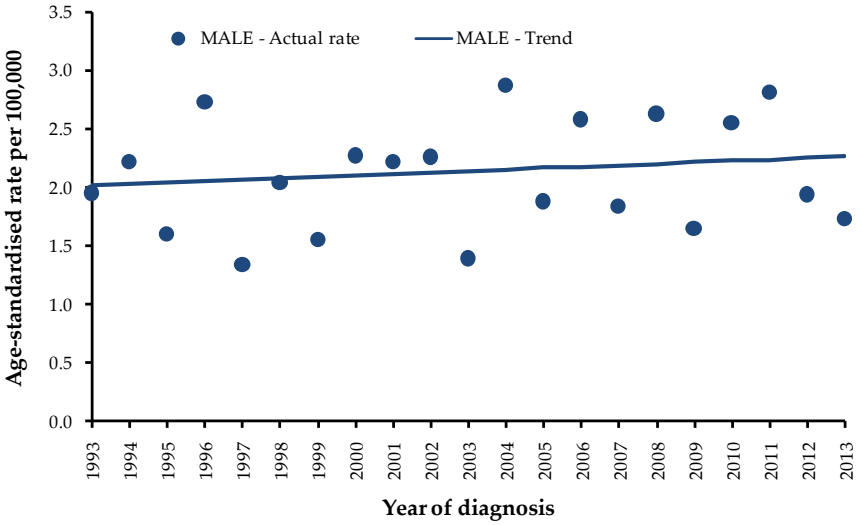
23.6: PENILE CANCER (C60)

During 2009-2013 there was an average of 18 cases of penile cancer diagnosed among men each year in Northern Ireland. It was the 24th most common male cancer diagnosed in this period making it one of the least common cancers, contributing only 0.4% of all male cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 2.0 cases diagnosed per 100,000 males.

Incidence trends

Over the last twenty-one years incidence of cancer of the penis increased from 12 cases per year in 1993-1997 to 18 cases per year in 2009-2013. On average there was a 2.4% per year increase in male cases during 1993-2013.

Figure 23.11: Trends in penile cancer incidence rates: 1993-2013



However, incidence rates of penile cancer (adjusted for age and population growth) did not increase significantly indicating that the growth in cases of penile cancer is a result of demographic change. (Fig. 23.11)

Incidence projections

Incidence rates among men of cancer of the penis are projected to continue to remain steady, however as a further result of demographic change, compared to a baseline of 18 cases per year in 2009-2013, the number of male cases is expected to increase by 17% to 21 cases per year by 2020 and by 39% to 25 cases per year by 2035. (Tab. 23.6, Fig. 23.12)

Figure 23.12: Penile cancer incidence projections to 2035

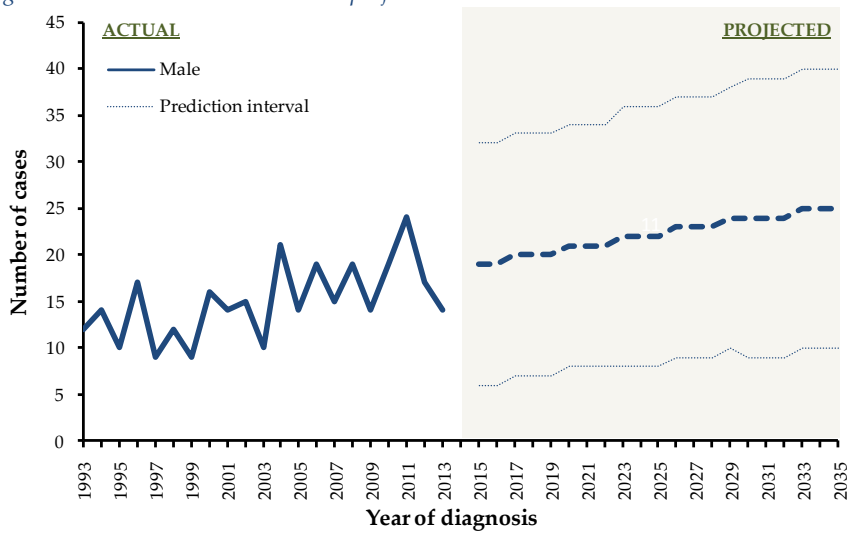


Table 23.6: Projected cases to 2035 for penile cancer by year with comparison to 2009-2013 average

Year	Male			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	18			
2015	19	(6, 32)	6%	(-67%, 78%)
2020	21	(8, 34)	17%	(-56%, 89%)
2025	22	(8, 36)	22%	(-56%, 100%)
2030	24	(9, 39)	33%	(-50%, 117%)
2035	25	(10, 40)	39%	(-44%, 122%)

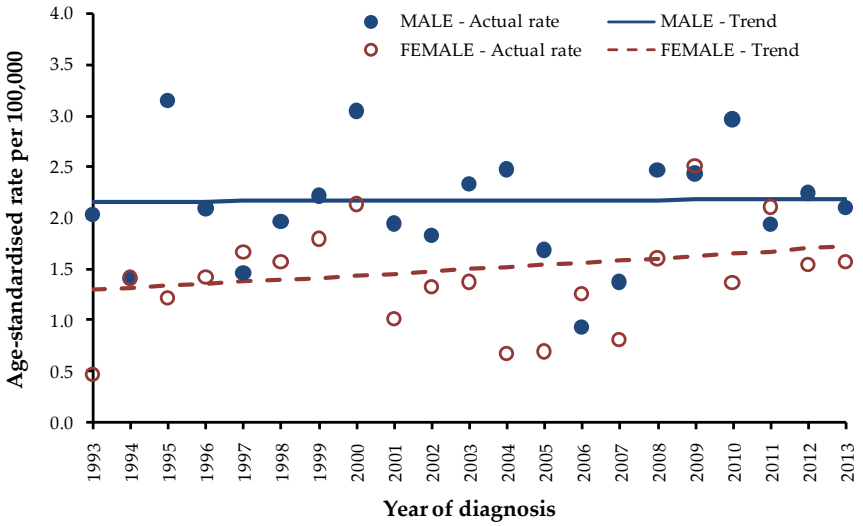
23.7: SMALL INTESTINE CANCER (C17)

An average of 38 cases (20 male, 18 female) of small intestine cancer were diagnosed each year during 2009-2013. It was the 23rd most common male and 24th most common female cancer diagnosed in this period making up 0.4% of all male and female cancers (ex. NMSC). The incidence rate of small intestine cancer was 2.2 cases per 100,000 males and 1.9 cases per 100,000 females.

Incidence trends

During 1993-2013 incidence of small intestine cancer rose from 22 to 38 cases per year. On average there was a 2.1% per year increase in male cases and a 2.6% per year increase in female cases.

Figure 23.13: Trends in small intestine cancer incidence rates by sex: 1993-2013



Incidence rates (adjusted for demographic change) increased by 1.4% per year among females during 1993-2013 although this was not a statistically significant (p=0.269) increase. Incidence rates among males remained static over the twenty-one year period. (Fig. 23.13)

Incidence projections

Compared to a baseline of 20 cases per year in 2009-2013, the number of male cases of small intestine cancer is expected to increase by 20% to 24 cases per year by 2020 and by 40% to 28 cases per year by 2035. Among women the number of cases is expected to increase by 17% from 18 to 21 cases per year by 2020 and by 50% to 27 cases per year by 2035. (Tab. 23.7, Fig. 23.14)

Figure 23.14: Small intestine cancer incidence projections to 2035 by sex

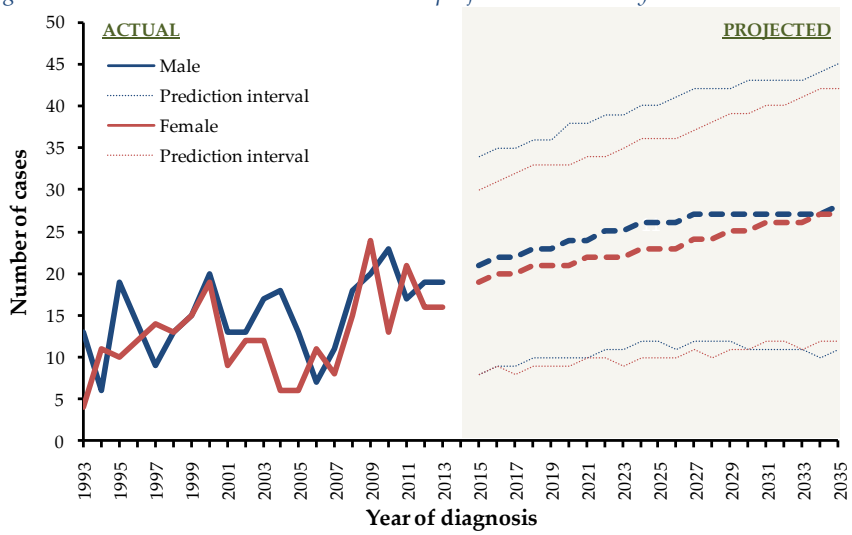


Table 23.7: Projected cases to 2035 for small intestine cancer by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	20				18			
2015	21	(8, 34)	5%	(-60%, 70%)	19	(8, 30)	6%	(-56%, 67%)
2020	24	(10, 38)	20%	(-50%, 90%)	21	(9, 33)	17%	(-50%, 83%)
2025	26	(12, 40)	30%	(-40%, 100%)	23	(10, 36)	28%	(-44%, 100%)
2030	27	(11, 43)	35%	(-45%, 115%)	25	(11, 39)	39%	(-39%, 117%)
2035	28	(11, 45)	40%	(-45%, 125%)	27	(12, 42)	50%	(-33%, 133%)

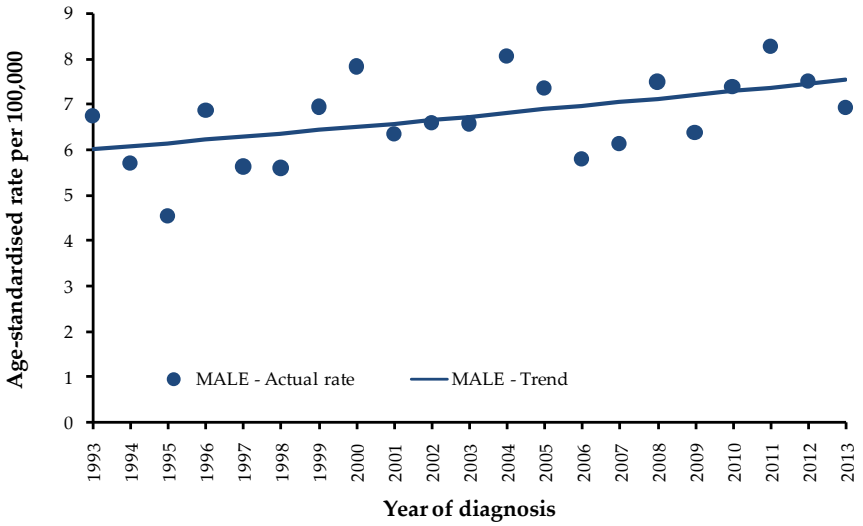
23.8: TESTICULAR CANCER (C62)

An average of 65 cases of testicular cancer were diagnosed among men each year during 2009-2013 in Northern Ireland. It was the 16th most common male cancer diagnosed in this period making up 1.5% of all male cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 7.3 cases diagnosed per 100,000 males.

Incidence trends

The number of cases of testicular cancer diagnosed among men increased from 48 cases per year in 1993-1997 to 65 cases per year in 2009-2013. On average there was a 1.7% per year increase in testicular cancer cases over the twenty-one year period.

Figure 23.15: Trends in testicular cancer incidence rates: 1993-2013



Incidence rates of testicular cancer (adjusted for demographic change) increased by 1.1% per year (p=0.021). (Fig. 23.15)

Incidence projections

Testicular cancer incidence rates are projected to continue to increase. As a result the number of cases diagnosed each year is expected to increase from 65 per year in 2009-2013 to 71 cases per year by 2020 and to 73 cases per year by 2035. Overall this is a 12% increase which is only related to increasing rates as testicular cancer is more common among younger men, the population of which is not expected to change significantly over the next twenty-two years (Tab. 23.8, Fig. 23.16)

Figure 23.16: Testicular cancer incidence projections to 2035

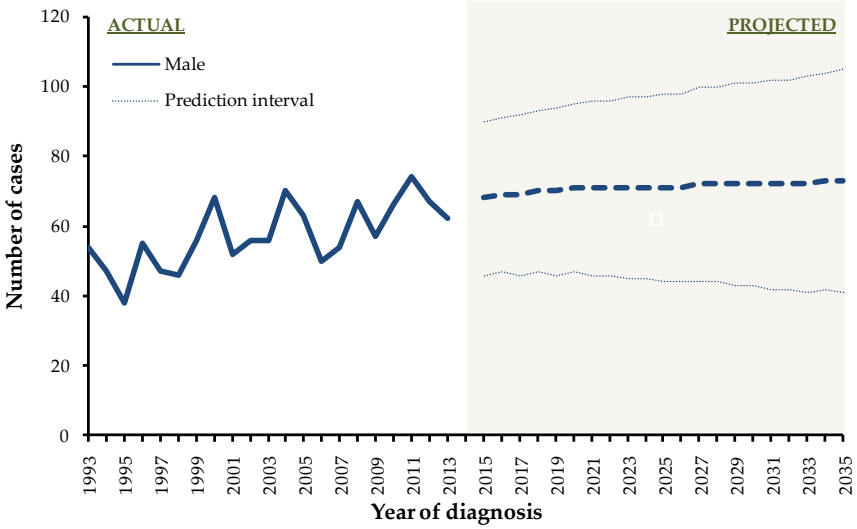


Table 23.8: Projected cases to 2035 for testicular cancer by year with comparison to 2009-2013 average

Year	Male			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	65			
2015	68	(46, 90)	5%	(-29%, 38%)
2020	71	(47, 95)	9%	(-28%, 46%)
2025	71	(44, 98)	9%	(-32%, 51%)
2030	72	(43, 101)	11%	(-34%, 55%)
2035	73	(41, 105)	12%	(-37%, 62%)

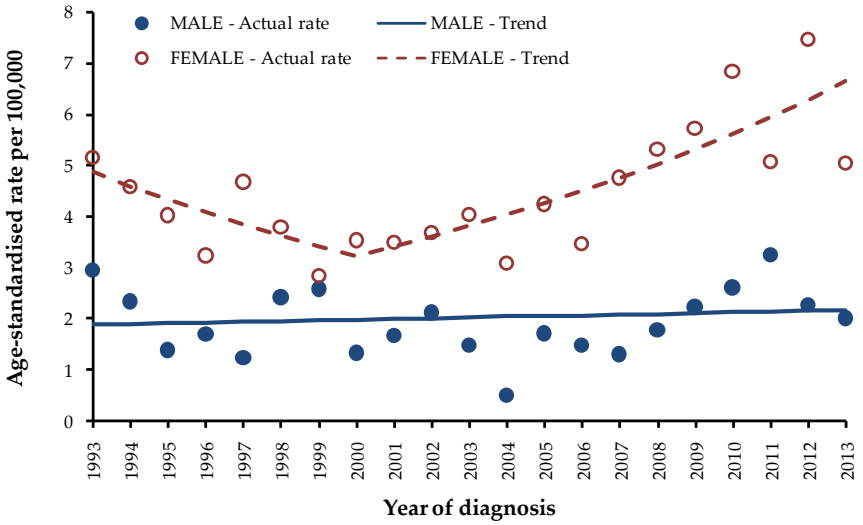
23.9: THYROID CANCER (C73)

There was an average of 78 cases (21 male, 57 female) of thyroid cancer diagnosed each year during 2009-2013. Among men thyroid cancer made up 0.5% of cancers (ex. NMSC), while among women it made up 1.3% making it the 16th most common female cancer. It is one of the few non gender specific cancers that was more common among women than men, with 2.4 cases diagnosed per 100,000 males compared to 6.2 cases diagnosed per 100,000 females.

Incidence trends

During 2009-2013 there were 78 thyroid cancers (21 male, 57 female) diagnosed each year compared to 48 cases (13 male, 35 female) in 1993-1997. The number of cases diagnosed each year increased by 2.2% per year among men during 1993-2013 and by 7.0% per year among women during 2000-2013.

Figure 23.17: Trends in thyroid cancer incidence rates by sex: 1993-2013



Thyroid cancer incidence rates did not change significantly among males during 1993-2013, however among women incidence rates increased by 5.8% per year (p<0.001) from 2000 onwards. (Fig. 23.17)

Incidence projections

The 21 male and 57 female cases of thyroid cancer diagnosed each year in 2009-2013 are projected to increase to 27 male and 80 female cases by 2020. By 2035 this is expected to increase further to 32 male and 112 female cases, a 52% increase among males and a 96% increase among females. (Tab. 23.9, Fig. 23.18)

Figure 23.18: Thyroid cancer incidence projections to 2035 by sex

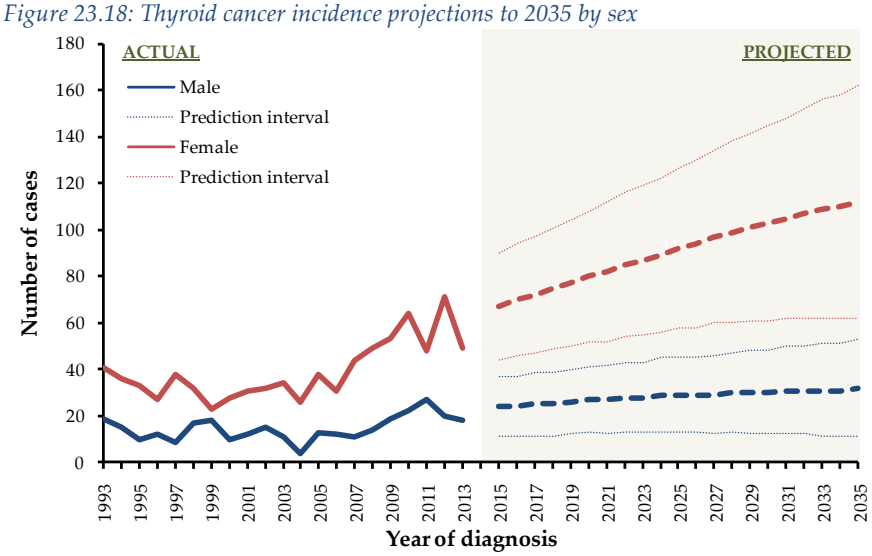


Table 23.9: Projected cases to 2035 for thyroid cancer by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	21				57			
2015	24	(11, 37)	14%	(-48%, 76%)	67	(44, 90)	18%	(-23%, 58%)
2020	27	(13, 41)	29%	(-38%, 95%)	80	(52, 108)	40%	(-9%, 89%)
2025	29	(13, 45)	38%	(-38%, 114%)	92	(58, 126)	61%	(2%, 121%)
2030	30	(12, 48)	43%	(-43%, 129%)	103	(61, 145)	81%	(7%, 154%)
2035	32	(11, 53)	52%	(-48%, 152%)	112	(62, 162)	96%	(9%, 184%)

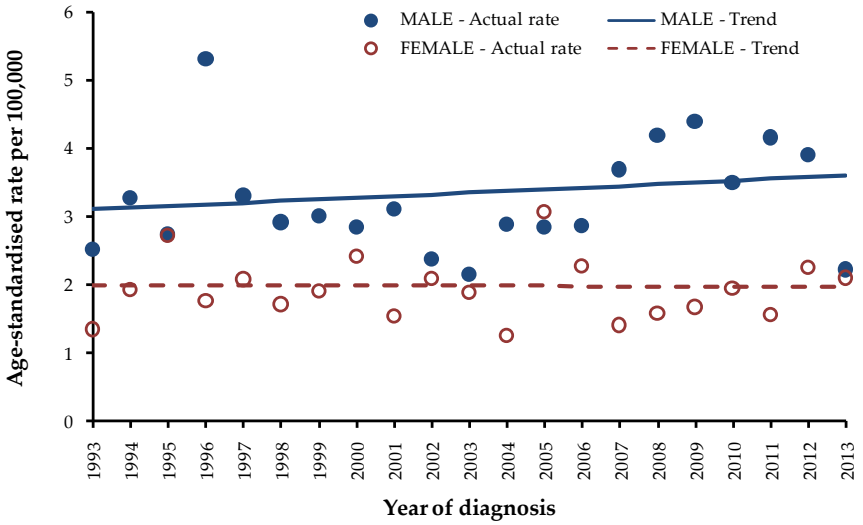
23.10: TISSUE CANCER (CONNECTIVE & SOFT TISSUE) (C47 & C49)

An average of 49 cases (30 male, 19 female) of tissue cancer (specifically cancer of the connective and soft tissues) were diagnosed each year during 2009-2013. It was the 21st most common male cancer diagnosed in this period making up 0.7% of all cancers (ex. NMSC), while it made up only 0.4% of female cancers (ex. NMSC) diagnosed making it the 23rd most common female cancer. There were 3.4 cases diagnosed per 100,000 males and 2.0 cases diagnosed per 100,000 females.

Incidence trends

During 2009-2013 there were 49 tissue cancers (30 male, 19 female) diagnosed each year compared to 40 per year (23 male, 17 female) in 1993-1997. On average the number of male cases increased by 2.1% per year during 1993-2013, with a 0.8% per year increase among women.

Figure 23.19: Trends in tissue cancer incidence rates by sex: 1993-2013



Tissue cancer incidence rates (adjusted for demographic factors) were static over time for both sexes with little change between 1993 and 2013. (Fig. 23.19)

Incidence projections

Compared to a baseline of 30 male and 19 female cases per year in 2009-2013, the number of cases of tissue cancer is expected to increase to 36 male and 20 female cases per year by 2020. Compared to the same baseline by 2035 there is expected to be a 57% increase in cases among men and a 21% increase among women with 47 male and 23 female cases expected per year. (Tab. 23.10, Fig. 23.20)

Figure 23.20: Tissue cancer incidence projections to 2035 by sex

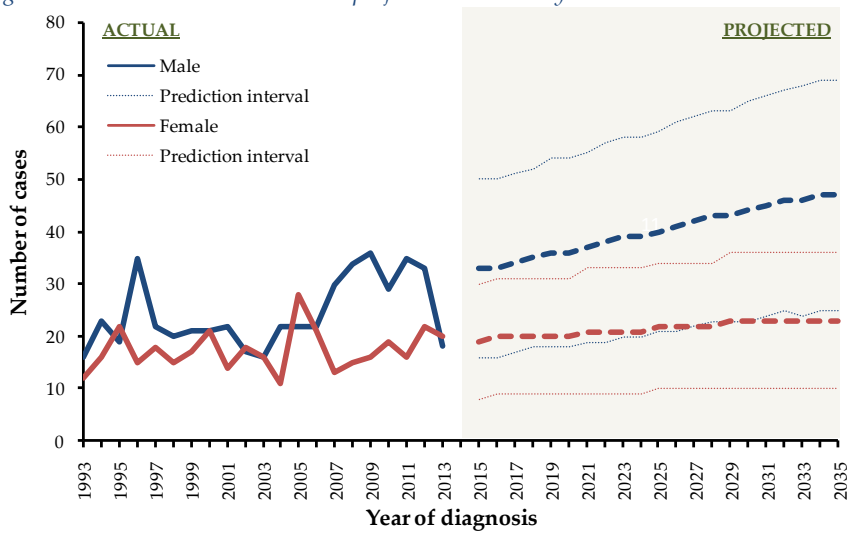


Table 23.10: Projected cases to 2035 for tissue cancer by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	30				19			
2015	33	(16, 50)	10%	(-47%, 67%)	19	(8, 30)	0%	(-58%, 58%)
2020	36	(18, 54)	20%	(-40%, 80%)	20	(9, 31)	5%	(-53%, 63%)
2025	40	(21, 59)	33%	(-30%, 97%)	22	(10, 34)	16%	(-47%, 79%)
2030	44	(23, 65)	47%	(-23%, 117%)	23	(10, 36)	21%	(-47%, 89%)
2035	47	(25, 69)	57%	(-17%, 130%)	23	(10, 36)	21%	(-47%, 89%)

23.11: VULVAL CANCER (C51)

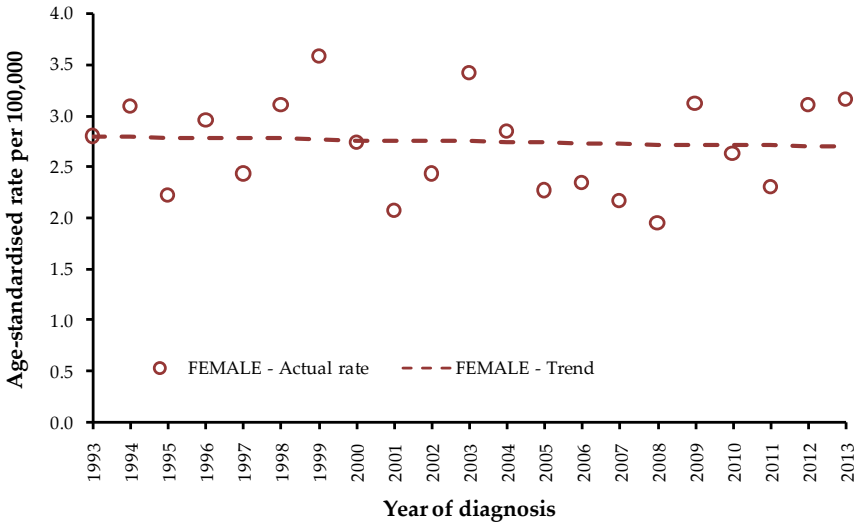
During 2009-2013 there was an average of 29 cases of cancer of the vulva diagnosed among women each year in Northern Ireland. It was the 21st most common female cancer diagnosed in this period. It made up 0.7% of all female cancers (ex. NMSC). As a proportion of the resident population in Northern Ireland there were 3.1 cases diagnosed per 100,000 females.

Incidence trends

Over the last twenty-one years incidence of cancer of the vulva increased from 23 cases per year in 1993-1997 to 29 cases per year in 2009-2013. On average vulval cancer cases increased by 0.9% per year during 1993-2013.

However incidence rates of vulval cancer (adjusted for demographic change) did not change significantly during 1993-2013. (Fig. 23.21)

Figure 23.21: Trends in vulval cancer incidence rates: 1993-2013



Incidence projections

Incidence rates of cancer of the vulva are projected to remain steady in the foreseeable future. However due to the growth and ageing of the female population the average number of cases diagnosed each year is expected to increase from 29 per year in 2009-2013 to 32 cases per year by 2020 and to 37 cases per year by 2035. Overall this is a 28% increase. (Tab. 23.11, Fig. 23.22)

Figure 23.22: Vulval cancer incidence projections to 2035

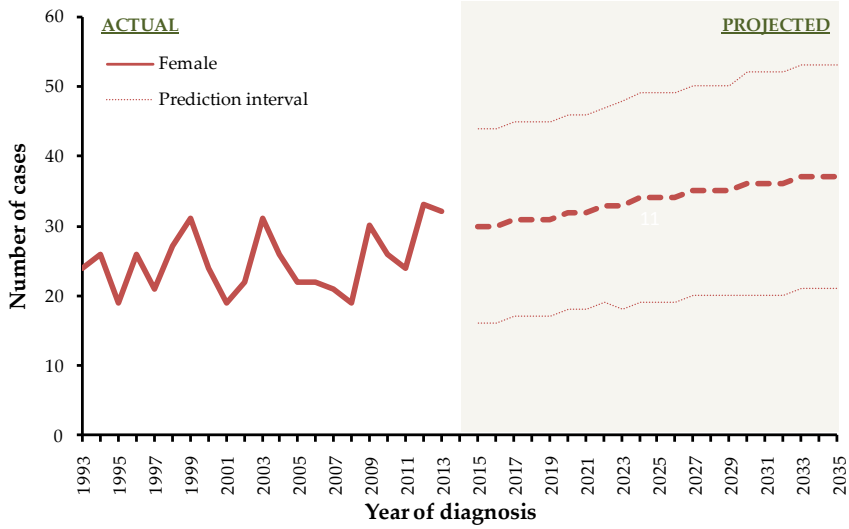


Table 23.11: Projected cases to 2035 for vulval cancer by year with comparison to 2009-2013 average

Year	Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	29			
2015	30	(16, 44)	3%	(-45%, 52%)
2020	32	(18, 46)	10%	(-38%, 59%)
2025	34	(19, 49)	17%	(-34%, 69%)
2030	36	(20, 52)	24%	(-31%, 79%)
2035	37	(21, 53)	28%	(-28%, 83%)

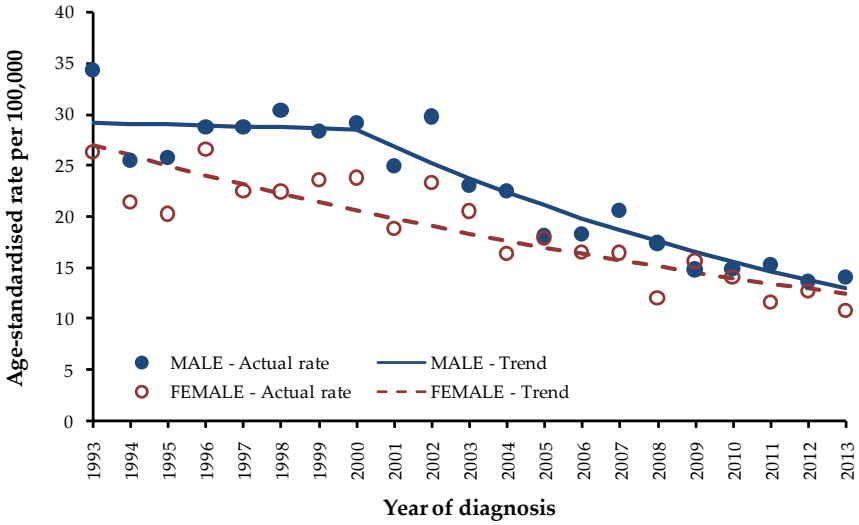
23.12: CANCER OF UNKNOWN PRIMARY (C76-C80)

Cancer of unknown primary represents a group of cancers where the exact primary source of the cancer cannot be identified due to the cancer being widespread at the time of diagnosis. An average of 249 cases (111 male, 138 female) were diagnosed each year during 2009-2013. It made up 2.5% of all male cancers (ex. NMSC) and 3.2% of all female cancers (ex. NMSC) diagnosed. There were 12.4 cases diagnosed per 100,000 males and 14.9 cases diagnosed per 100,000 females.

Incidence trends

On average the number of cases of cancer of unknown primary decreased by 4.1% per year for men during 2000-2013 and by 2.6% per year among women during 1993-2013.

Figure 23.23: Trends in cancer of unknown primary incidence rates by sex: 1993-2013



Incidence rates of this cancer decreased among males during 2000-2013 by 5.8% per year (p<0.001), while among women rates decreased by 3.8% per year (p<0.001) during 1993-2013. The reduction is likely related to improved diagnostic techniques reducing the proportion of cancers whose type is unknown. (Fig. 23.23)

Incidence projections

After 2013 the number of cases of cancer of unknown primary is expected to continue to drop. By 2020 the number of cases is expected to fall to 88 male and 121 female cases, while compared to 2009-2013 the number of cases is projected to decrease to 74 male and 106 female cases by 2035; a decrease of 33% for males and 23% for females. (Tab. 23.12, Fig. 23.24)

Figure 23.24: Cancer of unknown primary incidence projections to 2035 by sex

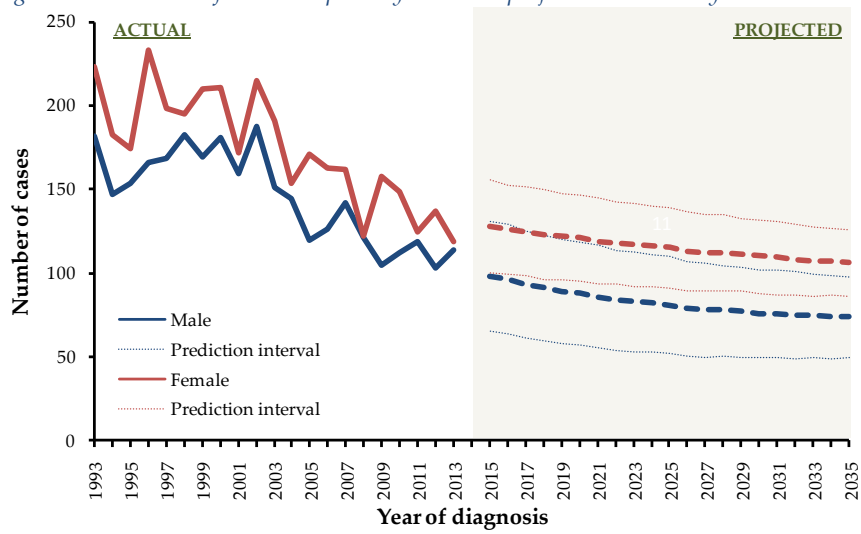


Table 23.12: Projected cases to 2035 for cancer of unknown primary by sex and year with comparison to 2009-2013 average

Year	Male				Female			
	Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)		Cases per year (prediction interval)		% change since 2009-2013 (prediction interval)	
2009-2013	111				138			
2015	98	(65, 131)	-12%	(-41%, 18%)	128	(100, 156)	-7%	(-28%, 13%)
2020	88	(57, 119)	-21%	(-49%, 7%)	121	(95, 147)	-12%	(-31%, 7%)
2025	81	(52, 110)	-27%	(-53%, -1%)	115	(91, 139)	-17%	(-34%, 1%)
2030	76	(50, 102)	-32%	(-55%, -8%)	110	(88, 132)	-20%	(-36%, -4%)
2035	74	(50, 98)	-33%	(-55%, -12%)	106	(86, 126)	-23%	(-38%, -9%)

24 DISCUSSION

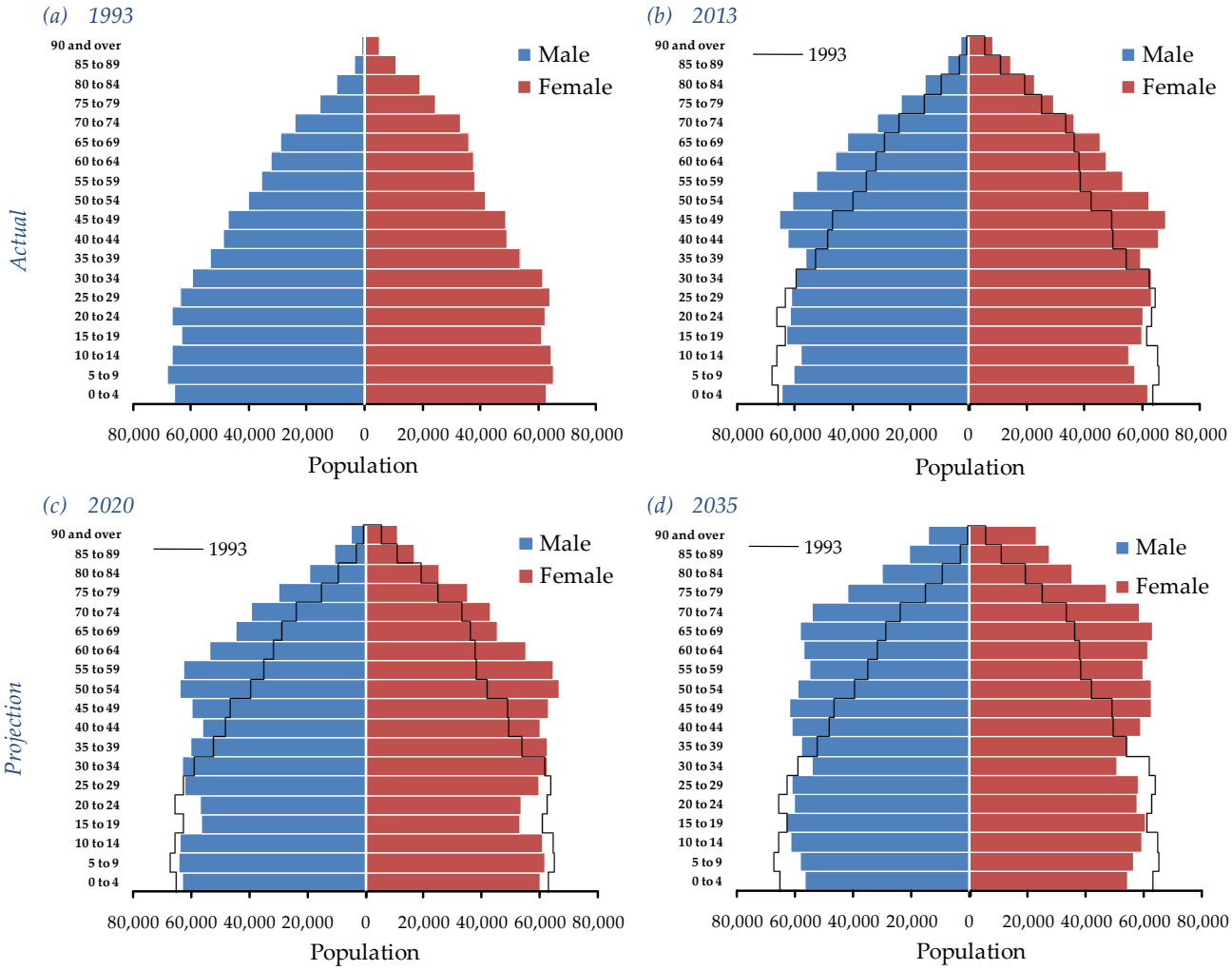
Within this report we have presented detailed data on cancer trends in Northern Ireland and used these trends along with population projections to derive estimates of cancer incidence up to the year 2035. The approach applied is widely used in making such types of predictions, however such approaches are limited as they rely heavily on the accuracy of population projections and upon the assumption that current cancer incidence trends will continue into the near future.

There are many factors that have influenced the historical trends in cancer incidence and thus also have the potential to influence the projections presented in this report. The four key elements influencing the trends include the size and age structure of the NI population, exposure to the risk factors for cancer within the general population, health service initiatives introduced that aim to either prevent or diagnose cancer early and the way in which cancers are classified.

24.1: DEMOGRAPHIC CHANGE

The most significant factor in the projected increase in cancer incidence is the growth of the population, particularly among the elderly. Since 1993 the population of Northern Ireland has increased by 11.9 per cent from 1.636 million to 1.830 million in 2013[3] with a further estimated increase of 9.2 per cent to 1.997 million by 2035[4]. However while the increase in the overall size of the population is important the change in the age distribution of this population is even more

Figure 24.1: Northern Ireland population by sex, age and calendar year



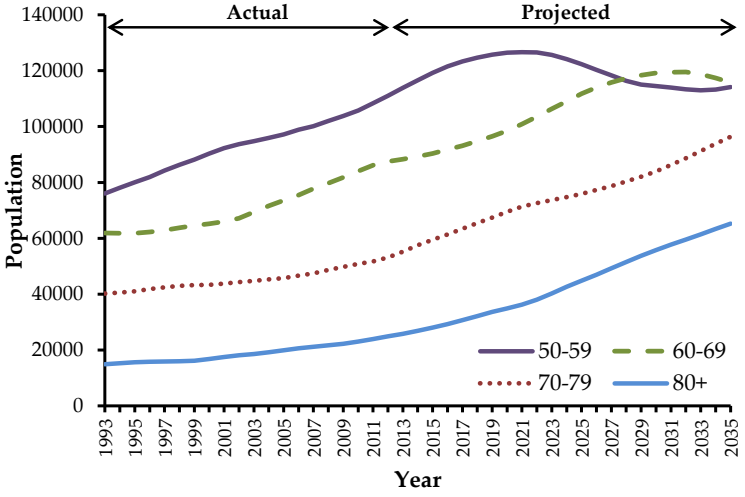
Source: NISRA[3] & ONS[4]

relevant from a cancer perspective as age is the primary risk factor associated with cancer. In 1993 the population was heavily skewed towards younger ages with only 26.8 per cent (males 24.2%, females 29.2%) of the population aged 50 or over, however by 2013 this had increased to 32.9 per cent (males 31.6%, females 34.2%)[3] and it has been estimated that this will increase further to 41.5 per cent (males 39.6%, females 43.3%)[4] by 2035. (Fig. 24.1)

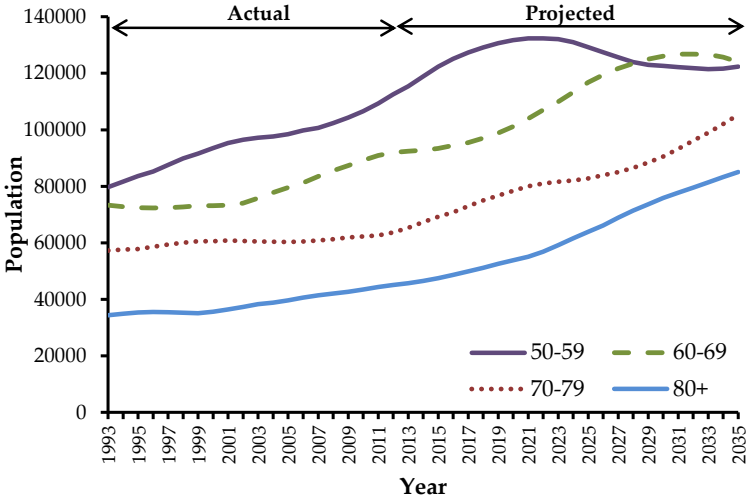
This change in distribution is due to the increase in the over 50 population, with the under 50 population estimated to remain virtually static. There were 1.198 million people aged under 50 resident in Northern Ireland in 1993 compared to 1.228 million in 2013[3], with a slight reduction to 1.169 million estimated by 2035[4]. In contrast in 1993 20,600 people were aged 85 and over. By 2013 this had increased to 33,300 people[3], an increase of 61.7 per cent, but it is projected to further increase by 155.7 per cent to 85,100 people by 2035[4]. This growth is also apparent in the 50-59, 60-69 and 70-79 age groups, although for those aged 50-59 the population is projected to stabilise at around 250,000 in 2020, while for those aged 60-69 the projected population stabilises at around 240,000 in 2030. (Fig. 24.2)

Figure 24.2: Northern Ireland population aged over 50 by sex, age and calendar year

(a) Males



(b) Females



Source: NISRA [3] & ONS[4]

While the increase in the over 50 population will not impact on the change in age-standardised rates (as these are adjusted for age and population size), it will have a significant impact on incidence of all cancer types with the exception of testicular cancer which rarely occurs among the elderly. Cervical cancer incidence will also be impacted to a much smaller degree as three quarters of these cancers occur among women aged under 50.

24.2: RISK FACTORS

Cancer can develop as a result of factors related to environment, lifestyle, and heredity. While our current understanding of the causes of cancer is incomplete, many avoidable risk factors that increase the possibility of getting cancer have been identified. These include:

- Tobacco use[5];
- Excessive alcohol consumption[6];
- Obesity and/or lack of physical activity[7];
- Lack of a balanced diet, in particular insufficient consumption of fruit and vegetables[8] or eating too much red or processed meat[9];

- Ultraviolet radiation from sunshine or sunbeds[10];
- Exposure to certain chemicals such as asbestos[11], arsenic and benzene[12];
- Exposure to ionising radiation or radon gas[10];
- Infections such as human papillomavirus[13], hepatitis B[14] or helicobacter pylori[15];
- Treatments such as exposure to oestrogen through hormone replacement therapy[16];
- Reproductive history including late or lack of reproduction in women and/or lack of breast feeding in women[17];

Of these avoidable factors some only increase the risk by a slight margin, while others, such as tobacco use, can increase the risk of getting particular cancers by a significant amount. These factors have the most potential to influence the cancer incidence trend.

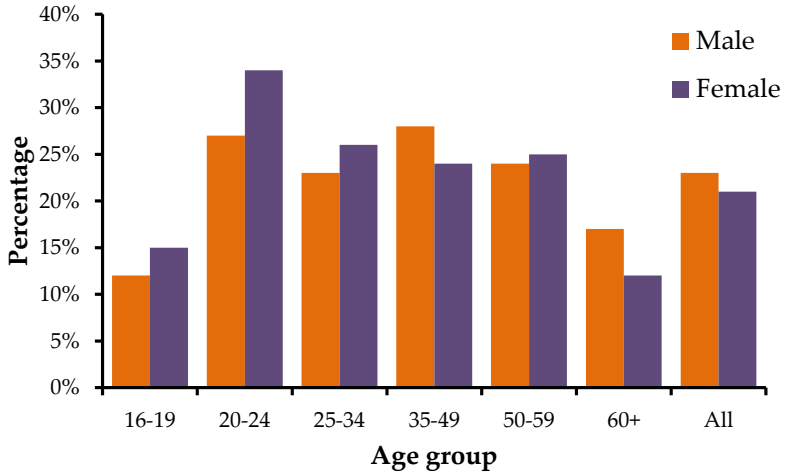
Tobacco use

Smoking is the most important preventable cause of cancer with almost one in five cancer cases in the UK caused by this habit[18]. It causes over 85 per cent of lung cancers[18] and increases the risk of many other cancers including laryngeal, oesophageal, oral, colorectal, kidney, bladder, stomach, liver, pancreatic, cervical and ovarian cancers and myeloid leukaemia[5].

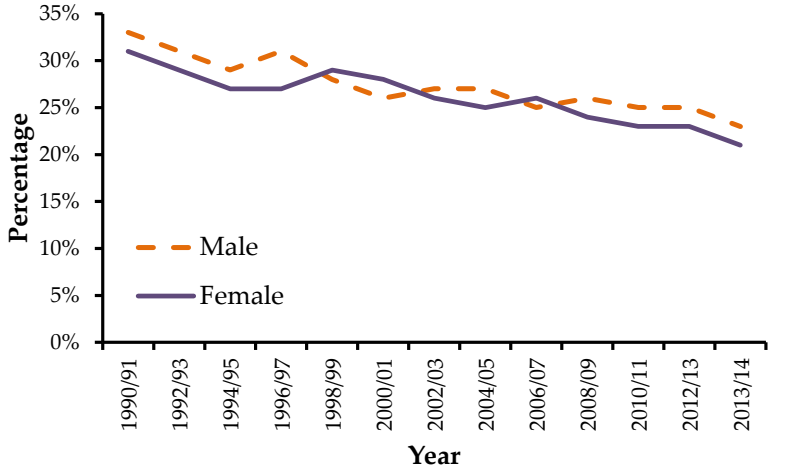
Among adults aged 16 and over 23 per cent of men and 21 per cent of women were current smokers during 2013/14. The prevalence of smoking was highest amongst those aged 20-24 (31%) and lowest amongst those aged 60 and over (13%)[20]. Since 1990/91 smoking prevalence has decreased from 32 per cent to 22 per cent with the decrease similar among men (33% to 23%) and women (31% to 21%). Over the last ten years, smoking prevalence declined from 27 to 23 per cent for males compared with 25 to 21 per cent for females[20] (Fig. 24.3).

Figure 24.3: Smoking prevalence in Northern Ireland

(a) By sex and age (2013/14)



(b) By sex and calendar year (1990/91 – 2013/14)



Source: Continuous Household Survey[19] / Health Survey Northern Ireland[20,21]

The overall reduction in smoking rates will potentially have an impact on cancer incidence trends, particularly for lung cancer. However it will be several decades before the smoking trend seen since the beginning of the 21st century is reflected in the lung cancer incidence rate trend. The current trend in lung cancer incidence likely reflects smoking prevalence in the 1980s when 39 per cent of men and 29 per cent of women smoked (1983 figures[19]) but over the next twenty years we can expect to see female lung cancer incidence rates begin to level out before starting to decrease, while male lung cancer incidence rates should at some point begin to decline again. Providing smoking prevalence continues to decline the

projections for lung cancer around 2035 presented in this report may be higher than might actually occur.

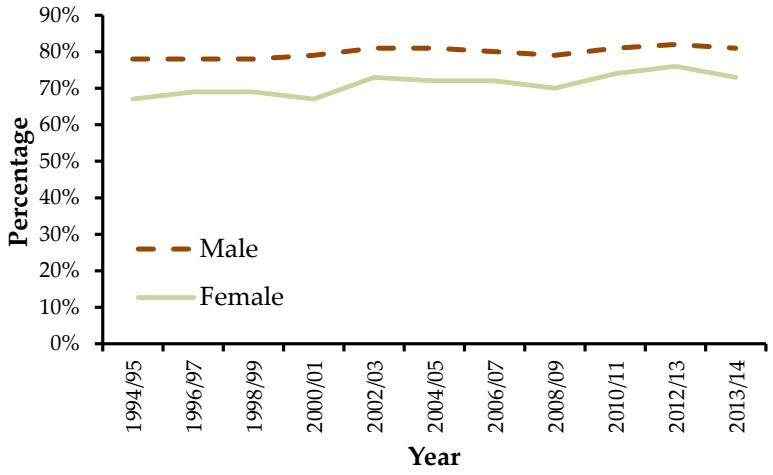
Alcohol consumption

Drinking alcohol elevates the risk of developing six types of cancer: oral, oesophageal, laryngeal, colorectal, breast and liver cancer[6]. The risk of developing these cancers varies by the amount of alcohol consumed[6], while the combination of alcohol and smoking can greatly increase the risk[6] Overall 4 per cent of cancers are estimated to be caused by alcohol, with between 20 and 30 per cent of oral, oesophageal and laryngeal cancers attributed to this factor[18].

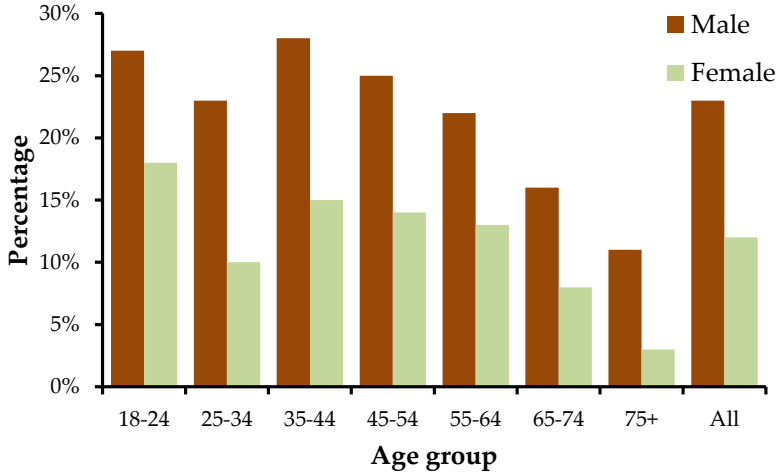
In 2013/14 almost four out of five adults aged 18 and over drank some alcohol within the previous week. This proportion was slightly higher for men (81%) than women (73%)[20], however while the percentage of the population who drank some alcohol remained fairly constant for men over time, it increased slightly for women[21]. (Fig. 24.4a)

Figure 24.4: Drinking prevalence in Northern Ireland

(a) Alcohol consumption by sex and calendar year (1994/95 – 2013/14)



(b) Drinking over recommended limit by sex and age (2013/14)



Source: Continuous Household Survey[19]/ Health Survey Northern Ireland[20,21]

More relevant to cancer development is excessive intake of alcohol. In 2013/14 just under one quarter of men (23%) and one in eight women (12%) exceeded the recommended limit (21 units per week for men and 14 units per week for women). This proportion varied slightly by age with older people less likely to drink excessively (Fig. 24.4b). Since 2011/12 the proportion of adults drinking above sensible weekly limits decreased from 19% to 16% in 2013/14, however longer term trends (since 2000/01) remained fairly constant[20]. Future trends in cancer incidence are thus unlikely to be impacted in a major way by variations in this risk factor.

Obesity

Approximately 5 per cent of cancers are linked to being overweight or obese making it the third most avoidable cause of cancer[18]. In particular rates of breast (post menopausal), colorectal, uterine, oesophageal, pancreatic, kidney and gallbladder cancer are all higher among people who are overweight or obese[7].

In Northern Ireland in 2013/14 just under one quarter of people (males: 25%, females: 23%) were obese with a further 37 per cent (males: 43%, females: 33%) classified as being overweight. These

proportions varied by age and gender, with men more likely to be overweight and the proportion of people of normal weight being lowest among those aged 55 to 74 (Tab. 24.1). Among children (ages 2-15) 7 per cent were obese and 18 per cent were overweight[21].

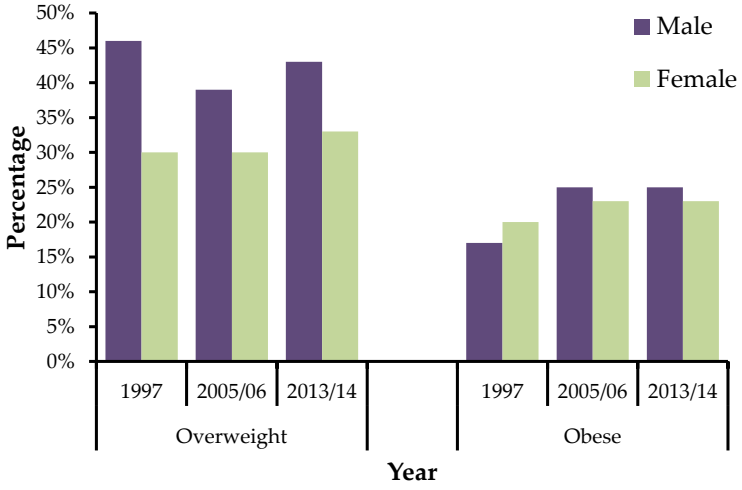
Table 24.1: Weight of adults (aged 18 and over) in Northern Ireland: 2013/14

	All persons	Gender		Age						
		Male	Female	16-24	25-34	35-44	45-54	55-64	65-74	75+
Underweight	1%	1%	1%	1%	2%	1%	0%	0%	1%	1%
Normal weight	38%	32%	42%	66%	43%	35%	29%	25%	26%	37%
Overweight	37%	43%	33%	23%	36%	41%	40%	42%	43%	39%
Obese	24%	25%	23%	10%	19%	23%	31%	33%	30%	23%

Source: Health Survey Northern Ireland[20,21]
Weight category assessed using Body Mass Index (BMI)

For both sexes the proportion of adults who were overweight in 2013/14 was similar to that in 1997 (males: 46%, females: 30%), however the proportion of adults that were obese increased for males from 17 to 25 per cent, while there was little change for women[20] (Fig. 24.5). The impact on incidence trends is difficult to assess but the current stability in female obesity levels is encouraging as it has the potential to reduce the rate of increase in incidence of obesity related cancers, such as uterine, kidney and breast cancer.

Figure 24.5: Overweight and obese adults (aged 18 and over) in Northern Ireland by sex and calendar year



Source: Health Survey Northern Ireland[20,21]

Lack of physical activity

Being physically active can help reduce cancer risk by reducing weight. However, physical exercise has other protective effects against cancer, particularly for colorectal, breast and uterine cancer[7], with 3 per cent of each of these cancers attributed to lack of physical exercise[18].

During 2013/14 just over half (53%) of adults took the recommended weekly amount (150min) of physical exercise; however there was a considerable difference between men and women (60% vs. 48%). The proportion taking the recommended amount decreased by age from 70 per cent among those aged 19-24 to 12 per cent among those aged 75 and over, with almost three quarters (74%) of those aged 75 and over taking less than 30 minutes of exercise per week[21]. (Tab. 24.2)

Table 24.2: Physical activity among adults (aged 19 and over) in Northern Ireland: 2013/14

Minutes of exercise per week	All persons	Gender		Age						
		Male	Female	19-24	25-34	35-44	45-54	55-64	65-74	75+
Less than 30	28%	23%	32%	10%	12%	15%	24%	35%	53%	74%
30-59	5%	5%	5%	4%	4%	5%	6%	6%	6%	5%
60-149	14%	12%	15%	16%	15%	14%	15%	15%	13%	9%
150 and over	53%	60%	48%	70%	69%	66%	56%	44%	28%	12%

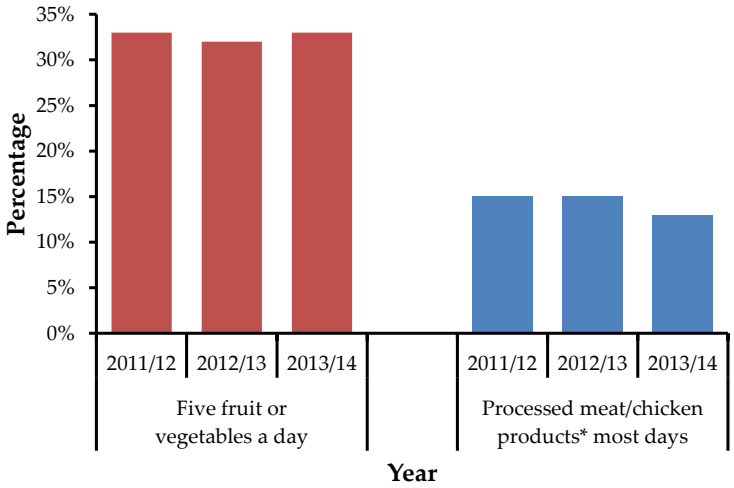
Source: Health Survey Northern Ireland[20,21]

Diet

A poor diet can increase cancer risk, not only because of the link with healthy body weight but through the beneficial nature of some types of food. In particular diets low in fibre or high in red and processed meat can increase colorectal cancer risk, while excessive salt intake increases stomach cancer risk. People with diets that are low in fruit or vegetable intake have an increased risk of developing oral, oesophageal, colorectal and laryngeal cancer[8,9]. Eating recommended levels of these foods, such as five portions of fruit and vegetables a day can thus have a protective effect against cancer[8].

Only one third (33%) of adults in Northern Ireland consumed five or more portions of fruit and vegetables in 2013/14 with females (37%) more likely than males (27%) to meet this recommendation. The overall proportion eating five or more portions of fruit or vegetables was constant over the last three years, however it represents an increase from 2005/06 when 27 per cent of adults met the recommendations[21] (Fig. 24.6).

Figure 24.6: Food consumption by adults (aged 16 and over) in Northern Ireland by calendar year



Source: Health Survey Northern Ireland[20,21]
Note: Only eating processed meat has been linked to cancer. There is no evidence that eating chicken elevates cancer risk.

Over the last three years there has been little change in the proportion who consume processed meat (including chicken products which are not linked to cancer) on most days (13% in 2013/14) (Fig. 24.6), however males were more likely than females (males: 19%, females: 10%) to consume these products[21].

UV exposure

Exposure to ultraviolet (UV) radiation, either naturally from the sun or artificially from sun beds is the primary cause of melanoma (and non-melanoma skin cancer). The risk increases with increasing levels of exposure, with a history of sunburn often considered to be a marker of high levels of UV exposure[10].

A history of sun burn was reported by 60 per cent of adults in Northern Ireland in 2008, with almost one quarter of adults (23%) reporting at least one sun burn event in the previous year. This was greater among men than women (males: 33%, females: 20%) and among younger than older people (aged 16-25: 39%, aged over 64: 5%)[22]. (Tab. 24.3)

Table 24.3: Sunburn occurrence among adults (aged 16 and over) in Northern Ireland: 2008

	All persons	Gender		Age			
		Male	Female	16-25	25-44	45-64	>64
In the past year	23%	33%	20%	39%	32%	17%	5%
One or more years ago	37%	31%	38%	27%	28%	40%	56%
Never	40%	36%	42%	34%	40%	43%	39%

Source: Boyle et al[22]

A history of sun bed use was reported by 20 per cent of adults in 2008, with the history of use greater among women than men (31% vs. 9%) and among those aged 25-44 (33%). Current use of sun beds however was greatest among those aged 16-24 (5%), with active use rare among those aged 45 and over[22]. (Tab. 24.4)

Table 24.4: Sun bed use by adults (aged 16 and over) in Northern Ireland: 2008

	All persons	Gender		Age			
		Male	Female	16-25	25-44	45-64	>64
Currently	1%	1%	2%	5%	2%	0%	0%
Previously	19%	8%	29%	19%	31%	16%	2%
Never	80%	92%	69%	76%	67%	84%	98%

Source: Boyle et al[22]

24.3: HEALTH SERVICE FACTORS

Public health initiatives which aim to reduce some of the discussed risk factors in the population have the potential to alter the trend in cancer incidence. These interventions however are likely to be long term and have a gradual impact. Other health service initiatives, however, based upon vaccination, screening and diagnostic improvements have the potential to impact on cancer incidence trends in a more dramatic way.

HPV vaccination

Nearly all cases of cervical cancer are related to infection by human papilloma virus (HPV), particularly types 16 and 18 which cause approximately 70 percent of cervical cancers, and types 6 and 11 which cause a further 20 per cent. To a lesser extent HPV can also cause other types of cancer including oral cancer and cancers of the vagina, vulva, penis and anus[13].

Girls aged 12 to 13 are offered a vaccination against HPV types 6, 11, 16 and 18, while girls up to the age of 18 can request vaccination if they weren't vaccinated at age 12 to 13. This vaccination has been available since September 2008, although prior to September 2012 only HPV types 16 and 18 were included[23]. Over the next decade cervical cancer incidence trends are likely to continue as projected, however the longer term projections for cervical cancer presented in this report may need revision once the first girls given the vaccination reach the age where they would have been at risk from developing cervical cancer if they had not received the vaccine. Once the benefits of this vaccination begin to become apparent a considerable reduction in the number of women who develop cervical cancer over the following twenty years should occur, potentially reducing the underlying incidence rates among those vaccinated by up to 90 per cent.

Screening

The use of specific medical tests or examinations on a population basis, known as screening, aims to detect cancer at an early stage or to identify it before it occurs. Screening programmes can thus influence cancer incidence trends upon their introduction or if they change their target population. Northern Ireland currently screens for three types of cancer:

- **Breast cancer** – From 2009 onwards offered to all women aged 50 to 70 every three years. Between 1989 and 2009 offered to women aged 50 to 64 every three years.
- **Cervical cancer** – From 2011 onwards offered to women aged 25 to 49 every three years, and to women aged 50 to 64 every five years. Between 1989 and 2011 offered to women aged 20 to 64 every five years.

- **Colorectal cancer** – Offered to all men and women aged 60 to 74 every two years. The programme was phased in by Trust from April 2010 onwards with the programme in operation in all Trusts by 2012[24].

Both the breast and cervical cancer screening programmes were in operation throughout Northern Ireland on or before 1993, with uptake rates and the target population only changing slightly over the last twenty-one years. Thus the impact on breast and cervical cancer incidence trends is likely to have been small although small fluctuations may have resulted from the changes in 2009 and 2011. There is therefore no indication that future trends will be heavily impacted by these screening programmes unless they change their method of operation.

The colorectal screening programme however only started in 2010 and may have an impact on bowel cancer trends in the next few years. Screening has the potential to impact trends in several ways:

- By identifying premalignant conditions, thereby allowing treatment which prevents cancer before it occurs. This would show as a drop in the underlying bowel cancer incidence rate;
- By over diagnosis (i.e. diagnosis of cancers that the patient would not have been aware of and would not have been life threatening). This would potentially result in an increase in the underlying bowel cancer incidence rate;
- By diagnosing bowel cancer earlier. This would temporarily increase the colorectal cancer rate, but it would be followed by a brief decrease before incidence rate trends would continue on their present course.

At this early stage none of these impacts can be clearly seen in the overall bowel cancer incidence trend with no noticeable change in rates among those aged 60-74 over the last few years. In England a similar screening method for 60-69 year olds has been in place since 2006. Colorectal cancer incidence rates among this age group in England increased slightly after screening was initially introduced, with a small decrease occurring by 2011 and an expectation that trends would continue as before screening was introduced[25]. Based upon this experience we have assumed that the current trend in colorectal cancer incidence in Northern Ireland will continue. However if significant levels of premalignant conditions are detected by the screening programme, thereby allowing treatment which prevents colorectal cancer before it occurs, then the projections presented are likely to need some revision.

PSA testing

A prostate-specific antigen (PSA) test is a blood test used to detect the PSA chemical produced by the prostate, thereby indicating men who have prostate cancer as PSA levels are often raised when a man has prostate cancer. Randomized controlled trials in the USA did not detect a survival benefit from PSA testing[26] while a European case control study reported a prostate cancer mortality reduction after almost nine years but with 1,410 men needing to be screened in order to save one life[27]. The use of the PSA test thus results in a considerable number of men being over diagnosed. While these men have genuine prostate cancers, these would not have been life threatening or caused clinical problems within a patient's lifetime and these men would not have been diagnosed with prostate cancer in the absence of a PSA test. Prostate cancer incidence trends are thus highly correlated with the use of PSA testing in a population[28].

Prostate cancer trends in Northern Ireland increased rapidly from 1998 to 2008 which coincides with the introduction of PSA testing. Since 2008 rates have been stable suggesting that PSA testing levels have also stabilised. The projections in this report have been based upon this assumption; however any future change in PSA testing levels has the potential to produce prostate cancer levels that deviate considerably from current future estimates.

24.4: CLASSIFICATION OF CANCERS

Cancers are classified using the tenth revision of the International Classification of Diseases[29] (ICD10). In addition cancer morphology is coded to the third revision of the International Classification of Diseases for Oncology[30] (ICD-O-3). Both of these are in wide use throughout the world in cancer registries; however they are subject to revision which can sometimes influence the trend in cancer incidence. The biggest change in the last twenty-one years occurred in 2006 when NICR moved from version 2 to version 3 of the ICD-O classification. While this resulted in many small changes that are unlikely to influence the trend between 1993 and 2013, two larger changes can be seen to have had an impact:

1. The reclassification of borderline ovarian tumours from being malignant ovarian cancer to being non-malignant, which lead to a reduction in ovarian cancer incidence.
2. The inclusion of myelodysplastic syndromes and myeloproliferative disorders as malignant cancer, which lead to an increase in the overall number of cancers registered.

In the analysis conducted we have attempted to reduce the impact of these reclassifications by excluding borderline ovarian tumours, myelodysplastic syndromes and myeloproliferative disorders from trend analysis.

In the future the next anticipated change to cancer classification will be an update of the International Classification of Diseases from version 10 (ICD10) to version 11 (ICD11)[31]. This revision is expected in 2017, however the impact of the introduction of this update, and the timing of its introduction to cancer registries is unknown. The potential impact on cancer incidence trends cannot yet be assessed.

24.5: PREDICTION ACCURACY

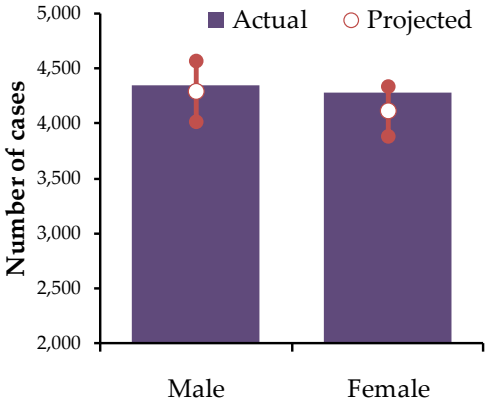
The methods for forecasting cancer cases used in this report are those that have been widely used in other countries. They are also based upon a continuous twenty-one year trend in cancer incidence which has a high level of completeness and consistency in classification and collection methodology. However a major limitation of the approach used is the assumption that current trends will continue in the future. While for most cancers this appears to have been a valid assumption over the last twenty-one years, there have been some cancers, such as prostate cancer and male lung cancer, which have seen a change in trend over that period of time as a result of changes in diagnostic approaches and risk factor exposure. While we have discussed these issues we have not fully been able to incorporate these factors into future projections. This is due primarily to lack of availability of data on cancer patient characteristics and life style choices. For example, despite its importance the smoking status of cancer patients is not always available to cancer registries, while population level data on such lifestyles is unavailable with survey data providing an imprecise substitute for use in forecasting. While data on diagnostic and screening factors is more readily available, these factors influence cancer incidence trends through strategic and policy change, with the timing, reasons, patients to be impacted and scale of the impact unknown beforehand making it impossible to incorporate them into any forecast model.

The choice of model used in this report is discussed in the methodology section (appendix 1). Naturally if a different model were used we would obtain a different set of projections. Given that this is the first cancer incidence projection report in Northern Ireland the choice of this model has been guided by work done in other countries. To provide some measure of reliability however we have used data from 1993 to 2007 to estimate data for 2009-2013 and have compared the results with the actual number of cases diagnosed in 2009-2013.

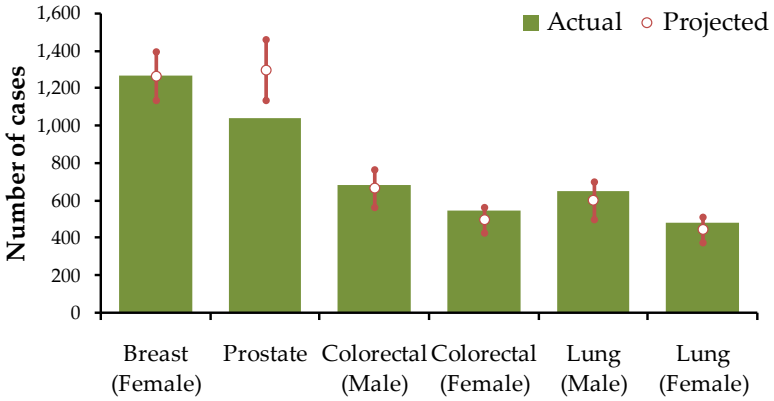
In general the projections are reasonably good. The actual average number of cancers (ex. NMSC) diagnosed each year for 2009-2013 is well within the prediction interval although the exact number of cases predicted is around 50 cases too low for men and around 150 cases too low for women. With regard to specific cancers, the projections are all within the prediction intervals except for prostate cancer. For this cancer the projections are too high as they are based upon increasing trends which were driven by increasing use of PSA testing. Since 2008 incidence rates have fallen slightly, probably due to PSA testing rates stabilising, a factor not accounted for in the forecast. (Fig. 24.7)

Figure 24.7: Comparisons between actual and projected cancer incidence made using data from 1993 to 2007: Average number of cases diagnosed per year in 2009-2013

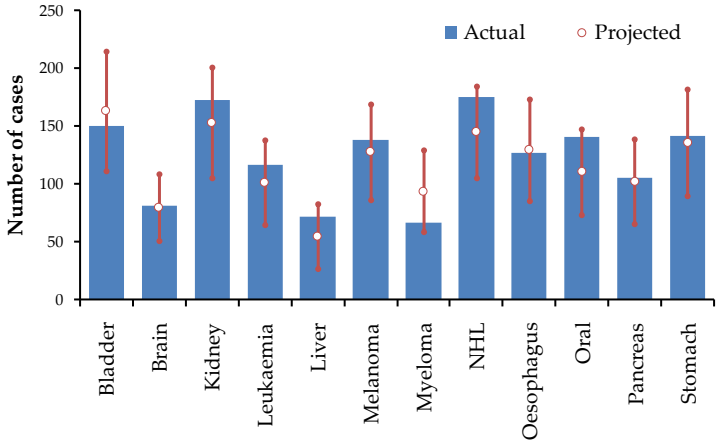
(a) All cancers (ex. NMSC)



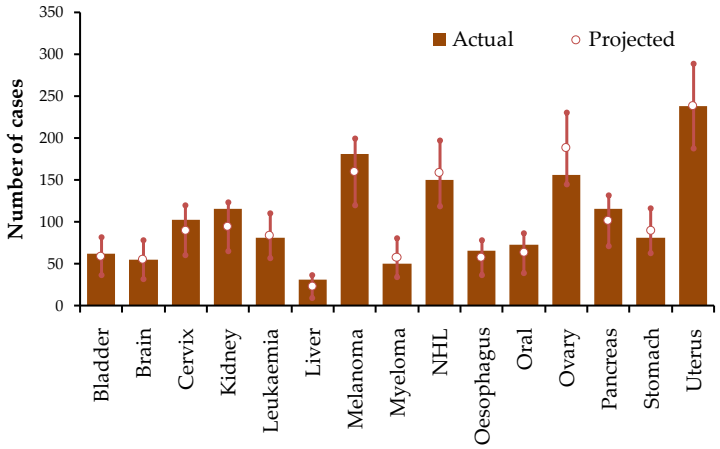
(b) Most common cancers



(c) Males – Less common cancers



(d) Females – Less common cancers



APPENDICES

A1 METHODOLOGY

A1.1: CANCER REGISTRATION

The Northern Ireland Cancer Registry (NICR) was established in 1994 and uses an automated computer system with multiple information sources to collate information on new diagnoses of cancer, with information collected for incidence from 1993 onwards. The three main sources for registration are the Patient Administration System (PAS) used by all the Hospital Trusts, pathology reports from Trusts and death notifications which are supplied by the General Register Office (GRO). From PAS the registry obtains demographic information such as age on individual patients along with basic site and behaviour information for each tumour. This information is supplemented by electronic downloads from histopathology and cytopathology laboratories. A major focus of the registry's operation work is on the verification of the information from a single hospital admission, a single pathology report or a single death certificate. Trained Tumour Verification Officers (TVOs) examine general practitioners' (GPs) notes for patients who have died from cancer, hospital records for cases identified without histopathology or cytology confirmation and pathology reports where there is conflicting information or other possible errors. In the event that no further information on death-initiated cases is obtainable, the record is included in the registry but flagged as a death certificate only (DCO) case. Only 0.45% of records in 2009-2013 (excluding non-melanoma skin cancer) were death certificate only cases.

Classification and coding

Cancer is coded to the tenth revision of the International Classification of Diseases (ICD10)[29]. The ICD10 codes used to classify each type of cancer used in this report are listed in table A.1. For some cancers particular subtypes of these cancers may be excluded for certain types of analysis (e.g. to maintain consistency in cancer classification over time). Any exclusions are noted in the text.

Table A.1: Classification of cancer type based upon ICD10 code

Cancer type	ICD10 code	Cancer type	ICD10 code
Bladder	C67	Non-melanoma skin	C44
Bone	C40 & C41	Oesophagus	C15
Brain (and other CNS)	C70-C72,C75.1-C75.3	Oral	C00-C14
Breast	C50	Ovary	C56
Cervix	C53	Pancreas	C25
Colorectal (Bowel)	C18-C21	Penis	C60
Eye	C69	Prostate	C61
Gallbladder (and other biliary)	C23 & C24	Small intestine	C17
Hodgkin's lymphoma	C81	Stomach	C16
Kidney (and other urinary)	C64-C66,C68	Testis	C62
Leukaemia	C91-C95	Thyroid	C73
Larynx	C32	Tissue (Connective & soft)	C47 & C49
Liver	C22	Uterus	C54 & C55
Lung	C33 & C34	Vulva	C51
Malignant melanoma	C43	Unknown primary	C76-C80
Mesothelioma	C45		
Multiple myeloma	C90	All cancers (ex. NMSC)	C00-C97 ex. C44
Non-Hodgkin's lymphoma	C82-C85	All cancers	C00-C97

CNS: Central Nervous System; NMSC: Non-melanoma skin cancer

A1.2: ADDITIONAL DATA

Population data

Throughout this report the population data for Northern Ireland for the years 1993 to 2013 are the mid-year population estimates produced by the Northern Ireland Statistics and Research Agency (NISRA)[3]. These population estimates are derived from census figures along with births, deaths and migration data to provide up to date estimates of the population of Northern Ireland.

The population projections used from 2014 to 2035 are produced by the population projections unit of the Office of National Statistics (ONS)[4] using the cohort component method. This method ages the previous year's population by one and incorporates net migration levels, fertility rates and mortality rates to estimate the next year's population for each sex and single year of age.

Geographic areas

NICR routinely collects address information, including postcode, allowing geographic areas to be assigned to records of cancer incidence. This is accomplished for each patient through an electronic process that uses the collected postcode along with a lookup file, known as the Central Postcode Directory (CPD)[32], which provides the relationship between each valid postcode in Northern Ireland and a range of higher geographic areas.

The key areas derived from the patient's postcode in this manner are Health and Social Care Trusts (HSCT), Local Government Districts (LGD), Electoral Wards and Super Output Areas (SOA - a small geographic area with a target population of around 2,000 people). Addresses with an unknown, incomplete or invalid postcode cannot be assigned higher geographic areas. However only a small proportion (0.3%) of records for cancers diagnosed in 2009-2013 could not be assigned to one of these areas.

Socio-economic deprivation

The income domain of the 2010 Northern Ireland multiple deprivation measure (NIMDM)[33] assigned a deprivation score to each Super Output Area (SOA) in Northern Ireland based upon the economic characteristics of all persons usually resident in that area. For the purposes of this report the SOAs were ranked according to this score and divided into quintiles, with quintile 1 containing the fifth of the population resident in the least deprived SOAs and quintile 5 containing the fifth of the population resident in the most deprived SOAs. Patients were then assigned a deprivation quintile based upon their SOA of residence which was derived for each patient based upon their postcode of residence.

The population data for these areas is derived from the SOA level population estimates[34], with the broad age groups split into five-year age groups based upon the distribution dictated by the 2011 Census[35]. Population estimates for these areas are only available from 2001 onwards, thus trend analysis of deprivation quintiles is restricted to the period from 2001 to 2013.

A1.3: STATISTICAL METHODS

Numbers of cases

The most common and useful measure of cancer levels in a population is the absolute number of cases (incidence) in a given year. It is these very basic figures that allow planning by the health service for each year and are the fundamental building blocks of any other analysis. However the number of diagnoses of cancer within a year compared to the size of the population of Northern

Ireland is relatively small. This can result in the number of events being studied fluctuating each year as a result of random factors, particularly when data are broken down by smaller geographic areas such as Trusts or demographics such as age. This requires the population to be observed over a number of years in order to present a stable value for the number of cases diagnosed. Other than the headline number of cases or those used in trend analysis, we thus use a five-year or ten-year annual average for the number of cases diagnosed in order to represent the situation at a given point in time rather than using data for a particular year.

Accuracy and rounding

The majority of values presented in this report are rounded to one decimal place with the exception of average numbers of cases that are rounded to the nearest whole number. All percentage values, calculations of differences, significance tests etc. however are calculated using the maximum number of decimal places available rather than the rounded figures available in tables. Totals and percentages presented in the body of the text may thus occasionally differ from those calculated directly from values presented in tables.

Unknown geographic values

In order to avoid an undercount in the number of cases due to the small proportion of cancer patients with an unknown HSCT of residence, the cases with an unknown geographic area are redistributed among the HSCTs according to the distribution of cases by known HSCT. In this way the sum of the cases in each HSCT adds to the NI total (with the exception of some differences caused by rounding). This approach, however, has the drawback of being based upon the assumption that missing values are not clustered in a particular geographic area. This method is also used for analysis of other geographic areas such as deprivation quintile.

Risk

The risk of developing cancer before a given age is calculated using the current probability method[36]. This method uses data on cancer incidence, population, cancer deaths and deaths from all causes by age to determine the likelihood of developing cancer before a given age. This method potentially overestimates risk where multiple primary tumours in the same patient are present in the data, thus only the first tumour of the cancer type being analysed is included in the calculation.

Incidence rates

While the absolute number of cases is useful for planning purposes these measures do not allow accurate comparison of populations of different size. A crude incidence rate compensates for this by presenting the number of cases per 100,000 members of the population and is based upon the ratio of events to members of the population.

Age-specific rates

Crude rates are not always the best measure for comparative purposes as there is a very strong relationship between cancer and age, thus a younger population is more likely to have a lower number of cancers than an older population of the same size. The most useful and easiest to calculate measure that compensates for differences in the age-structures of two populations is a set of age-specific rates, which are calculated in a similar manner to crude rates by considering the number of cases per 100,000 members of the population of a certain age group.

Age-standardised rates

The drawback of the use of age-specific rates is the large number of these that must be quoted in order to give a full picture of the cancer population being studied, particularly since five-year age-groups are the most commonly used age breakdown. In addition the small numbers involved can cause very noticeable fluctuations over time, even when several years' worth of data are used. A summary measure that allows for the changing or differing population age structure is an age-standardised rate. There are two methods of age-standardisation, indirect and direct. The indirect method, referred to as the standardised incidence ratio, provides a comparison of the incidence observed in a population (e.g. in a particular HSC Trust) relative to the incidence expected if the rate in this population was that same as that in a reference population (e.g. Northern Ireland). The direct method uses a standard population and presents a theoretical rate representing the number of cases diagnosed per 100,000 persons if the population in Northern Ireland had the same age-structure as this standard population. In this report the 2011 NI Census population[35] is used as the standard population.

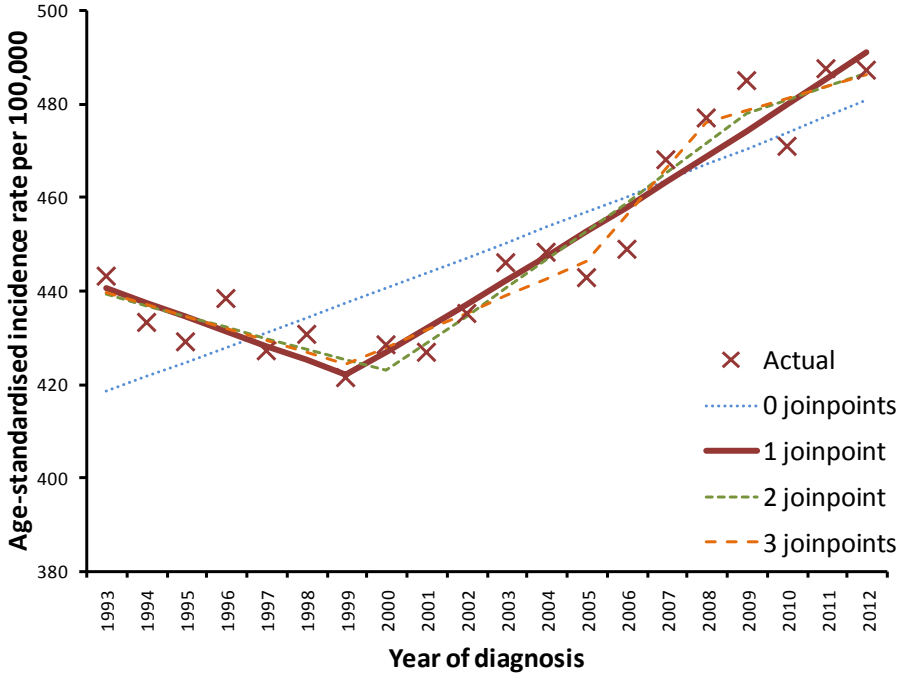
Trends in age-standardised rates

Trends in age-standardised rates are assessed by calculation of the annual percentage change (APCIR), which is the percentage increase or decrease per year in the age-standardised incidence rate. Due to fluctuations in rates over time it is not appropriate to select the rates corresponding to the beginning and end of the trend and calculate the percentage difference. Using an average over several years provides a better estimate; however a much better approach is through the use of curve fitting or regression.

Regression is a mathematical technique that allows a series of points in a trend to be estimated by a simple formula. In this case we are assuming that the logarithm of the age-standardised rate directly depends upon the calendar year so that when one is plotted on a graph against the other, a straight line results. This is known as a log-linear model and is a good fit for the data in addition to being commonly used in cancer incidence studies.

The calculation makes the assumption that the age-standardised rate increases or decreases at a constant rate over the period examined. While this is a reasonable assumption for incidence rates, it is not reasonable to assume that there is no change in the trend during the time period for which data exists. To investigate whether changes in trends occur during the years for which data exists the JoinPoint regression program developed by the US National Cancer Institute[37] was used. This software reads trend data and divides

Figure A1.1: Example of trend analysis using joinpoint regression (all cancers ex. NMSC)



In this example the addition of one joinpoint is statistically significant; however the addition of a second is not. Thus the results indicate a single change of trend in 1999.

the trend into an increasing number of separate sections, which are connected by points known as joinpoints. For each number of joinpoints (starting at 0) it fits the simplest model that the data allow up to a maximum number dictated by the user (with 3 selected for this report) giving a set of possible fits to the data (4 in the analysis in this report) ranging from the best possible fit using a straight line to the best possible fit using the maximum number of joinpoints. Statistical tests are conducted to assess whether the addition of joinpoints from one model to another is statistically significant thereby allowing the user to test whether an apparent change in trend is statistically significant. Figure A1.1 provides an example showing that the addition of one joinpoint in 1999 provides a much better fit to the trend in rates of cancer than the use of a single straight line. However the addition of further joinpoints provides very little benefit leading to the conclusion that a single change in trend direction occurred in 1999.

Incidence projections

In order to estimate cancer incidence in future years we make the assumption that the most recent trend will continue for the foreseeable future. However we allow for the fact that the trend may differ depending upon sex and age and thus utilise the trends for each sex separately in the following age groups: 0-49, 50-59, 60-69, 70-79 and 80+, with the start point of the trend taken to be that dictated by the joinpoint analysis detailed above.

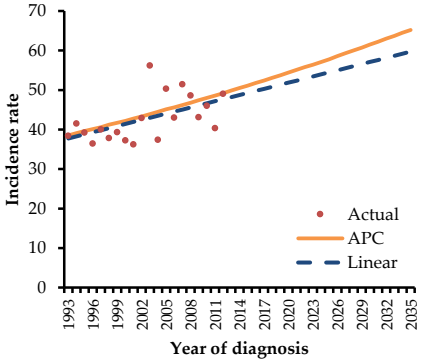
For each age group the number of cases diagnosed each year is fitted using a regression model which is based upon four factors:

- Year of diagnosis;
- Age at diagnosis, which is grouped into five-year intervals;
- Birth cohort, which is grouped into five-year intervals;
- The population at risk based upon sex, age and year. This is included as an exposure variable rather than a predictor of the annual number of cases which means that it is the incidence rate that is modelled rather than the actual number of cases.

The regression model used in the forecasting is that recommended by Moller et al[38]. They suggested that the age, period of diagnosis and birth cohort should have a linear relationship with the incidence rate which has been raised to the power of 0.2. This means that the change in incidence rates over time does not necessary follow a straight line but can curve slightly upwards or downwards. The model used is technically referred to as an age-period-cohort model using a power 5 link function (simplified to APC model). Some examples of the difference between this type of model and a simple linear model are illustrated in figure A1.2. As can be seen in some scenarios the growth predicted by the APC model for some cancer site, sex and age combinations

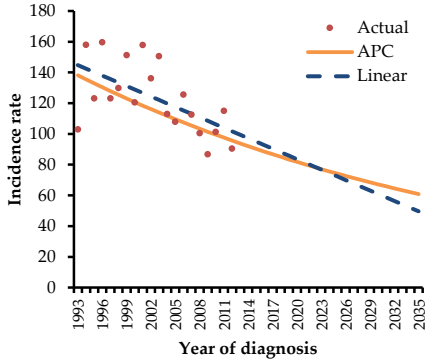
Figure A1.2: Examples of fitting incidence rate data with linear and APC models

(a) Uterine cancer – females aged 50-59



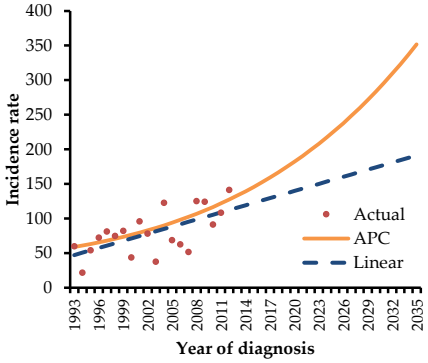
APC model curves slightly upwards compared to the linear model

(b) Stomach cancer – males aged 70-79



APC model curve begins to level out while the linear model will eventually reach zero

(c) Melanoma – males aged 80+



APC model demonstrates unrealistic growth in incidence rates

are unrealistic (Figure A1.2c). These scenarios are rare and usually only occur whenever there has been an unusual period of growth which is unlikely to be sustained or where the number of cases upon which the trend is based is very small. To avoid unrealistic forecasts a reduction in the growth component of the projection is applied. In similar studies the growth was halved after a ten year period[38]. However tests using Northern Ireland data from 1993-2007 to predict the number of cases in 2009-2013 (see section 24.5) showed this to be too conservative and we have halved the growth component over twenty years instead.

The fitted APC model is used to project forward for each age group and year to provide estimates of the age-specific incidence rates for future years. The projected rates are then multiplied by the population projections for that age group to give an estimate of the number of cases in future years. They are then summed to give an estimate for all ages, and are also used in combination with a standard population to give a projection for the age-standardised rate.

As with any form of forecast there is an element of uncertainty associated with the future estimates which needs to be quantified. Prediction intervals are thus provided which are based upon a combination of the natural variation found in incidence rates plus the errors associated with model predictions. The standard error for the former is derived using the same methodology as for any age-standardised rate, while the later is based upon the standard error of the rate prediction from the regression model. The resulting prediction interval is a more realistic guide to future incidence rather than the exact value presented for a particular year.

Confidence intervals and statistical significance

As with all other statistical measures age-standardised incidence rates, standardised incidence ratios and annual percentage changes are only estimates of the true value, as uncertainty exists due to random fluctuations in the number of events occurring over a period of time. In order to quantify this uncertainty 95% confidence intervals are calculated to indicate the range within which there is a 95% probability that the true value is likely to fall. The size of the confidence intervals depends upon the number of events and the size of the population within which they occur, with measures made up of a small number of observations within a large population being less stable and having large confidence intervals.

Measures for two different time periods or population groups are considered to differ only if the 95% confidence intervals for the two measures do not overlap. Alternatively, in the case of annual percentage changes, the change is considered to be an increase or decrease only if the confidence interval does not include 0. This is known as statistical significance and for significant differences the level of certainty about any difference can be quantified by calculating the p-value. This measure provides the probability that any difference observed between two measures is due to chance. Thus a p-value of 0.05 indicates a 95% probability that differences are genuine and not a result of random factors. For the trend analysis we have presented the p-value for each annual percentage change to allow identification of trends that are close to being statistically significant.

A2 Glossary Of Terms

Age-period-cohort model: A mathematical model that relates the incidence rate of cancer to a patient's age at diagnosis, period of diagnosis and period when born.

Age-specific rate: The rate that an event occurs per 100,000 persons of a particular age class.

Age-standardised rate (ASR): The rate per 100,000 persons that has been adjusted to take account of different age structures between geographic areas or time periods by adopting a reference population. It thus represents the incidence rate within a population which has the same age structure as the reference population.

Annual percentage change: The percentage increase or decrease per year in the age-standardised incidence rate.

Behaviour: The manner in which a tumour acts, i.e. benign, in situ or malignant.

Cancer: A disease resulting from the breakdown in the normal growth of body cells as a result of faults or damage to the genes that control for cell growth.

Cancer registry: An organisation that collects comprehensive information on all new cases of cancer occurring in a defined population.

Cancer site: The body place that a cancer originates in, e.g. lung, breast or prostate.

Confidence interval: The range of values calculated to have a specified (usually 95%) probability of containing the true value of an observation. Thus the 95% confidence interval for a rate is the range of values within which there is a 95% probability of finding the true value for the rate.

Death certificate only: A cancer registration that comes solely from a death certificate.

ICD10: The tenth edition of the International Classification of Diseases and Related Health Problems, which is published by the World Health Organisation (WHO). It provides a detailed description of known diseases and injuries and is used in the production of morbidity and mortality statistics.

Incidence: The number of new cases of a cancer diagnosed in a particular period for a particular population.

Local Government District: A geographic area in Northern Ireland defined for Local Government purposes. There are currently 11 Local Government Districts in Northern Ireland. These areas are sometimes referred to as District Councils.

Malignant tumour: A cancerous tumour that can invade and destroy nearby tissue and spread to other parts of the body.

Median: The middle value of a set of observations that has been ordered.

Mid-year population estimate: An estimate of the population in a region. Population estimates are based upon the number of births, deaths and migration flows for regions that have occurred since the last population census.

Morphology: The type of cell affected by cancer.

Mortality: The number of deaths from a particular cause for a particular period of time and population.

Pathology: The identification of cancer through the examination of organs, tissues and bodily fluids. Diagnosis of cancer is usually made through microscopic examination of whole tissues (histopathology) or individual cells or tissue fragments (cytopathology).

Population projection: An estimate of the population in Northern Ireland in future years. It is calculated for each sex and age using the cohort component method.

P-value: The probability of an event occurring given a null hypothesis is true. In any statistical tests in this report the null hypothesis is taken to be that there is no difference between two mean values or rates. A small p-value (typically less than 0.05) suggests that the two means or rates tested are significantly different. In this case the result is called statistically significant.

Quintile: One of five groups of equal size into which the population is divided, with the division depending upon the value of a particular variable (e.g. relative deprivation levels).

Screening: A method of checking for the presence of disease when there are no signs or symptoms.

Statistically significant: A difference between two values that has a low probability (typically less than 5%) of being a result of a random occurrence.

Super Output Area: A small geographic area derived at the time of the 2001 Census (with slight modifications in 2011) with a target population of around 2,000 people.

Tumour: An abnormal mass of tissue resulting from uncontrolled cell growth and causing a swelling in the body. Tumours may have one of four behaviours: benign, in situ, uncertain or malignant.

A3 ABBREVIATIONS

APC	Age-Period-Cohort
APCIR	Annual Percentage Change in Incidence Rate
ASIR	Age-Standardised Incidence Rate
BMI	Body Mass Index
CI	Confidence Interval
CNS	Central Nervous System
CPD	Central Postcode Directory
GP	General Practitioner
DCO	Death Certificate Only
GRO	General Registrar Office
HPV	Human Papilloma Virus
HSC(T)	Health and Social Care (Trust)
ICD	International Classification of Diseases
ICD-O	International Classification of Diseases for Oncology
LGD	Local Government District
NHL	Non-Hodgkin's Lymphoma
NHS	National Health Service
NI	Northern Ireland
NICR	Northern Ireland Cancer Registry
NIMDM	Northern Ireland Multiple Deprivation Measure
NISRA	Northern Ireland Statistics and Research Agency
NMSC	Non-Melanoma Skin Cancer
ONS	Office for National Statistics
PAS	Patient Administration System
PSA	Prostate Specific Antigen
SOA	Super Output Area
TVO	Tumour Verification Officer
UK	United Kingdom
UV	Ultraviolet

A4 FURTHER INFORMATION

Further information on cancer in Northern Ireland is available from the Northern Ireland Cancer Registry.

NI Cancer Registry
Centre for Public Health
Mulhouse Building
Grosvenor Road
Belfast
BT12 6DP

Phone: +44 (0)28 9063 2573
e-mail: nicr@qub.ac.uk
web:www.qub.ac.uk/nicr

A4.1: OTHER RESOURCES

Statistical information

Cancer information for United Kingdom

- National Cancer Intelligence Network (NCIN) - *www.ncin.org.uk/home*
- Office for National Statistics (ONS) - *www.ons.gov.uk/ons/taxonomy/index.html?nscl=Cancer*
- Scottish Cancer Registry - *http://www.isdscotland.org/Health-Topics/Cancer/Scottish-Cancer-Registry/*
- Welsh Cancer Intelligence and Surveillance Unit - *http://www.wcisu.wales.nhs.uk/home*
- Cancer Research UK (CRUK) - *www.cancerresearchuk.org/cancer-info/cancerstats/*

Cancer information for Republic of Ireland

- National Cancer Registry, Ireland (NCRI) - *www.ncri.ie*

Global incidence and survival of cancer

- International Agency for Research on Cancer (IARC) - *www-dep.iarc.fr*
- European Cancer Registry (EUROCARE) - *www.eurocare.it*

Other Northern Ireland Resources

- Cancer waiting times - Department of Health, Social Services and Public Safety (DHSSPSNI) *www.dhsspsni.gov.uk/index/statistics/hospital/waitingtimes/cancer-waiting-times.htm*
- Cancer screening programmes - NI Quality Assurance Reference Centre (QARC) *www.cancerscreening.hscni.net*

Information on cancer

- NI Cancer Network (NICaN) - *www.cancerni.net*
- NHS Choices - *www.nhs.uk/conditions/Cancer/Pages/Introduction.aspx*
- Cancer Focus - *www.cancerfocusni.org*
- Macmillan cancer support - *www.macmillan.org.uk*
- Cancer Research, UK - *www.cancerresearchuk.org*
- Action Cancer - *www.actioncancer.org*

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